PHILCO RADIO MODEL B570, CODE 122

SPECIFICATIONS

CABINET	Molded plastic
CIRCUIT	Four-tube superheterodyne (plus rectifier)
FREQUENCY RANGE	
Standard Broadcast	540 kc. to 1620 kc.
AUDIO OUTPUT	1 watt
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	12BE6 converter, 12BA6 i-f amplifier, 12AV6 det.—a.v.c.-1st audio, 35C5 output, 35W4 rectifier

MODEL B570, CODE 122

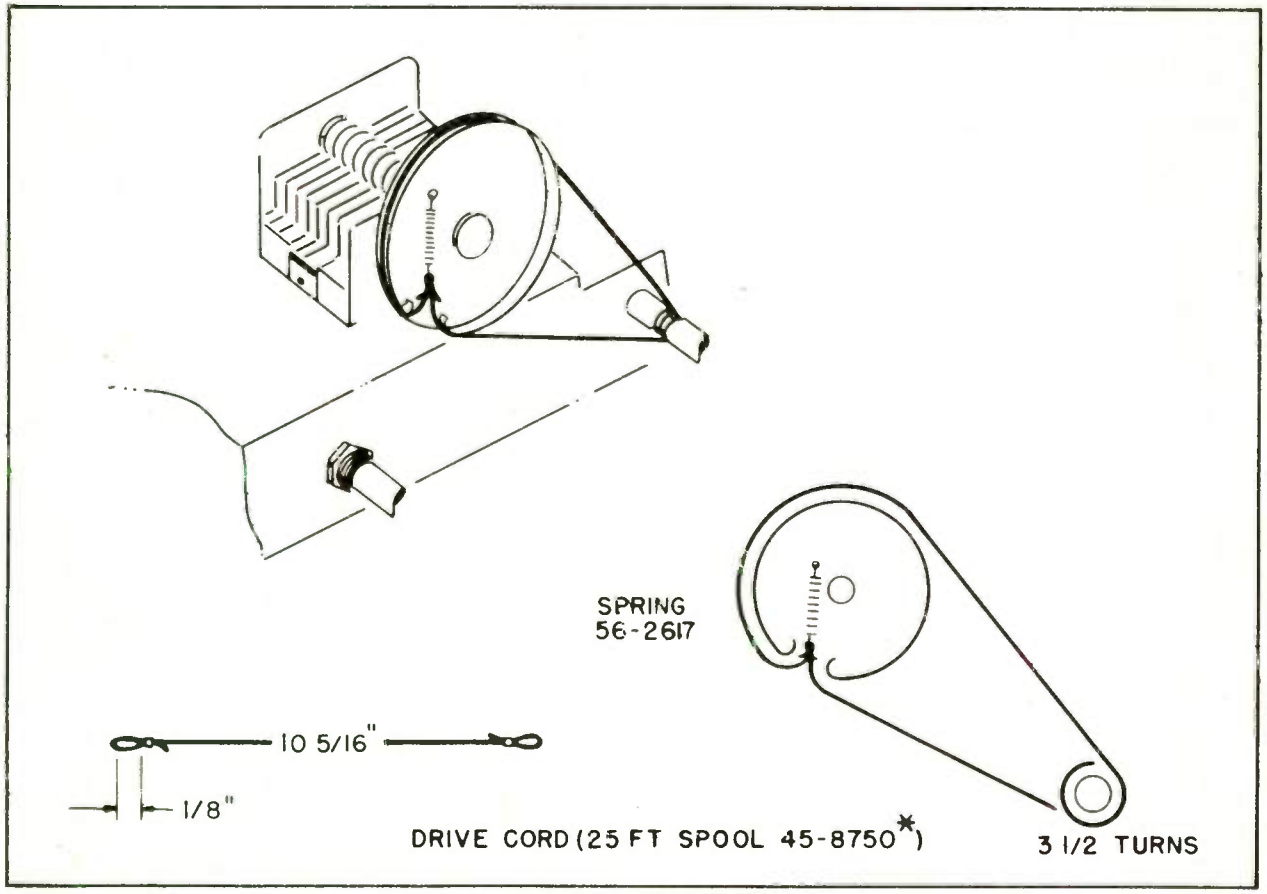

Figure 1. Dial-Cord Installation Details

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.

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
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 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—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.

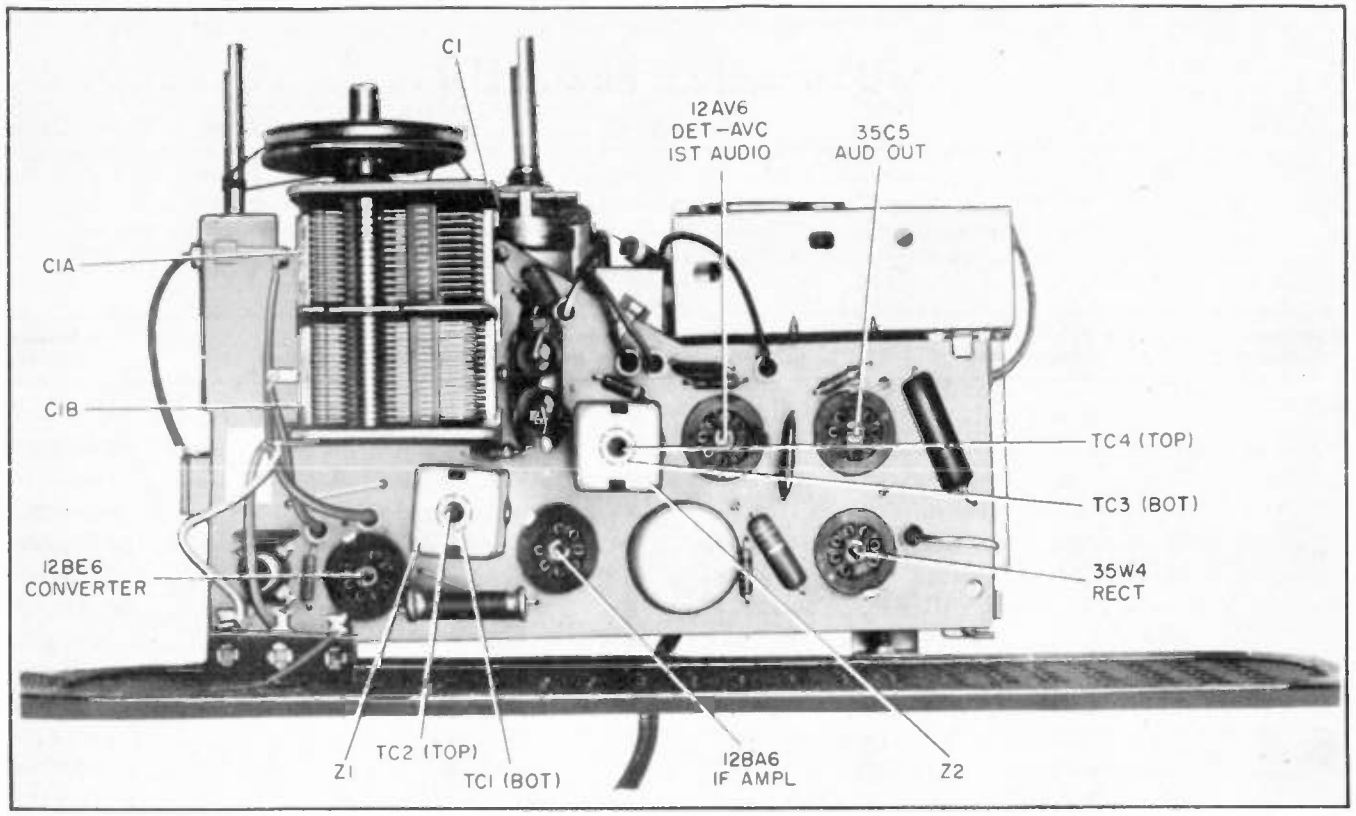

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Figure 2. Top View, Showing Trimmer Locations

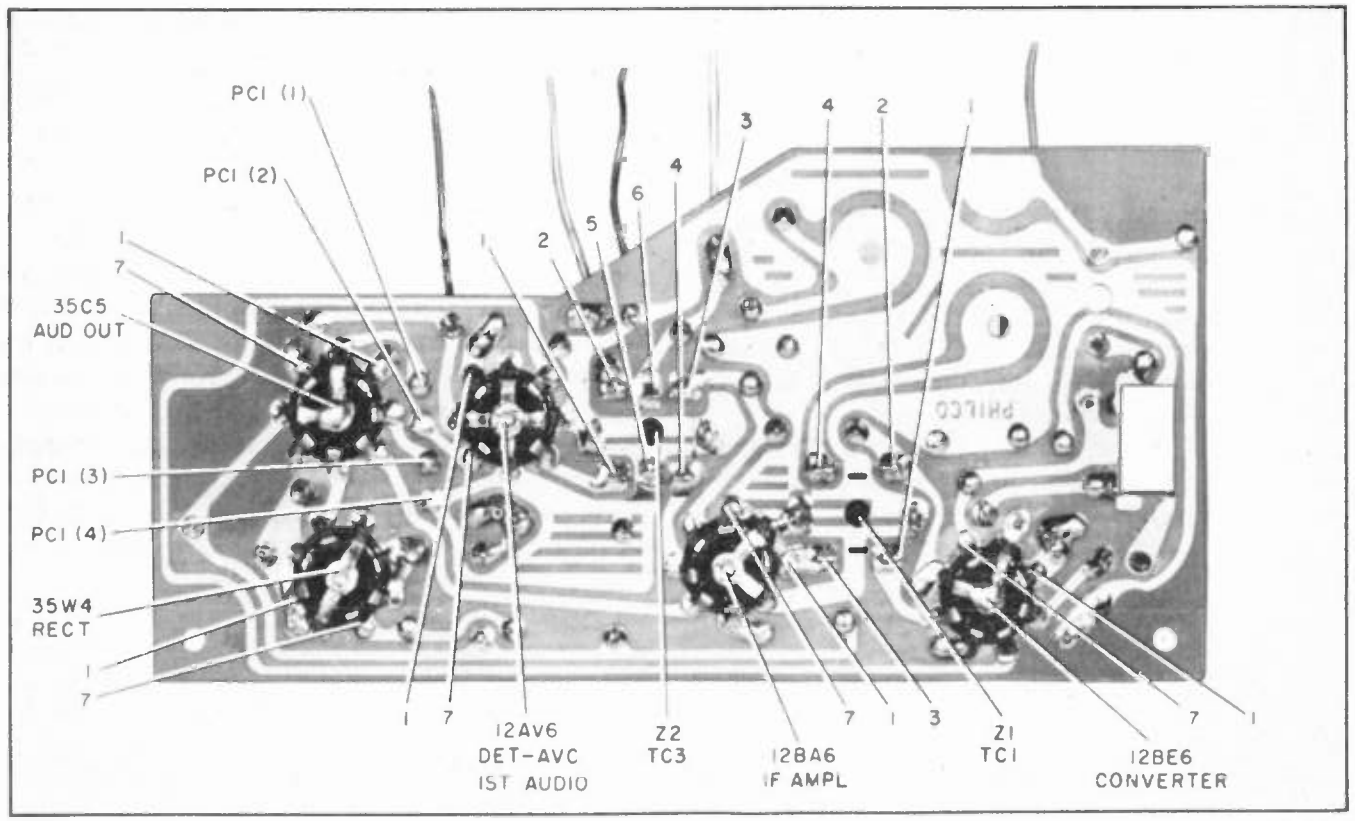

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Figure 3. Base View, Showing Printed Wiring Circuit

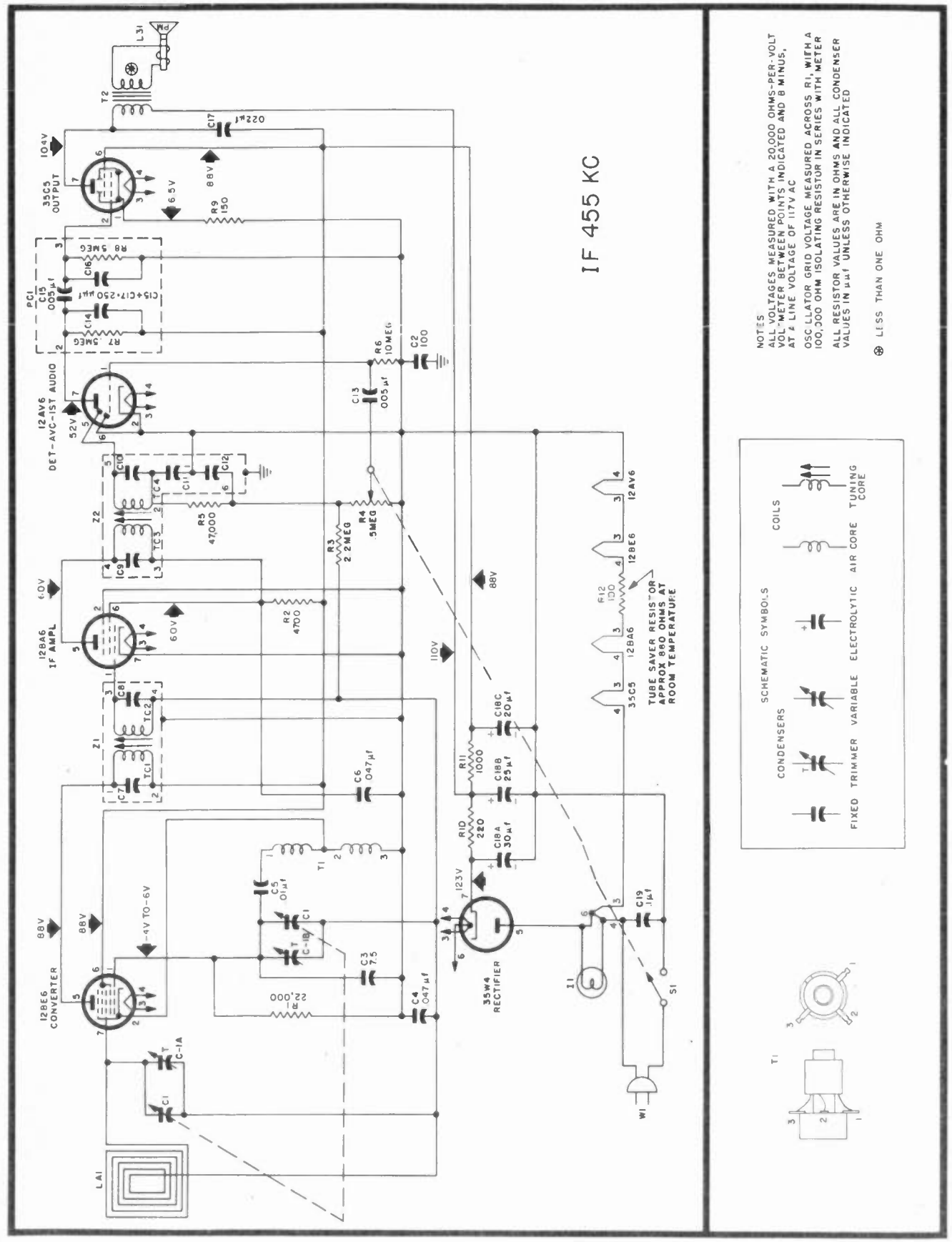

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Figure 4. Philco Radio Model B570, Code 122, Schematic Diagram

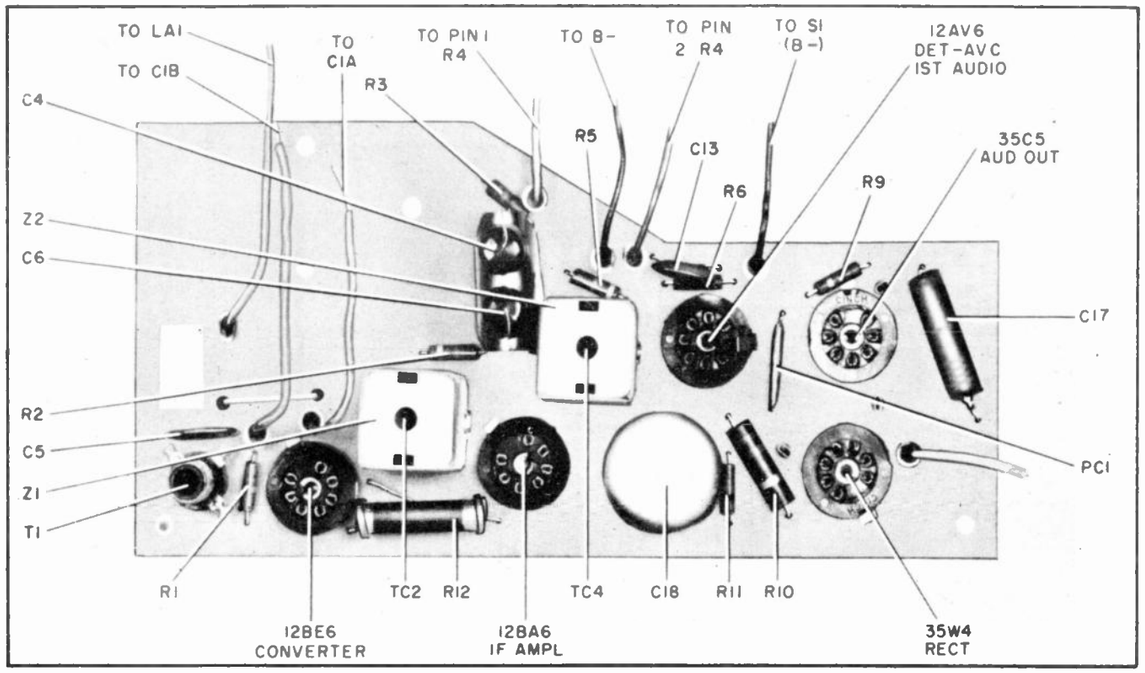

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Figure 5. Top View, Showing Parts Placement

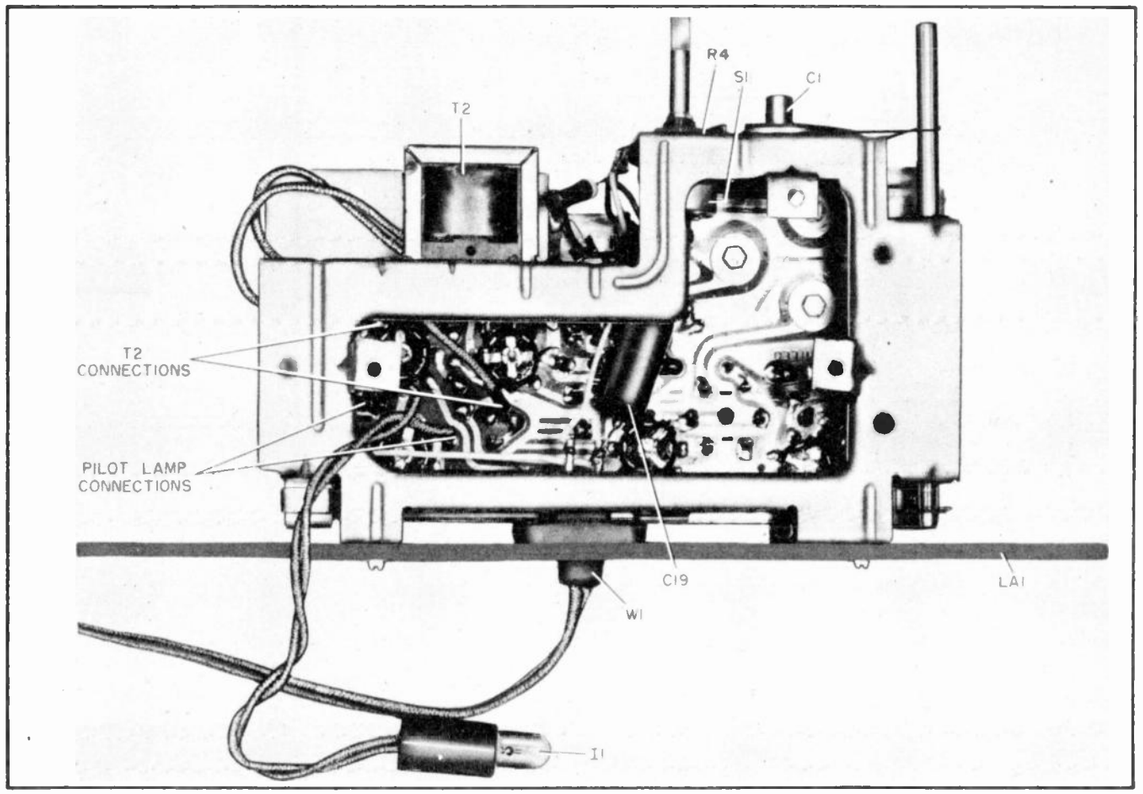

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Figure 6. Bottom View, Showing Parts Placement

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	Description	Service Part No.
C1	Condenser, tuning gang	31-2751-16
C1A	Condenser, aerial trimmer	Part of C1
C1B	Condenser, oscillator trimmer	Part of C1
C2	Condenser, B minus to chassis, 100 μμf.	62-110009001
C3	Condenser, drift compensation, 7.5 μμf.	30-1224-83
C4	Condenser, a-v-c by-pass, .047 μf.	30-4650-45
C5	Condenser, oscillator grid, .01 μf.	30-1238-2
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 μf.	30-1238-1
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.	30-4650-43
C18	Condenser, electrolytic, 3-section	30-2583-1
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, 0.1 μf.	30-4650-47
I1	Lamp, pilot	34-2068
LA1	Loop, part of cabinet back	76-8515
LS1	Speaker, p-m	36-1627-8
PC1	Printed circuit	30-6001
R1	Resistor, oscillator grid, 22,000 ohms	66-3228340*
R2	Resistor, i-f screen dropping, 4700 ohms	66-2748340*
R3	Resistor, a-v-c filter, 2.2 megohms	66-3228340*
R4	Resistor, volume control, .5 megohm	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	33-1343-3
S1	Switch, off-on	Part of R4
T1	Transformer, oscillator	32-4582
T2	Transformer, output	Part of LS1
W1	Line cord	41-3865
Z1	Transformer, 1st i-f	32-4583
Z2	Transformer, 2nd i-f	32-4584

MISCELLANEOUS

Description	Service Part No.
Cabinet, cardinal	10990-3
Cabinet, sand	10990-4
Back-and-loop assembly	76-8515
Connector, interlock, male	27-6240-6
Drive cord, 25-foot spool	45-8750
Knob	54-4773-3
Shaft, tuning	28-9312
Socket assembly, pilot lamp	41-4176-2
Shield, pilot lamp	54-8806
Socket, 7-pin miniature	27-6296-5
Socket, 7-pin miniature, 12AV6	27-6296-4
Shield, tube	56-5629-12
Printed wiring panel (less components)	54-6058

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PHILCO Factory-Supervised Service SERVICE

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)	56-8127
Lifter lever	56-8132
Spring, lifter lever	56-8133
(Spring, lifter lever Part No. 28-9626 not used in Model M-24)	
Changer base plate, tone-arm rest, tone-arm stanchion	76-7701
Bumper, tone-arm rest, rubber	54-8136
Control Assembly	
Knob, SPEED control assembly	76-7700
Knob, FUNCTION control	54-4971
Motor and Hardware	
Spacer, mounting (3)	54-4926
Motor assembly (complete), 60-cycle	35-1451
Motor assembly, 50-60-cycles	35-1462
Conversion kit, for 50-cycle operation	40-8680
Record-Shelf Assembly	
Hold-down fulcrum arm	56-8301-1
Push-off saddle	56-8078-1
Record-shelf-and-shaft assembly	76-5914-1
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	56-8973
Retainer plate, rear	56-8415
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 SERVICE

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HOME RADIO

PHILCO RADIO-PHONOGRAPH MODEL B1349

SPECIFICATIONS

CABINET	Molded plastic
CIRCUIT	Four-tube superheterodyne (plus rectifier)
FREQUENCY RANGE	540—1620 kc.
AUDIO OUTPUT	3 watts
OPERATING VOLTAGE	105—120 volts, 60 cycles, a.c.
POWER CONSUMPTION	
Radio	35 watts
Phonograph	60 watts
INTERMEDIATE FREQUENCY	455 kc.
ANTENNA	Built-in high-impedance loop; provision for external antenna
PHILCO TUBES	7A8 converter; 7B7 i-f amplifier; 7C6 detector-a.v.c. 1st audio; 35L6GT output; 50Y7GT rectifier.
PHONOGRAPH	Philco Model M-24 All-Speed Automatic Record Changer (For service information refer to Service Manual PR-2178.)

MODEL B1349

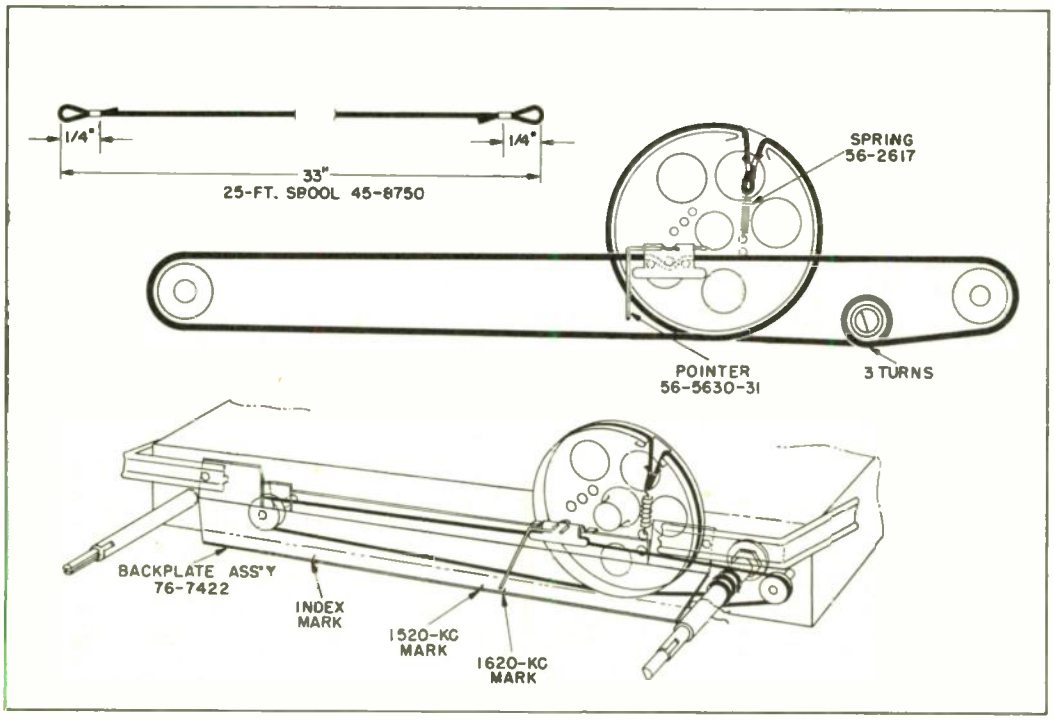

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Figure 1. Drive-Cord Installation Details

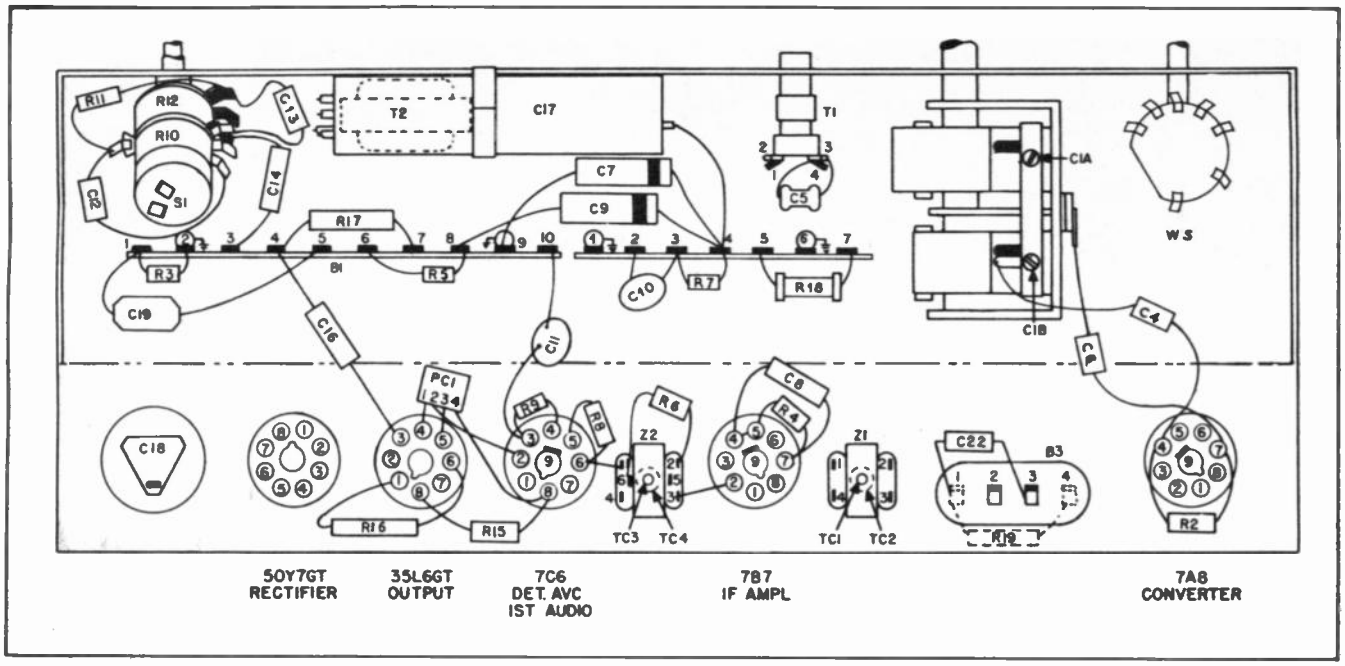

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Figure 2. Base View, Showing Parts Placement and Alignment Points

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, 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.

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST TRIMMER
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
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

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.

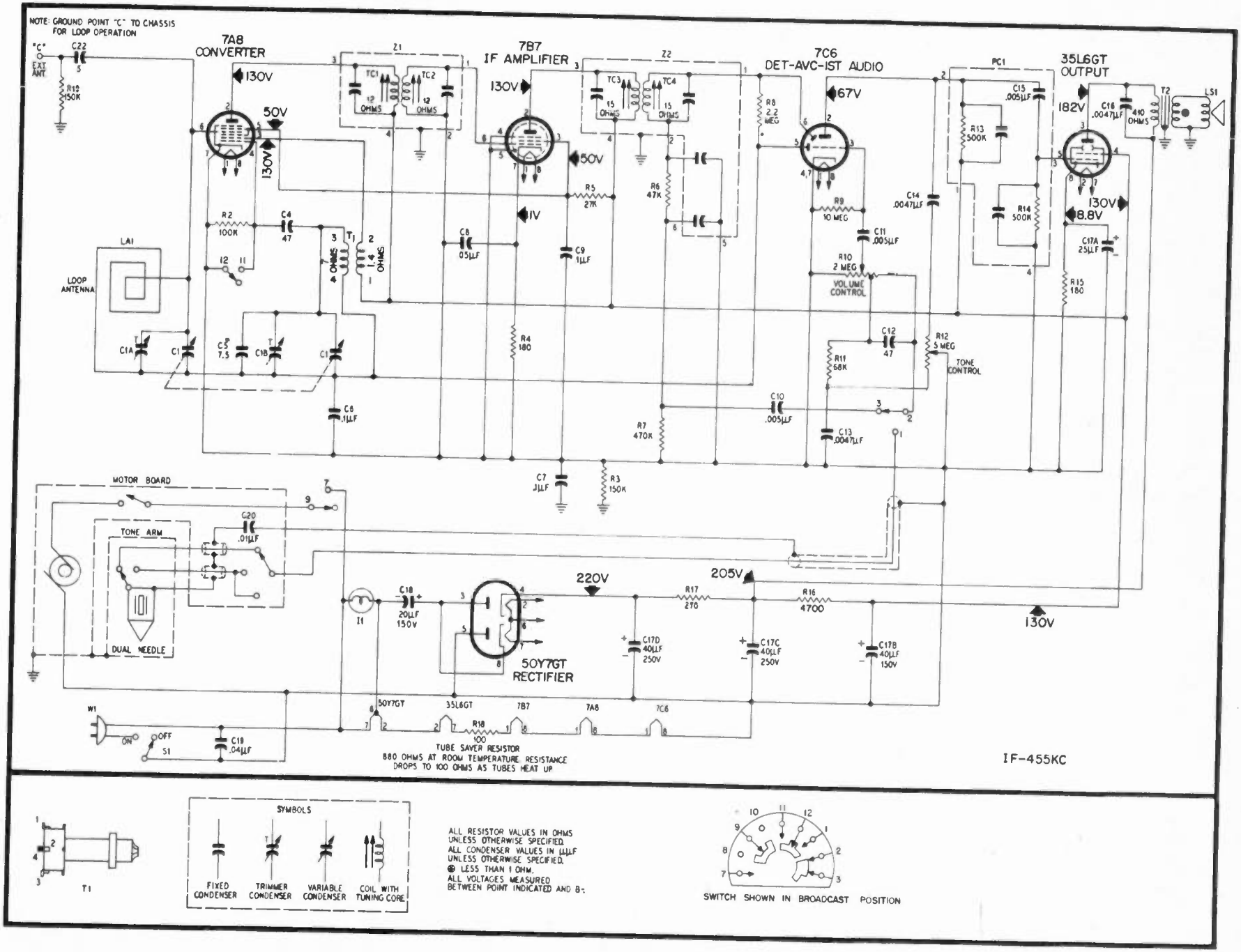

Figure 3. Philco Radio-Phonograph Model B1349, Schematic Diagram

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
C1A	Condenser, trimmer, antenna	Part of C1
C1B	Condenser, trimmer, oscillator	Part of C1
C4	Condenser, d-c blocking, 47 μμf.	60-00475420
C5	Condenser, fixed trimmer, 7.5 μμf.	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., 150v	30-2568-22
C19	Condenser, line by-pass, .04 μf.	30-1226-17*
C20	Condenser, phono isolation, .01 μf.	30-4650-58*
C22	Condenser, antenna blocking, 5 μμf.	30-1221-5
I1	Lamp, pilot	34-2064*
LA1	Loop assembly, antenna	76-2127-21
LS1	Speaker	36-1639-1
PC1	Printed circuit, d-c blocking	30-6001
R2	Resistor, grid leak, 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	66-4478340*
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)	33-5563-65
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*
R16	Resistor, filter, 4700 ohms, 2 watts	66-2475340
R17	Resistor, filter, 270 ohms, 7 watts	33-1335-91
R18	Resistor, tubesaver, 100 ohms	33-1343-3
R19	Resistor, antenna loading, 150,000 ohms	66-4158340*
S1	Switch, off-on	Part of R10
T1	Transformer, oscillator	32-4574-4
T2	Transformer, output	32-8242-14
W1	Line cord	L-2183*
WS	Wafer switch	42-1949-1
Z1	Transformer, 1st i-f	32-4160A
Z2	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Description	Service Part No.
Backplate assembly	76-7422
Cabinet	10840-12
Bottom cover	54-8255-1
Hinge (2)	56-6603
Lid	54-4838-5
Lid support	56-6604
Binder post	56-6296
Changer Mounting Hardware	
Sleeve, rubber (3)	54-7798
Speed nut (3)	W-2554
Spring, mounting, top (3)	56-7059FA9
Spring, mounting, bottom (3)	56-7059-1FCP
Dial scale	54-5107
Drive cord, 25-ft. spool	45-8750*
Foot, rubber (4)	54-4579
Knob, off-on-volume	54-4842-12
Knob, radio-phono	54-4842-5
Knob, tuning	54-4841-8
Knob, tone	54-4841-13
Lead assembly, antenna	76-1472-1
Mounting foot (4)	56-7778-1
Panel, wiring	38-9161-9
Pilot-lamp-socket assembly	76-1179-7
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

PHILCO SERVICE

PHILCO Factory-Supervised Service

HOME RADIO

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	10925-11
Colonial green	10925-10
Maroon	10925-3
Knob (2)	54-4980-1
Dial scale	54-5146-3
Back-and-loop ass'y.	76-8749-1
Pointer	54-4981

PR-2632 11-53

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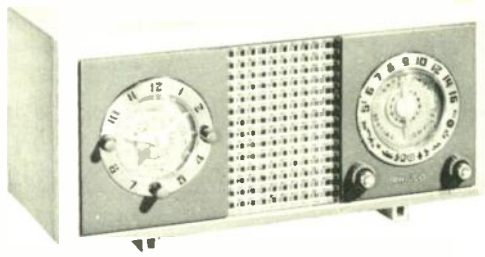
SERVICE BULLETIN FOR PHILCO HOME RADIO MODEL B572, CODE 121 PR-2632

PHILCO RADIO-CLOCK MODEL 53-804

SPECIFICATIONS

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

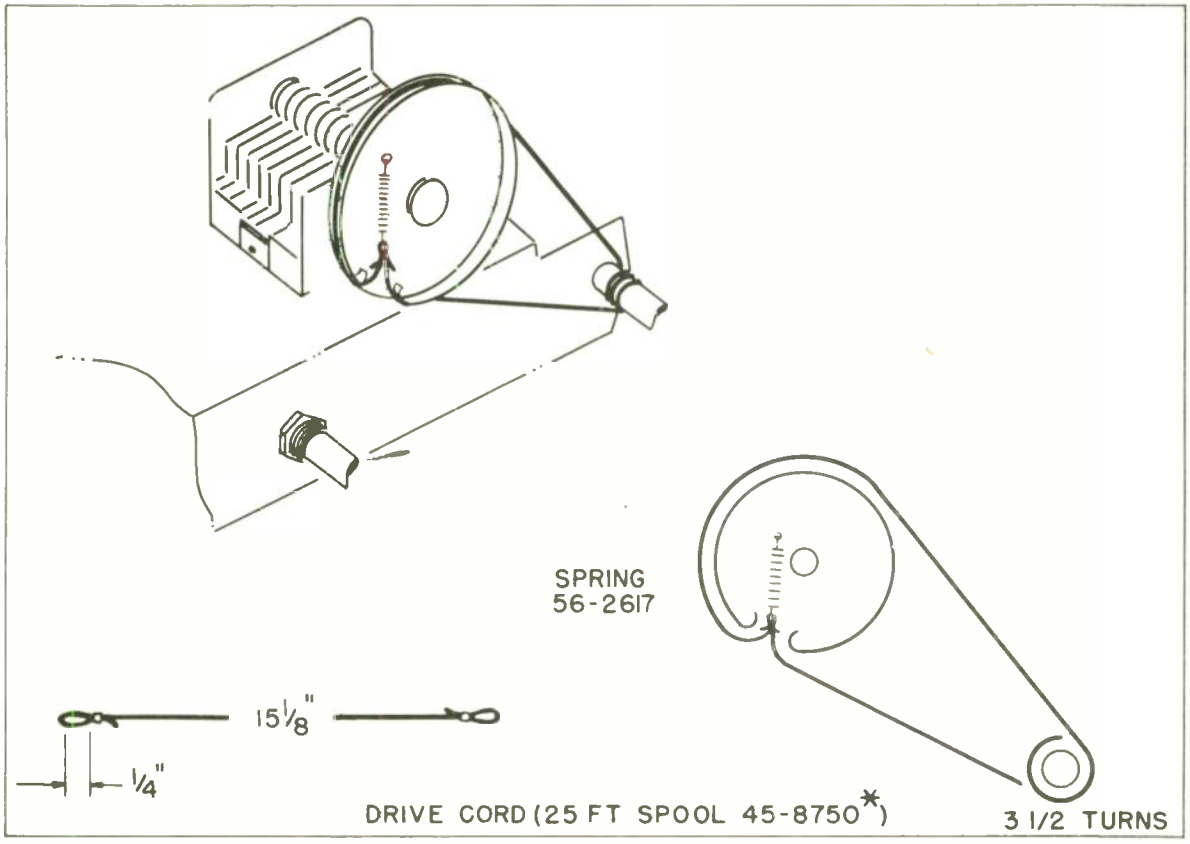


Figure 1. Drive-Cord Installation Details

TP2-1405A

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.

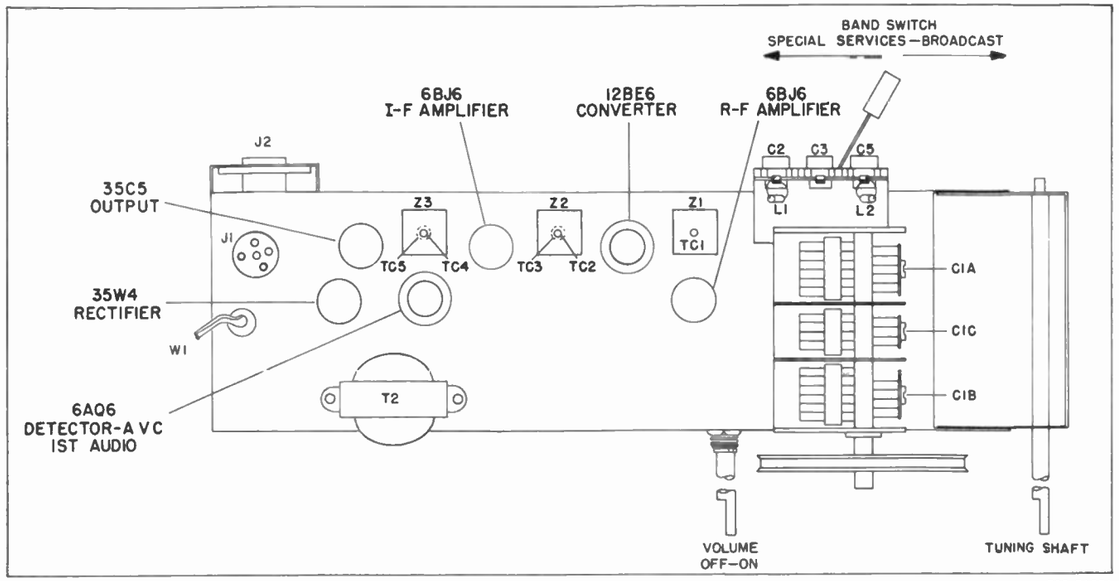
DIAL POINTER—Before the alignment is started, the dial pointer should be set to coincide with the dial scale mark to the left of "55" when the tuning gang is fully meshed.

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 .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)	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

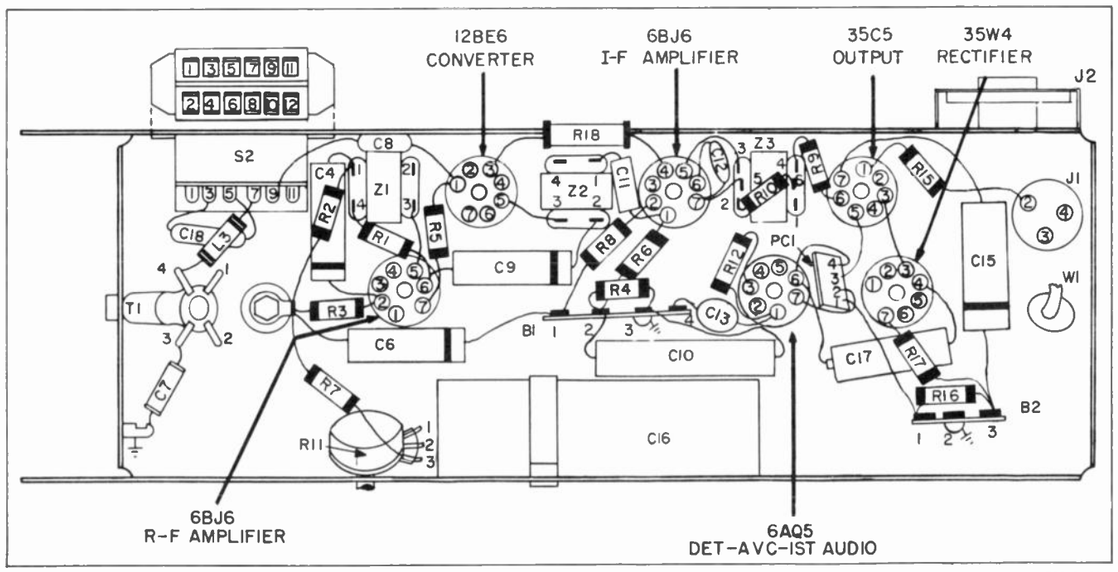
NOTE 1: Make up a 6—8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads and place near radio loop antenna. The loop antenna must be connected to the radio.

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.



TP2-2655A

Figure 2. Top View, Showing Tuning Adjustments



TP2-2653A

Figure 3. Base View, Showing Parts Placement

REPLACEMENT PARTS LIST

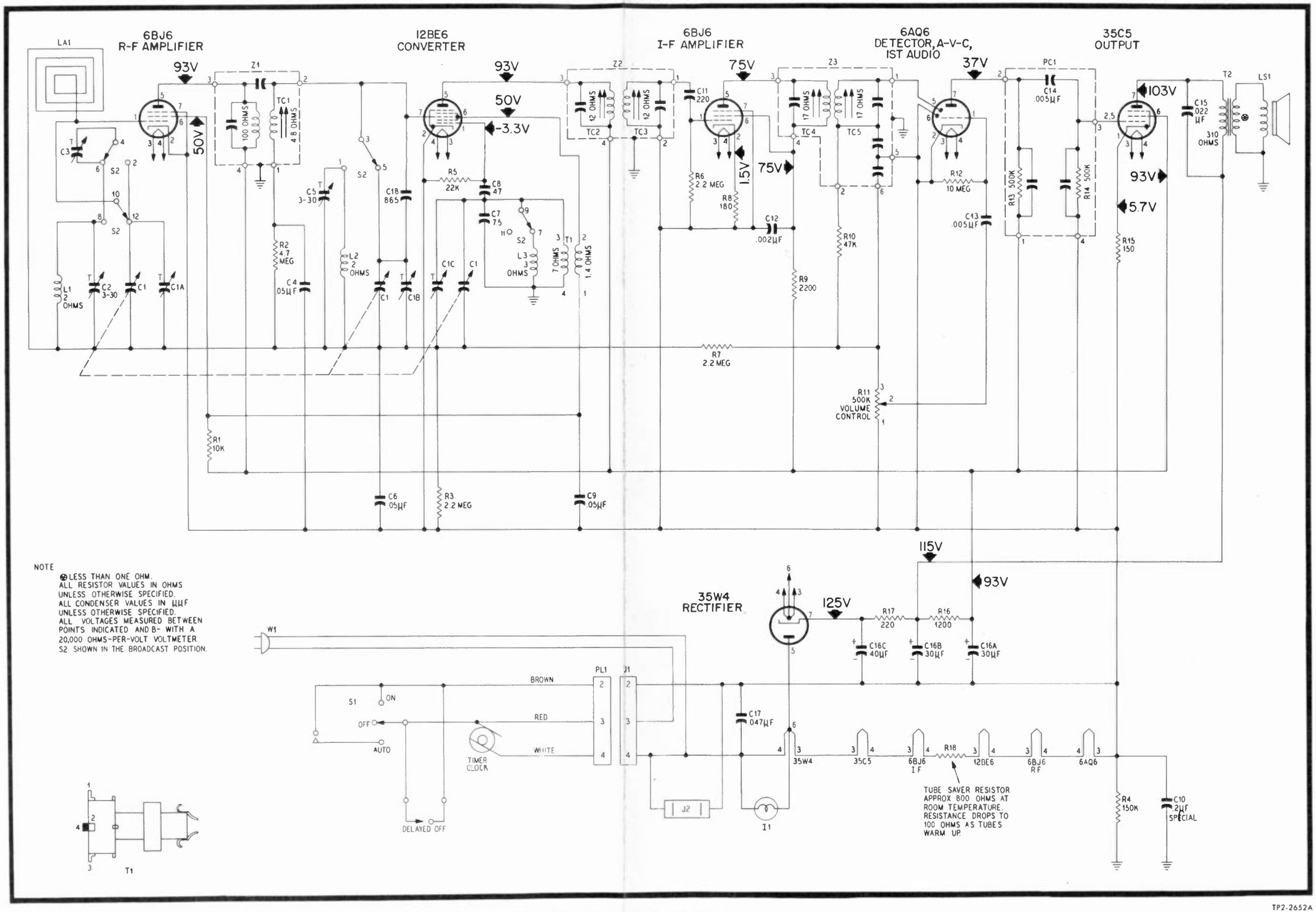
NOTE: Part numbers identified by an asterisk (°) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in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

Reference Symbol	Description	Service Part No.
C1	Condenser, tuning gang, 3-section	31-2771-2
C1A	Condenser, trimmer, antenna	Part of C1
C1B	Condenser, trimmer, r-f	Part of C1
C1C	Condenser, trimmer, oscillator	Part of C1
C2	Condenser, trimmer, special services r-f	Part of CA1
C3	Condenser, padder, special services r-f	Part of CA1
C4	Condenser, r-f by-pass, .05 μf.	30-4650-45°
C5	Condenser, trimmer, special services mixer-grid	Part of CA1
C6	Condenser, a-v-c by-pass, .05 μf.	30-4650-45°
C7	Condenser, fixed trimmer, 7.5 μμf.	30-1224-65
C8	Condenser, d-c blocking, 47 μμf.	60-00475420
C9	Condenser, screen by-pass, .05 μf.	30-4650-45°
C10	Condenser, special, B— to chassis, .2 μf.	30-4644
C11	Condenser, i-f coupling, 220 μμf.	62-122001001°
C12	Condenser, screen by-pass, .002 μf.	30-1238-8°
C13	Condenser, audio coupling, .005 μf.	30-1238-1°
C14	Condenser, d-c blocking, .005 μf.	Part of PC1
C15	Condenser, tone compensation, .022 μf.	30-4650-60°
C16	Condenser, electrolytic filter	30-2575-27
C16A	Condenser, filter, 30 μf., 150v	Part of C16
C16B	Condenser, filter, 30 μf., 150v	Part of C16
C16C	Condenser, filter, 40 μf., 150v	Part of C16
C17	Condenser, line by-pass, .047 μf.	30-4650-45°
C18	Condenser, fixed padder, 865 μμf.	30-1220-68
CA1	Condenser assembly, trimmer	31-6477-17
I1	Lamp, pilot	34-2068
J1	Connector, clock cable, female	27-6273
J2	Connector, appliance	76-3931
L1	Coil, special services r-f	32-4561-4
L2	Coil, special services mixer-grid	32-4561-4
L3	Coil, oscillator shunt	32-4562-1
PC1	Printed circuit	30-6001
PL1	Connector, clock cable, male	Part of clock cable
R1	Resistor, screen dropping, 10,000 ohms	66-3108340°
R2	Resistor, a-v-c load, 4.7 megohms	66-5478340°
R3	Resistor, a-v-c load, 2.2 megohms	66-5228340°
R4	Resistor, B— to chassis, 150,000 ohms	66-4158340°
R5	Resistor, grid leak, 22,000 ohms	66-3228340°
R6	Resistor, grid leak, 2.2 megohms	66-5228340°
R7	Resistor, a-v-c load, 2.2 megohms	66-5228340°
R8	Resistor, cathode bias, 180 ohms	66-1188340°
R9	Resistor, screen dropping 2200 ohms	66-2228340°
R10	Resistor, i-f filter, 47,000 ohms	66-3478340°
R11	Volume control, 500,000 ohms	33-5565-51
R12	Resistor, grid leak, 10 megohms	66-6108340°
R13	Resistor, plate load, 500,000 ohms	Part of PC1
R14	Resistor, grid leak, 500,000 ohms	Part of PC1
R15	Resistor, cathode bias, 150 ohms, 1 watt	66-1154340°
R16	Resistor, B+ filter, 1200 ohms	66-2128340°
R17	Resistor, B+ filter, 220 ohms, 1 watt	66-1224340°
R18	Resistor, tube saver, 100 ohms	33-1343-3
S2	Switch, band, broadcast-special services	42-1893-3
T1	Transformer, oscillator	32-4453-2
T2	Transformer, output	32-8310-3
W1	Line cord	L-2183°
Z1	Transformer, r-f	32-4399-7A
Z2	Transformer, 1st i-f	32-4160A
Z3	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Description	Service Part No.
Bezel, radio	28-9039
Ring, bezel	28-9171
Cabinet	10965
Back and loop assembly	76-8098
Cable assembly, clock	41-3909-4
Clamp, electrolytic condenser	56-1466
Clock	41-2044-1
Cover and bracket assembly, clock	76-8095
Dial scale and backplate assembly	76-8094
Drive cord, 25-ft. spool	45-8750°
Spring, drive-cord	56-2617°
Gasket, speaker	54-8871
Grille	54-6023
Knob (2)	76-6373-2
Knob, band switch	54-4998
Pointer	27-4891-2
Rubber mount, gang mounting	27-4596
Shaft, tuning	56-9807-3
Spring, retaining	28-8610
Shield, tube (2)	56-5629FA3
Socket assembly, pilot lamp	27-6233-6
Socket, tube (2)	27-6203-14
Socket, tube (4)	27-6265
Speaker	36-1627-21

MODEL 53-804



NOTE

⊛LESS THAN ONE OHM.
ALL RESISTOR VALUES IN OHMS UNLESS OTHERWISE SPECIFIED.
ALL CONDENSER VALUES IN μμF UNLESS OTHERWISE SPECIFIED.
ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND B- WITH A 20,000 OHMS-PER-VOLT VOLTMETER.
S2 SHOWN IN THE BROADCAST POSITION.

TP2-2652A

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

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PHILCO SERVICE

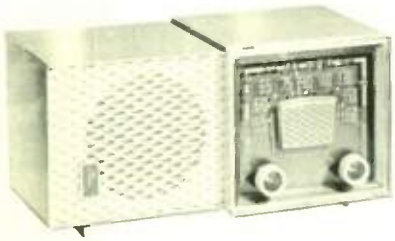
PHILCO Factory-Supervised Service

HOME RADIO

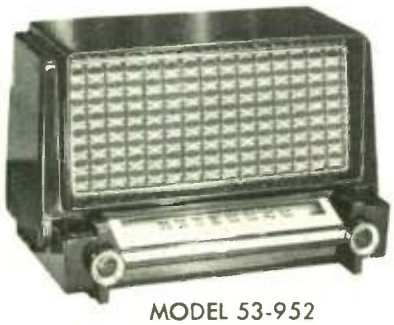
PHILCO RADIO MODELS 53-950, 53-952, AND 53-954

SPECIFICATIONS

Cabinet	
Model 53-950	Phenolic, brown or ivory
Model 53-952	Phenolic, brown
Model 53-954	Wood, mahogany or blond
Circuit	Five-tube superheterodyne (plus rectifier)
Frequency Range	
Broadcast	540—1620 kc.
Special Services	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	455 kc.
Philco Tubes	6BJ6 r-f ampl.; 12BE6 converter; 6BJ6 i-f ampl.; 6AQ6 det., a.v.c., 1st audio; 35C5 output; 35W4 rectifier



MODEL 53-950



MODEL 53-952

MODEL 53-954

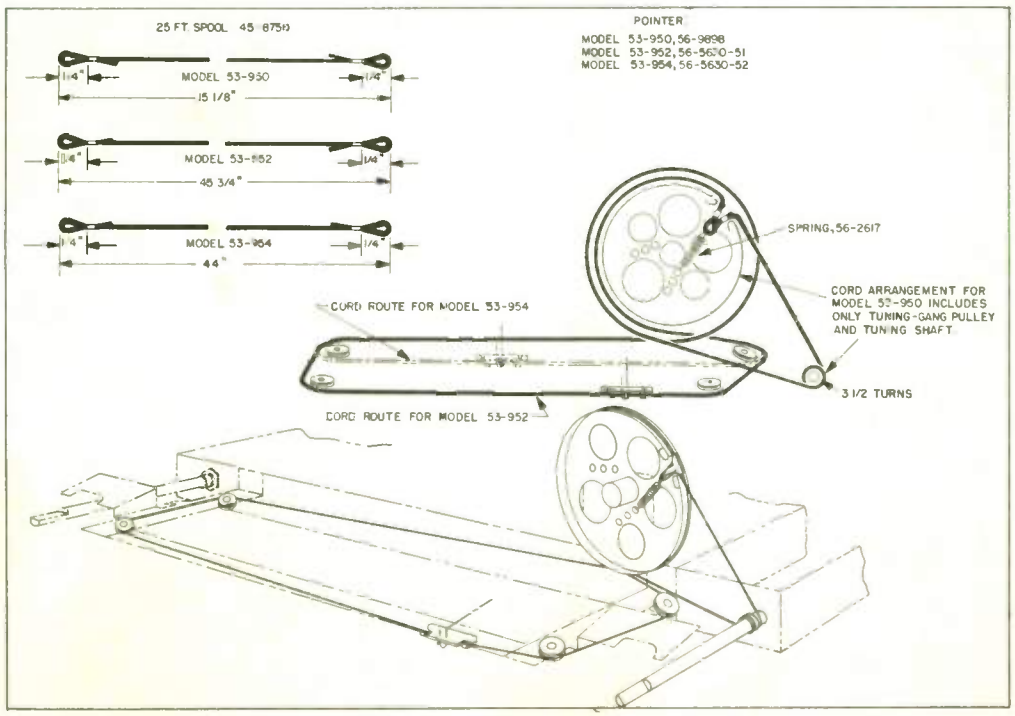


Figure 1. Drive-Cord Installation Details

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.

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 .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)	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

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)

Reference Symbol	Description	Service Part No.
R5	Resistor, grid leak, 22,000 ohms	66-3228340°
R6	Resistor, grid leak, 2.2 megohms	66-5228340°
R7	Resistor, a-v-c load, 2.2 megohms	66-5228340°
R8	Resistor, cathode bias, 180 ohms	66-1188340°
R9	Resistor, screen dropping, 2200 ohms	66-2228340°
R10	Resistor, i-f filter, 47,000 ohms	66-3478340°
R11	Volume control, 500,000 ohms	
	Models 53-950, 53-954	33-5566-43
	Model 53-952	33-5566-46
R12	Resistor, grid leak, 10 megohms	66-6108340°
R13	Resistor, plate load, 500,000 ohms	Part of PC1
R14	Resistor, grid leak, 500,000 ohms	Part of PC1
R15	Resistor, cathode bias, 150 ohms, 1 watt	66-1154340°
R16	Resistor, B+ filter, 1200 ohms	66-2128340°
R17	Resistor, B+ filter, 220 ohms, 1 watt	66-1224340°
R18	Resistor, tube saver, 100 ohms	33-1343-3
S1	Switch, off-on	Part of R11
S2	Switch, broadcast-special services	
	Model 53-950	42-1893-3
	Model 53-952	42-1893-5
	Model 53-954	42-1893-4
T1	Transformer, oscillator	32-4453-2
T2	Transformer, output	32-8310-3
W1	Line cord	L-2183°
Z1	Transformer, r-f	32-4399-7A
Z2	Transformer, 1st i-f	32-4160A
Z3	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

PARTS COMMON TO ALL MODELS

Description	Service Part No.
Drive cord, 25-ft. spool	45-8750°
Spring, drive cord	56-2617
Rubber mount, gang mtg. (3)	27-4596
Shield, tube (2)	56-5629FA3
Socket assembly, pilot lamp	27-6233-6
Socket, tube (2)	27-6203-14
Socket, tube (4)	27-6265
Speed nut (4)	1W56920FE7

MODEL 53-950

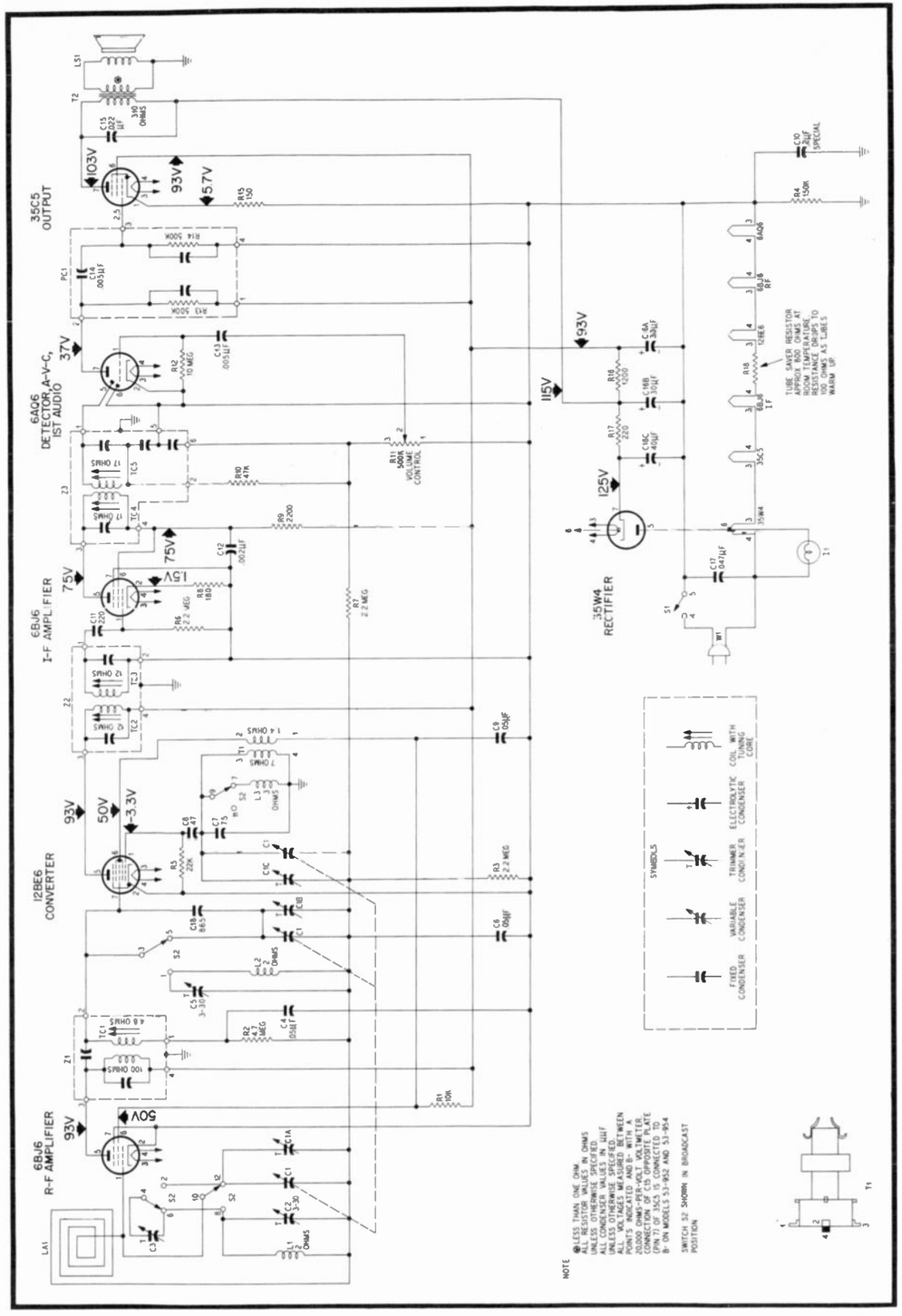
Cabinet, mahogany	10938
Cabinet, ivory	10938-2
Cabinet back and loop assembly	76-7881
Scale, mahogany	54-5152
Scale, ivory	54-5152-1
Knob (2)	54-4718-39
Knob, band switch	54-4998
Pointer	56-9898
Shaft, tuning	56-9807-1
Spring, retaining	28-8610
Speaker	45-9731

MODEL 53-952

Cabinet	10963
Cabinet back and loop assembly	76-8068
Knob (2)	54-6025
Knob, band switch	54-4998
Panel, diffusing	54-8819
Clip, panel diffusing	56-3587-1
Pointer	56-5630-51
Pointer rail assembly	76-8067
Scale, dial	54-5163
Shaft, tuning	56-9807-2
Spring, retaining	28-8610
Speaker	45-9736

MODEL 53-954

Cabinet, mahogany	10959
Cabinet, blond	10959-1
Back assembly, mahogany cabinet	76-8063
Back assembly, blond cabinet	76-8063-10
Loop assembly, antenna	76-2127-13
Metal grille	56-10034
Knob (2), mahogany	54-6019
Knob (2), blond	54-6019-1
Knob, band switch	54-4998
Panel, diffusing	54-8817
Clip, diffusing panel	56-3587-1
Pointer	56-5630-52
Pointer rail assembly	76-7981
Shaft, tuning	56-9807-1
Spring, retaining	28-8610
Speaker	36-1626-5



TP2-2652

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

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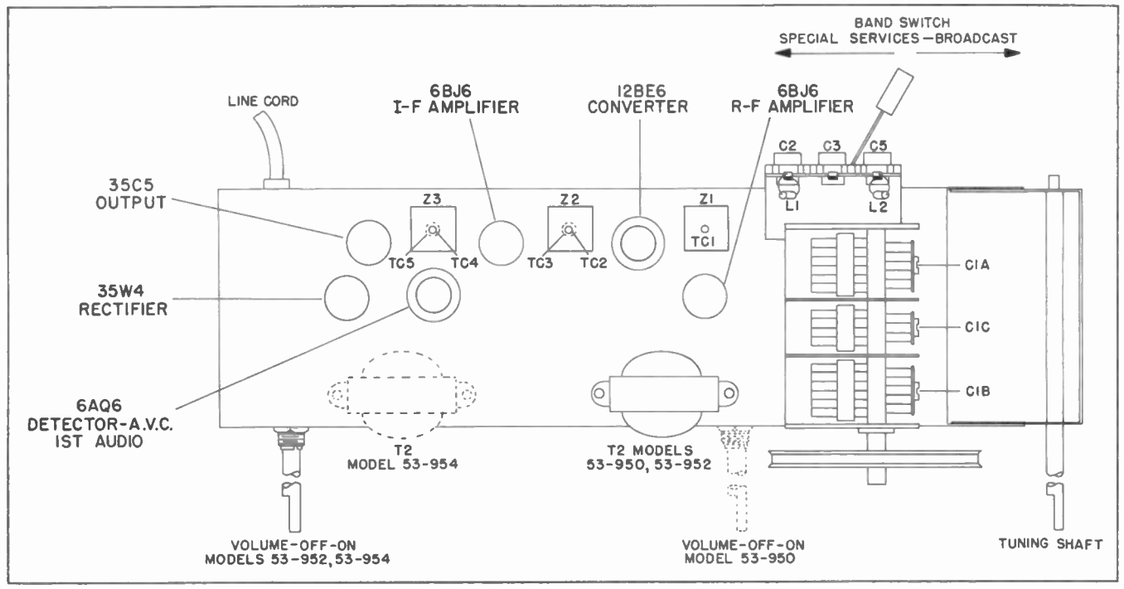


Figure 2. Top View, Showing Tuning Adjustments

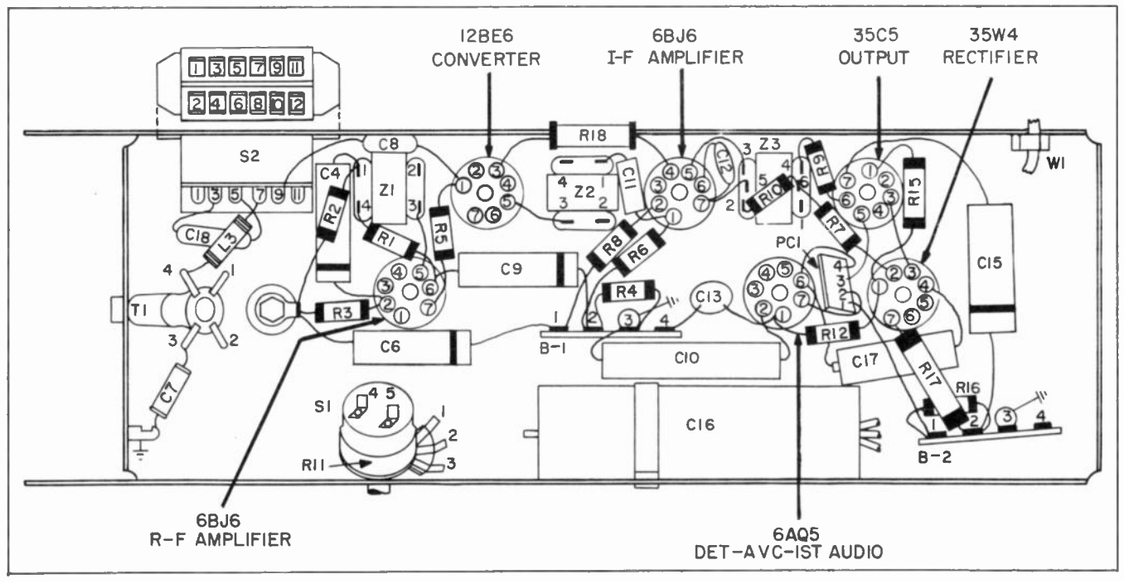


Figure 3. Base View, Model 53-950, Showing Parts Placement

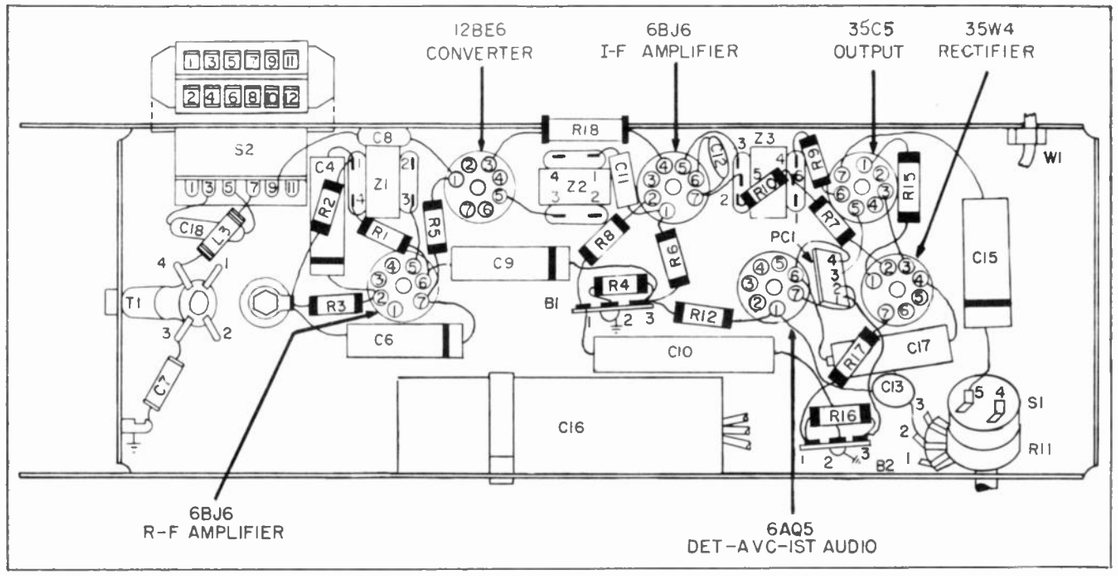


Figure 4. Base View, Models 53-952 and 53-954, Showing Parts Placement

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.
C1	Condenser, tuning gang, 3 section	
	Model 53-950	31-2771
	Models 53-952, 53-954	31-2771-1
C1A	Condenser, trimmer, antenna	Part of C1
C1B	Condenser, trimmer, r-f	Part of C1
C1C	Condenser, trimmer, oscillator	Part of C1
C2	Condenser, trimmer, special services r-f	Part of CA1
C3	Condenser, padder, special services r-f	Part of CA1
C4	Condenser, r-f by-pass, .05 μf.	30-4650-45*
C5	Condenser, trimmer, special services mixer-grid	Part of CA1
C6	Condenser, a-v-c by-pass, .05 μf.	30-4650-45*
C7	Condenser, fixed trimmer, 7.5 μμf.	30-1224-65
C8	Condenser, d-c blocking, 47 μμf.	60-00475420
C9	Condenser, screen by-pass, .05 μf.	30-4650-45*
C10	Condenser, special, B— to chassis, .2 μf.	30-4644
C11	Condenser, i-f coupling, 220 μμf.	62-122001001*
C12	Condenser, screen by-pass, .002 μf.	30-1238-8*
C13	Condenser, audio coupling, .005 μf.	30-1238-1*
C14	Condenser, d-c blocking, .005 μf.	Part of PC1
C15	Condenser, tone compensation, .022 μf.	30-4650-43*
C16	Condenser, electrolytic filter	30-2575-27
C16A	Condenser, filter, 30 μf., 150v	Part of C16
C16B	Condenser, filter, 30 μf., 150v	Part of C16
C16C	Condenser, filter, 40 μf., 150v	Part of C16
C17	Condenser, line by-pass, .047 μf.	30-4650-45*
C18	Condenser, fixed padder, 865 μf.	30-1220-68
CA1	Condenser assembly, trimmer	31-6477-17
I1	Lamp, pilot	34-2068
L1	Coil, special services r-f	32-4561-4
L2	Coil, special services mixer-grid	32-4561-4
L3	Coil, oscillator shunt	32-4562-1
PC1	Printed circuit	30-6001
R1	Resistor, screen dropping, 10,000 ohms	66-3108340*
R2	Resistor, a-v-c load, 4.7 megohms	66-5478340*
R3	Resistor, a-v-c load, 2.2 megohms	66-5228340*
R4	Resistor, B— to chassis, 150,000 ohms	66-4158340*

PHILCO

PHILCO Factory-Supervised Service

SERVICE

TELEVISION

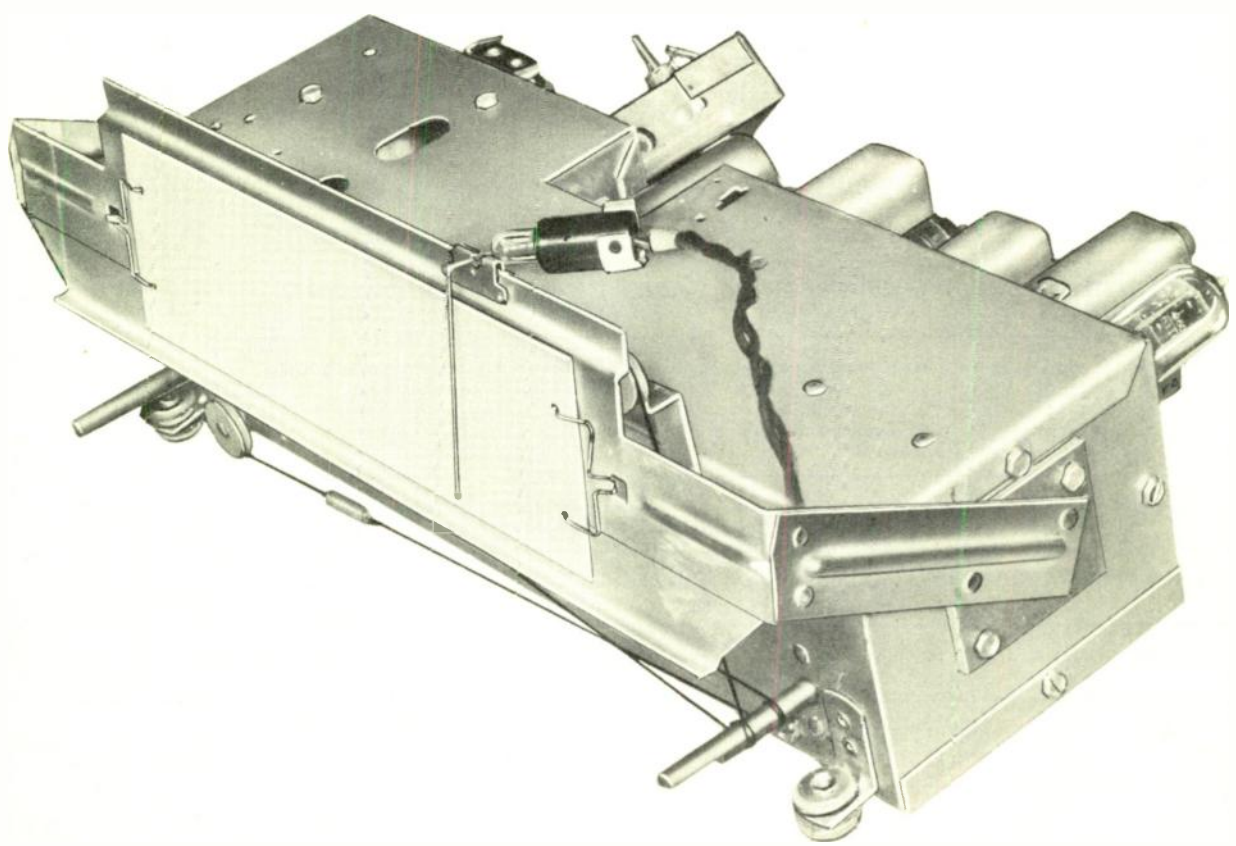
PHILCO TELEVISION SERVICE MANUAL

FOR

AM-FM RADIO TUNER RT-11

USED IN 1953 PHILCO TELEVISION

RECEIVERS



PHILCO AM-FM RADIO TUNER RT-11

TP2-796

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 300-ohm 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.

AM ALIGNMENT CHART

STEP	SIGNAL-GENERATOR CONNECTION	OUTPUT-INDICATOR CONNECTION	SIGNAL-GENERATOR SETTING	RADIO-DIAL SETTING	ADJUSTMENT INSTRUCTIONS
1	Connect signal generator through a .1-μf. condenser to grid (pin 7) of 6BE6.	Connect vertical input 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 maximum 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.				

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.

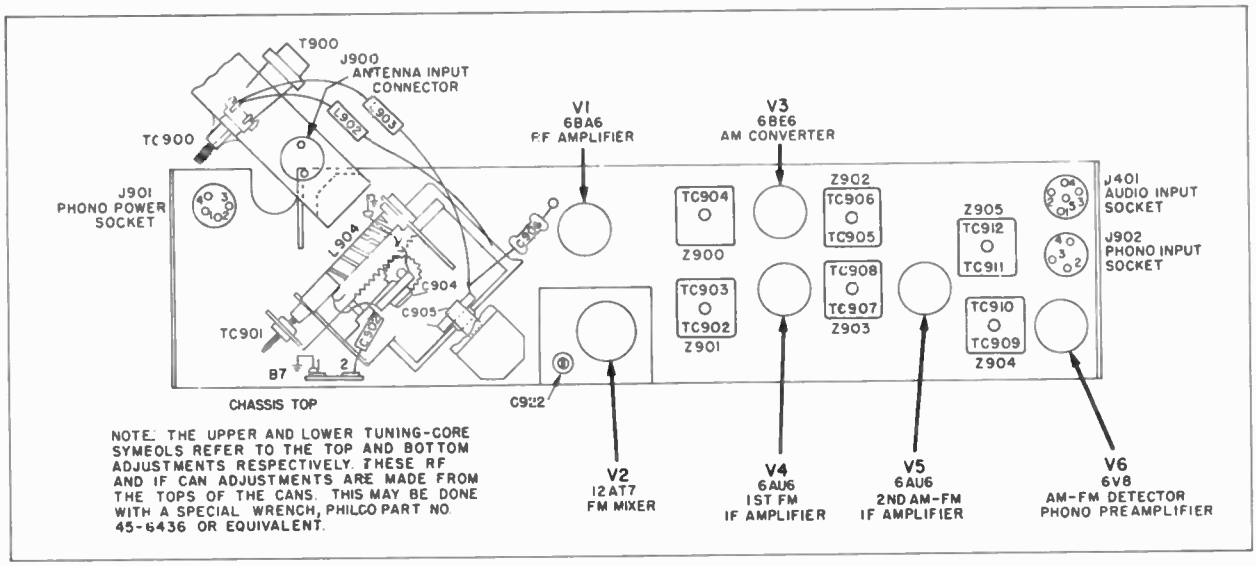
FM ALIGNMENT CHART

STEP	SIGNAL-GENERATOR CONNECTION	OUTPUT-INDICATOR CONNECTION	SIGNAL-GENERATOR SETTING	RADIO-DIAL SETTING	ADJUSTMENT INSTRUCTIONS
1	Connect signal generator 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 conductor of signal generator coaxial cable to TV antenna terminal 1, as explained under the RADIO ALIGNMENT PROCEDURE paragraph of the preliminary instructions.	Same as step 1.	Set signal generator to 108.5 mc., unmodulated.	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., unmodulated.	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 105 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.				

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 can 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.

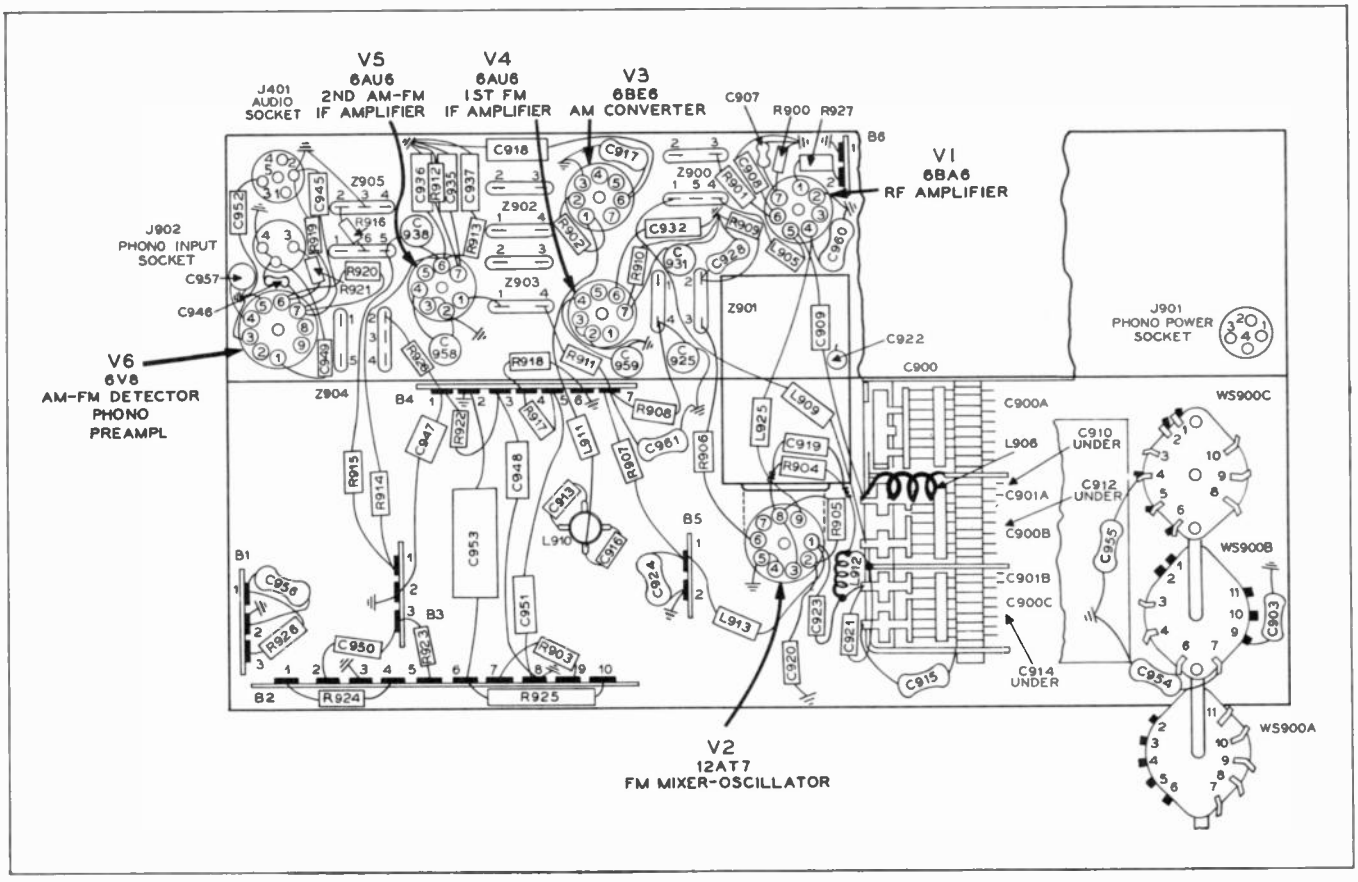


TP2-2041

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

TUBE COMPLEMENT

NUMBER OF TUBES	TUBE TYPE	FUNCTION
1	6BA6, 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



TP2-2038

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

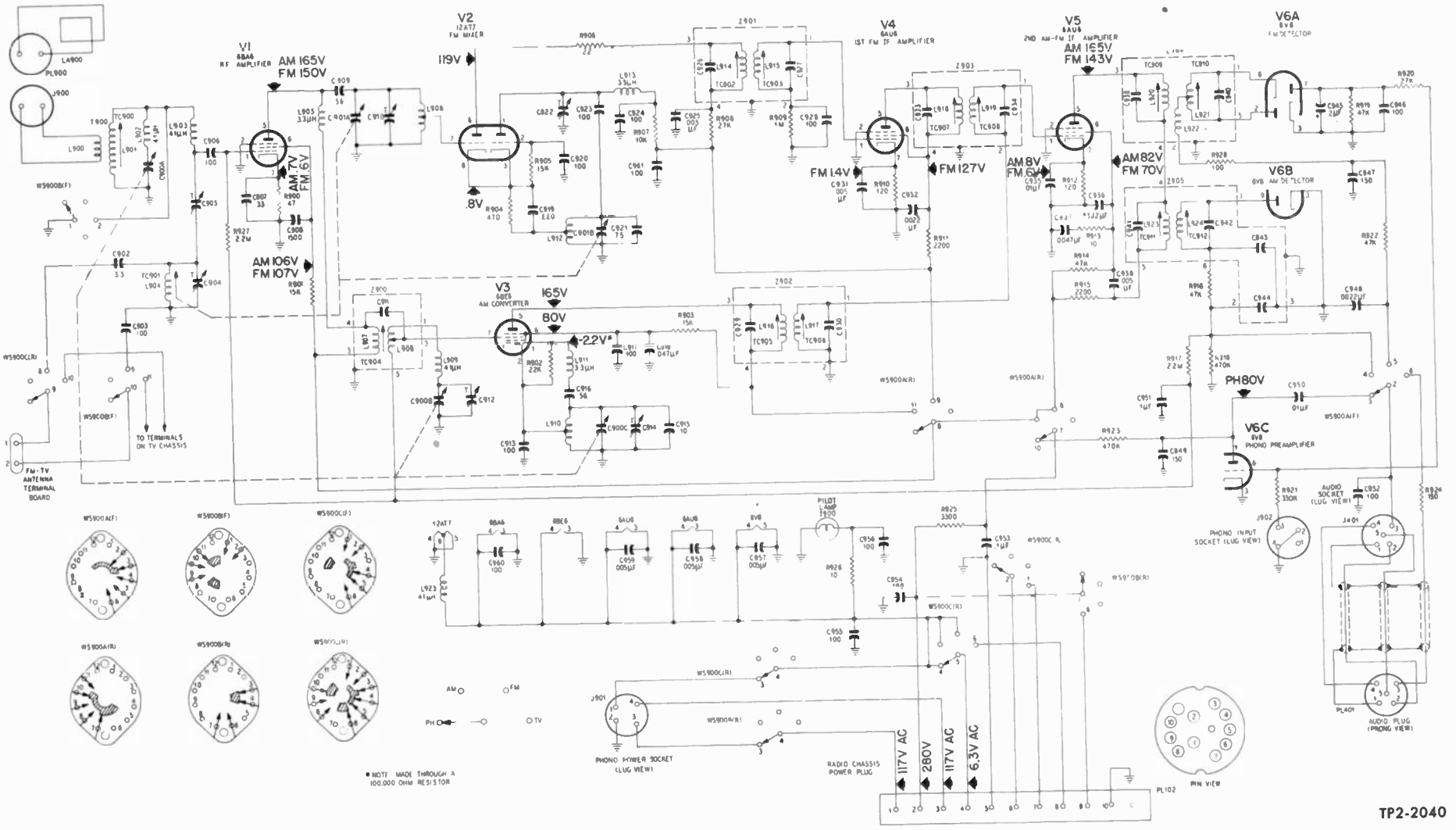


Figure 3. AM-FM Radio Tuner RT-11, Schematic Diagram

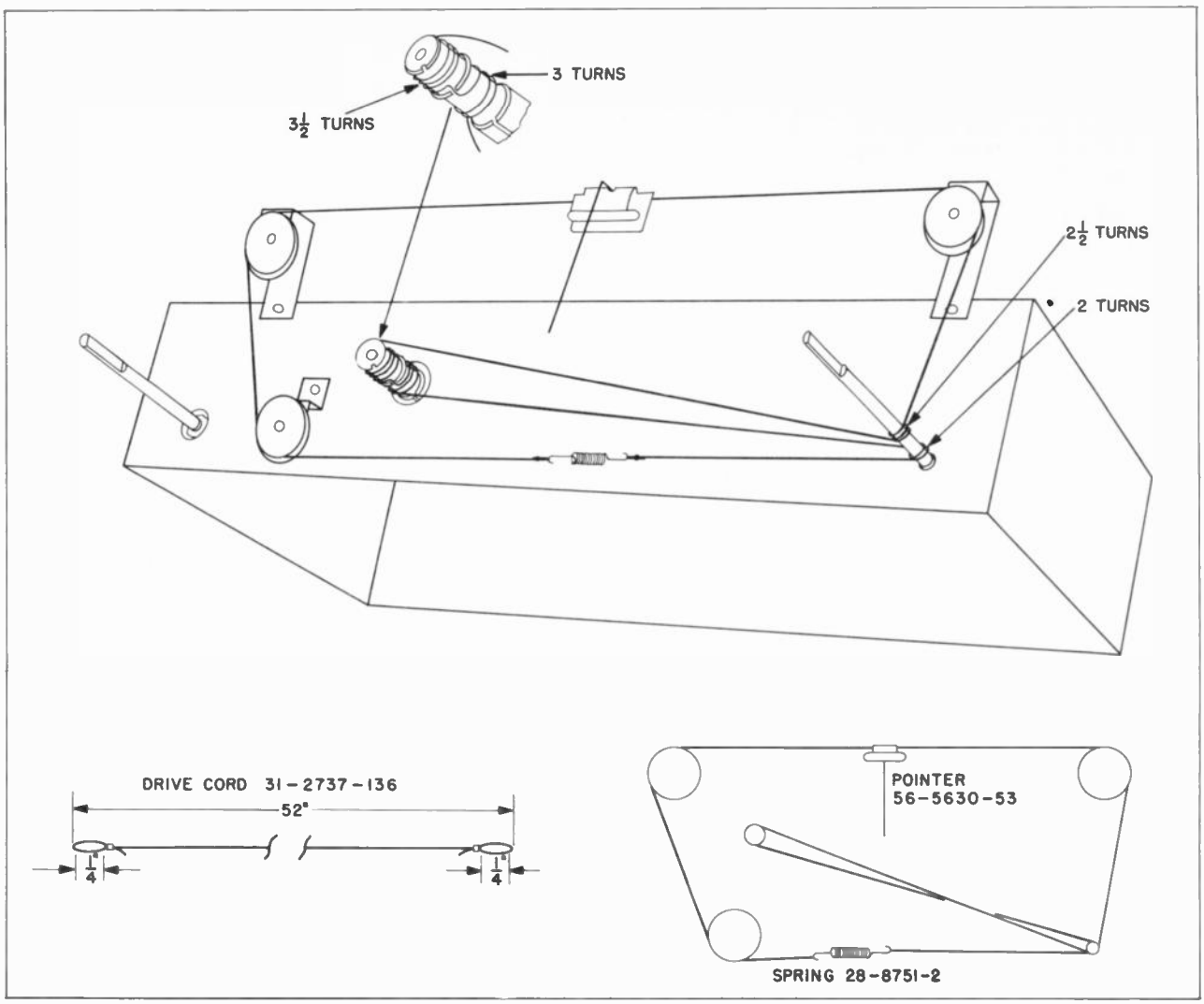


Figure 4. AM-FM Radio Tuner RT-11, Drive-Cord Installation Details

REPLACEMENT PARTS LIST

IMPORTANT

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 ½-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.

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

REPLACEMENT PARTS LIST (Cont.)

REFERENCE SYMBOL	DESCRIPTION	SERVICE PART NO.
C909	Condenser, d-c blocking, 56 μμf.	62-056409001
C910	Condenser, trimmer, FM mixer	Part of C901A
C911	Condenser, r-f coupling	Part of Z900
C912	Condenser, trimmer, AM converter	Part of C900B
C913	Condenser, trimmer, fixed, 100 μμf.	62-110009001
C914	Condenser, trimmer, AM oscillator	Part of C900C
C915	Condenser, trimmer, fixed, 10 μμf.	30-1224-26
C916	Condenser, grid leak, 56 μμf.	62 056409001
C917	Condenser, screen by-pass, 100 μμf.	62-110009001
C919	Condenser, cathode by-pass, 220 μμf.	62-122001001
C920	Condenser, grid leak, 100 μμf.	62-110009001
C921	Condenser, trimmer, fixed, 7.5 μμf.	30-1224-8
C922	Condenser, trimmer, plate decoupling	31-6511-12
C923	Condenser, d-c blocking, 100 μμf.	62-110009001
C924	Condenser, plate by-pass, 100 μμf.	62-110009001
C925	Condenser, plate by-pass, .005 μμf.	36-1238-1
C926	Condenser, fixed trimmer, 1st FM i-f	Part of Z901
C927	Condenser, fixed trimmer, 1st FM i-f	Part of Z901
C928	Condenser, r-f by-pass, 1000 μμf.	62-110009001
C929	Condenser, fixed trimmer, 1st AM i-f	Part of Z902
C930	Condenser, fixed trimmer, 1st AM i-f	Part of Z902
C931	Condenser, cathode by-pass, .005 μf.	30-1238-1
C933	Condenser, fixed trimmer, 2nd i-f	Part of Z903
C934	Condenser, fixed trimmer, 2nd i-f	Part of Z903
C938	Condenser, decoupling, .005 μf.	30-1238-1
C939	Condenser, fixed trimmer, FM detector	Part of Z904
C940	Condenser, fixed trimmer, FM detector	Part of Z904
C941	Condenser, fixed trimmer, AM detector	Part of Z905
C942	Condenser, fixed trimmer, AM detector	Part of Z905
C943	Condenser, i-f by-pass	Part of Z905
C944	Condenser, i-f by-pass	Part of Z905
C945	Condenser, electrolytic, filter, 2 μf.	30-2417
C946	Condenser, i-f by-pass, 100 μf.	62-110009001
C947	Condenser, i-f by-pass, 150 μμf.	60-10155417
C949	Condenser, plate decoupling, 150 μμf.	60-10155417
C952	Condenser, r-f by-pass, 100 μμf.	62-110009001
C954	Condenser, r-f by-pass, 100 μμf.	62-110009001
C955 and C956	Condensers, filament by-pass, 100 μμf.	62-110009001
C957, C958, and C959	Condensers, filament by-pass, .005 μf.	30-1238-1
C960	Condenser, filament by-pass, 100 μμf.	62-110009001
C961	Condenser, r-f by-pass, 100 μμf.	62-110009001
I900	Lamp, pilot	34-2064
J401	Connector, volume control, female, chassis type	27-6273
J900	Connector, AM antenna, male, chassis type	54-4878-8
J901	Connector, phono power, female, chassis type	27-6273
J902	Connector, phono input, female, chassis type	27-6273
L900	Coil, AM antenna	Part of T900
L901	Coil, AM antenna	Part of T900
L902 and L903	Coils, AM r-f grid, 4.1 μh.	32-4061-2
L904	Coil, tuning, FM r-f grid	Part of C900
L905	Coil, FM r-f choke, 3.3 μh.	32-4422-10
L906	Coil, FM mixer grid	32-4415-3
L907	Coil, AM r-f primary	Part of Z900
L908	Coil, AM r-f secondary	Part of Z900
L909	Coil, AM converter grid, 4.1 μh.	32-4061-2
L910	Coil, AM oscillator	32-4453-7
L911	Coil, AM oscillator grid, 3.3 μh.	32-4422-10
L912	Coil, FM oscillator	32-4414-3
L913	Coil, r-f choke, 3.3 μh.	32-4422-10
L914	Coil, FM 1st i-f primary	Part of Z901
L915	Coil, FM 1st i-f secondary	Part of Z901
L916	Coil, AM 1st i-f primary	Part of Z902
L917	Coil, AM 1st i-f secondary	Part of Z902
L918	Coil, 2nd i-f primary	Part of Z903
L919	Coil, 2nd i-f secondary	Part of Z903
L920	Coil, FM detector primary	Part of Z904
L921	Coil, FM detector secondary	Part of Z904
L922	Coil, FM detector tertiary	Part of Z904
L923	Coil, AM detector primary	Part of Z905
L924	Coil, AM detector secondary	Part of Z905
L925	Coil, r-f choke, filament, 4.1 μh.	32-4061-3
PL102	Connector, interchassis	See Misc.
PL401	Connector, volume control	See Misc.
R903	Resistor, screen dropping, 15,000 ohms, 1 watt	66-315340
R925	Resistor, B+ dropping, 3300 ohms, 7 watts	33-1335-115
T900	Transformer, antenna input	32-4519
Z900	Transformer, AM r-f	32-4535A
Z901	Transformer, FM 1st i-f	32-4518A
Z902	Transformer, AM 1st i-f	32-4537A
Z903	Transformer, 2nd i-f	32-4518-1A
Z904	Transformer, FM detector	32-4536A
Z905	Transformer, AM detector	32-4517-1A

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
Panel, diffusing	54-8803
Pointer	56-5630-53
Shaft, tuning	56-7931-3
Shield, tube (12AT7)	56-5629-5
Shield, tube	56-3978-1FA3
Spring, drive-cord	28-8751-2
Spring, diffusing panel	56-3841
Spring, hairpin	28-8610
Socket, tube, 7-pin miniature	27-6265
Socket, tube, 7-pin miniature (6BA6)	27-6265-1
Socket, tube, 9-pin miniature	27-6203-6
Socket, tube, 9-pin miniature (6V8)	27-6203-18
Switch, wave	42-1970

PR-2375

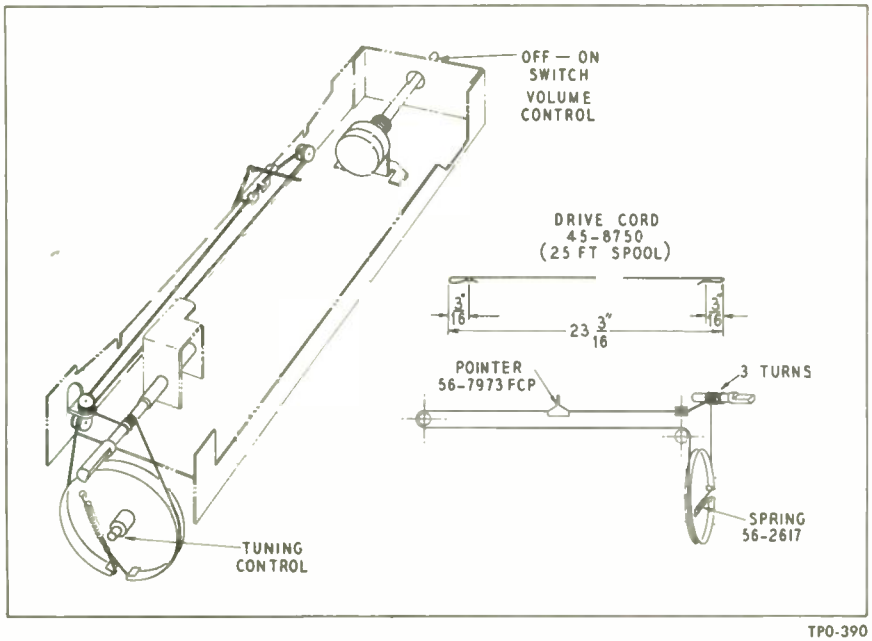
Printed in U. S. A.

PHILCO PORTABLE RADIO MODEL 53-651

SPECIFICATIONS

MODEL 53-651

	MODEL 53-651
CABINET	Molded plastic
CIRCUIT	Four-tube superheterodyne (plus selenium rectifier)
FREQUENCY RANGE	540 kc.–1620 kc.
AUDIO OUTPUT	
A.C. or d.c.	150 milliwatts
Battery	75 milliwatts
OPERATING VOLTAGE	
Line operation	117 volts, a.c. or d.c.
Battery operation	2 D cells and 67½-volt "B" battery
POWER CONSUMPTION	
A.-C. or d.-c. operation	15 watts
Battery operation	10 ma. from 67½-volt "B" battery; 260 ma. from 2 D cells
ANTENNA	Magnecor high-impedance loop with provision for external antenna
INTERMEDIATE FREQUENCY	455 kc.
PHILCO TUBES	1R5, converter; 1U4, i-f amplifier; 1U5, detector-a.v.c.-1st audio; 3V4, output
BATTERY TYPE	P67 "B" battery; 2 D cells



TPO-390

Figure 1. Drive-Cord Stringing Arrangement

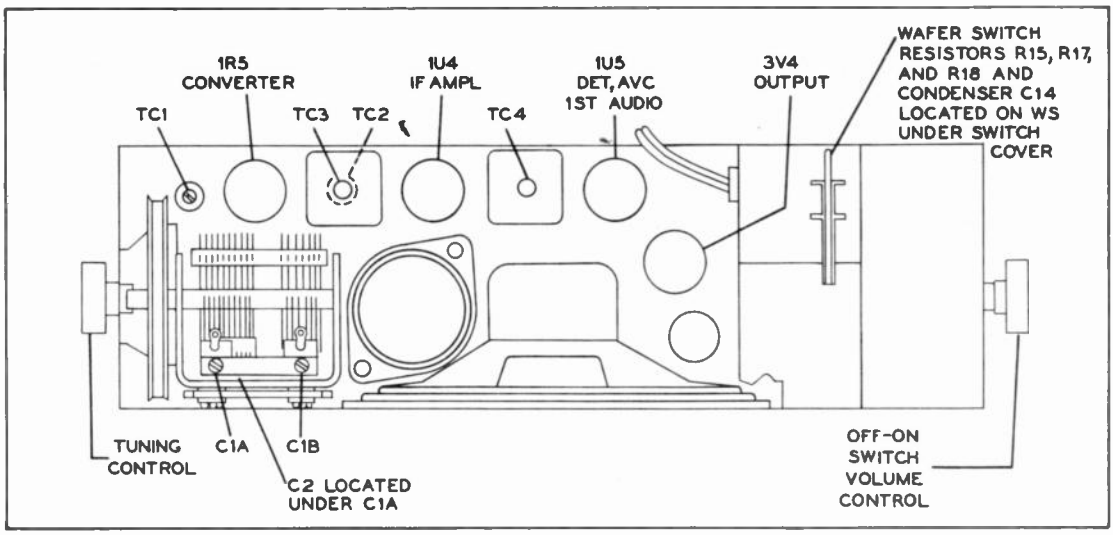


Figure 2. Top View, Showing Tuning Adjustments

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.

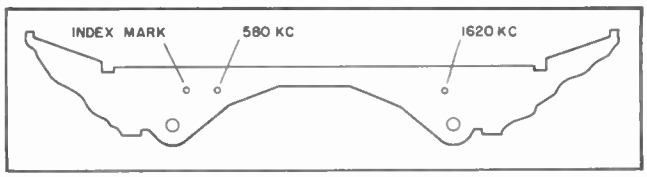


Figure 3. Front View of Pointer Rail, Showing Alignment Marks

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Output lead through a .1-μf. condenser to antenna section of tuning condenser or to pin 6 of converter (1R5). Ground lead to B—.	455 kc.	Tuning gang fully open.	Adjust, in order given, for maximum 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.

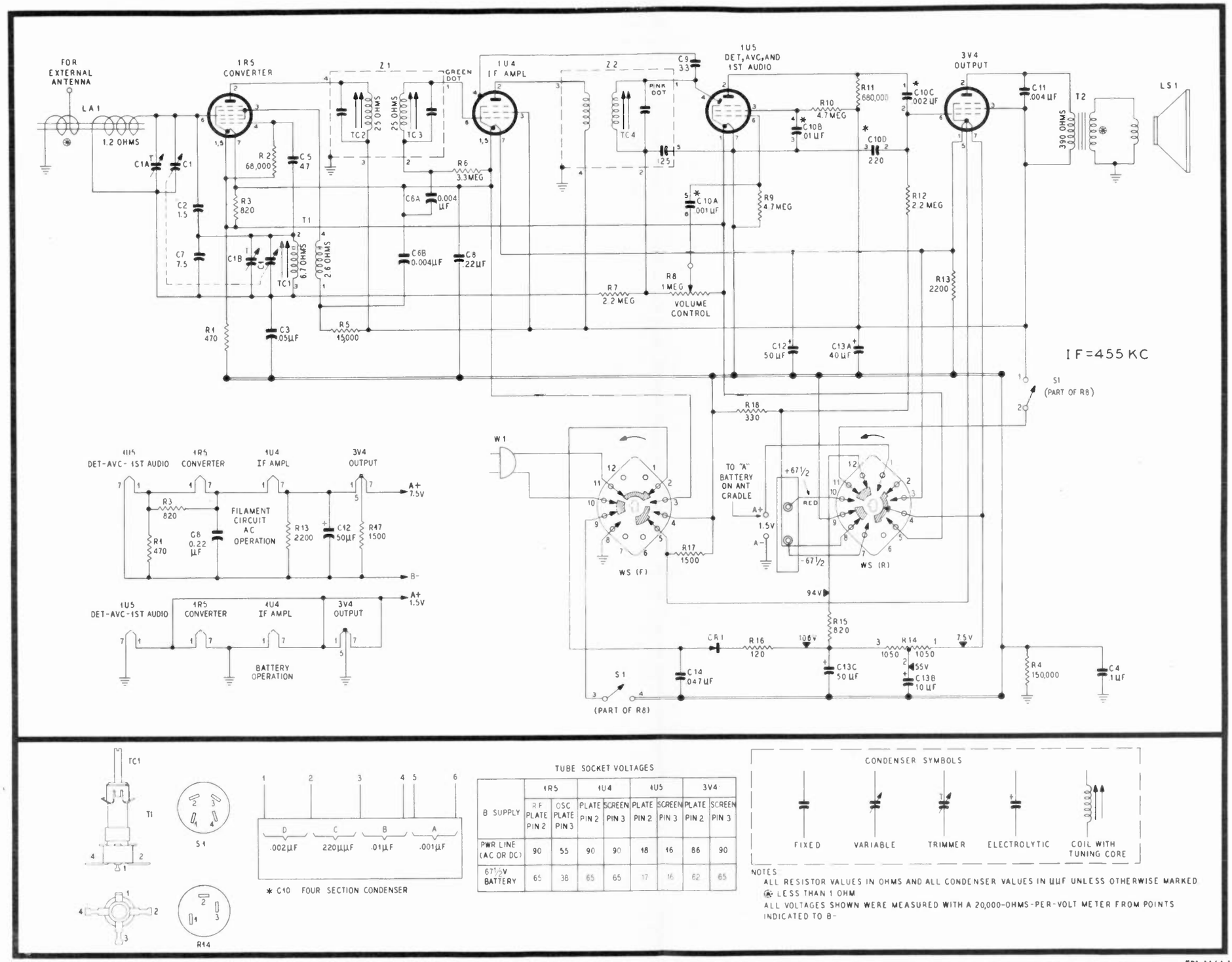


Figure 4. Philco Portable Radio Model 53-651, Schematic Diagram

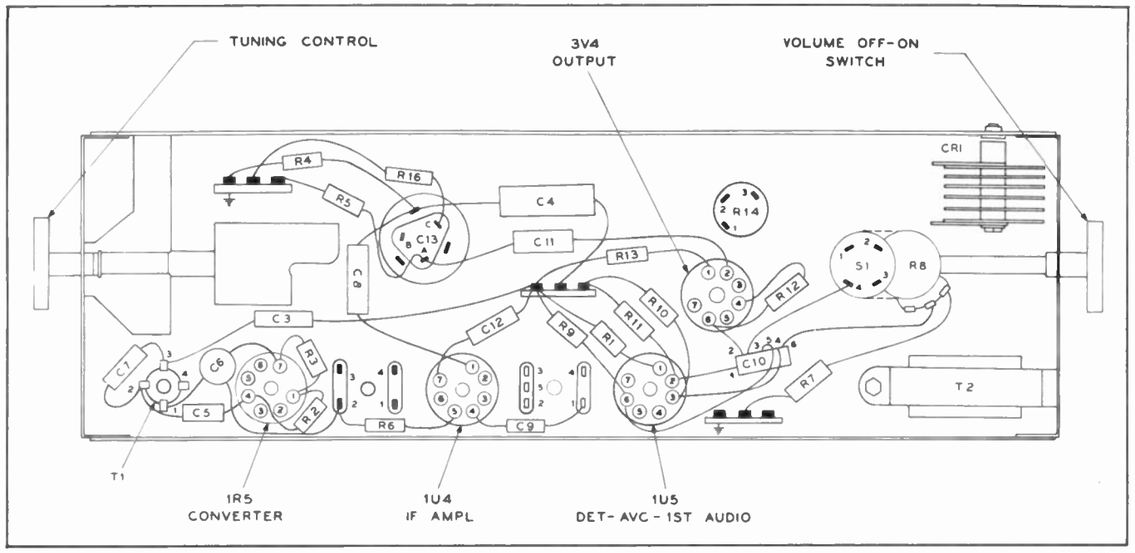


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Figure 5. Base View, Showing Parts Placement

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.*
C1	Condenser, tuning gang, 2-section	31-2735-2
C1A	Condenser, trimmer, antenna	Part of C1
C1B	Condenser, trimmer, oscillator	Part of C1
C2	Condenser, neutralizing, 1.5μμf.	30-1221-3
C3	Condenser, a-v-c by-pass, .05 μf.	30-4650-45°
C4	Condenser, B- to ground, .1 μf.	30-4650-47°
C5	Condenser, d-c blocking, 47 μμf.	60-00475420
C6	Condenser, dual ceramic	30-1239
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, 3.3 μμf.	30-1221
C10	Condenser, ceramic, 4-section	30-1237
C10A	Condenser, d-c blocking, .001 μf.	Part of C10
C10B	Condenser, screen by-pass, .01 μf.	Part of C10
C10C	Condenser, d-c blocking, .002 μf.	Part of C10
C10D	Condenser, grid by-pass, 220 μμf.	Part of C10
C11	Condenser, tone compensation, .004 μf.	30-4650-56°
C12	Condenser, electrolytic, filament by-pass, 50 μf., 25v	30-2417-12
C13	Condenser, electrolytic, 3-section	30-2568-39
C13A	Condenser, filter, 40 μf., 150v	Part of C13
C13B	Condenser, filter, 10 μf., 150v	Part of C13
C13C	Condenser, filter, 50 μf., 150v	Part of C13
C14	Condenser, line by-pass, .047 μf.	30-4650-45°
CR1	Selenium rectifier, 75 ma. at 117 volts	34-8003
LA1	Loop antenna	32-4455-10
LS1	Speaker, 4-inch, p-m	36-1637
R1	Resistor, current limiting, 470 ohms	66-1478340°
R2	Resistor, grid return, 68,000 ohms	66-3688340°
R3	Resistor, bias, 820 ohms	66-1828340°
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	33-5566-21
R9	Resistor, grid return, 4.7 megohms	66-5478340°
R10	Resistor, screen dropping, 4.7 megohms	66-5478340°
R11	Resistor, plate load, 680,000 ohms	66-4688340°
R12	Resistor, grid return, 2.2 megohms	66-5228340°

REPLACEMENT PARTS LIST (Cont.)

Reference Symbol	*Description*	*Service Part No.*
R13	Resistor, bias, 2200 ohms	66-2228340°
R14	Resistor, filament dropping and filter, 2100 ohms (center-tapped)	33-3445
R15	Resistor, filter, 820 ohms	66-1828340°
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
T1	Transformer, oscillator	32-4453-1
T2	Transformer, output	32-8434
W1	Line cord	L2183
WS	Wafer switch, voltage change-over	42-1925
Z1	Transformer, 1st i-f	32-4160-4A
Z2	Transformer, 2nd i-f	32-4454-1A

MISCELLANEOUS

Description	*Service Part No.*
Cabinet, cherry	10799-24
Back, cabinet, cherry	54-4767-21
Cabinet, driftwood	10799-26
Back, cabinet, driftwood	54-4767-23
Cabinet, spruce green	10799-25
Back, cabinet, spruce green	54-4767-22
Cable, battery	41-3988
Cover, sub-base	56-7912
Cover, switch	56-7911
Dial scale	54-5087
Drive cord (25-ft. spool)	45-8750°
Fastener, baffle mtg. (4 required)	W2235-7FA9
Handle	54-4883
Hinge, R.H.	56-7915-1
Hinge, L.H.	56-7915
Insulator, capacitor mtg.	27-9508
Knob (2 required)	54-4773
Nameplate	54-4884
Pointer	56-7973-1
Ring, shaft retaining	28-8610
Rubber mount, tuning capacitor (3 required)	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	27-6203
Socket	27-6203-12
Battery cradle and antenna ass'y.	76-5740-1

PR-2490

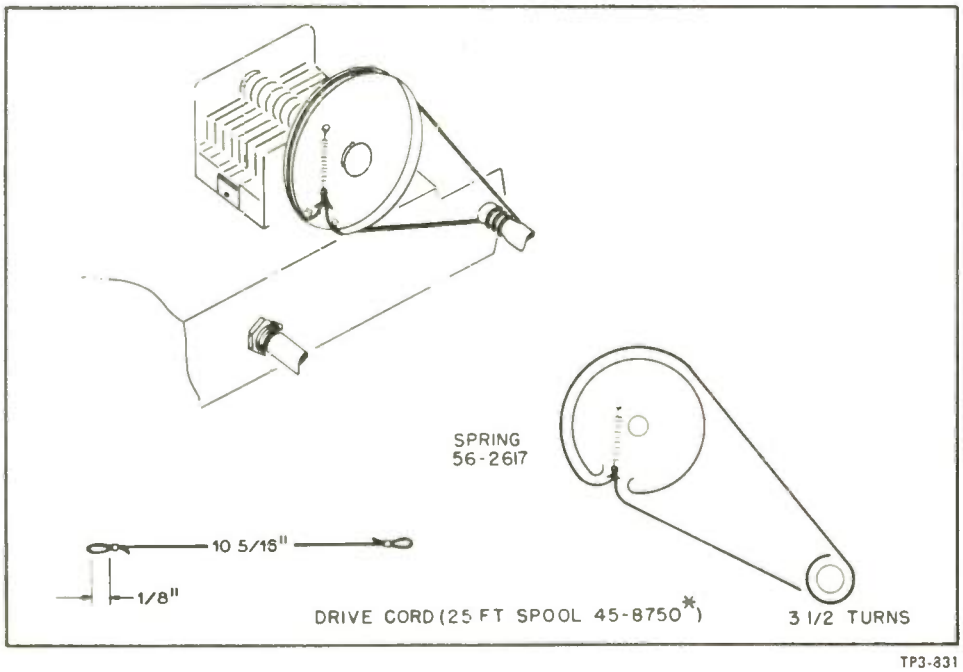
Printed in U.S.A.

PHILCO HOME RADIO MODEL B570, Code 121

SPECIFICATIONS

CABINET	Molded plastic
CIRCUIT	Four-tube superheterodyne (plus rectifier)
FREQUENCY RANGE	
Standard Broadcast	540 kc. to 1620 kc.
AUDIO OUTPUT	1 watt
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	12BE6 converter, 12BA6 i-f amplifier, 12AV6 det.-a.v.c.-1st audio, 35C5 output, 35W4 rectifier

MODEL B570



TP3-831

Figure 1. Dial-Cord Installation Details

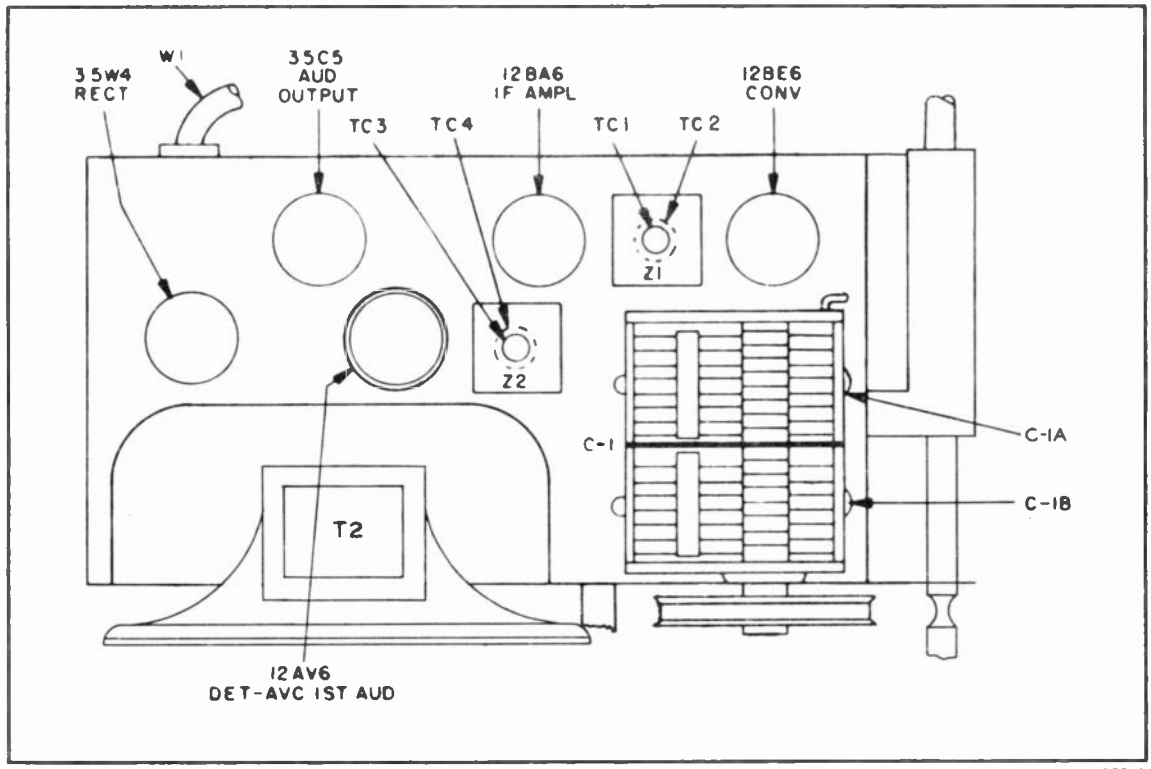
ALIGNMENT PROCEDURE

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.



TP3-829-A

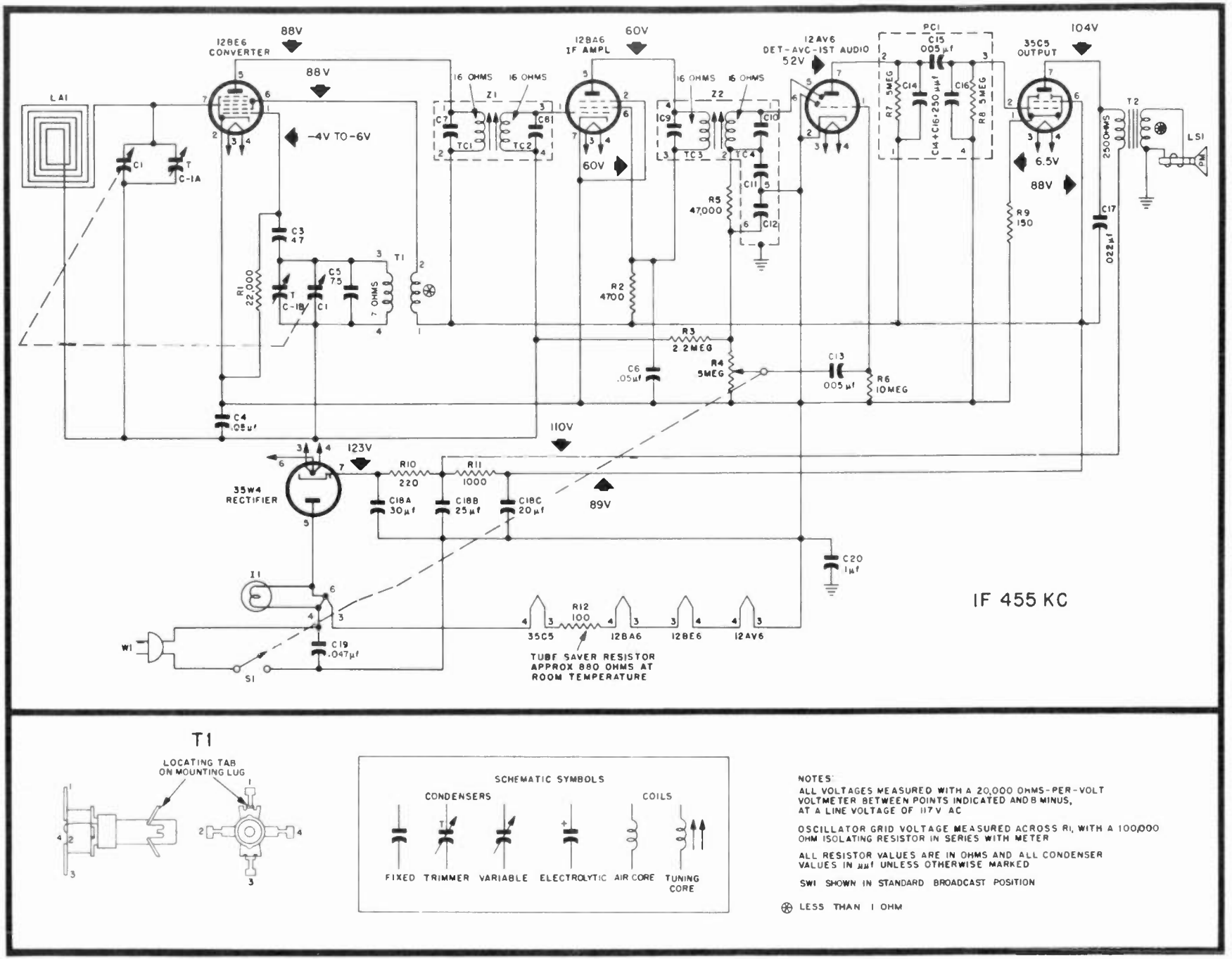
Figure 2. Top View, Showing Trimmer Locations

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO			ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	BAND SWITCH SETTING	SPECIAL INSTRUCTIONS	
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. 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 kc.	Broadcast	Adjust trimmer for maximum output.	C1-A aerial (broadcast).

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.



NOTES:
ALL VOLTAGES MEASURED WITH A 20,000 OHMS-PER-VOLT VOLTMETER BETWEEN POINTS INDICATED AND B MINUS, AT A LINE VOLTAGE OF 117 V AC

OSCILLATOR GRID VOLTAGE MEASURED ACROSS R1, WITH A 100,000 OHM ISOLATING RESISTOR IN SERIES WITH METER

ALL RESISTOR VALUES ARE IN OHMS AND ALL CONDENSER VALUES IN μμf UNLESS OTHERWISE MARKED

SW1 SHOWN IN STANDARD BROADCAST POSITION

⊛ LESS THAN 1 OHM

TP2-1408-1

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

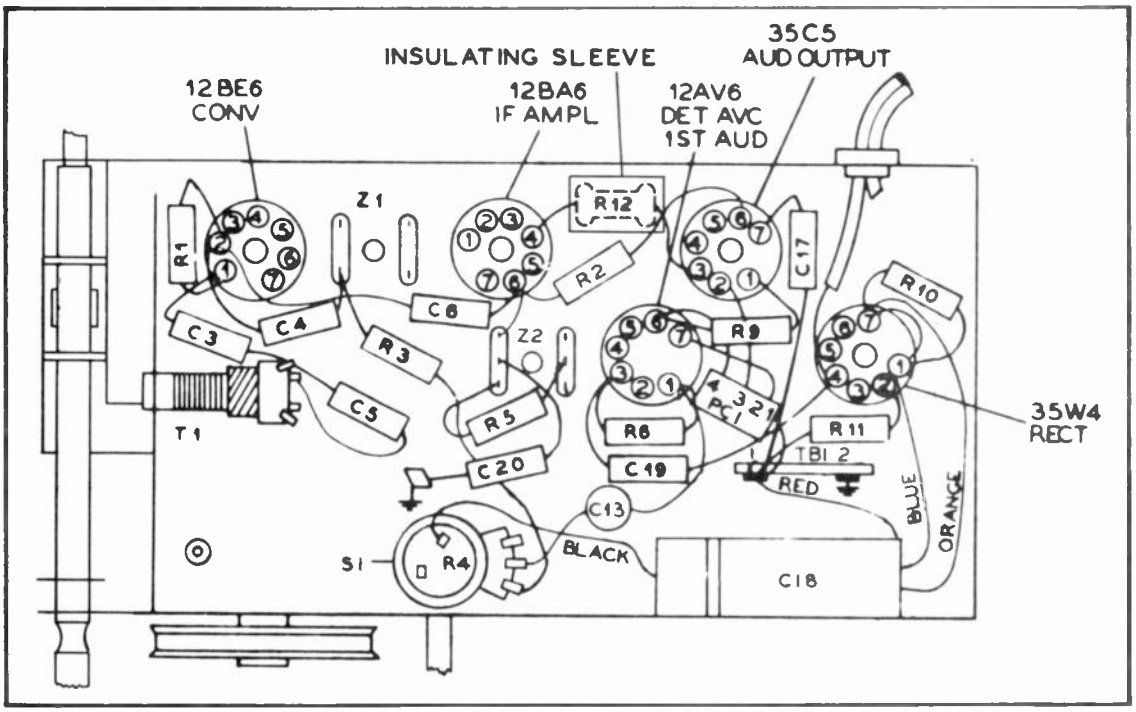


Figure 4. Base View, Showing Symbolized Chassis

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.
C1	Condenser, tuning gang	31-2751-14
C1A	Condenser, aerial trimmer	Part of C1
C1B	Condenser, osc. trimmer	Part of C1
C3	Condenser, oscillator grid, 47 μμf.	30-1230-4
C4	Condenser, a-v-c by-pass, .05 μf.	45-3505-28*
C5	Condenser, drift compensation 7.5 μμf.	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
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-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.	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 μf.	30-4650-45
C20	Condenser, B– to chassis, .1 μf.	45-3505-47*
I1	Lamp, pilot	34-2068
LA1	Loop, aerial	Part of back-and-loop ass'y.
LS1	Speaker, p-m	36-1627-8
PC1	Printed circuit	30-6001
R1	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
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	33-1343-3
S1	Switch, off-on	Part of R4
T1	Transformer, oscillator	32-4453-6
T2	Transformer, output	32-8384*
W1	Line cord	L-2183*
Z1	Transformor, 1st i-f	32-4161A
Z2	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Description	Service Part No.
Cabinet	
Cardinal	10990
Sand	10990-1
Back-and-loop ass'y.	76-8515-1
Knob (2)	54-6062
Drive cord, 25-foot spool	45-8750
Pointer, dial	
Cardinal cabinet	54-6061
Sand cabinet	54-6061
Shaft, tuning	28-9475FA11
Socket ass'y., pilot lamp	27-6233-80
Socket, 7-pin miniature, 12AV6	27-6303-14
Socket, 7-pin miniature, 12BE6, 12BA6	27-6265
Socket, 7-pin miniature, 35C5, 35W4	27-6265-2
Spring, retaining (3)	1W60980FE7
Spring, drive cord	56-2617
Bracket, switch operating	28-9473FA3
Bracket, switch mounting	28-9474FA3
Switch bracket and padder ass'y.	76-8477

Printed in U.S.A.

PHILCO SERVICE

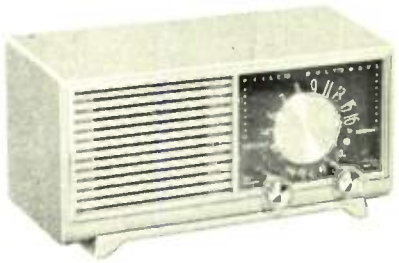
PHILCO Factory-Supervised Service

HOME RADIO

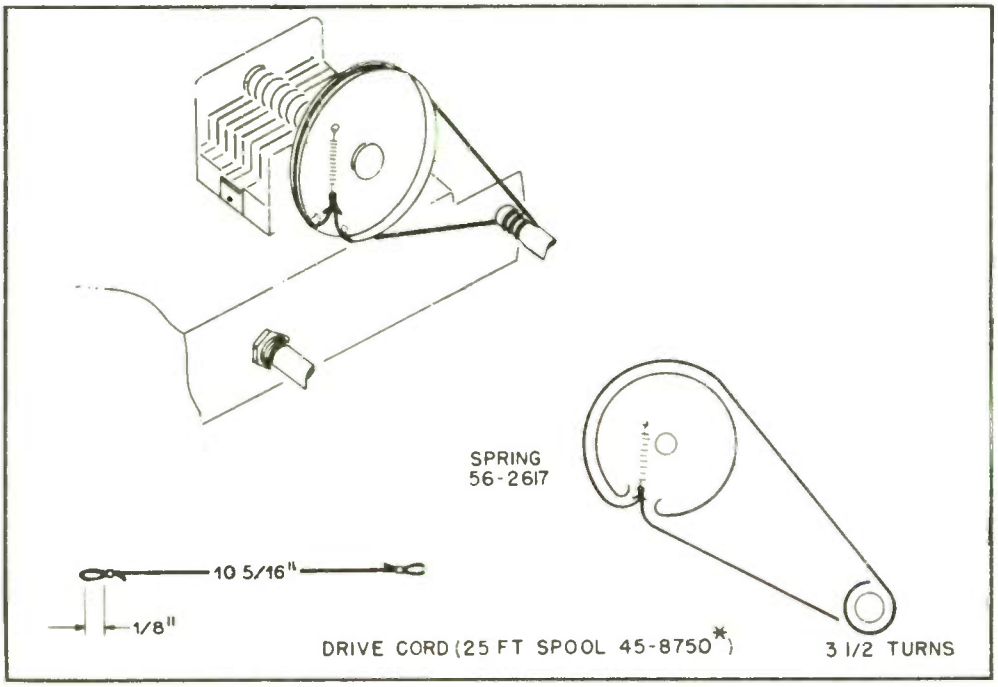
PHILCO HOME RADIO MODEL B574, CODE 121

SPECIFICATIONS

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
AERIAL	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



MODEL B574, CODE 121



TP3-831-2

Figure 1. Dial-Cord Installation Details

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.

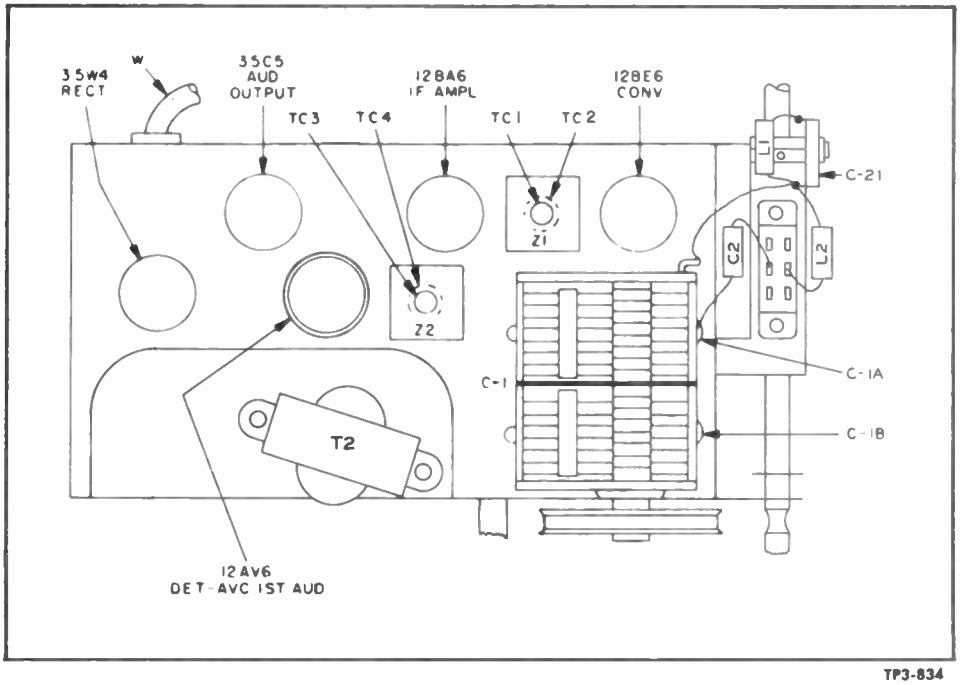


Figure 2. Top View, Showing Trimmer Locations

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO			ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	BAND SWITCH SETTING	SPECIAL INSTRUCTIONS	
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. 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 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.	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.

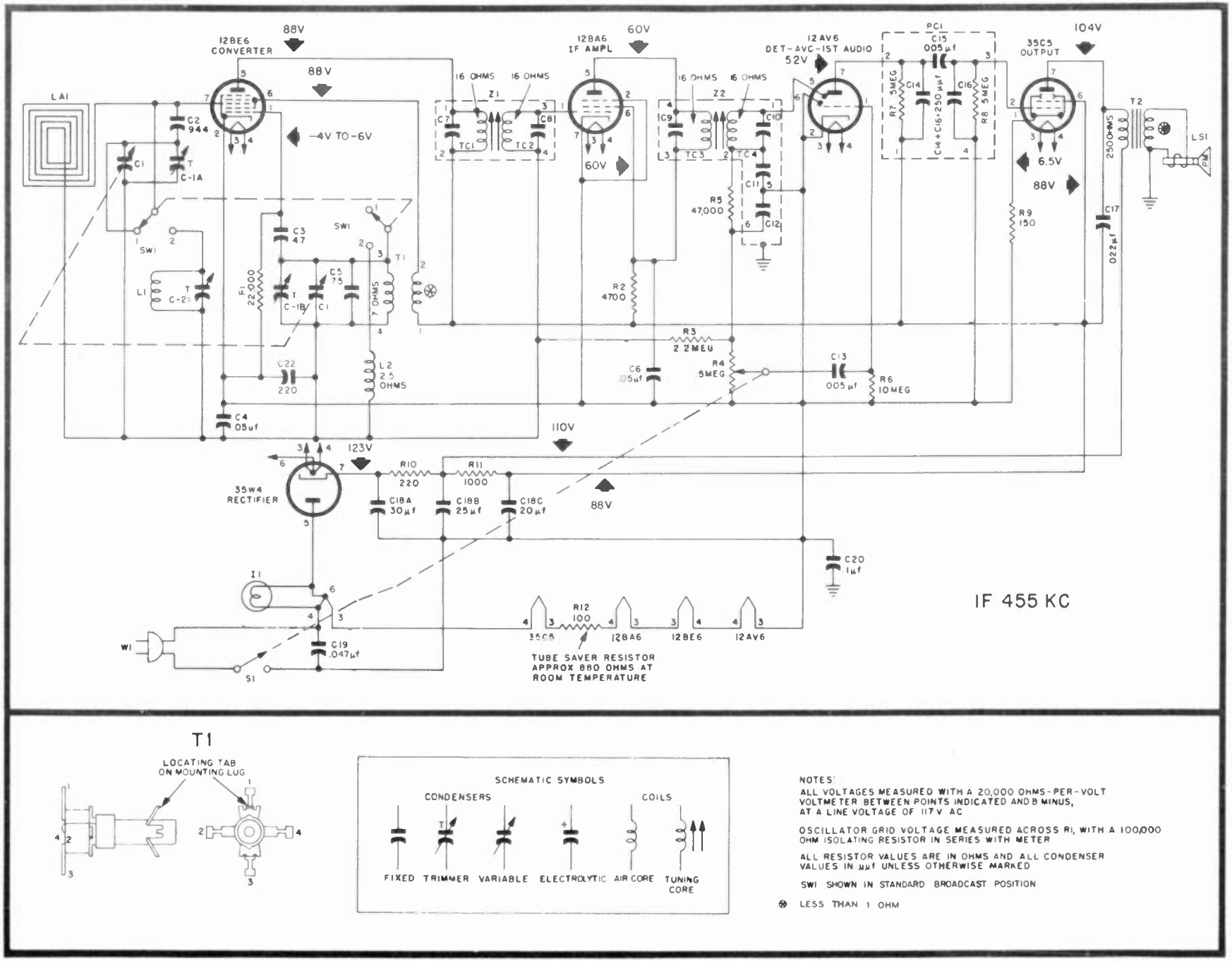
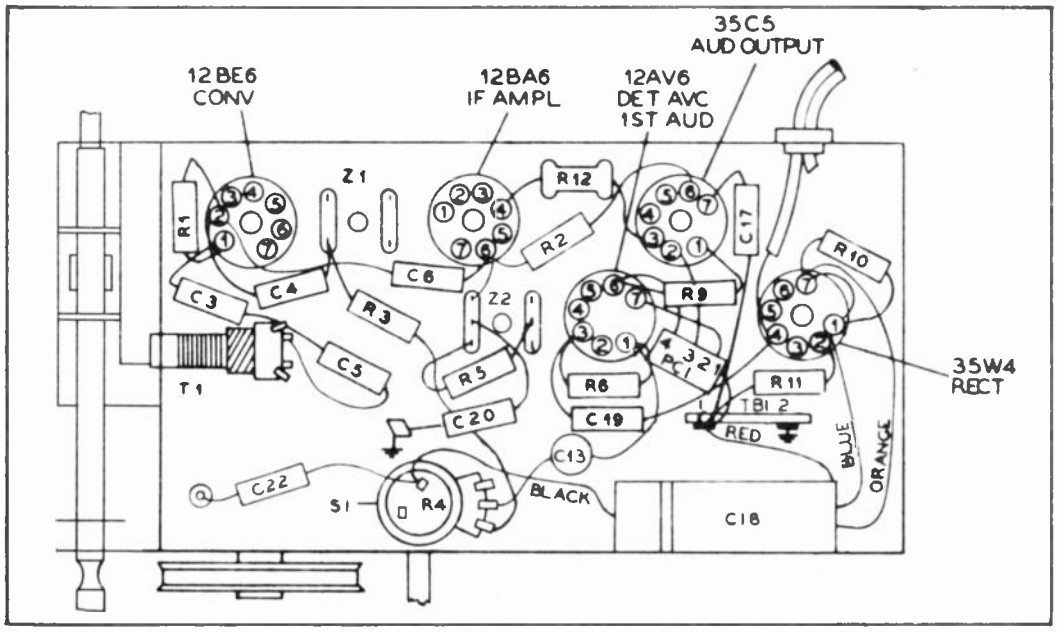


Figure 3. Philco Radio Model B574, Code 121, Schematic Diagram



TP3-829-1

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.
C1	Condenser, tuning gang	31-2751-14
C1A	Condenser, aerial trimmer	Part of C1
C1B	Condenser, osc. trimmer	Part of C1
C2	Condenser, aerial series tracker, 944 μμf.	30-1220-65
C3	Condenser, oscillator grid, 47 μμf.	30-1230-4
C4	Condenser, a-v-c by-pass, .05 μf.	45-3505-28*
C5	Condenser, drift compensation, 7.5 μμf.	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
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-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.	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, .047 μf.	30-4650-45
C20	Condenser, B- to chassis, .1 μf.	45-3505-47*
C21	Condenser, trimmer, special service	31-6473-32
I1	Lamp, pilot	34-2068
LA1	Loop, aerial	Part of back-and-loop ass'y.
L1	Coil, antenna, special services	32-4561-3
L2	Coil, oscillator shunt	32-4562-2
LS1	Speaker, p-m	36-1627-8
PC1	Printed circuit	30-6001
R1	Resistor, oscillator grid, 22,000 ohms	66-3228340*
R2	Resistor, i-f screen dropping, 4700 ohm.	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
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	33-1343-3
S1	Switch, off-on	Part of R4
SW1	Switch, broadcast-special services	42-1796-2
T1	Transformer, oscillator	32-4453-6
T2	Transformer, output	32-8384-4
W1	Line cord	L-2183*
Z1	Transformer, 1st i-f	32-4161A
Z2	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Description	Service Part No.
Cabinet, spruce	10926-29
Back-and-loop ass'y.	76-8362-1
Knob (2)	54-4773-3
Drive cord, 25-foot spool	45-8750
Pointer, dial	28-9502FCP
Shaft, tuning	28-9475FA11
Socket ass'y., pilot lamp	27-6233-80
Socket, 7-pin miniature, 12AV6	27-6203-14
Socket, 7-pin miniature, 12BE6, 12BA6	27-6265
Socket, 7-pin miniature, 35C5, 35W4	27-6265-2
Spring, retaining (3)	1W60980FE7
Spring, drive cord	56-2617
Bracket, switch operating	28-9473FA3
Bracket, switch mounting	28-9474FA3
Switch bracket and padder ass'y.	76-8477

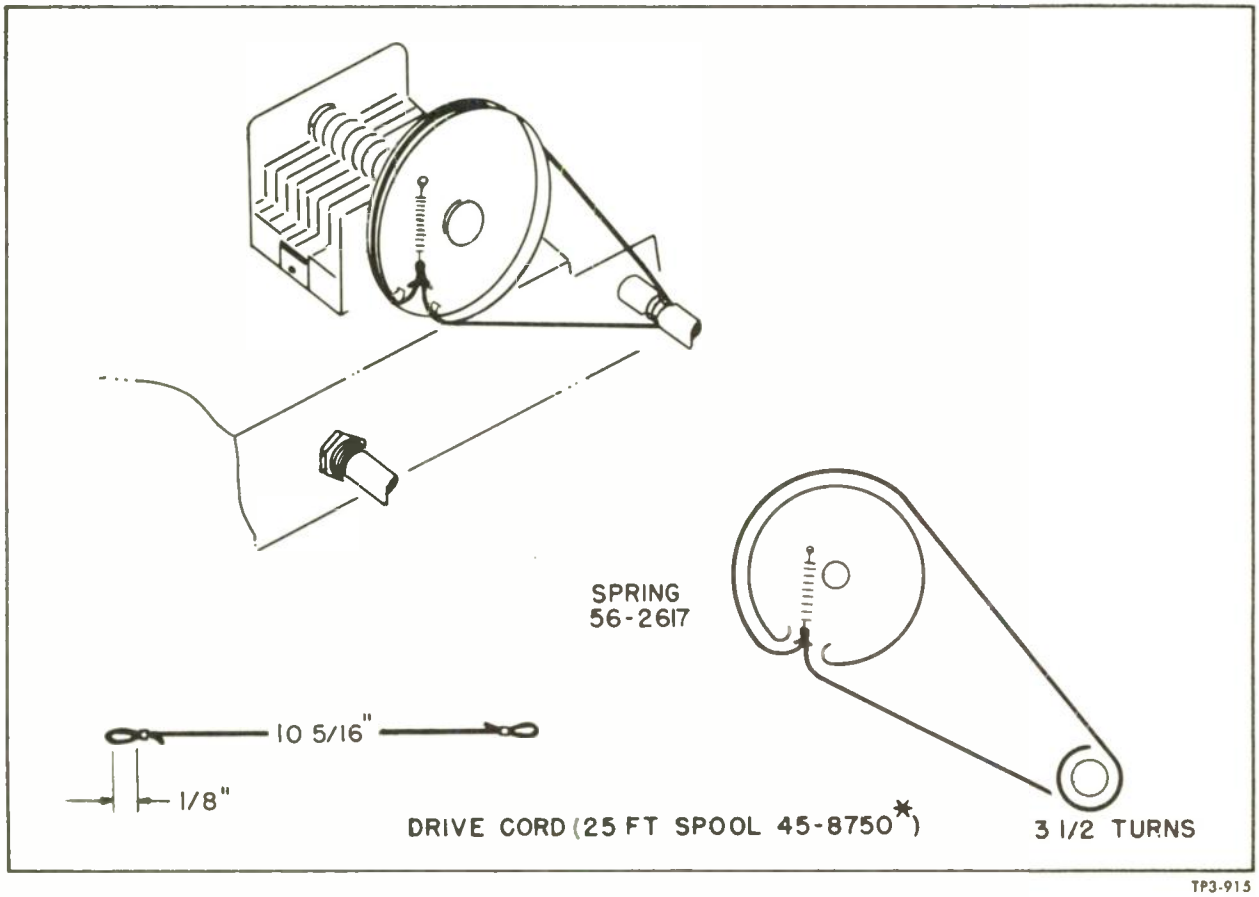
Printed in U.S.A.

PHILCO RADIO MODEL B574, CODE 122

SPECIFICATIONS

CABINET	Molded plastic, ebony or Swedish red
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
AERIAL	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

MODEL B574, CODE 122



TP3-915

Figure 1. Dial-Cord Installation Details

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. 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.

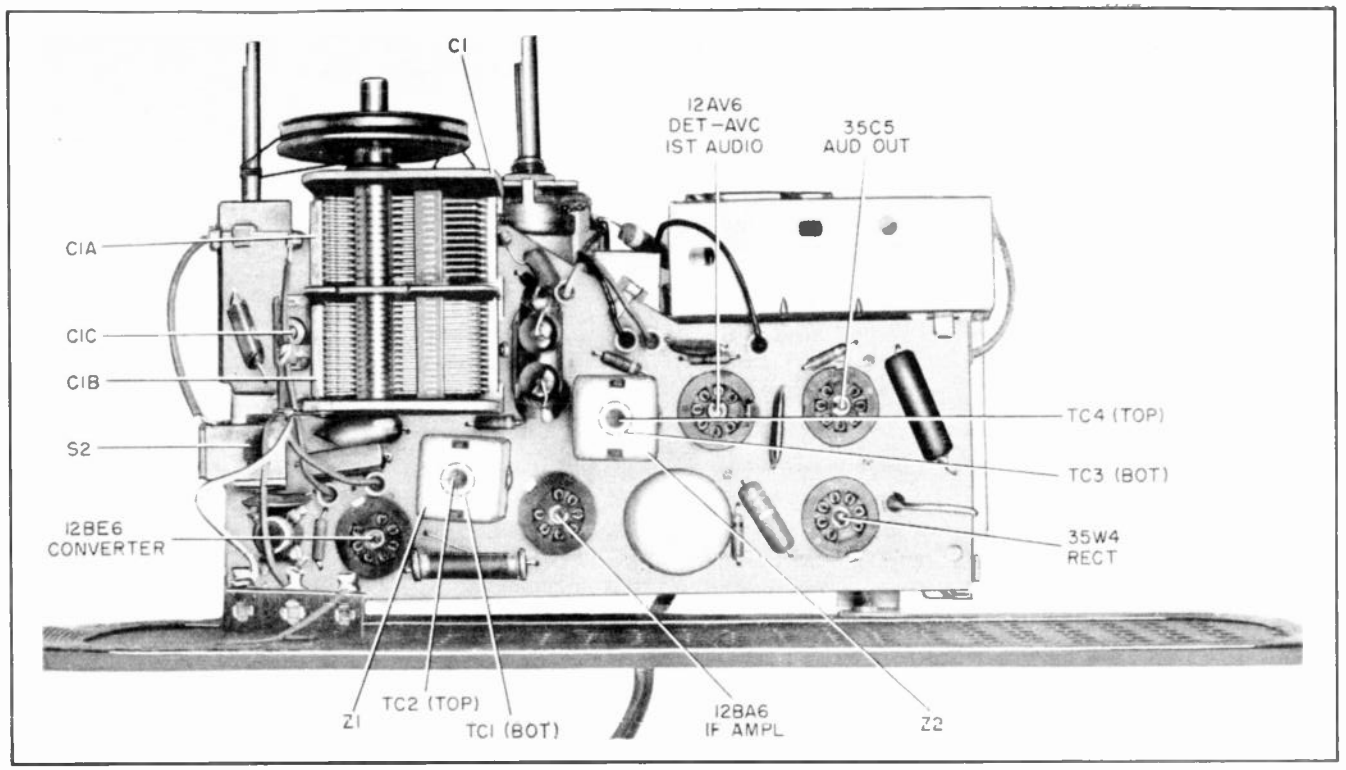
SIGNAL GENERATOR—Connect generator and set frequency as indicated in chart. Use modulated output.

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

STEP	SIGNAL GENERATOR		RADIO			ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	BAND SWITCH SETTING	SPECIAL INSTRUCTIONS	
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. 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 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).

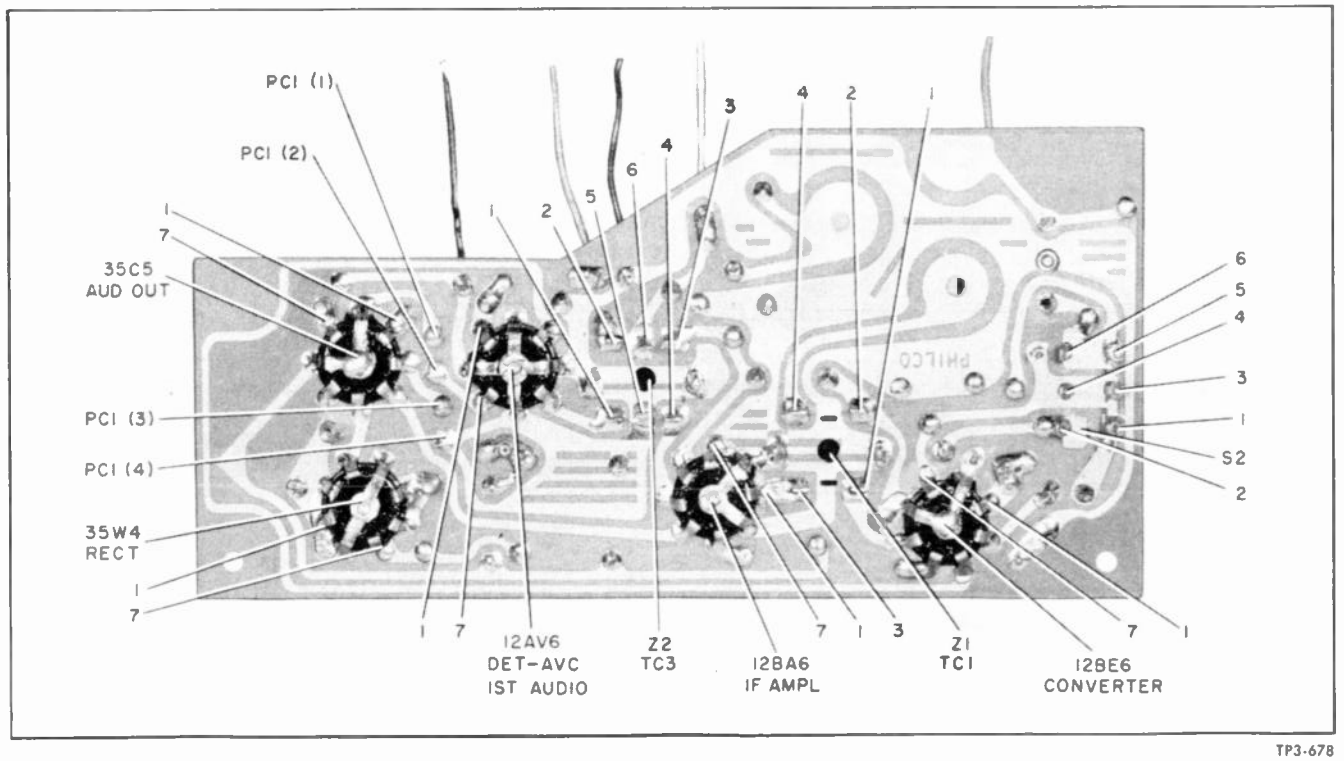
NOTE: Make up a 6—8 turn, 6-inch-diameter loop from insulated wire, connect to signal-generator leads, and place near radio loop. The 1620-kc. index mark is located on the pointer rail, to the extreme right side as viewed from the front.

* 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.



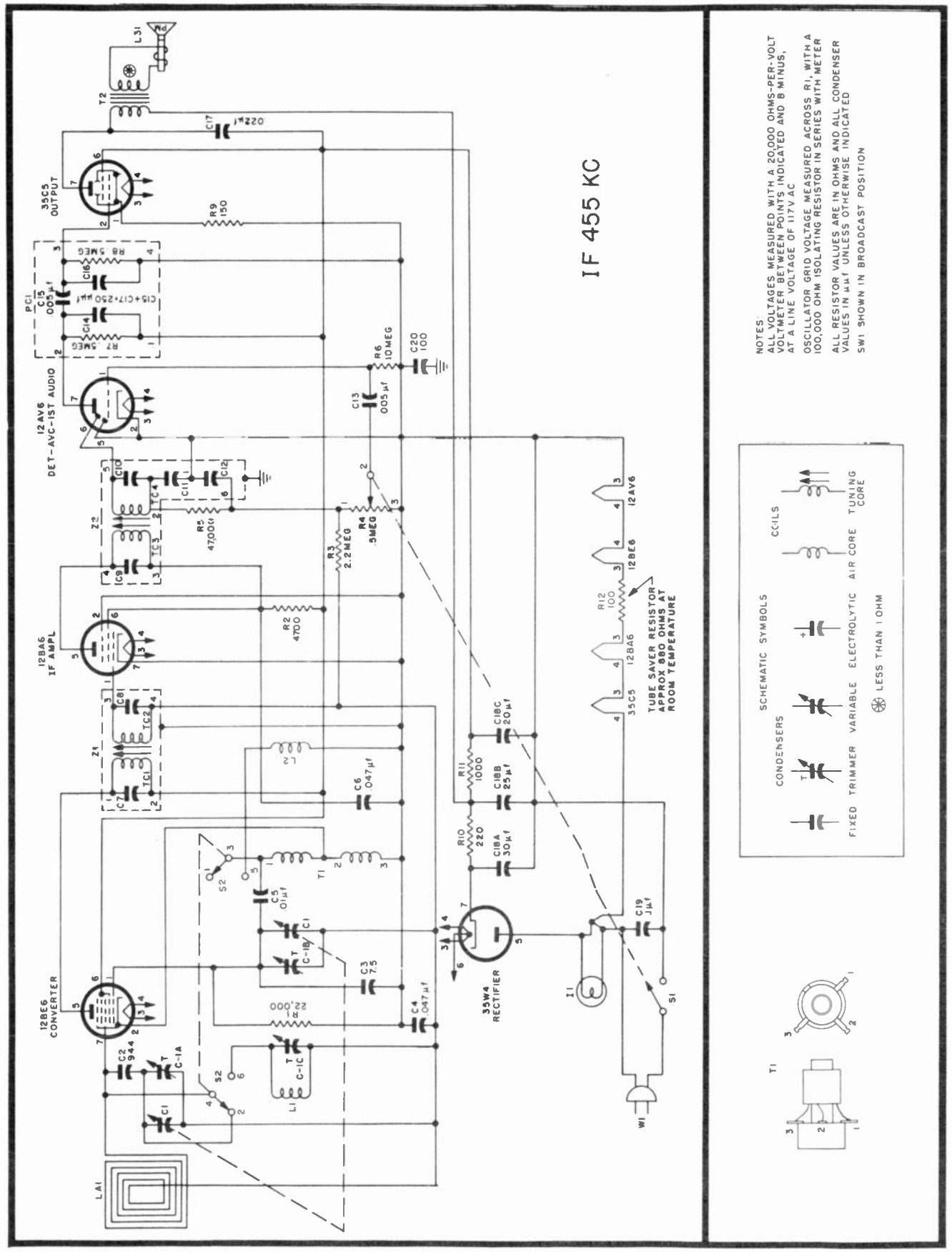
TP3-679

Figure 2. Top View, Showing Trimmer Locations



TP3-678

Figure 3. Base View, Showing Printed Wiring Circuit



TP3-500

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

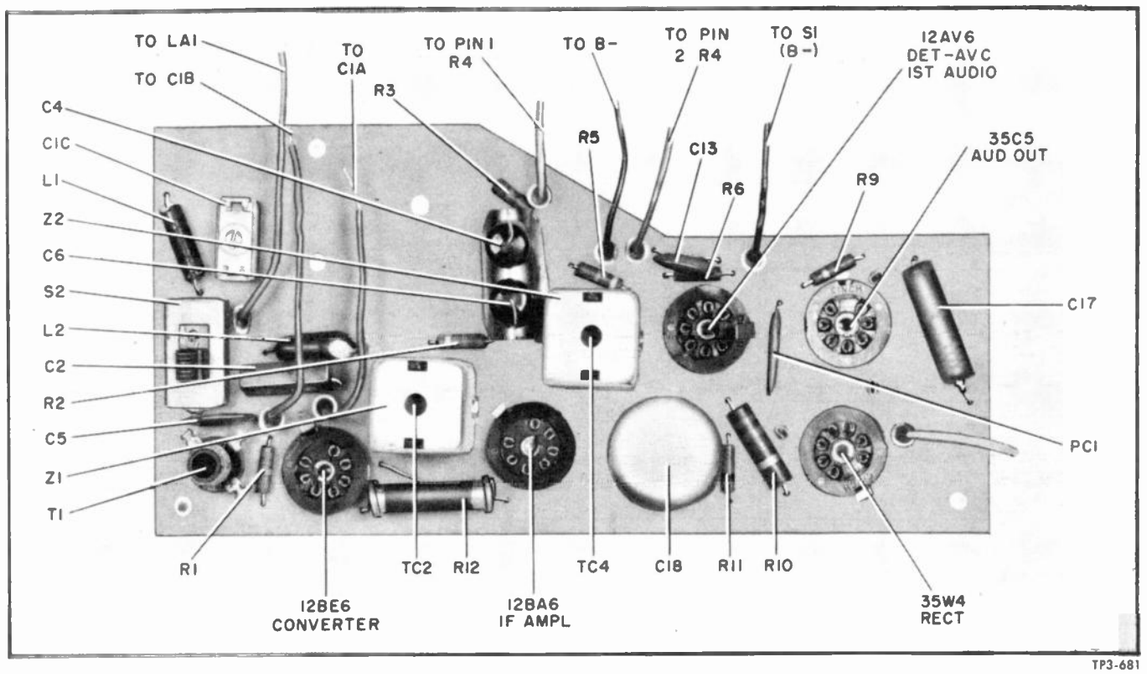


Figure 5. Top View, Showing Parts Placement

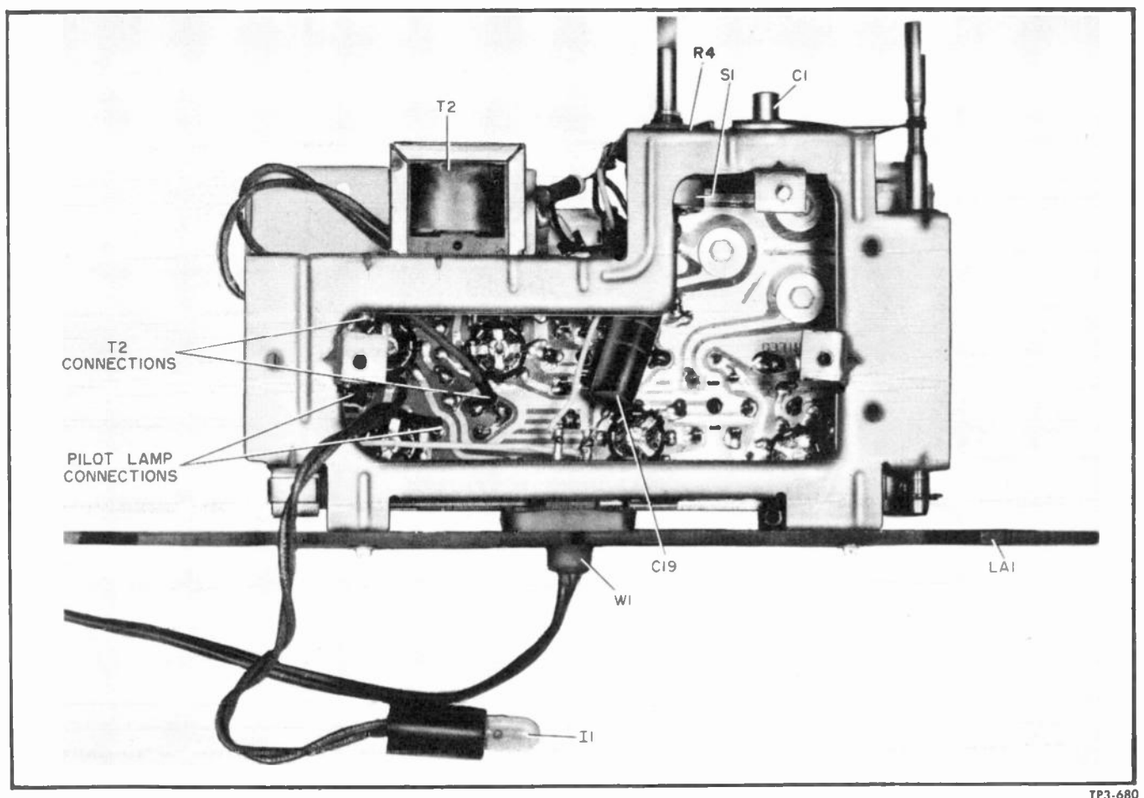


Figure 6. Bottom View, Showing Parts Placement

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	Description	Service Part No.
C1	Condenser, tuning gang	31-2751-16
C1A	Condenser, aerial trimmer	Part of C1
C1B	Condenser, oscillator trimmer	Part of C1
C1C	Condenser, trimmer, Special Services	31-6502-4
C2	Condenser, antenna series tracker, 944 μμf.	30-1220-05
C3	Condenser, drift compensation, 7.5 μμf.	30-1224-83
C4	Condenser, a-v-c by-pass, .047 μf.	30-4650-45
C5	Condenser, oscillator grid, .01 μf.	30-1238-2
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 μf.	30-1238-1
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.	30-4650-43
C18	Condenser, electrolytic, 3-section	30-2583-1
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.	30-4650-47
C20	Condenser, B minus to chassis, 100 μμf.	62-110009001
I1	Lamp, pilot	34-2068
L1	Coil, aerial, Special Services	32-4561-3
L2	Coil, oscillator shunt	32-4562-2
LA1	Loop, part of cabinet back	76-8362
LS1	Speaker, p-m	36-1627-21
R1	Resistor, oscillator grid, 22,000 ohms	66-3228340*
R2	Resistor, i-f screen dropping, 4700 ohms	66-2748340*
R3	Resistor, a-v-c filter, 2.2 megohms	66-5228340*
R4	Resistor, volume control, .5 megohm	33-5566-41
R5	Resistor, diode load, 47,00 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	33-1343-3
S1	Switch, off-on	Part of R4
S2	Switch, Broadcast-Special Services	42-1796-4
T1	Transformer, oscillator	32-4582
T2	Transformer, output	32-8384-5
W1	Line cord	L-2183*
Z1	Transformer, 1st i-f	32-4583
Z2	Transformer, 2nd i-f	32-4584

MISCELLANEOUS

Description	Service Part No.
Cabinet, spruce	10926-19
Cabinet, tangerine	10926-23
Back-and-loop assembly	76-8362
Connector, interlock, male	27-6240-6
Dial backplate, spruce	54-4972-2
Dial backplate, tangerine	54-4972
Dial scale	54-5147-3
Drive cord, 25-foot spool	45-8750
Knob	54-4773-3
Pointer	28-9502
Shaft, tuning	28-9312
Brackot, switch operating	28-9313
Socket assembly, pilot lamp	41-4176-2
Shield, pilot lamp	54-8806
Socket, 7-pin miniature	27-6296-5
Socket, 7-pin miniature, 12AV6	27-6296-4
Shield, tube	56-5629-12
Printed wiring panel (less components)	54-6058

PHILCO SERVICE

PHILCO Factory-Supervised Service

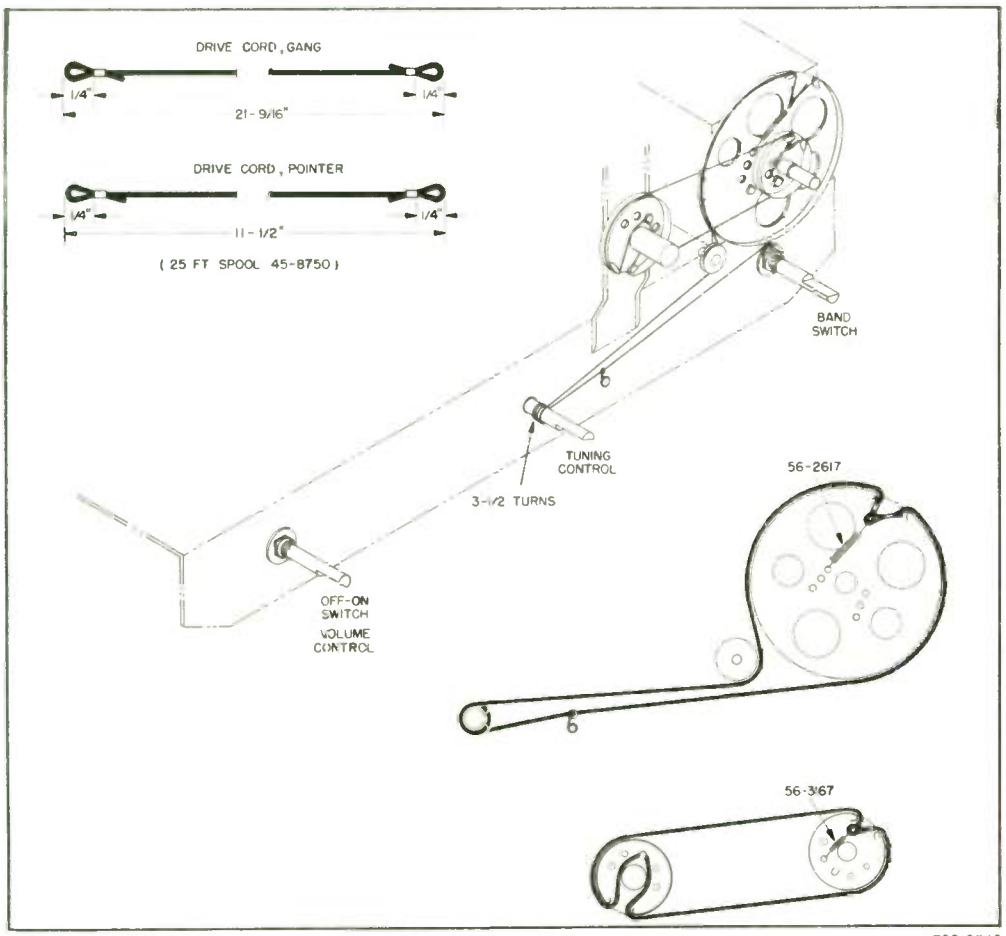
HOME RADIO

PHILCO RADIO MODEL B956

SPECIFICATIONS

CABINET	Plastic table model
CIRCUIT	Six-tube superheterodyne plus selenium rectifier
FREQUENCY RANGES	
Broadcast	540—1620 kc.
FM	88—108 mc.
AUDIO OUTPUT	1 watt
OPERATING VOLTAGE	105—125 volts, a.c./d.c.
POWER CONSUMPTION	45 watts
AERIAL	Built-in pancake loop for AM, line cord for FM; provision for connecting external aerial
INTERMEDIATE FREQUENCY	
AM	455 kc.
FM	9.1 mc.
PHILCO TUBES (6)	12AU6 r-f ampl., 12AT7 converter, 12BA6 1st i-f ampl., 12AU6 2nd i-f ampl., 19V8 det.-a.v.c.-1st audio, 35C5GT output

MODEL B956



TP2-2260

Figure 1. Drive-Cord Installation Details

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

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
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 maximum output, in order given.	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 maximum output.	C1C—osc. trimmer.
3	Same as step 2.	1500 kc.	1500 kc.	Adjust for maximum 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.

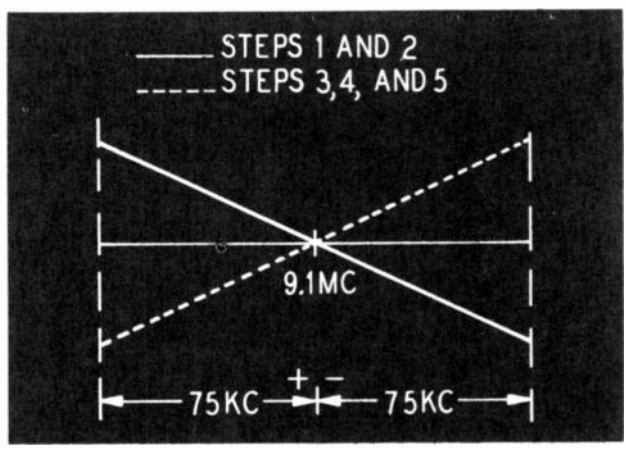
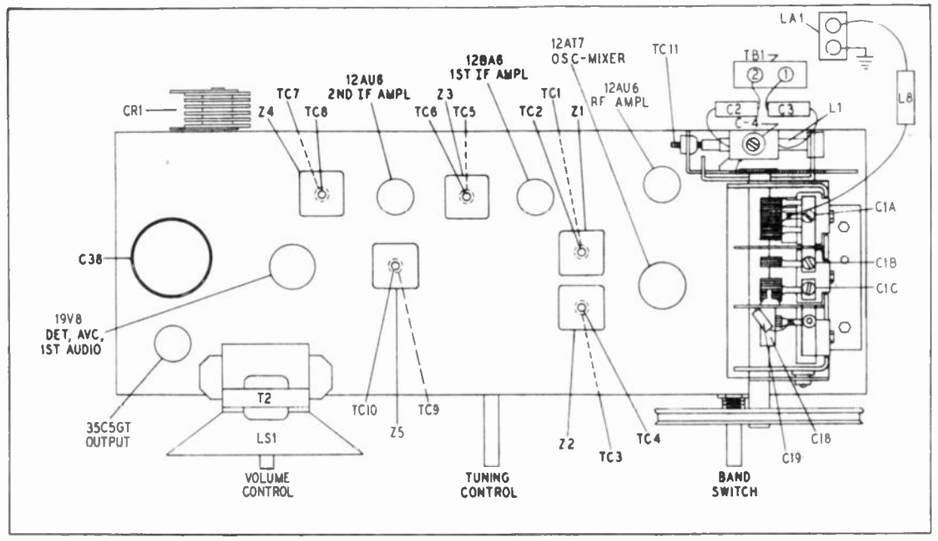


Figure 2. Characteristic Curve of FM Detector

FM ALIGNMENT CHART

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



TP2-2261

Figure 3. Top View, Showing Trimmer Locations

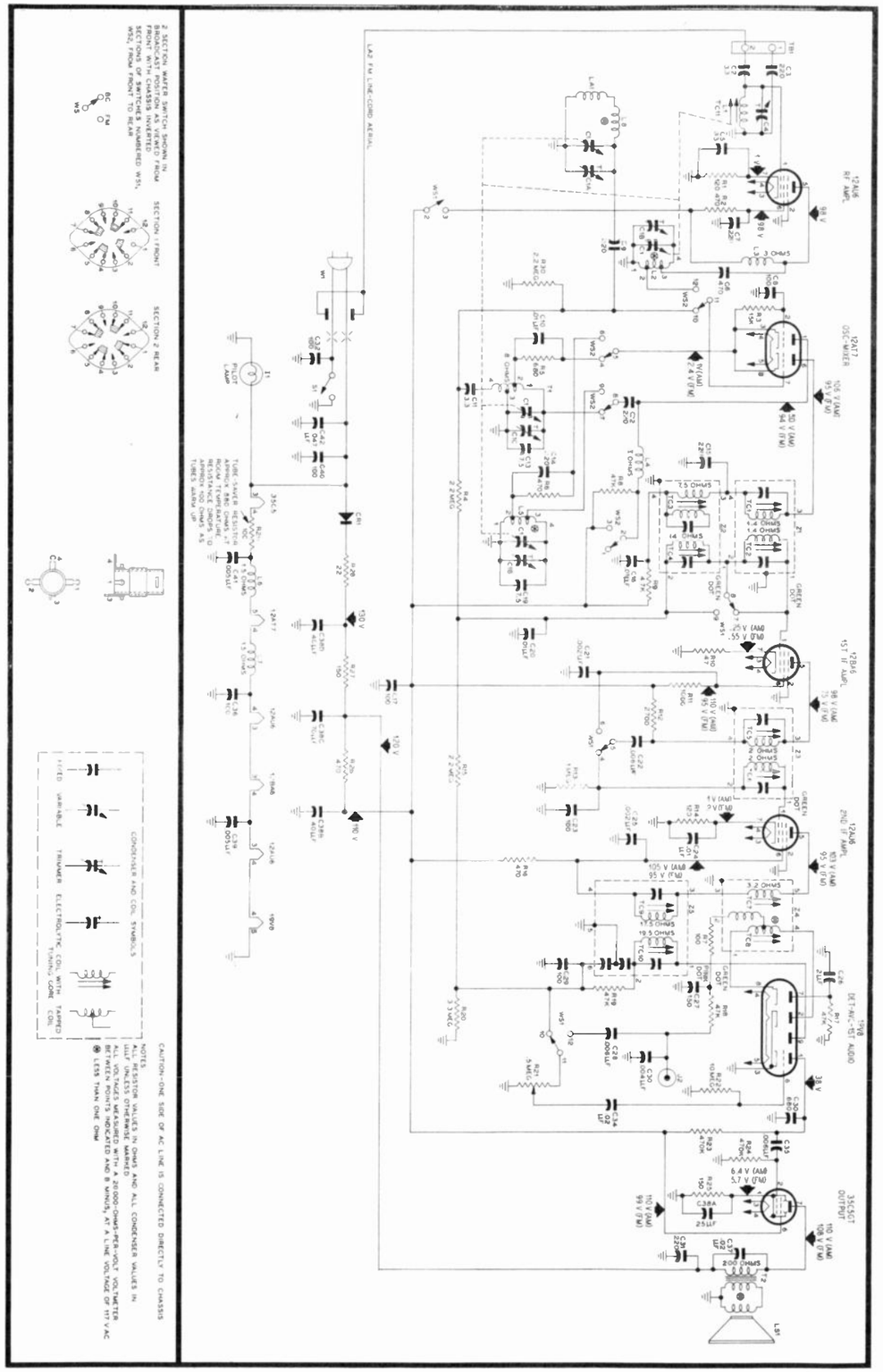
FM ALIGNMENT CHART *(Continued)*

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
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. Output 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 aerial coil, L1, is replaced, it should be 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.



TP2-2262-A

Figure 4. Philco Radio Model B956, Schematic Diagram

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, 5-section	31-2762-1
C1A	Condenser, trimmer, BC aerial	Part of C1
C1B	Condenser, trimmer, FM r-f	Part of C1
C1C	Condenser, trimmer, BC oscillator	Part of C1
C2	Condenser, aerial isolating, 3.3 μμf.	30-1221
C3	Condenser, aerial isolating, 220 μμf.	62-122001001*
C4	Condenser, FM aerial trimmer	45-3034
C5	Condenser, cathode by-pass, 33 μμf.	62-033009001
C6	Condenser, d-c blocking, 470 μμf.	62-147001021*
C7	Condenser, screen by-pass, 220 μμf.	62-122001001*
C8	Condenser, oscillator grid, 100 μμf.	62-110001021*
C9	Condenser, d-c blocking, 220 μμf.	62-122001001*
C10	Condenser, cathode by-pass, .01 μf.	30-4650-58*
C11	Condenser, neutralizing, 3.3 μμf.	30-1224-49
C12	Condenser, d-c blocking 220 μμf.	62-122001001*
C13	Condenser, fixed trimmer, 7.5 μμf.	30-1224-65
C14	Condenser, cathode by-pass, 220 μμf.	62-122001001*
C15	Condenser, r-f by-pass, 220 μμf.	62-122001001*
C16	Condenser, plate decoupling, .01 μf.	30-4650-58*
C17	Condenser, r-f by-pass, 100 μμf.	62-110009001*
C18	Condenser, trimmer, FM oscillator	31-6511-10
C19	Condenser, fixed trimmer, 7.5 μμf.	30-1224-8
C20	Condenser, a-v-c decoupling, .01 μf.	30-4650-58*
C21	Condenser, screen by-pass, .002 μf.	30-4650-54*
C22	Condenser, neutralizing, .006 μf.	30-4650-57*
C23	Condenser, i-f by-pass, 100 μμf.	62-110001021*
C24	Condenser, cathode by-pass, .01 μf.	30-4650-58*
C25	Condenser, screen by-pass, .002 μf.	30-4650-54*
C26	Condenser, electrolytic, diode-load filter, 2 μf., 50v	30-2417-7
C27	Condenser, i-f by-pass, 150 μμf.	62-115001011*
C28	Condenser, d-c blocking, .006 μf.	30-4650-57*
C29	Condenser, i-f by-pass, 100 μμf.	62-110001021*
C30	Condenser, de-emphasis, .004 μf.	30-4650-56*
C31	Condenser, plate decoupling, 220 μμf.	62-122001001*
C32	Condenser, line by-pass, 100 μμf.	62-110001021*
C33	Condenser, plate by-pass, 680 μμf.	62-168001001*
C34	Condenser, d-c blocking, .02 μf.	30-4650-60*
C35	Condenser, d-c blocking, .006 μf.	30-4650-57*
C36	Condenser, filament by-pass, 100 μμf.	62-110001021*
C37	Condenser, tone compensation, .02 μf.	30-4650-60*
C38	Condenser, electrolytic, 4-section	30-4650-46
C38A	Condenser, cathode by-pass, 25 μf., 25v	Part of C38
C38B	Condenser, filter, 40 μf., 150v	Part of C38
C38C	Condenser, filter, 70 μf., 150v	Part of C38
C38D	Condenser, filter, 40 μf., 150v	Part of C38
C39	Condenser, filament by-pass, .005 μf.	30-1238-1*
C40	Condenser, line by-pass, 100 μμf.	62-110001021*
C41	Condenser, filament by-pass, .005 μf.	30-1238-1*
C42	Condenser, line by-pass, .047 μf.	30-4650-45*
CR1	Selenium rectifier, 100 ma., 117v.	34-8003-1
I1	Pilot lamp, frosted, 117v, 7 watts	34-2605
J1	Jack, male, a-c	27-6240-5
J2	Socket, FM test	27-6180
L1	Coil, FM aerial, complete with grommet	32-4532A
L2	Coil, FM r-f	32-4415-2
L3	Choke, r-f, 3.3 μh.	32-4422-10
L4	Choke, r-f, 3.3 μh.	32-4422-10
L5	Coil, FM oscillator	32-4414-5
L6	Choke, filament, 2.2 μh.	32-4422-8
L7	Choke, filament, 2.2 μh.	32-4422-8
L8	Choke, r-f, 4.1 μh.	32-4061-3
LA1	AM loop and support assembly	76-7836
LA2	Line-cord aerial, FM	Part of W1
LS1	Speaker, 4" p-m, including output transformer	36-1625-14
R1	Resistor, cathode bias, 120 ohms	66-1128340*
R2	Resistor, screen decoupling, 470 ohms	66-1478340*
R3	Resistor, grid return, 15,000 ohms	66-3158340*
R4	Resistor, grid return, 2.2 megohms	66-5228340*
R5	Resistor, parasitic suppressor, 680 ohms	66-1688340*
R6	Resistor, parasitic suppressor, 470 ohms	66-1478340*
R7	Resistor, loading, 100 ohms	66-1108340*
R8	Resistor, plate dropping, AM, 47,000 ohms	66-3478340*
R9	Resistor, plate dropping, 4700 ohms	66-2478340*
R10	Resistor, cathode bias, 47 ohms	66-0478340*
R11	Resistor, screen decoupling, 1000 ohms	66-2108340*
R12	Resistor, plate decoupling, 2700 ohms	66-2278340*
R13	Resistor, grid return, 1 megohm	66-5108340*
R14	Resistor, cathode bias, 120 ohms	66-1128340*
R15	Resistor, a-v-c filter, 2.2 megohms	66-5228340*
R16	Resistor, decoupling, 470 ohms	66-1478340*
R17	Resistor, FM diode load, 47,000 ohms	66-3478340*
R18	Resistor, de-emphasis, 47,000 ohms	66-3478340*
R19	Resistor, i-f filter, 47,000 ohms	66-3478340*
R20	Resistor, a-v-c load, 3.3 megohms	66-5338340*
R21	Volume control (with off-on switch) 500,000 ohms	33-5566-20
R22	Resistor, grid return, 10 megohms	66-6108340*
R23	Resistor, plate load, 470,000 ohms	66-4478340*
R24	Resistor, grid return, 470,000 ohms	66-4478340*

(Continued on next page)

REPLACEMENT PARTS LIST *(Cont.)*

Reference Symbol	Description	Service Part No.
R25	Resistor, cathode bias, 150 ohms	66-1158340*
R26	Resistor, filter, 470 ohms, 1 watt	66-1474340*
R27	Resistor, filter, 150 ohms, 2 watts	66-1155360*
R28	Resistor, current limiting, 22 ohms, 2 watts	66-0225360*
R29	Resistor, current limiting, 100 ohms	33-1343-3
R30	Resistor, grid return, 2.2 megohms	66-5228340*
S1	Switch, off-on	Part of R21
T1	Transformer, AM oscillator	32-4569-1
T2	Transformer, output	Part of LS1
W1	Line cord	41-3865-3
W2	Cable, FM aerial, 72-ohm twin lead	41-3987
WS	Switch, band, 2-wafer	42-1924-1
Z1	Transformer, FM, 1st i-f	32-4518A
Z2	Transformer, AM, 1st i-f	32-4516A
Z3	Transformer, FM, 2nd i-f	32-4518-1A
Z4	Transformer, FM, detector	32-4310-4A
Z5	Transformer, AM, 2nd i-f	32-4517A

MISCELLANEOUS

Description	Service Part No.
Cabinet	10941
Back, flange, and socket assembly	76-7829

MISCELLANEOUS (Cont.)

Description	Service Part No.
Fastener, back mtg. (4)	W-2235-FA9
Dial scale	54-4987
Knob, FM-AM	54-4774-28
Knob, tuning	54-4774-26
Knob, volume-off-on	54-4774-27
Clip, pilot lamp	56-3545-FA3
Drive cord, 25-foot spool	45-8750*
Pointer	56-9906
Shaft, drive	56-7931FA11
Spring, gang drive	56-2617
Spring, pointer drive	56-3167
Rubber mount, speaker (2)	54-4651-1
Socket, 12BA6 (i-f ampl.)	27-6265
Socket, 12AU6 (i-f ampl.)	27-6265
Socket, 12AU6 (r-f ampl.)	27-6275-1
Socket, 12AT7	27-6203-6
Socket, 19V8	27-6203-6
Socket, 35C5	27-6203-12
Shield, tube (2)	56-5629-3
Shield, tube base (1)	56-3978-1FA3
Shield, tube base (2)	56-5628-1FA3
Socket, assembly, pilot lamp	27-6233-21
Spring, hairpin	28-8610

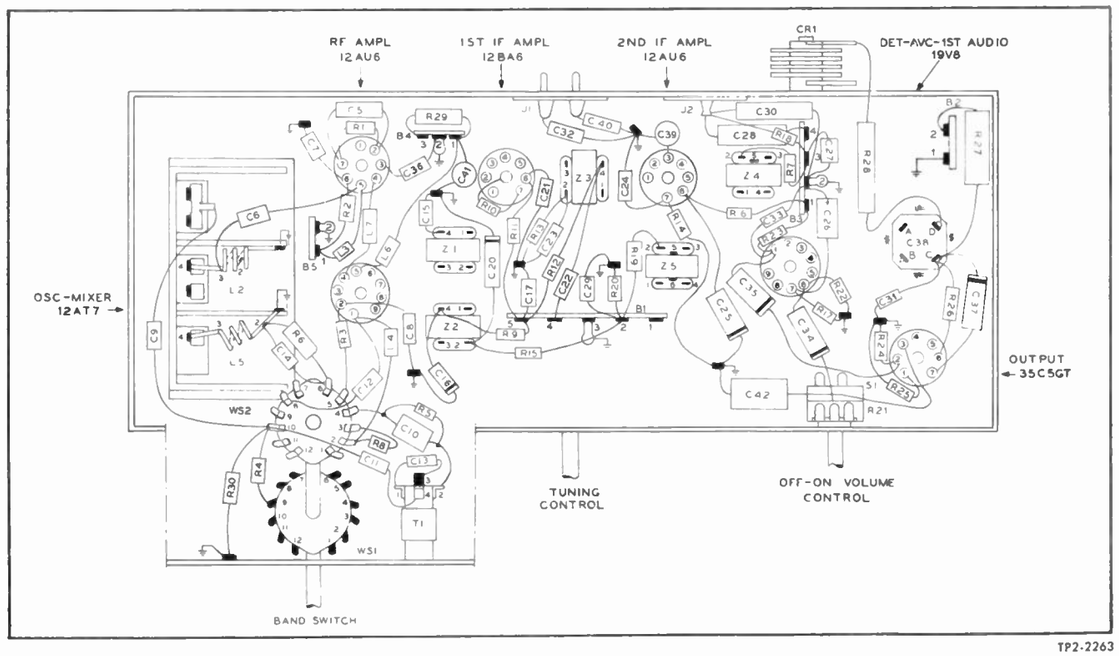


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Figure 5. Base View, Showing Parts Placement

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PHILCO SERVICE

PHILCO Factory-Supervised Service

HOME RADIO

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 ampl; 6BE6 converter, osc., phono preampl; 6BJ6 i-f ampl; 6AV6 detector, a.v.c., 1st audio; 6AQ5 output; 6X4 rectifier

MODEL B1754

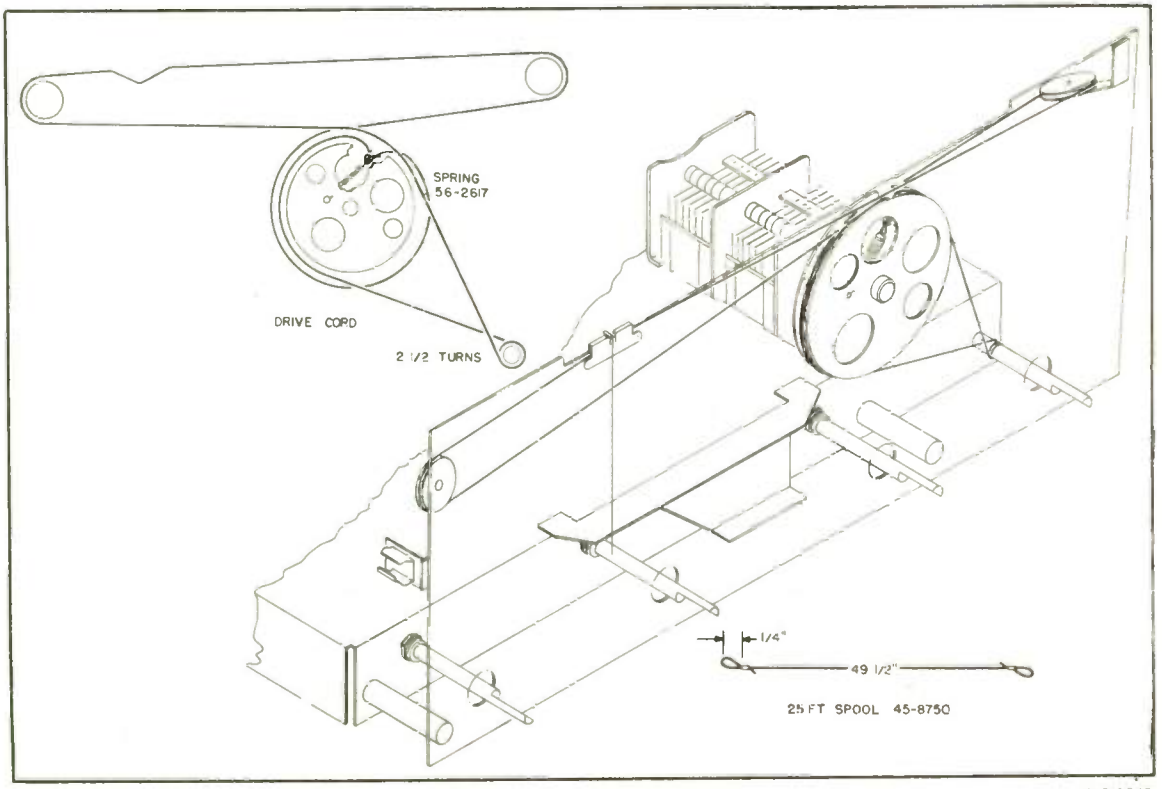

Figure 1. Drive-Cord Installation Details

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.

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
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-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).	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 services mixer-grid trimmer C4—special services r-f trimmer
7	Same as step 2.	1800 kc.	Same as step 3.	Adjust for maximum output.	C2—special services r-f padder

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.

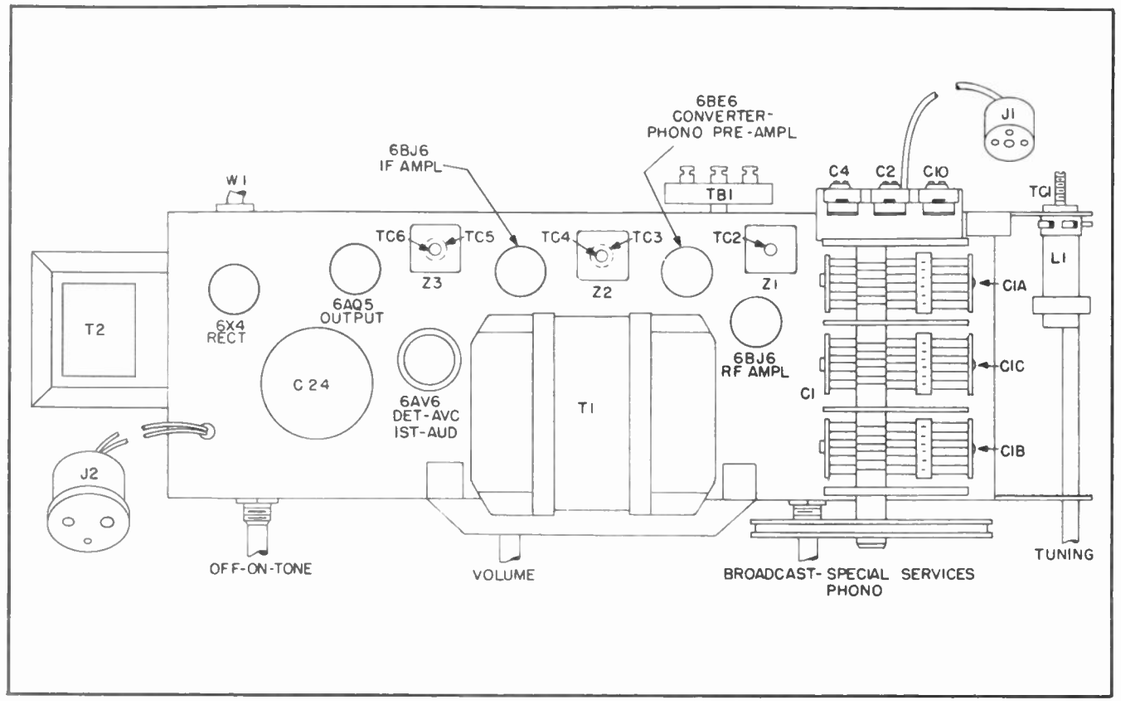

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Figure 2. Top View, Showing Tuning Adjustments

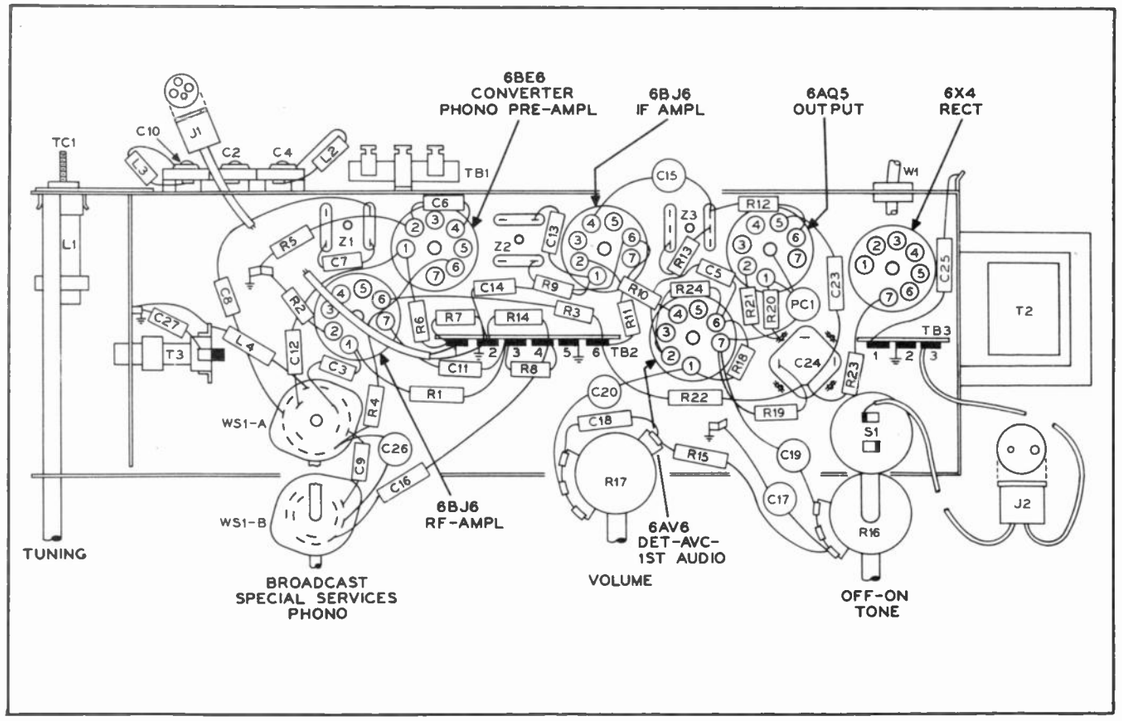

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Figure 3. Base View, Showing Parts Placement

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.
C1	Condenser, tuning gang, 3-section	31-2771-3
C1A	Condenser, trimmer, antenna	Part of C1
C1B	Condenser, trimmer, r-f	Part of C1
C1C	Condenser, trimmer, oscillator	Part of C1
C2	Condenser, padder, special services r-f	Part of CA1
C3	Condenser, d-c blocking, 100 μμf.	62-110001001*
C4	Condenser, trimmer, special services r-f	Part of CA1
C5	Condenser, r-f by-pass, 220 μμf.	62-122001001*
C6	Condenser, r-f by-pass, 100 μμf.	62-110001001*
C7	Condenser, r-f by-pass, 5 μμf.	60-90505020
C8	Condenser, fixed padder, 865 μμf.	30-1220-72
C9	Condenser, harmonic suppression, 47 μμf.	60-00475417
C10	Condenser, trimmer, special services mixer-grid	Part of CA1
C11	Condenser, a-v-c by-pass, .047 μf.	30-4650-45*
C12	Condenser, oscillator coupling, 47 μμf.	60-00475417
C13	Condenser, i-f coupling, 220 μμf.	62-122001001*
C14	Condenser, screen by-pass, .047 μf.	30-4650-45*
C15	Condenser, plate by-pass, .01 μf.	30-1238-2*
C16	Condenser, audio coupling, .0068 μf.	30-4650-57
C17	Condenser, tone compensation (bass boost), .005 μf.	30-1238-1*
C18	Condenser, tone compensation, 47 μμf.	60-00475417
C19	Condenser, tone compensation (high cut) .01 μf.	30-1238-2*
C20	Condenser, audio coupling, .005 μf.	30-1238-1*
C21	Condenser, d-c blocking, .007 μf.	Part of PC1
C22	Condenser, r-f by-pass, 220 μμf.	Part of PC1
C23	Condenser, tone compensation, .0033 μf.	30-4650-89*
C24	Condenser, electrolytic filter	30-2584-32
C24A	Condenser, filter, 20 μf.	Part of C24
C24B	Condenser, filter, 20 μf.	Part of C24
C24C	Condenser, filter, 40 μf.	Part of C24
C24D	Condenser, filter, 10 μf.	Part of C24
C25	Condenser, line by-pass, .0068 μf.	30-4650-57
C26	Condenser, audio coupling (phono), .005 μf.	30-1238-1
C27	Condenser, fixed trimmer, 7.5 μμf.	30-1224-65
CA1	Condenser assembly, trimmer	31-6477-17
I1	Lamp assembly, pilot (2)	27-6233-4
J1	Connector, phono input	76-8262-1
J2	Connector, phono a-c	76-8366
L1	Coil, antenna	32-4413-2
L2	Coil, special services r-f	32-4561-5
L3	Coil, special services mixer grid	32-4561-5
L4	Coil, oscillator shunt	32-4562-1
LA1	Loop antenna	32-4394-13
LS1	Speaker (10")	36-1610-6
PC1	Printed circuit	30-1239-4
R1	Resistor, r-f a-v-c, 1 megohm	66-5108340*
R2	Resistor, cathode bias, 82 ohms	66-0828340*
R3	Resistor, screen dropping, 22,000 ohms	66-3225340*
R4	Resistor, plate load, preampl., 220,000 ohms	66-4228340
R5	Resistor, cathode bias, 27,000 ohms	66-3278340*
R6	Resistor, oscillator grid leak, 33,000 ohms	66-3338340*
R7	Resistor, load (phono), 1 megohm	66-5108340*
R8	Resistor, a-v-c load, 2.2 megohms	66-5228340*
R9	Resistor, grid leak, 470,000 ohms	66-4478340*
R10	Resistor, cathode bias, 270 ohms	66-1275340*
R11	Resistor, screen dropping, 68,000 ohms	66-3688340*
R12	Resistor, plate dropping, 10,000 ohms	66-3108340*
R13	Resistor, i-f filter, 47,000 ohms	66-3478340*
R14	Resistor, diode load, 330,000 ohms	66-4338340*
R15	Resistor, tone compensation (bass boost)	66-3478340*
R16	Resistor, tone control, 5 megohms	33-5566-48
R17	Resistor, volume control, 2 megohms	33-5535-36
R18	Resistor, grid leak, 10 megohms	66-6108340*
R19	Resistor, plate load, 1 megohm	66-5108340*
R20	Resistor, grid leak, 470,000 ohms	66-4478340*
R21	Resistor, cathode bias, 330 ohms, 1 watt	66-1334340*
R22	Resistor, B+ filter, 1000 ohms	66-2105340*
R23	Resistor, B+ filter, 270 ohms	66-1275340*
R24	Resistor, diode load, 470,000 ohms	66-4478340*
S1	Switch, off-on	Part of R16
S2	Switch, off-on, phono motor	Part of M-24 Record Changer
T1	Transformer, power	32-8610
T2	Transformer, output	32-8242-13
T3	Transformer, oscillator	32-4453-2
W1	Line cord	L-2183*
WS1	Switch, band	42-1997
Z1	Transformer, r-f	32-4399-7A
Z2	Transformer, 1st i-f	32-4160A
Z3	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Description	Service Part No.
Cabinet, mahogany	10985
Back	54-8932
Hinge, right hand (2)	56-9922
Hinge, left hand (2)	56-9922-1
Cabinet, blonde oak	10985-1
Back	54-8932-1
Hinge, right hand (2)	56-9922-2
Hinge, left hand (2)	56-9922-3
Dome (4)	45-6190
Door pull (2)	56-7062-1
Bullet catch (2)	45-6002
Strike plate (2)	45-6003
Changer frame ass'y.	76-6600-2
Rail ass'y., r.h. (changer drawer)	76-6597
Rail ass'y., l.h. (changer drawer)	76-6258
Spring, changer mtg. (3)	56-7059FA9
Spring, changer mtg. (3)	56-7059-1FCP
Sleeve, changer mtg. (3)	54-7798
Pull knob, changer drawer	56-8496
Frame ass'y.	45-9790
Dial backplate ass'y.	76-8321
Dial scale	54-5184
Clip, scale	56-4756FE11
Knob (3)	54-4718-20
Knob	54-4718-21
Spring, shaft retaining	28-8610
Pointer	56-5630-57
Socket (5)	27-6275
Socket (6AV6)	27-6203-14
Rubber mount, gang mounting	27-4596
Tube shield	56-5629FA3

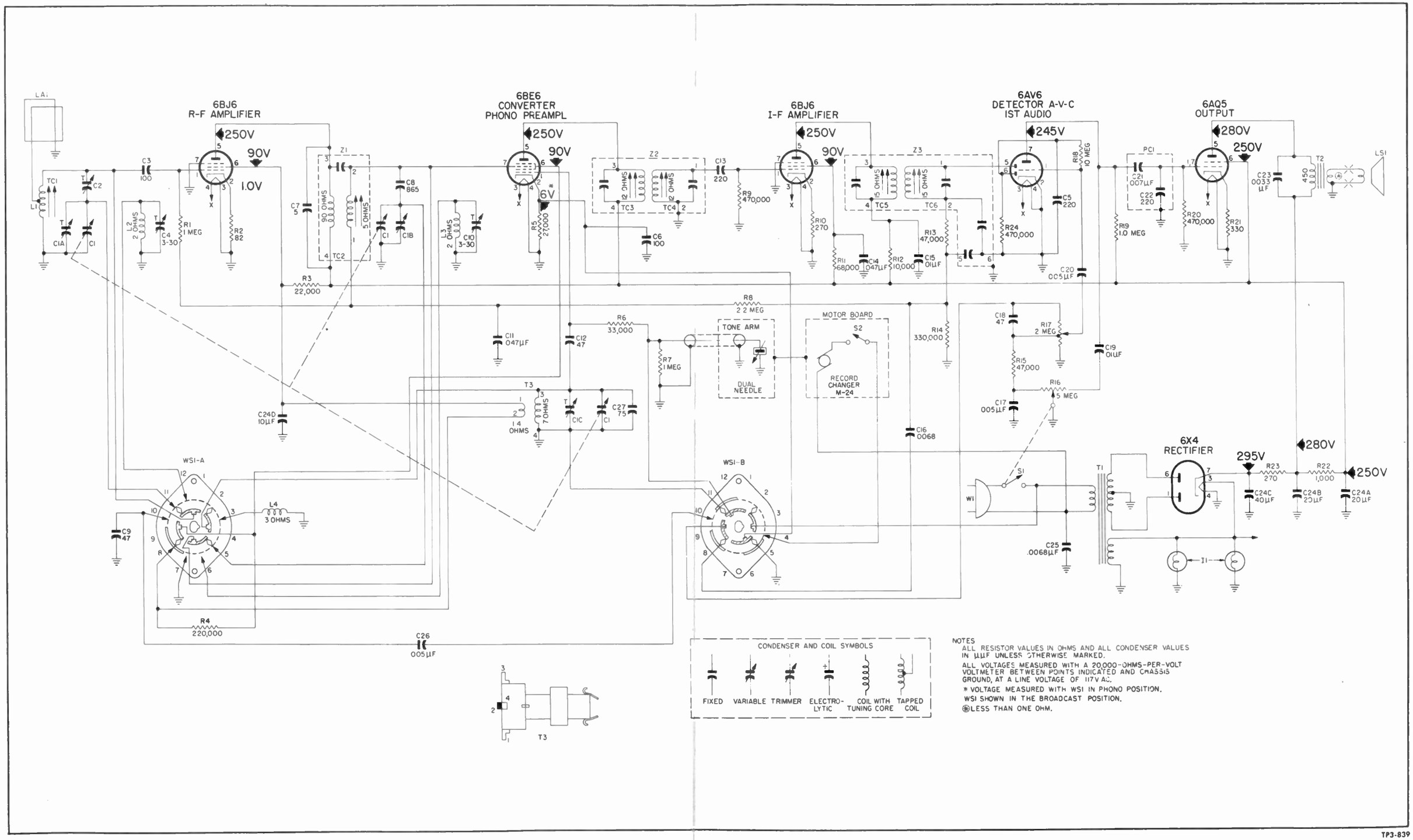


Figure 4. Philco Radio-Phonograph Model B1754, Schematic Diagram

PHILCO SERVICE

PHILCO Factory-Supervised Service

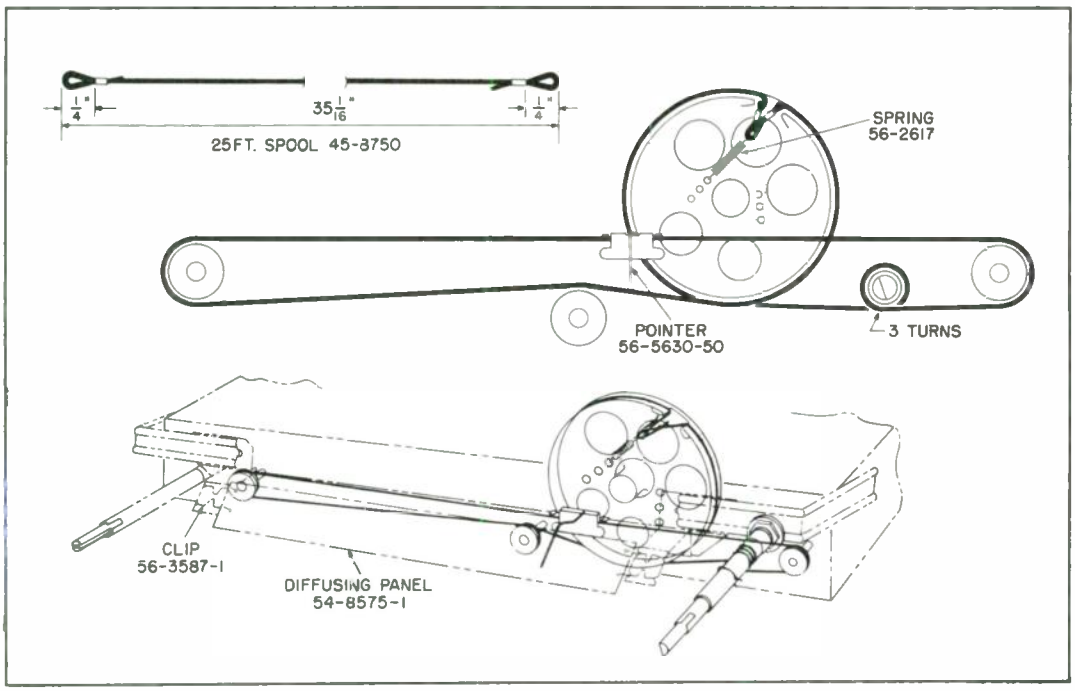
HOME RADIO

PHILCO RADIO-PHONOGRAPH MODEL B1350

SPECIFICATIONS

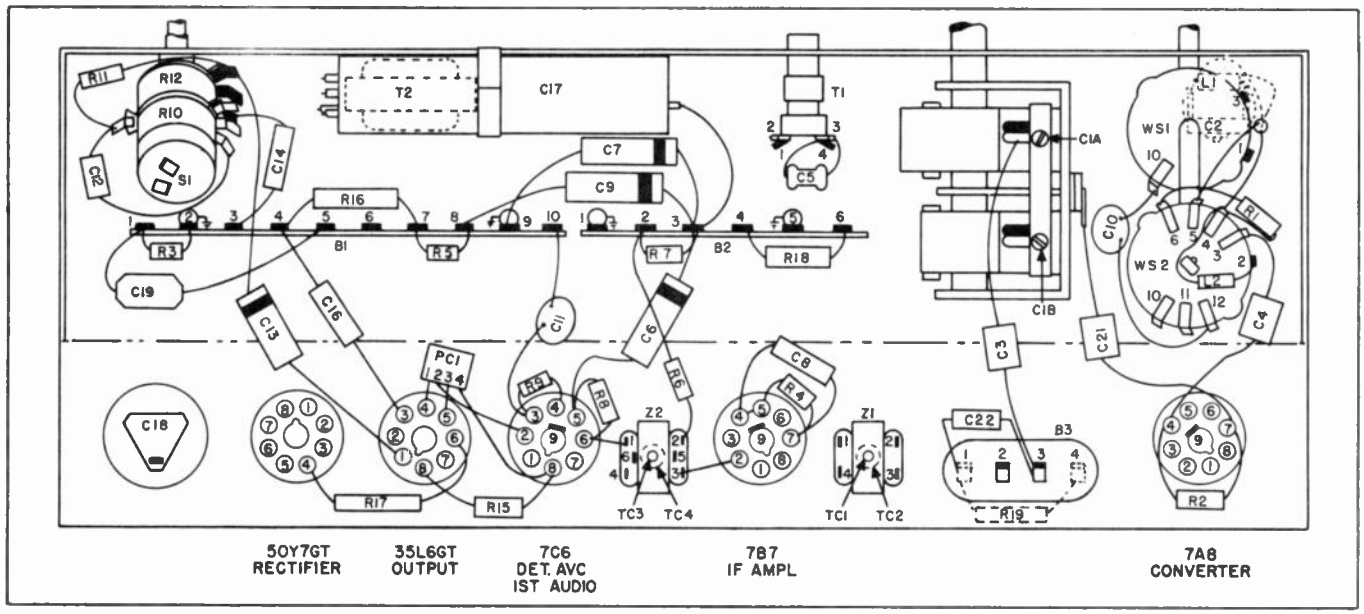
CABINET	Molded plastic
CIRCUIT	Four-tube superheterodyne plus rectifier
FREQUENCY RANGES	
Broadcast	540—1620 kc.
Special Services	1700—3400 kc.
AUDIO OUTPUT	3 watts
OPERATING VOLTAGE	105—120 volts, 60 cycles, a.c.
POWER CONSUMPTION	
Radio	35 watts
Phonograph	60 watts
INTERMEDIATE FREQUENCY	455 kc.
ANTENNA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

MODEL B1350



TP2-2587

Figure 1. Drive-Cord Installation Details



TP2-2588

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.

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST TRIMMER
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
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)

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.

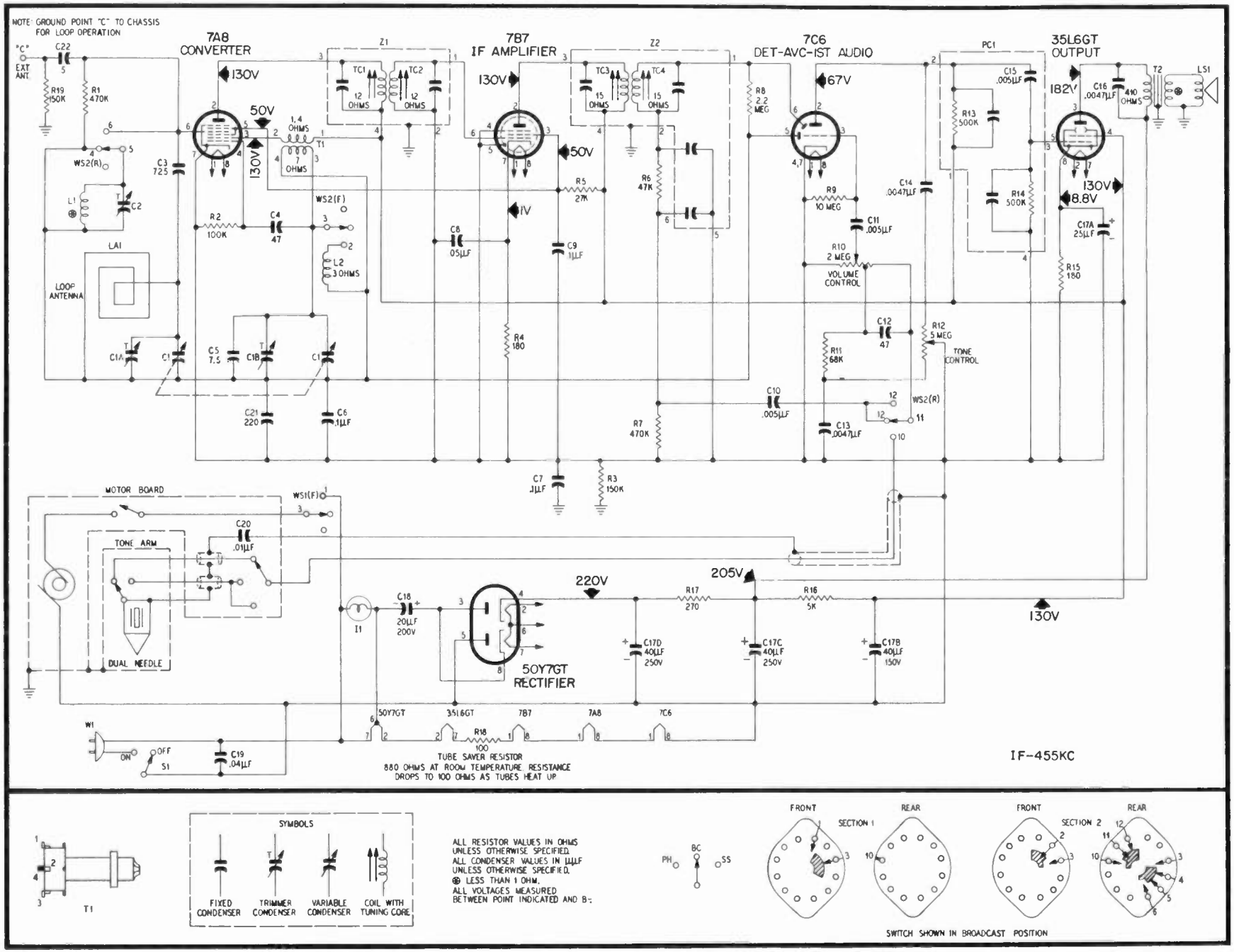


Figure 3. Philco Radio-Phonograph Model B1350, Schematic Diagram

TP2-2589

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	31-2751-9
C1A	Condenser, trimmer, antenna	Part of C1
C1B	Condenser, trimmer, oscillator	Part of C1
C2	Condenser, trimmer, special services antenna	31-6473-31
C3	Condenser, series tracker, 725 μμf.	30-1220-69
C4	Condenser, d-c blocking, 47 μμf.	60-00475420
C5	Condenser, fixed trimmer, 7.5 μμf.	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.	304650-56*
C15	Condenser, d-c blocking, .005 μf.	Part of PC1
C16	Condenser, tone compensation, .0047 μf.	30-4650-56
C17	Condenser, electrolytic, 4-section	30-2575-32
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., 200v	30-2568-22
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 μμf.	62-122001001*
C22	Condenser, aerial blocking, 5 μμf.	30-1221-5
I1	Lamp, pilot	34-2064*
L1	Coil, antenna, special services	32-4561-5
L2	Coil, oscillator shunt	32-4562-1
LA1	Loop assembly, antenna	76-2127-16
LS1	Speaker	36-1639-1
PC1	Printed circuit, d-c blocking	30-6001
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	66-4158340*
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	66-4478340*
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
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*
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, aerial loading, 150,000 ohms	66-4158340*
S1	Switch, off-on	Part of R10
T1	Transformer, oscillator	32-4453-2
T2	Transformer, output	32-8242-9
W1	Line cord	L-2183*
WS	Wafer switch, 2-section	42-1989
Z1	Transformer, 1st i-f	32-4160A
Z2	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Description	Service Part No.
Cabinet	10949
Bottom cover	54-8255-1
Hinge (2)	56-6603
Lid	54-4990
Lid support	56-6604
Binder post	56-6296
Changer Mounting Hardware	
Sleeve, rubber (3)	54-7798
Speed nut (3)	W-2554
Spring, mounting, top (3)	56-7059FA9
Spring, mounting, bottom (3)	56-7059-1FCP
Dial scale	54-5156
Drive cord, 25 ft. spool	45-8750*
Foot, rubber (4)	54-4579
Gasket, speaker	54-8089
Knob, off-on-volume	54-4842-8
Knob, radio-phono—Special Services	54-4842-9
Knob, tuning	54-4841
Knob, tone	54-4841-10
Lead assembly, antenna	76-1472
Mounting foot (4)	56-7778-1
Mount, rubber (3)	27-4596
Panel, diffusing	54-8575-1
Clip, diffusing panel (2)	56-3587-1
Pilot-lamp socket assembly	76-1179-7
Fastener, pilot-lamp shield (2)	W2235-1FA9
Pointer	56-5630-50
Rail assembly, pointer	76-7906
Spring, pointer drive	56-2617*
Socket, Loktal (3)	27-6207*
Socket, octal (2)	27-6174*
Spring, hairpin	56-6552
Tuning shaft	56-8370-1

PHILCO SERVICE

PHILCO Factory-Supervised Service

HOME RADIO

PHILCO RADIO-PHONOGRAPH MODEL B1750

SPECIFICATIONS

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

MODEL B1750

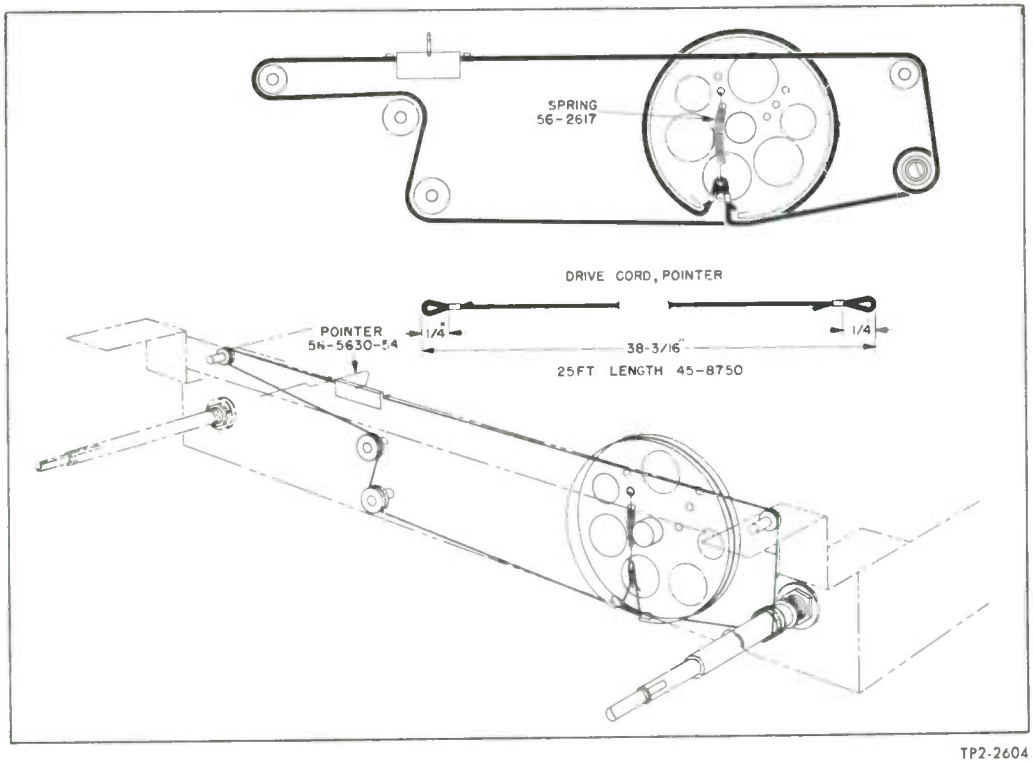
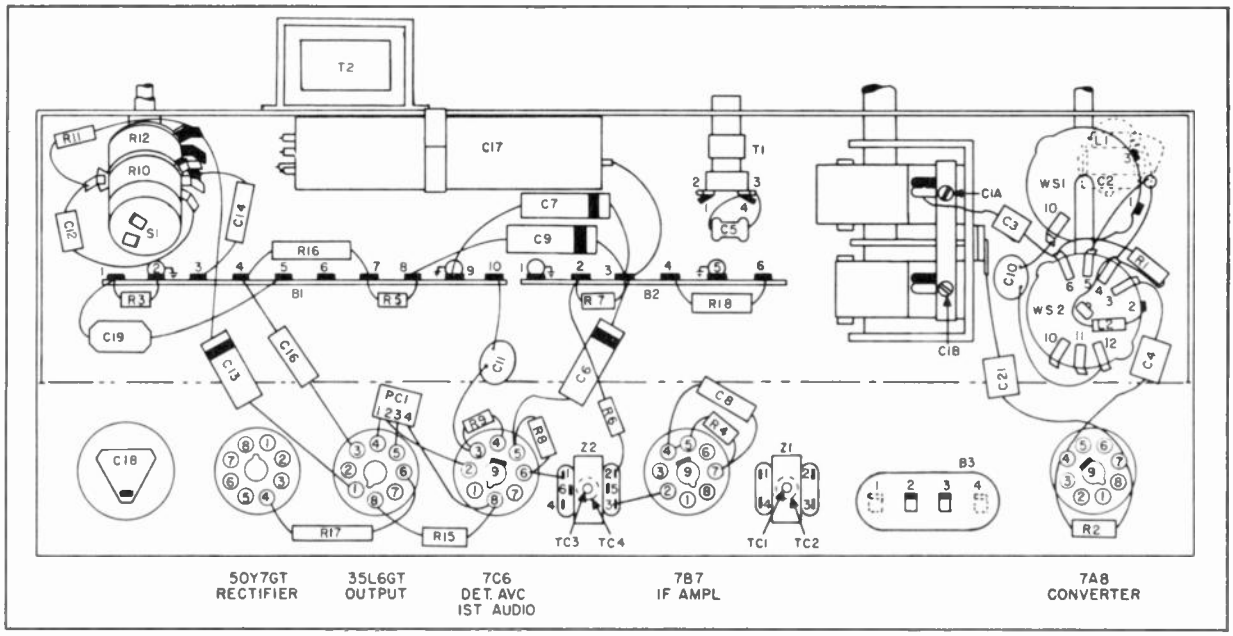


Figure 1. Drive-Cord Installation Details



TP2-2588A

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

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.

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST TRIMMER
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
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—aerial trimmer (broadcast)
4	Same as step 2.	3200 kc.	3200 kc.	Adjust for maximum output.	C2—aerial trimmer (special services)

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.

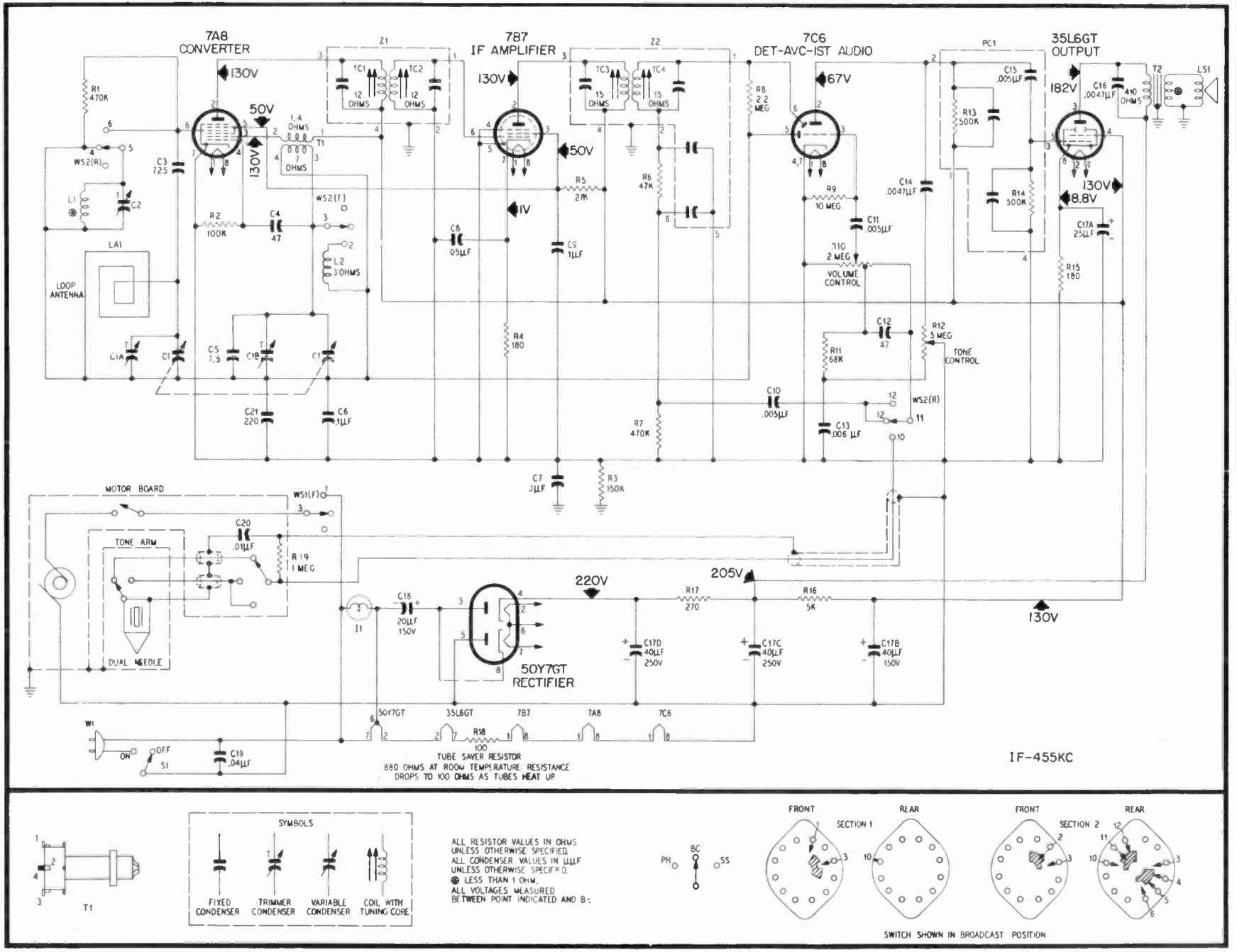


Figure 3. Philco Radio-Phonograph Model B1750, Schematic Diagram

TP2-2589B

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
C1A	Condenser, trimmer, antenna	Part of C1
C1B	Condenser, trimmer, oscillator	Part of C1
C2	Condenser, trimmer, special services antenna	31-6473-31
C3	Condenser, series tracker, 725 μμf.	30-1220-69
C4	Condenser, d-c blocking, 47 μμf.	60-00475420
C5	Condenser, fixed trimmer, 7.5 μμf.	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, .006 μf.	30-4650-57*
C14	Condenser, tone, .0047 μf.	30-4650-56*
C15	Condenser, d-c blocking, .005 μf.	Part of PC1
C16	Condenser, tone compensation, .0047 μf.	30-4650-56*
C17	Condenser, electrolytic, 4-section	30-2575-32
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., 200 v	30-2568-22
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 μμf.	62-122001001*
I1	Lamp, pilot	34-2064*
L1	Coil, antenna, special services	32-4561-6
L2	Coil, oscillator shunt	32-4562-1
LA1	Loop assembly, antenna	76-2127-13
LS1	Speaker	36-1626-5
PC1	Printed circuit, d-c blocking	30-6001
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	66-4158340*
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	66-4478340*
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
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*
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, phono shunt, 1 megohm	66-5108540
S1	Switch, off-on	Part of R10
T1	Transformer, oscillator	32-4453-2
T2	Transformer, output	32-8242-9
W1	Line cord	L-2183*
WS	Wafer switch, 2-section	42-1989-1
Z1	Transformer, 1st i-f	32-4160A
Z2	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Description	Service Part No.
MODEL B1750 (MAHOGANY)	
Cabinet	10962
Hinge, top (2)	45-6200
Hinge, top leaf (4)	28-9055
Hinge, spring (2)	28-9054
Tapped stud, spring hinge (8)	56-6296-1
Knob, off-on-volume	54-4842-8
Knob, radio-phono—Special Services	54-4842-9
Knob, tuning	76-6353
Knob, tone	76-6353-1
Metal grille	56-8660-5
MODEL B1750 (BLOND)	
Cabinet	10962-1
Hinge, top (2)	45-6200
Hinge, top leaf (4)	28-9055
Hinge, spring (2)	28-9054
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)	54-7798
Speed nut (3)	W2554
Spring, mounting, top (3)	56-7059FA9
Spring, mounting, bottom (3)	56-7059-1FCP
Dial scale and bezel assembly	76-8116
Drive cord, 25 ft. spool	45-8750*
Foot, cabinet (4)	3363-3
Mount, rubber (3)	27-4596
Panel, diffusing	54-8832
Spring clip, diffusing panel	56-3587-1
Pilot-lamp socket assembly	76-1179-7
Fastener, pilot-lamp shield (2)	W2235-1FA9
Pointer	56-5630-54
Rail assembly, pointer	76-8119
Spring, pointer drive	56-2617*
Slide assembly, changer support (2)	76-6742-1
Socket, Loktal (3)	27-6207*
Socket, octal (2)	27-6174*
Spring, hairpin	56-6552
Tuning shaft	56-8370-2

PHILCO RADIO MODEL B656

SPECIFICATIONS

MODEL B656

CABINET	
B656	Molded plastic
CIRCUIT	Five-tube superheterodyne (plus selenium rectifier)
FREQUENCY RANGES	
Standard broadcast	550—1600 kc.
Special services	1700—3400 kc.
AUDIO OUTPUT	160 milliwatts
OPERATING VOLTAGES	117 volts, a.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	55 ma. at 9 volts, and 15 ma. at 90 volts
AERIAL	Magnecor high-impedance loop; provision for connecting external aerial
INTERMEDIATE FREQUENCY	265 kc.
PHILCO TUBES	1T4 r-f amplifier, 1R5 converter, 1U4 i-f amplifier, 1U5 det.—a.v.c.—1st audio 3V4 output
BATTERY TYPE	Philco P-274

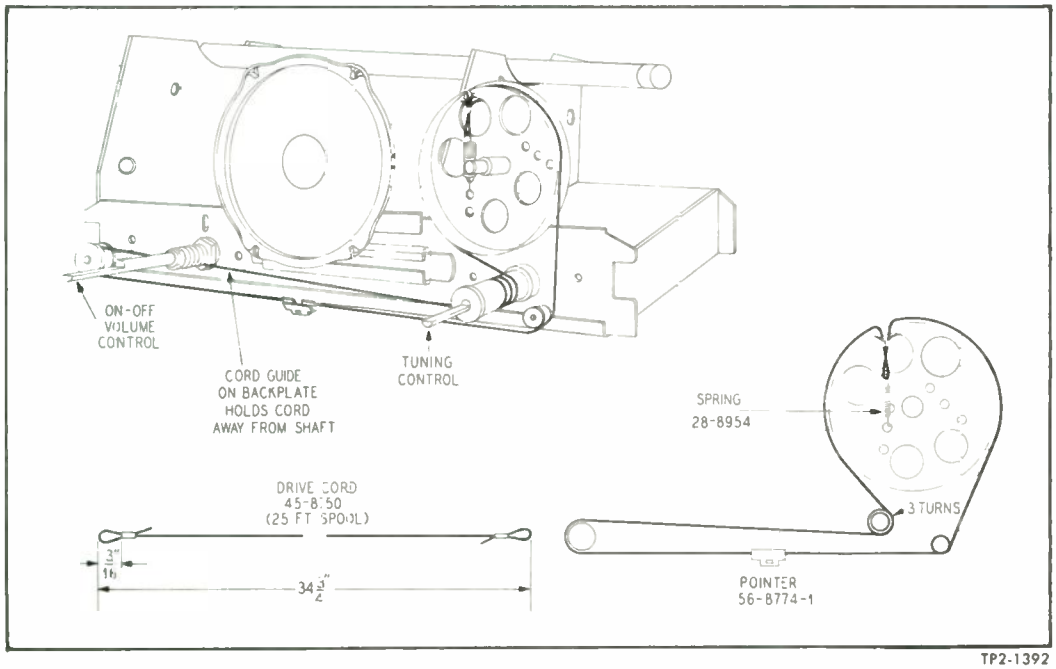


Figure 1. Drive-Cord Installation Details

ALIGNMENT PROCEDURE

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

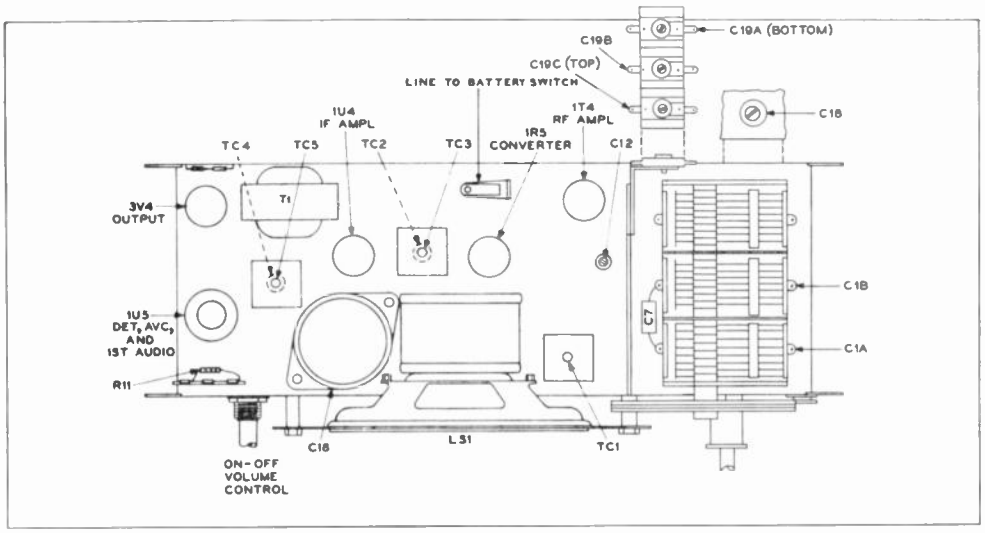
RADIO CONTROLS—Set volume control to maximum; set broadcast-special services switch, SW1, as indicated in chart.

OUTPUT METER — Connect across voice-coil terminals.

SIGNAL GENERATOR—Use modulated output.

OUTPUT LEVEL—During alignment, adjust signal-generator 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.



TP2-1394

Figure 2. Top View, Showing Trimmer Locations

STEP	SIGNAL GENERATOR		RADIO		ADJUST TRIMMER
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
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—osc. 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 kc.	1500 kc. (index mark at right)	Adjust, in order given, for maximum output.	C1A—r-f C19A—BC aerial
6	Repeat steps 3 and 5 until no further improvement 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 kc.	1900 kc.	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.

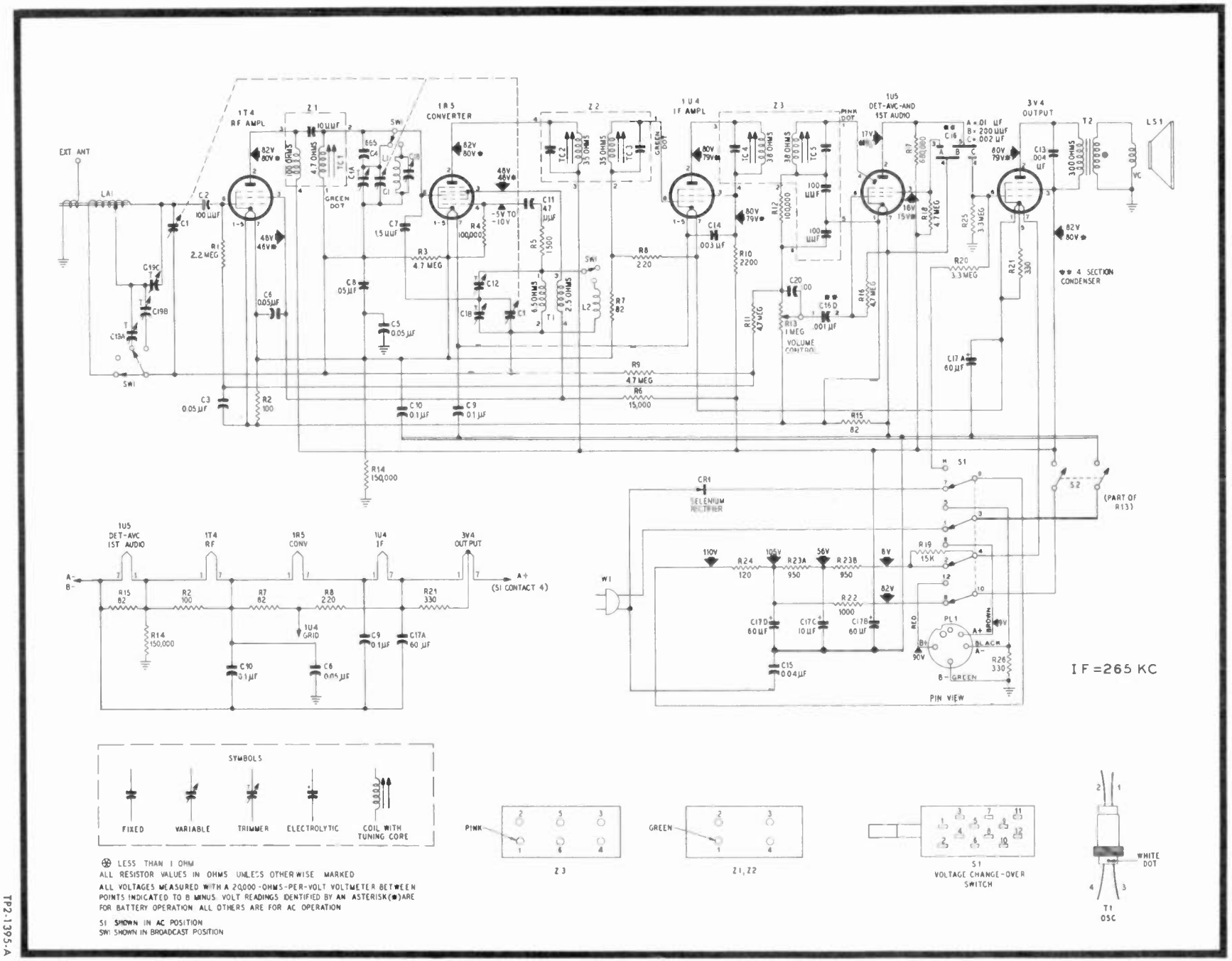


Figure 3. Philco Radio Model B656, Schematic Diagram

TP2-1395-A

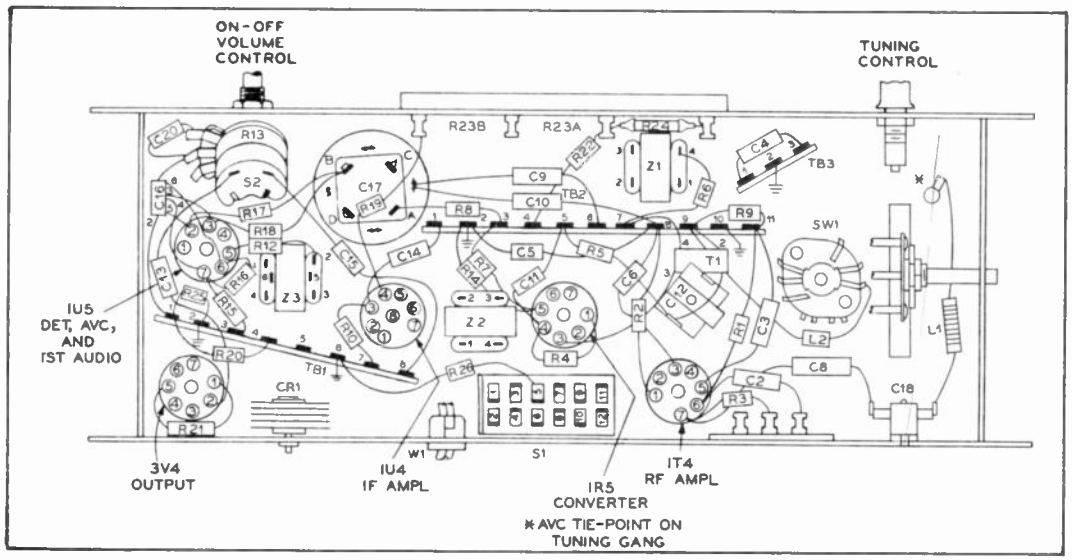


Figure 4. Bottom View, Showing Symbolized Chassis

TP2-1393-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.
C1	Condenser, tuning gang, 3-section	31-2748-5
C1A	Condenser, r-f trimmer	Part of C1
C1B	Condenser, osc. trimmer	Part of C1
C2	Condenser, d-c blocking, 100 μμf.	62-110009001*
C3	Condenser, bias filter, .05 μf.	61-0122*
C4	Condenser, converter tracking, 665 μμf.	30-1220-66
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.	60-00475420
C12	Condenser, osc. series padder, 700 to 900 μμf.	31-6473-28
C13	Condenser, tone compensation .004 μf.	61-0179
C14	Condenser, screen neutralizing .003 μf.	45-3505-61
C15	Condenser, line by-pass, .04 μf.	45-3500-2*
C16	Condenser, ceramic, 4-section	30-1237
C16A	Condenser, screen by-pass, .01 μf.	Part of C16
C16B	Condenser, by-pass, 200 μμf.	Part of C16
C16C	Condenser, d-c blocking, .002 μf.	Part of C16
C16D	Condenser, d-c blocking, .001 μf.	Part of C16
C17	Condenser, electrolytic, 4-section	30-2568-58
C17A	Condenser, filament by-pass, 60 μf.	Part of C17
C17B	Condenser, filter, 60 μf.	Part of C17
C17C	Condenser, filter, 10 μf.	Part of C17
C17D	Condenser, filter, 60 μf.	Part of C17
C18	Condenser, SS hi-frequency r-f trimmer	31-6476-27
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
C19C	Condenser, SS hi-frequency	Part of C19
C20	Condenser, compensating, high-frequency, 100 μμf.	62-110009001*
CR1	Selenium rectifier	34-8003*
L2	Coil, oscillator shunt	32-4562
LA1	Coil, aerial	32-4565
LS1	Speaker, 5-inch	36-1625
PL1	Plug-and-cable assembly, battery	41-3712-5
R1	Resistor, grid return, 2.2 megohms	66-5228340*
R2	Resistor, current limiting, 100 ohms	66-1108340*
R3	Resistor, grid return, 4.7 megohms	66-5478340*
R4	Resistor, grid return, 100,000 ohms	66-4108340*
R5	Resistor, oscillator coupling, 1500 ohms	66-2158340*
R6	Resistor, dropping, 15,000 ohms	66-3158340*
R7	Resistor, grid return, 82 ohms	66-0828340*
R8	Resistor, grid return, 220 ohms	66-1228340*
R9	Resistor, a-v-c filter, 4.7 megohms	66-5478340*
R10	Resistor, neutralization, 2200 ohms	66-2228340*
R11	Resistor, a-v-c filter, 4.7 megohms	66-5478340*
R12	Resistor, i-f filter, 100,000 ohms	66-4108340*
R13	Resistor, volume control, 1 megohm	45-5001-21
R14	Resistor, leakage, 150,000 ohms	66-4158340*
R15	Resistor, current limiting, 82 ohms	66-0828340*
R16	Resistor, grid return, 4.7 megohms	66-5478340*
R17	Resistor, plate load, 680,000 ohms	66-4688340*
R18	Resistor, screen dropping, 4.7 megohms	66-5478340*
R19	Resistor, filament, 15,000 ohms	66-3153546
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	33-3431-7
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 ohms	33-1334-14
R25	Resistor, grid return, 3.3 megohms	66-5338340
R26	Resistor, bias resistor (battery operation), 330 ohms	66-1338340*
S1	Switch, change-over	42-1899
S2	Switch, on-off	Part of R13
SW1	Band switch	42-1986
T1	Transformer, oscillator	32-4263-6
T2	Transformer, output	32-8528
W1	Line cord	L2183
Z1	Transformer, r-f	32-4399-6A
Z2	Transformer, 1st i-f	32-4160-2A
Z3	Transformer, 2nd i-f	32-4240-6A

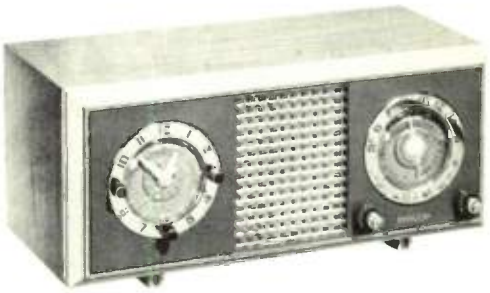
MISCELLANEOUS

Description	Service Part No.
Cabinet, light beige	10883-4
Back, light beige	54-4903
Clip, back (2)	56-3807-3
Handle assembly	76-7719
Scale, light beige	54-5148
Knob (2)	54-4773-1
Knob (1)	54-4816-4
Cabinet, pine green	10883-5
Back, pine green	54-4903-2
Clip, back (2)	56-3807-3
Handle assembly	76-7719
Scale, pine green	54-5148
Knob (2)	54-4773-5
Knob (1)	76-6206-1
Cabinet, charcoal gray	10883-6
Back, charcoal gray	54-4903-3
Clip, back (2)	56-3807-3
Handle assembly	76-7719-2
Scale, charcoal gray	54-5148-1
Knob (2)	54-4773-6
Knob (1)	54-4816-6
Dial-backplate assembly	76-7720
Drive cord, 25-ft. spool	45-8750*
Pointer	56-8774-1
Spring, drive cord	28-8954
Shaft-and-pulley assembly	76-7637
Mount, rubber (3)	27-4596
Spring, retaining	57-1868FA11
Shield, 1U5 tube	56-5629FA3
Socket (3)	27-6203
Socket, 1U5 tube (1)	27-6203-22
Socket, 3V4 tube (1)	27-6203-12

PHILCO RADIO-CLOCK MODEL B804

SPECIFICATIONS

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.; 6AQ6 detector, a.v.c., 1st audio; 35C5 output; 35W4 rectifier



MODEL B804

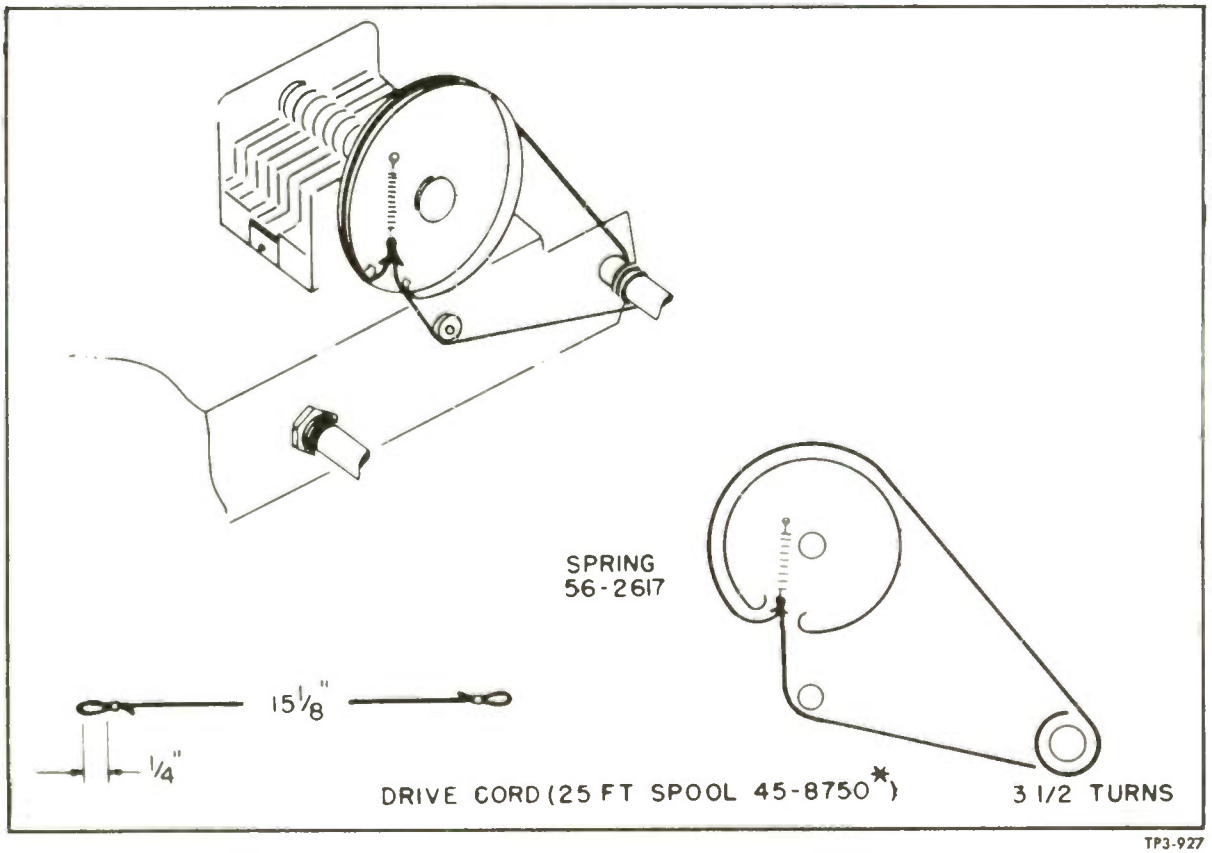


Figure 1. Drive-Cord Installation Details

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.

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
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)	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

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.

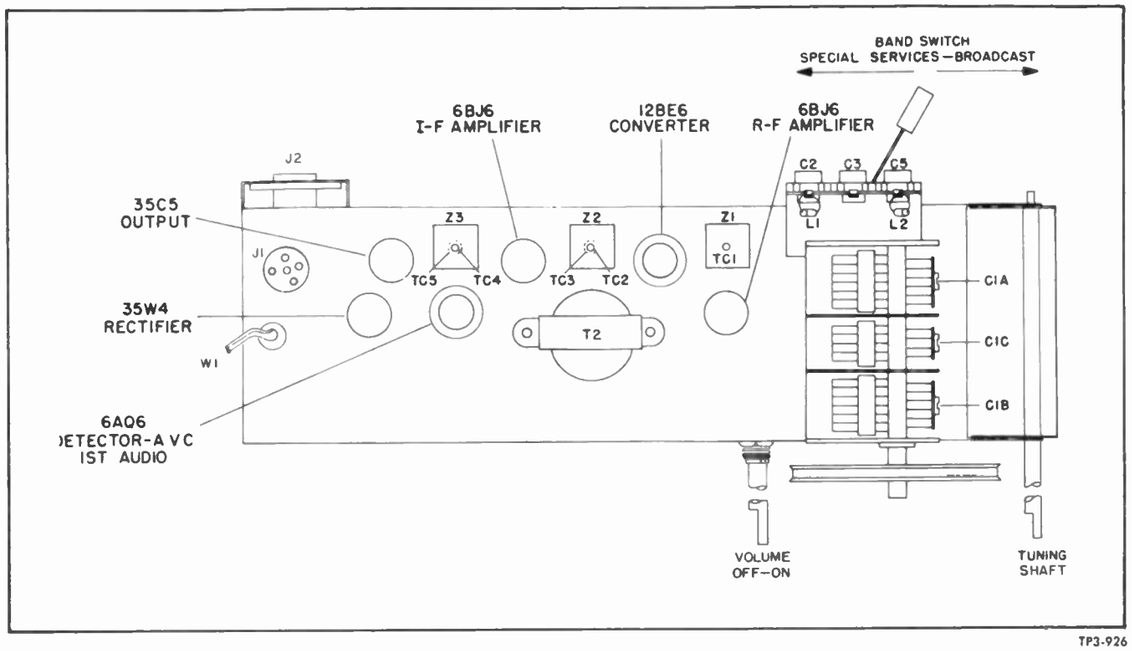


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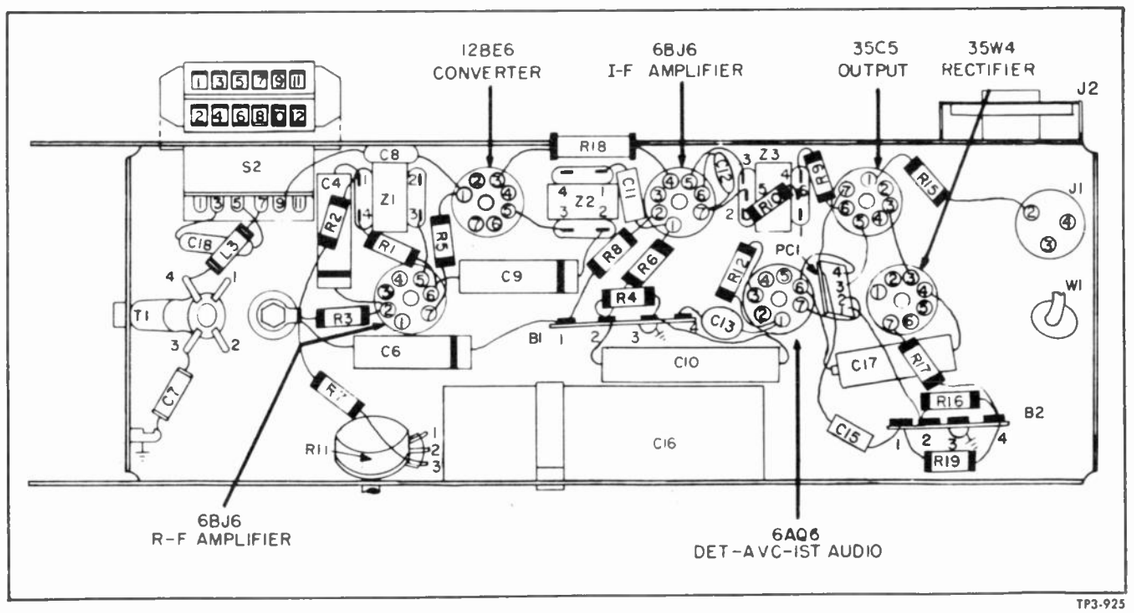
Figure 2. Top View, Showing Tuning Adjustments



TP3-925

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.
C1	Condenser, tuning gang, 3-section	31-2771-2
C1A	Condenser, trimmer, antenna	Part of C1
C1B	Condenser, trimmer, r-f	Part of C1
C1C	Condenser, trimmer, oscillator	Part of C1
C2	Condenser, trimmer, special services r-f	Part of CA1
C3	Condenser, padder, special services r-f	Part of CA1
C4	Condenser, r-f by-pass, .01 μf.	30-4650-58*
C5	Condenser, trimmer, special services mixer-grid	Part of CA1
C6	Condenser, a-v-c by-pass, .05 μf.	30-4650-45*
C7	Condenser, fixed trimmer, 7.5 μμf.	30-1224-65
C8	Condenser, d-c blocking, 47 μμf.	60-00475420
C9	Condenser, screen by-pass, .05 μf.	30-4650-45*
C10	Condenser, special, B— to chassis, .2 μf.	30-4644
C11	Condenser, i-f coupling, 220 μμf.	62-122001001*
C12	Condenser, screen by-pass, .002 μf.	30-1238-8*
C13	Condenser, audio coupling, .005 μf.	30-1238-1*
C14	Condenser, d-c blocking, .005 μf.	Part of PC1
C15	Condenser, tone compensation, .047 μf.	30-4650-62*
C16	Condenser, electrolytic filter	30-2575-27
C16A	Condenser, filter, 30 μf., 150v	Part of C16
C16B	Condenser, filter, 30 μf., 150v	Part of C16
C16C	Condenser, filter, 40 μf., 150 v	Part of C16
C17	Condenser, line by-pass, .047 μf.	30-4650-45*
C18	Condenser, fixed padder, 944 μμf.	30-1220-65
CA1	Condenser assembly, trimmer	31-6477-17
I1	Lamp, pilot	34-2068
J1	Connector, clock cable, female	27-6273
J2	Connector, appliance	76-3331
L1	Coil, special services r-f	32-4561-5
L2	Coil, special services mixer-grid	32-4561-5
L3	Coil, oscillator shunt	32-4562-1
PC1	Printed circuit	30-6001
PL1	Connector, clock cable, male	Part of clock cable
R1	Resistor, screen dropping, 10,000 ohms	66-3108340*
R2	Resistor, a-v-c load, 4.7 megohms	66-5478340*
R3	Resistor, a-v-c load, 2.2 megohms	66-5228340*
R4	Resistor, B— to chassis, 150,000 ohms	66-4158340*
R5	Resistor, grid leak, 22,000 ohms	66-3228340*
R6	Resistor, grid leak, 2.2 megohms	66-5228340*
R7	Resistor, a-v-c load, 2.2 megohms	66-5228340*
R8	Resistor, cathode bias, 180 ohms	66-1188340*
R9	Resistor, screen dropping 2200 ohms	66-2228340*
R10	Resistor, i-f filter, 47,000 ohms	66-3478340*
R11	Volume control, 500,000 ohms	33-5565-51
R12	Resistor, grid leak, 10 megohms	66-6108340*
R13	Resistor, plate load, 500,000 ohms	Part of PC1
R14	Resistor, grid leak, 500,000 ohms	Part of PC1
R15	Resistor, cathode bias, 150 ohms, 1 watt	66-1154340*
R16	Resistor, B+ filter, 1200 ohms	66-2128340*
R17	Resistor, B+ filter, 220 ohms, 1 watt	66-1224340*
R18	Resistor, tube saver, 100 ohms	33-1343-3
R19	Resistor, tone compensation, 2200 ohms	66-2228340
S2	Switch, band, broadcast-special services	42-1893-3
T1	Transformer, oscillator	32-4453-2
T2	Transformer, output	32-8310-3
W1	Line cord	L-2183*
Z1	Transformer, r-f	32-4399-7A
Z2	Transformer, 1st i-f	32-4160A
Z3	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Description	Service Part No.
Bezel, radio	28-9039
Ring, bezel	28-9171
Cabinet	10965
Back and loop assembly	76-8098
Cable assembly, clock	41-3909-4
Clamp, electrolytic condenser	56-1466
Clock	41-2044-1
Cover and bracket assembly, clock	76-8095
Dial scale and backplate assembly	76-8094
Drive cord, 25-ft. spool	45-8750*
Spring, drive-cord	56-2617*
Gasket, speaker	54-8871
Grille	54-6023
Knob (2)	76-6373-2
Knob, band switch	54-4998
Pointer	27-4891-2
Rubber mount, gang mounting	27-4596
Shaft, tuning	56-9807-3
Spring, retaining	28-8610
Shield, tube (2)	56-5629FA3
Socket assembly, pilot lamp	27-6233-6
Socket, tube (2)	27-6203-14
Socket, tube (4)	27-6265
Speaker	36-1627-21

MODEL B804

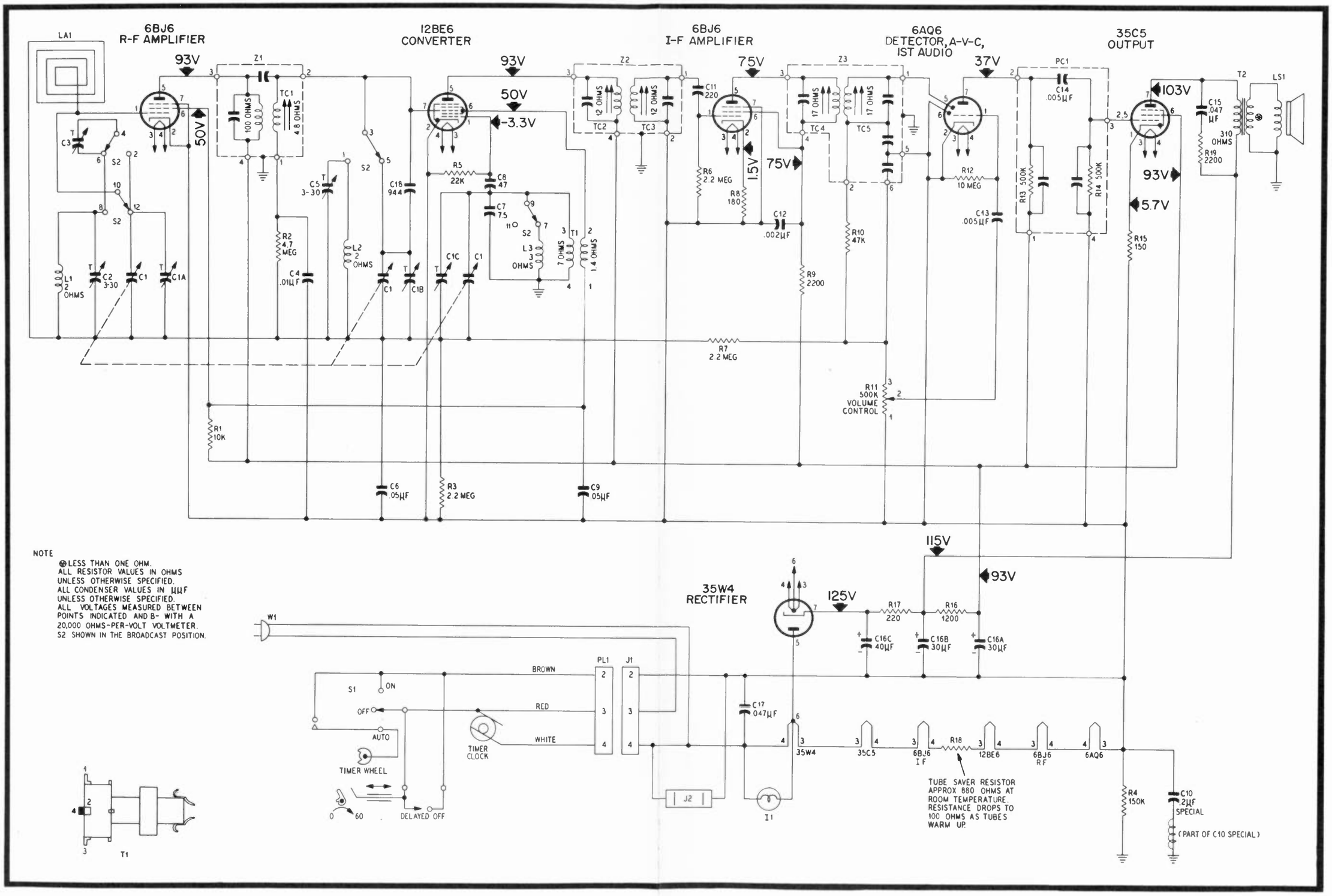


Figure 4. Philco Radio Model B804, Schematic Diagram

PR-2566

Printed in U.S.A.

PHILCO SERVICE

PHILCO Factory-Supervised Service

HOME RADIO

PHILCO PORTABLE RADIO MODEL B650

SPECIFICATIONS

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
INTERMEDIATE FREQUENCY	455 kc.
PHILCO TUBES	1R5 converter, 1U4 i-f amplifier, 1U5 detector-a.v.c. 1st audio, 3V4 output
BATTERY TYPE	P144 "B" battery P77 "A" battery

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.

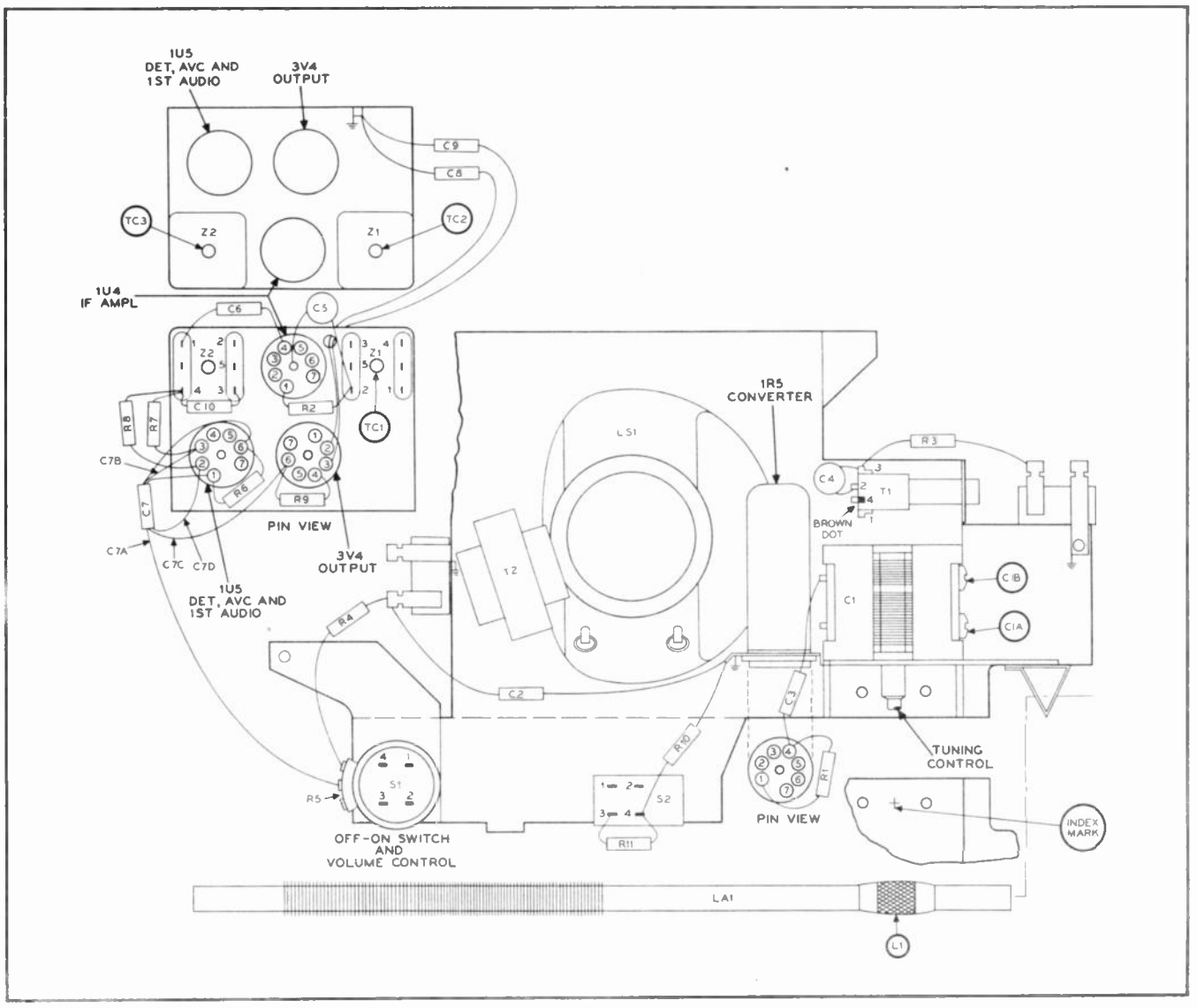
RADIO CONTROLS—Set the volume control to maximum. Set the tuning control as indicated in the alignment chart. Set the Battery Saver Switch to the HI position.

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Connect signal generator through a .1-μf. condenser to pin 6 (converter 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 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.	C1A—antenna trimmer
4	Same as step 2.	600 kc.	600 kc. (See NOTE 2 below.)	Adjust for maximum output. Rock tuning gang while making this adjustment.	L1—antenna adjusting winding
5	Repeat steps 2, 3, and 4 until no further improvement is obtained.				

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 chassis. See figure 1.



TP3-836

Figure 1. View Showing Tuning Adjustments and Parts Placement

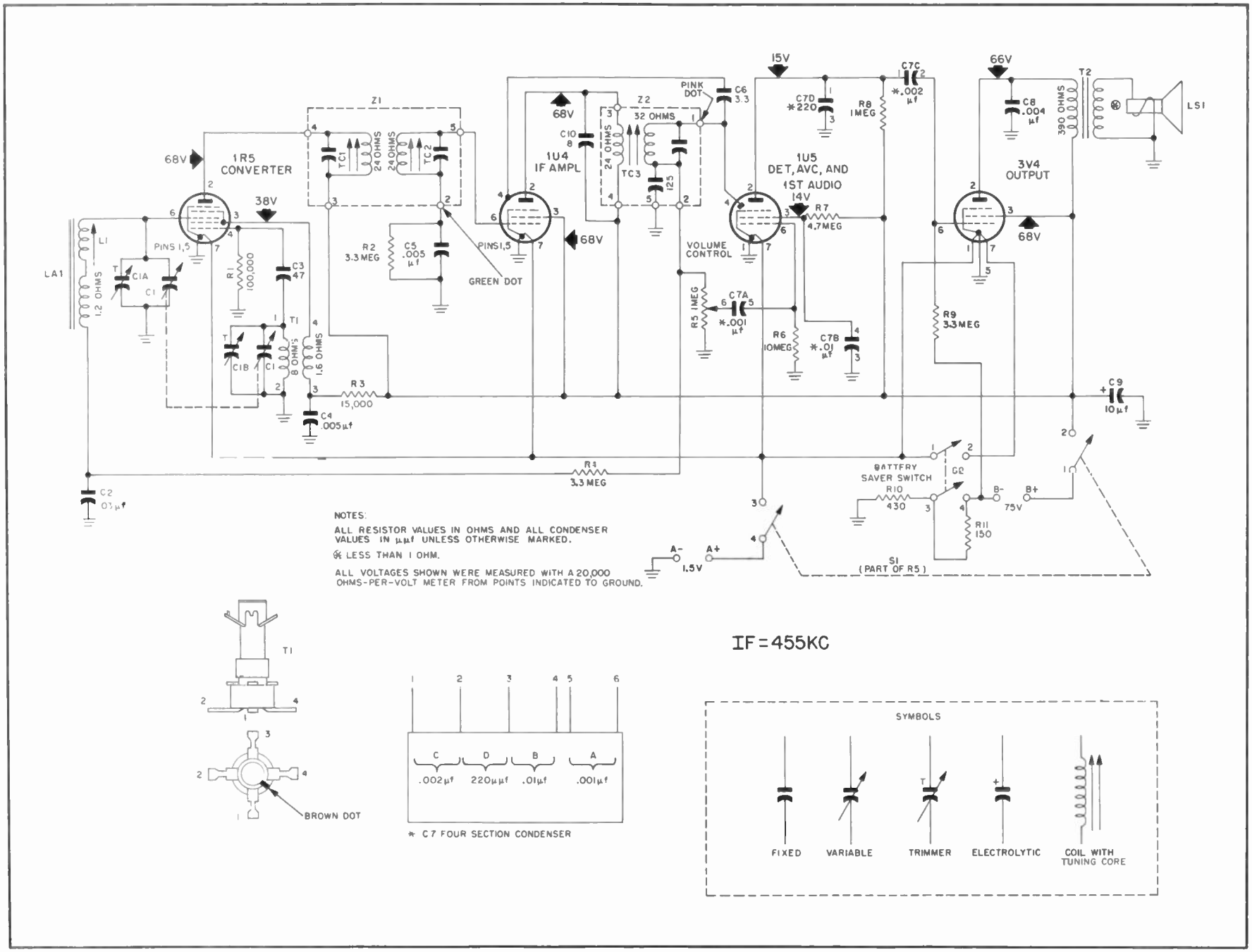


Figure 2. Philco Portable Radio Model B650, Schematic Diagram

TP3-856

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	31-2772
C1A	Condenser, trimmer, antenna	Part of C1
C1B	Condenser, trimmer, oscillator	Part of C1
C2	Condenser, a-v-c by-pass, .03 μf.	30-4650-0
C3	Condenser, d-c blocking, 47 μμf.	62-047009011
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 μμf.	30-1221
C7	Condenser, audio circuit	30-1237
C7A	Condenser, audio coupling, .001 μf.	Part of C7
C7B	Condenser, screen by-pass, .01 μf.	Part of C7
C7C	Condenser, d-c 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
LA1	Coil, antenna	32-4600
LS1	Loudspeaker	36-1652
R1	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
R11	Resistor, battery economizer, 150 ohms	66-1158340
S1	Switch, on-off	Part of R5
S2	Switch, battery economizer	42-1796-6
T1	Transformer, oscillator	32-4574
T2	Transformer, output	32-8628
Z1	Transformer, 1st i-f	32-4160-13A
Z2	Transformer, 2nd i-f	32-4454-1A

MISCELLANEOUS

Description	Service Part No.
Cabinet, cherry	11006-3
Back, cabinet, cherry	54-6077-3
Handle, cabinet, cherry	54-6078-3
Cabinet, sand	11006-1
Back, cabinet, sand	54-6077-1
Handle, cabinet, sand	54-6078-1
Cabinet, colonial green	11006-2
Back, cabinet, colonial green	54-6077-2
Handle, cabinet, colonial green	54-6078-2
Cable, battery	41-3988-3
Dial scale	54-6083
Handle, battery-saver switch	54-6081
Knob, volume	54-6082
Knob, tuning	54-6082-1
Socket, tube (2), 1U5, 3V4	27-6265-6
Socket, tube (2), 1R5, 1U4	27-6265-7

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PHILCO SERVICE

PHILCO Factory-Supervised Service

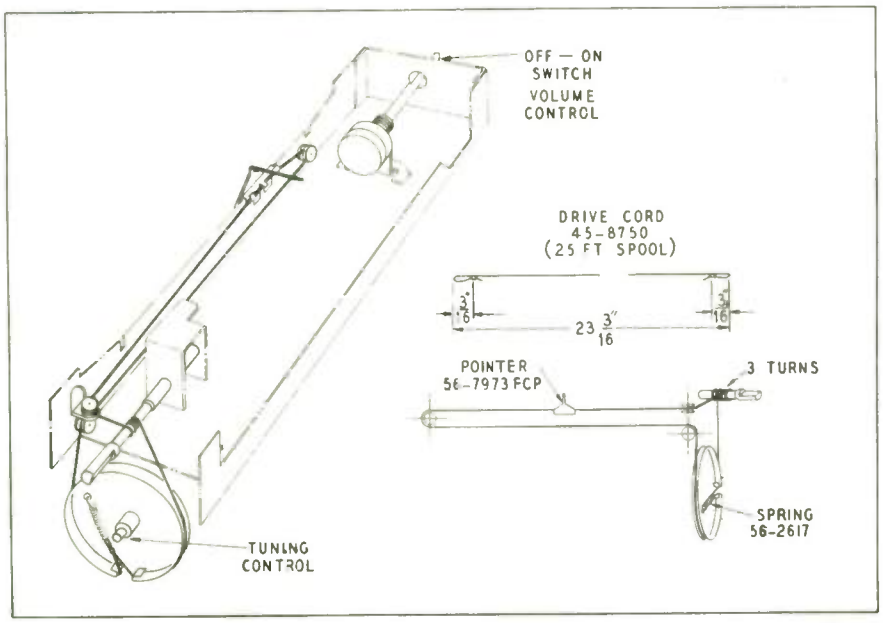
HOME RADIO

PHILCO PORTABLE RADIO MODEL B651

SPECIFICATIONS

MODEL B651

	MODEL B651
CABINET	Molded plastic
CIRCUIT	Four-tube superheterodyne (plus selenium rectifier)
FREQUENCY RANGE	540 kc.—1620 kc.
AUDIO OUTPUT	
A.C. or d.c.	150 milliwatts
Battery	75 milliwatts
OPERATING VOLTAGE	
Line operation	117 volts, a.c. or d.c.
Battery operation	2 D cells and 67½-volt "B" battery
POWER CONSUMPTION	
A-C or d-c operation	15 watts
Battery operation	10 ma. from 67½-volt "B" battery; 260 ma. from 2 D cells
ANTENNA	Magnecor high-impedance loop with provision for external antenna
INTERMEDIATE FREQUENCY	455 kc.
PHILCO TUBES	1R5, converter; 1U4, i-f amplifier; 1U5, detector-a.v.c.-1st audio; 3V4, output
BATTERY TYPE	P67 "B" battery; 2 D cells



TPO-390

Figure 1. Drive-Cord Stringing Arrangement

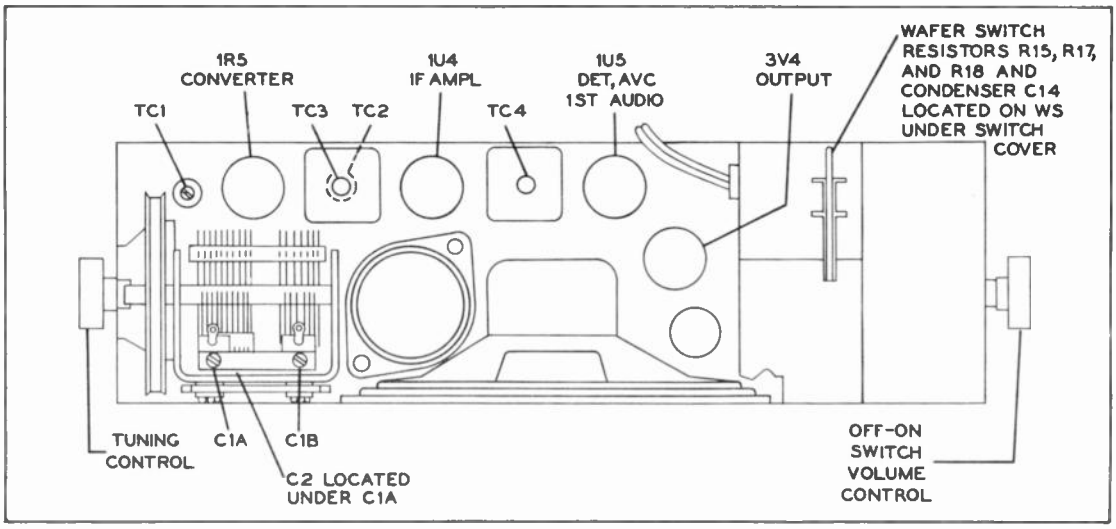


Figure 2. Top View, Showing Tuning Adjustments

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.

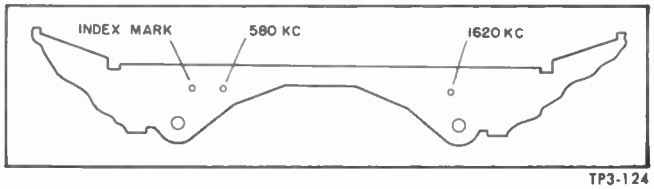


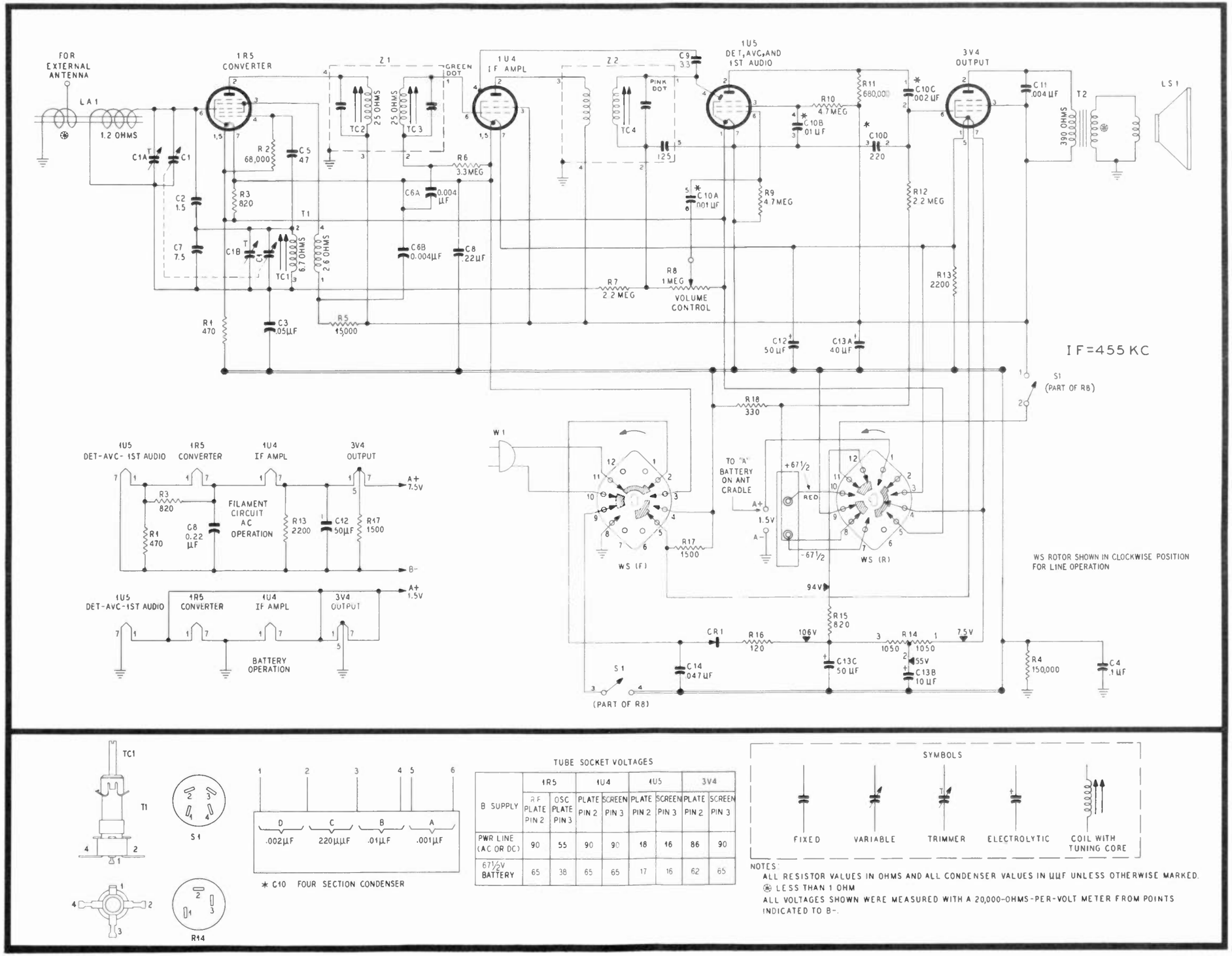
Figure 3. Front View of Pointer Rail, Showing Alignment Marks

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Output lead through a .1-μf. condenser to antenna section of tuning condenser or to pin 6 of converter (1R5). Ground lead to B–.	455 kc.	Tuning gang fully open.	Adjust, in order given for maximum 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.



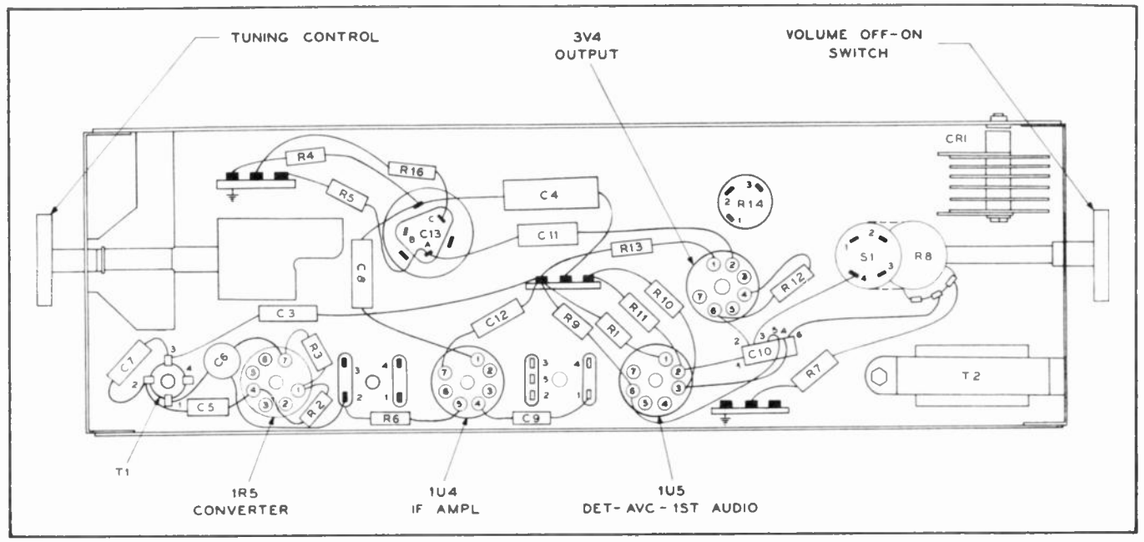
TUBE SOCKET VOLTAGES

B SUPPLY	1R5 RF PLATE PIN 2	1R5 OSC. PLATE PIN 3	1U4 PLATE PIN 2	1U4 SCREEN PIN 3	1U5 PLATE PIN 2	1U5 SCREEN PIN 3	3V4 PLATE PIN 2	3V4 SCREEN PIN 3
PWR LINE (AC OR DC)	90	55	90	90	18	16	86	90
67½V BATTERY	65	38	65	65	17	16	62	65

NOTES:
ALL RESISTOR VALUES IN OHMS AND ALL CONDENSER VALUES IN µµF UNLESS OTHERWISE MARKED.
Ⓢ LESS THAN 1 OHM
ALL VOLTAGES SHOWN WERE MEASURED WITH A 20,000-OHMS-PER-VOLT METER FROM POINTS INDICATED TO B-.

TP1-1164-1A

Figure 4. Philco Portable Radio Model B651, Schematic Diagram



TP1-1167-1

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.
C1	Condenser, tuning gang, 2-section	31-2735-2
C1A	Condenser, trimmer, antenna	Part of C1
C1B	Condenser, trimmer, oscillator	Part of C1
C2	Condenser, neutralizing, 1.5μμf.	30-1221-3
C3	Condenser, a-v-c by-pass, .05 μf.	30-4650-45°
C4	Condenser, B- to ground, .1 μf.	30-4650-47°
C5	Condenser, d-c blocking, 47 μμf.	60-00475420
C6	Condenser, dual ceramic	30-1239
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, 3.3 μμf.	30-1221
C10	Condenser, ceramic, 4-section	30-1237
C10A	Condenser, d-c blocking, .001 μf.	Part of C10
C10B	Condenser, screen by-pass, .01 μf.	Part of C10
C10C	Condenser, d-c blocking, .002 μf.	Part of C10
C10D	Condenser, grid by-pass, 220 μμf.	Part of C10
C11	Condenser, tone compensation, .004 μf.	30-4650-56°
C12	Condenser, electrolytic, filament by-pass, 50 μf., 25v	30-2417-12
C13	Condenser, electrolytic, 3-section	30-2568-39
C13A	Condenser, filter, 40 μf., 150v	Part of C13
C13B	Condenser, filter, 10 μf., 150v	Part of C13
C13C	Condenser, filter, 50 μf., 150v	Part of C13
C14	Condenser, line by-pass, .047 μf.	30-4650-45°
CR1	Selenium rectifier, 75 ma. at 117 volts	34-8003
LA1	Loop antenna	32-4455-10
LS1	Speaker, 4-inch, p-m	36-1637
R1	Resistor, current limiting, 470 ohms	66-1478340°
R2	Resistor, grid return, 68,000 ohms	66-3688340°
R3	Resistor, bias, 820 ohms	66-1828340°
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	33-5566-21
R9	Resistor, grid return, 4.7 megohms	66-5478340°
R10	Resistor, screen dropping, 4.7 megohms	66-5478340°
R11	Resistor, plate load, 680,000 ohms	66-4688340°
R12	Resistor, grid return, 2.2 megohms	66-5228340°

REPLACEMENT PARTS LIST (Cont.)

Reference Symbol	Description	Service Part No.
R13	Resistor, bias, 2200 ohms	66-2228340°
R14	Resistor, filament dropping and filter, 2100 ohms (center-tapped)	33-3445
R15	Resistor, filter, 820 ohms	66-1828340°
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
T1	Transformer, oscillator	32-4453-1
T2	Transformer, output	32-8434
W1	Line cord	L2183
WS	Wafer switch, voltage change-over	42-1925
Z1	Transformer, 1st i-f	32-4160-4A
Z2	Transformer, 2nd i-f	32-4454-1A

MISCELLANEOUS

Description	Service Part No.
Cabinet, sand	10799-28
Back, cabinet, sand	54-4767-25
Cabinet, driftwood	10799-26
Back, cabinet, driftwood	54-4767-23
Cabinet, spruce green	10799-25
Back, cabinet, spruce green	54-4767-22
Cable, battery	41-3988
Cover, sub-base	56-7912
Cover, switch	56-7911
Dial scale	54-5087
Drive cord (25-ft. spool)	45-8750°
Fastener, baffle mtg. (4 required)	W2235-7FA9
Handle	54-4883
Hinge, R.H.	56-7915-1
Hinge, L.H.	56-7915
Insulator, capacitor mtg.	27-9508
Knob (2 required)	54-4773
Nameplate	54-4884
Pointer	56-7973-1
Ring, shaft retaining	28-8610
Rubber mount, tuning capacitor (3 required)	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	27-6203
Socket	27-6203-12
Battery cradle and antenna ass'y.	76-5740-1

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PHILCO SERVICE

PHILCO Factory-Supervised Service

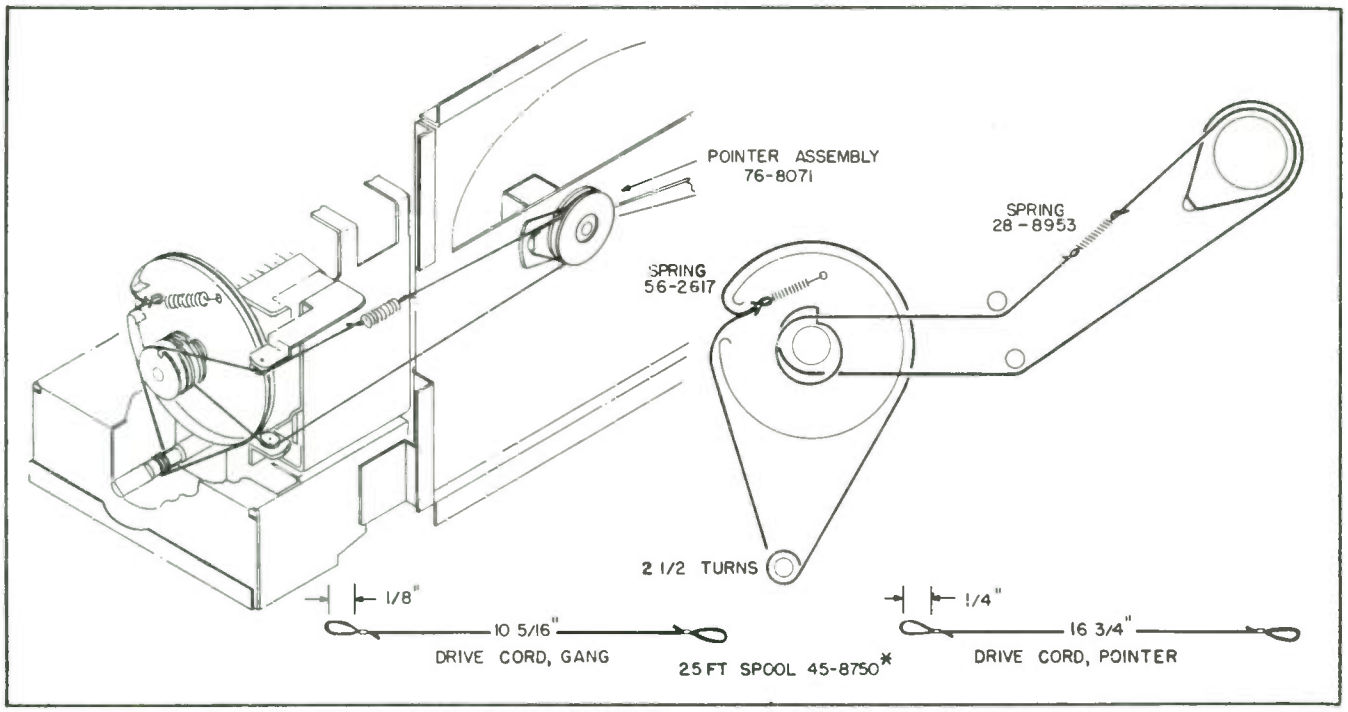
HOME RADIO

PHILCO PORTABLE RADIO MODEL B652

SPECIFICATIONS

CABINET	Plastic portable
CIRCUIT	Four-tube superheterodyne (plus selenium rectifier)
AUDIO OUTPUT	
A-C or d-c operation	160 milliwatts
Battery operation	85 milliwatts
OPERATING VOLTAGE	117 volts, a.c. or d.c. 1.5-volt "A" battery and 75-volt "B" battery
POWER CONSUMPTION	
A-C or d-c operation	11 watts
Battery operation	10 ma. from 75-volt "B" battery (7 ma.: battery-saver operation) 260 ma. from 1.5-volt "A" battery
ANTENNA	Magnecor high-impedance loop with provision for external antenna
INTERMEDIATE FREQUENCY	455 kc.
PHILCO TUBES	1R5 converter, 1U4 i-f amplifier, 1U5 detector-a.v.c. 1st audio, 3V4 output
BATTERY TYPE	P144 "B" battery P77 "A" battery

MODEL B652



TP2-3225

Figure 1. Dial-Cord Stringing Arrangement

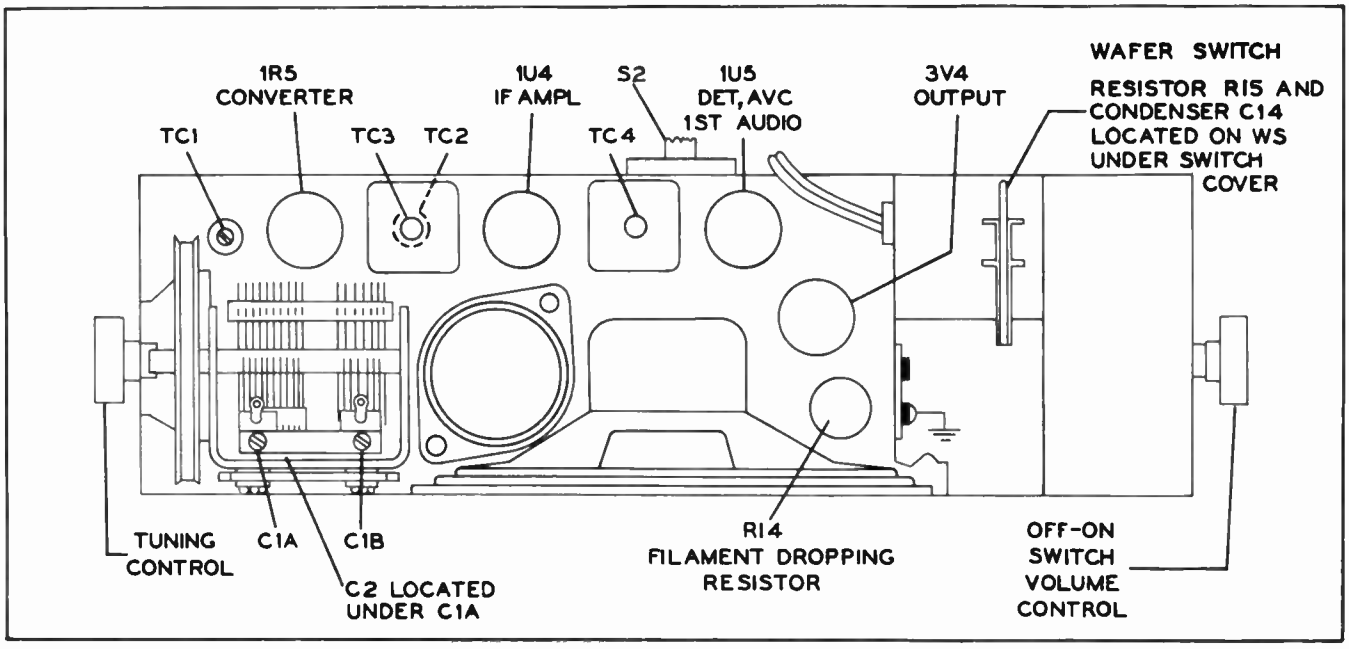


Figure 2. Top View, Showing Tuning Adjustments

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 generator. 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.

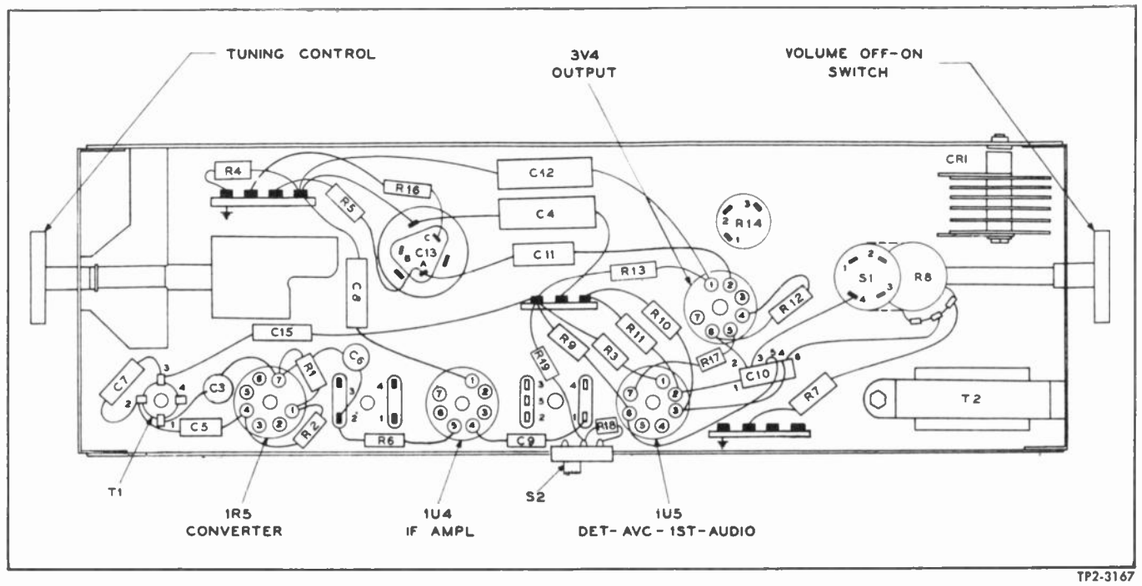
RADIO CONTROLS—Set the volume control to maximum. Set the tuning control as indicated in the alignment chart. During alignment of the radio, the batteries should be in the same position with respect to the chassis and the loop antenna as they normally are in the cabinet. It is recommended that a-c power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

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Connect signal generator through a .1-μf. condenser to pin 6 (converter 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.	C1A—antenna trimmer
4	Same as step 2.	600 kc.	600 kc. (See NOTE 2 below.)	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.				

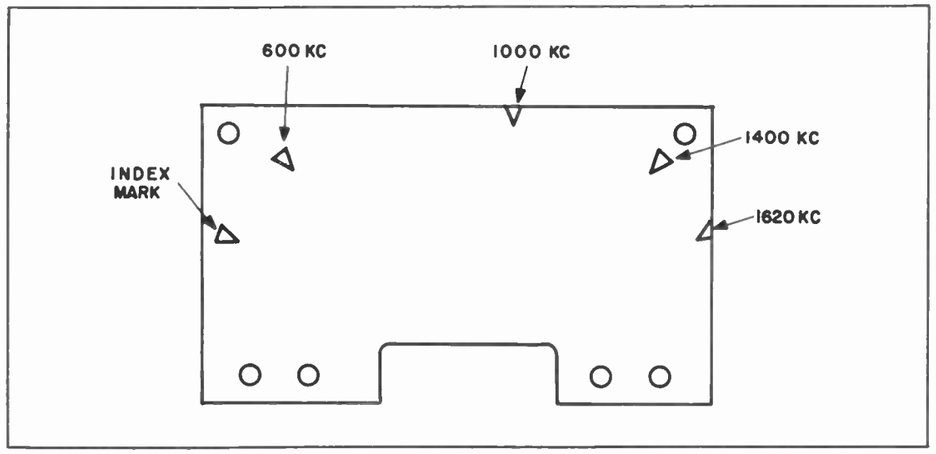
NOTE 1. Use a 6-to-8-turn, 6-inch-diameter loop made up of insulated wire. Connect to generator terminals, and place about one foot from radio loop.

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.



TP2-3167

Figure 3. Base View, Showing Parts Placement



TP2-3224

Figure 4. Dial Backplate, Showing Alignment Marks

REPLACEMENT PARTS LIST

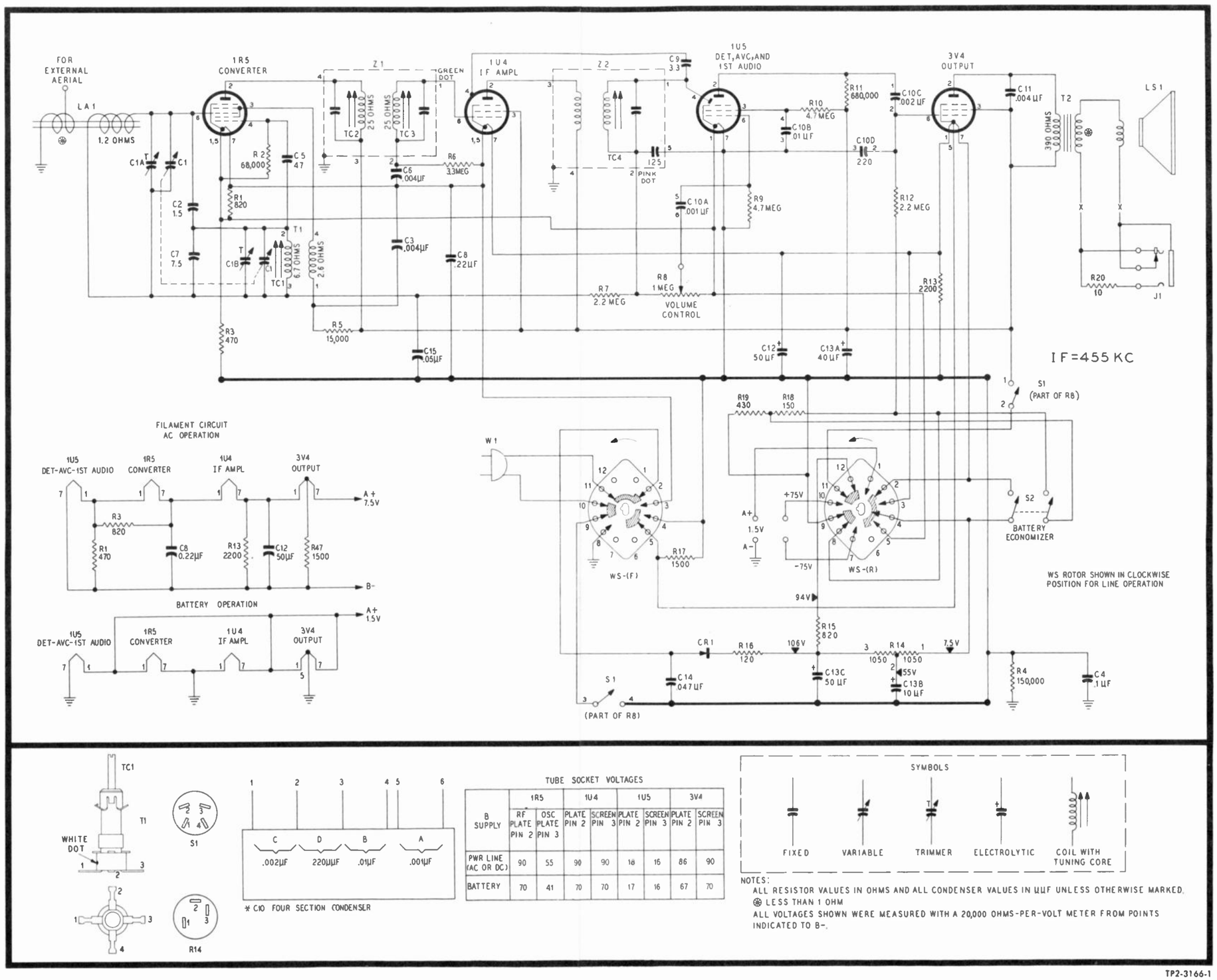
NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in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

Reference Symbol	Description	Service Part No.
C1	Condenser, tuning gang	31-2735-4
C1A	Condenser, trimmer, antenna	Part of C1
C1B	Condenser, trimmer, oscillator	Part of C1
C2	Condenser, i-f neutralizing, 1.5 μμf.	30-1221-7
C3	Condenser, screen by-pass, .004 μf.	30-1239*
C4	Condenser, B– to chassis, .1 μf.	30-4650-47*
C5	Condenser, d-c blocking, 47 μμf.	60-00475420*
C6	Condenser, grid by-pass .004 μf.	30-1239*
C7	Condenser, temperature compensating, 7.5 μμf.	30-1224-83
C8	Condenser, filament by-pass, .25 μf.	30-4656-1
C9	Condenser, neutralizing 3.3 μμf.	30-1221
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
C10C	Condenser, d-c blocking, .002 μf.	Part of C10
C10D	Condenser, grid by-pass, 220 μμf.	Part of C10
C11	Condenser, tone compensation, .004 μf.	30-4650-56*
C12	Condenser, electrolytic, filament by-pass, 50 μf.	30-2417-12
C13	Condenser, electrolytic, filter	30-2568-39
C13A	Condenser, filter, 40 μf.	Part of C13
C13B	Condenser, filter, 10 μf.	Part of C13
C13C	Condenser, filter, 50 μf.	Part of C13
C14	Condenser, line by-pass, .047 μf.	30-4650-45*
C15	Condenser, a-v-c by-pass, .05 μf.	30-4650-45*
CR1	Rectifier, selenium	34-8003
J1	Private listening unit	42-1975-2
LA1	Coil, antenna	32-4455-9
LS1	Loudspeaker	36-1637
R1	Resistor, filament dropping, 820 ohms	66-1828340*
R2	Resistor, grid leak, 68,000 ohms	66-3688340*
R3	Resistor, cathode bias, 470 ohms	66-1478340*
R4	Resistor, B– to chassis, 150,000 ohms	66-4158340*
R5	Resistor, screen dropping, 15,000 ohms	66-3158340*
R6	Resistor, grid leak, 3.3 megohms	66-5338340*
R7	Resistor, a-v-c load, 2.2 megohms	66-5228340*
R8	Volume control, 1 megohm	33-5566-21
R9	Resistor, grid leak, 4.7 megohms	66-5478340*
R10	Resistor, screen dropping, 4.7 megohms	66-5478340*
R11	Resistor, plate load, 680,000 ohms	66-4688340*
R12	Resistor, grid leak, 2.2 megohms	66-5228340*
R13	Resistor, filament dropping, 2200 ohms	66-2228340*
R14	Resistor, limiting, 2100 ohms	33-3445
R15	Resistor, B+ filter, 820 ohms	66-1828340*
R16	Resistor, limiting, 120 ohms	33-1334-14
R17	Resistor, filament dropping, 1500 ohms	66-2158340*
R18	Resistor, battery economizer, 150 ohms	66-1158340*
R19	Resistor, battery economizer, 430 ohms	66-1438340*
R20	Resistor, private listening unit, 10 ohms	66-0108340*
S1	Switch, on-off	Part of R8
S2	Switch, battery economizer	42-1796-3
T1	Transformer, oscillator	32-4453-1
T2	Transformer, output	32-8434
W1	Line cord	L2183*
WS1	Switch, wafer, battery to line	42-1925-1
Z1	Transformer, 1st i-f	32-4160-4A
Z2	Transformer, 2nd i-f	32-4454-1A

MISCELLANEOUS

Description	Service Part No.
Cabinet, pine green	10954-10
Back, pine green	54-0010-5
Handle, pine green	54-6012-5
Jack, cover	54-4967-11
Knob (2)	54-6016-2
Cabinet, cherry	10954-12
Back, cherry	54-6010-6
Handle, cherry	54-6012-6
Jack, cover	54-4967-10
Knob (2)	54-6016-1
Cabinet, spruce green	10954-16
Back, spruce green	54-6010-8
Handle, spruce green	54-6012-8
Jack, cover	54-4967-8
Knob (2)	54-6016-3
Cabinet, pearl grey	10954-18
Back, pearl grey	54-6010-9
Handle, pearl grey	54-6012-9
Jack, cover	54-4967-12
Knob (2)	54-6016-9
Cable, battery	41-3988-1
Clip, cabinet back (2)	56-9162
Dial scale	56-9986
Backplate assembly, dial	76-8177
Window, dial	54-6011
Drive cord, 25-ft. spool	45-8750*
Spring, gang drive	56-2617*
Spring, pointer drive	28-8953
Fastener, speaker baffle (2)	W2235-7FA9
Hinge, cabinet (2)	56-5457
Insulator, tuning-condenser mtg.	27-9508
Pointer assembly	76-8071
Ring, handle mtg. (2)	56-9987
Rubber mount, tuning-condenser mtg. (3)	27-4099-3
Shaft, tuning	56-7906FA42
Shield, tube base	56-3978-1FA3
Socket, tube (2)	27-6203
Socket, tube (2)	27-6203-12
Spring, hairpin, shaft mtg.	28-8610
Spring, retaining	57-1868FA11

MODEL B652



TUBE SOCKET VOLTAGES

B SUPPLY	1R5 RF PLATE PIN 2	1R5 OSC PLATE PIN 3	1U4 PLATE PIN 2	1U4 SCREEN PIN 3	1U5 PLATE PIN 2	1U5 SCREEN PIN 3	3V4 PLATE PIN 2	3V4 SCREEN PIN 3
PWR LINE (AC OR DC)	90	55	90	90	18	16	86	90
BATTERY	70	41	70	70	17	16	67	70

NOTES:
ALL RESISTOR VALUES IN OHMS AND ALL CONDENSER VALUES IN μμF UNLESS OTHERWISE MARKED.
⊛ LESS THAN 1 OHM
ALL VOLTAGES SHOWN WERE MEASURED WITH A 20,000 OHMS-PER-VOLT METER FROM POINTS INDICATED TO B-.

TP2-3166-1

Figure 5. Philco Portable Radio Model B652, Schematic Diagram

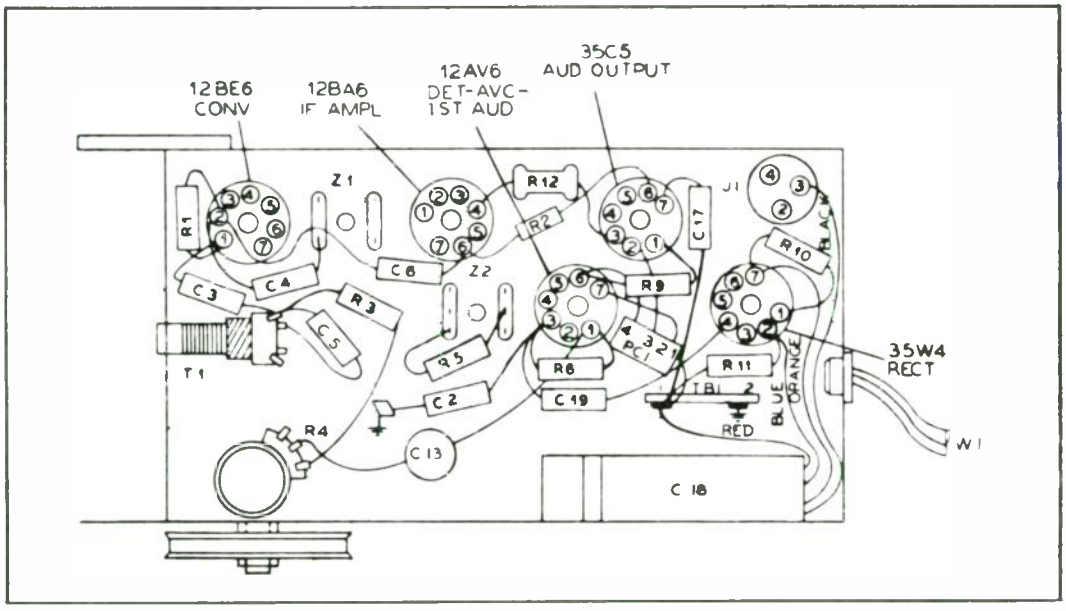
PHILCO RADIO-CLOCK MODEL B710

SPECIFICATIONS

CABINET	Molded phenolic
CIRCUIT	Four-tube superheterodyne (plus rectifier)
FREQUENCY RANGE	540—1620 kc.
AUDIO OUTPUT	1 watt
OPERATING VOLTAGE	117 volts, a.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.

MODEL B710



TP3-832

Figure 1. Base View, Showing Parts Placement

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.

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
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 order given, for maximum output. (TC1 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 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.

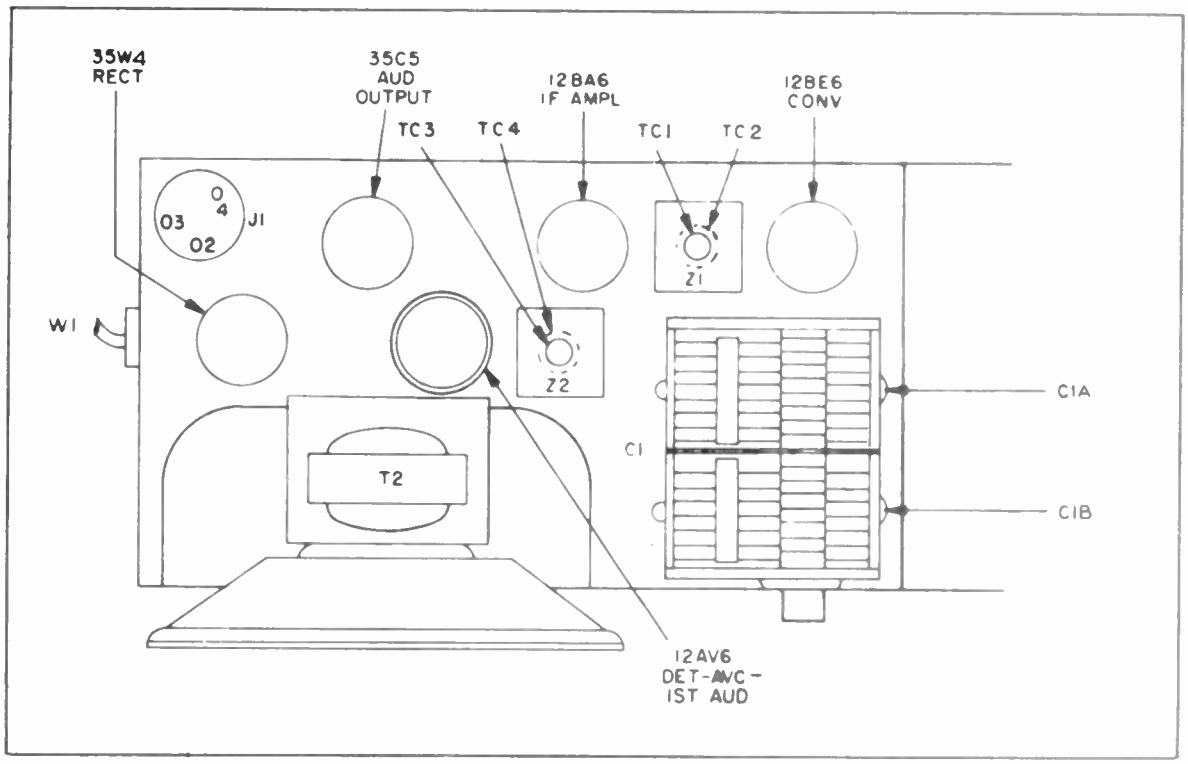


Figure 2. Top View, Showing Tuning Adjustments

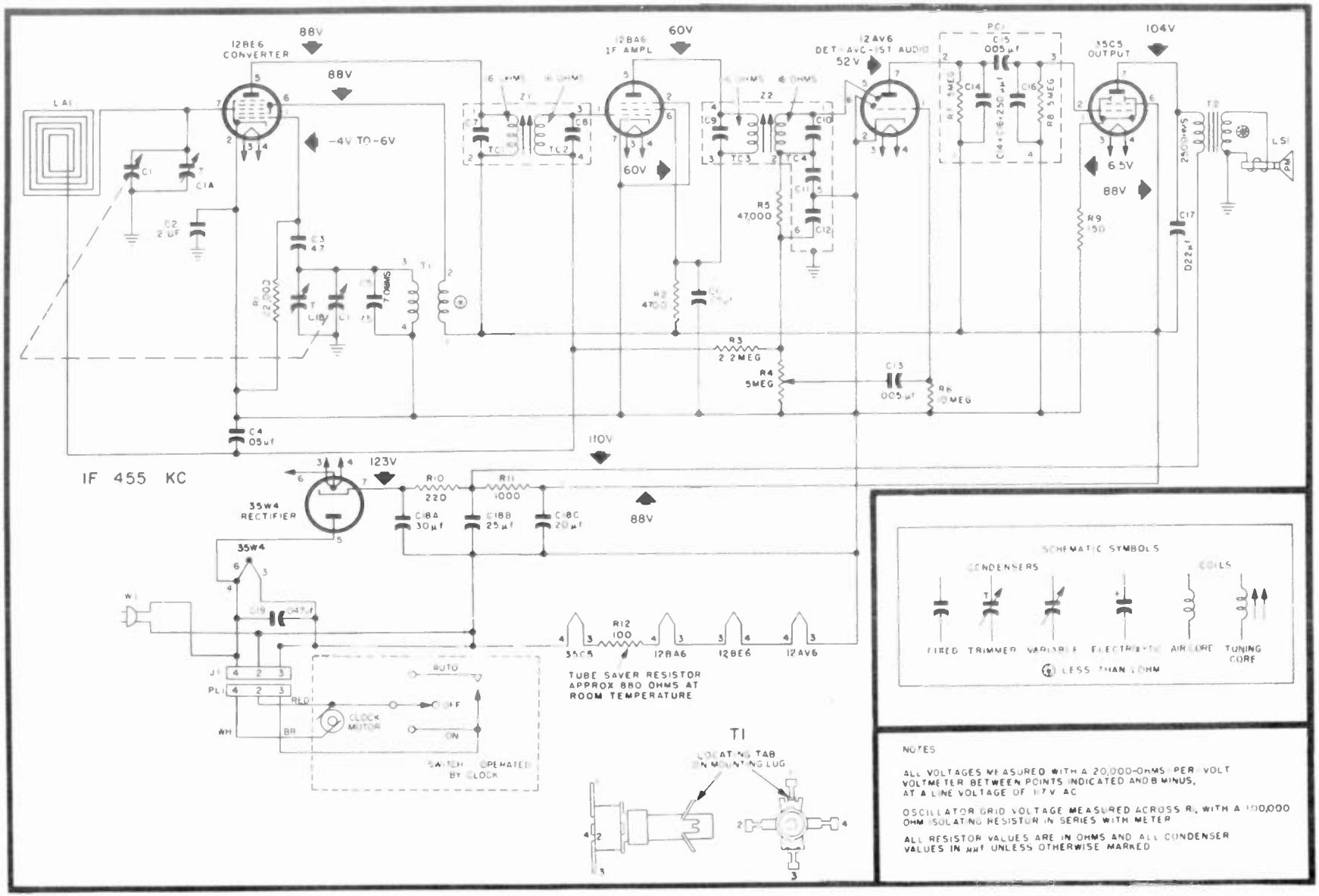


Figure 3. Philco Radio-Clock Model B710, Schematic Diagram

TP2-3230-B

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	31-2751-13
C1A	Condenser, r-f trimmer	Part of C1
C1B	Condenser, oscillator trimmer	Part of C1
C2	Condenser, B– to chassis, .2 μf.	30-4650-49
C3	Condenser, oscillator grid, 47 μμf.	30-1230-4
C4	Condenser, a-v-c by-pass, .05 μf.	30-4650-45*
C5	Condenser, drift compensation, 7.5 μμf.	30-1224-83
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 μf.	30-1238-1
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.	30-4650-43*
C18	Condenser, electrolytic, 3-section	45-3037
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*
J1	Jack clock	27-6273
LA1	Loop	Part of cabinet back
LS1	Speaker ass'y., p-m	36-1627-23
PC1	Printed circuit	30-6001
PL1	Plug, clock assembly	54-4878-2
R1	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 megohm	33-5565
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, 1 watt	66-1224340*
R11	Resistor, B plus filter, 1000 ohms	66-2108340*
R12	Resistor, tube saver, 100 ohms	33-1343-3
T1	Transformer, oscillator	33-4453-6
T2	Transformer, output	Part of LS1
W1	Line cord	L2183*
Z1	Transformer, 1st i-f	32-4161A
Z2	Transformer, 2nd i-f	32-4240A

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)	27-6265*
Socket, miniature (12AV6)	27-6203-14
Window, radio dial	54-4977-5

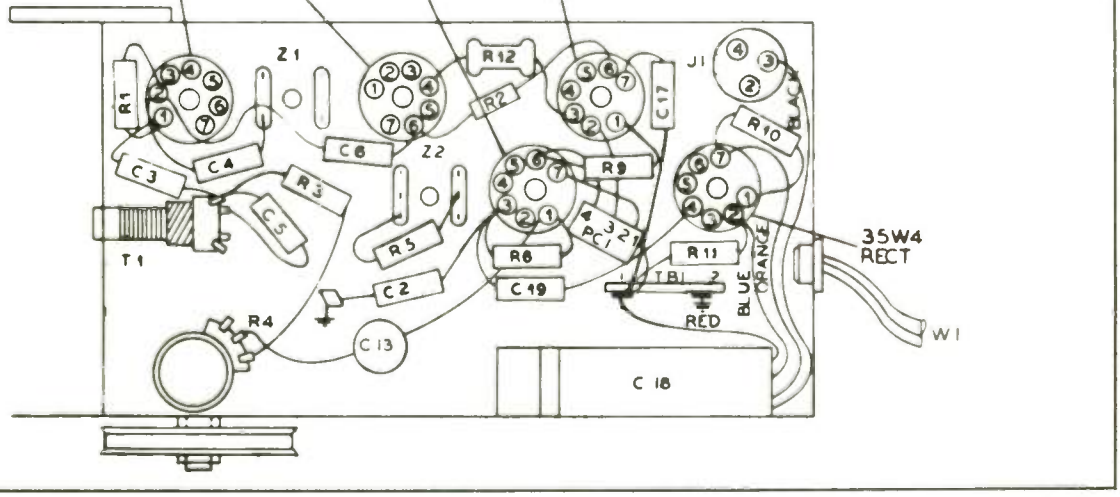
PHILCO RADIO-CLOCK MODEL B711, Code 121

SPECIFICATIONS

CABINET	Molded phenolic
CIRCUIT	Four-tube superheterodyne (plus rectifier)
FREQUENCY RANGE	540—1620 kc.
AUDIO OUTPUT	1 watt
OPERATING VOLTAGE	117 volts, a.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.

MODEL B711



TP3-832-1

Figure 1. Base View, Showing Parts Placement

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.

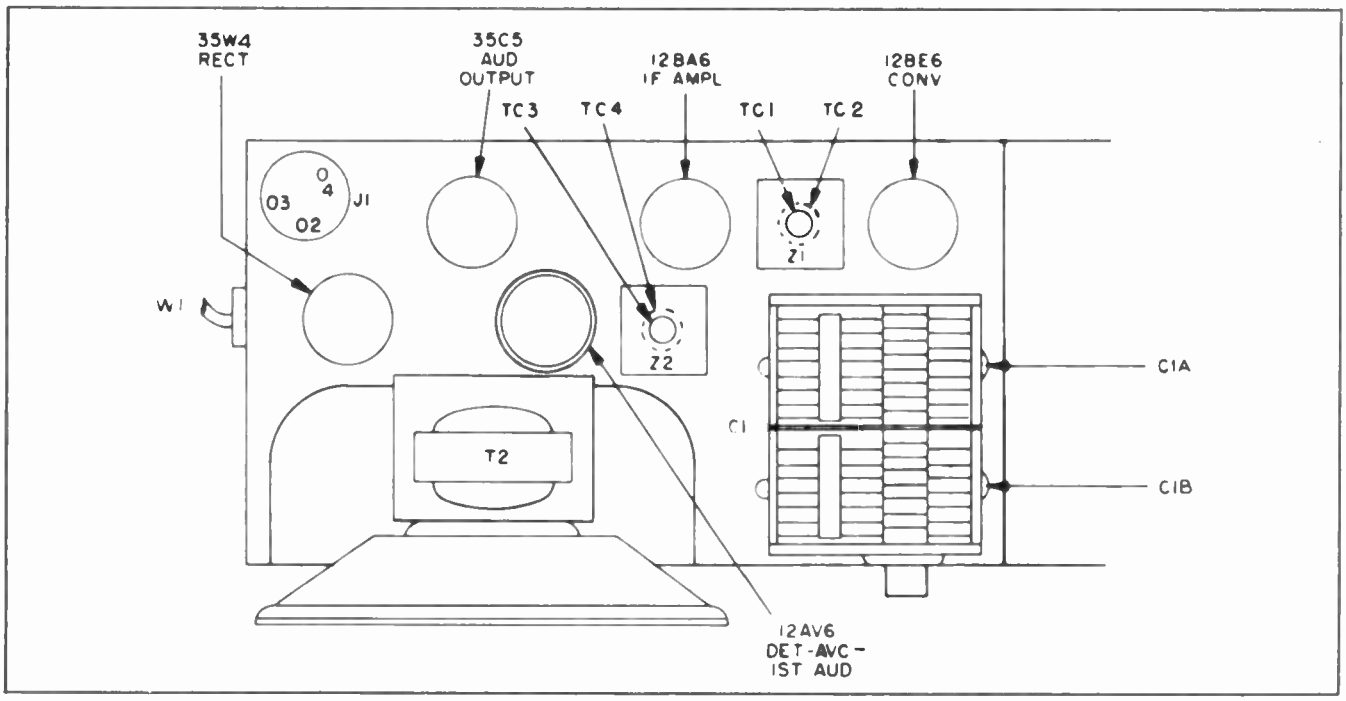
ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
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 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.

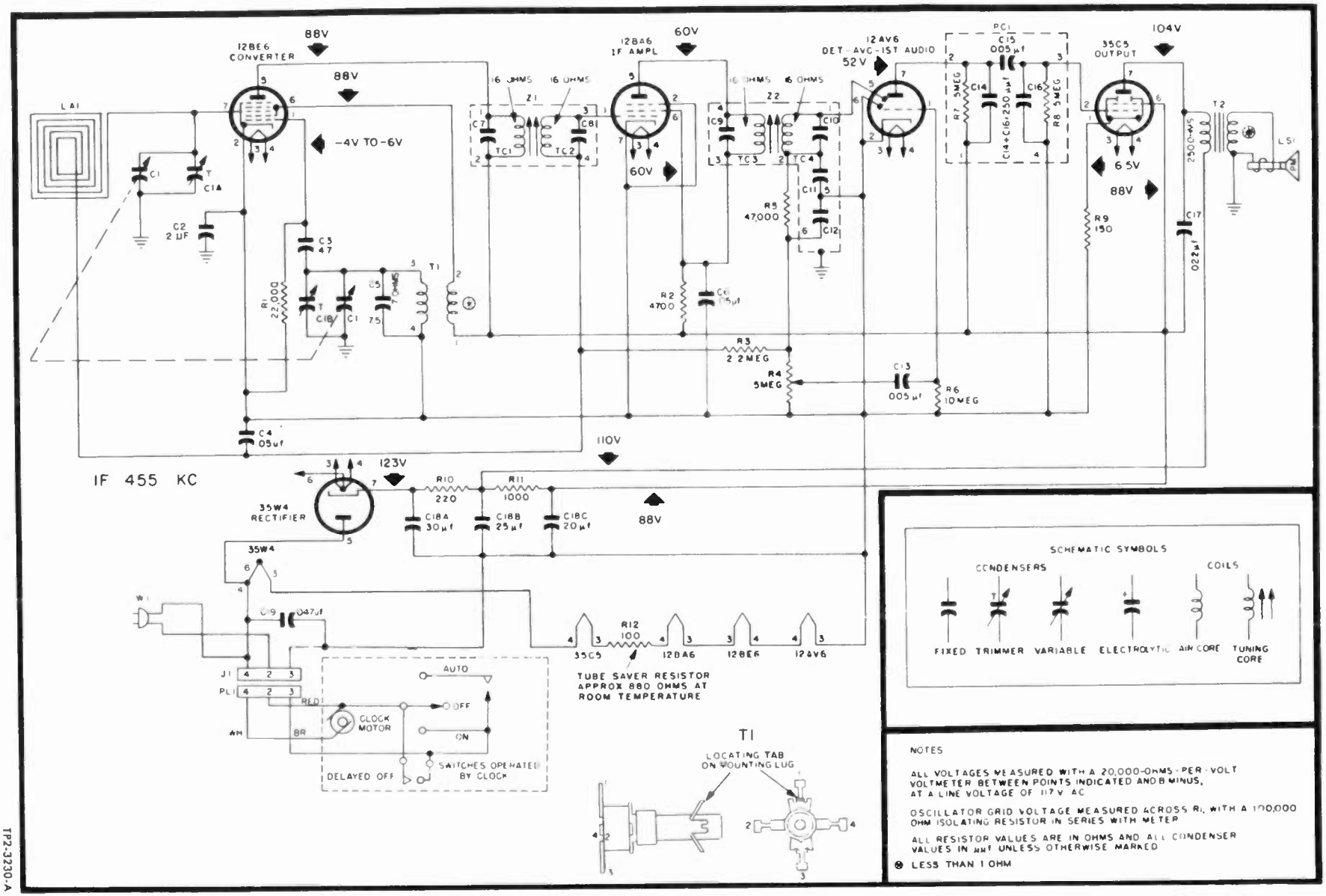
* To set the tuning gang to 1620 kc., fully open the gang and insert a .006-inch, nonmetallic shim between the heel of the rotor and the top of the stator plates. Close the gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting.

† 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.



TP3-830-1

Figure 2. Top View, Showing Tuning Adjustments



TP2-3230-A

Figure 3. Philco Radio-Clock Model B711, Code 121, Schematic Diagram

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	31-2751-13
C1A	Condenser, r-f trimmer	Part of C1
C1B	Condenser, oscillator trimmer	Part of C1
C2	Condenser, B– to chassis, .2 μf.	30-4650-49
C3	Condenser, oscillator grid, 47 μμf.	30-1230-4
C4	Condenser, a-v-c by-pass, .05 μf.	30-4650-45*
C5	Condenser, drift compensation, 7.5 μμf.	30-1224-83
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 μf.	30-1238-1
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.	30-4650-43*
C18	Condenser, electrolytic, 3-section	45-3037
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, .047 μf.	30-4650-45*
J1	Jack, clock	27-6273
LA1	Loop	Part of cabinet back
LS1	Speaker ass'y., p-m	36-1627-23
PC1	Printed circuit	30-6001
PL1	Plug, clock assembly	54-4878-2
R1	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 megohm	33-5565
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, 1 watt	66-1224340*
R11	Resistor, B plus filter, 1000 ohms	66-2108340*
R12	Resistor, tube saver, 100 ohms	33-1343-3
T1	Transformer, oscillator	33-4453-6
T2	Transformer, output	Part of LS1
W1	Line cord	L2183*
Z1	Transformer, 1st i-f	32-4161A
Z2	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Description	Service Part No.
Cabinet	10924-12
Knobs	
Clock (4 required)	54-4983-6
Station selector	54-4978-5
Off-on	54-4815-8
Clock	41-2041-6
Back-and-loop assembly	76-7757-3
Shield, tube	56-5629FA3
Socket, miniature (4 required)	27-6265*
Socket, miniature, 12BE6	27-6203-14
Window, radio dial	54-4977-5

Printed in U. S. A.

PHILCO SERVICE

PHILCO Factory-Supervised Service

HOME RADIO

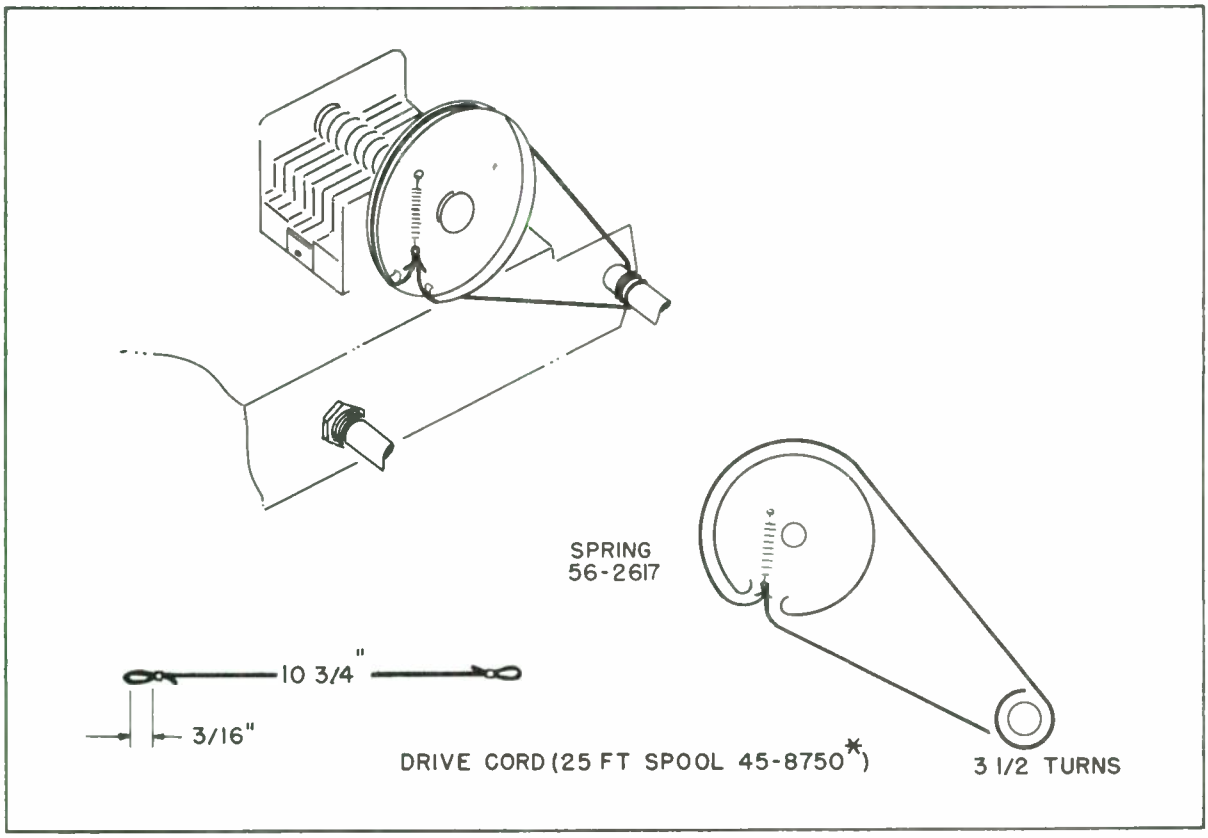
PHILCO HOME RADIO MODEL B578

MODEL B578

SPECIFICATIONS

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.



TP2-1405

Figure 1. Dial-Cord Installation Details

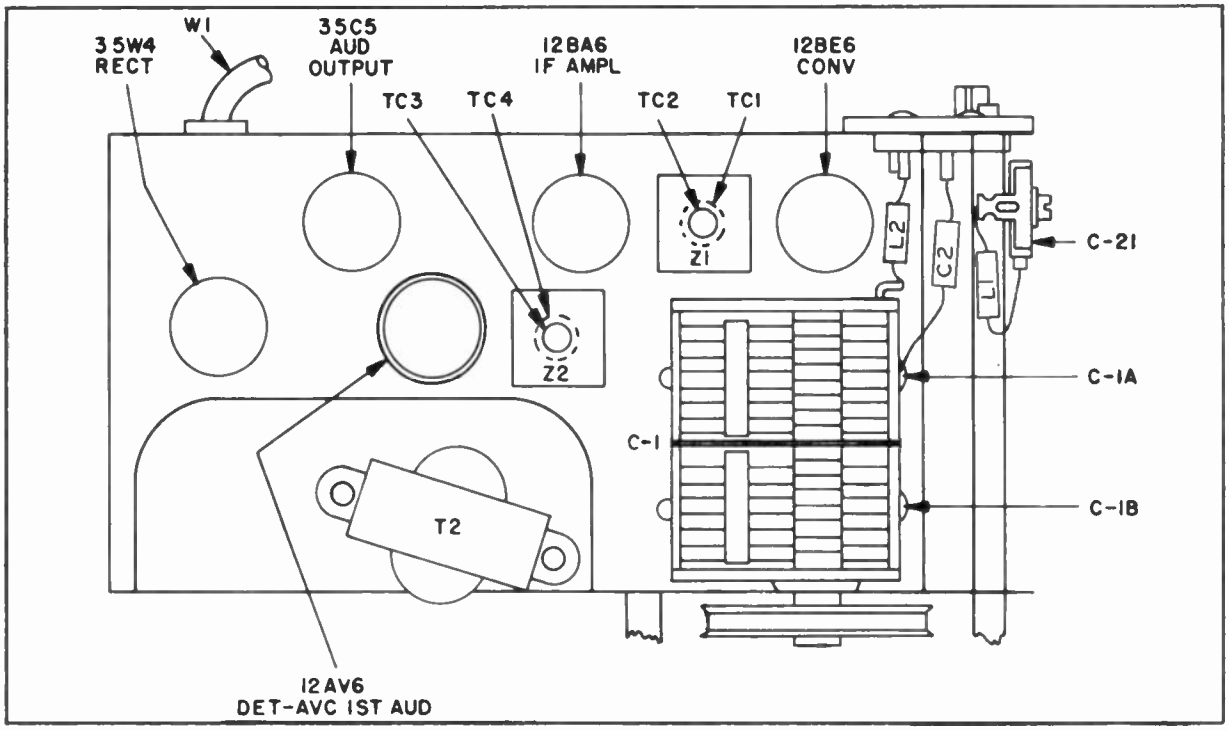


Figure 2. Top View, Showing Tuning Adjustments

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.

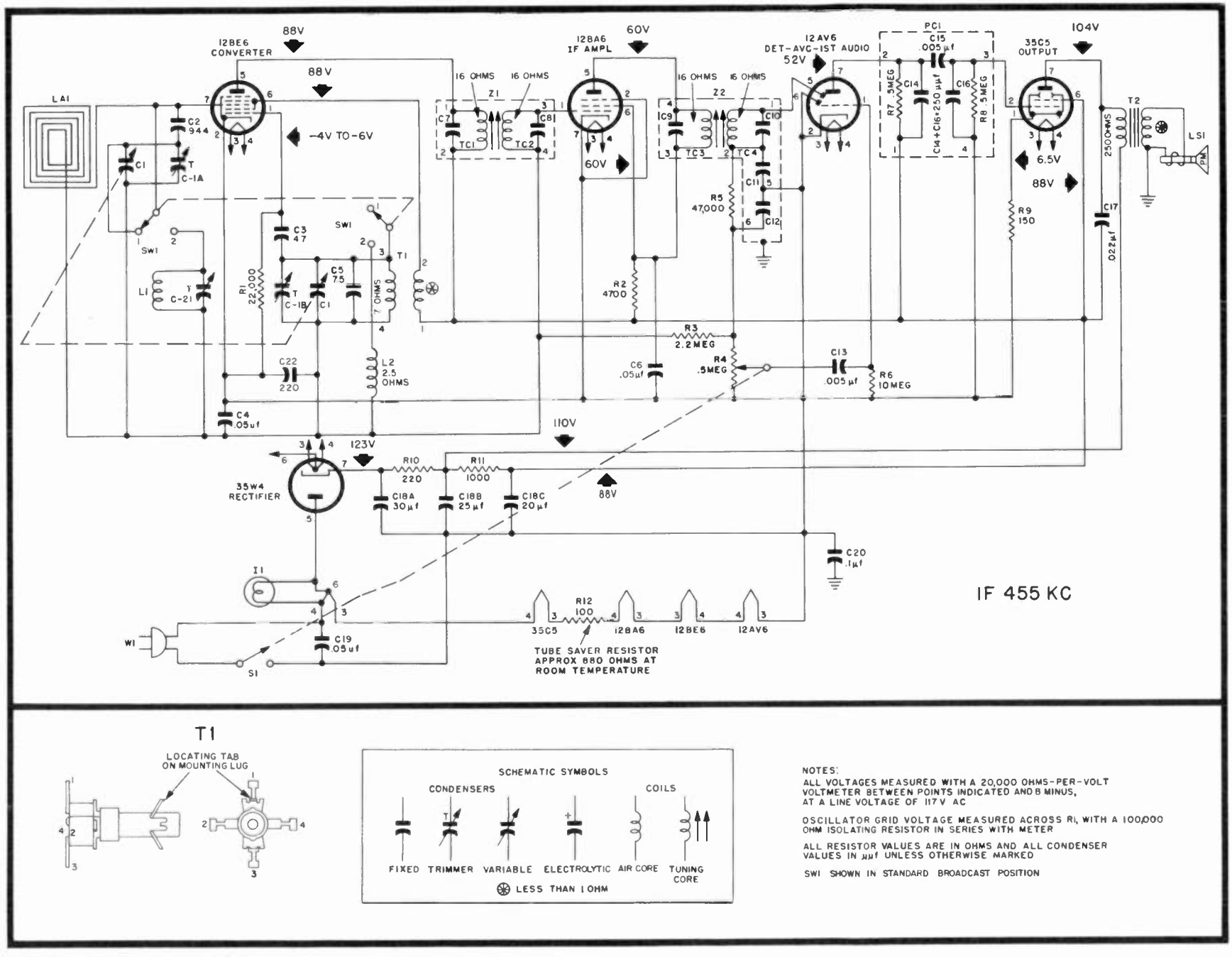
ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO			ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	BAND-SWITCH SETTING	SPECIAL INSTRUCTIONS	
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. 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 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)

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.



T1

SCHEMATIC SYMBOLS

NOTES:

ALL VOLTAGES MEASURED WITH A 20,000 OHMS-PER-VOLT VOLTMETER BETWEEN POINTS INDICATED AND B MINUS, AT A LINE VOLTAGE OF 117 V AC

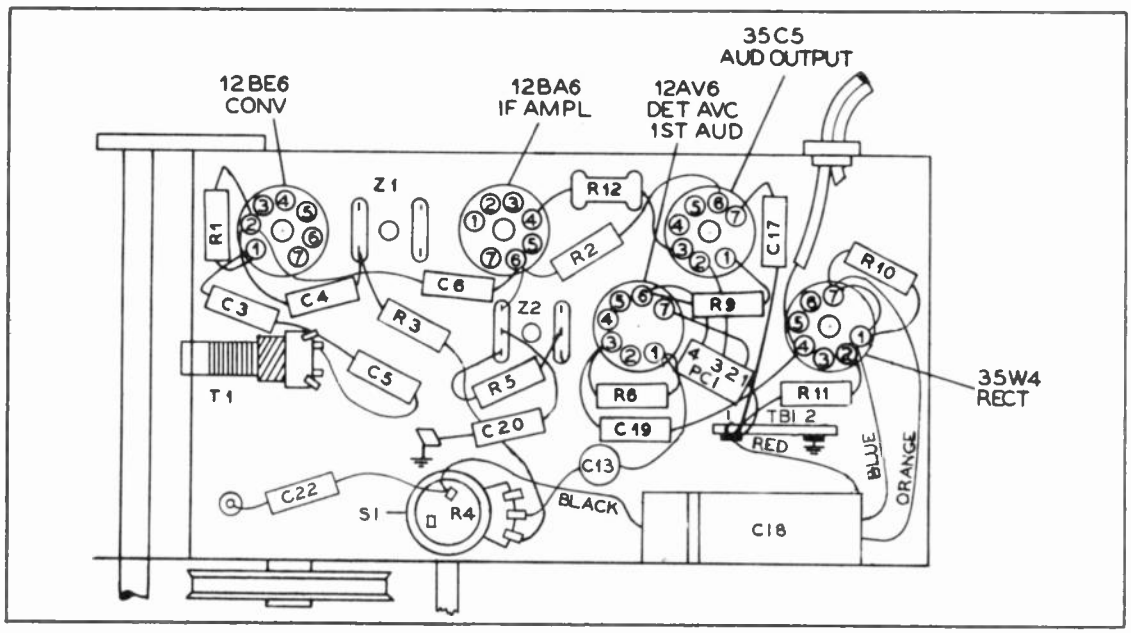
OSCILLATOR GRID VOLTAGE MEASURED ACROSS R1, WITH A 100,000 OHM ISOLATING RESISTOR IN SERIES WITH METER

ALL RESISTOR VALUES ARE IN OHMS AND ALL CONDENSER VALUES IN µµf UNLESS OTHERWISE MARKED

SWI SHOWN IN STANDARD BROADCAST POSITION

Figure 3. Philco Radio Model B578, Schematic Diagram

TP2-1408



TP2-1406

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.
C1	Condenser, tuning gang	31-2751-14
C1A	Condenser, antenna trimmer	Part of C1
C1B	Condenser, osc. trimmer	Part of C1
C2	Condenser, antenna series tracker, 944 μμf.	30-1220-65
C3	Condenser, oscillator grid, 47 μf.	30-1230-4
C4	Condenser, a-v-c by-pass, .05 μf.	30-4650-45*
C5	Condenser, drift compensation, 7.5 μμf.	30-1224-83
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 μf.	30-1238-1
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.	30-4650-43*
C18	Condenser, electrolytic, 3-section	45-3037
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.	30-4650-47*
C21	Condenser, trimmer, special services	31-6473-29
I1	Lamp, pilot	34-2068
LA1	Loop, antenna	Part of cabinet back
L1	Coil, antenna, special services	32-4561-3
L2	Coil, oscillator shunt	32-4562-2
LS1	Speaker, p-m	36-1625-3
PC1	Printed circuit	30-6001
R1	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	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	33-1343-3
S1	Switch, off-on	Part of R4
SW1	Switch, broadcast-special services	42-1796-2
T1	Transformer, oscillator	32-4453-6
T2	Transformer, output	32-8384
W1	Line cord	L-2183*
Z1	Transformer, 1st i-f	32-4161A
Z2	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Description	Service Part No.
Cabinet	
Spruce green	10927-4
Mahogany	10927-9
Back-and-loop assembly	76-7769
Knob (2)	54-4982-1
Drive cord, 25-foot spool	45-8750*
Pointer, dial	54-4979
Shaft, tuning	56-9807
Socket assembly, pilot lamp	27-6233-6
Socket, 7-pin miniature (4 used)	27-6265*
Socket (12AV6) (1)	27-6203-14*
Spring, retaining	28-8610
Spring, dial cord	56-2617

Printed in U.S.A.

PHILCO SERVICE

PHILCO Factory-Supervised Service

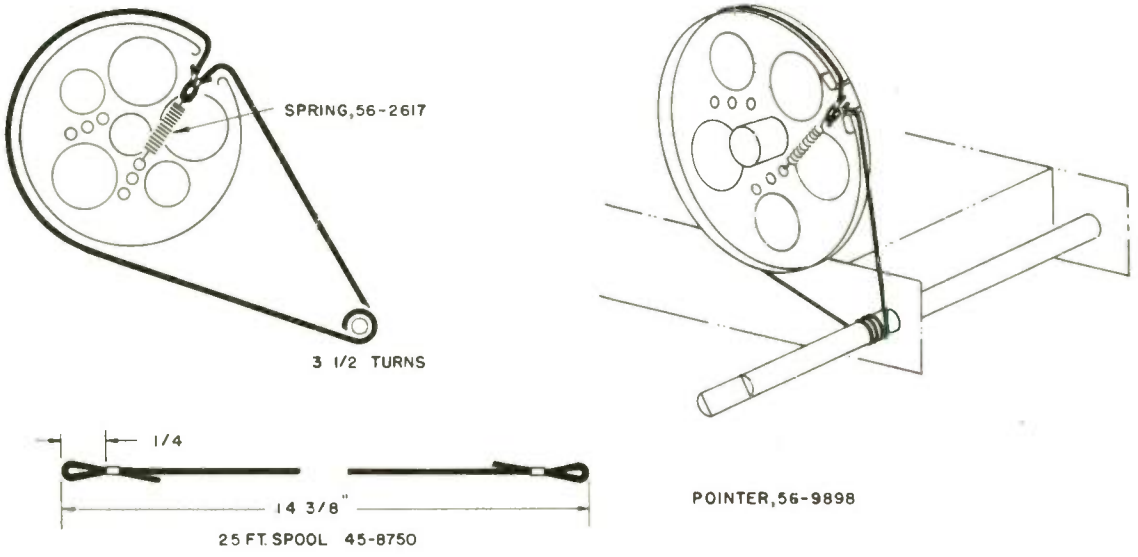
HOME RADIO

PHILCO RADIO MODEL B962

SPECIFICATIONS

Cabinet	Phenolic, mahogany or sand
Circuit	Five-tube superheterodyne (plus rectifier)
Frequency Range	
Broadcast	540—1620 kc.
Special Services	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	455 kc.
Philco Tubes	6BJ6 r-f ampl.; 12BE6 converter; 6BJ6 i-f ampl.; 6AQ6 det., a.v.c., 1st audio; 35C5 output; 35W4 rectifier

MODEL B962



TP3-806

Figure 1. Drive-Cord Installation Details

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.

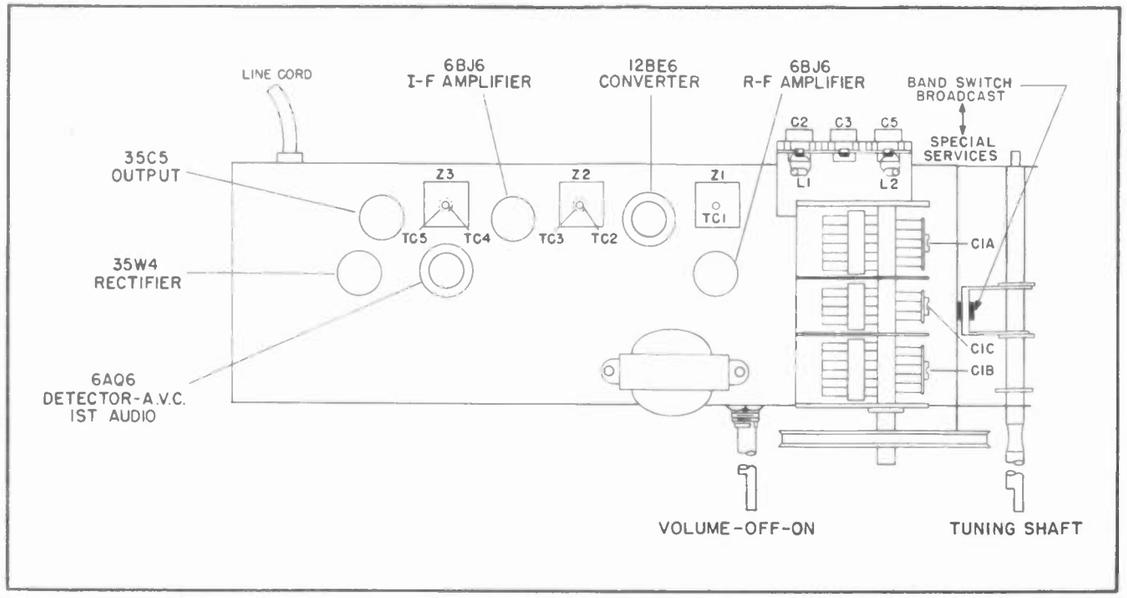
DIAL POINTER—Before the alignment is started, the dial pointer should be set to coincide with the dial scale mark below the number "55" when the tuning gang is fully meshed.

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
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)	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 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

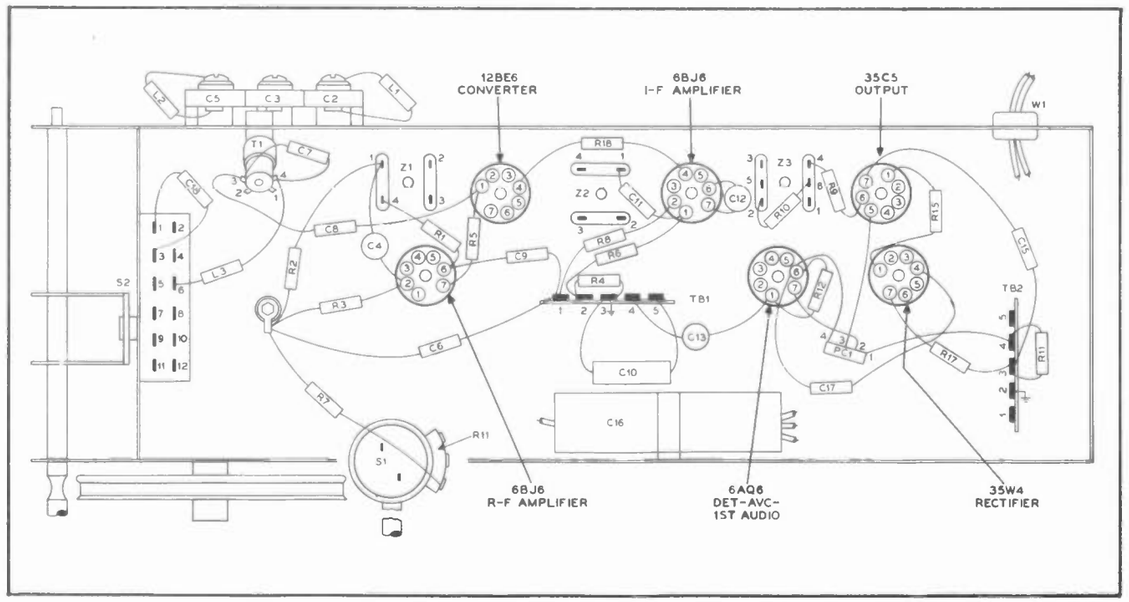
NOTE 1: Make up a 6—8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads and place near radio loop antenna. The loop antenna must be connected to the radio.

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.



TP3-840

Figure 2. Top View, Showing Tuning Adjustments



TP3-864

Figure 3. Base View, Showing Parts Placement

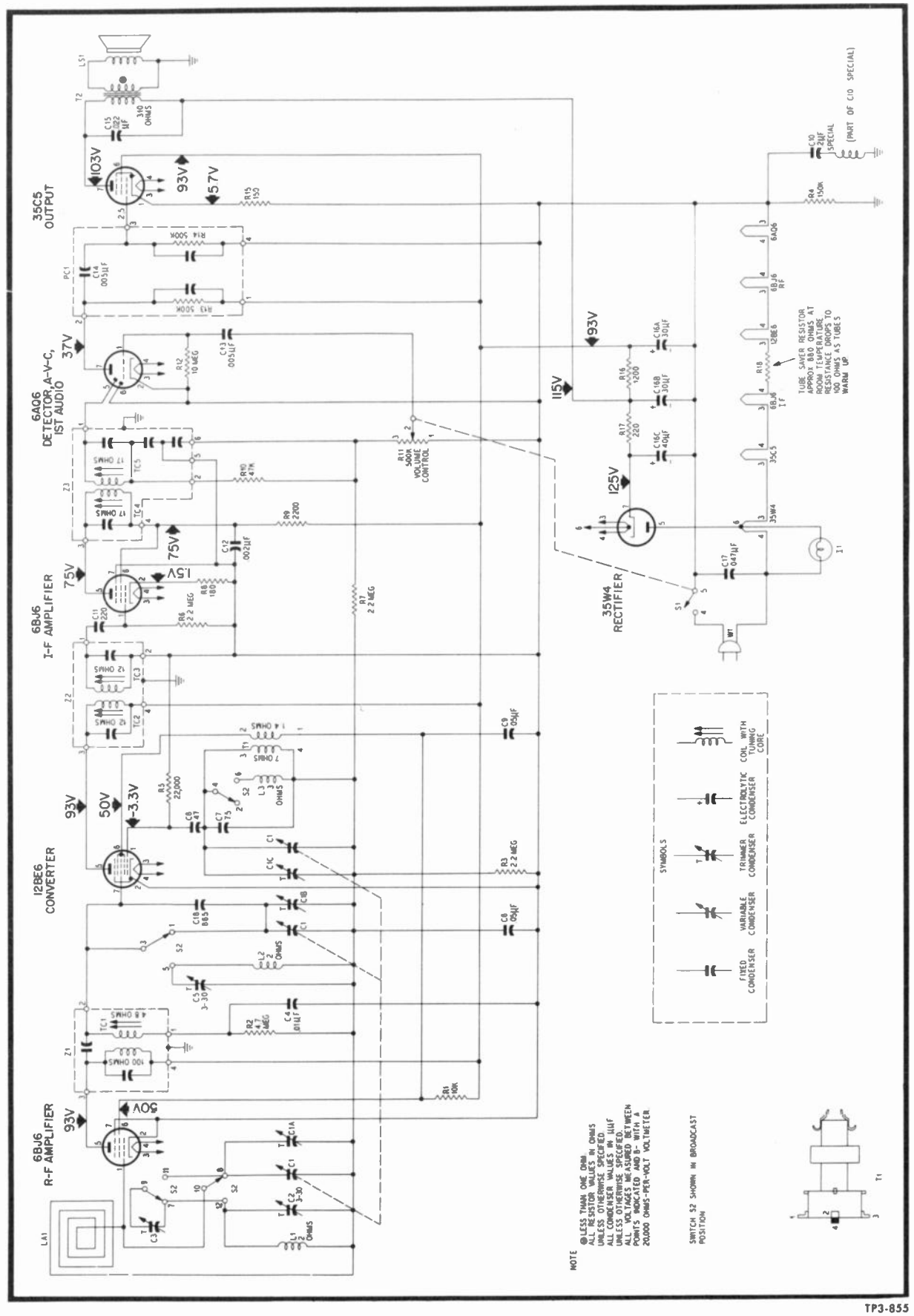
REPLACEMENT PARTS LIST

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.
C1	Condenser, tuning gang, 3 section	
	Model 53-950	31-2771
	Models 53-952, 53-954	31-2771-1
C1A	Condenser, trimmer, antenna	Part of C1
C1B	Condenser, trimmer, r-f	Part of C1
C1C	Condenser, trimmer, oscillator	Part of C1
C2	Condenser, trimmer, special services r-f	Part of CA1
C3	Condenser, padder, special services r-f	Part of CA1
C4	Condenser, r-f by-pass, .01 μf.	30-4650-41*
C5	Condenser, trimmer, special services mixer-grid	Part of CA1
C6	Condenser, a-v-c by-pass, .05 μf.	30-4650-45*
C7	Condenser, fixed trimmer, 7.5 μμf.	30-1224-65
C8	Condenser, d-c blocking, 47 μμf.	60-00475420
C9	Condenser, screen by-pass, .05 μf.	30-4650-45*
C10	Condenser, special, B– to chassis, .2 μf.	30-4644
C11	Condenser, i-f coupling, 220 μμf.	62-122001001*
C12	Condenser, screen by-pass, .002 μf.	30-1238-8*
C13	Condenser, audio coupling, .005 μf.	30-1238-1*
C14	Condenser, d-c blocking, .005 μf.	Part of PC1
C15	Condenser, tone compensation, .022 μf.	30-4650-43*
C16	Condenser, electrolytic filter	30-2575-27
C16A	Condenser, filter, 30 μf., 150v	Part of C16
C16B	Condenser, filter, 30 μf., 150v	Part of C16
C16C	Condenser, filter, 40 μf., 150v	Part of C16
C17	Condenser, line by-pass, .047 μf.	30-4650-45*
C18	Condenser, fixed padder, 865 μf.	30-1220-68
CA1	Condenser assembly, trimmer	31-6477-17
I1	Lamp, pilot	34-2068
L1	Coil, special services r-f	32-4561-4
L2	Coil, special services mixer-grid	32-4561-4
L3	Coil, oscillator shunt	32-4562-1
PC1	Printed circuit	30-6001
R1	Resistor, screen dropping, 10,000 ohms	66-3108340*
R2	Resistor, a-v-c load, 4.7 megohms	66-5478340*
R3	Resistor, a-v-c load, 2.2 megohms	66-5228340*
R4	Resistor, B– to chassis, 150,000 ohms	66-4158340*
R5	Resistor, grid leak, 22,000 ohms	66-3228340*
R6	Resistor, grid leak, 2.2 megohms	66-5228340*
R7	Resistor, a-v-c load, 2.2 megohms	66-5228340*
R8	Resistor, cathode bias, 180 ohms	66-1188340*
R9	Resistor, screen dropping, 2200 ohms	66-2228340*
R10	Resistor, i-f filter, 47,000 ohms	66-3478340*
R11	Volume control, 500,000 ohms	
	Models 53-950, 53-954	33-5566-43
	Model 53-952	33-5566-46
R12	Resistor, grid leak, 10 megohms	66-6108340*
R13	Resistor, plate load, 500,000 ohms	Part of PC1
R14	Resistor, grid leak, 500,000 ohms	Part of PC1
R15	Resistor, cathode bias, 150 ohms, 1 watt	66-1154340*
R16	Resistor, B + filter, 1200 ohms	66-2128340*
R17	Resistor, B + filter, 220 ohms, 1 watt	66-1224340*
R18	Resistor, tube saver, 100 ohms	33-1343-3
S1	Switch off-on	Part of R11
S2	Switch, broadcast-special services	
	Model 53-950	42-1893-3
	Model 53-952	42-1893-5
	Model 53-954	42-1893-4
T1	Transformer, oscillator	32-4453-2
T2	Transformer, output	32-8310-3
W1	Line cord	L-2183*
Z1	Transformer, r-f	32-4399-7A
Z2	Transformer, 1st i-f	32-4160A
Z3	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Description	Service Part No.
Drive cord, 25-ft. spool	45-8750*
Spring, drive cord	56-2617
Rubber mount, gang mtg. (3)	27-4596
Shield, tube (2)	56-5629FA3
Socket assembly, pilot lamp	27-6233-6
Socket, tube (2)	27-6203-14
Socket, tube (4)	27-6265
Speed nut (4)	1W56920FE7
Cabinet, mahogany	10938
Cabinet, sand	10938-2
Cabinet back and loop assembly	76-7881
Scale, mahogany	54-5152
Scale, ivory	54-5152-1
Knob (2)	54-4718-40
Knob, band switch	54-4998
Pointer	56-9998
Shaft, tuning	56-9807-1
Spring, retaining	28-8610
Speaker	45-9731



TP3-855

Figure 4. Philco Radio Model B962, Schematic Diagram

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PHILCO SERVICE

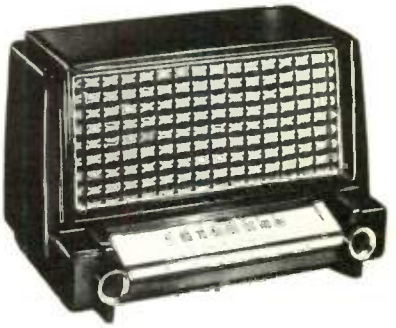
PHILCO Factory-Supervised Service

HOME RADIO

PHILCO RADIO MODEL B964

SPECIFICATIONS

CABINET	Phenolic, brown
CIRCUIT	Five-tube superheterodyne (plus rectifier)
FREQUENCY RANGE	
Broadcast	540—1620 kc.
Special Services	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	455 kc.
PHILCO TUBES	6BJ6 r-f ampl.; 12BE6 converter; 6BJ6 i-f ampl.; 6AQ6 det., a.v.c., 1st audio; 35C5 output; 35W4 rectifier



MODEL B964

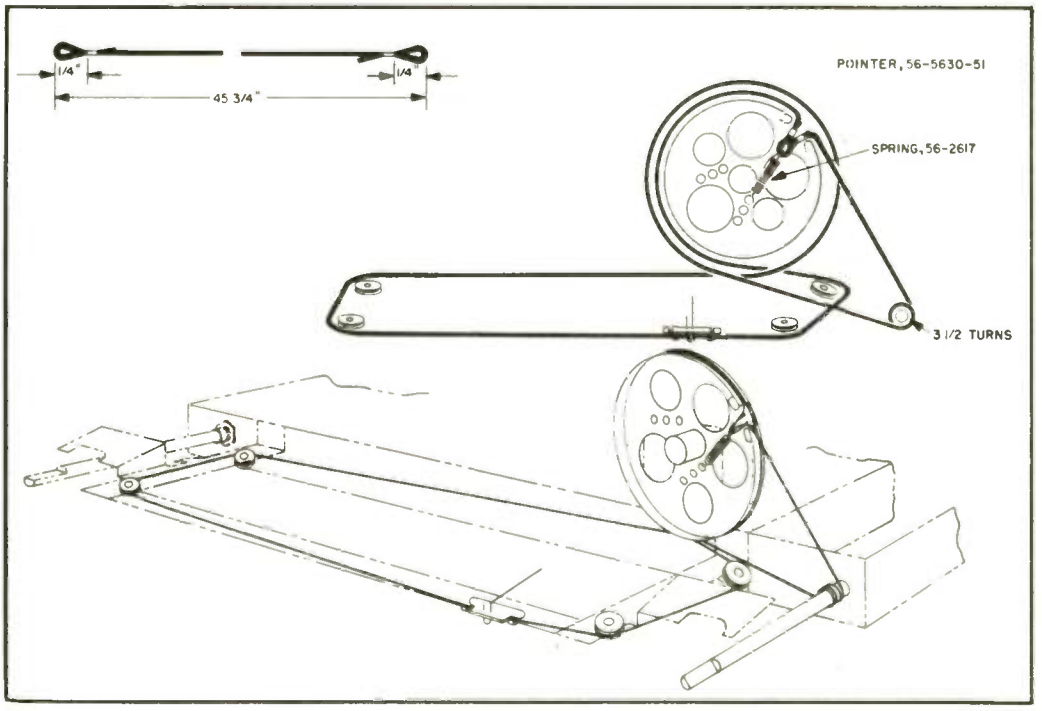


Figure 1. Drive-Cord Installation Details

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.

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
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)	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

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.

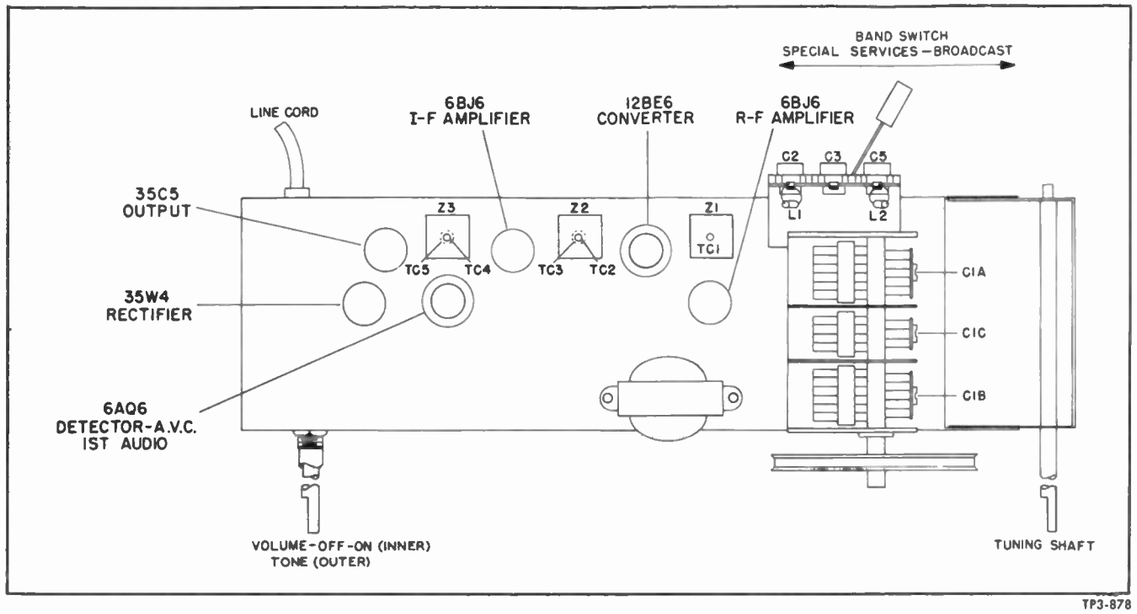


Figure 2. Top View, Showing Tuning Adjustments

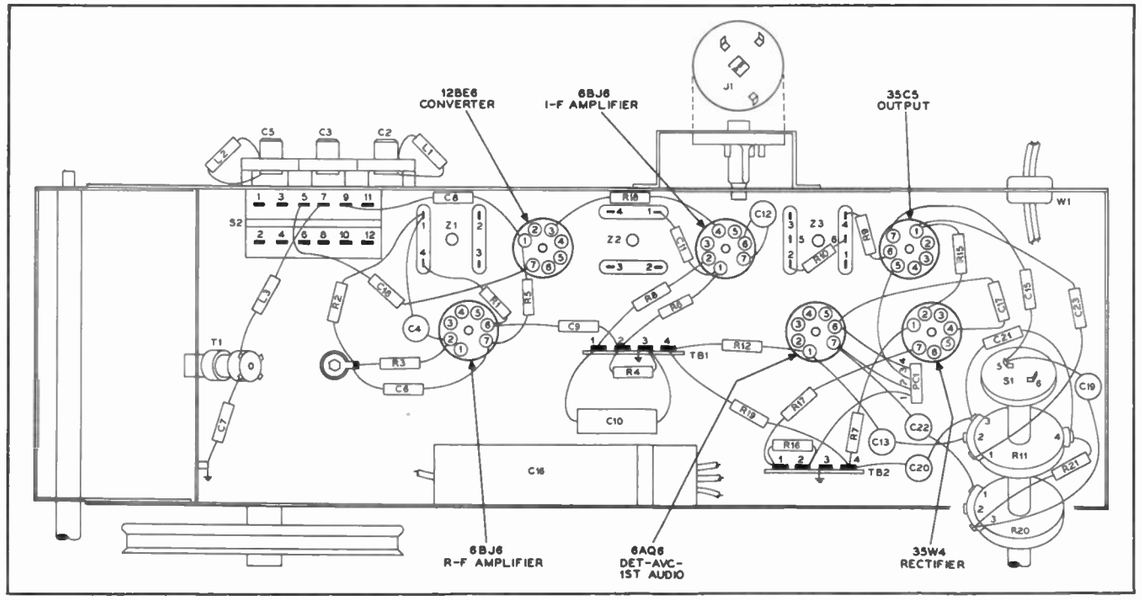


Figure 3. Base View, Showing Parts Placement

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 Part No.
C1	Condenser, tuning gang, 3 section	31-2771-1
C1A	Condenser, trimmer, antenna	Part of C1
C1B	Condenser, trimmer, r-f	Part of C1
C1C	Condenser, trimmer, oscillator	Part of C1
C2	Condenser, trimmer, special services r-f	Part of CA1
C3	Condenser, padder, special services r-f	Part of CA1
C4	Condenser, r-f by-pass, .01 μf.	30-1238-2*
C5	Condenser, trimmer, special services mixer-grid	Part of CA1
C6	Condenser, a-v-c by-pass .05 μf.	30-4650-45*
C7	Condenser, fixed trimmer, 7.5 μμf.	30-1224-65
C8	Condenser, d-c blocking, 47 μμf.	60-00475420
C9	Condenser, screen by-pass, .05 μf.	30-4650-45*
C10	Condenser, special, B– to chassis, .1 μf.	30-4644-3
C11	Condenser, i-f coupling, 220 μμf.	62-122001001*
C12	Condenser, screen by-pass, .002 μf.	30-1238-8*
C13	Condenser, audio coupling, .005 μf.	30-1238-1*
C14	Condenser, d-c blocking, .005 μf.	Part of PC1
C15	Condenser, tone compensation, .0033 μf.	30-4650-55
C16	Condenser, electrolytic filter	45-3037-3
C16A	Condenser, filter, 30 μf., 150v	Part of C16
C16B	Condenser, filter, 30 μf., 150v	Part of C16
C16C	Condenser, filter, 40 μf., 150v	Part of C16
C17	Condenser, line by-pass, .047 μf.	30-4650-45*
C18	Condenser, fixed padder, 1030 μμf.	30-1220-72
C19	Condenser, bass comp., .01 μf.	30-1238-2
C20	Condenser, phono coupling, .005 μf.	30-1238-1
C21	Condenser, high comp., 100 μμf.	62-110009001
C22	Condenser, tone comp., .002 μf.	30-1238-8
C23	Condenser, cathode by-pass, 10 μf., 50v	45-3035-6
CA1	Condenser assembly, trimmer	31-6477-17
I1	Lamp, pilot	34-2068
L1	Coil, special services r-f	32-4561-5
L2	Coil, special services mixer-grid	32-4561-5
L3	Coil, oscillator shunt	32-4562-1
PC1	Printed circuit	30-6001
R1	Resistor, screen dropping, 10,000 ohms	66-3108340*
R2	Resistor, a-v-c load, 4.7 megohms	66-5478340*
R3	Resistor, a-v-c load, 2.2 megohms	66-5228340*
R4	Resistor, B– to chassis, 150,000 ohms	66-4158340*
R5	Resistor, grid leak, 22,000 ohms	66-3228340*
R6	Resistor, grid leak, 2.2 megohms	66-5228340*
R7	Resistor, a-v-c load, 2.2 megohms	66-5228340*
R8	Resistor, cathode bias, 180 ohms	66-1188340*
R9	Resistor, screen dropping, 2200 ohms	66-2228340*
R10	Resistor, i-f filter, 47,000 ohms	66-3478340*
R11	Volume control, 500,000 ohms	33-5563-64
R12	Resistor, grid leak, 10 megohms	66-6108340*
R13	Resistor, plate load, 500,000 ohms	Part of PC1
R14	Resistor, grid leak, 500,000 ohms	Part of PC1
R15	Resistor, cathode bias, 150 ohms, 1 watt	66-1154340*
R16	Resistor, B+ filter, 1200 ohms	66-2128340*
R17	Resistor, B+ filter, 220 ohms, 1 watt	66-1224340*
R18	Resistor, tube saver, 100 ohms	33-1343-3
R19	Resistor, diode load, 470,000 ohms	66-4478340
R20	Resistor, tone control, 5 megohms	Part of R11
R21	Resistor, tone compensation, 33,000 ohms	66-3338340
S1	Switch, off-on	Part of R11
S2	Switch, broadcast-special services	42-1893-5
T1	Transformer, oscillator	32-4453-2
T2	Transformer, output	32-8310-9
W1	Line cord	L-2183*
Z1	Transformer, r-f	32-4399-7A
Z2	Transformer, 1st i-f	32-4160A
Z3	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

PARTS COMMON TO ALL MODELS

Description	Service Part No.
Drive cord, 25-ft. spool	45-8750*
Spring, drive cord	56-2617
Rubber mount, gang mtg. (3)	27-4596
Shield, tube (2)	56-5629FA3
Socket assembly, pilot lamp	27-6233-6
Socket, tube (2)	27-6203-14
Socket, tube (4)	27-6265
Speed nut (4)	1W56920FE7
Cabinet	10963
Cabinet back and loop assembly	76-8068
Knob, band switch	54-4998
Knob, off-on-volume	54-4842-7
Knob, tone	76-6353-1
Knob, tuning	76-6354-1
Panel, diffusing	54-8819
Clip, panel diffusing	56-3587-1
Pointer	56-5630-51
Pointer rail assembly	76-8067
Scale, dial	54-5163
Shaft, tuning	56-9807-6
Spring, retaining	28-8610
Speaker	36-1641-12

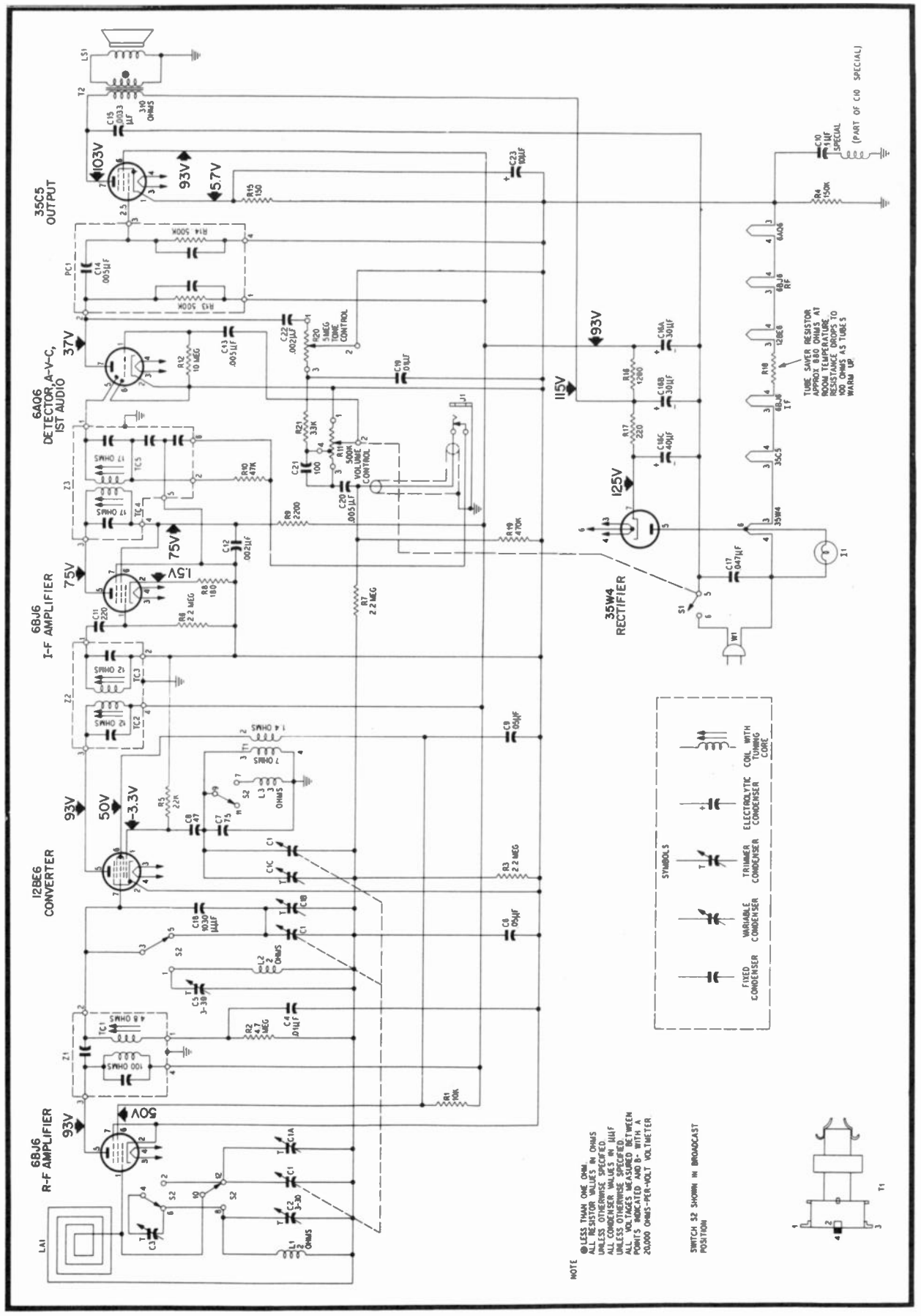


Figure 4. Philco Radio Model B964, Schematic Diagram

PHILCO
Factory-Supervised
Service

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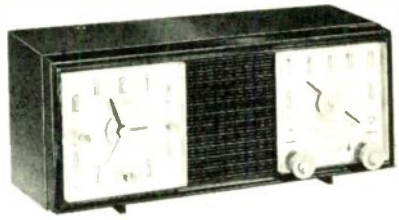
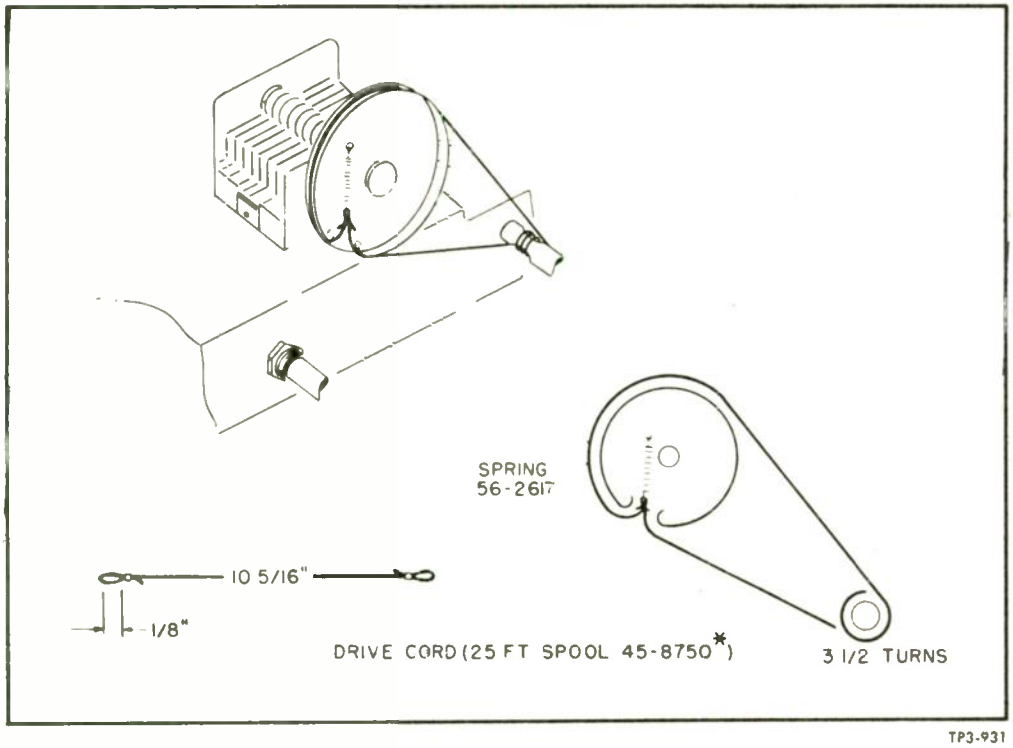
PHILCO RADIO-CLOCK MODEL B712, CODE 121

SPECIFICATIONS

CABINET	Molded plastic
CIRCUIT	Five-tube Superheterodyne (plus rectifier)
FREQUENCY RANGES	
Standard Broadcast	540—1620 kc.
Special Services	1700—3400 kc.
AUDIO OUTPUT	1 watt
OPERATING VOLTAGE	117 volts, a.c.
POWER CONSUMPTION	30 watts
AERIAL	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



MODEL B712



TP3-931

Figure 1. Drive-Cord Installation Details

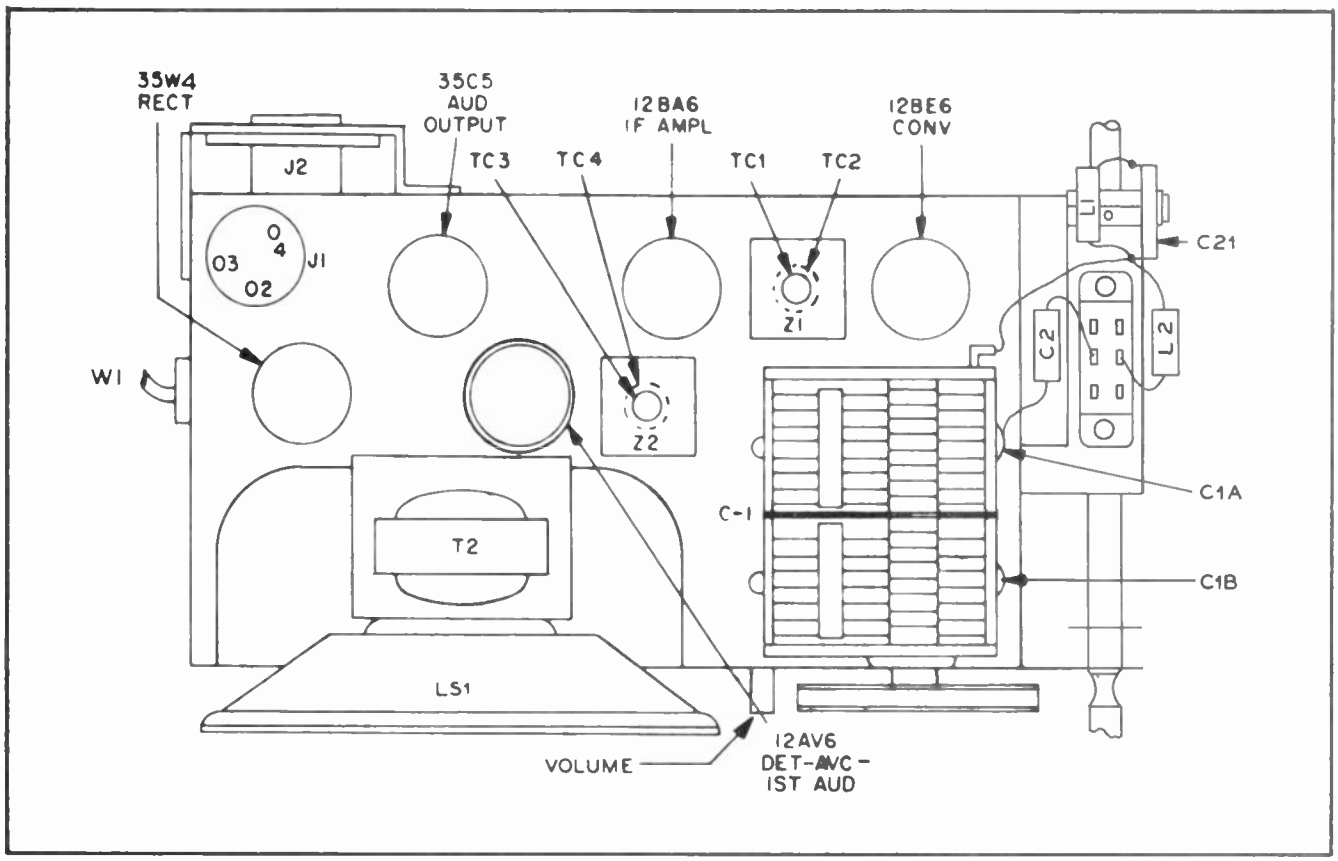
ALIGNMENT PROCEDURE

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 signal-generator output to hold output-meter reading below 1.25 volts.



TP3-929

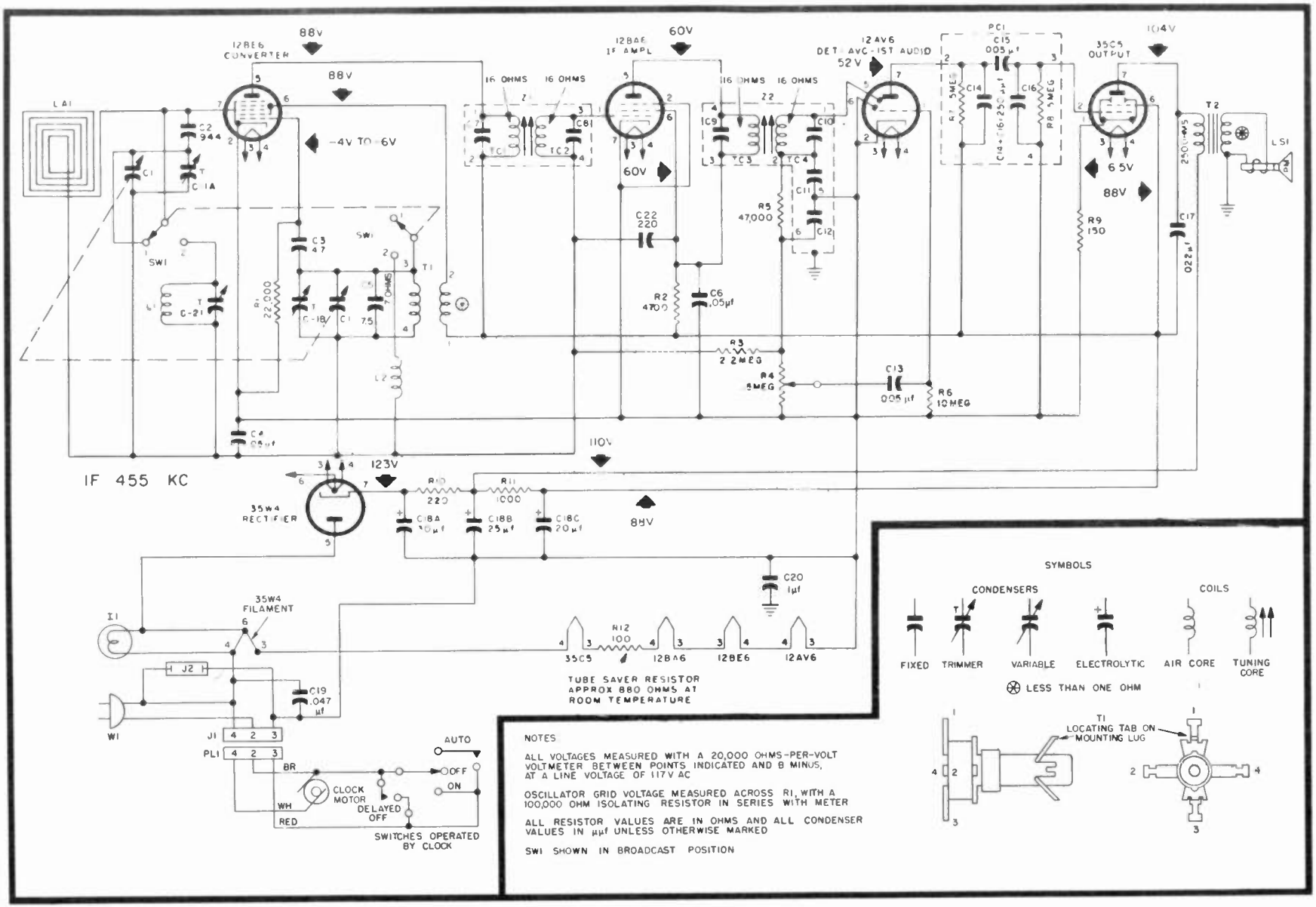
Figure 2. Top View, Showing Trimmer Locations

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO			ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	BAND SWITCH SETTING	SPECIAL INSTRUCTIONS	
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. 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.	C1-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)

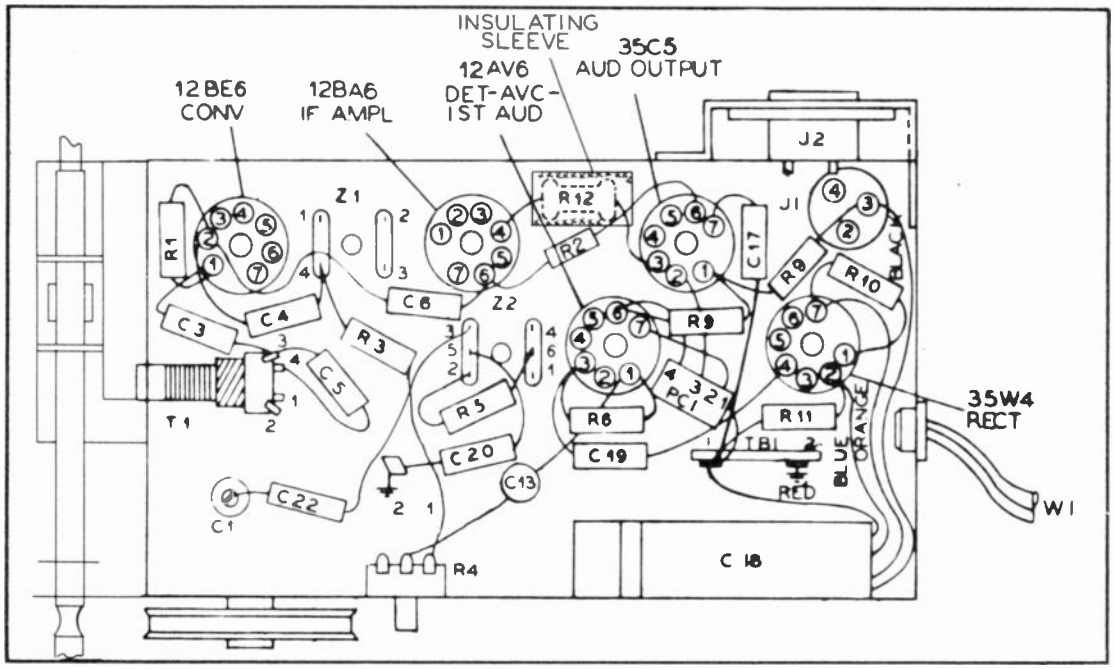
NOTE: Make up a 6-8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads, and place near radio loop.

* 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.



TP3-932

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



TP3-930

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.
C1	Condenser, tuning gang	31-2751-14
C1A	Condenser, r-f trimmer	Part of C1
C1B	Condenser, oscillator trimmer	Part of C1
C2	Condenser, aerial series tracker, 944 μμf.	30-1220-65
C3	Condenser, oscillator grid, 47 μμf.	30-1230-4
C4	Condenser, a-v-c by-pass, .05 μf.	30-4650-45*
C5	Condenser, drift compensation, 7.5 μμf.	30-1224-83
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 μf.	30-1238-1*
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.	30-4650-43*
C18	Condenser, electrolytic, 3-section	30-2535-36
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, .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, 220 μμf.	62-122001001*
I1	Lamp, pilot	34-2068
J1	Jack, clock	27-6273-7
J2	Jack, appliance receptacle, a-c	76-3931
L1	Coil, aerial, special services	32-4561-3
L2	Coil, oscillator shunt	32-4562-2
LA1	Loop, antenna	Part of back-and-loop ass'y
LS1	Speaker, p-m	36-1627-8
PC1	Coupling network	30-6001
PL1	Plug, clock assembly	54-4878-2
R1	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 megohm	33-5565
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, 1 watt	66-1224340*
R11	Resistor, B plus filter, 1000 ohms	66-2108340*
R12	Resistor, tube saver, 100 ohms	33-1343-3
SW1	Switch, broadcast-special services	42-1796-2
T1	Transformer, oscillator	32-4453-6
T2	Transformer, output	32-8384*
W1	Line cord	L-2183*
Z1	Transformer, 1st i-f	32-4161A
Z2	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Description	Service Part No.
Cabinet	
Sand	11013
Forest green	11013-1
Knobs	
Clock (3)	54-6096
Tuning and volume	54-6095
Clock	41-2047
Back-and-loop assembly	76-8703
Scale, radio	28-9648FCP
Pointer	78-8606
Clock cover	54-4989
Shaft, tuning	28-9475FA3
Shield, tube	56-5629FCP
Shield, tube base	56-3978FA3
Socket, tube (4)	27-6265
Socket, tube, 12BE6	27-6203-14
Socket assembly, pilot lamp	27-6233-6
Spring, drive cord	56-2617
Spring, retaining	28-8610
Drive cord, 25-ft. spool	45-8750

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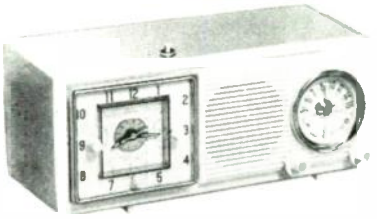
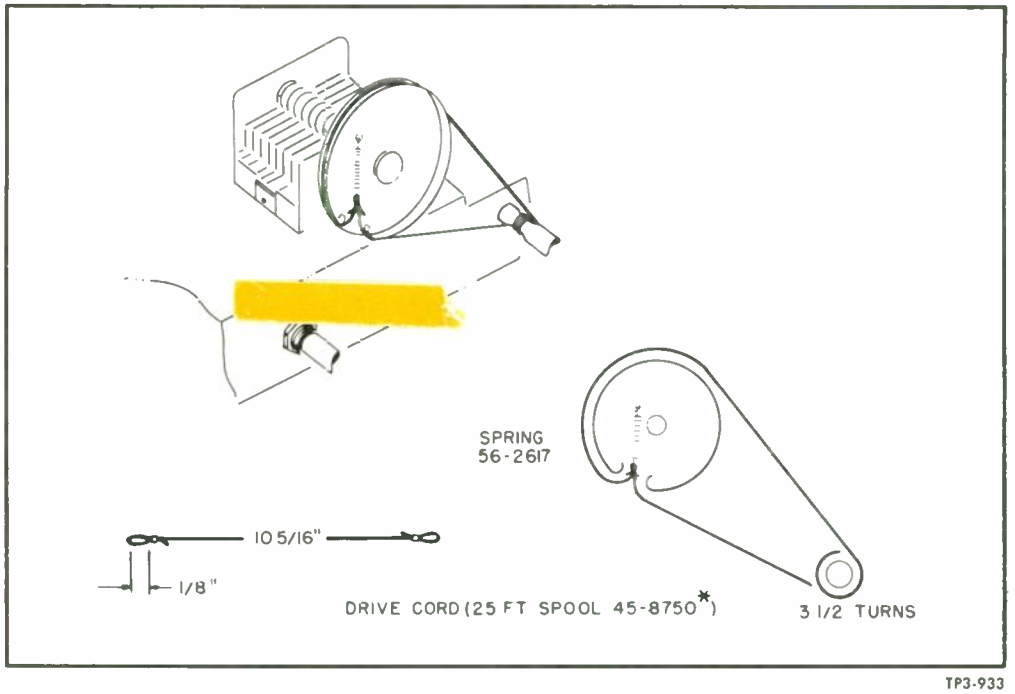
PHILCO RADIO-CLOCK MODEL B714, CODES 121 AND 123

SPECIFICATIONS

CABINET	Molded plastic
CIRCUIT	Five-tube Superheterodyne (plus rectifier)
FREQUENCY RANGES	
Standard Broadcast	540—1620 kc.
Special Services	1700—3400 kc.
AUDIO OUTPUT	1 watt
OPERATING VOLTAGE	117 volts, a.c.
POWER CONSUMPTION	30 watts
AERIAL	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



MODEL B714, CODES 121 AND 123



TP3-933

Figure 1. Drive-Cord Installation Details

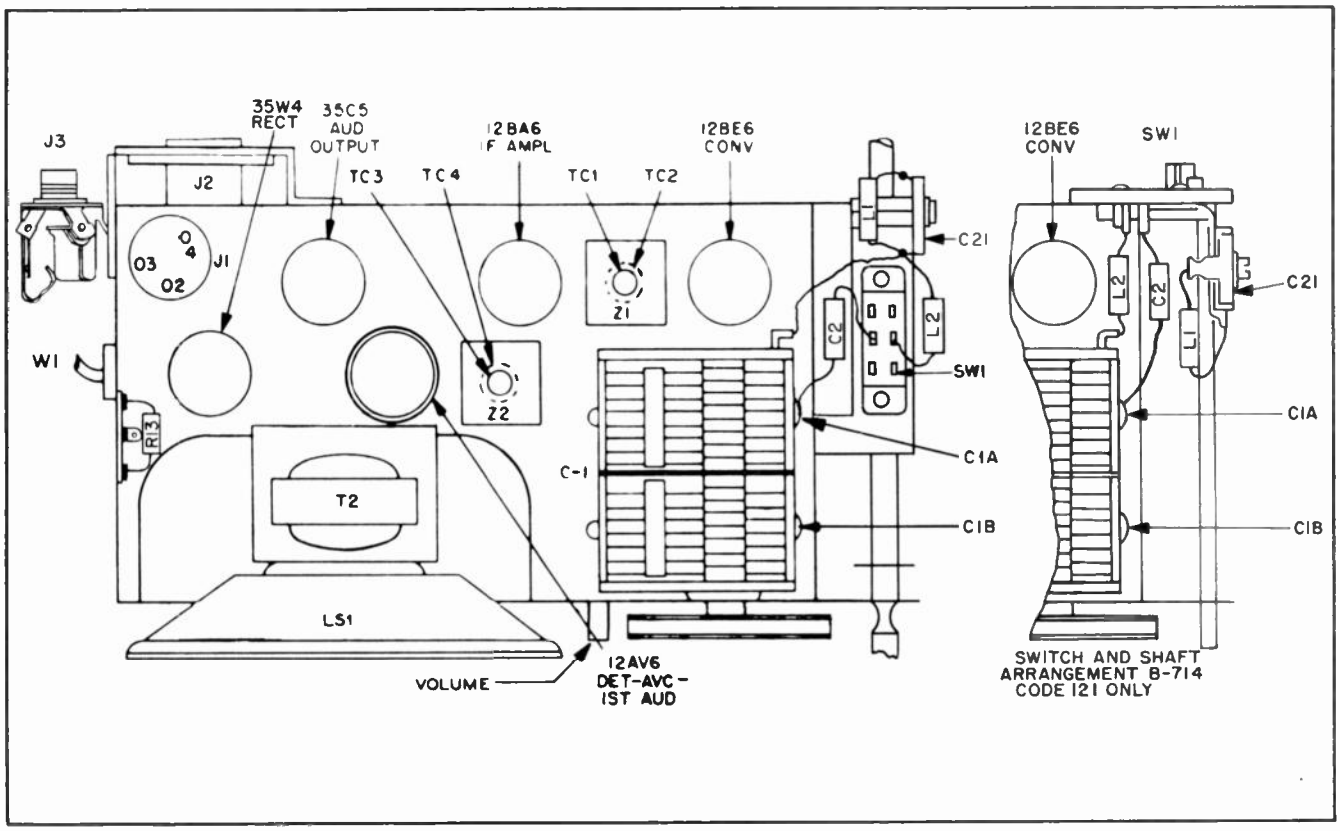
ALIGNMENT PROCEDURE

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 signal-generator output to hold output-meter reading below 1.25 volts.



TP3-940

Figure 2. Top View, Showing Trimmer Locations

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO			ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	BAND SWITCH SETTING	SPECIAL INSTRUCTIONS	
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. 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 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.

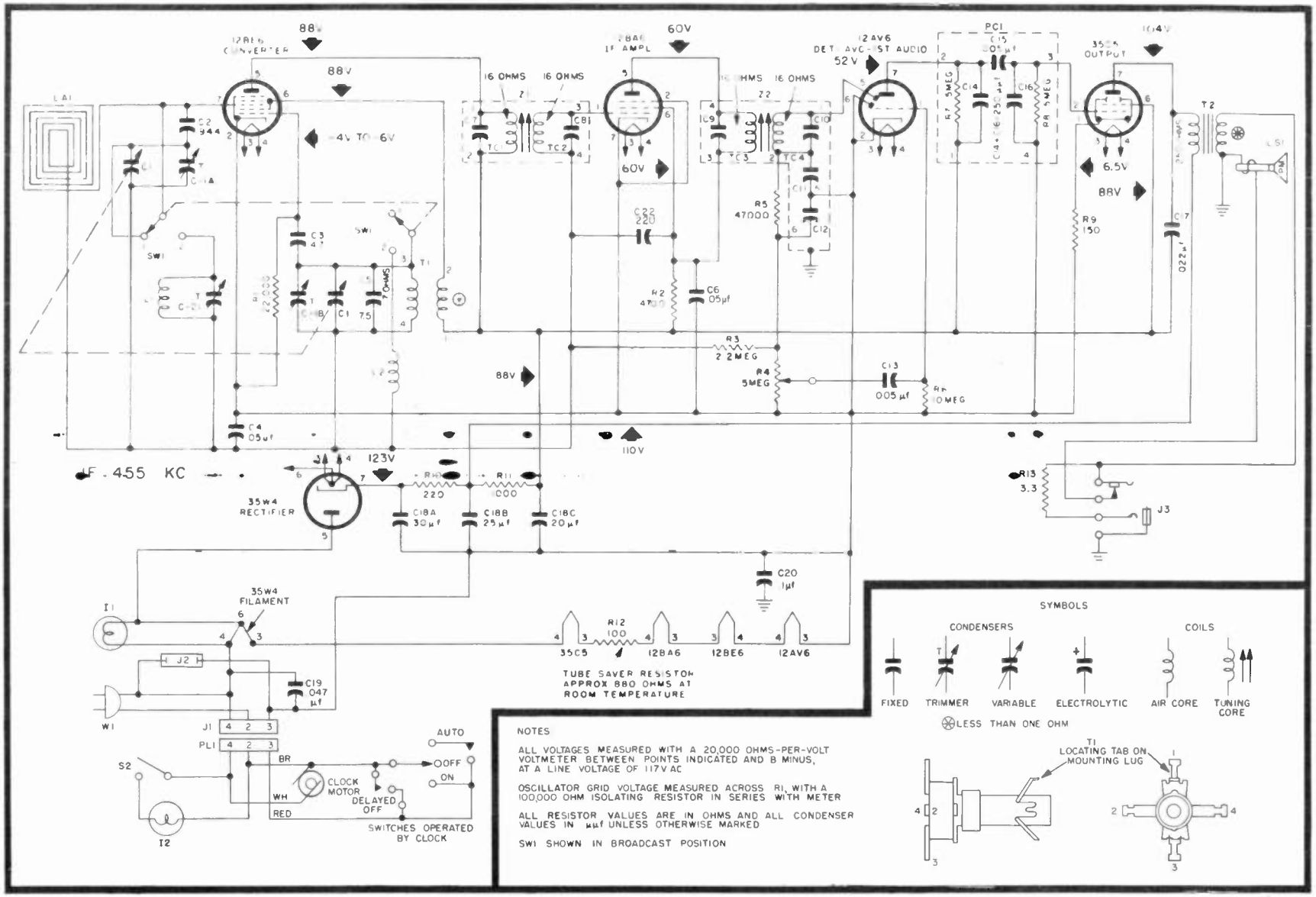


Figure 3. Philco Radio-Clock Model B714, Codes 121 and 123, Schematic Diagram

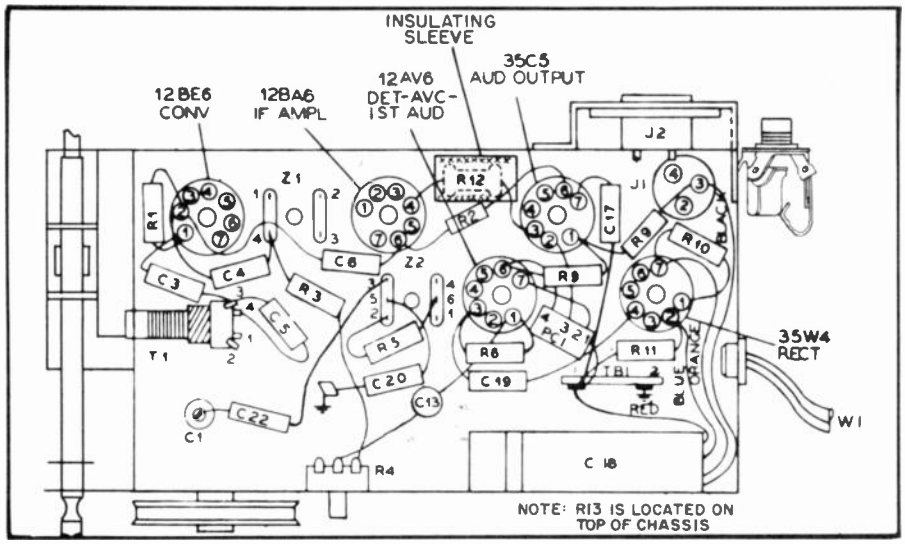


Figure 4. Base View, Showing Parts Placement

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.
C1	Condenser, tuning gang	31-2751-14
C1A	Condenser, r-f trimmer	Part of C1
C1B	Condenser, oscillator trimmer	Part of C1
C2	Condenser, aerial series tracker, 944 μμf.	30-1220-65
C3	Condenser, oscillator grid, 47 μμf.	30-1230-4
C4	Condenser, a-v-c by-pass, .05 μf.	30-4650-45*
C5	Condenser, drift compensation, 7.5 μμf.	30-1224-83
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 μf.	30-1238-1*
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.	30-4650-43*
C18	Condenser, electrolytic, 3-section	30-2573
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, .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, 220 μμf.	62-122001001*
I1	Lamp, pilot	34-2068
I2	Lamp, night light	34-2477
J1	Jack, clock	27-6273
J2	Jack, appliance receptacle, a-c	76-3931
J3	Private listening unit	42-1975-2
L1	Coil, aerial, special services	32-4561-3
L2	Coil, oscillator shunt	32-4562-2
LA1	Loop, antenna	Part of back-and-loop ass'y.
LS1	Speaker, p-m	36-1627-8
PC1	Coupling network	30-6001
PL1	Plug, clock assembly	54-4878-2
R1	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 megohm	33-5565
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, 1 watt	66-1224340*
R11	Resistor, B plus filter, 1000 ohms	66-2108340*
R12	Resistor, tube saver, 100 ohms	33-1343-3
R13	Resistor, private listening unit, 3.3 ohms	66-9333540
S2	Switch, night light	42-2023
SW1	Switch, broadcast-special services	42-1796-2
T1	Transformer, oscillator	32-4453-6
T2	Transformer, output	32-8384*
W1	Line cord	L-2183*
Z1	Transformer, 1st i-f	32-4161A
Z2	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Description	Service Part No.
Cabinet	
White	10940-6
Knobs	
Clock (3)	54-4983-5
Tuning and volume	54-4986-3
Clock	41-2042-2
Back-and-loop assembly	76-7807
Backplate and clip assembly, pilot lamp	76-8720
Scale	
Radio	54-4985
Clock	54-4984
Pointer	56-9846
Clock cover	54-4989
Shaft, tuning	56-9807
Shield, tube	56-5629FA3
Shield, tube base	56-3978FA3
Socket, tube (4)	27-6265
Socket, tube, 12BE6	27-6203-14
Socket assembly, pilot lamp	27-6233-6
Socket assembly, night light	27-6233-110
Spring, drive cord	56-2617
Spring, retaining	28-8610
Drive cord, 25-ft. spool	45-8750*

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PHILCO

PHILCO Factory-Supervised Service

SERVICE

HOME RADIO

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 alignment chart.

Deletion from Schematic Notes

Delete SW1 SHOWN IN STANDARD BROADCAST POSITION.

Correction to Parts List

Cabinet

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

Cabinet

Spruce	10926-17
Tangerine	10926-6

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

Correction to Specifications

The specifications for the cabinet should read:

CABINET .....Molded 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	88v	60v	52v	104v
Screen grid	88v	60v		88v
Control grid	—4v to —6v			
Cathode				6.5v

At the junction of R11 and C18C: 88v.
At the junction of R11, R10, and C18B: 110v.
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

After LS1 in the parts list, add:

PC1	Printed circuit	30-6001

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

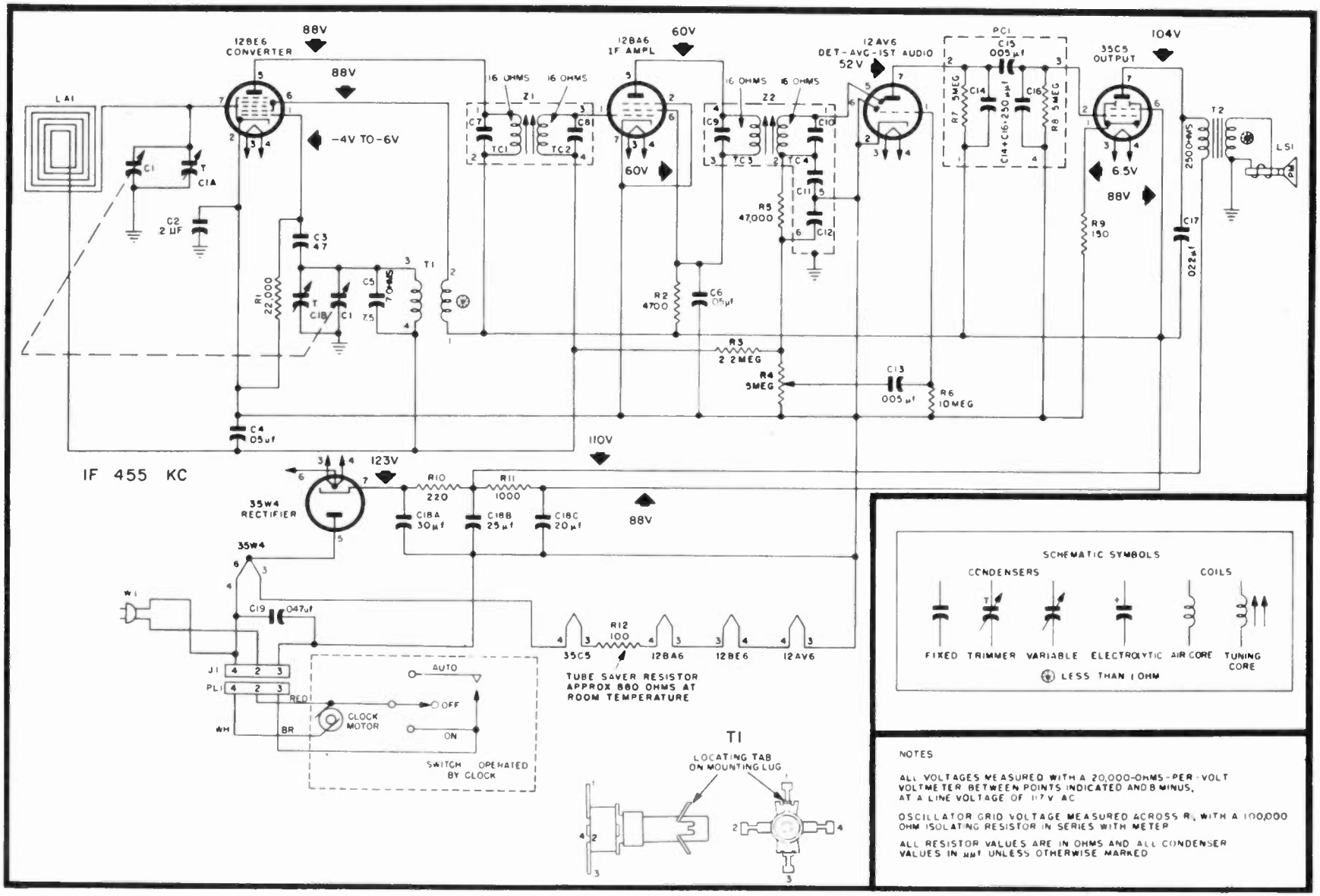


Figure 1. Philco Radio Model B710, Code 121, Schematic Diagram

PHILCO SERVICE

PHILCO Factory-Supervised Service

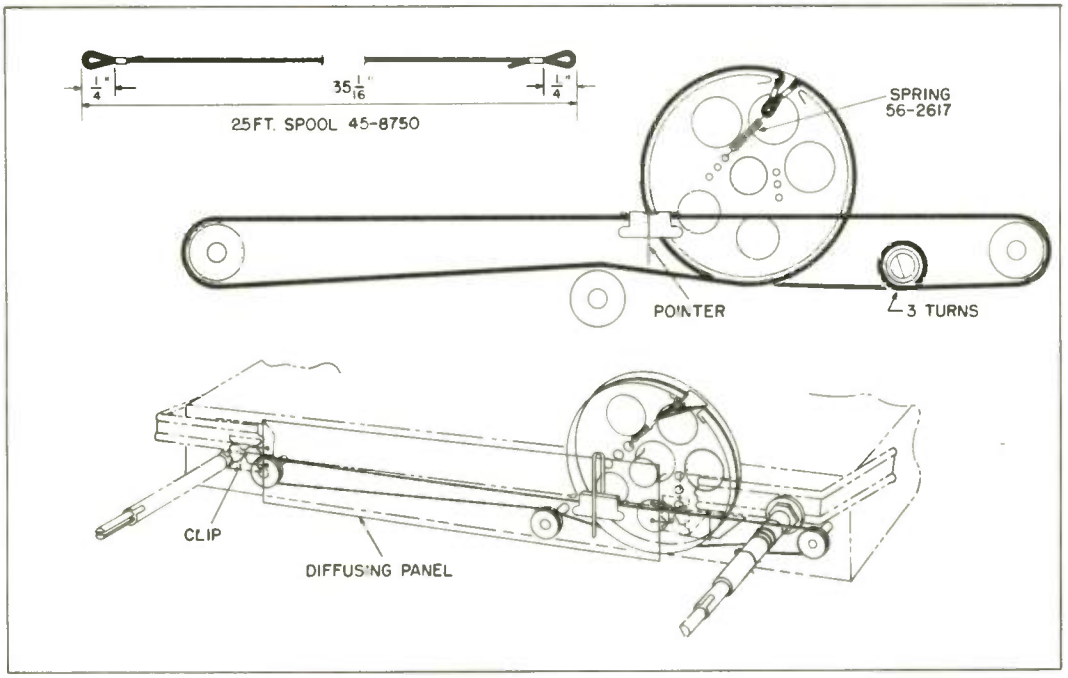
HOME RADIO

PHILCO RADIO-PHONOGRAPH MODEL B1752

SPECIFICATIONS

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

MODEL B1752



TP2-2587A

Figure 1. Drive-Cord Installation Details

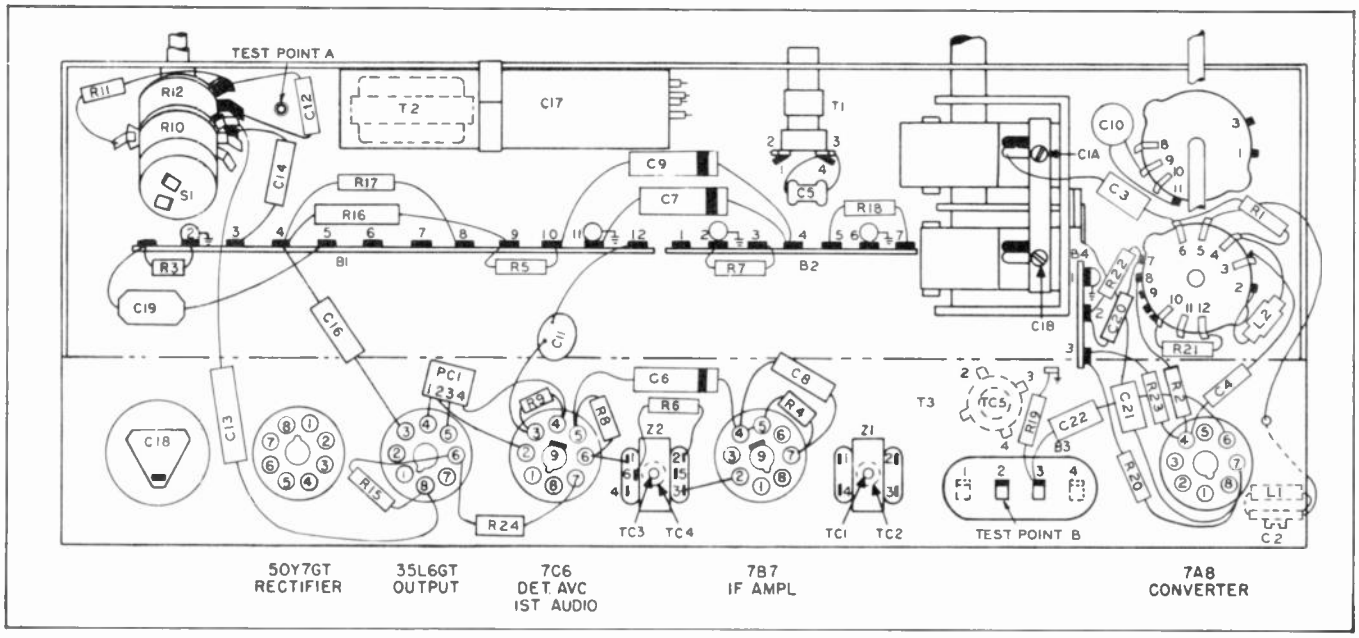


Figure 2. Base View, Showing Parts Placement and Tuning Adjustments TP3-1211

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.

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Connect output lead through a .01-μf condenser to control grid (pin 6) of 7A8 osc.-mixer 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. 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 kc.	Adjust for maximum output.	C1A—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)

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.

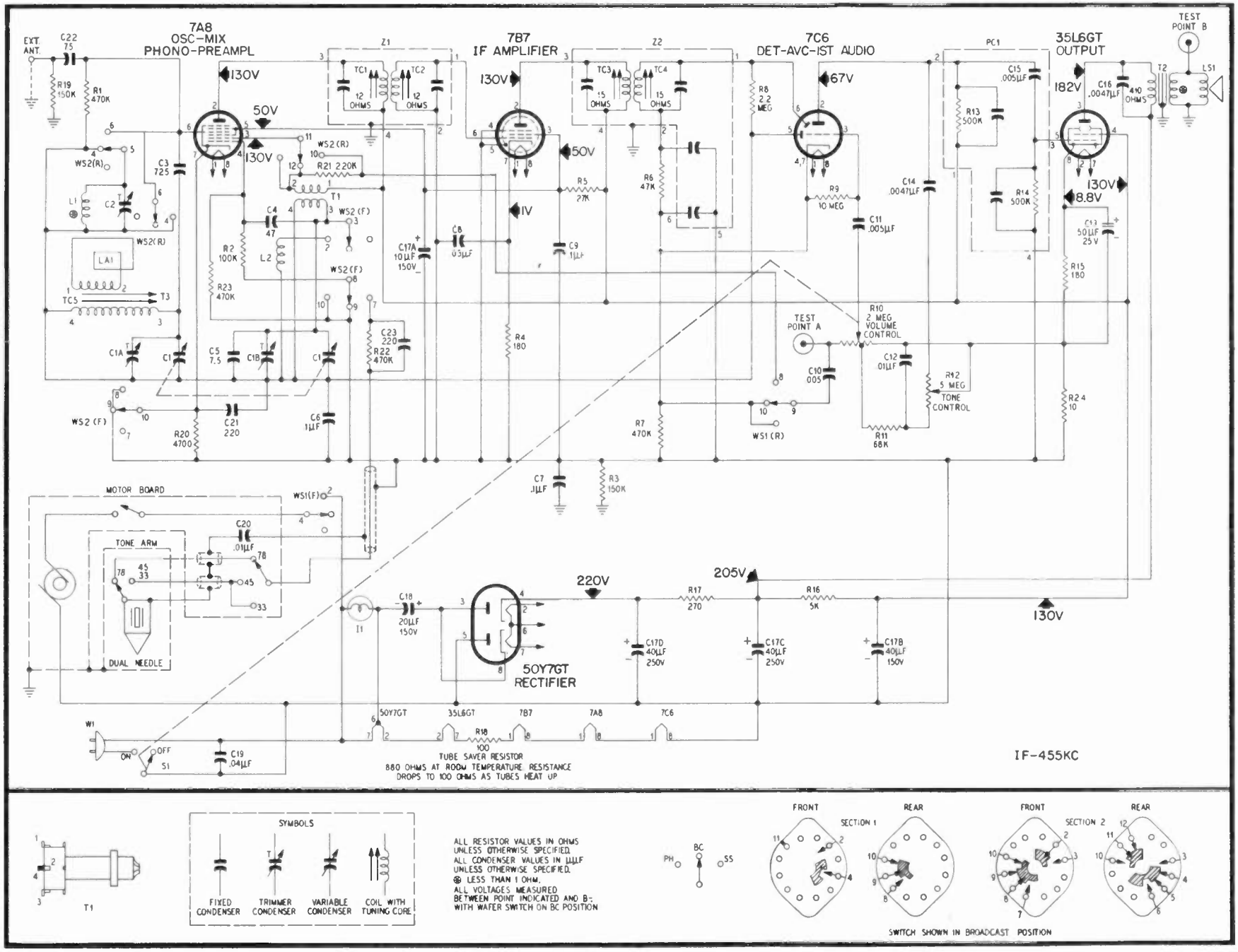


Figure 3. Philco Radio-Phonograph Model B1752, Schematic Diagram

IP3-1212

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
C1A	Condenser, trimmer, antenna	Part of C1
C1B	Condenser, trimmer, oscillator	Part of C1
C2	Condenser, trimmer, Special Services antenna	31-6473-31
C3	Condenser, series tracker, 725 μμf.	30-1220-69
C4	Condenser, d-c blocking, 47 μμf.	60-00475420
C5	Condenser, fixed trimmer, 7.5 μμf.	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, audio coupling, .005 μf.	30-1238-1
C11	Condenser, d-c blocking, .005 μf.	30-1238-1*
C12	Condenser, bass compensation, .01 μf.	30-4650-41*
C13	Condenser, cathode by-pass, 50 μf., 25v	45-3035-2
C14	Condenser, tone, .0047 μf.	30-4650-56*
C15	Condenser, d-c blocking, .005 μf.	Part of PC1
C16	Condenser, tone compensation, .0047 μf.	36-4650-90*
C17	Condenser, electrolytic, 4-section	30-2575-38
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
C18	Condenser, voltage doubling, 20 μf., 150v	45-3041
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, 8 μμf.	30-1224-46
C23	Condenser, phono attenuator, 220 μμf.	62-122001001*
I1	Lamp, pilot	34-2064*
L1	Coil, antenna, Special Services	32-4561-3
L2	Coil, oscillator shunt	32-4562-1
LA1	Loop antenna	See Note
LS1	Speaker	36-1651-5
PC1	Printed circuit, d-c blocking	30-6001
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	66-4158340*
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	66-4478340*
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
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
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	42-2017
Z1	Transformer, 1st i-f	32-4160
Z2	Transformer, 2nd i-f	32-4240

MISCELLANEOUS

Description	Service Part No.
Antenna lead	76-1472
Cabinet, mahogany	11014
Cabinet back, mahogany	54-9099
Cabinet Parts	
Bullet catch	45-6002
Changer frame	76-6600
Dome	3363-3
Door pull	28-9608
Hinge, r.h.	56-9922
Hinge, l.h.	56-9922-1
Scale strap	56-2234-3
Strike plate	45-6003
Dial scale	54-5196
Knob, tone	54-6092
Knob, tuning	54-6092-1
Knob, wafer switch	54-6093
Knob, volume, on-off	54-6093-1
Panel, diffusing	54-8575-2
Spring clip, panel	56-3841
Pointer	56-5630-60
Rail, pointer	76-8621
Shaft, tuning	56-8370-1
Hairpin, shaft retaining	56-6552
Socket, octal	27-6174
Socket, Loktal	27-6207-1

Note: LA1 consists of a 17½-foot length of No. 14 insulated stranded wire, attached to the rear of the cabinet frame.

PHILCO RADIO MODEL B572, CODE 122

SPECIFICATIONS

CABINET	Molded plastic
CIRCUIT	Four-tube superheterodyne (plus rectifier)
FREQUENCY RANGE	
Standard Broadcast	540 kc. to 1620 kc.
AUDIO OUTPUT	1 watt
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	12BE6 converter, 12BA6 i-f amplifier, 12AV6 det.—a.v.c.-1st audio, 35C5 output, 35W4 rectifier

MODEL B572, CODE 122

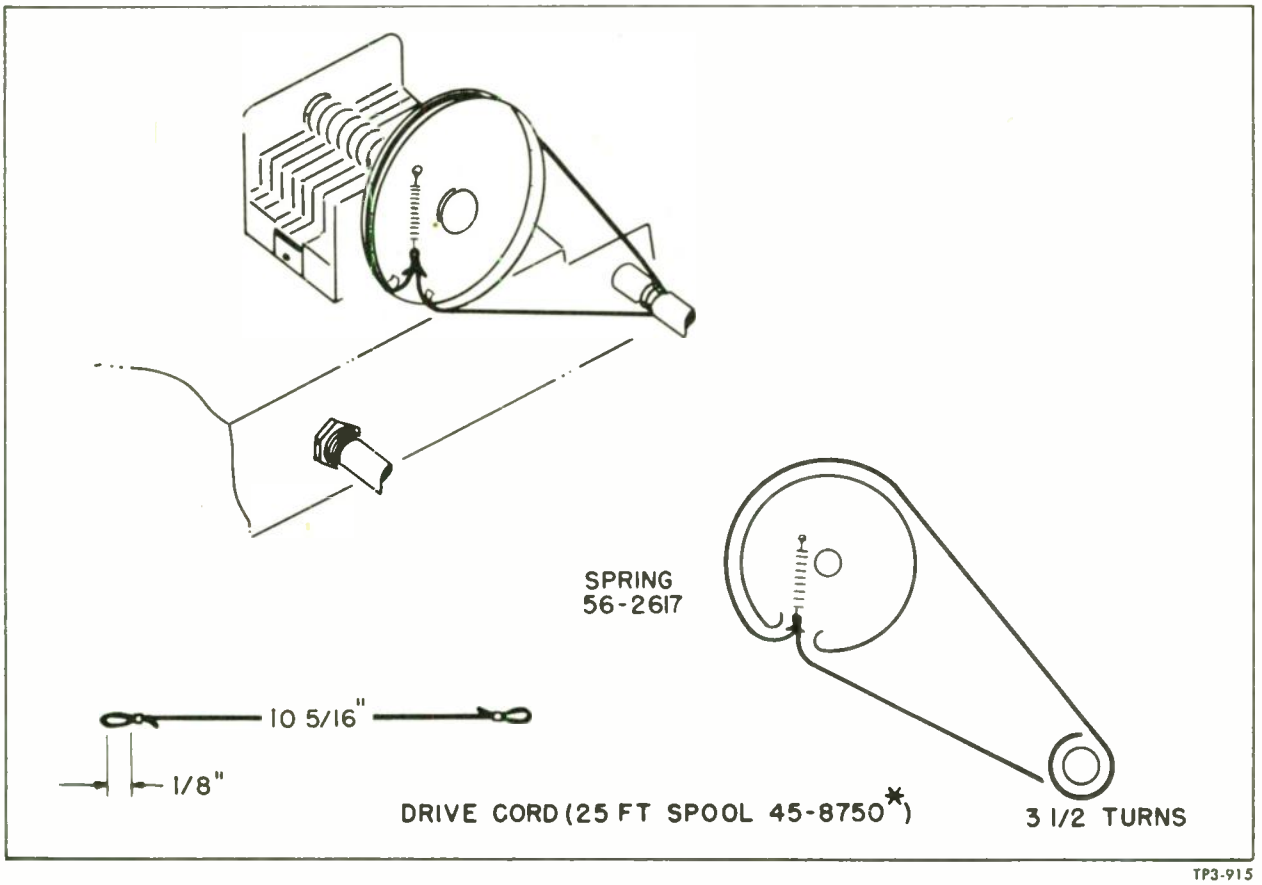


Figure 1. Dial-Cord Installation Details

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.

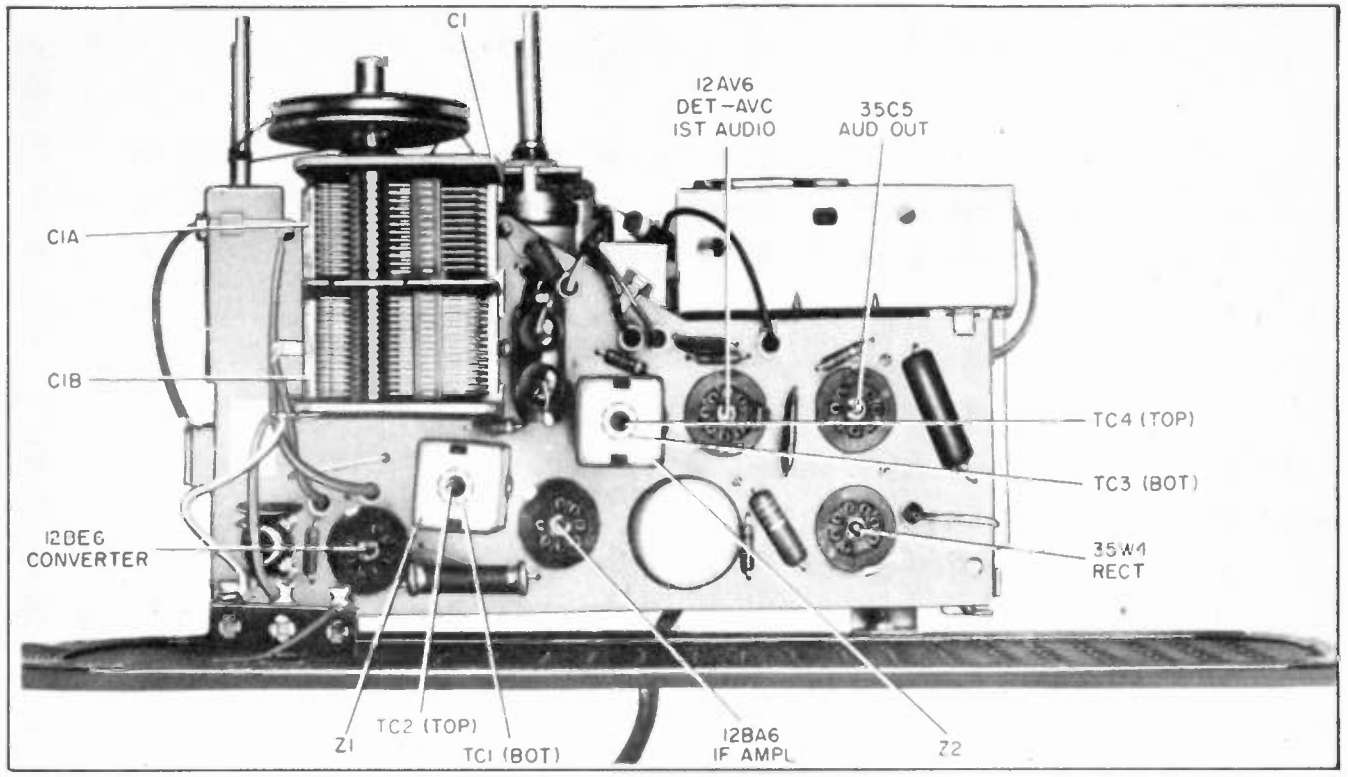
ALIGNMENT PROCEDURE

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.

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
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 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—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.



TP3-679-A

Figure 2. Top View, Showing Trimmer Locations

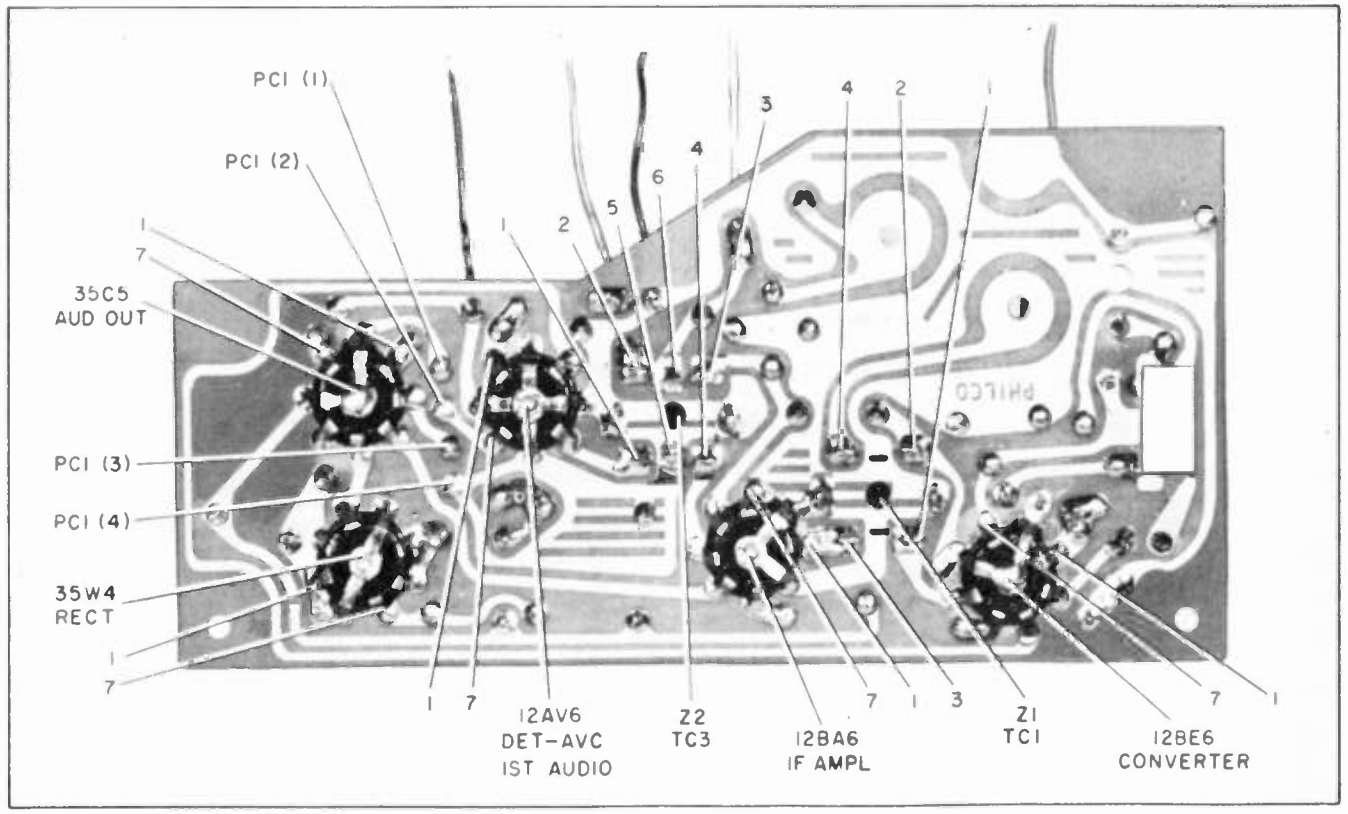


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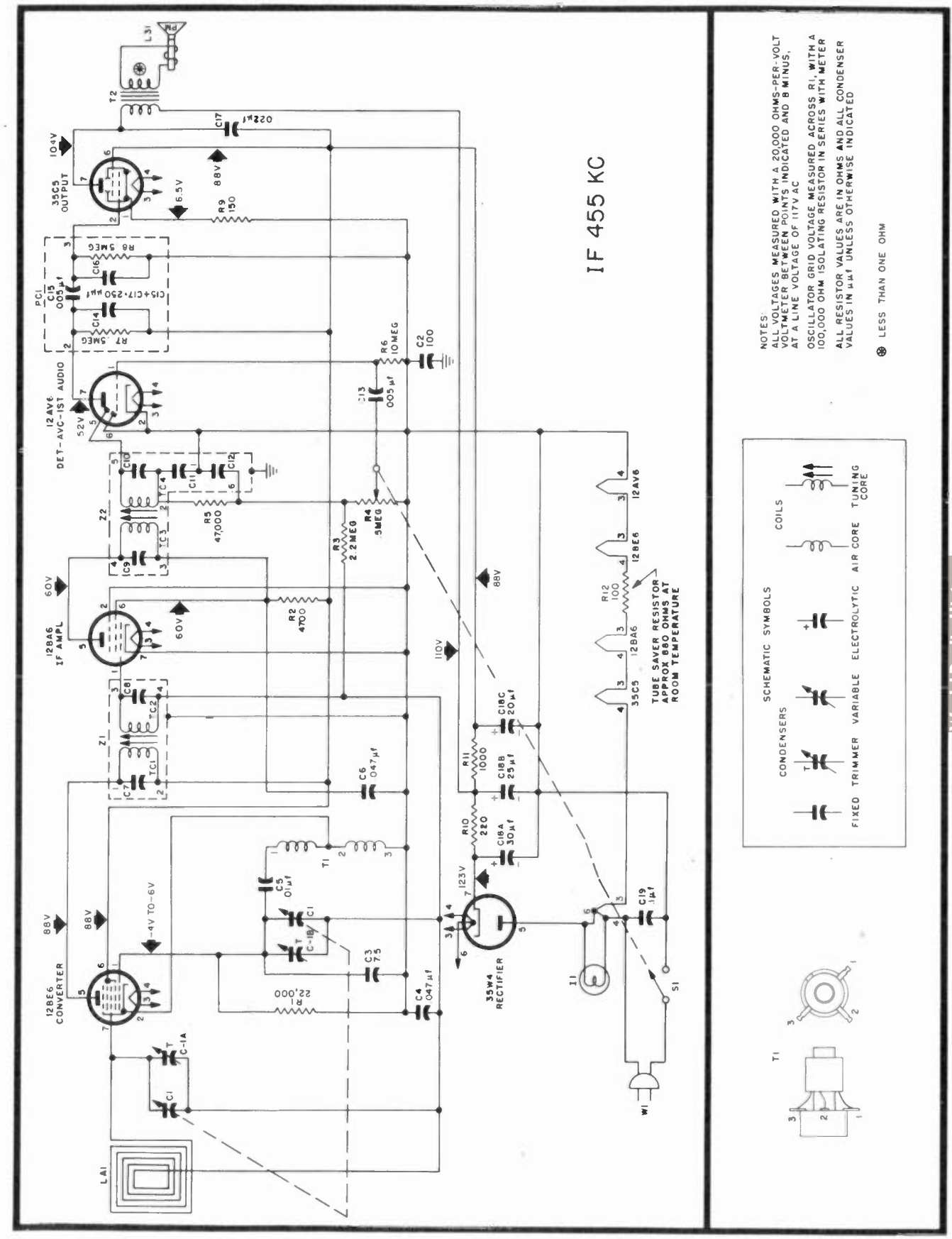
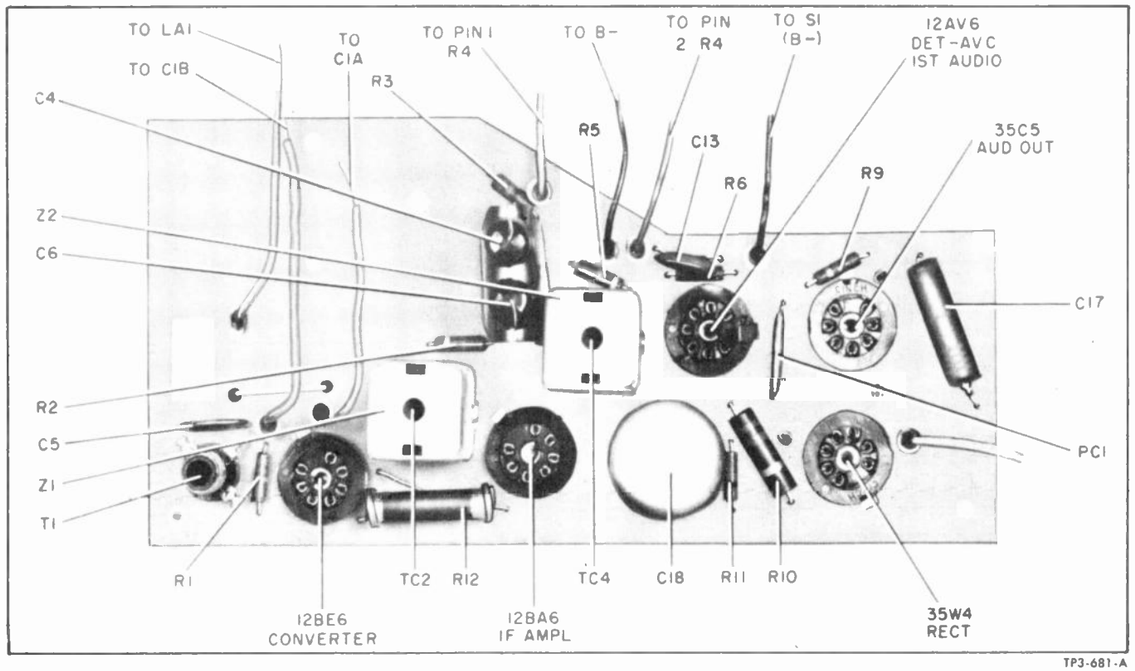
Figure 3. Base View, Showing Printed Wiring Circuit



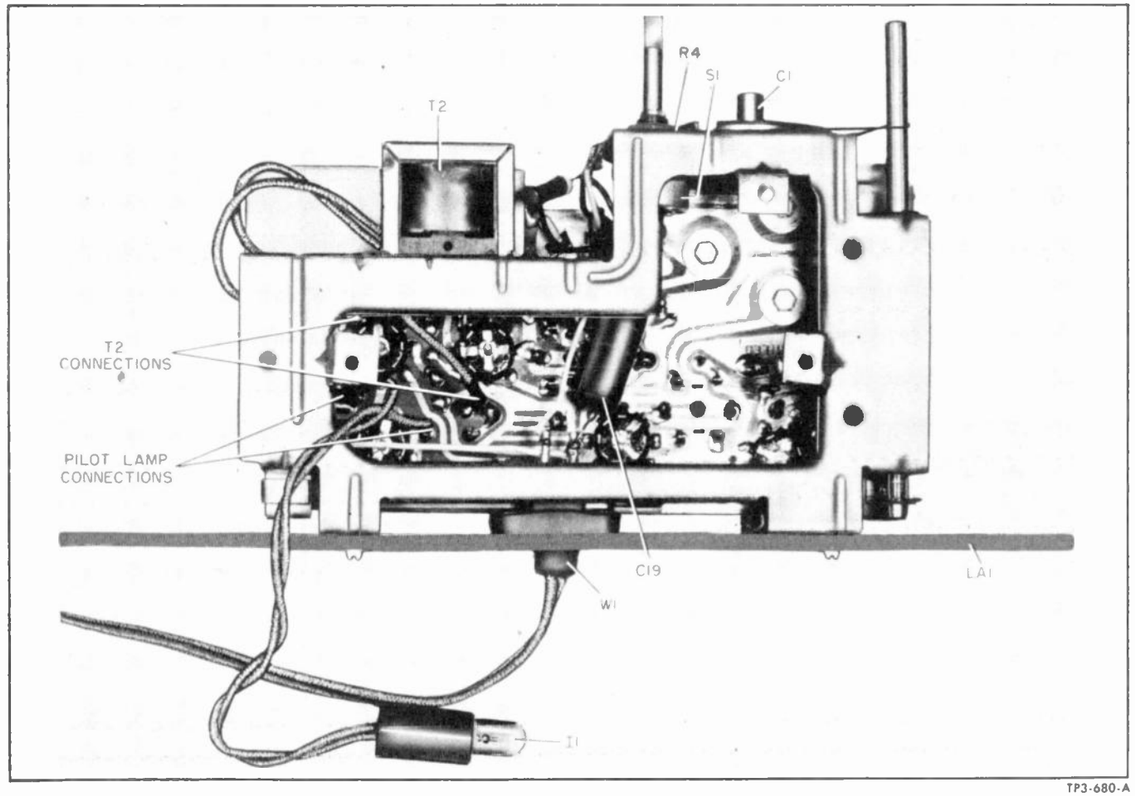
TP3-500-A

Figure 4. Philco Radio Model B572, Code 122, Schematic Diagram



TP3-681-A

Figure 5. Top View, Showing Parts Placement



TP3-680-A

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	Description	Service Part No.
C1	Condenser, tuning gang	31-2751-16
C1A	Condenser, aerial trimmer	Part of C1
C1B	Condenser, oscillator trimmer	Part of C1
C2	Condenser, B minus to chassis, 100 μμf.	62-110009001
C3	Condenser, drift compensation, 7.5 μμf.	30-1224-83
C4	Condenser, a-v-c by-pass, .047 μf.	30-4650-45
C5	Condenser, oscillator grid, .01 μf.	30-1238-2
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 μf.	30-1238-1
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.	30-4650-43
C18	Condenser, electrolytic, 3-section	30-2583-1
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, 0.1 μf.	30-4650-47
I1	Lamp, pilot	34-2068
LA1	Loop, part of cabinet back	76-8515
LS1	Speaker, p-m	36-1627-8
PC1	Printed circuit	30-6001
R1	Resistor, oscillator grid, 22,000 ohms	66-3228340*
R2	Resistor, i-f screen dropping, 4700 ohms	66-2748340*
R3	Resistor, a-v-c filter, 2.2 megohms	66-5228340*
R4	Resistor, volume control, .5 megohm	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	33-1343-3
S1	Switch, off-on	Part of R4
T1	Transformer, oscillator	32-4582
T2	Transformer, output	32-8384-5
W1	Line cord	L-2183*
Z1	Transformer, 1st i-f	32-4583
Z2	Transformer, 2nd i-f	32-4584

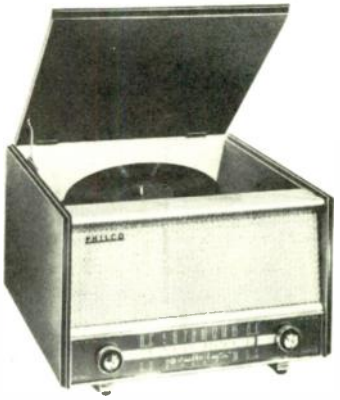
MISCELLANEOUS

Description	Service Part No.
Cabinet, spruce	10926-19
Cabinet, tangerine	10926-23
Back-and-loop assembly	76-8362
Connector, interlock, male	27-6240-6
Dial backplate, spruce	54-4972-2
Dial backplate, tangerine	54-4972
Dial scale	54-5147-3
Drive cord, 25-foot spool	45-8750
Knob	54-4773-3
Pointer	28-9502
Shaft, tuning	28-9312
Bracket, switching operating	28-9313
Socket assembly, pilot lamp	41-4176-2
Shield, pilot lamp	54-8806
Socket, 7-pin miniature	27-6296-5
Socket, 7-pin miniature, 12AV6	27-6296-4
Shield, tube	56-5629-12
Printed wiring panel (less components)	54-6058

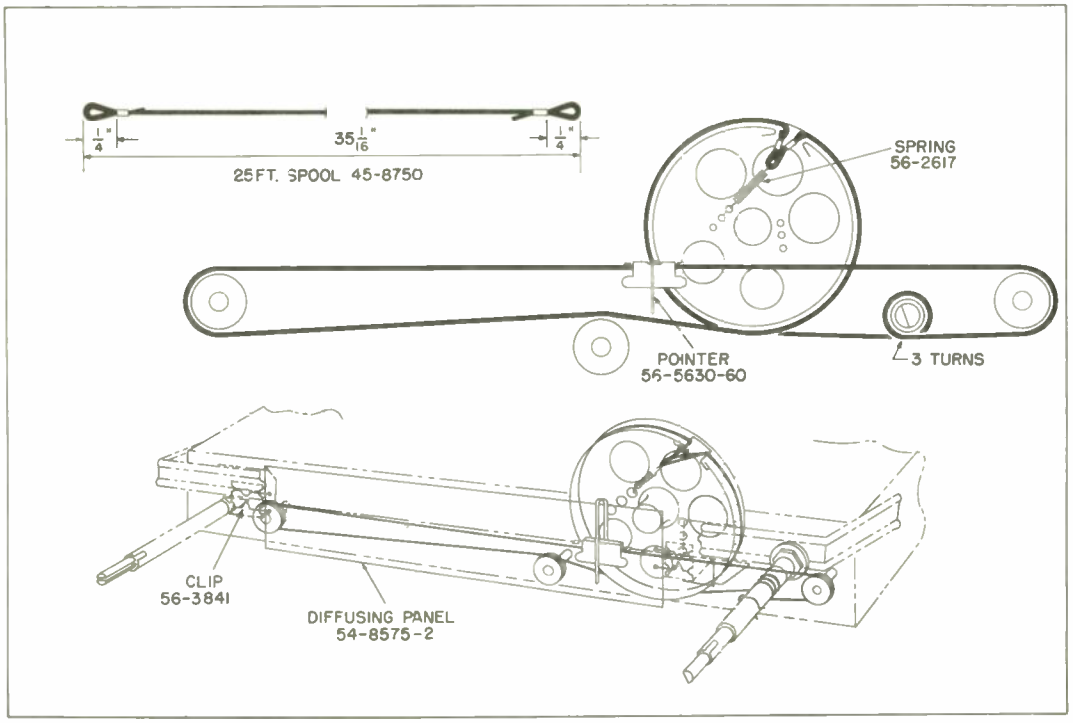
PHILCO RADIO-PHONOGRAPH MODEL B1352

SPECIFICATIONS

CABINET	Wood, birch
CIRCUIT	Four-tube superheterodyne plus rectifier
FREQUENCY RANGES	
Broadcast	540—1620 kc.
Special Services	1700—3400 kc.
AUDIO OUTPUT	3 watts
OPERATING VOLTAGE	105—120 volts, 60 cycles, a.c.
POWER CONSUMPTION	
Radio	35 watts
Phonograph	60 watts
INTERMEDIATE FREQUENCY	455 kc.
ANTENNA	Built-in Magnecor antenna; provision for external antenna
PHILCO TUBES	7A8 osc.-mixer-phono preampl.; 7B7 i-f amplifier; 7C6 detector-a.v.c.-1st audio; 35L6GT output; 50Y7GT rectifier
PHONOGRAPH	Philco Model M-24 All-Speed Automatic Record Changer (For service information, refer to Service Manual PR-2178)

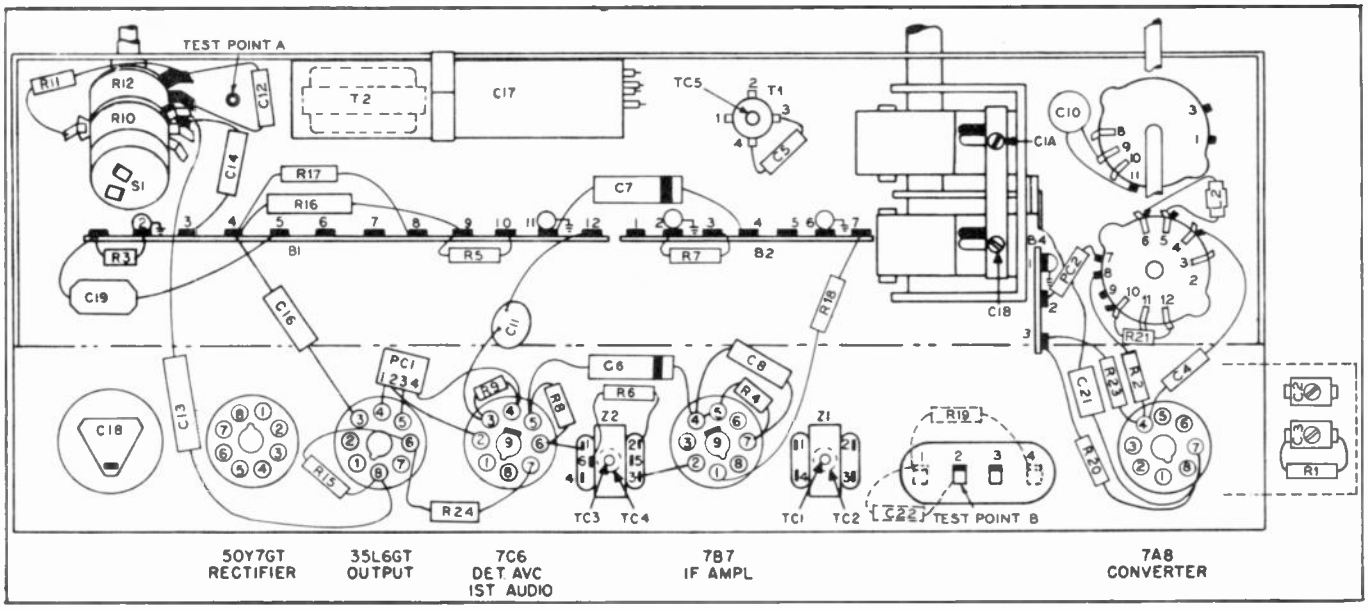


MODEL B1352



TP2-2587A-1

Figure 1. Drive-Cord Installation Details



TP3-1211A

Figure 2. Base View, Showing Parts Placement

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.

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.

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Connect output lead through a .01-μf condenser to control grid (pin 6) of 7A8 osc.-mixer 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 NOTE 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)

NOTE 1: If the Magnecor 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 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.

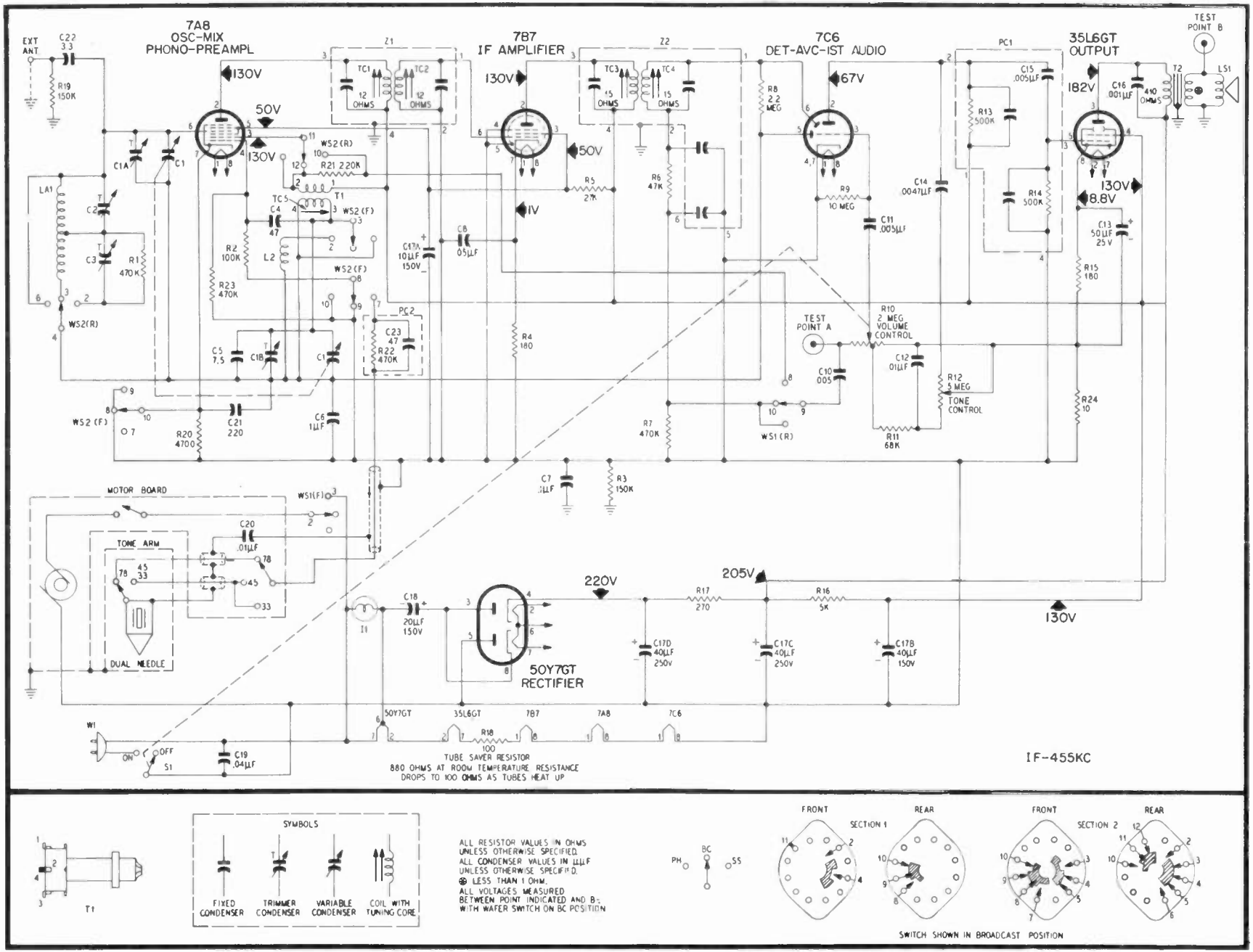


Figure 3. Philco Radio-Phonograph, Model B1352, Schematic Diagram

TP3-1212A

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
C1A	Condenser, trimmer, antenna	Part of C1
C1B	Condenser, trimmer, oscillator	Part of C1
C2	Condenser, trimmer, Special Services antenna	31-6476-27
C3	Condenser, trimmer, series tracker	31-6476-27
C4	Condenser, d-c blocking, 47 μμf.	60-00475420
C5	Condenser, fixed trimmer, 7.5 μμf.	30-1224-65
C6	Condenser, a-v-c by-pass, .1 μf.	30-4650-47*
C7	Condenser, by-pass, .1 μf.	30-4669
C8	Condenser, cathode by-pass, .05 μf.	30-4650-45*
C10	Condenser, audio coupling. .005 μf.	30-1238-1*
C11	Condenser, d-c blocking, .005 μf.	30-1238-1*
C12	Condenser, bass compensation, .01 μf.	30-4650-41*
C13	Condenser, cathode by-pass, 50 μf., 25v	45-3035-2
C14	Condenser, tone, .0047 μf.	30-4650-56*
C15	Condenser, d-c blocking, .005 μf.	Part of PC1
C16	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., 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	45-3041
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.	Part of PC2
I1	Lamp, pilot	34-2064*
L2	Coil, oscillator shunt	32-4562-1
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	66-4478340*
R2	Resistor, grid leak, 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	66-4478340*
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
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*
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, preamplifier plate, 220,000 ohms	66-4228340
R22	Resistor, phono attenuator, 470,000 ohms	Part of PC2
R23	Resistor, grid leak, 470,000 ohms	66-4478340*
R24	Resistor, feedback, 10 ohms	66-0108340
S1	Switch, off-on	Part 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
Z1	Transformer, 1st i-f	32-4160
Z2	Transformer, 2nd i-f	32-4240

MISCELLANEOUS

Description	Service Part No.
Antenna lead ass'y.	76-1472-17
Cabinet, birch	11026
Cabinet bottom	54-9144
Dial scale	76-8772
Hardware, Changer Mounting	
Sleeve (3)	54-7798
Speed nut (3)	W2554
Spring, top (3)	56-7059FA9
Spring, bottom (3)	56-7059-1FCP
Knob, tone	76-6048-5
Knob, tuning	76,6048-7
Knob, volume-on-off	76-8457-1
Knob, wafer switch	76-8457-4
Panel, diffusing	54-8575-3
Spring clip, diffusing panel (2)	56-3841
Pointer	28-9739
Rail ass'y., pointer	76-8742
Rubber mount, tuner mtg.	27-4596
Shaft, tuning	56-8370-1
Hairpin, shaft retaining	56-6552
Spring clamp, tone arm	56-8554
Socket, Loktal	27-6207-1
Socket, octal	27-6174

PHILCO SERVICE

PHILCO Factory-Supervised Service

HOME RADIO

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, l.h.	56-9922-3

PR-2582 10-53

Printed in U.S.A.

PHILCO SERVICE

PHILCO Factory-Supervised Service

HOME RADIO

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

PR-2578 10-53

Printed in U. S. A.

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

SERVICE BULLETIN FOR PHILCO RADIO-CLOCK MODEL B714X, CODE 121 PR-2580

PHILCO SERVICE

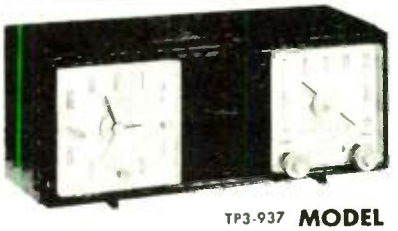
PHILCO Factory-Supervised Service

HOME RADIO

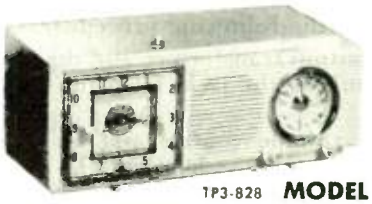
PHILCO RADIO-CLOCK
MODELS B712, CODE 122, AND B714, CODE 122

SPECIFICATIONS

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
AERIAL	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



TP3-937 **MODEL B712**



TP3-828 **MODEL B714**

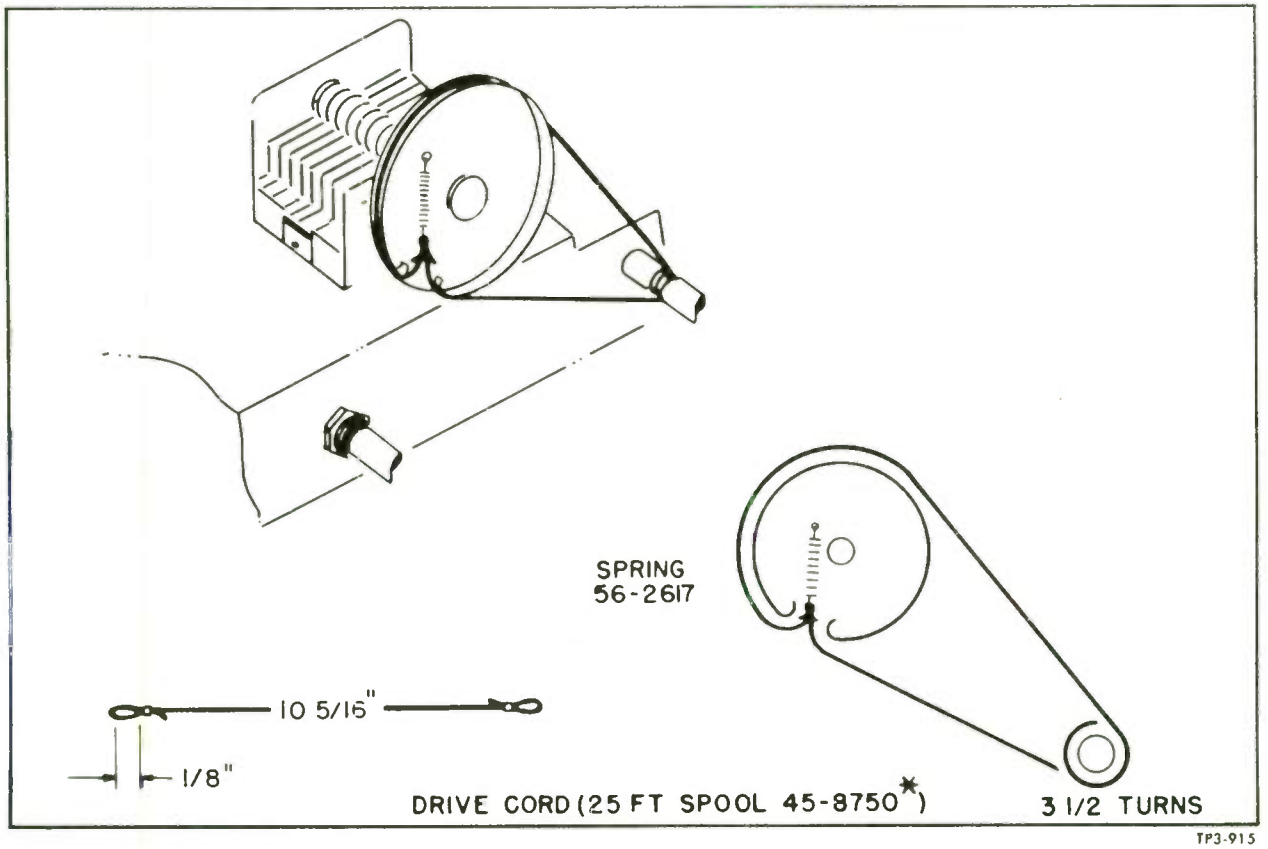


Figure 1. Dial-Cord Installation Details

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.

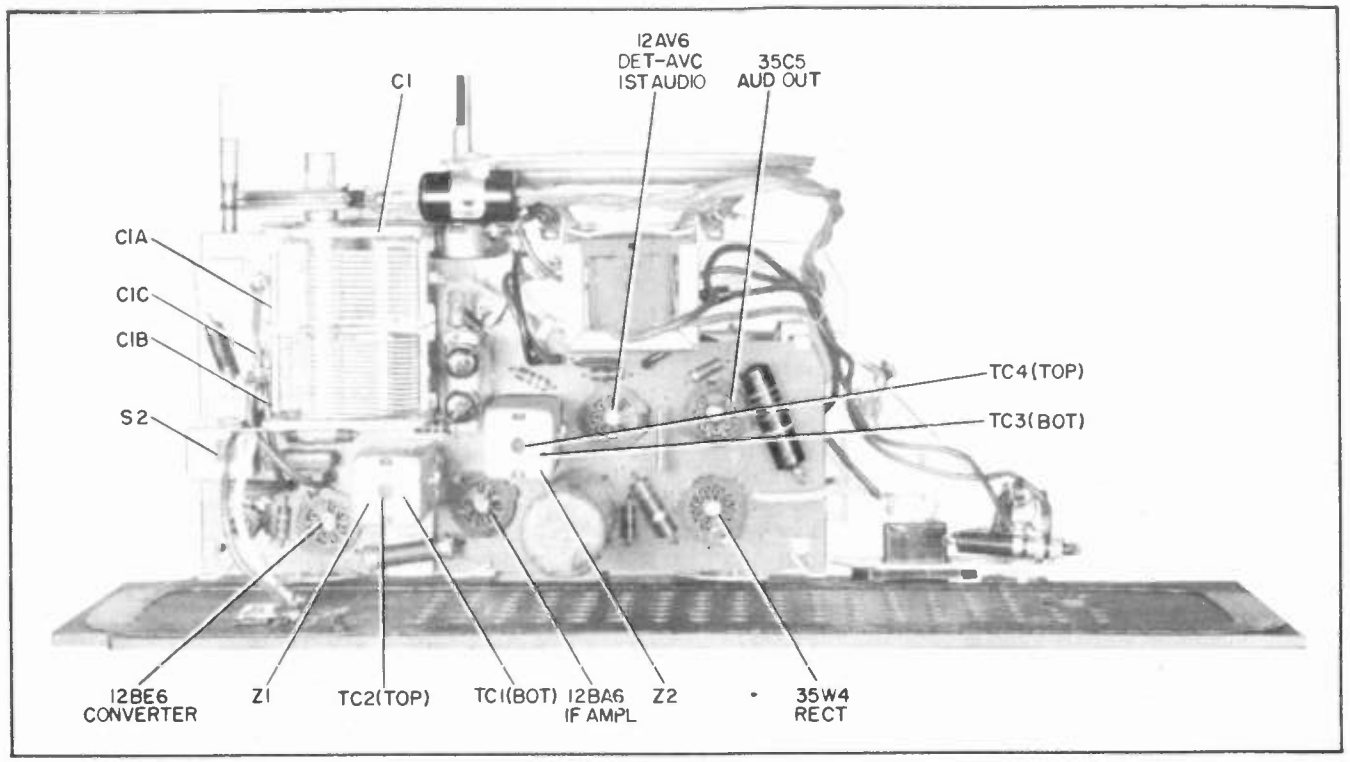
SIGNAL GENERATOR—Connect generator and set frequency as indicated in chart. Use modulated output.

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

STEP	SIGNAL GENERATOR		RADIO			ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	BAND SWITCH SETTING	SPECIAL INSTRUCTIONS	
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. 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 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.	C1-C—aerial (special services).

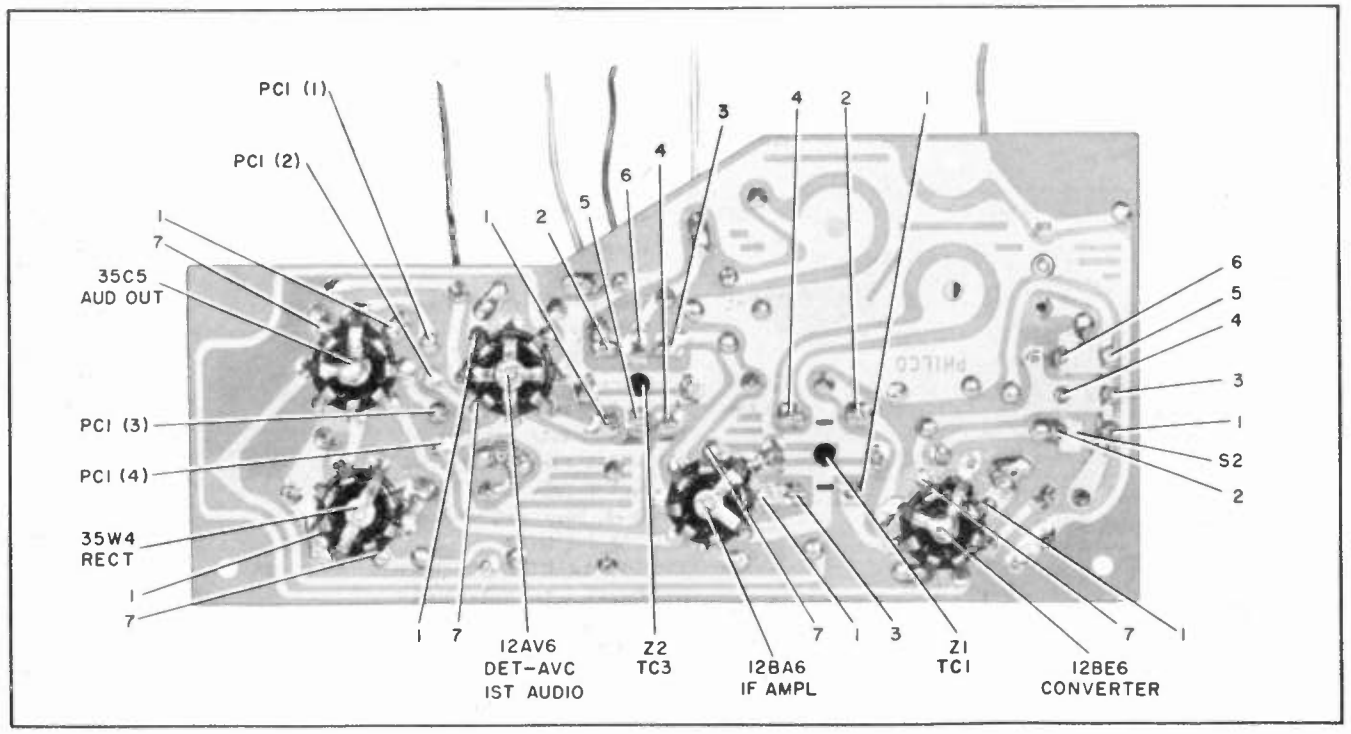
NOTE: Make up a 6—8 turn, 6-inch-diameter loop from insulated wire, connect to signal-generator leads, and place near radio loop.

* 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.



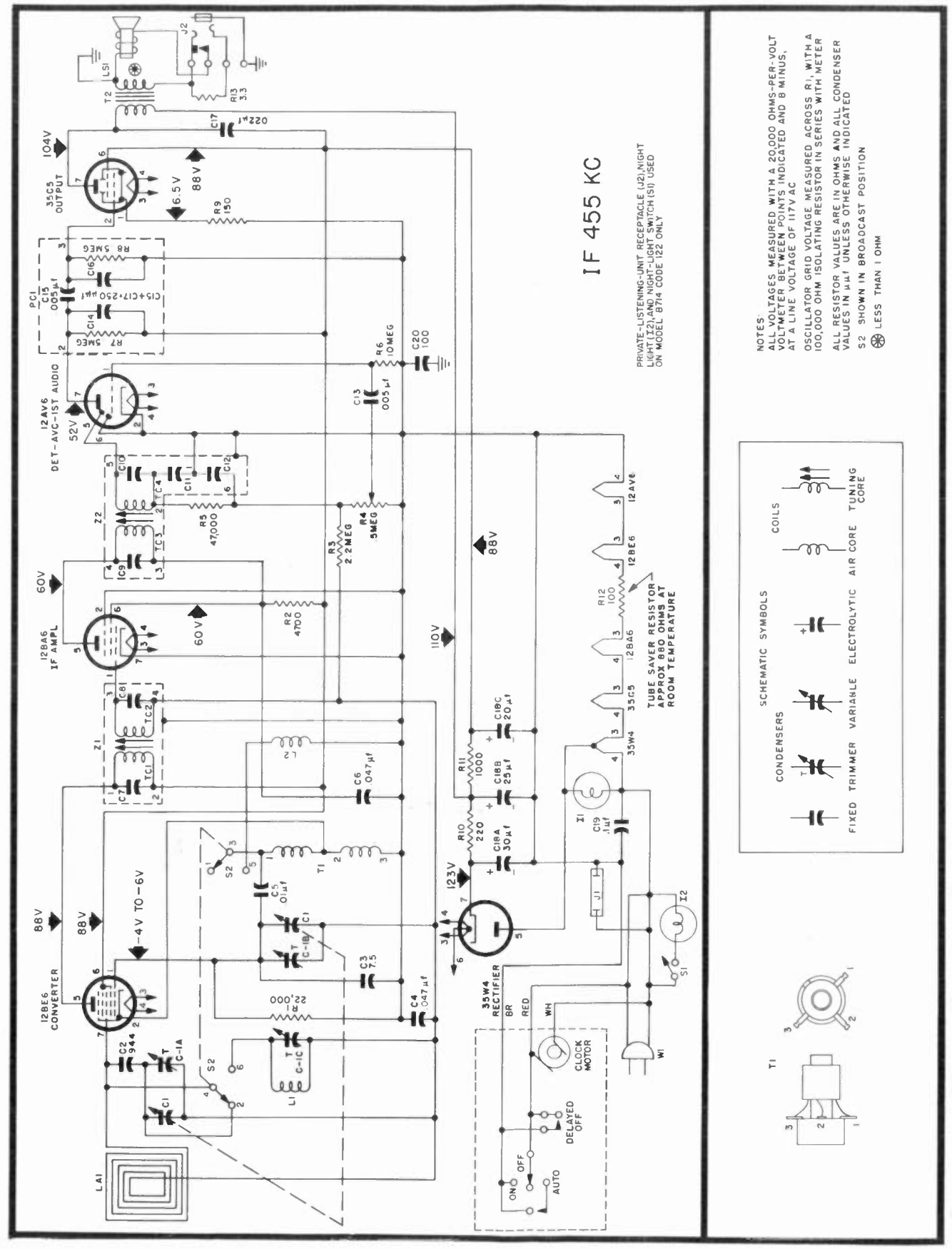
TP3-2175

Figure 2. Top View, Showing Trimmer Locations



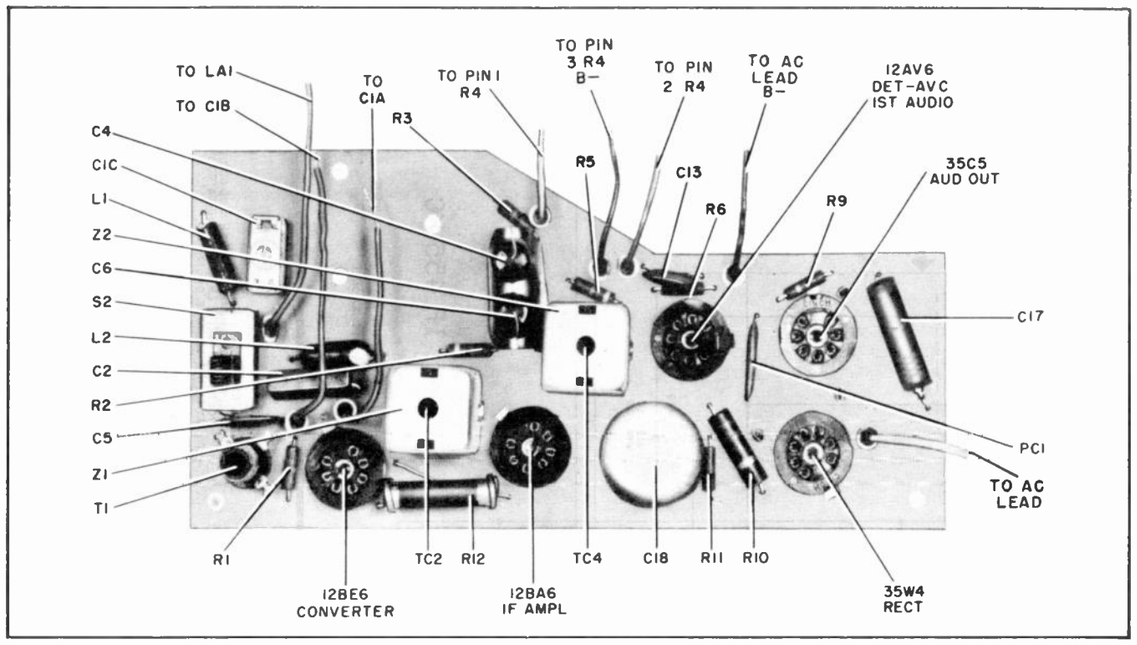
TP3-678

Figure 3. Base View, Showing Printed Wiring Circuit



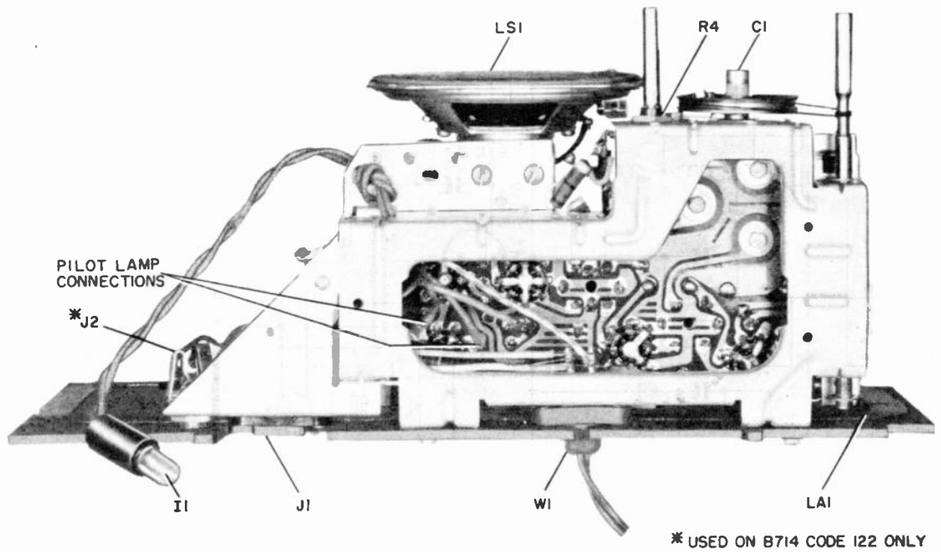
TP3-1871

Figure 4. Philco Radio Models B712, Code 122, and B714, Code 122, Schematic Diagram



TP3-681B

Figure 5. Top View, Showing Parts Placement



TP3-2174

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	Description	Service Part No.
C1	Condenser, tuning gang	31-2751-16
C1A	Condenser, antenna trimmer	Part of C1
C1B	Condenser, oscillator trimmer	Part of C1
C1C	Condenser, trimmer, Special Services	31-6502-4
C2	Condenser, antenna series tracker, 944 $\mu\mu$f.	30-1220-65
C3	Condenser, drift compensation, 7.5 $\mu\mu$f.	30-1224-83
C4	Condenser, a-v-c bypass, .047 μf.	30-4650-45
C5	Condenser, oscillator grid, .01 μf.	30-1238-2
C6	Condenser, screen bypass, .047 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 μf.	30-1238-1
C14	Condenser, plate bypass	Part of PC1
C15	Condenser, audio coupling, .005 μf.	Part of PC1
C16	Condenser, compensating	Part of PC1
C17	Condenser, tone compensation, .022 μf.	30-4650-43
C18	Condenser, electrolytic, 3-section	30-2583-1
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, 0.1 μf.	30-4650-47
C20	Condenser, B minus to chassis, 100 $\mu\mu$f.	62-110009001*
I1	Lamp, pilot	34-2605
I2	Lamp, night light (Model B714)	34-2477
J1	Jack, appliance receptacle, a-c	76-3931
J2	Jack, private listening unit (Model B714)	42-1975-2
L1	Coil, antenna, Special Services	32-4561-3
L2	Coil, oscillator shunt	32-4562-2
LA1	Antenna loop	Part of cabinet back
LS1	Speaker, p-m (Model B712)	36-1627-8
LS1	Speaker, p-m (Model B714)	36-1627-26
R1	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 megohm	33-5565
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	33-1343-3
R13	Resistor, private listening unit, 3.3 ohms (Model B714)	66-9334340
PC1	Printed circuit	30-6001
S1	Switch, off-on, night light (Model B714)	42-2023
S2	Switch, Broadcast—Special Services	42-1796-4
T1	Transformer, oscillator	32-4582
T2	Transformer, output	Part of LS1
W1	Line cord	41-3865
Z1	Transformer, 1st i-f	32-4583
Z2	Transformer, 2nd i-f	32-4584

MISCELLANEOUS

Cabinet	
Model B712	
Sand	11013
Forest green	11013-1
Model B714	
Pearl grey	10940-16
Knobs	
Model B712	
Clock (3)	54-6096
Tuning or volume	54-6095
Model B714	
Clock (3)	54-4983-5
Tuning or volume	54-4986-3
Dial scale, radio (Model B712)	28-9648
Window, radio (Model B712)	54-6091
Pointer	
Model B712	76-8706
Model B714	56-9846FCP
Jewel (Model B712)	54-4304-5
Clock	
Model B712	41-2047
Model B714	41-2042-5
Clock cover	
Model B714	54-4989-2
Window, clock	
Model B712	54-6090
Shaft, tuning	28-9312
Bracket, switch operating	28-9313
Ring, retaining	1W60980FE7
Connector, interlock	27-6240-6
Connector	76-3931
Connector, male (4)	28-2669-2
Connector ass'y., pilot light	41-4176-5
Socket, tube, 12AV6	27-6296-4
Socket, tube (12BA6)	27-6296-6
Socket, tube (12BE6, 35C5)	27-6296-7
Socket, tube (35W4)	27-6296-8
Back, loop, and line-cord ass'y.	
Model B712	76-8736
Model B714	76-8731
Shield, pilot light, back	
Model B714	54-9087
Shield, pilot light, front	
Model B714	54-9088
Socket ass'y., pilot-night light	
Model B714	27-6233-110
Switch, night light	
Model B714	42-2023
Printed wiring panel (less components)	54-6058

PR-2570 10-53

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PHILCO SERVICE

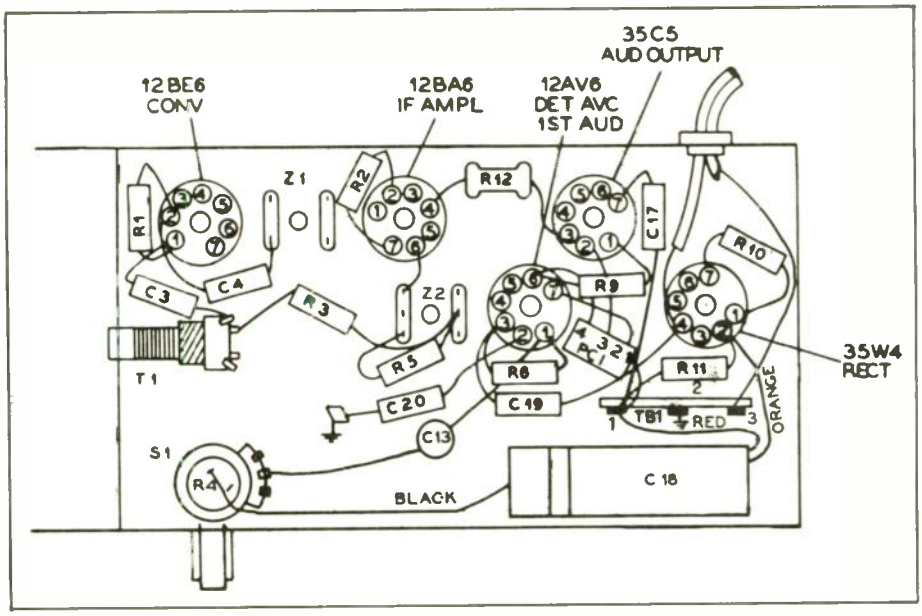
PHILCO Factory-Supervised Service

HOME RADIO

PHILCO HOME RADIO MODEL B569, Code 121

SPECIFICATIONS

CABINET	Molded plastic
CIRCUIT	Four-tube superheterodyne (plus rectifier)
FREQUENCY RANGE	540 kc. to 1620 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



TP3-835A

Figure 1. Base View, Showing Symbolized Chassis

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.

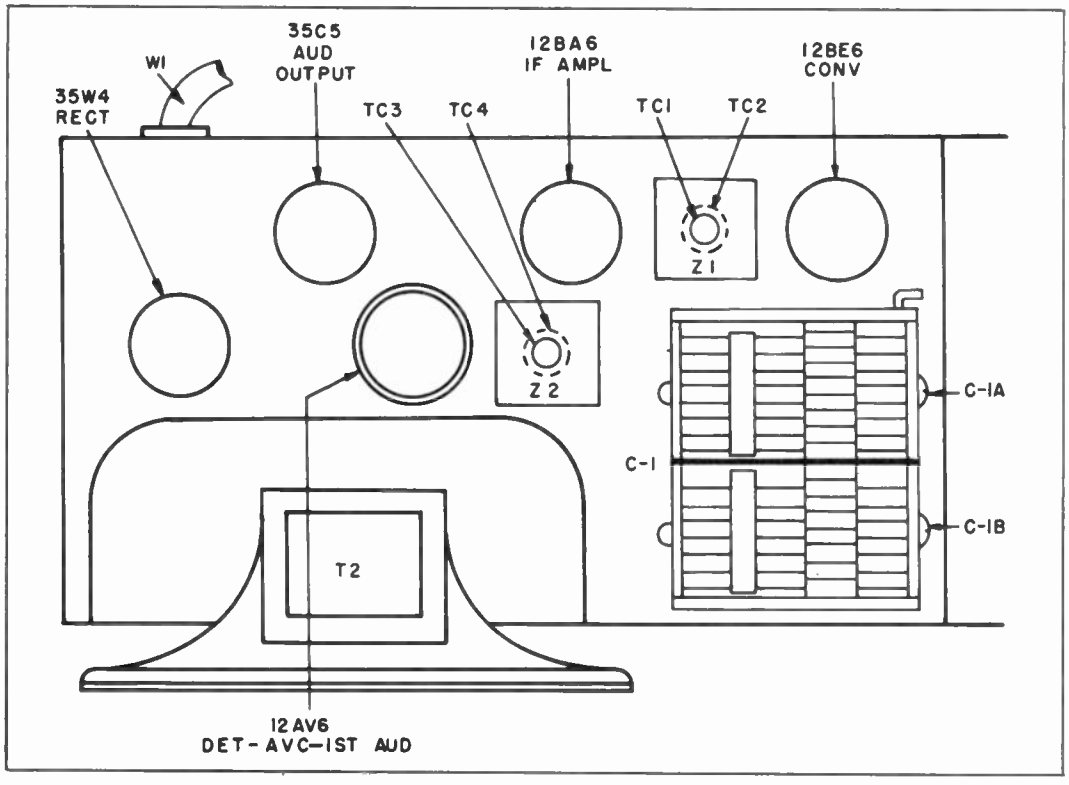
OUTPUT LEVEL—During alignment, adjust signal-generator output to hold output-meter reading below 1.25 volts.

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
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 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 osc.
3	Same as step 2.	1500 kc.	1500 kc.	Adjust trimmer for maximum output.	C1-A antenna

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

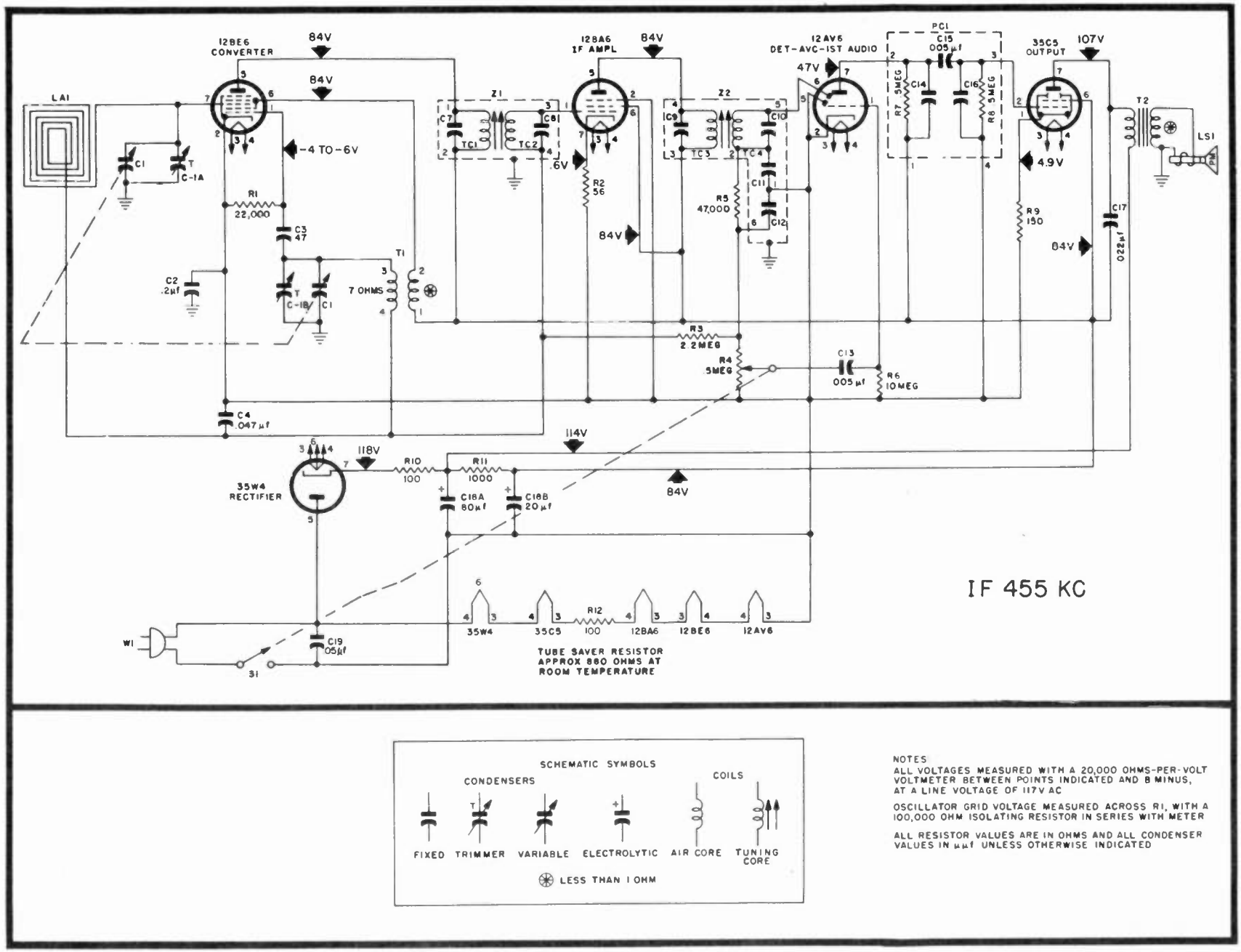


Figure 3. Philco Radio Model B569, Code 121, Schematic Diagram

TP3-500A

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	31-2751-13
C1A	Condenser, antenna trimmer	Part of C1
C1B	Condenser, osc. trimmer	Part of C1
C2	Condenser, cathode bypass, .2 μf.	30-4650-49*
C3	Condenser, oscillator grid, 47 μμf.	30-1230-4
C4	Condenser, a-v-c by-pass, .047 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 Z1
C10	Condenser, i-f tuning	Part of Z1
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 bypass	Part of PC1
C15	Condenser, audio-coupling, .005 μf.	Part of PC1
C16	Condenser, compensating	Part of PC1
C17	Condenser, tone compensating, .022 μf.	30-4650-43*
C18	Condenser, electrolytic, 2-section	30-2575-40
C18A	Condenser, filter, 80 μf.	Part of C18
C18B	Condenser, filter, 20 μf.	Part of C18
C19	Condenser, line bypass, .05 μf.	30-4650-45*
LA1	Loop aerial	Part of back-and-loop ass'y.
LS1	Speaker, p-m	36-1654
PC1	Printed circuit	30-6001
R1	Resistor, oscillator grid, 22,000 ohms	66-3228340*
R2	Resistor, cathode bias, 56 ohms	66-0568340
R3	Resistor, a-v-c filter, 2.2 megohms	66-5228340
R4	Resistor, volume control, .5 megohm	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, 100 ohms	66-1104340*
R11	Resistor, B plus filter, 1000 ohms	66-2108340*
R12	Resistor, tube saver, 100 ohms	33-1343-3
S1	Switch, off-on	Part of R4
T1	Transformer, oscillator	32-4453-6
T2	Transformer, output	32-8384*
W1	Line cord	L2183
Z1	Transformer, 1st i-f	32-4161A
Z2	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Cabinet	11029
Back-and-loop ass'y.	76-8777
Knob, tuning	54-4969-2
Knob, volume	27-4815-13
Socket, 7-pin miniature, 12AV6	27-6203-14
Socket, 7-pin miniature, 12BE6, 12BA6, 35C5, 35W4	27-6265
Tube shield	56-5629FA3

Printed in U. S. A.

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

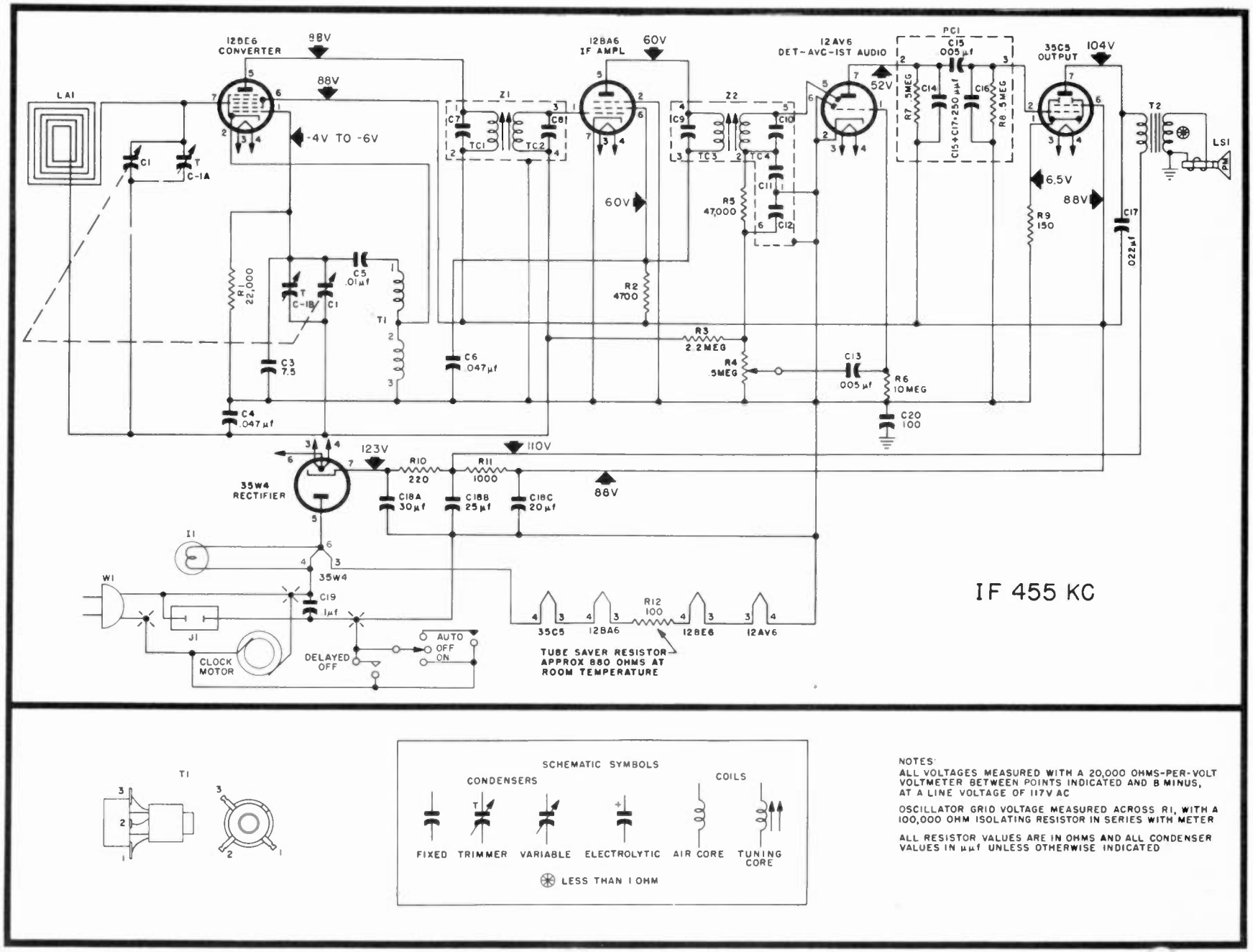


Figure 1. Philco Radio-Clock Model B712X, Code 122 Schematic Diagram

PHILCO

PHILCO Factory-Supervised Service

SERVICE

HOME RADIO

PHILCO THREE-SPEED CUSTOM AUTOMATIC RECORD CHANGER

MODEL M-25

SERVICE MANUAL

TPO-620-1

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 33⅓-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.

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 trip-arm 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 trip-plate 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

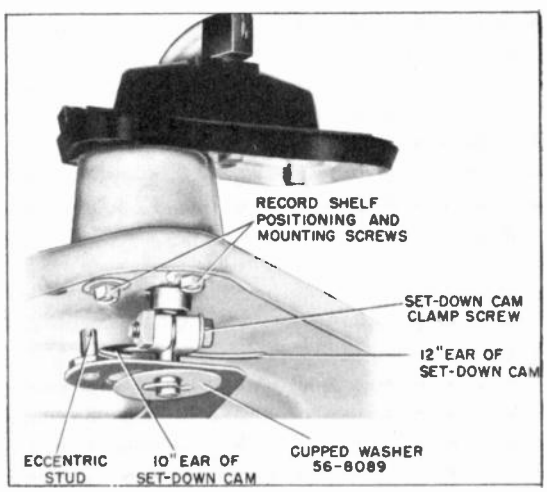
SPINDLE

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 push-off-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

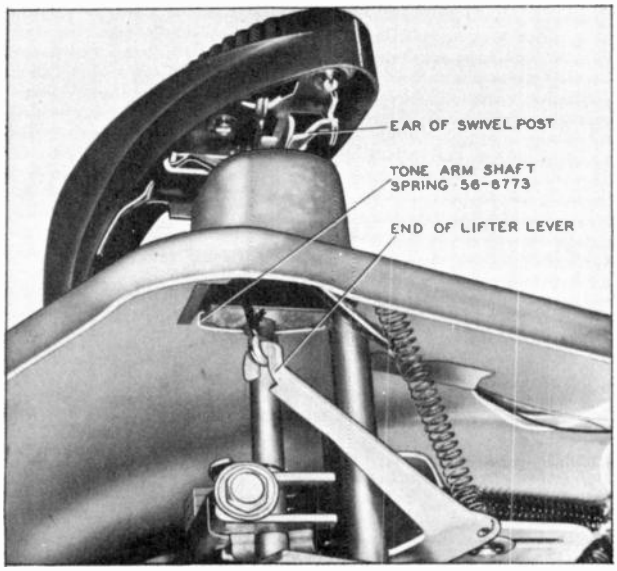
CAUTION: This adjustment must be made immediately after a change cycle is completed.

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



TPO-1831A

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

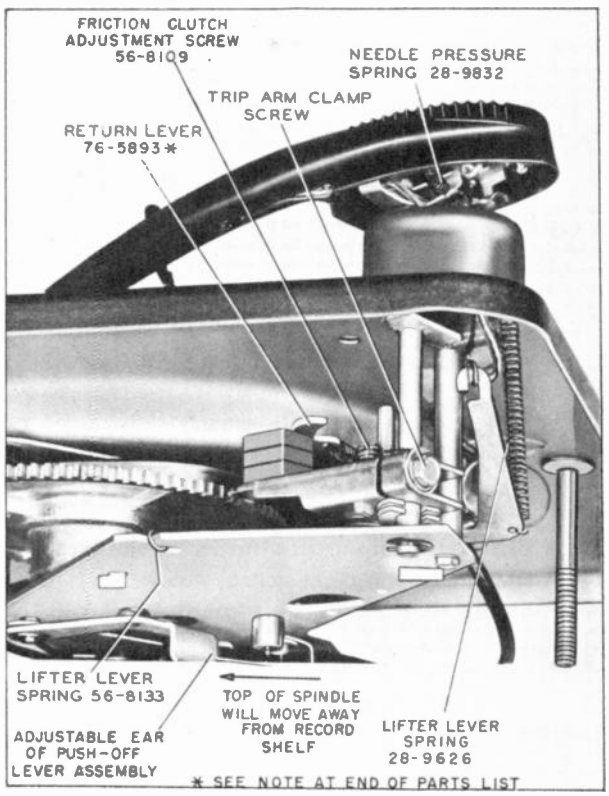
With the changer out of cycle, and the tone arm over the base plate, the needle point should be $\frac{1}{8}$ inch $\pm$ $\frac{1}{16}$ inch above the base plate. To adjust the clearance, bend the protruding ear of the swivel post, at the rear of the tone arm heel. See figure 2. Bending the ear upward 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 tone-arm 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 ear 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-



TPO-1845A

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

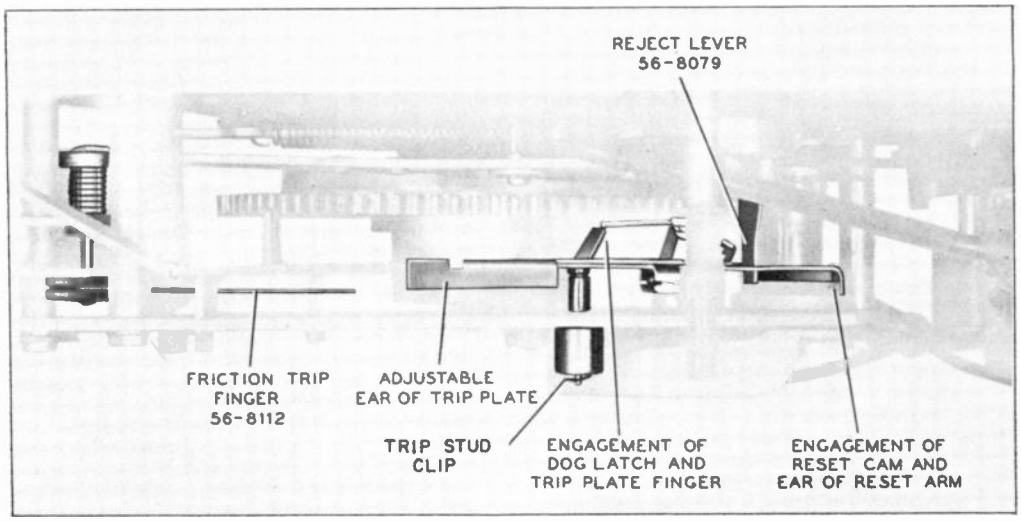


Figure 4. Trip Adjustment

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.

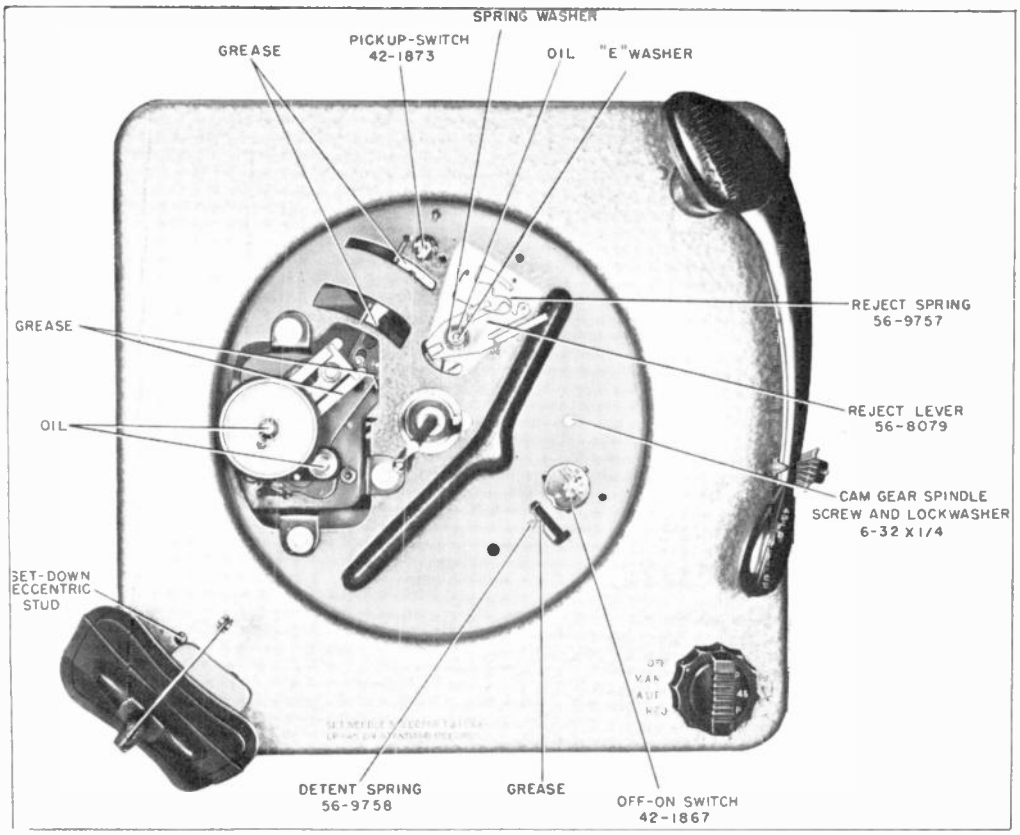
NOTE: Too much engagement will prevent tripping, while too little engagement will cause pretripping.

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 properly, check for tight tone-arm lead dress or excessive friction in the tone-arm-shaft 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)

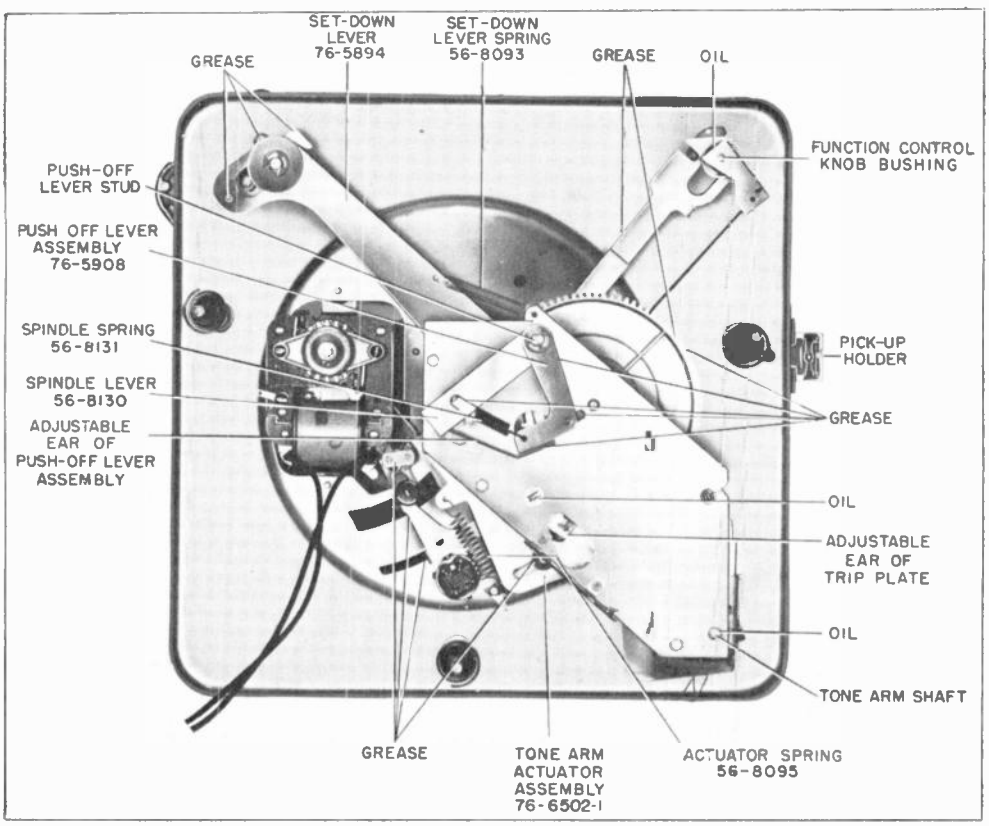
Uneven turntable speed may be caused by any of the following conditions:

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.



TP2-524A

Figure 5. Top View, Showing Lubrication Points



TP2-519A

Figure 6. Bottom View, Showing Lubrication Points

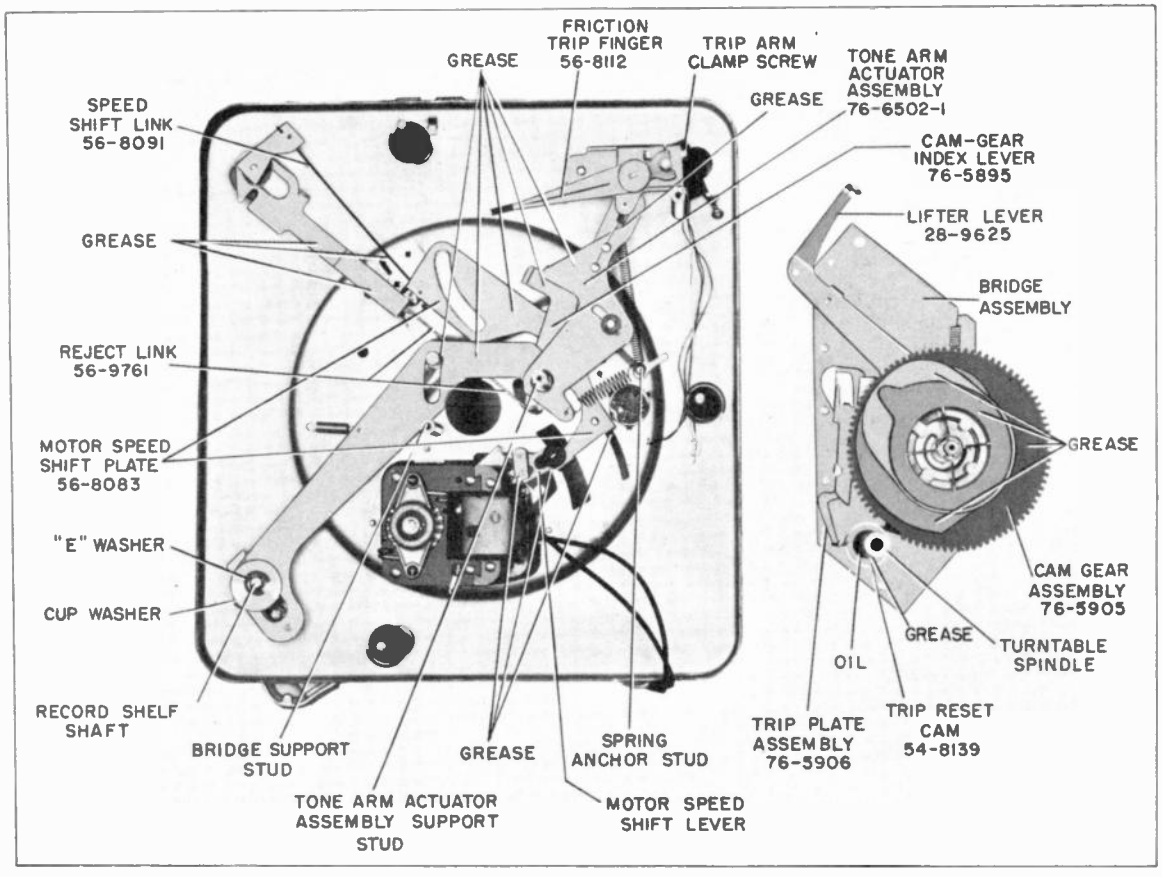


Figure 7. Bottom View, Bridge Removed, Showing Lubrication Points

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

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.

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 cam-gear 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.

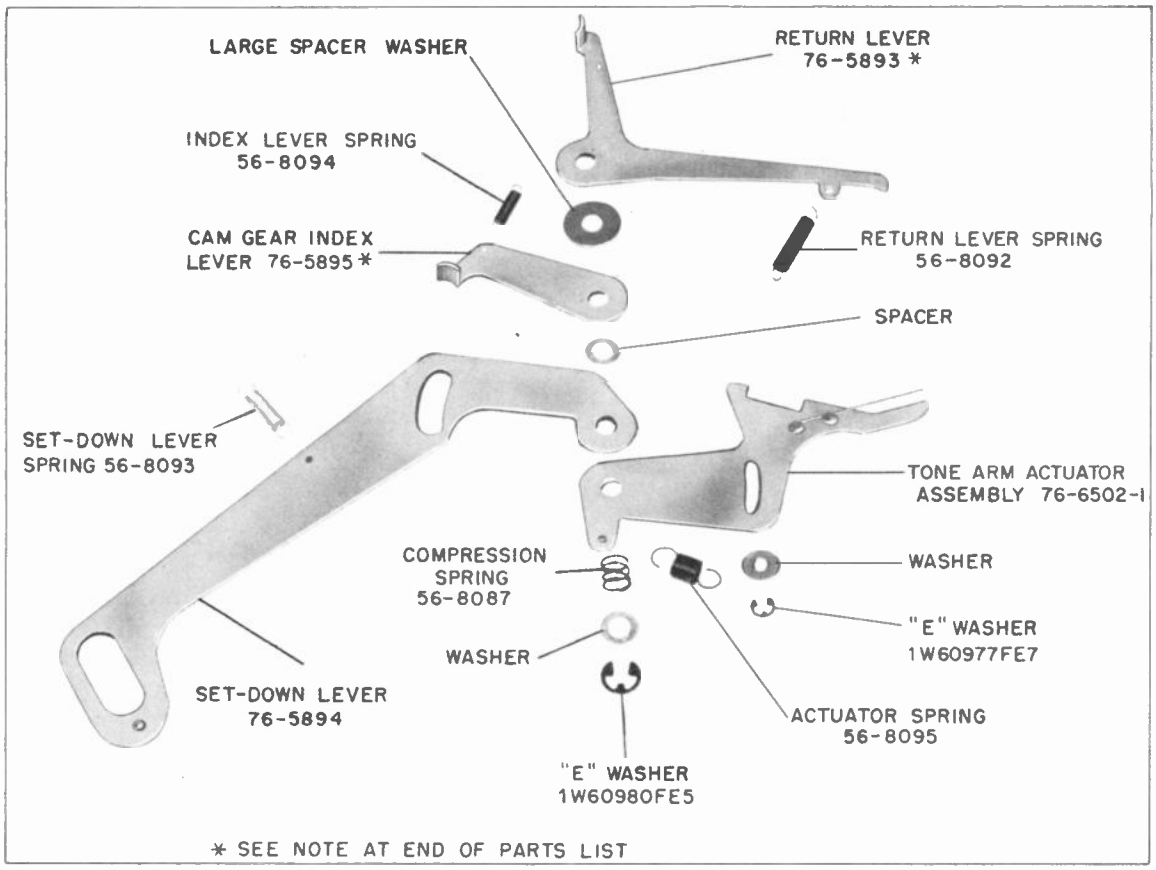


Figure 8. Actuator Assembly

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.

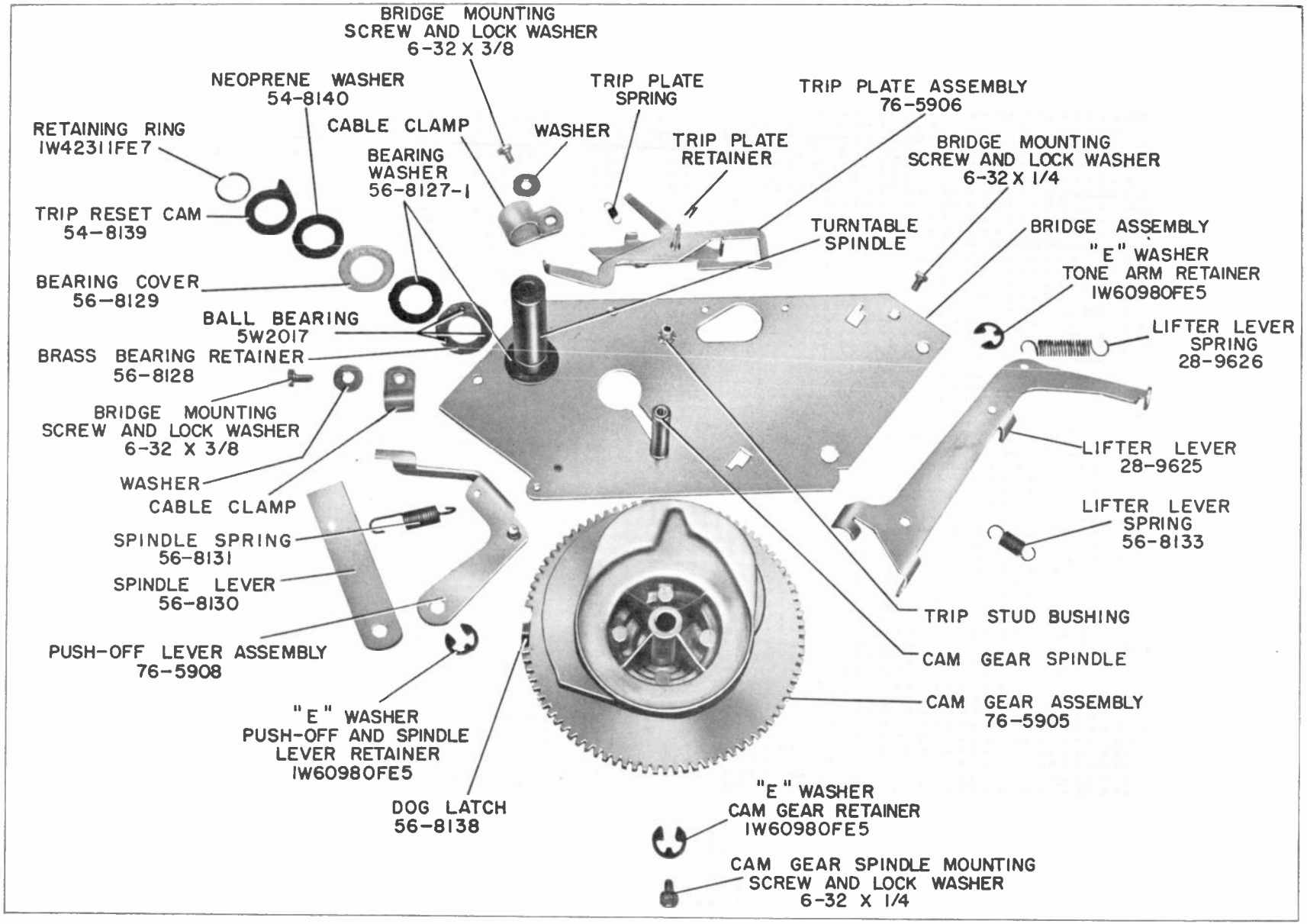


Figure 9. Bridge Assembly

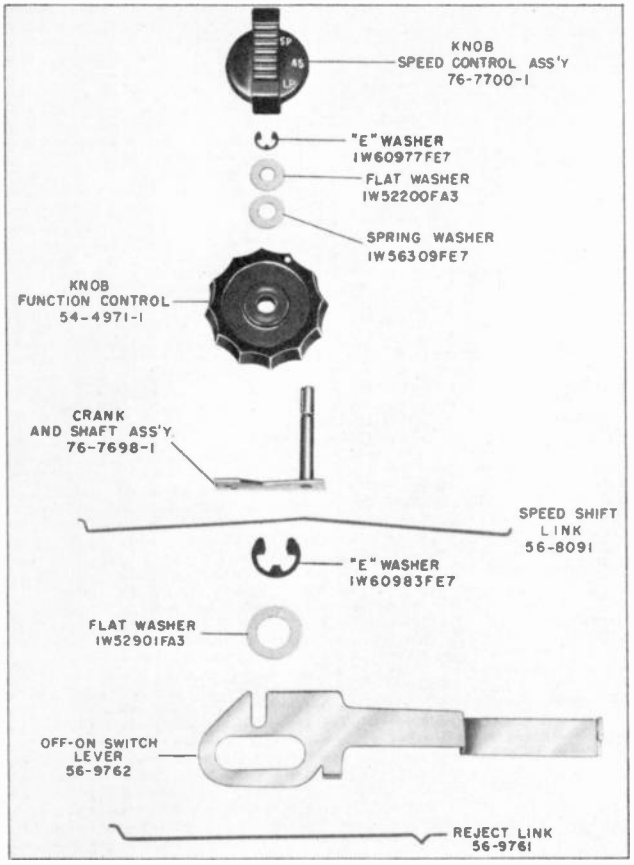


Figure 10. Control Assembly

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 record-shelf 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 tone-arm-actuator support stud.

e. Remove tone-arm-actuator assembly.

f. Remove spacer washer from actuator support stud.

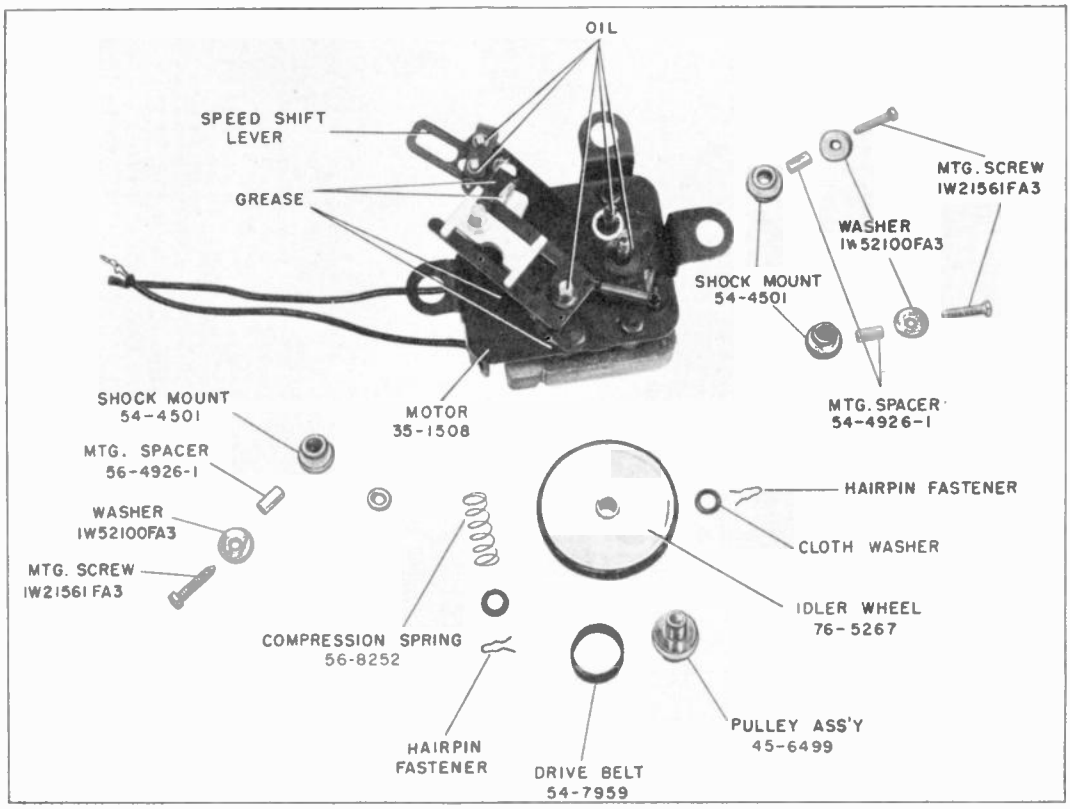
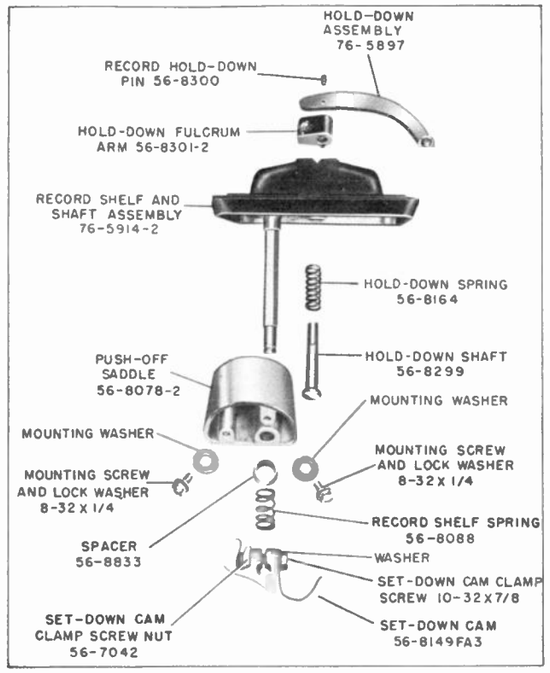


Figure 11. Motor Assembly



TPO-1835A

Figure 12. Record-Shelf Assembly

g. Remove set-down lever.

h. Remove cam-gear index lever.

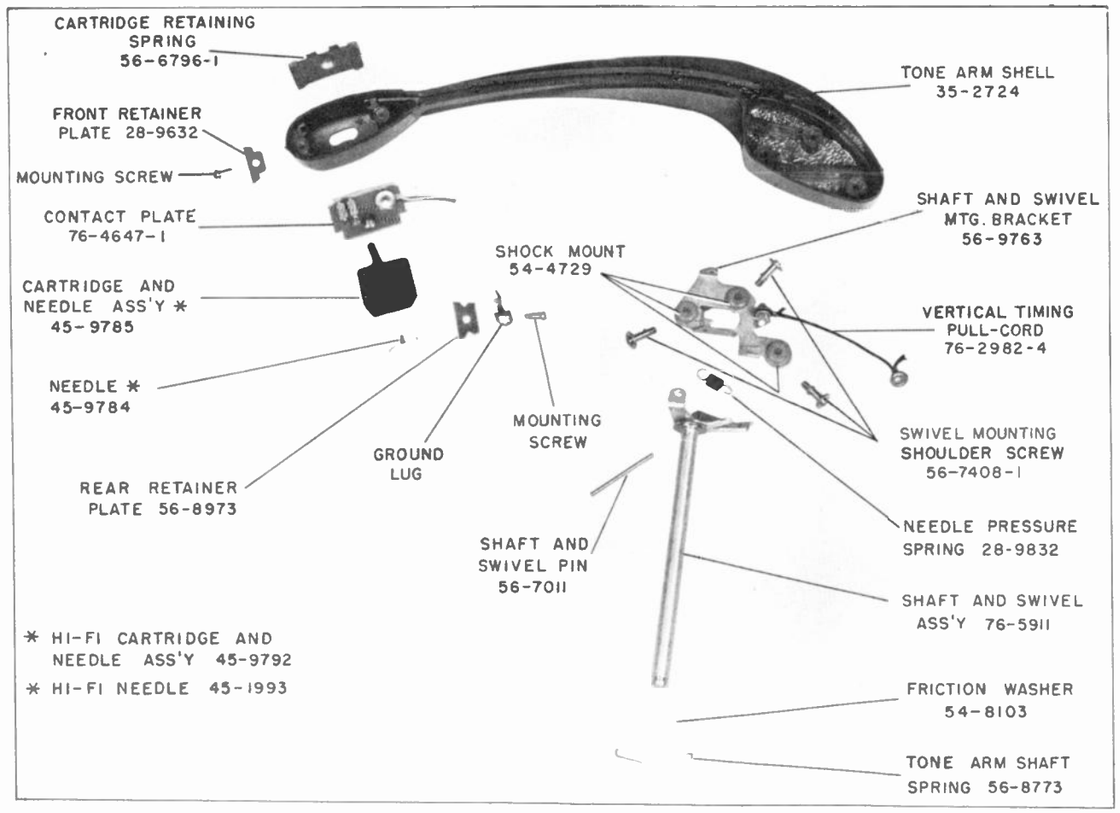
i. Remove motor-shift plate by first removing turntable (see paragraph 3) and removing the set of motor mounting hardware nearest record shelf. With Speed control in "45" position, free shift-lever ear from motor grommet by tilting motor upward from motor board. Return freed shift lever to an outward 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.

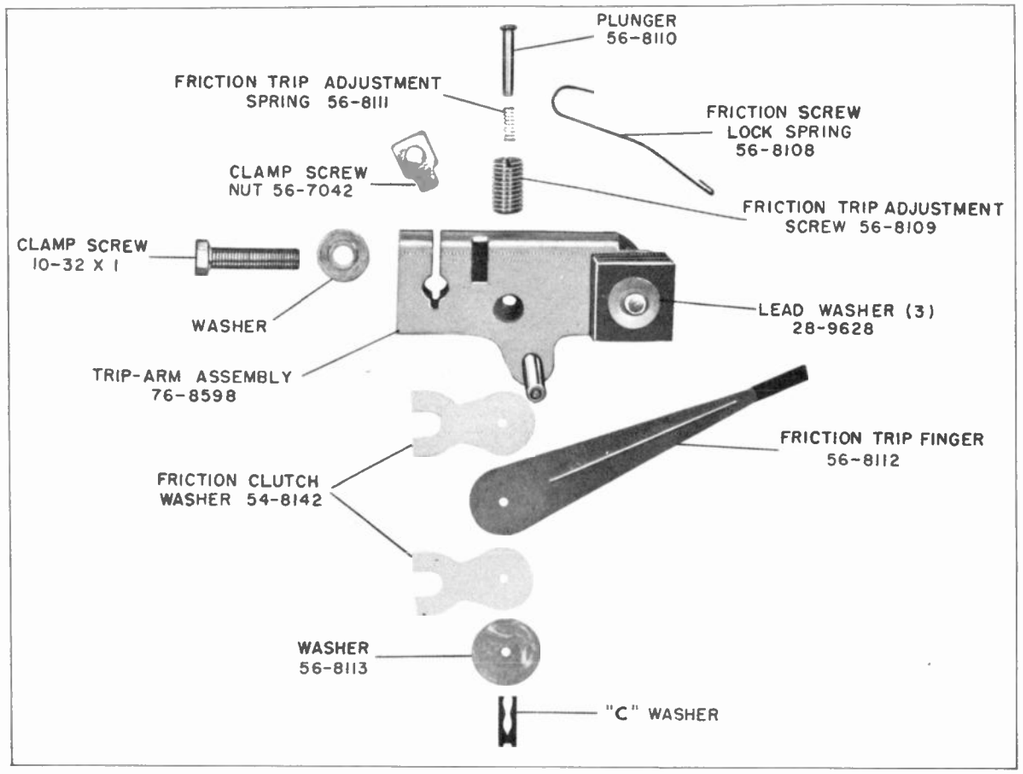
l. Remove tone-arm-return lever.

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.



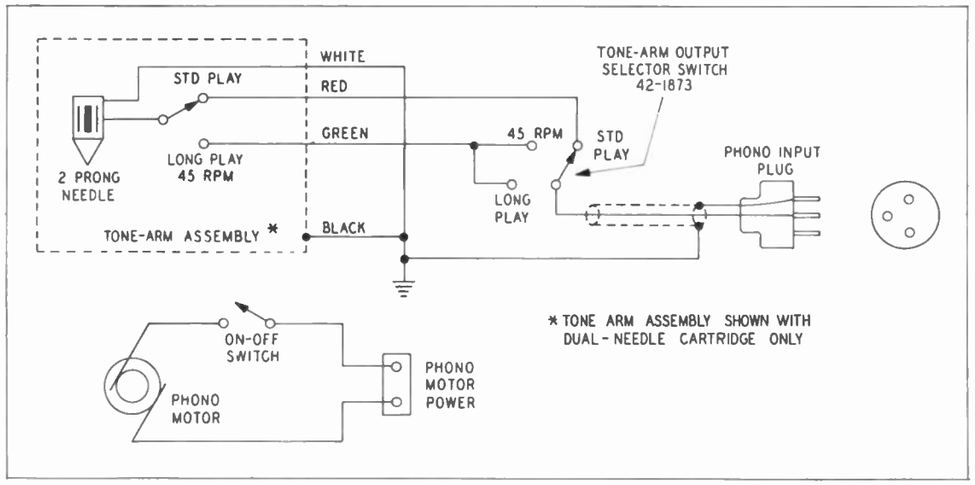
TPO-1840B

Figure 13. Tone-Arm Assembly



TPO-1842A

Figure 14. Trip-Arm Assembly



TPO-2313A

Figure 15. Wiring Diagram for Model M-25

REPLACEMENT PARTS LIST

Description	Service Part No.
Actuator Assembly	
Cam-gear index lever	76-5895*
Spring, index lever	56-8094
Compression spring	56-8087
Return lever	76-5893*
Spring, return lever	56-8092
Set-down lever	76-5894
Spring, set-down lever	56-8093
Tone-arm-actuator assembly	76-6502-1
Spring, actuator	56-8095
Bridge Assembly	
Ball bearing, ⅛ inch dia. (3)	5W2017
Bearing cover	56-8129
Bearing retainer, ball	56-8128
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	1W42311FE7
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)	56-7059-1FCP
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	56-8091
Washer, "E", switch lever	1W60980FE7
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)	1W21561FA3
Spacer, mounting (3)	56-4926-1

Description	Service Part No.
Washer, mounting (3)	1W52100FA3
Shock mount (3)	54-4501
Motor, 117 volts, 60 cycles	35-1508
Record-Shelf Assembly	
Hold-down assembly	76-5897
Hold-down fulcrum arm	56-8301-2
Hold-down pin	56-8300
Hold-down shaft	56-8299
Hold-down spring	56-8164
Push-off saddle	56-8078-2
Record-shelf-and-shaft assembly	76-5914-2
Set-down cam	56-8149FA3
Nut, cam locking	56-7042
Spacer	56-8833
Spring, record shelf	56-8088
Washer, cupped	56-8089
Reject lever	56-8079
Spring, detent	56-9758
Spring, reject	56-9757
Spindle, record	76-5909
Tone-arm assembly (complete)	35-2725
Bracket, mounting for shaft and swivel	56-9763
Cartridge and needle ass'y., Hi-Fidelity	45-9792
Needle, Hi-Fidelity	45-1993
Contact plate	76-4647-1
Cartridge and needle ass'y., regular	45-9785
Needle, regular	45-9784
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
Plunger	56-8110
Screw, friction-trip adjustment	56-8109
Spring, friction-screw lock	56-8108
Spring, friction-trip adjustment	56-8111
Washer, flat	56-8113
Washer, friction clutch (plastic) (2)	54-8142
Washer, "C"	56-8793
Washer, lead (3)	28-9628
Turntable	35-2711-4
Retainer, turntable	56-8097
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.

PHILCO
Factory-Supervised
Service

PR-2557 10-53

Printed in U. S. A.

PHILCO "Phonorama"

MODEL B1756

SPECIFICATIONS

Cabinet	Wood console
Circuit	
R-F Chassis	Eight-tube superheterodyne
Power Chassis	Five-tube audio amplifier plus rectifier
Frequency Range	
AM	540–1620 kc.
FM	88–108 mc.
Audio Output	Push-pull, 10-watt, undistorted
Operating Voltage	105–120 volts, a.c.
Power Consumption	150 watts
Antenna	Built-in, low-impedance loop
Intermediate Frequency	
AM	455 kc.
FM	9.1 mc.
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
V2	6BA6, miniature	AM-FM r-f amplifier
V3	12AT7, miniature	Mixer-oscillator
V4	6BA6, miniature	1st 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 V13	6V6G	Output
V14	5U4GT	Rectifier

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 REMOVAL 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 ALIGNMENT 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 ALIGNMENT 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

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1.	Ground lead to chassis. Output lead through a .05-μf. condenser to pin 1 of V5, 6AU6.	455 kc.	Gang fully open.	Adjust, in order given, for maximum 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. Remove 1000-ohm resistor from across primary, and place across secondary 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 output. 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 maximum 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 maximum 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 REMOVAL 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 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 FM position, and set the tuning control as indicated in the FM ALIGNMENT 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 ALIGNMENT 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.

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).

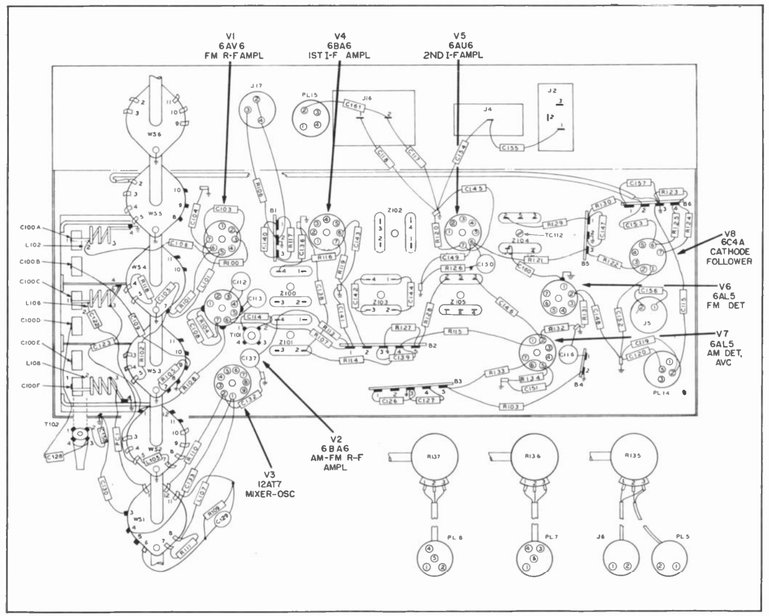


Figure 1. Base View, R-F Chassis, Showing Parts Placement and Tuning Adjustments

FM ALIGNMENT CHART
(AM METHOD)

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
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 maximum 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-μf. condenser to lug of C100C (pin 1 of L106).	Same as step 1.	Same as step 1.	Adjust, in order given, for maximum 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 maximum 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 maximum 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 REMOVAL 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 ALIGNMENT CHART (FM METHOD).

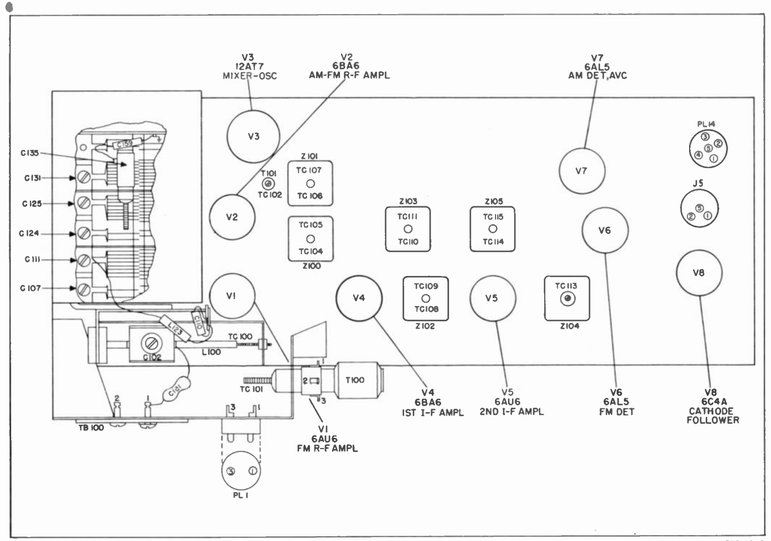
OUTPUT INDICATOR—Use an oscilloscope. Connect the ground leads to the chassis. Connect the vertical-input lead to test jack J4, and the horizontal-input lead to the horizontal-sweep output of the sweep signal generator.

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.



TP3-1865

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

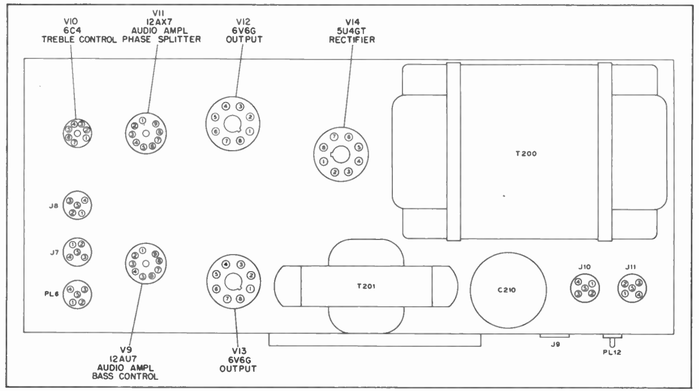
FM ALIGNMENT CHART
(FM METHOD)

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1.	Ground lead to chassis. Output lead through a .05-μf. condenser to pin 1 of V5, 6AU6.	9.1 mc. (80-kc. deviation)	Gang fully closed.	Adjust TC113 for balance (centered 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. deviation)	Gang fully closed.	Adjust, in order given, for maximum 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-μf. condenser to lug of C100C (pin 1 of L106).	9.1 mc. (80-kc. deviation)	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. deviation)	108.5 mc. (See NOTE 1 below.)	Adjust for maximum output.	C135—FM osc. trimmer
5.	Same as step 4.	88 mc. (80-kc. deviation)	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 further improvement is obtained.				
7.	Same as step 4.	105 mc. (80-kc. deviation)	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. deviation)	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:

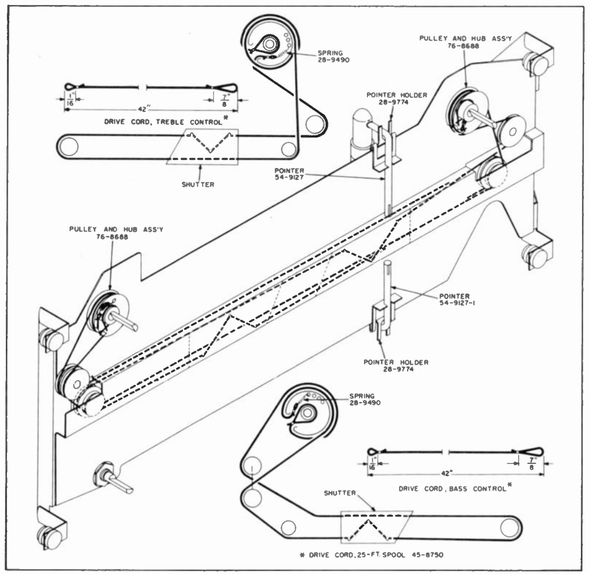
108.5 mc.—6-1/4 inches
105 mc.—4 inches
92 mc.—1-1/16 inches
88 mc.—3/16 inch

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.)



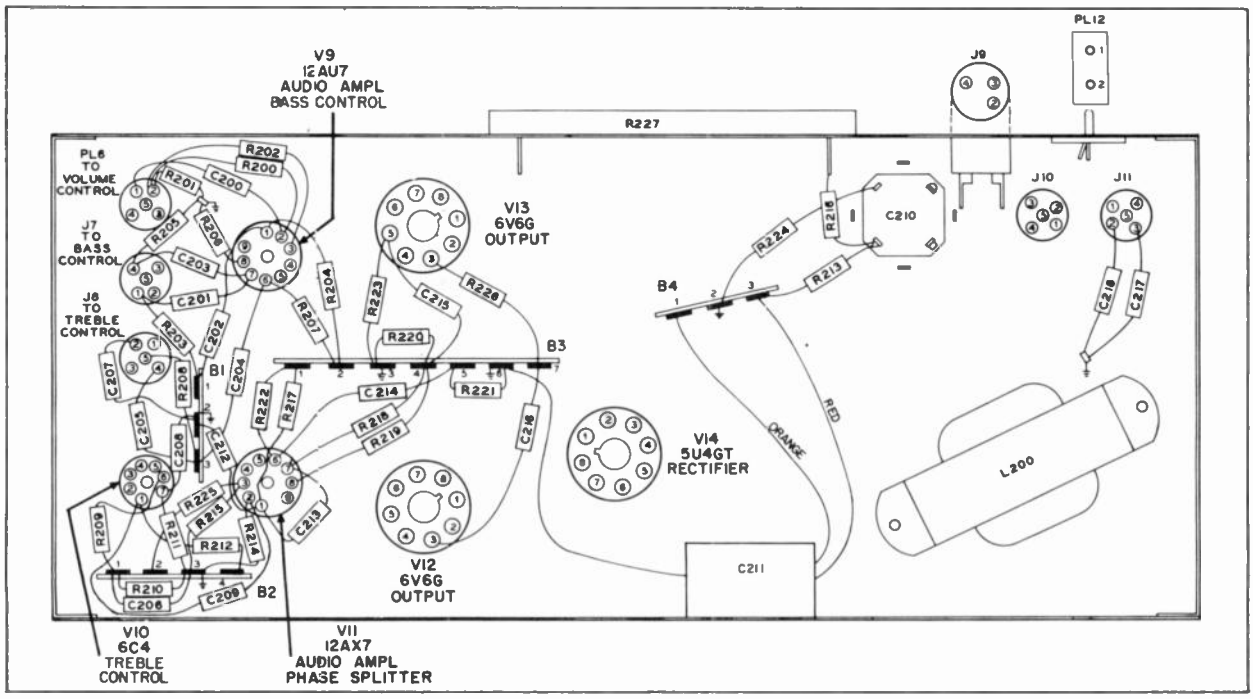
TP3-1864

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



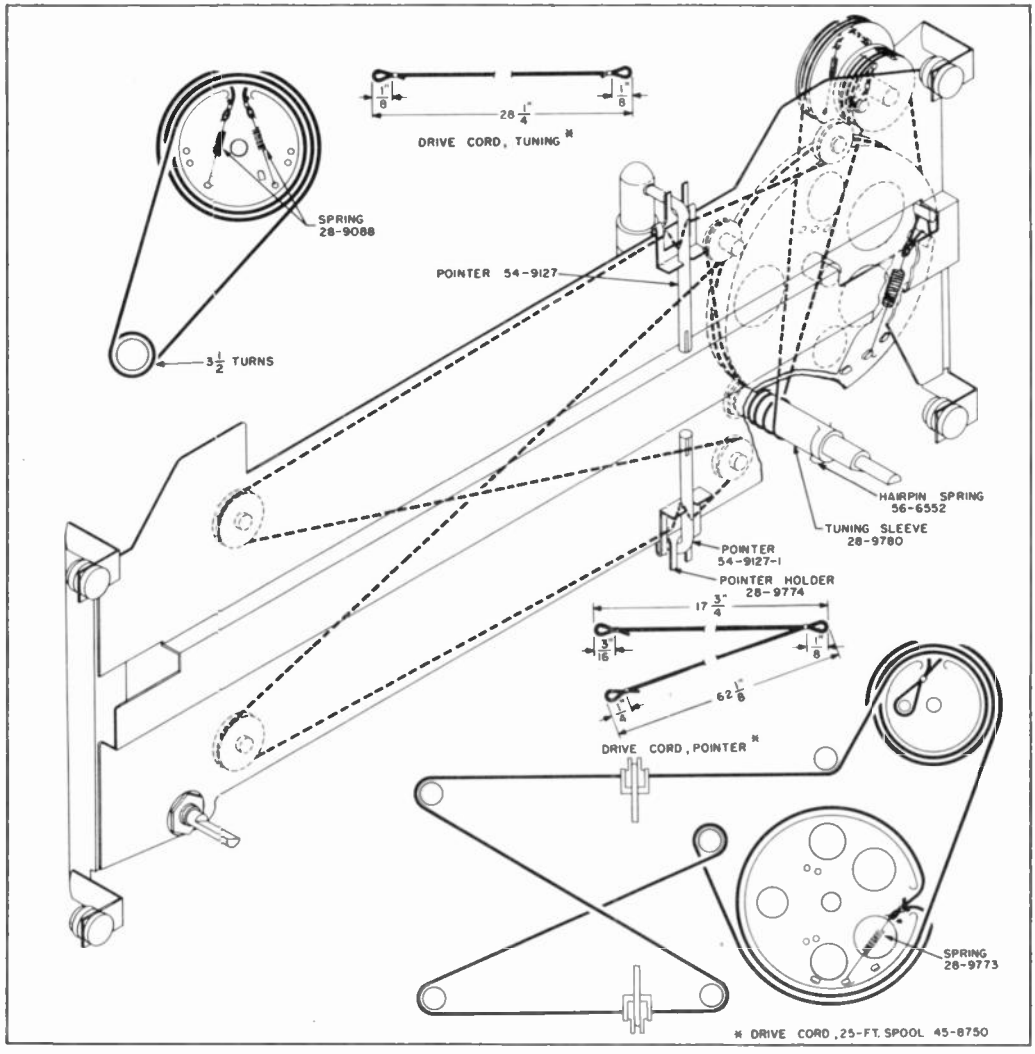
TP3-1861

Figure 4. Drive-Cord Installation Details, Tone Controls



TP3-1863

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



TP3-1862

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

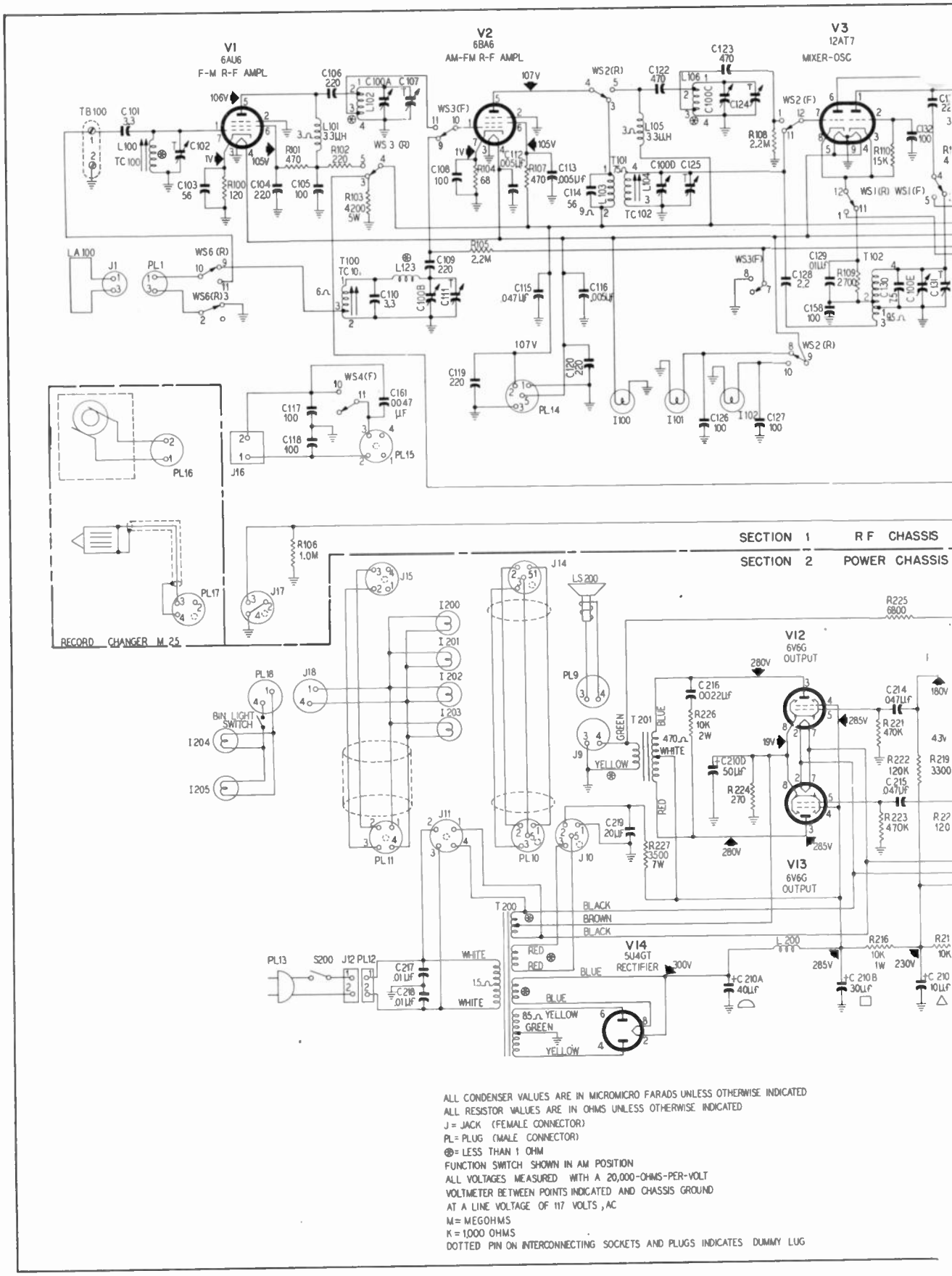
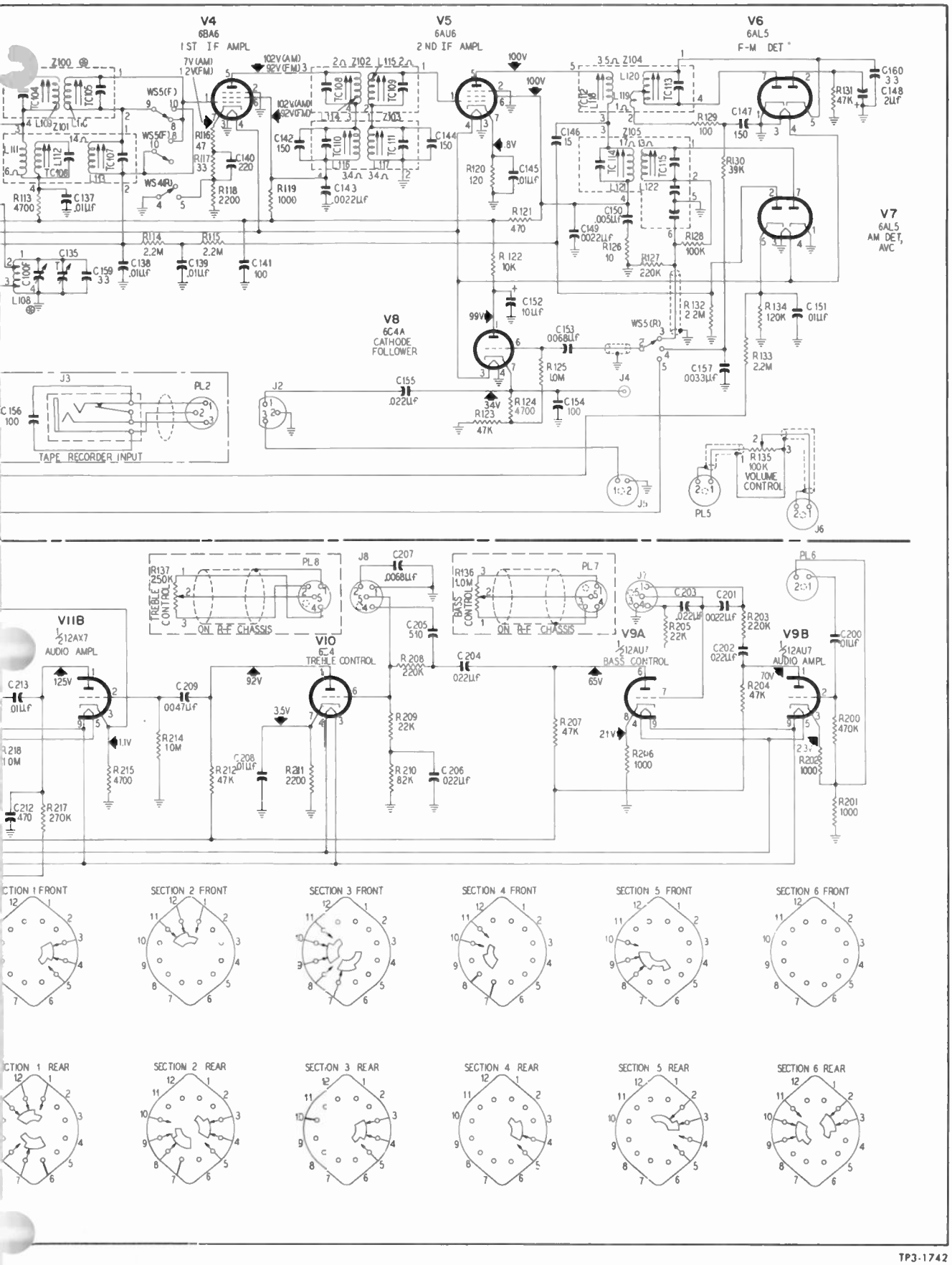


Figure 7. Philco "Phonor



TP3-1742

l B1756, Schematic Diagram

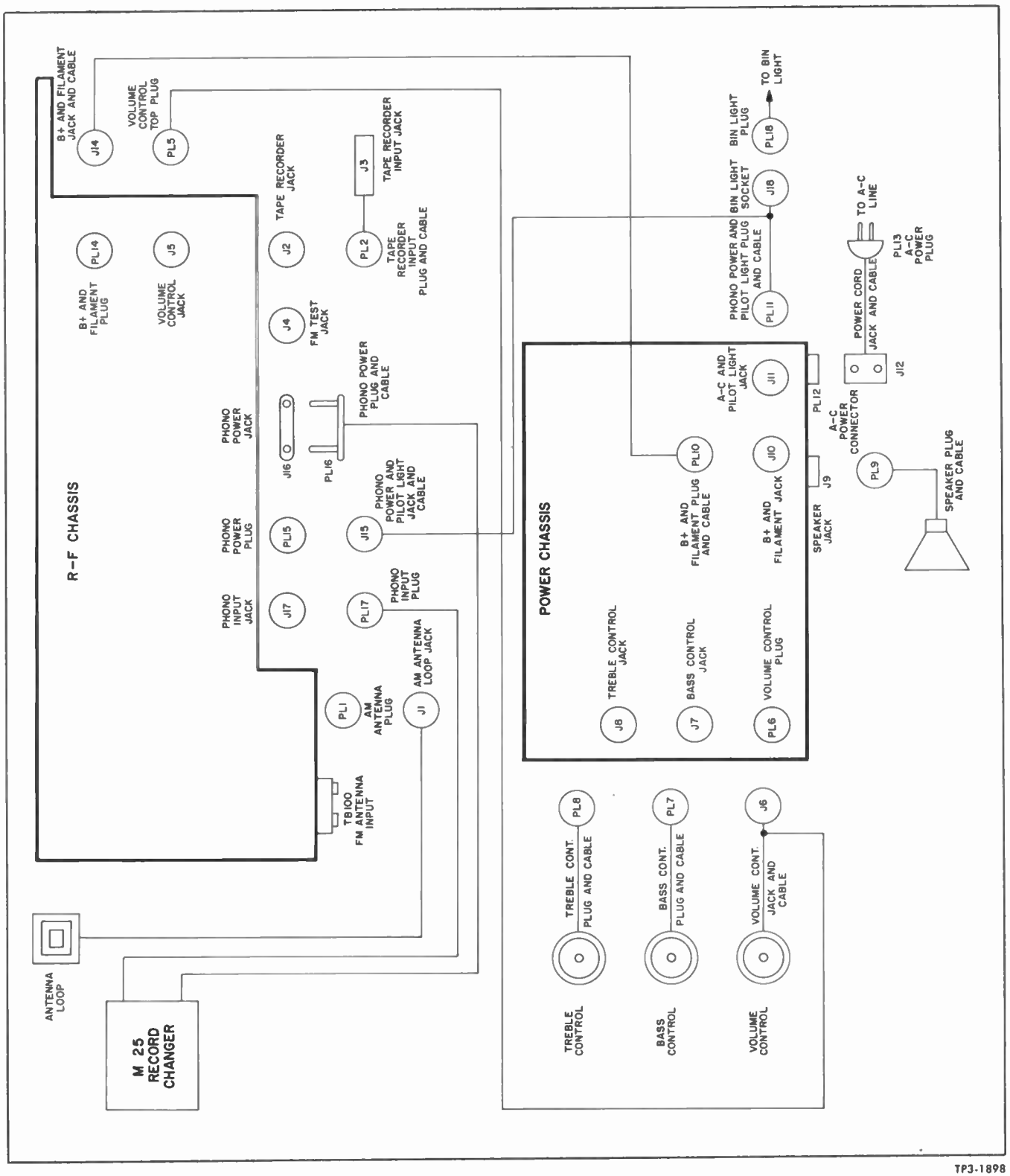


Figure 8. Philco "*Phonorama*" Model B1756, Chassis Interconnecting Diagram

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."

SECTION 1—R-F CHASSIS

Reference Symbol	Description	Service Part No.
C100	Condenser, tuning gang, 6-section	31-2773
C100A	Condenser, tuning, FM r-f amplifier	Part of C100
C100B	Condenser, tuning, AM antenna	Part of C100
C100C	Condenser, tuning, 2nd FM r-f amplifier	Part of C100
C100D	Condenser, tuning, AM r-f amplifier	Part of C100
C100E	Condenser, tuning, AM oscillator	Part of C100
C100F	Condenser, tuning, FM oscillator	Part of C100
C101	Condenser, FM antenna coupling, 3.3 μμf.	30-1224-103
C102	Condenser, trimmer, FM antenna tuning	31-6511-10
C103	Condenser, cathode by-pass, 56 μμf.	62-056409001
C104	Condenser, screen by-pass, 220 μμf.	62-122001001*
C105	Condenser, r-f by-pass, 100 μμf.	62-110009001
C106	Condenser, d-c blocking, 220 μμf.	62-122001001*
C107	Condenser, trimmer, FM r-f amplifier tuning	Part of C100
C108	Condenser, cathode by-pass, 100 μμf.	62-110001021*
C109	Condenser, d-c blocking, 220 μμf.	62-122001001*
C110	Condenser, temperature compensating, 3.3 μμf.	30-1224-103
C111	Condenser, trimmer, AM antenna tuning	Part of C100
C112	Condenser, filament by-pass, .005 μf.	30-1238-1
C113	Condenser, screen by-pass, .005 μf.	30-1238-1
C114	Condenser, r-f by-pass, 56 μμf.	62-056409001
C115	Condenser, B+ by-pass, .047 μf.	30-4650-62*
C116	Condenser, filament by-pass, .005 μf.	30-1238-1
C117	Condenser, line by-pass, record changer, 100 μμf.	62-110001021*
C118	Condenser, line by-pass, record changer, 100 μμf.	62-110001021*
C119	Condenser, B+ by-pass, 220 μμf.	62-122001001*
C120	Condenser, filament by-pass, 220 μμf.	62-122001001*
C122	Condenser, d-c blocking, 470 μμf.	62-147001021*
C123	Condenser, d-c blocking, 470 μμf.	62-147001021*
C124	Condenser, trimmer, 2nd FM r-f amplifier	Part of C100
C125	Condenser, trimmer, AM r-f amplifier	Part of C100
C126	Condenser, AM pilot-light by-pass, 100 μμf.	62-11001021*
C127	Condenser, FM pilot-light by-pass, 100 μμf.	62-11001021*
C128	Condenser, neutralizing, 2.2 μf.	30-1221-4
C129	Condenser, cathode by-pass, .01 μf.	30-1238-2
C130	Condenser, temperature compensating, 7.5 μf.	30-1224-65
C131	Condenser, trimmer, AM oscillator tuning	Part of C100
C132	Condenser, grid return, 100 μμf.	62-110001021*
C133	Condenser, d-c blocking, 220 μμf.	62-122001001*
C134	Condenser, cathode by-pass, 220 μμf.	Part of PC1
C135	Condenser, trimmer, FM oscillator tuning	31-6524
C136	Condenser, r-f by-pass, 200 μμf.	62-122001001*
C137	Condenser, B+ by-pass, .01 μf.	30-1238-2
C138	Condenser, a-v-c by-pass, .01 μf.	30-4650-58*
C139	Condenser, a-v-c by-pass, .01 μf.	30-4650-58*
C140	Condenser, cathode by-pass, 220 μμf.	62-122001001*
C141	Condenser, B+ by-pass 100 μμf.	62-110001021*
C142	Condenser, r-f by-pass, 150 μμf.	60-10155417
C143	Condenser, screen by-pass, .0022 μf.	30-4650-54*
C144	Condenser, r-f by-pass, 150 μμf.	60-10155417
C145	Condenser, cathode by-pass, .01 μf.	30-4650-58*
C146	Condenser, a-v-c coupling, 15 μμf.	60-00155417
C147	Condenser, de-emphasis, 150 μμf.	62-115001011*
C148	Condenser, filter, 2 μf.	45-3035-4
C149	Condenser, screen by-pass, .0022 μf.	30-4650-54*
C150	Condenser, neutralizing, .005 μf.	30-1238-1
C151	Condenser, cathode by-pass, .01 μf.	30-4650-58*
C152	Condenser, electrolytic, plate by-pass, 10 μf.	45-3035-39
C153	Condenser, audio coupling, .0068 μf.	30-4650-57*
C154	Condenser, r-f by-pass, 100 μμf.	62-110001021*
C155	Condenser, audio coupling, .022 μf.	30-4650-60*
C156	Condenser, r-f by-pass, 100 μμf.	62-110001021*
C157	Condenser, de-emphasis, .0033 μf.	30-4650-55*
C159	Condenser, temperature compensating, 3.3 μμf.	30-1224-49
C160	Condenser, r-f by-pass, 3.3 μμf.	30-1224-103
C161	Condenser, switch by-pass, .0047 μf.	30-4650-56*
I100	Lamp, pilot, dial	34-2064
I101	Lamp, pilot, AM	34-2064
I102	Lamp, pilot, FM	34-2064
L100	Coil, FM antenna tuning	32-4532A
L101	Coil, FM r-f choke, 3.3 μh.	32-4422-10
L102	Coil, FM r-f amplifier tuning	32-4415-5
L103	Coil, AM r-f transformer primary	Part of T101
L104	Coil, AM r-f transformer secondary	Part of T101
L105	Coil, FM r-f choke, 3.3 μh.	32-4422-10
L106	Coil, 2nd FM r-f amplifier tuning	32-4415-4
L107	Coil, r-f choke, 3.3 μh.	32-4422-10
L108	Coil, FM oscillator	32-4414-6
L109	Coil, 1st FM i-f primary	Part of Z100
L110	Coil, 1st FM i-f secondary	Part of Z100
L111	Coil, 1st AM i-f primary	Part of Z101
L112	Coil, 1st AM i-f secondary	Part of Z101
L113	Coil, 1st AM i-f tertiary	Part of Z101
L114	Coil, 2nd FM i-f primary	Part of Z102
L115	Coil, 2nd FM i-f secondary	Part of Z102
L116	Coil, 2nd AM i-f primary	Part of Z103
L117	Coil, 2nd AM i-f secondary	Part of Z103
L118	Coil, FM discriminator primary	Part of Z104
L119	Coil, FM discriminator tertiary	Part of Z104
L120	Coil, FM discriminator secondary	Part of Z104
L121	Coil, 3rd AM i-f primary	Part of Z105
L122	Coil, 3rd AM i-f secondary	Part of Z105
L123	Coil, AM antenna choke	32-4061-3
LA100	Loop antenna	See NOTE below
PC1	Printed circuit, FM oscillator cathode	30-6002
R100	Resistor, cathode bias, 120 ohms	66-1128340*
R101	Resistor, screen dropping, 470 ohms	66-1478340*
R102	Resistor, B+ dropping, 220 ohms	66-1228340*
R103	Resistor, B+ loading, 4200 ohms, 5 watts	33-1335-101
R104	Resistor, cathode bias, 68 ohms	66-0688340*
R105	Resistor, a-v-c return, 2.2 megohms	66-5228340*
R106	Resistor, phono input, 1.0 megohm	66-5108340*
R107	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 (Cont.)	
R108	Resistor, grid leak, 2.2 megohms	66-5228340*
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
T100	Transformer, AM antenna	32-4605
T101	Transformer, AM r-f	32-4572
T102	Transformer, AM oscillator	32-4569-2
WS1 through WS6	Wafer switch, function	42-2014
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 μf.	30-4650-58*
C201	Condenser, bass compensation, .0022 μf.	30-4650-54*
C202	Condenser, d-c blocking, .022 μf.	30-4650-60*
C203	Condenser, bass boost, .022 μf.	30-4650-60*
C204	Condenser, d-c blocking, .022 μf.	30-4650-60*
C205	Condenser, treble compensation, 510 μμf.	60-10515337
C206	Condenser, bass boost, .022 μf.	30-4650-60*
C207	Condenser, treble boost, .0068 μf.	30-4650-57*
C208	Condenser, cathode by-pass, .01 μf.	30-4650-58*
C209	Condenser, d-c blocking, .0047 μf.	30-4650-56*
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	30-2417-39
C212	Condenser, plate by-pass, 470 μμf.	62-147001021*
C213	Condenser, d-c blocking, .01 μf.	30-4650-58*
C214	Condenser, d-c blocking, .047 μf.	30-4650-62
C215	Condenser, d-c blocking, .047 μf.	30-4650-62
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 I201	Lamp, pilot, tone	34-2064
I202	Lamp, pilot, tone	34-2068
I203	Lamp, off-on	34-2068
I204 and I205	Lamp, record-changer bin	34-2068
L200	Coil, filter choke	32-8639
LS200	Loudspeaker	36-1653
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, 22,000 ohms	66-3228340*
R206	Resistor, cathode bias, 1000 ohms	66-2108340*
R207	Resistor, plate load, 47,000 ohms	66-3478340*
R208	Resistor, treble compensation, 220,000 ohms	66-4228340*
R209	Resistor, grid leak, 22,000 ohms	66-3228340*
R210	Resistor, bass boost, 82,000 ohms	66-3828340*
R211	Resistor, cathode bias, 2200 ohms	66-2228340*
R212	Resistor, plate load, 47,000 ohms	66-3478340*
R213	Resistor, B+ filter, 10,000 ohms	66-3108340*
R214	Resistor, grid leak, 1.0 megohm	66-5108340*
R215	Resistor, cathode bias, 4700 ohms	66-2478340*
R216	Resistor, B+ filter, 10,000 ohms, 1 watt	66-3104340*
R217	Resistor, plate load, 270,000 ohms	66-4278340*
R218	Resistor, grid leak, 1.0 megohm	66-5108340*
R219	Resistor, cathode bias, 3300 ohms	66-2338340*
R220	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 bias, 270 ohms, 7 watts	33-1335-91
R225	Resistor, feedback, 6800 ohms	66-2688340*
R226	Resistor, bass compensation, 10,000 ohms, 2 watts	66-3105340*
R227	Resistor, B+ filter, 3500 ohms	33-3446-12
S200	Switch, off-on	Part of power-cable ass'y.
T200	Transformer, power	32-8638
T201	Transformer, output	32-8640
	JACKS, PLUGS, AND CABLE ASSEMBLIES	
J1	Jack, AM antenna loop	27-6273-20
J2	Jack, tape recorder	27-6126
J3	Jack, tape-recorder input	42-1805-3
J4	Jack, FM test	27-6180
J5	Jack, volume control	27-6273-27
J6	Jack, volume control	Part of volume-control-arm cable ass'y.
J7	Jack, bass control	27-6273-24
J8	Jack, treble control	27-6273-25
J9	Jack, speaker	27-6273-23
J10	Jack, B+ and filament	27-6273-35
J11	Jack, a-c and pilot light	27-6273-11
J12	Jack, power cord	Part of power-cable ass'y.
J14	Jack, B+ and filament	Part of B+ and filament cable ass'y.

REPLACEMENT PARTS LIST (Cont.)

JACKS, PLUGS, AND CABLE ASSEMBLIES (Cont.)

Reference Symbol	Description	Service Part No.
J15	Jack, phono power	Part of phono-power and pilot-light cable ass'y.
J16	Jack, phono power	27-6200
J17	Jack, phono input	27-6273-9
J18	Jack, bin light	27-4419-7
PL1	Plug, AM antenna	54-4878-8
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	27-6302-10
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	Part of B+ and filament cable ass'y.
PL11	Plug, phono power and pilot light	Part of phono-power and pilot-light cable ass'y.
PL12	Plug, a-c power connector	27-6240-3
PL13	Plug, a-c power	Part of power-cable ass'y.
PL14	Plug, B+ and filament	27-6302-11
PL15	Plug, phone power	27-6302
PL16	Plug, phone power	Part of phono-power cable ass'y.
PL17	Plug, phono input	Part of M25 Record Changer
PL18	Plug, bin light	27-4785-33
Cable Assemblies:		
	Bass control	41-4192-1
	Bin light	41-4200
	B+ and filament	41-4189
	Phono power	76-2172-8
	Phono power and pilot light	41-4188-2
	Power	41-4190
	Speaker	41-4191-2
	Tape recorder	41-4194
	Treble control	41-4192
	Volume-control arm	41-4193
	Volume-control top	41-4193-1

MISCELLANEOUS

(Cabinet Parts)

Description	Service Part No.
Cabinet, light	11011-1
Back, cabinet	54-9066-1
Ball strike	56-7655-1
Clip, spring	56-7654-1
Hinge, concealed, left-hand	28-9644-6
Hinge, concealed, right-hand	28-9644-7
Hinge, continuous	56-3627-18
Knob (3)	76-8671-1
Knob, function switch	78-8672-1
Lid support	28-9823-1
Cabinet, Mahogany	11011-3
Back, cabinet	54-9066
Ball strike	56-7655
Clip, spring	56-7654
Hinge, concealed, left-hand	28-9644-4
Hinge, concealed, right-hand	28-9644-5
Hinge, continuous	56-3627-17
Knob (3)	76-8671
Knob, function switch	76-8672
Lid support	28-9823
Dial scale	54-5194-1
Dome, cabinet feet (4)	45-6190
Grille, metal	76-8660
Knob, off-on switch (both cabinets)	54-6089
Knob, tuning (both cabinets)	54-6087
Trim, window (2)	28-9788
Trim, window (2)	28-9788-1
Window, decorative	54-5200

MISCELLANEOUS

(Chassis Parts)

Description	Service Part No.
Changer Mounting Hardware:	
Sleeve	54-7798
Speed nut	W2554
Spring, mounting, bottom	56-7059-1FCP
Spring, mounting, top	56-7059FA9
Clip, bin light	56-3545-6
Core, iron (L100)	56-9233
Dial backplate	76-8684
Lead assembly, antenna	76-1472-18
Panel, diffusing, blue, treble	54-9128
Panel, diffusing, red, bass	54-9128-1
Spring, (both diffusing panels)	28-9767
Pointer, AM	54-9127-1
Pointer, FM	54-9127
Holder, pointer (2)	28-9774
Spring, intermediate	28-9088
Springer, pointer	28-9773
Tie rod, pointer	54-9126
Pully and hub (2)	76-8688
Shield, pilot light	56-2194FA3
Shield, tube (5)	56-5629-5
Shield, tube (12AT7)	56-5629-3
Shield, tube base (5)	56-5628
Shield, tube base (12AT7)	56-5628-1FA3
Sleeve, tuning shaft	28-9780
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	56-6552
Spring, shaft ground	56-8023
Spring, shutter	28-9490
Switch, bin light	41-4199-1
Switch, function	42-2014

PR-2552 10-53

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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

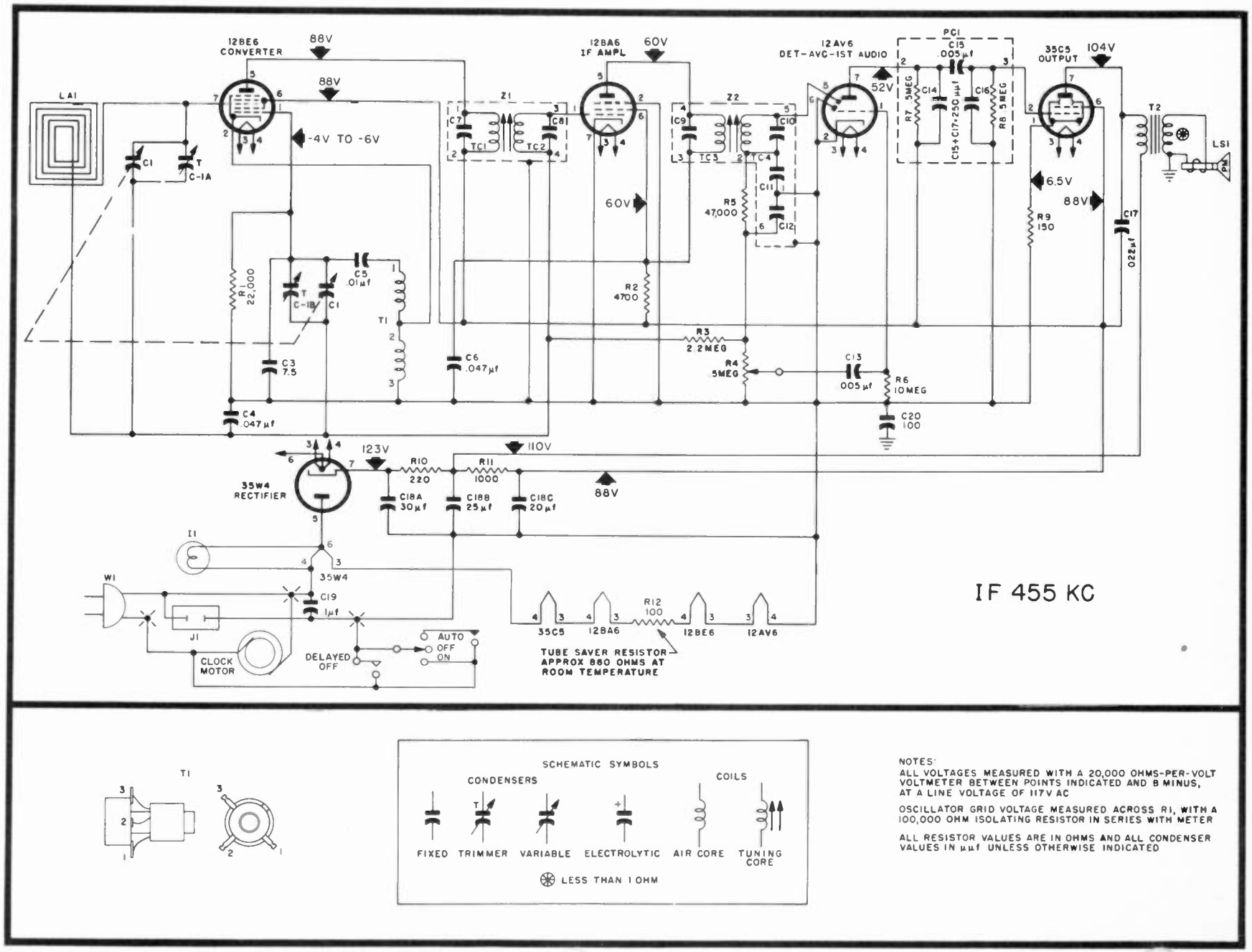

Figure 1. Philco Radio-Clock Model B712X, Code 122 Schematic Diagram

PHILCO

PHILCO Factory-Supervised Service

SERVICE

HOME RADIO

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 33⅓-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.

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 trip-arm 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 trip-plate 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 push-off-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.

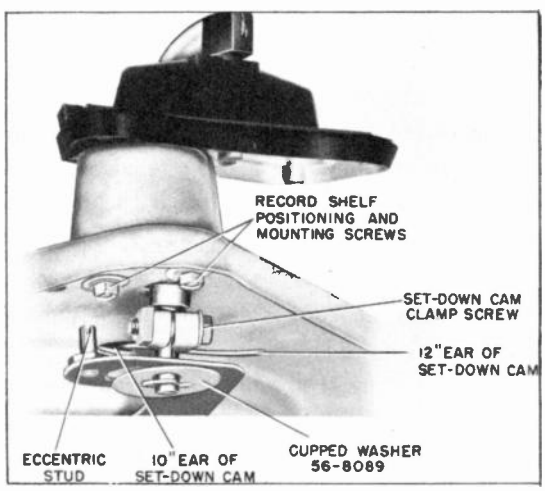

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Figure 1. Record-Shelf Adjustment and 10-Inch, 12-Inch, and Fine Set-Down

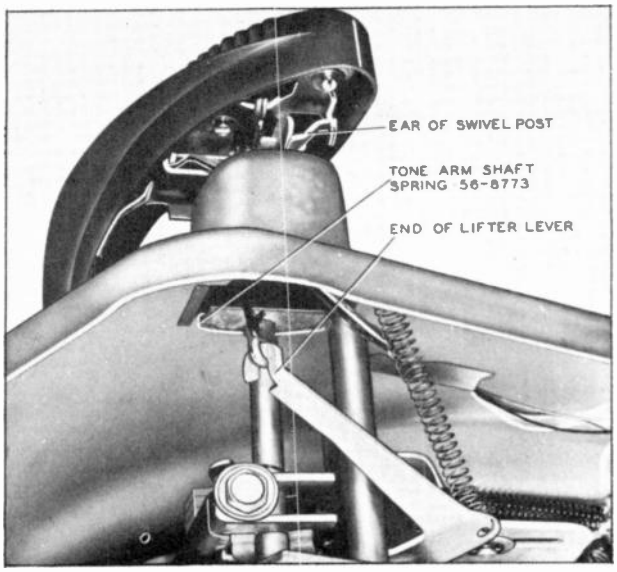

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Figure 2. Tone-Arm Height and Lift Adjustments and Vertical Timing Adjustments

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

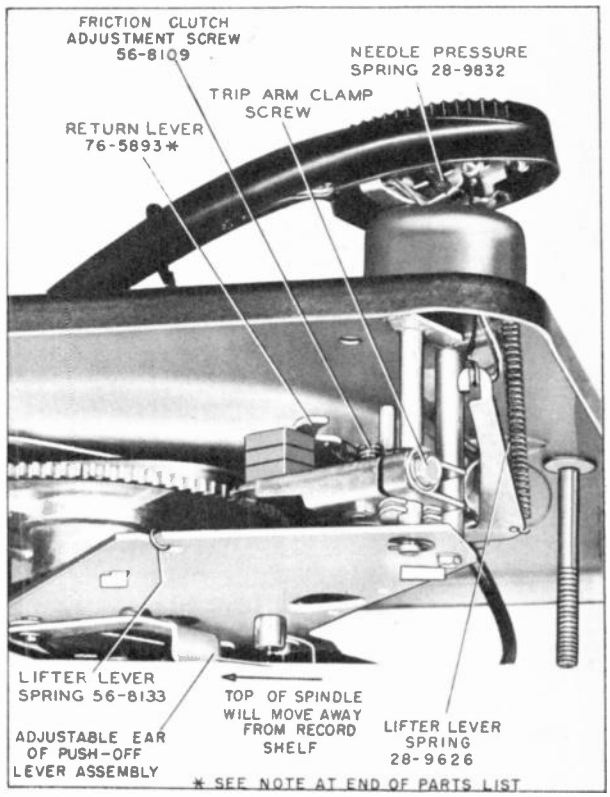
With the changer out of cycle, and the tone arm over the base plate, the needle point should be $\frac{1}{8}$ inch $\pm$ $\frac{1}{6}$ inch above the base plate. To adjust the clearance, bend the protruding ear of the swivel post, at the rear of the tone arm heel. See figure 2. Bending the ear upward 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 tone-arm 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 ear 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-



TPO-1845A

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

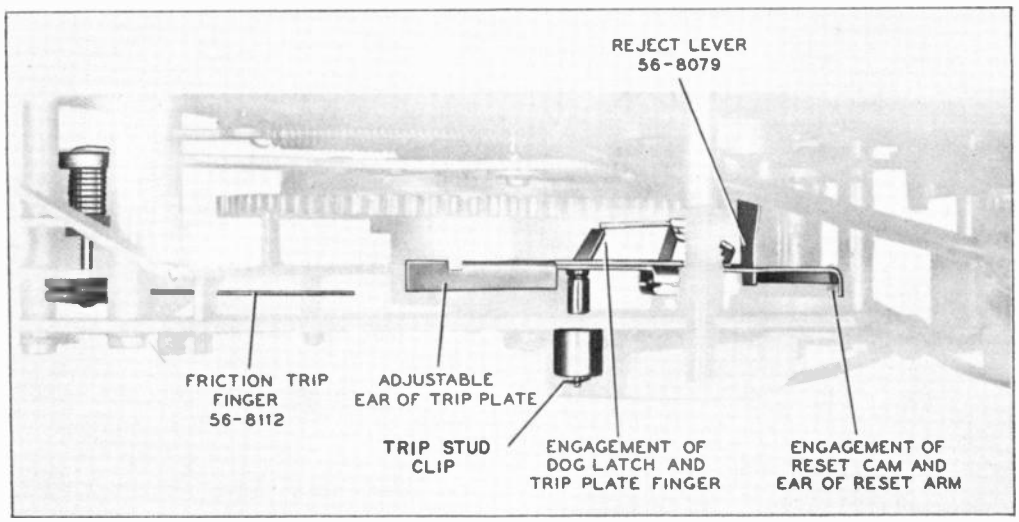


Figure 4. Trip Adjustment

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.

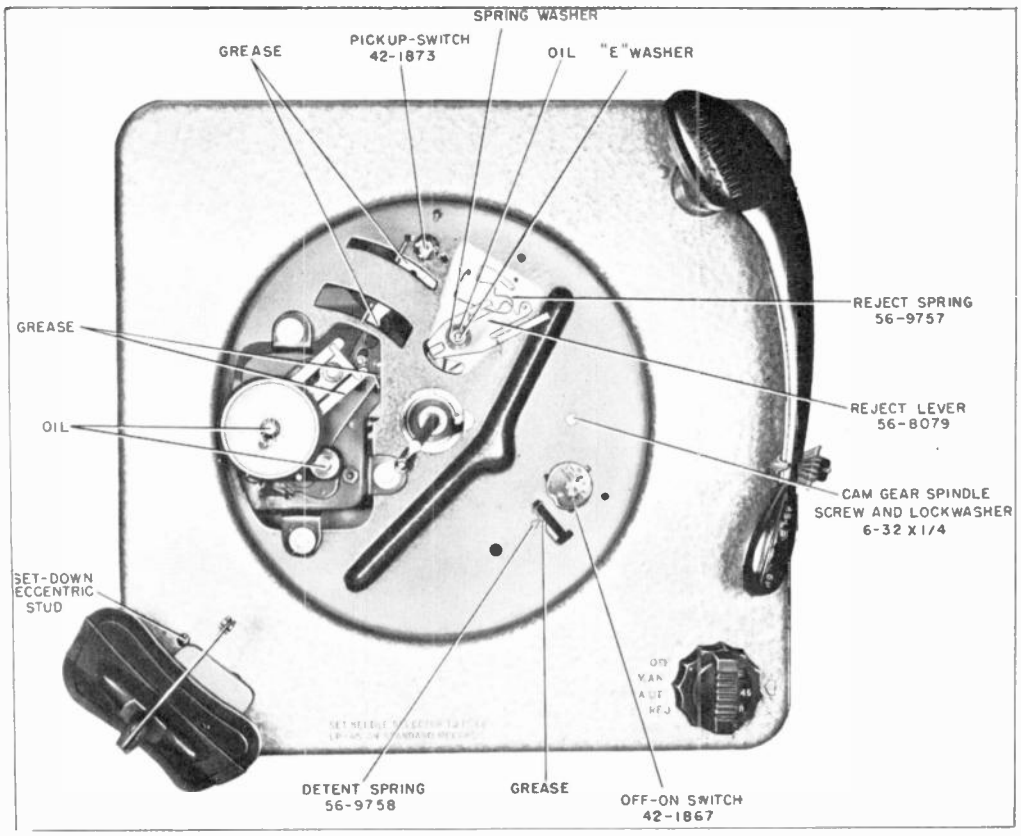
NOTE: Too much engagement will prevent tripping, while too little engagement will cause pretripping.

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 properly, check for tight tone-arm lead dress or excessive friction in the tone-arm-shaft 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)

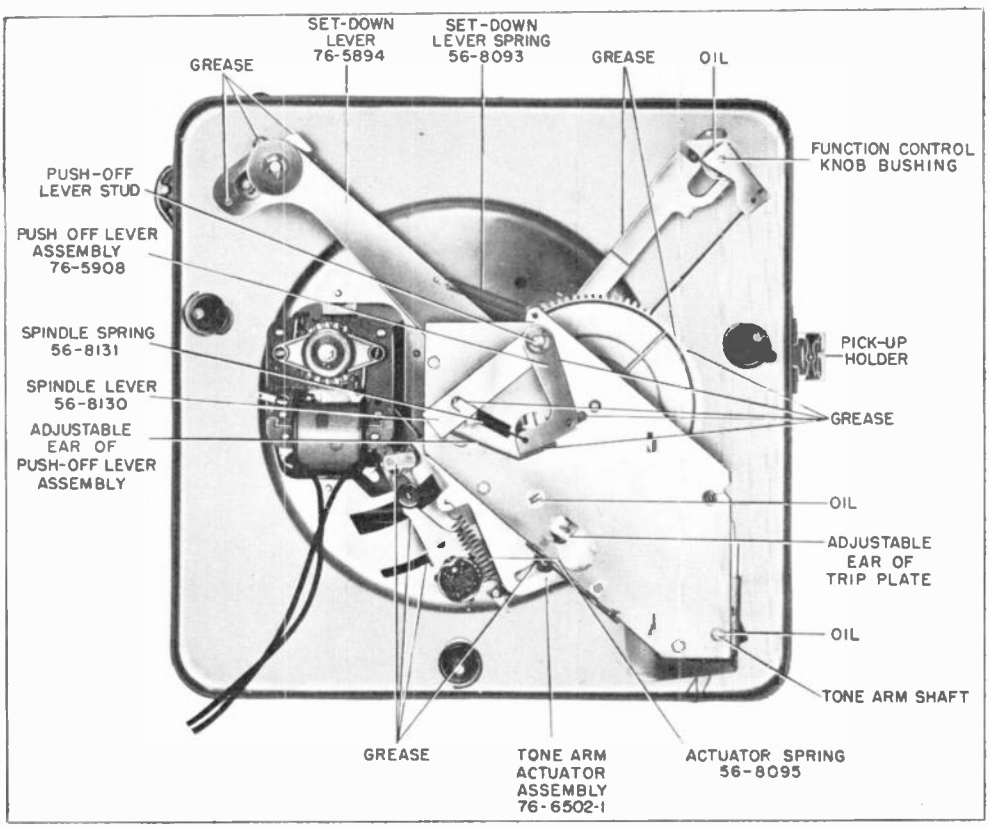
Uneven turntable speed may be caused by any of the following conditions:

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.



TP2-524A

Figure 5. Top View, Showing Lubrication Points



TP2-519A

Figure 6. Bottom View, Showing Lubrication Points

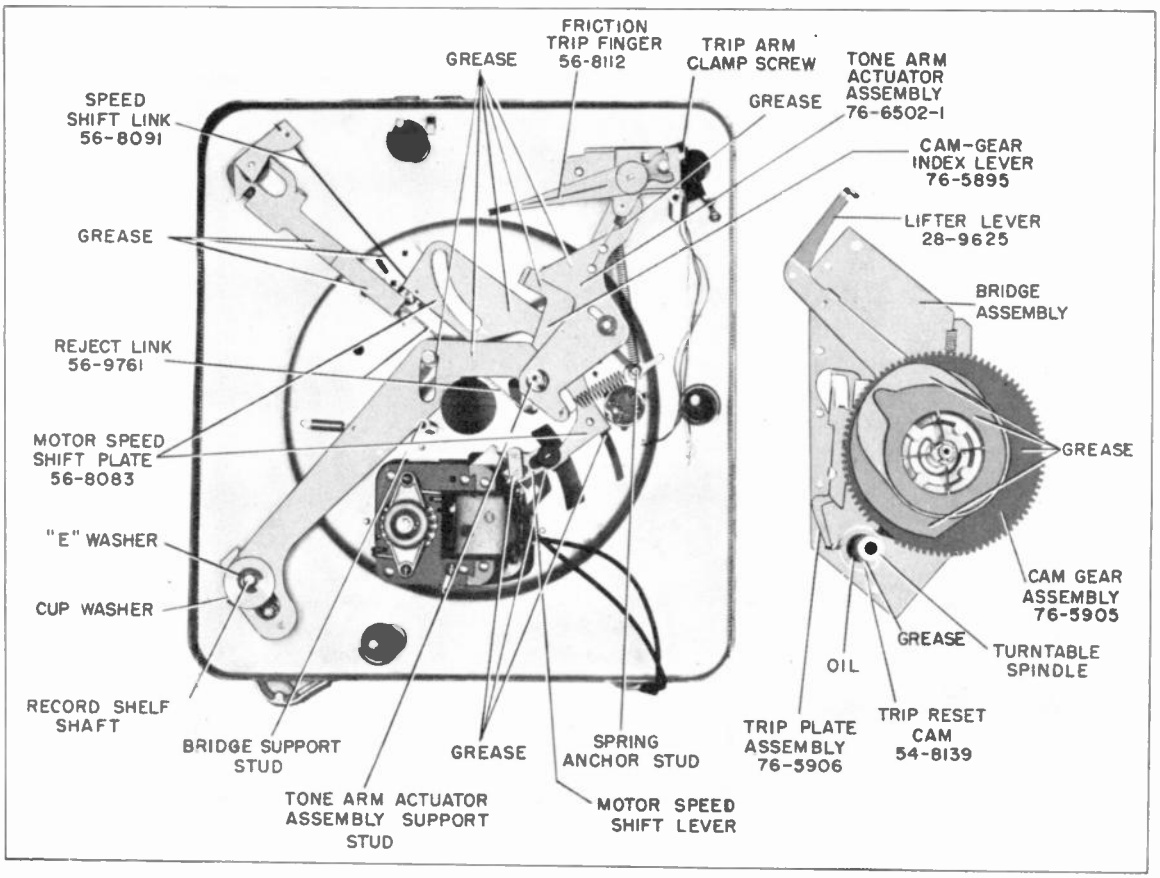


Figure 7. Bottom View, Bridge Removed, Showing Lubrication Points

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

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.

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 cam-gear 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.

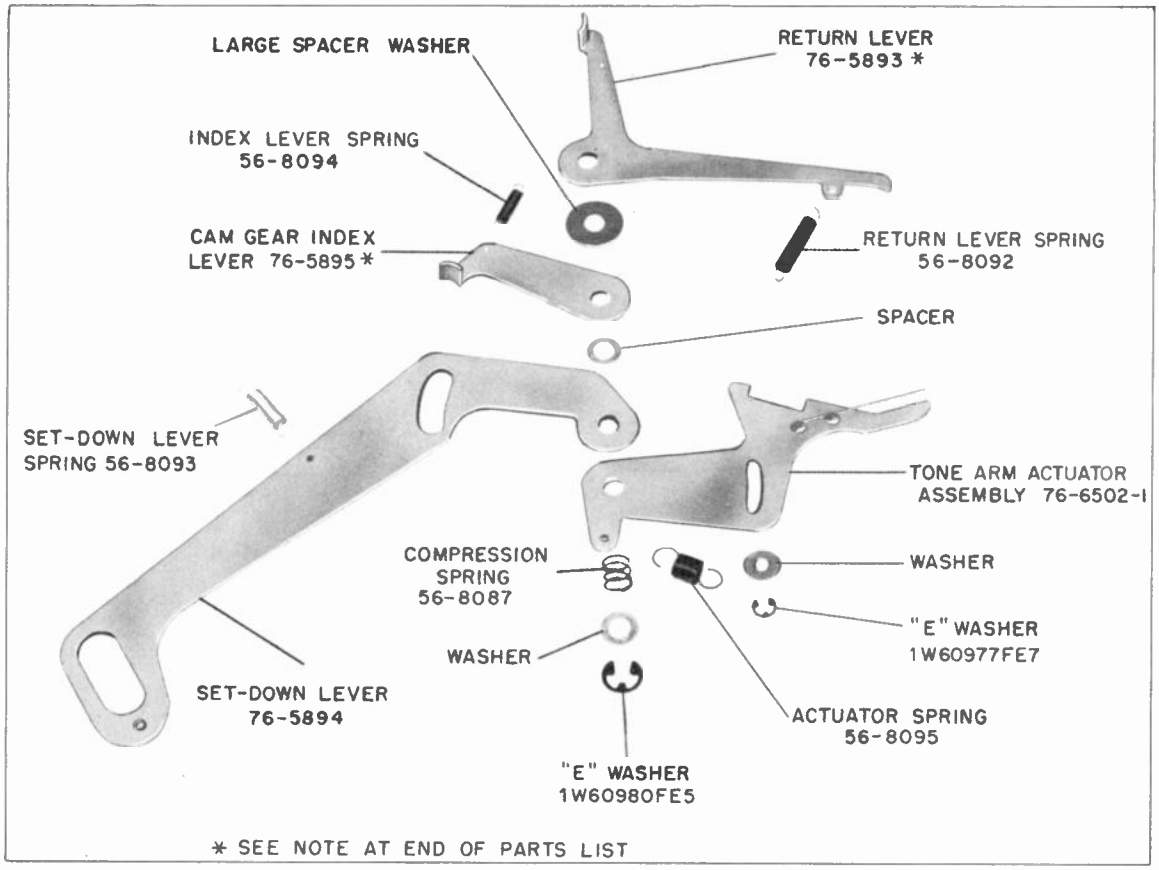


Figure 8. Actuator Assembly

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.

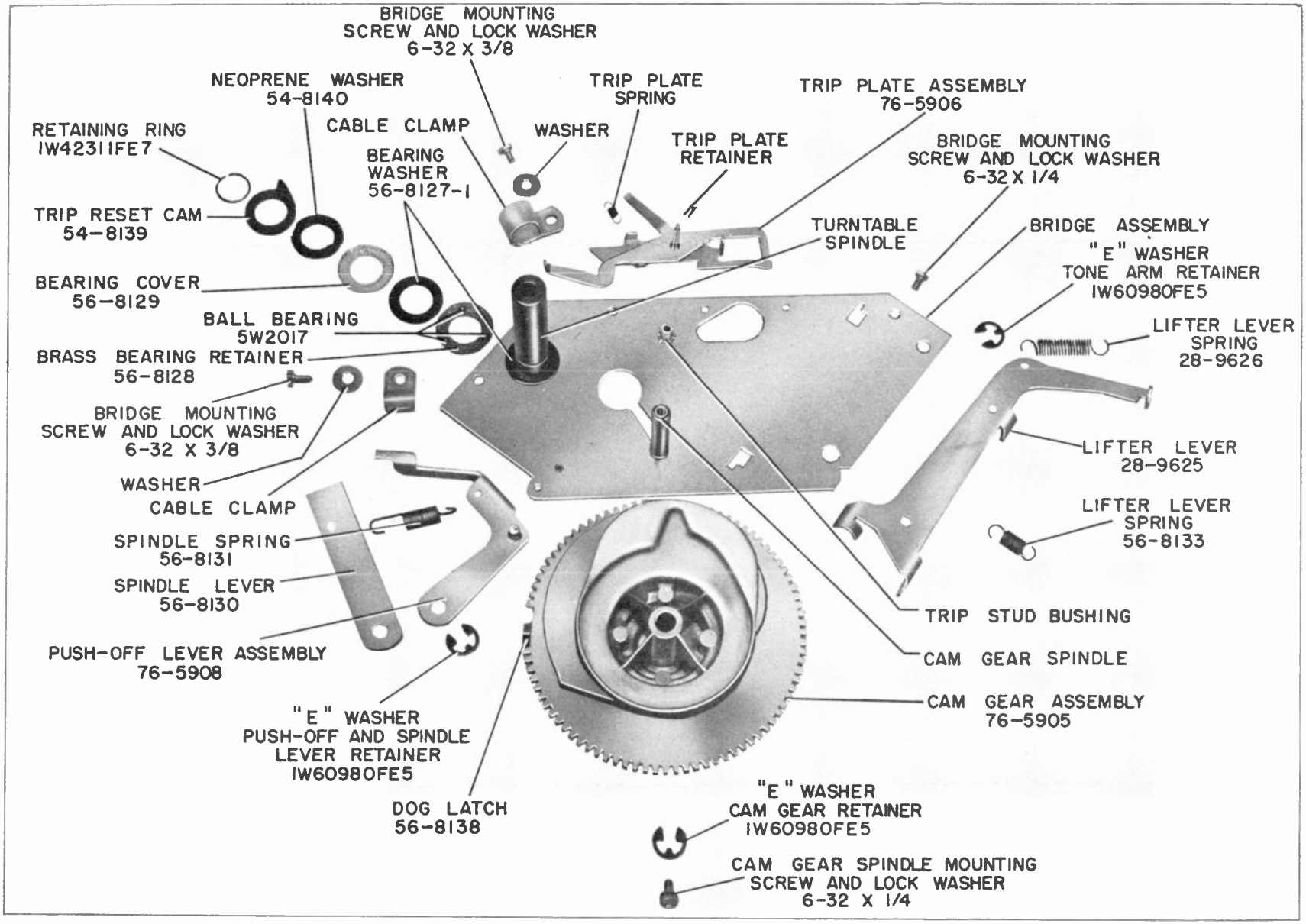


Figure 9. Bridge Assembly

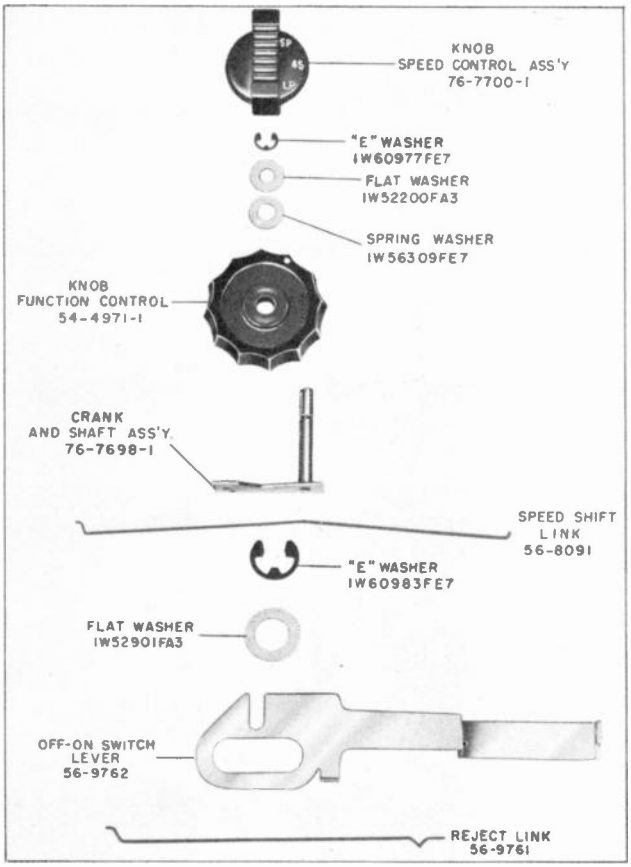


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Figure 10. Control Assembly

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 record-shelf 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 tone-arm-actuator support stud.

e. Remove tone-arm-actuator assembly.

f. Remove spacer washer from actuator support stud.

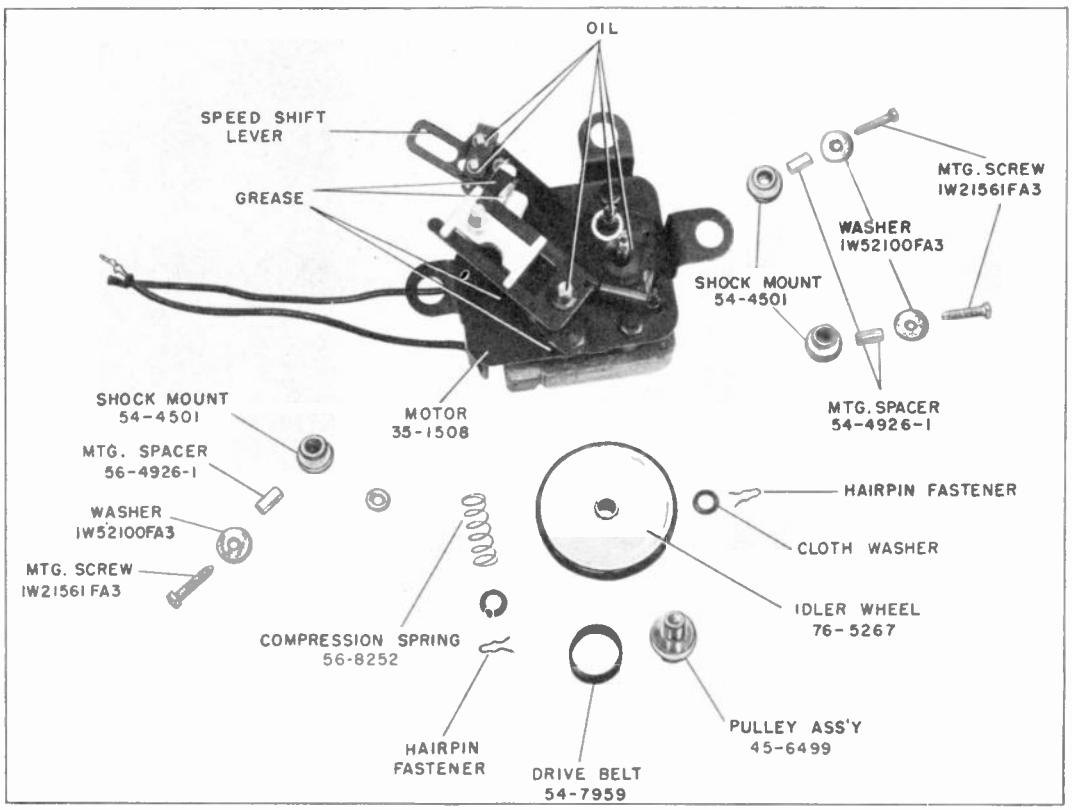

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Figure 11. Motor Assembly

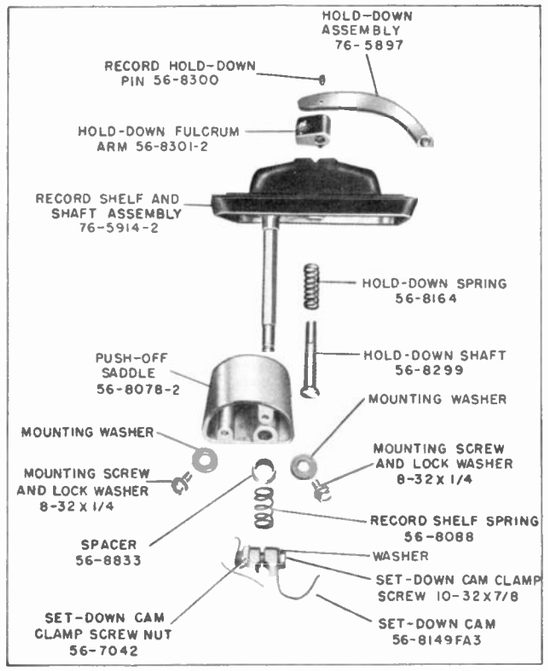

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Figure 12. Record-Shelf Assembly

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.

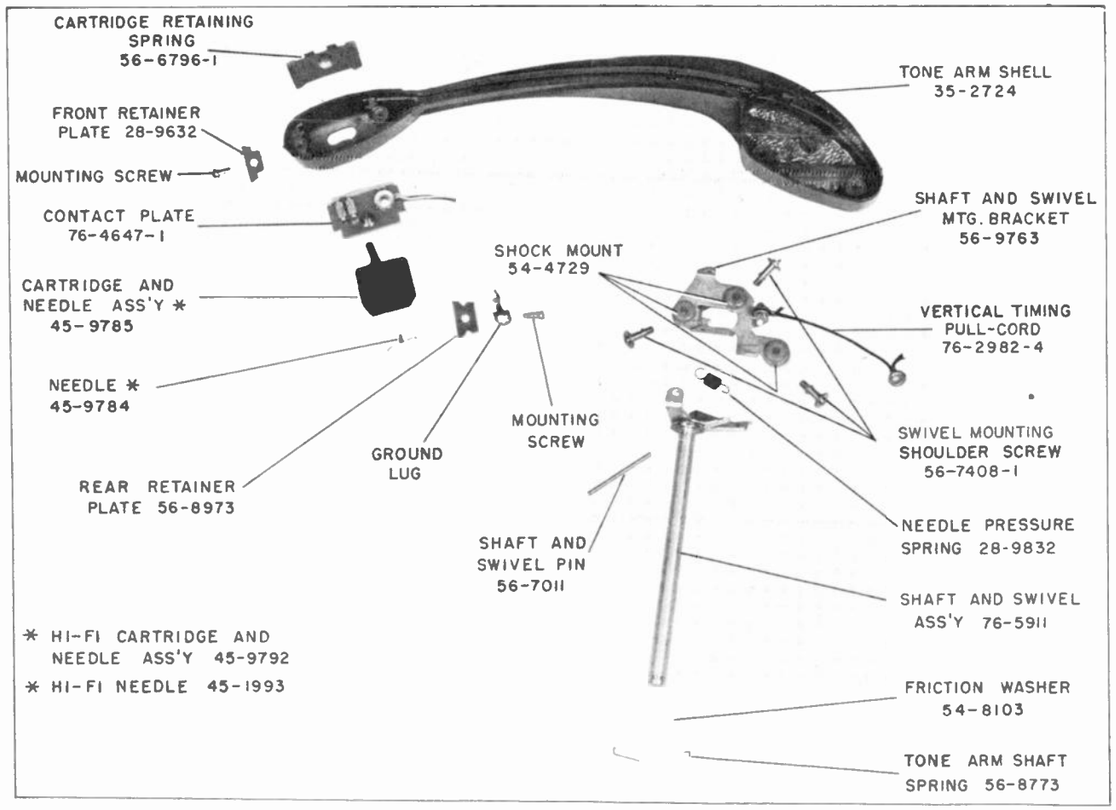

Figure 13. Tone-Arm Assembly

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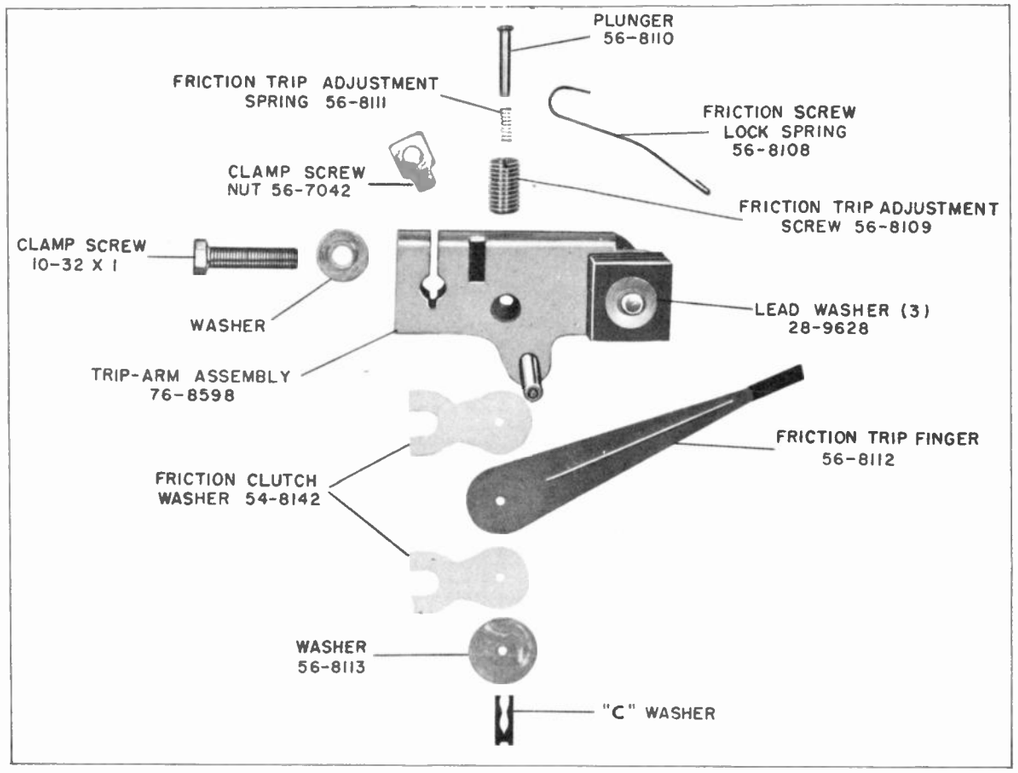

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Figure 14. Trip-Arm Assembly

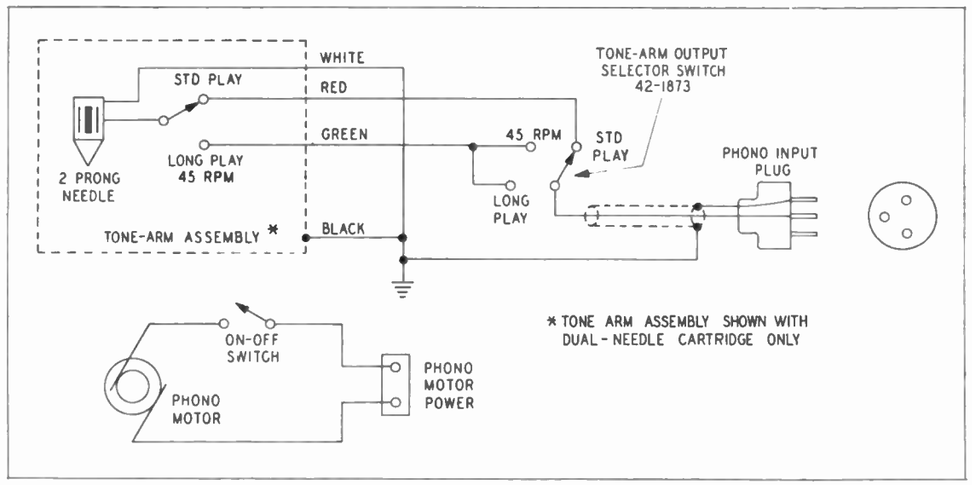

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Figure 15. Wiring Diagram for Model M-25

REPLACEMENT PARTS LIST

Description	Service Part No.
Actuator Assembly	
Cam-gear index lever	76-5895*
Spring, index lever	56-8094
Compression spring	56-8087
Return lever	76-5893*
Spring, return lever	56-8092
Set-down lever	76-5894
Spring, set-down lever	56-8093
Tone-arm-actuator assembly	76-6502-1
Spring, actuator	56-8095
Bridge Assembly	
Ball bearing, ⅛ inch dia. (3)	5W2017
Bearing cover	56-8129
Bearing retainer, ball	56-8128
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	1W42311FE7
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)	56-7059-1FCP
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	56-8091
Washer, "E", switch lever	1W60980FE7
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)	1W21561FA3
Spacer, mounting (3)	56-4926-1
Washer, mounting (3)	1W52100FA3
Shock mount (3)	54-4501
Motor, 117 volts, 60 cycles	35-1508
Record-Shelf Assembly	
Hold-down assembly	76-5897
Hold-down fulcrum arm	56-8301-2
Hold-down pin	56-8300
Hold-down shaft	56-8299
Hold-down spring	56-8164
Push-off saddle	56-8078-2
Record-shelf-and-shaft assembly	76-5914-2
Set-down cam	56-8149FA3
Nut, cam locking	56-7042
Spacer	56-8833
Spring, record shelf	56-8088
Washer, cupped	56-8089
Reject lever	56-8079
Spring, detent	56-9758
Spring, reject	56-9757
Spindle, record	76-5909
Tone-arm assembly (complete)	35-2725
Bracket, mounting for shaft and swivel	56-9763
Cartridge and needle ass'y., Hi-Fidelity	45-9792
Needle, Hi-Fidelity	45-1993
Contact plate	76-4647-1
Cartridge and needle ass'y., regular	45-9785
Needle, regular	45-9784
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
Plunger	56-8110
Screw, friction-trip adjustment	56-8109
Spring, friction-screw lock	56-8108
Spring, friction-trip adjustment	56-8111
Washer, flat	56-8113
Washer, friction clutch (plastic) (2)	54-8142
Washer, "C"	56-8793
Washer, lead (3)	28-9628
Turntable	35-2711-4
Retainer, turntable	56-8097
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.

PHILCO
Factory-Supervised
Service

PR-2557 10-53

Printed in U. S. A.

PHILCO SERVICE

PHILCO Factory-Supervised Service

HOME RADIO

PHILCO

"Phonorama"

MODEL B1756

SPECIFICATIONS

Cabinet	Wood console
Circuit	
R-F Chassis	Eight-tube superheterodyne
Power Chassis	Five-tube audio amplifier plus rectifier
Frequency Range	
AM	540–1620 kc.
FM	88–108 mc.
Audio Output	Push-pull, 10-watt, undistorted
Operating Voltage	105–120 volts, a.c.
Power Consumption	150 watts
Antenna	Built-in, low-impedance loop
Intermediate Frequency	
AM	455 kc.
FM	9.1 mc.
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
V2	6BA6, miniature	AM-FM r-f amplifier
V3	12AT7, miniature	Mixer-oscillator
V4	6BA6, miniature	1st 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 V13	6V6G	Output
V14	5U4GT	Rectifier

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 REMOVAL 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 ALIGNMENT 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 ALIGNMENT 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 REMOVAL 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 ALIGNMENT 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 horizontal-input 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.

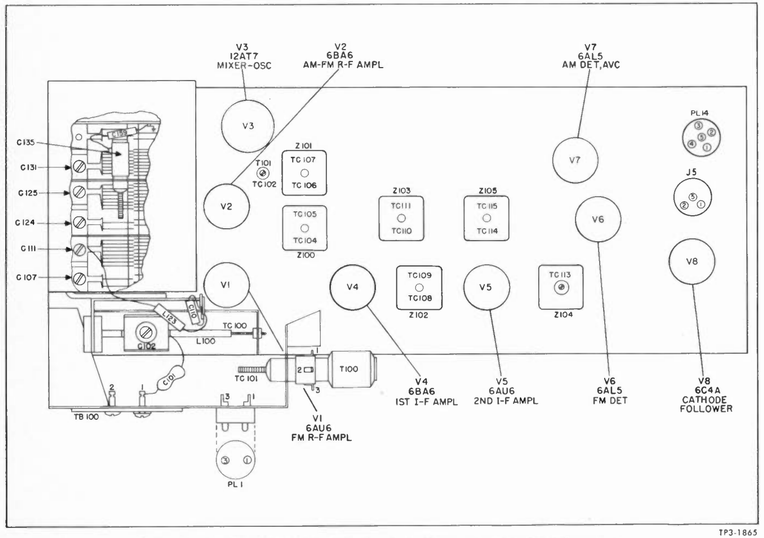

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Figure 2. Top View, R-F Chassis, Showing Parts Placement and Tuning Adjustments

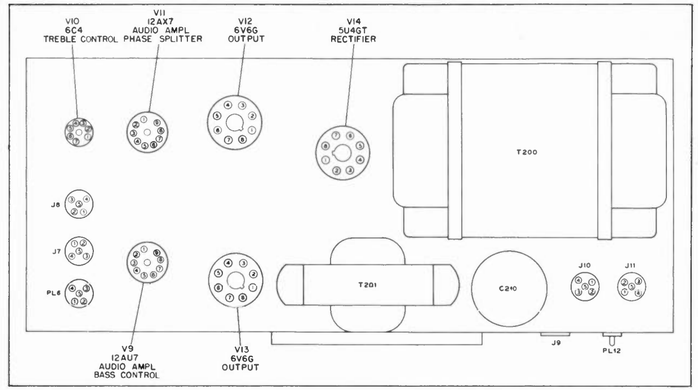
FM ALIGNMENT CHART
(FM METHOD)

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1.	Ground lead to chassis. Output lead through a .05-μf. condenser to pin 1 of V5, 6AU6.	9.1 mc. (80-kc. deviation)	Gang fully closed.	Adjust TC113 for balance (centered 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. deviation)	Gang fully closed.	Adjust, in order given, for maximum 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-μf. condenser to lug of C100C (pin 1 of L106).	9.1 mc. (80-kc. deviation)	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. deviation)	108.5 mc. (See NOTE 1 below.)	Adjust for maximum output.	C135—FM osc. trimmer
5.	Same as step 4.	88 mc. (80-kc. deviation)	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 further improvement is obtained.				
7.	Same as step 4.	105 mc. (80-kc. deviation)	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. deviation)	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:

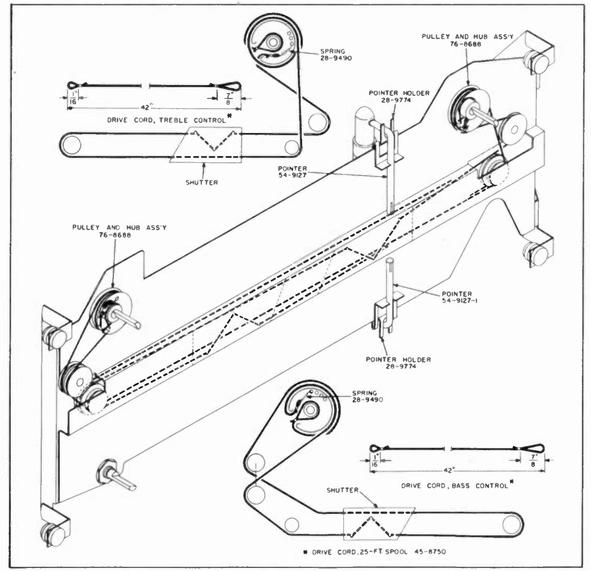
108.5 mc.—6-1/4 inches
105 mc.—4 inches
92 mc.—1-1/16 inches
88 mc.—3/16 inch

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.)



TP3-1864

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



TP3-1861

Figure 4. Drive-Cord Installation Details, Tone Controls

AM ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1.	Ground lead to chassis. Output lead through a .05-μf. condenser to pin 1 of V5, 6AU6.	455 kc.	Gang fully open.	Adjust, in order given, for maximum 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. Remove 1000-ohm resistor from across primary, and place across secondary 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 output. 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 maximum 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 maximum 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 REMOVAL 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 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 FM position, and set the tuning control as indicated in the FM ALIGNMENT CHART (AM METHOD).

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

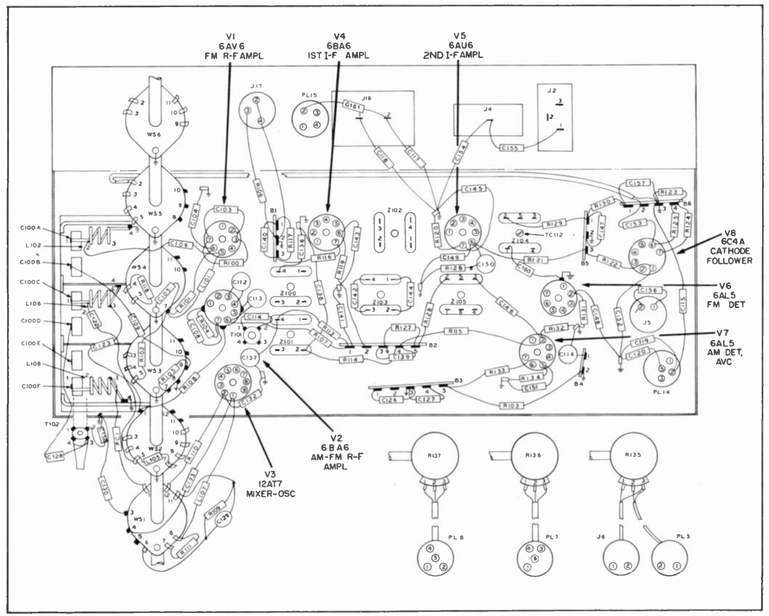
SIGNAL GENERATOR—Use an AM r-f signal generator with modulated output. Connect the generator and set the frequency as indicated in the FM ALIGNMENT CHART (AM METHOD).

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.

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).



TP3-1866

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

FM ALIGNMENT CHART
(AM METHOD)

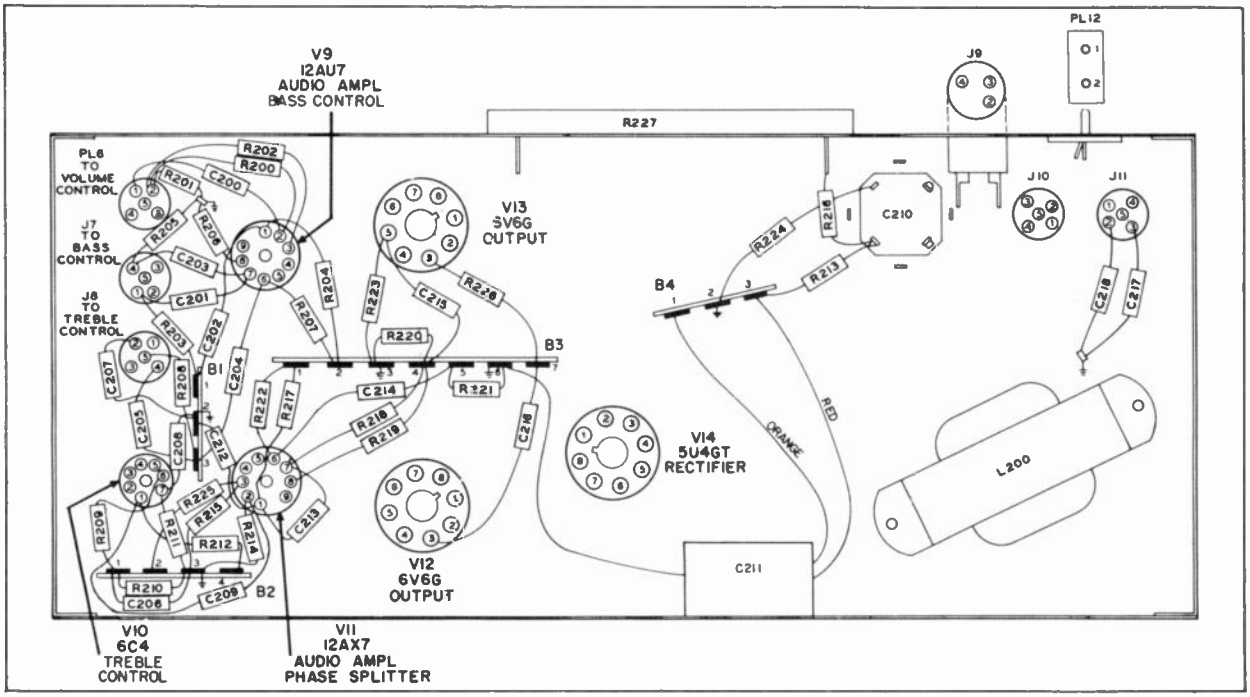
STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1.	Ground lead to chassis. Output lead through a .05-μf. condenser to pin 1 of V5, 6AU6.	9.1 mc.	Gang fully closed.	Adjust for balance (zero indication on meter).	TC113—Discriminator secondary (top)
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 maximum 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-μf. condenser to lug of C100C (pin 1 of L106).	Same as step 1.	Same as step 1.	Adjust, in order given, for maximum 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 maximum 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 maximum 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:

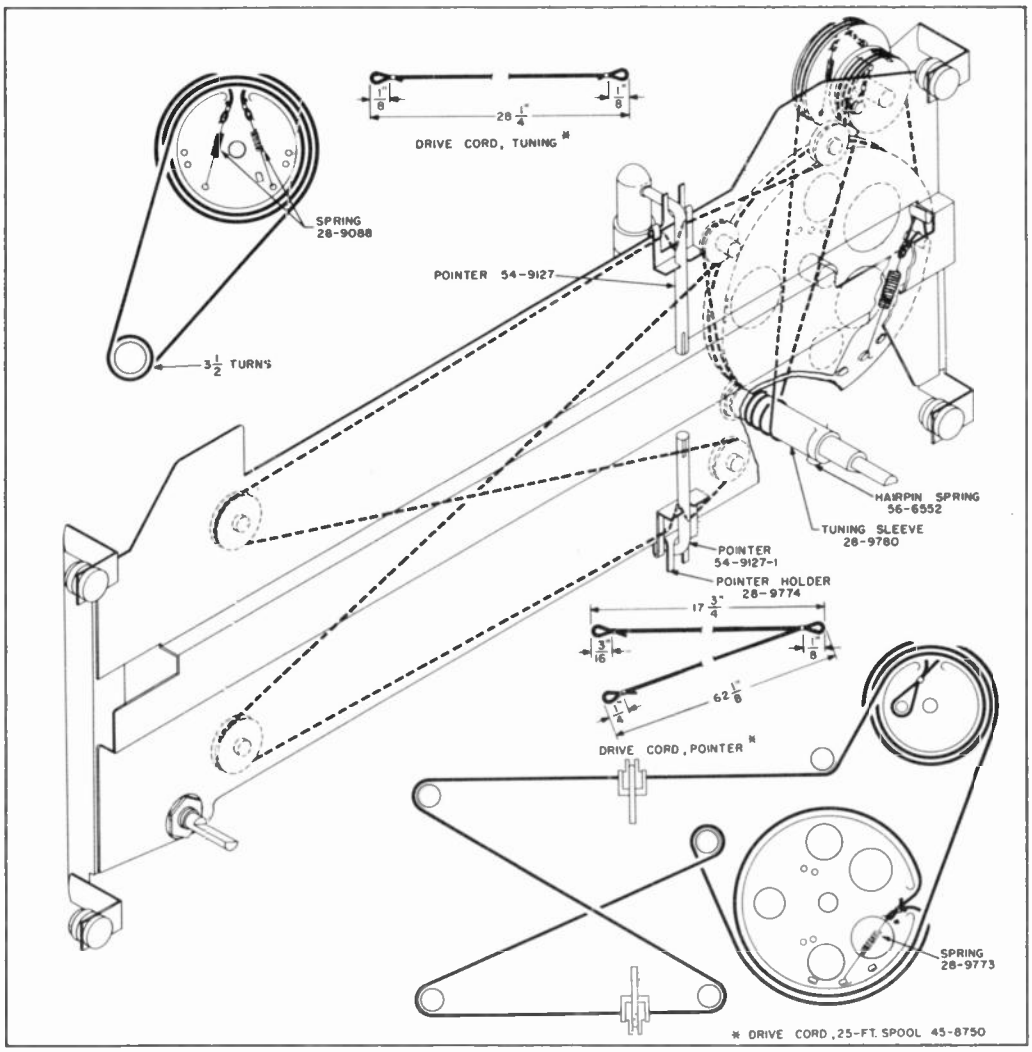
108.5 mc.—6-1/4 inches
105 mc.—4 inches
92 mc.—1-1/16 inches
88 mc.—3/16 inch

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.)



TP3-1863

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



TP3-1862

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

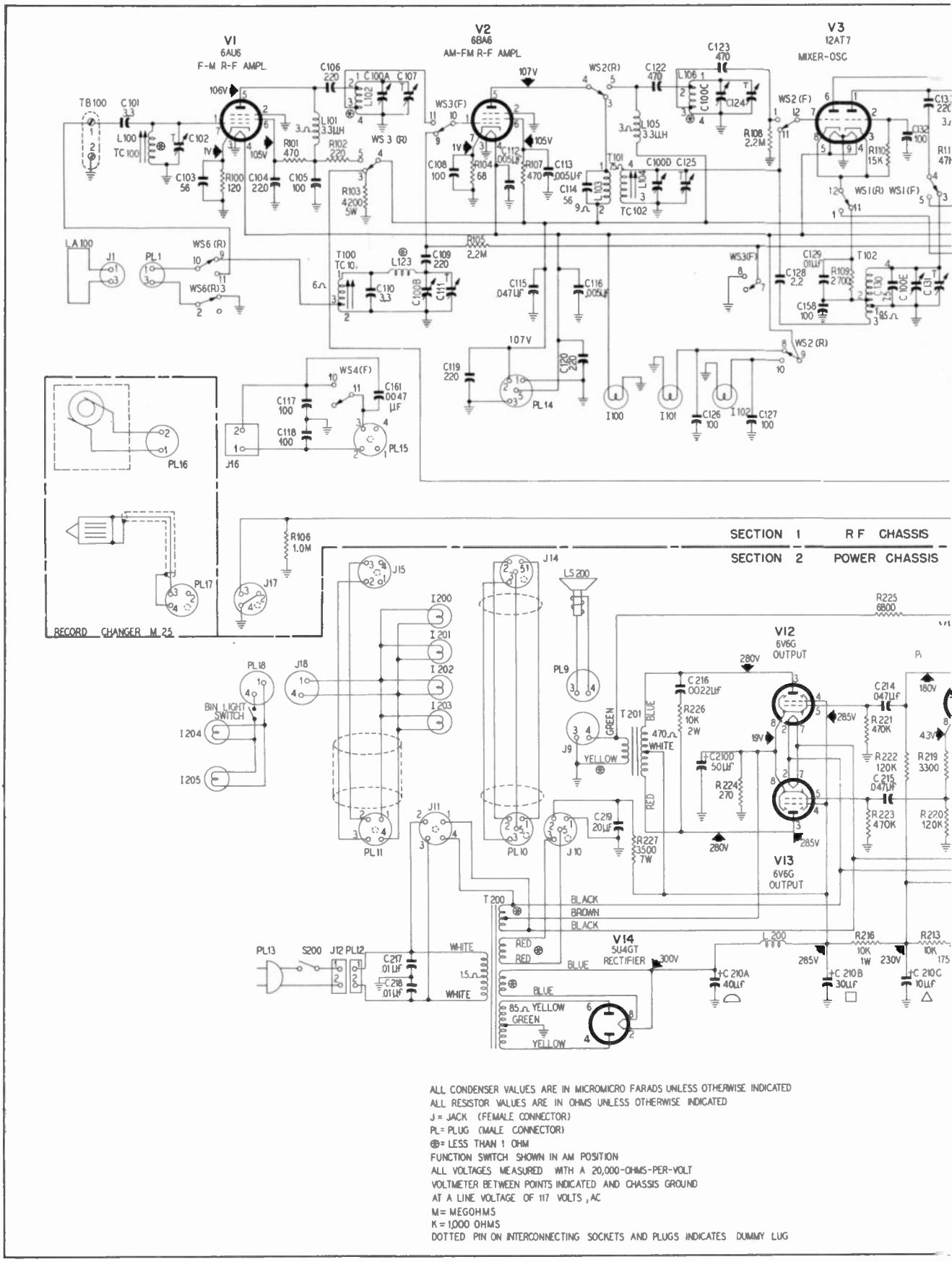
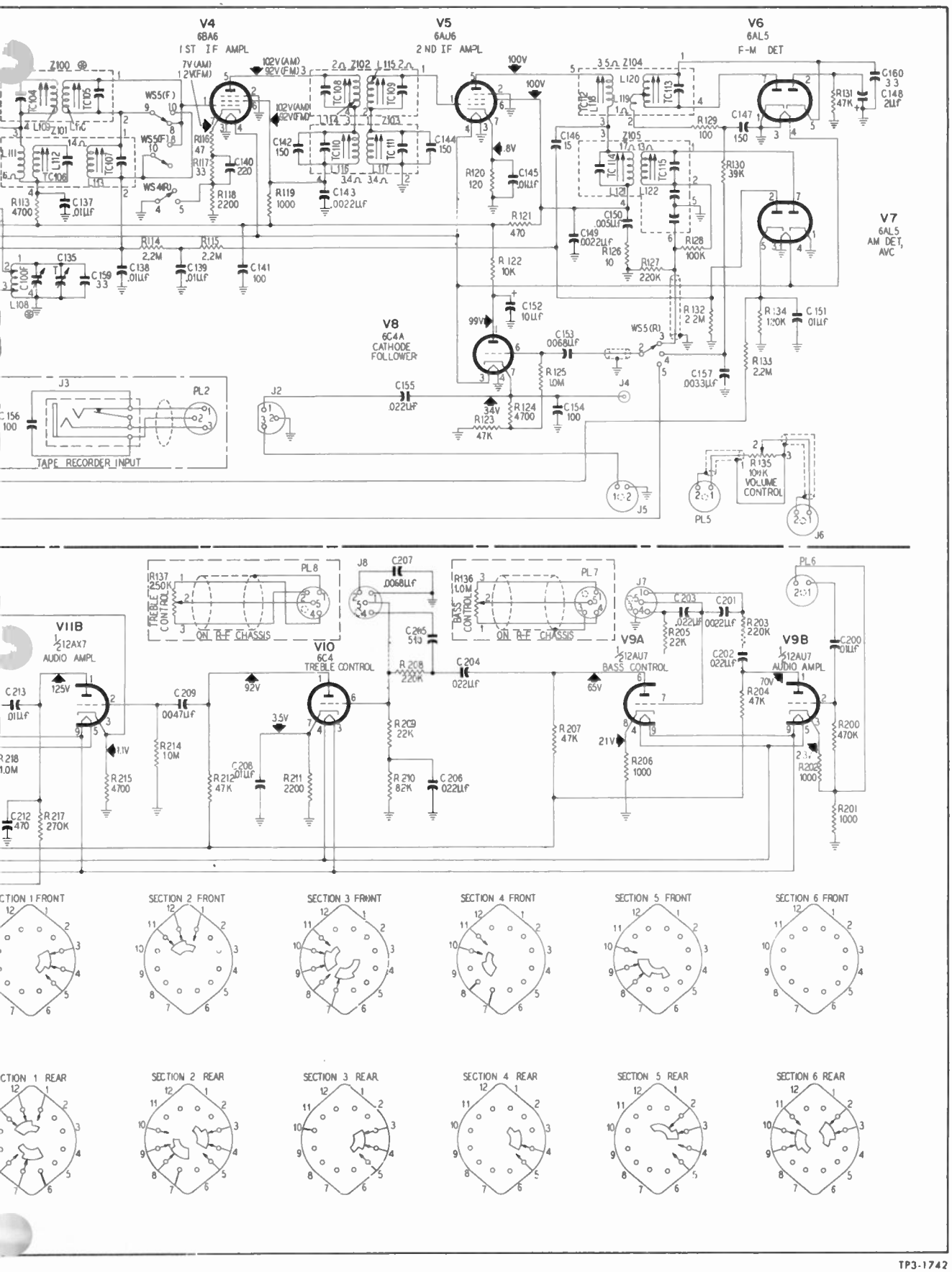


Figure 7. Philco "*Phonoran*



TP3-1742

1 B1756, Schematic Diagram

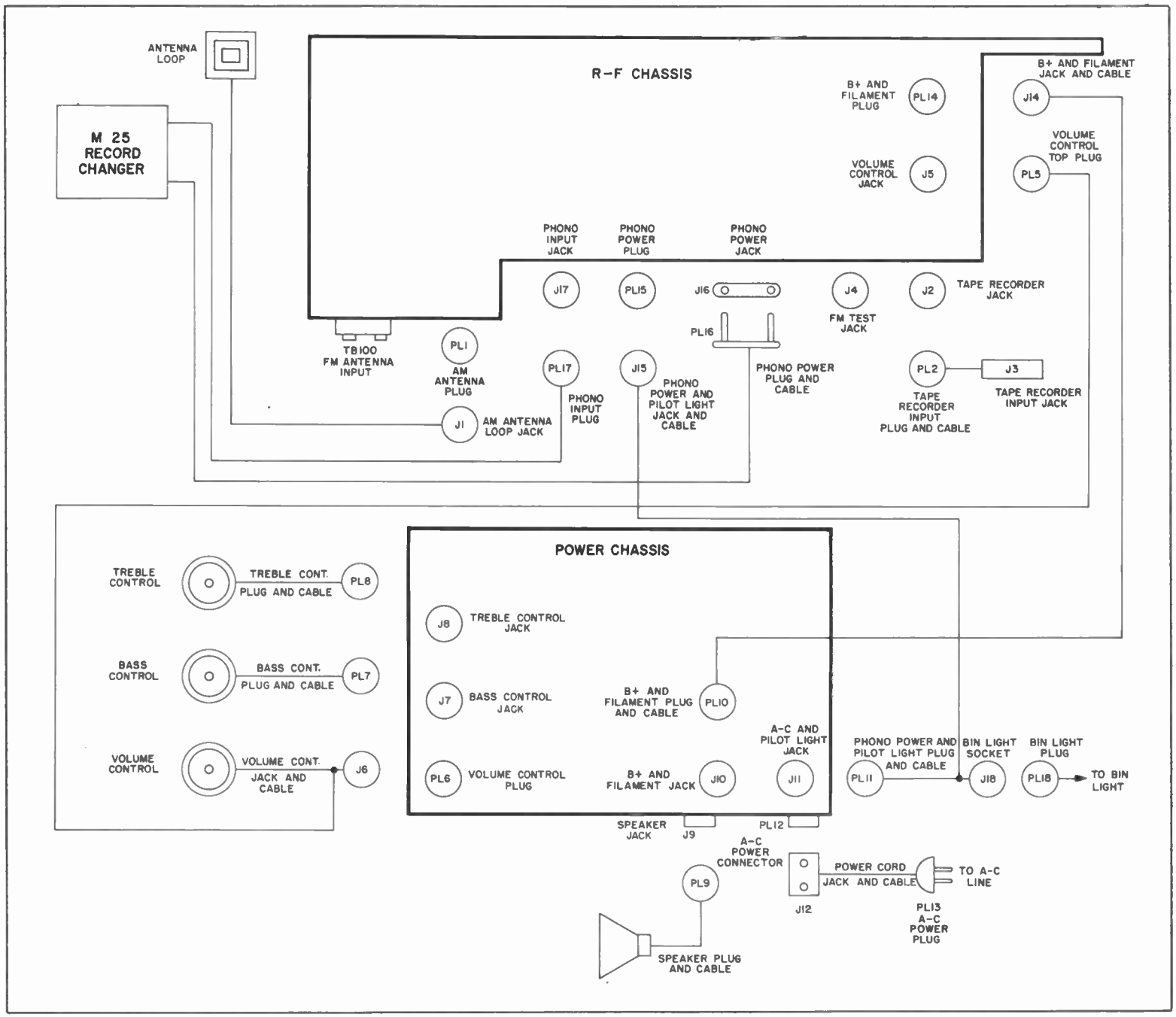


Figure 8. Philco "phonorama" Model B1756, Chassis Interconnecting Diagram

TP3-1898

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."

SECTION 1—R-F CHASSIS

Reference Symbol	Description	Service Part No.
C100	Condenser, tuning gang, 6-section	31-2773
C100A	Condenser, tuning, FM r-f amplifier	Part of C100
C100B	Condenser, tuning, AM antenna	Part of C100
C100C	Condenser, tuning, 2nd FM r-f amplifier	Part of C100
C100D	Condenser, tuning, AM r-f amplifier	Part of C100
C100E	Condenser, tuning, AM oscillator	Part of C100
C100F	Condenser, tuning, FM oscillator	Part of C100
C101	Condenser, FM antenna coupling, 3.3 μμf.	30-1224-103
C102	Condenser, trimmer, FM antenna tuning	31-6511-10
C103	Condenser, cathode by-pass, 56 μμf.	62-056409001
C104	Condenser, screen by-pass, 220 μμf.	62-122001001*
C105	Condenser, r-f by-pass, 100 μμf.	62-110009001
C106	Condenser, d-c blocking, 220 μμf.	62-122001001*
C107	Condenser, trimmer, FM r-f amplifier tuning	Part of C100
C108	Condenser, cathode by-pass, 100 μμf.	62-110001021*
C109	Condenser, d-c blocking, 220 μμf.	62-122001001*
C110	Condenser, temperature compensating, 3.3 μμf.	30-1224-103
C111	Condenser, trimmer, AM antenna tuning	Part of C100
C112	Condenser, filament by-pass, .005 μf.	30-1238-1
C113	Condenser, screen by-pass, .005 μf.	30-1238-1
C114	Condenser, r-f by-pass, 56 μμf.	62-056409001
C115	Condenser, B+ by-pass, .047 μf.	30-4650-62*
C116	Condenser, filament by-pass, .005 μf.	30-1238-1
C117	Condenser, line by-pass, record changer, 100 μμf.	62-110001021*
C118	Condenser, line by-pass, record changer, 100 μμf.	62-110001021*
C119	Condenser, B+ by-pass, 220 μμf.	62-122001001*
C120	Condenser, filament by-pass, 220 μμf.	62-122001001*
C122	Condenser, d-c blocking, 470 μμf.	62-147001021*
C123	Condenser, d-c blocking, 470 μμf.	62-147001021*
C124	Condenser, trimmer, 2nd FM r-f amplifier	Part of C100
C125	Condenser, trimmer, AM r-f amplifier	Part of C100
C126	Condenser, AM pilot-light by-pass, 100 μμf.	62-11001021*
C127	Condenser, FM pilot-light by-pass, 100 μμf.	62-11001021*
C128	Condenser, neutralizing, 2.2 μf.	30-1221-4
C129	Condenser, cathode by-pass, .01 μf.	30-1238-2
C130	Condenser, temperature compensating, 7.5 μf.	30-1224-65
C131	Condenser, trimmer, AM oscillator tuning	Part of C100
C132	Condenser, grid return, 100 μμf.	62-110001021*
C133	Condenser, d-c blocking, 220 μμf.	62-122001001*
C134	Condenser, cathode by-pass, 220 μμf.	Part of PC1
C135	Condenser, trimmer, FM oscillator tuning	31-6524
C136	Condenser, r-f by-pass, 200 μμf.	62-122001001*
C137	Condenser, B+ by-pass, .01 μf	30-1238-2
C138	Condenser, a-v-c by-pass, .01 μf.	30-4650-58*
C139	Condenser, a-v-c by-pass, .01 μf.	30-4650-58*
C140	Condenser, cathode by-pass, 220 μμf.	62-122001001*
C141	Condenser, B+ by-pass 100 μμf.	62-110001021*
C142	Condenser, r-f by-pass, 150 μμf.	60-10155417
C143	Condenser, screen by-pass, .0022 μf.	30-4650-54*
C144	Condenser, r-f by-pass, 150 μμf.	60-10155417
C145	Condenser, cathode by-pass, .01 μf.	30-4650-58*
C146	Condenser, a-v-c coupling, 15 μμf.	60-00155417
C147	Condenser, de-emphasis, 150 μμf.	62-115001011*
C148	Condenser, filter, 2 μf.	45-3035-4
C149	Condenser, screen by-pass, .0022 μf.	30-4650-54*
C150	Condenser, neutralizing, .005 μf.	30-1238-1
C151	Condenser, cathode by-pass, .01 μf.	30-4650-58*
C152	Condenser, electrolytic, plate by-pass, 10 μf.	45-3035-39
C153	Condenser, audio coupling, .0068 μf.	30-4650-57*
C154	Condenser, r-f by-pass, 100 μμf.	62-110001021*
C155	Condenser, audio coupling, .022 μf.	30-4650-60*
C156	Condenser, r-f by-pass, 100 μμf.	62-110001021*
C157	Condenser, de-emphasis, .0033 μf.	30-4650-55*
C159	Condenser, temperature compensating, 3.3 μμf.	30-1224-49
C160	Condenser, r-f by-pass, 3.3 μμf.	30-1224-103
C161	Condenser, switch by-pass, .0047 μf.	30-4650-56*
I100	Lamp, pilot, dial	34-2064
I101	Lamp, pilot, AM	34-2064
I102	Lamp, pilot, FM	34-2064
L100	Coil, FM antenna tuning	32-4532A
L101	Coil, FM r-f choke, 3.3 μh.	32-4422-10
L102	Coil, FM r-f amplifier tuning	32-4415-5
L103	Coil, AM r-f transformer primary	Part of T101
L104	Coil, AM r-f transformer secondary	Part of T101
L105	Coil, FM r-f choke, 3.3 μh.	32-4422-10
L106	Coil, 2nd FM r-f amplifier tuning	32-4415-4
L107	Coil, r-f choke, 3.3 μh.	32-4422-10
L108	Coil, FM oscillator	32-4414-6
L109	Coil, 1st FM i-f primary	Part of Z100
L110	Coil, 1st FM i-f secondary	Part of Z100
L111	Coil, 1st AM i-f primary	Part of Z101
L112	Coil, 1st AM i-f secondary	Part of Z101
L113	Coil, 1st AM i-f tertiary	Part of Z101
L114	Coil, 2nd FM i-f primary	Part of Z102
L115	Coil, 2nd FM i-f secondary	Part of Z102
L116	Coil, 2nd AM i-f primary	Part of Z103
L117	Coil, 2nd AM i-f secondary	Part of Z103
L118	Coil, FM discriminator primary	Part of Z104
L119	Coil, FM discriminator tertiary	Part of Z104
L120	Coil, FM discriminator secondary	Part of Z104
L121	Coil, 3rd AM i-f primary	Part of Z105
L122	Coil, 3rd AM i-f secondary	Part of Z105
L123	Coil, AM antenna choke	32-4061-3
LA100	Loop antenna	See NOTE below
PC1	Printed circuit, FM oscillator cathode	30-6002
R100	Resistor, cathode bias, 120 ohms	66-1128340*
R101	Resistor, screen dropping, 470 ohms	66-1478340*
R102	Resistor, B+ dropping, 220 ohms	66-1228340*
R103	Resistor, B+ loading, 4200 ohms, 5 watts	33-1335-101
R104	Resistor, cathode bias, 68 ohms	66-0688340*
R105	Resistor, a-v-c return, 2.2 megohms	66-5228340*
R106	Resistor, phono input, 1.0 megohm	66-5108340*
R107	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.)

SECTION 1—R-F CHASSIS (Cont.)

Reference Symbol	Description	Service Part No.
R108	Resistor, grid leak, 2.2 megohms	66-5228340*
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
T100	Transformer, AM antenna	32-4605
T101	Transformer, AM r-f	32-4572
T102	Transformer, AM oscillator	32-4569-2
WS1 through WS6	Wafer switch, function	42-2014
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 μf.	30-4650-58*
C201	Condenser, bass compensation, .0022 μf.	30-4650-54*
C202	Condenser, d-c blocking, .022 μf.	30-4650-60*
C203	Condenser, bass boost, .022 μf.	30-4650-60*
C204	Condenser, d-c blocking, .022 μf.	30-4650-60*
C205	Condenser, treble compensation, 510 μμf.	60-10515337
C206	Condenser, bass boost, .022 μf.	30-4650-60*
C207	Condenser, treble boost, .0068 μf.	30-4650-57*
C208	Condenser, cathode by-pass, .01 μf.	30-4650-58*
C209	Condenser, d-c blocking, .0047 μf.	30-4650-56*
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	30-2417-39
C212	Condenser, plate by-pass, 470 μμf.	62-147001021*
C213	Condenser, d-c blocking, .01 μf.	30-4650-58*
C214	Condenser, d-c blocking, .047 μf.	30-4650-62
C215	Condenser, d-c blocking, .047 μf.	30-4650-62
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 I201	Lamp, pilot, tone	34-2064
I202	Lamp, pilot, tone	34-2068
I203	Lamp, off-on	34-2068
I204 and I205	Lamp, record-changer bin	34-2068
L200	Coil, filter choke	32-8639
LS200	Loudspeaker	36-1653
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, 22,000 ohms	66-3228340*
R206	Resistor, cathode bias, 1000 ohms	66-2108340*
R207	Resistor, plate load, 47,000 ohms	66-3478340*
R208	Resistor, treble compensation, 220,000 ohms	66-4228340*
R209	Resistor, grid leak, 22,000 ohms	66-3228340*
R210	Resistor, bass boost, 82,000 ohms	66-3828340*
R211	Resistor, cathode bias, 2200 ohms	66-2228340*
R212	Resistor, plate load, 47,000 ohms	66-3478340*
R213	Resistor, B+ filter, 10,000 ohms	66-3108340*
R214	Resistor, grid leak, 1.0 megohm	66-5108340*
R215	Resistor, cathode bias, 4700 ohms	66-2478340*
R216	Resistor, B+ filter, 10,000 ohms, 1 watt	66-3104340*
R217	Resistor, plate load, 270,000 ohms	66-4278340*
R218	Resistor, grid leak, 1.0 megohm	66-5108340*
R219	Resistor, cathode bias, 3300 ohms	66-2338340*
R220	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 bias, 270 ohms, 7 watts	33-1335-91
R225	Resistor, feedback, 6800 ohms	66-2688340*
R226	Resistor, bass compensation, 10,000 ohms, 2 watts	66-3105340*
R227	Resistor, B+ filter, 3500 ohms	33-3446-12
S200	Switch, off-on	Part of power-cable ass'y.
T200	Transformer, power	32-8638
T201	Transformer, output	32-8640

JACKS, PLUGS, AND CABLE ASSEMBLIES

J1	Jack, AM antenna loop	27-6273-20
J2	Jack, tape recorder	27-6126
J3	Jack, tape-recorder input	42-1805-3
J4	Jack, FM test	27-6180
J5	Jack, volume control	27-6273-27
J6	Jack, volume control	Part of volume-control-arm cable ass'y.
J7	Jack, bass control	27-6273-24
J8	Jack, treble control	27-6273-25
J9	Jack, speaker	27-6273-23
J10	Jack, B+ and filament	27-6273-35
J11	Jack, a-c and pilot light	27-6273-11
J12	Jack, power cord	Part of power-cable ass'y.
J14	Jack, B+ and filament	Part of B+ and filament cable ass'y.

REPLACEMENT PARTS LIST (Cont.)

JACKS, PLUGS, AND CABLE ASSEMBLIES (Cont.)

Reference Symbol	Description	Service Part No.
J15	Jack, phono power	Part of phono-power and pilot-light cable ass'y.
J16	Jack, phono power	27-6200
J17	Jack, phono input	27-6273-9
J18	Jack, bin light	27-4419-7
PL1	Plug, AM antenna	54-4878-8
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	27-6302-10
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	Part of B+ and filament cable ass'y.
PL11	Plug, phono power and pilot light	Part of phono-power and pilot-light cable ass'y.
PL12	Plug, a-c power connector	27-6240-3
PL13	Plug, a-c power	Part of power-cable ass'y.
PL14	Plug, B+ and filament	27-6302-11
PL15	Plug, phone power	27-6302
PL16	Plug, phone power	Part of phono-power cable ass'y.
PL17	Plug, phono input	Part of M25 Record Changer
PL18	Plug, bin light	27-4785-33
Cable Assemblies:		
	Bass control	41-4192-1
	Bin light	41-4200
	B+ and filament	41-4189
	Phono power	76-2172-8
	Phono power and pilot light	41-4188-2
	Power	41-4190
	Speaker	41-4191-2
	Tape recorder	41-4194
	Treble control	41-4192
	Volume-control arm	41-4193
	Volume-control top	41-4193-1

MISCELLANEOUS

(Cabinet Parts)

Description	Service Part No.
Cabinet, light	11011-1
Back, cabinet	54-9066-1
Ball strike	56-7655-1
Clip, spring	56-7654-1
Hinge, concealed, left-hand	28-9644-6
Hinge, concealed, right-hand	28-9644-7
Hinge, continuous	56-3627-18
Knob (3)	76-8671-1
Knob, function switch	78-8672-1
Lid support	28-9823-1
Cabinet, Mahogany	11011-3
Back, cabinet	54-9066
Ball strike	56-7655
Clip, spring	56-7654
Hinge, concealed, left-hand	28-9644-4
Hinge, concealed, right-hand	28-9644-5
Hinge, continuous	56-3627-17
Knob (3)	76-8671
Knob, function switch	76-8672
Lid support	28-9823
Dial scale	54-5194-1
Dome, cabinet feet (4)	45-6190
Grille, metal	76-8660
Knob, off-on switch (both cabinets)	54-6089
Knob, tuning (both cabinets)	54-6087
Trim, window (2)	28-9788
Trim, window (2)	28-9788-1
Window, decorative	54-5200

MISCELLANEOUS

(Chassis Parts)

Description	Service Part No.
Changer Mounting Hardware:	
Sleeve	54-7798
Speed nut	W2554
Spring, mounting, bottom	56-7059-1FCP
Spring, mounting, top	56-7059FA9
Clip, bin light	56-3545-6
Core, iron (L100)	56-9233
Dial backplate	76-8684
Lead assembly, antenna	76-1472-18
Panel, diffusing, blue, treble	54-9128
Panel, diffusing, red, bass	54-9128-1
Spring, (both diffusing panels)	28-9767
Pointer, AM	54-9127-1
Pointer, FM	54-9127
Holder, pointer (2)	28-9774
Spring, intermediate	28-9088
Springer, pointer	28-9773
Tie rod, pointer	54-9126
Pully and hub (2)	76-8688
Shield, pilot light	56-2194FA3
Shield, tube (5)	56-5629-5
Shield, tube (12AT7)	56-5629-3
Shield, tube base (5)	56-5628
Shield, tube base (12AT7)	56-5628-1FA3
Sleeve, tuning shaft	28-9780
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	56-6552
Spring, shaft ground	56-8023
Spring, shutter	28-9490
Switch, bin light	41-4199-1
Switch, function	42-2014

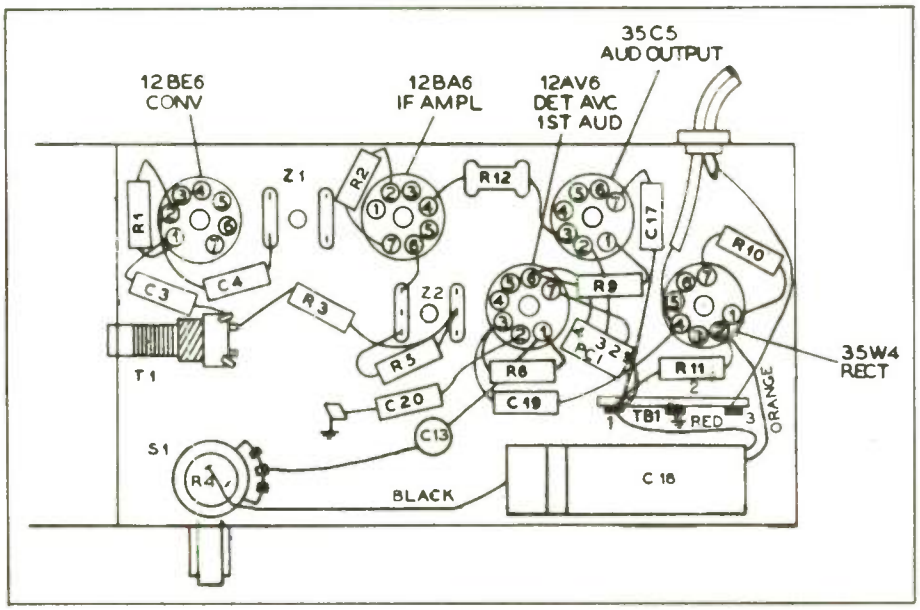
PR-2552 10-53

Printed in U.S.A.

PHILCO HOME RADIO MODEL B569, Code 121

SPECIFICATIONS

CABINET	Molded plastic
CIRCUIT	Four-tube superheterodyne (plus rectifier)
FREQUENCY RANGE	540 kc. to 1620 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



TP3-835A

Figure 1. Base View, Showing Symbolized Chassis

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.

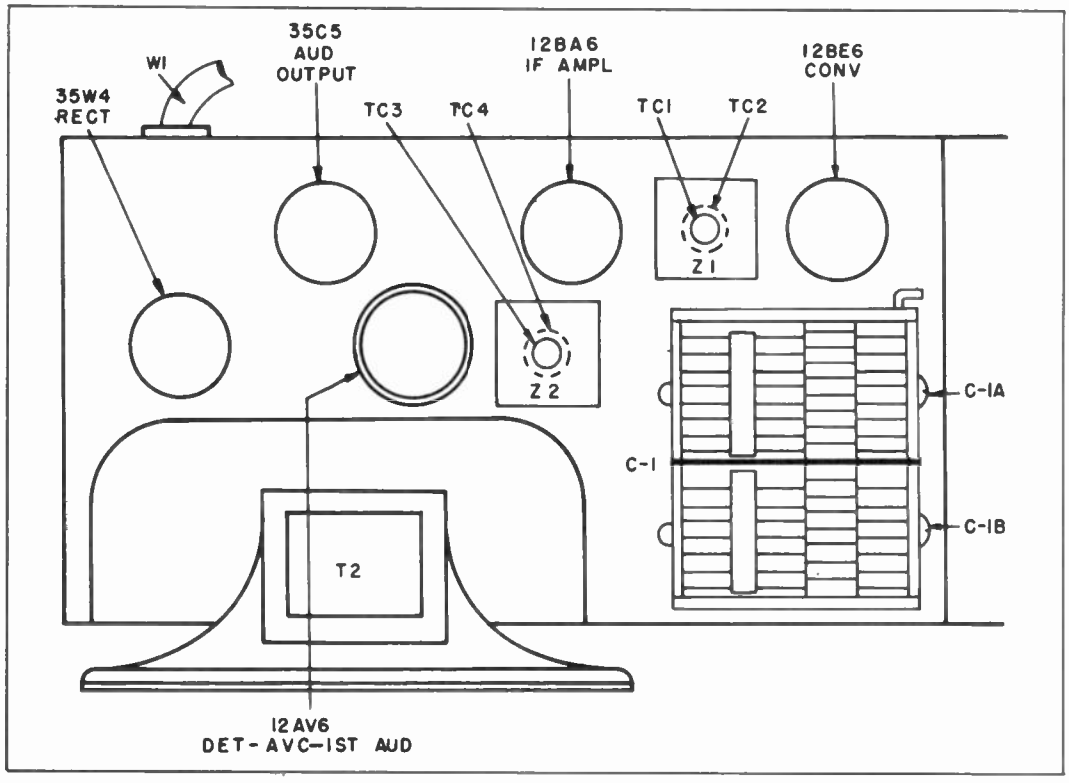
OUTPUT LEVEL—During alignment, adjust signal-generator output to hold output-meter reading below 1.25 volts.

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
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 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.	Adjust trimmer for maximum output.	C1-B osc.
3	Same as step 2.	1500 kc.	1500 kc.	Adjust trimmer for maximum output.	C1-A antenna

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

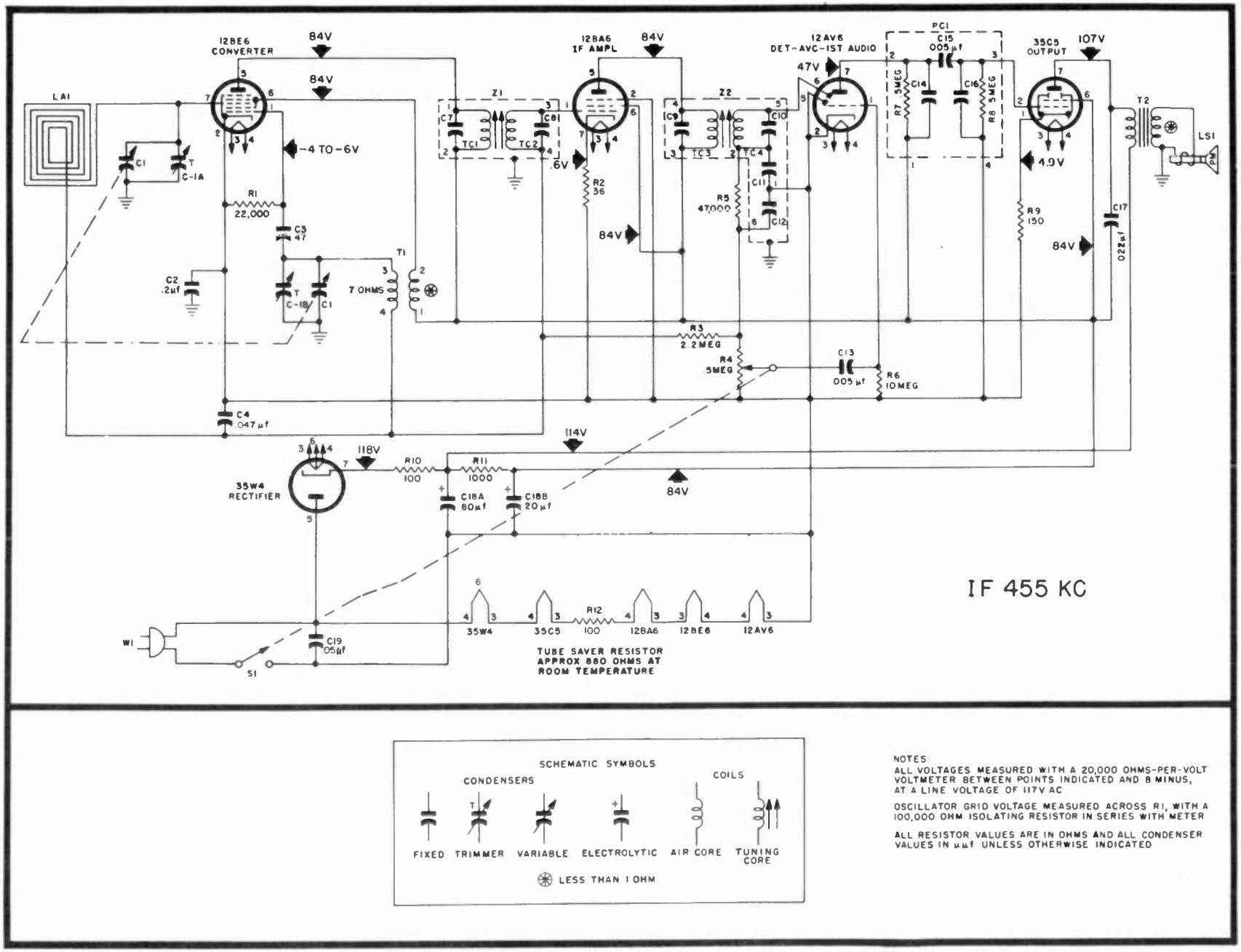


Figure 3. Philco Radio Model B569, Code 121, Schematic Diagram

TP3-500A

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	31-2751-13
C1A	Condenser, antenna trimmer	Part of C1
C1B	Condenser, osc. trimmer	Part of C1
C2	Condenser, cathode bypass, .2 μf.	30-4650-49*
C3	Condenser, oscillator grid, 47 μμf.	30-1230-4
C4	Condenser, a-v-c by-pass, .047 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 Z1
C10	Condenser, i-f tuning	Part of Z1
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 bypass	Part of PC1
C15	Condenser, audio-coupling, .005 μf.	Part of PC1
C16	Condenser, compensating	Part of PC1
C17	Condenser, tone compensating, .022 μf.	30-4650-43*
C18	Condenser, electrolytic, 2-section	30-2575-40
C18A	Condenser, filter, 80 μf.	Part of C18
C18B	Condenser, filter, 20 μf.	Part of C18
C19	Condenser, line bypass, .05 μf.	30-4650-45*
LA1	Loop aerial	Part of back-and-loop ass'y.
LS1	Speaker, p-m	36-1654
PC1	Printed circuit	30-6001
R1	Resistor, oscillator grid, 22,000 ohms	66-3228340*
R2	Resistor, cathode bias, 56 ohms	66-0568340
R3	Resistor, a-v-c filter, 2.2 megohms	66-5228340
R4	Resistor, volume control, .5 megohm	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, 100 ohms	66-1104340*
R11	Resistor, B plus filter, 1000 ohms	66-2108340*
R12	Resistor, tube saver, 100 ohms	33-1343-3
S1	Switch, off-on	Part of R4
T1	Transformer, oscillator	32-4453-6
T2	Transformer, output	32-8384*
W1	Line cord	L2183
Z1	Transformer, 1st i-f	32-4161A
Z2	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Cabinet	11029
Back-and-loop ass'y.	76-8777
Knob, tuning	54-4969-2
Knob, volume	27-4815-13
Socket, 7-pin miniature, 12AV6	27-6203-14
Socket, 7-pin miniature, 12BE6, 12BA6, 35C5, 35W4	27-6265
Tube shield	56-5629FA3

PHILCO SERVICE

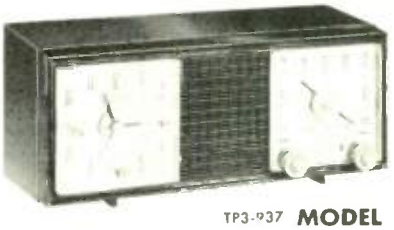
PHILCO Factory-Supervised Service

HOME RADIO

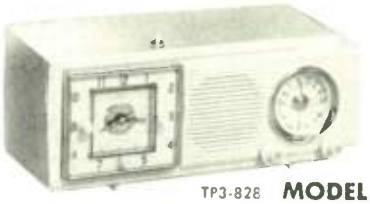
PHILCO RADIO-CLOCK
MODELS B712, CODE 122, AND B714, CODE 122

SPECIFICATIONS

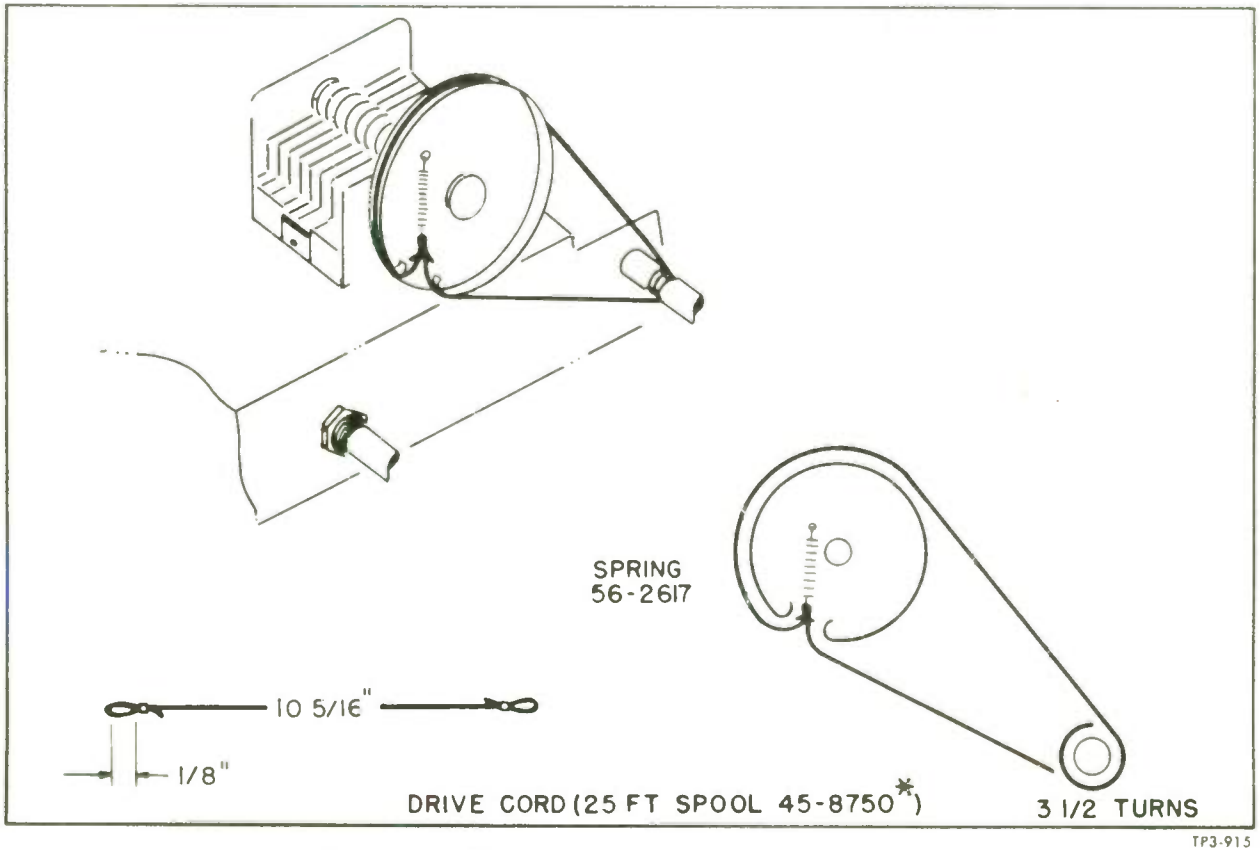
CABINET	Molded plastic
CIRCUIT	Four-tube superheterodyne (plus rectifier)
FREQUENCY RANGE	
Standard Broadcast	540 kc. to 1620 kc.
Special Services	1700 kc. to 3400 kc.
AUDIO OUTPUT	1 watt
OPERATING VOLTAGE	105 to 120 volts, a.c. or d.c.
POWER CONSUMPTION	30 watts
AERIAL	High-impedance loop
INTERMEDIATE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



TP3-937 **MODEL B712**



TP3-828 **MODEL B714**



TP3-915

Figure 1. Dial-Cord Installation Details

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.

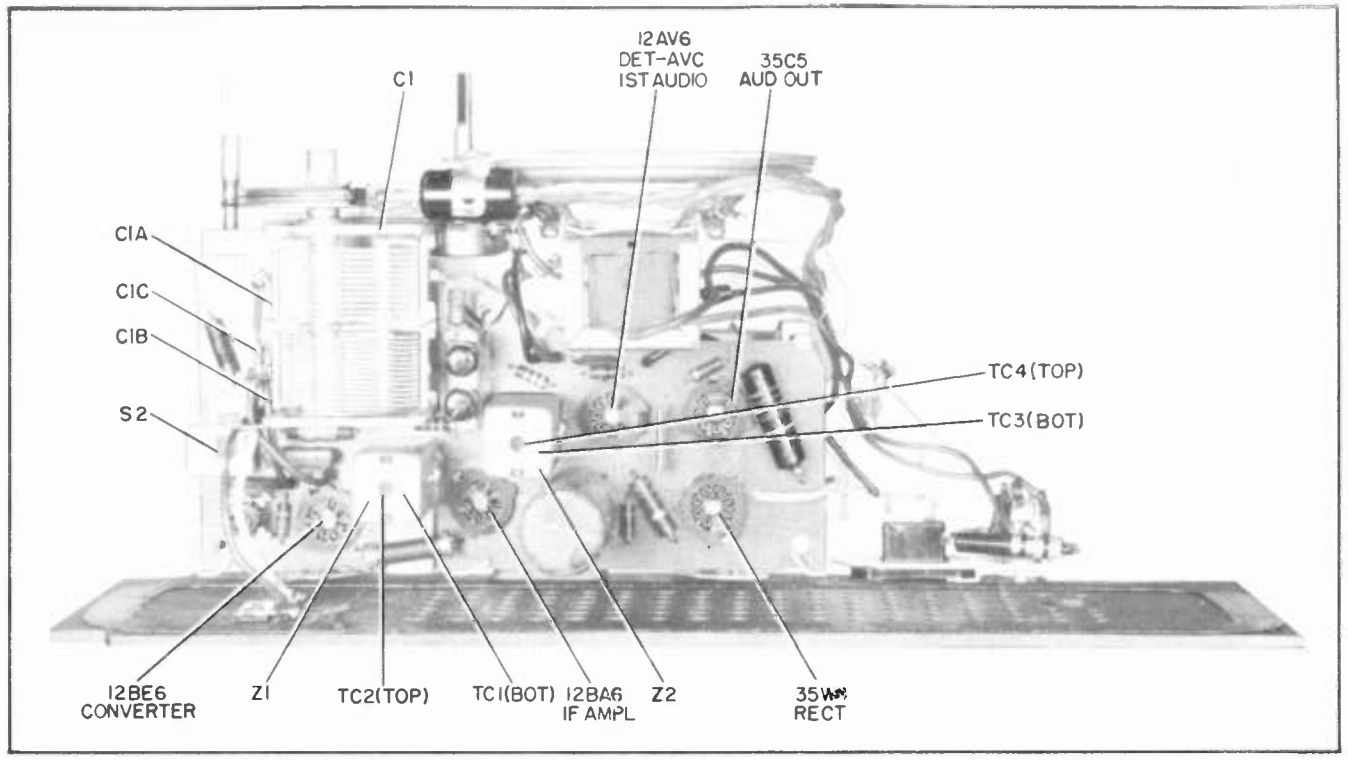
SIGNAL GENERATOR—Connect generator and set frequency as indicated in chart. Use modulated output.

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

STEP	SIGNAL GENERATOR		RADIO			ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	BAND SWITCH SETTING	SPECIAL INSTRUCTIONS	
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. 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 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.	C1-C—aerial (special services).

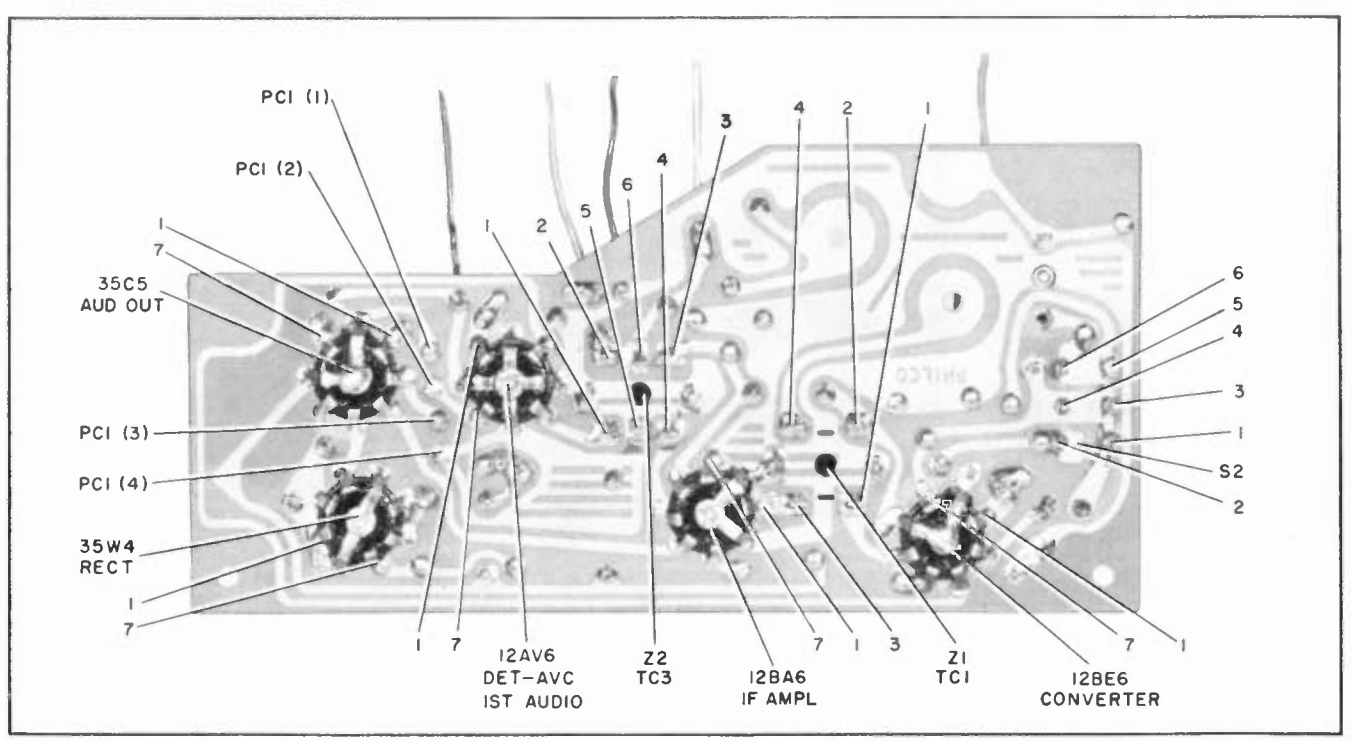
NOTE: Make up a 6—8 turn, 6-inch-diameter loop from insulated wire, connect to signal-generator leads, and place near radio loop.

* 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.



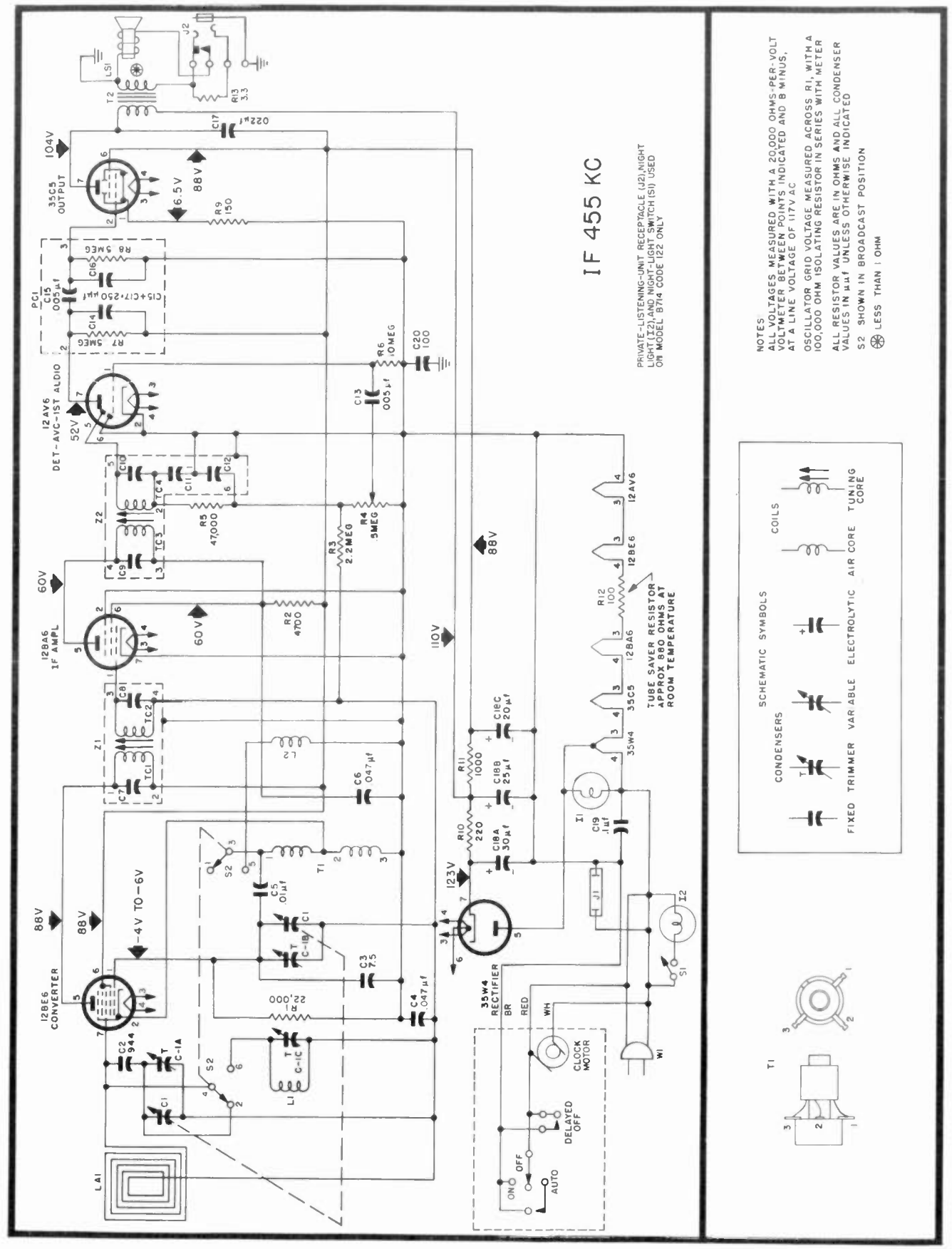
TP3-2175

Figure 2. Top View, Showing Trimmer Locations



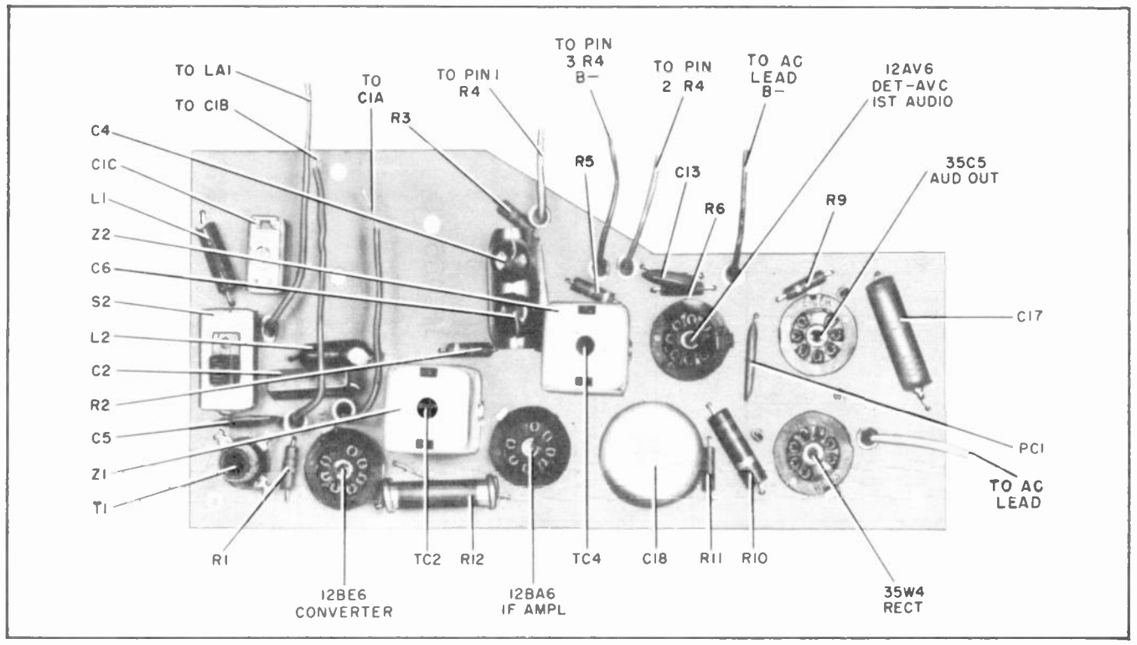
TP3-678

Figure 3. Base View, Showing Printed Wiring Circuit



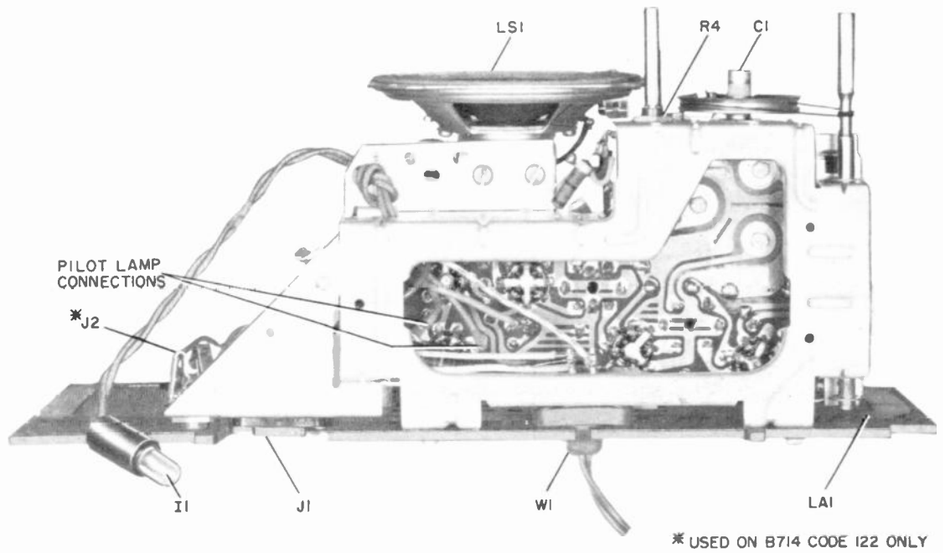
TP3-1871

Figure 4. Philco Radio Models B712, Code 122, and B714, Code 122, Schematic Diagram



TP3-681B

Figure 5. Top View, Showing Parts Placement



TP3-2174

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	Description	Service Part No.
C1	Condenser, tuning gang	31-2751-16
C1A	Condenser, antenna trimmer	Part of C1
C1B	Condenser, oscillator trimmer	Part of C1
C1C	Condenser, trimmer, Special Services	31-6502-4
C2	Condenser, antenna series tracker, 944 $\mu\mu$f.	30-1220-65
C3	Condenser, drift compensation, 7.5 $\mu\mu$f.	30-1224-83
C4	Condenser, a-v-c bypass, .047 μf.	30-4650-45
C5	Condenser, oscillator grid, .01 μf.	30-1238-2
C6	Condenser, screen bypass, .047 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 μf.	30-1238-1
C14	Condenser, plate bypass	Part of PC1
C15	Condenser, audio coupling, .005 μf.	Part of PC1
C16	Condenser, compensating	Part of PC1
C17	Condenser, tone compensation, .022 μf.	30-4650-43
C18	Condenser, electrolytic, 3-section	30-2583-1
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, 0.1 μf.	30-4650-47
C20	Condenser, B minus to chassis, 100 $\mu\mu$f.	62-110009001*
I1	Lamp, pilot	34-2605
I2	Lamp, night light (Model B714)	34-2477
	Cabinet	
	Model B712	
	Sand	11013
	Forest green	11013-1
	Model B714	
	Pearl grey	10940-16
	Knobs	
	Model B712	
	Clock (3)	54-6096
	Tuning or volume	54-6095
	Model B714	
	Clock (3)	54-4983-5
	Tuning or volume	54-4986-3
	Dial scale, radio (Model B712)	28-9648
	Window, radio (Model B712)	54-6091
	Pointer	
	Model B712	76-8706
	Model B714	56-9846FCP
	Jewel (Model B712)	54-4304-5
	Clock	
	Model B712	41-2047
	Model B714	41-2042-5
	Clock cover	
	Model B714	54-4989-2

Reference Symbol	Description	Service Part No.
J1	Jack, appliance receptacle, a-c	76-3931
J2	Jack, private listening unit (Model B714)	42-1975-2
L1	Coil, antenna, Special Services	32-4561-3
L2	Coil, oscillator shunt	32-4562-2
LA1	Antenna loop	Part of cabinet back
LS1	Speaker, p-m (Model B712)	36-1627-8
LS1	Speaker, p-m (Model B714)	36-1627-26
R1	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 megohm	33-5565
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	33-1343-3
R13	Resistor, private listening unit, 3.3 ohms (Model B714)	66-9334340
PC1	Printed circuit	30-6001
S1	Switch, off-on, night light (Model B714)	42-2023
S2	Switch, Broadcast—Special Services	42-1796-4
T1	Transformer, oscillator	32-4582
T2	Transformer, output	Part of LS1
W1	Line cord	41-3865
Z1	Transformer, 1st i-f	32-4583
Z2	Transformer, 2nd i-f	32-4584

MISCELLANEOUS

Window, clock	
Model B712	54-6090
Shaft, tuning	28-9312
Bracket, switch operating	28-9313
Ring, retaining	1W60980FE7
Connector, interlock	27-6240-6
Connector	76-3931
Connector, male (4)	28-2669-2
Connector ass'y., pilot light	41-4176-5
Socket, tube, 12AV6	27-6296-4
Socket, tube (12BA6)	27-6296-6
Socket, tube (12BE6, 35C5)	27-6296-7
Socket, tube (35W4)	27-6296-8
Back, loop, and line-cord ass'y.	
Model B712	76-8736
Model B714	76-8731
Shield, pilot light, back	
Model B714	54-9087
Shield, pilot light, front	
Model B714	54-9088
Socket ass'y., pilot-night light	
Model B714	27-6233-110
Switch, night light	
Model B714	42-2023
Printed wiring panel (less components)	54-6058

PR-2570 10-53

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PHILCO SERVICE

PHILCO Factory-Supervised Service

HOME RADIO

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

SPECIFICATIONS

CABINET

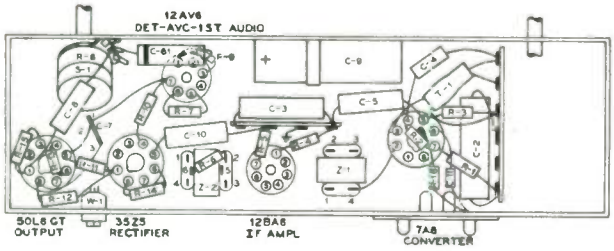
Model 52-540	Phenolic, mottled mahogany
Model 52-540-I	Phenolic, ivory
Model 52-541	Phenolic, mottled mahogany
Model 52-541-I	Phenolic, ivory
Model 52-542-I	Phenolic, ivory

CIRCUIT	5-tube superheterodyne
FREQUENCY RANGE	540—1630 kc.
AUDIO OUTPUT	1.2 watts
OPERATING VOLTAGE	105—125 volts, a.c. or d.c.
POWER CONSUMPTION	30 watts
AERIAL	High-impedance loop; connector for external aerial
INTERMEDIATE FREQUENCY	455 kc.
PHILCO TUBES (5)	7A8, 12BA6, 12AV6, 50L6GT, 35Z5GT

MODEL 52-540

MODEL 52-541

MODEL 52-542-I



TP1-1136

← Figure 1. Symbolized Chassis, Showing Parts Placement

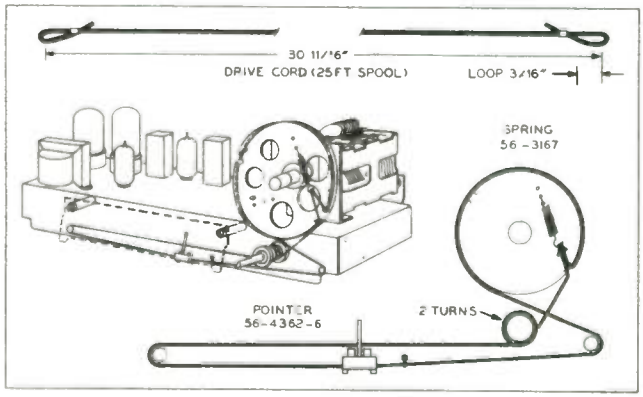
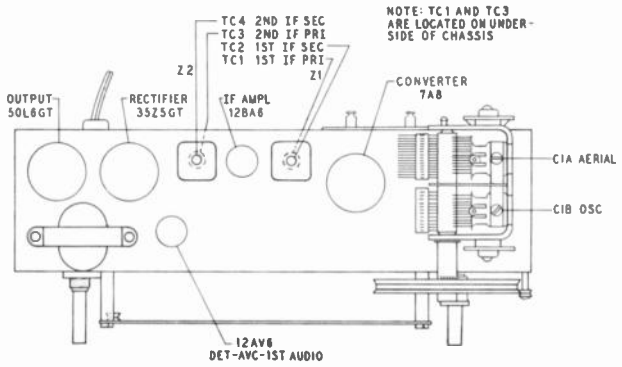


Figure 2. Drive-Cord Installation Details, Models 52-540 and 52-540-I →

TP-7865F-1



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."

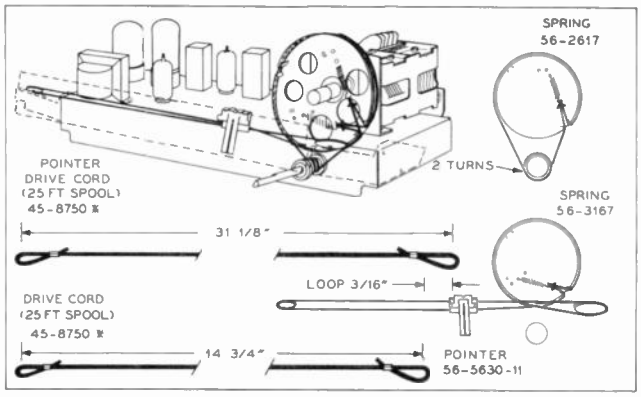
OUTPUT METER: Connect across voice-coil terminals.

SIGNAL GENERATOR: Connect as indicated in chart. Use modulated output.

OUTPUT LEVEL: During alignment, attenuate signal-generator output to maintain output-meter indication below 1.25 volts.

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Ground lead to B—; output lead through .1-mf. condenser to pin 6 of 7A8 converter.	455 kc.	540 kc. (gang fully meshed)	Adjust tuning cores, in order given, 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 output.	C1B—osc.
3	Same as step 2.	1500 kc.	1500 kc.	Adjust trimmer for maximum output.	C1A—aerial

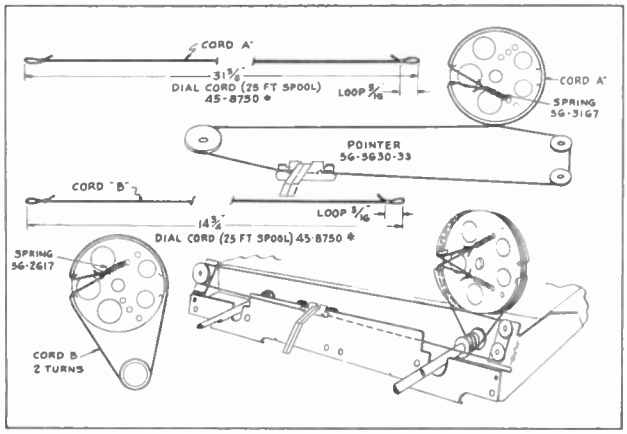
RADIATING LOOP: Make up a 6—8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads and place near radio loop antenna.



TP-7865E-1

Figure 5. Drive-Cord Installation Details, Model 52-542-1 ➡

← **Figure 4. Drive-Cord Installation Details, Models 52-541 and 52-541-1**



TP1-1131

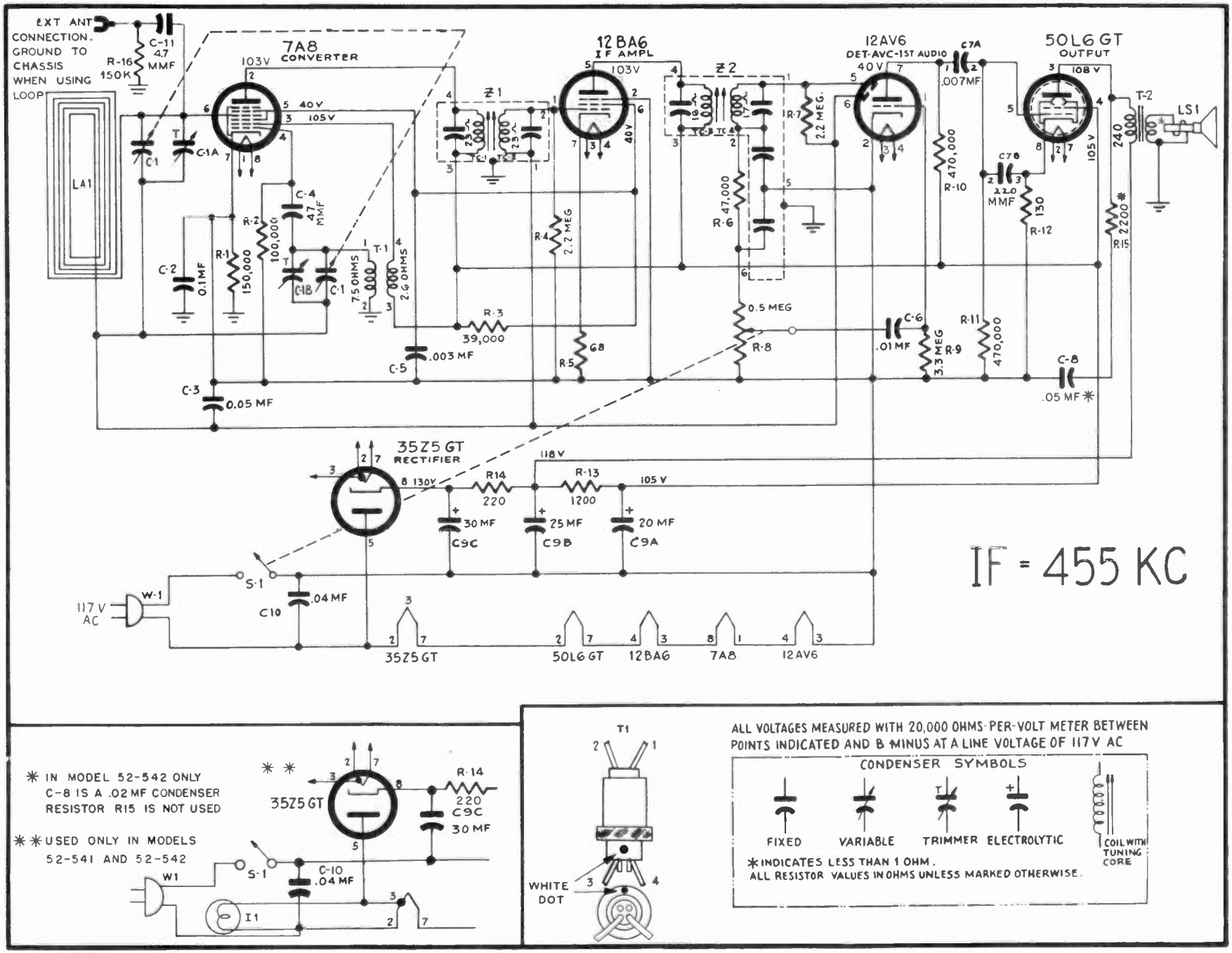


Figure 6. Philco Models 52-540, 52-540-1, 52-541, 52-541-1 and 52-542-1 Schematic Diagram

TP1-1135

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.
C1	Condenser, tuning gang	
	Model 52-540	31-2751-6
	Models 52-541 and 52-542	31-2751
C2	Condenser, i-f bypass, .1 μf.	61-0113*
C3	Condenser, a-v-c by-pass, .05 μf.	61-0122*
C4	Condenser, d-c blocking, 47 μμf.	60-00475417*
C5	Condenser, screen by-pass, .003 μf.	61-0109*
C6	Condenser, d-c blocking, .01 μf.	61-0120*
C7	Condenser, dual ceramic	30-1239-4
C7A	Condenser, d-c blocking, .007 μf.	Part of C7
C7B	Condenser, grid by-pass, 220 μμf.	Part of C7
C8	Condenser, tone compensation	
	Models 52-540 and 52-541: .05 μf.	61-0122*
	Model 52-542: .02 μf.	61-0108*
C9	Condenser, electrolytic, 3-section	30-2573
C9A	Condenser, filter, 20 μf., 150v	Part of C9
C9B	Condenser, filter, 25 μf., 150v	Part of C9
C9C	Condenser filter, 30 μf., 150v	Part of C9
C10	Condenser, line by-pass, .04 μf.	45-3500-2*
C11	Condenser, external-aerial coupling, 4.7 μμf.	30-1230
I1	Pilot lamp (Models 52-541 and 52-542-1 only)	34-2068
LA1	Loop aerial	
	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
LS1	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
R1	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*
R7	Resistor, diode load, 2.2 megohms	66-5228340*
R8	Volume control, 500,000 ohms	
	Models 52-540 and 52-540-I	33-5538-7
	Models 52-541 and 52-541-I	33-5566-4
	Model 52-542-I	33-5566-4
R9	Resistor, grid return, 3.3 megohms	66-5338340*
R10	Resistor, plate load, 470,000 ohms	66-4478340*
R11	Resistor, grid return, 470,000 ohms	66-4478340*
R12	Resistor, cathode bias, 130 ohms	66-1133260*
R13	Resistor, filter, 1200 ohms	66-2128340*
R14	Resistor, filter, 220 ohms, 1 watt	66-1224340*
R15	Resistor, tone compensation, 2200 ohms (Models 52-540, 52-540-I, 52-541 and 52-541-I only)	66-2228340
R16	Resistor, aerial isolating, 150,000 ohms	66-4158340
S1	Switch, off-on	Part of R8
T1	Transformer, oscillator	32-4263
T2	Transformer, output	32-8384
W1	Line cord	L-2183*
Z1	Transformer, st i-f	32-4160-6A
Z2	Transformer, 2nd i-f	32-4240-A

MISCELLANEOUS

Description	Service Part No.
MODELS 52-540 AND 52-540-I	
Cabinet, mottled mahogany	10750
Cabinet, ivory	10750-1
Back	54-7777
Fastener, back mounting (4)	W2235-2FA9
Baffle, speaker	54-7761
Dial-backplate assembly	76-4658
Knob (2)	54-4527-11
Mount, rubber (3)	27-4771-1
Pointer	56-4362-6
Pulley-and-shaft assembly	76-3671-3
MODELS 52-541 AND 52-541-I	
Cabinet, mahogany	10747
Knob (2)	54-4674
Cabinet, ivory	10747-1
Knob (2)	54-4674-1
Back	54-7767
Fastener, back mounting (4)	W2235FA9
Baffle, speaker	54-7761
Backplate, bracket and pulley assembly	76-8235
Dial-backplate assembly	76-4570
Fastener, pilot-lamp shield mounting (2)	W2235-1FA9
Speed clip, grille mounting (4)	1W56920FE7
Jewel	54-4304
Mount, rubber (3)	27-4771-1
Pointer	56-5830-11
Spring, pointer drive	56-3167
Pulley-and-shaft assembly	76-3671-2
Scale strap, dial mounting	
LH	56-7373
RH	56-7373-1
Socket assembly, pilot lamp	27-6233-6
MODEL 52-542-I	
Cabinet, ivory	10769-8
Back	5479-11
Fastener, back mounting (4)	W2235FA9
Clips, baffle mounting	1W56920FE7
Baffle, speaker	54-7761
Dial scale	54-5104
Screw, scale mounting (2)	1W14504FA1
Dial-backplate assembly	54-4929
Knob (2)	54-4718-33
Backplate, bracket-and-pulley assembly	76-7048
Fastener, pilot-lamp shield mounting (2)	W2235-1FA9
Grille, plastic	54-4919-1
Mount, rubber (3)	27-4771-1
Pointer	56-5830-33
Spring, pointer drive	56-3167
Pulley-and-shaft assembly	76-3671-2
Socket assembly, pilot lamp	27-6233-6
PARTS COMMON TO ALL MODELS	
Bushing, pulley and shaft	27-9437
Clamp, electrolytic mounting	56-1466
Drive cord, 25-foot spool	45-8750*
Fastener, hairpin, pulley and shaft	57-1468FA3
Socket, Loktal (1)	27-6269
Socket, miniature (2)	27-6265
Socket, octal (2)	27-6174
Spring, gang drive	56-2617

PR-1949

Printed in U. S. A.

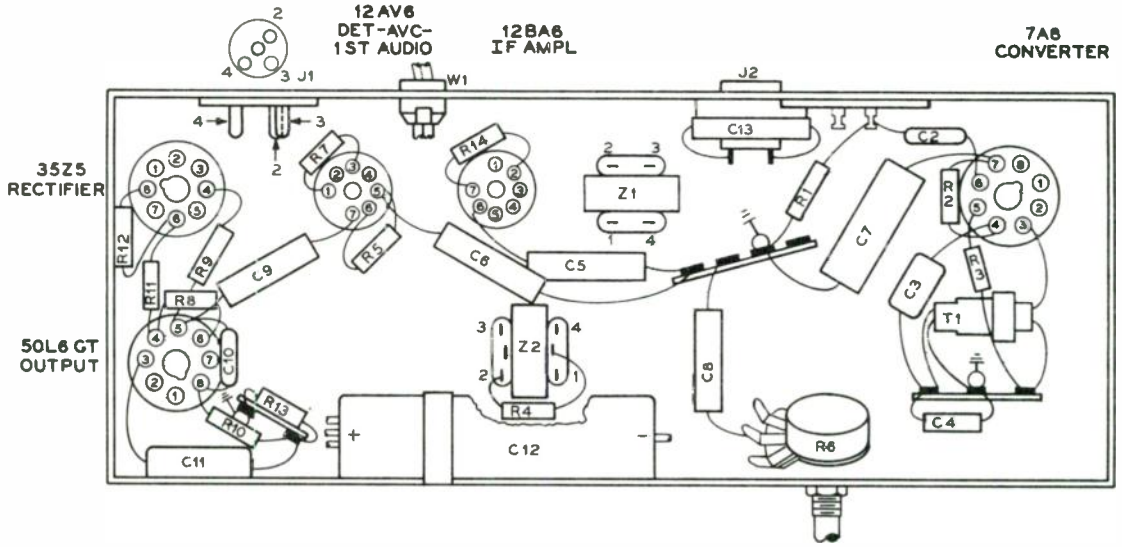
PHILCO RADIO-CLOCK MODELS 52-544, 52-544-I AND 52-544-W

SPECIFICATIONS

CABINET

Model 52-544	Molded phenolic, mahogany
Model 52-544-I	Molded phenolic, ivory
Model 52-544-W	Molded phenolic, white
FREQUENCY RANGE	540—1600 kc.
AUDIO OUTPUT	1 watt
OPERATING VOLTAGE	117 volts, a-c.
POWER CONSUMPTION	30 watts
AERIAL	High-impedance loop; connector for external aerial
INTERMEDIATE FREQUENCY	455 kc.
PHILCO TUBES (5)	7A8, 12BA6, 12AV6, 50L6GT, 35Z5

MODEL 52-544-I



TP1-1139

Figure 1. Base View, Showing Symbolized Chassis

ALIGNMENT PROCEDURE

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

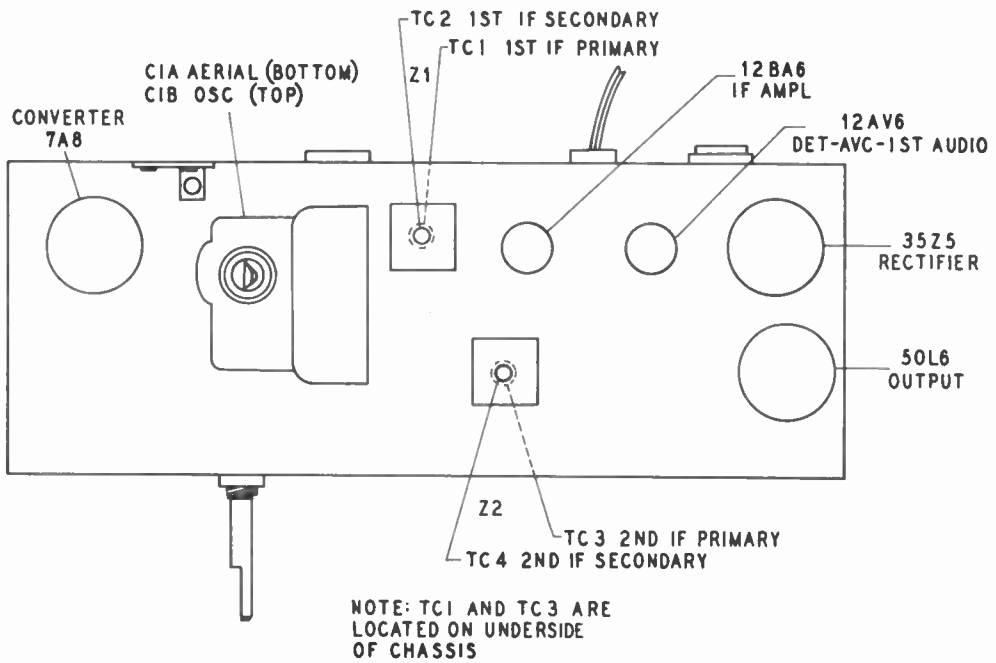
OUTPUT METER — Connect across voice-coil terminals.

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.

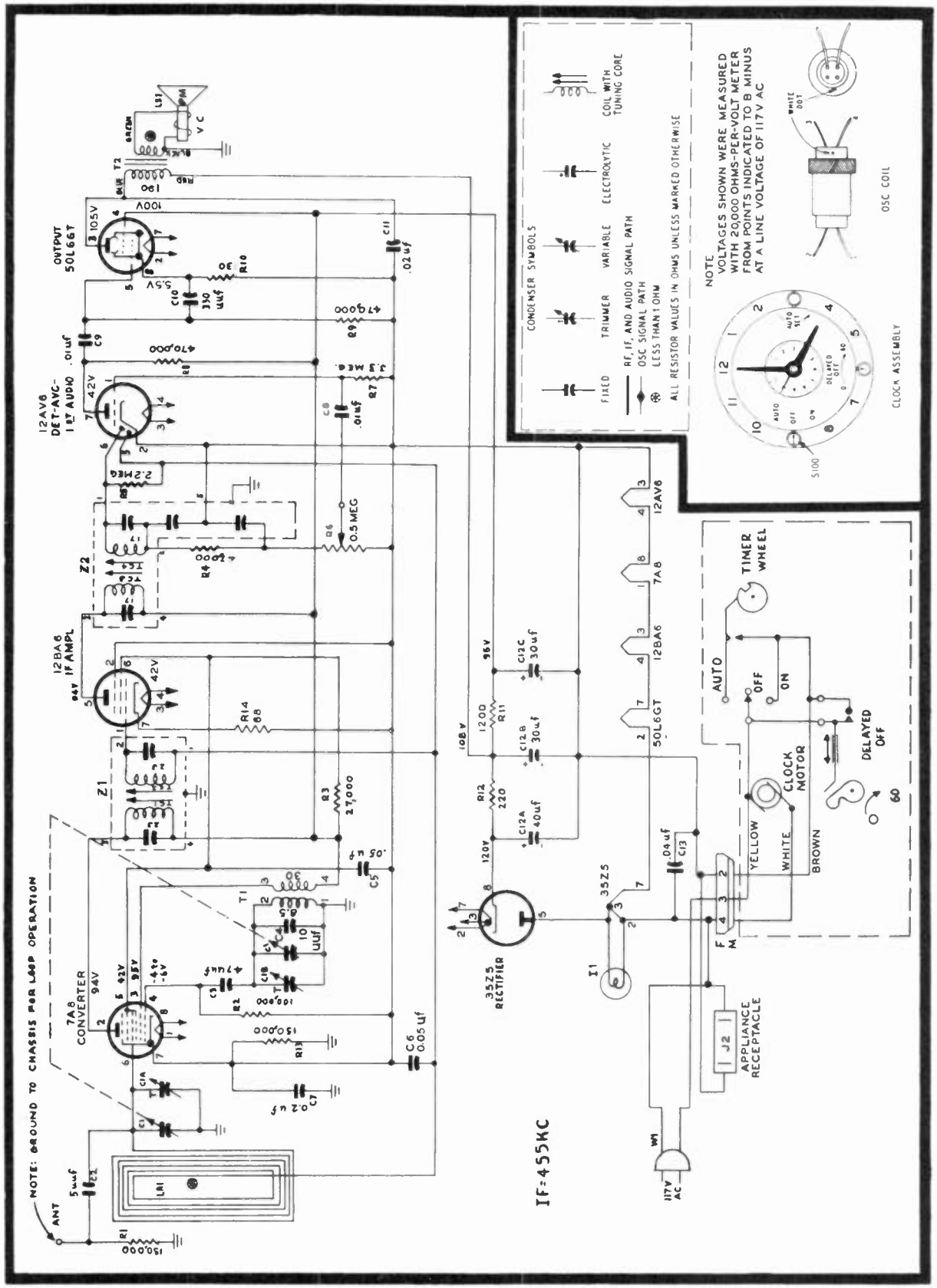
STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Connect ground lead to B—; output lead through .1-μf. condenser to grid (pin 8) of 7A8.	455 kc.	Tuning condenser fully meshed.	Adjust tuning cores, in order given, for maximum output.	TC4—2nd i-f 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 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 aerial.



TP1-1140

Figure 2. Top View, Showing Trimmer Locations



TP1-1141

Figure 3. Philco Radio-Clock Models 52-544, 52-544-I and 52-544-W, Schematic Diagram

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, tuning gang, 2-section	31-2751-5
C1A	Condenser, trimmer, aerial	Part of C1
C1B	Condenser, trimmer, oscillator	Part of C1
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 μf.	61-0108*
C12	Condenser, electrolytic, 3-section	30-2575-27
C12A	Condenser, filter, 30 μf., 150v	Part of C12
C12B	Condenser, filter, 25 μf., 150v	Part of C12
C12C	Condenser, filter, 20 μf., 150v	Part of C12
C13	Condenser, line filter, .04 μf.	45-3500-2*
I1	Pilot lamp	34-2068
J1	Socket, clock motor and switch	27-6273
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
S1	Switch, AUTO-OFF-ON	Part of clock assembly
T1	Transformer, oscillator	32-4263
T2	Transformer, output	Part of LS1
W1	Line cord	L-2183*
Z1	Transformer, 1st i-f	32-4160-6A
Z2	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Description	Service Part No.
Cabinet	
MODEL 52-544	10745
MODEL 51-544-I	10745-1
MODEL 52-544-W	10745-4
Back	54-8391
Fastener (4), back mounting	W2235FA9
Baffle-and-cloth assembly	
Model 52-544	40-7730
Model 52-544-I	40-7730-1
Model 52-544-W	40-7730-2
Jewel (used on mahogany and ivory cabinets)	54-4304
Jewel (used on white cabinet only)	54-4304-1
Knobs	
MODEL 52-544	
VOLUME	27-4820
AUTO-OFF-ON	
DELAYED OFF	54-4736
AUTO SET	54-4736-2
TIME SET	54-4736-4
MODEL 52-544-I	
VOLUME	54-4118
AUTO-OFF-ON	
DELAYED OFF	54-4736-1
AUTO SET	54-4736-3
TIME SET	54-4736-4
MODEL 52-544-W	
VOLUME	27-4817-7
AUTO-OFF-ON	
DELAYED OFF	54-4736-5
AUTO SET	54-4736-6
TIME SET	54-4736-7
Clamp, electrolytic mounting	56-1466
Clip, pilot-lamp mounting	56-3545-6FA3
Clock-and-cable assembly	
MODEL 52-544, 60-cycle	76-6723
MODEL 52-544-I, 60-cycle	76-6724
MODEL 52-544-W, 60-cycle	76-6725
Clock cover	56-6710
Dial scale, mahogany and ivory	54-5055-2
Dial scale, white	54-5055-4
Lead assembly, aerial	76-1472
Mount, rubber, gang mounting (3)	27-4771-1
Shield, pilot lamp	56-9074-3
Socket, clock	27-6273-7
Socket, Loktal (1)	27-6269
Socket, octal (2)	27-6174
Socket, miniature (1)	27-6265
Socket assembly, pilot lamp	27-6233-6

PHILCO RADIO MODELS 52-640 AND 52-641

SPECIFICATIONS

CABINET ..... Plastic, portable

CIRCUIT ..... Four-tube superheterodyne (plus selenium rectifier)

FREQUENCY RANGE ..... 540—1620 kc.

AUDIO OUTPUT
- A-c or d-c operation ..... 150 milliwatts
- Battery operation
  - Model 52-640 ..... 150 milliwatts
  - Model 52-641 ..... 75 milliwatts

OPERATING VOLTAGES
- Model 52-640 ..... 117 volts, a.c. or d.c.; 1.5-volt "A" and 90-volt "B" battery
- Model 52-641 ..... 117 volts, a.c. or d.c.; 1.5-volt "A" and 67.5-volt "B" battery

POWER CONSUMPTION
- A-c or d-c operation ..... 11 watts
- Battery operation
  - Model 52-640 ..... 13 ma. from 90-volt "B" battery; 250 ma. from 1.5-volt "A" battery
  - Model 52-641 ..... 9.5 ma. from 67.5-volt "B" battery; 250 ma. from 1.5-volt "A" battery

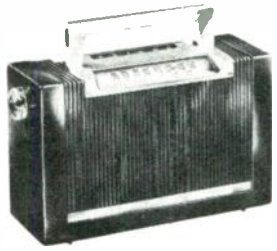
AERIAL
- Model 52-640 ..... High-impedance loop; provision for connecting external aerial
- Model 52-641 ..... Magnecor high-impedance loop; provision for connecting external aerial

INTERMEDIATE FREQUENCY ..... 455 kc.

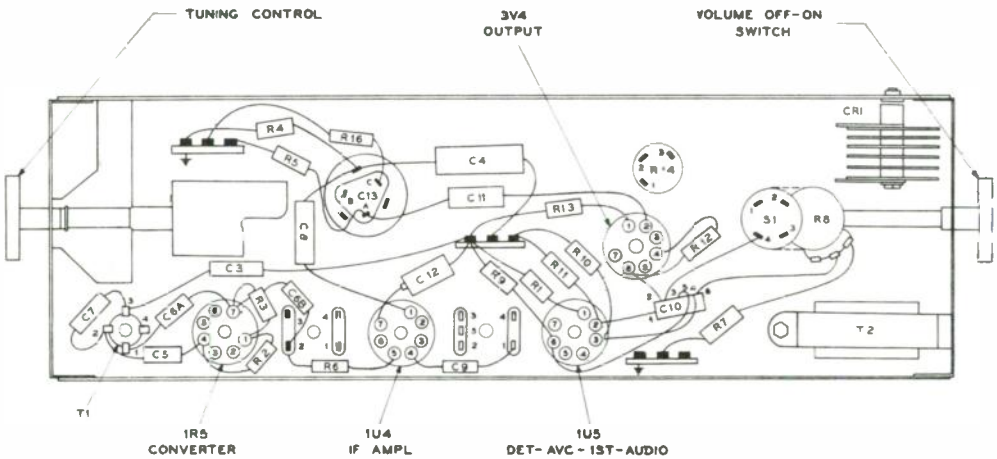
PHILCO TUBES (4) ..... 1R5 converter, 1U4 i-f ampl., 1U5 det-a.v.c.-1st audio, 3V4 output

BATTERY TYPE
- Model 52-640 ..... P-364
- Model 52-641 ..... P-67 "B" battery; Type D "A" battery

MODEL 52-640



MODEL 52-641



TP1-1167

Figure 1. Bottom View, Showing Symbolized Chassis

ALIGNMENT PROCEDURE

DIAL POINTER—With tuning-condenser plates fully meshed, set pointer to coincide with first index hole above pointer.

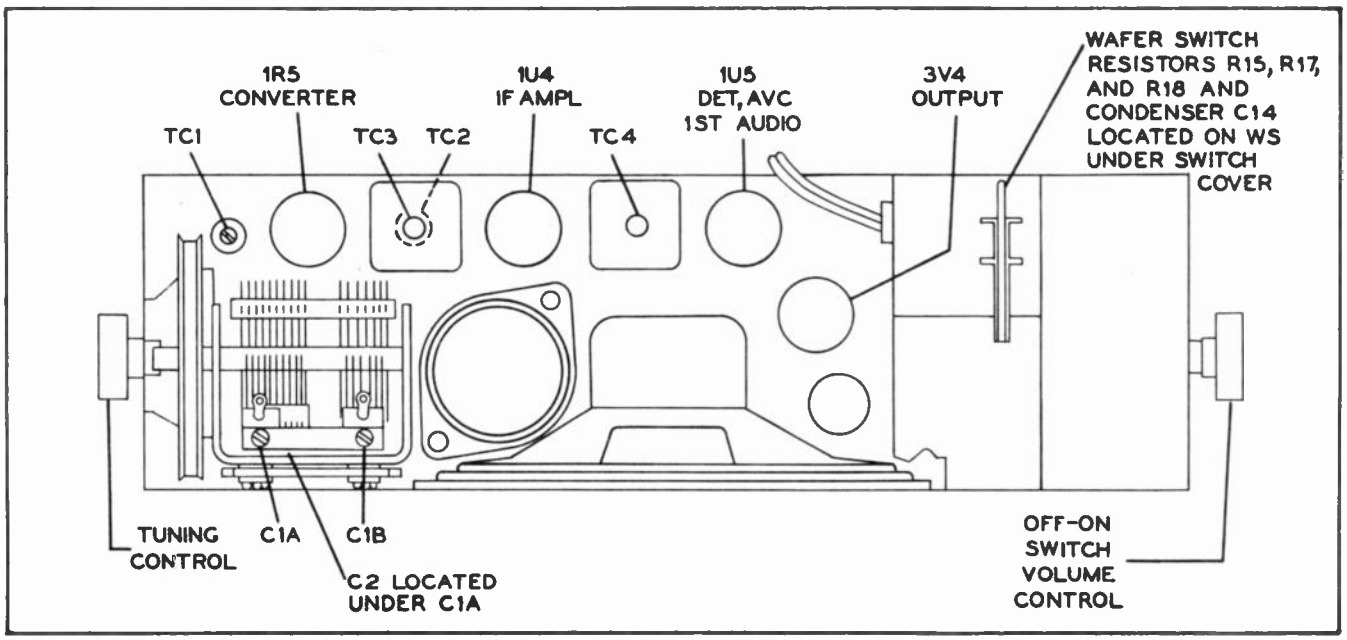
OUTPUT METER—Connect across speaker voice coil terminals.

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.



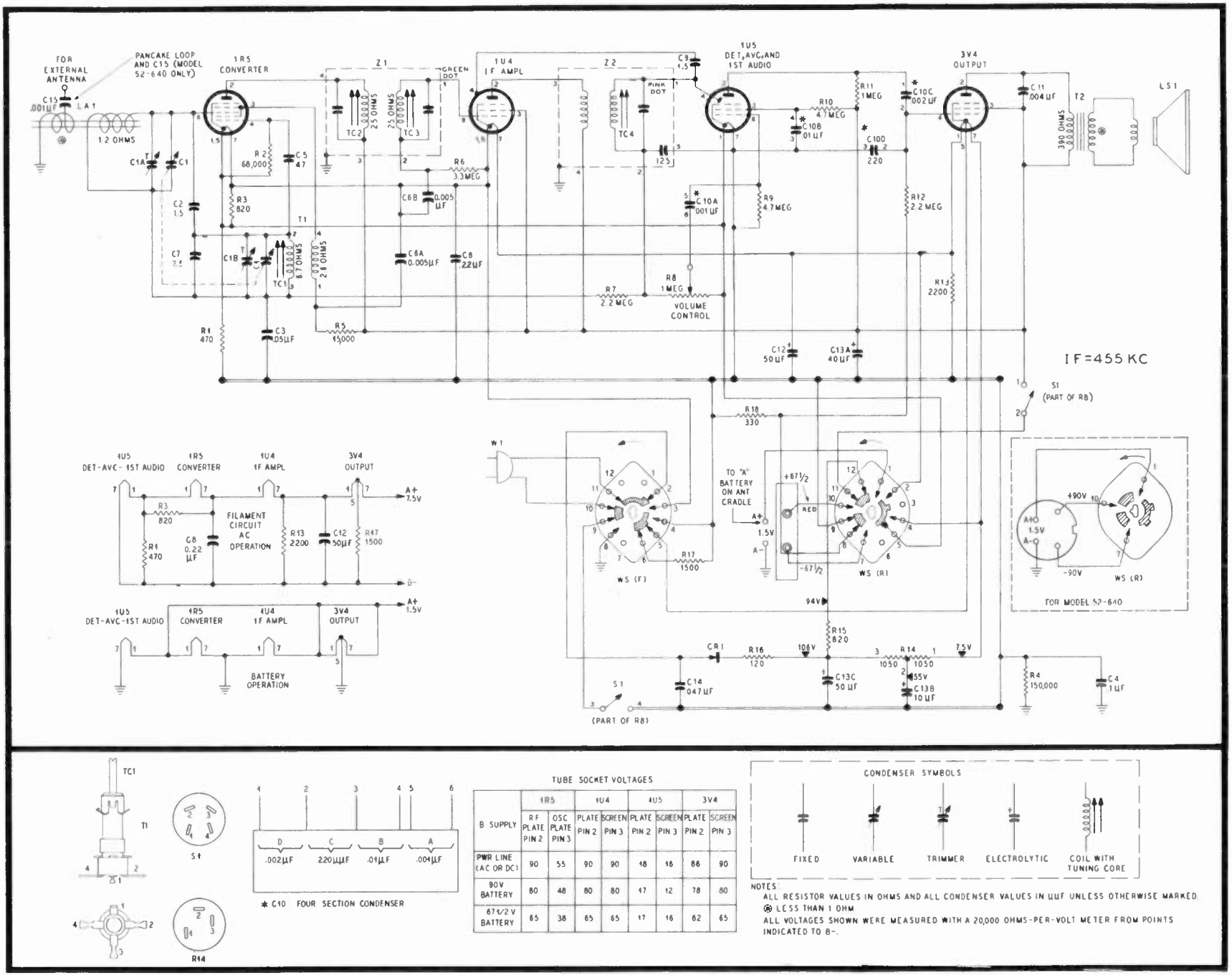
TPO-392

Figure 2. Top View, Showing Trimmer Locations

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Through .1-μf. condenser to antenna section of tuning condenser.	455 kc.	Tuning gang fully meshed	Adjust, in order given, for maximum output.	TC4—2nd i-f sec. TC3—1st i-f sec. TC2—1st i-f pri.
2	Radiating loop. See note below.	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 as 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 obtained. This step SHOULD NOT be necessary unless the oscillator transformer has been replaced.	TC1—osc. core

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.



TUBE SOCKET VOLTAGES

B SUPPLY	1R5		1U4		1U5		3V4	
	R.F. PLATE PIN 2	OSC. PLATE PIN 3	PLATE PIN 2	SCREEN PIN 3	PLATE PIN 2	SCREEN PIN 3	PLATE PIN 2	SCREEN PIN 3
PWR LINE (AC OR DC)	90	55	90	90	18	16	86	90
90V BATTERY	80	48	80	80	17	12	78	80
67½V BATTERY	65	38	65	65	17	16	62	65

NOTES:
ALL RESISTOR VALUES IN OHMS AND ALL CONDENSER VALUES IN µµF UNLESS OTHERWISE MARKED.
Ⓜ LESS THAN 1 OHM
ALL VOLTAGES SHOWN WERE MEASURED WITH A 20,000 OHMS-PER-VOLT METER FROM POINTS INDICATED TO B-.

Figure 3. Philco Radio Models 52-640 and 52-641, Schematic Diagram

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 Symbol	Description	Service Part No.
C1	Condenser, tuning gang, 2-section	
	Model 52-640	31-2735-3
	Model 52-641	31-2735-2
C1A	Condenser, trimmer, antenna	Part of C1
C1B	Condenser, trimmer, oscillator	Part of C1
C2	Condenser, neutralizing, 1.5 μμf.	30-1221-3
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	30-1239
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.	30-1221-3
C10	Condenser, ceramic, 4-section	30-1327
C10A	Condenser, d-c blocking, .001 μf.	Part of C10
C10B	Condenser, screen by-pass, .01 μf.	Part of C10
C10C	Condenser, d-c blocking, .002 μf.	Part of C10
C10D	Condenser, grid by-pass, 220 μμf.	Part of C10
C11	Condenser, tone compensation, .004 μf.	61-0179*
C12	Condenser, electrolytic, filament by-pass, 50 μf., 25v	30-2417-12
C13	Condenser, electrolytic, 3-section	30-2568-39
C13A	Condenser, filter, 40 μf., 150v	Part of C13
C13B	Condenser, filter, 10 μf., 150v	Part of C13
C13C	Condenser, filter, 50 μf., 150v	Part of C13
C14	Condenser, line by-pass, .047 μf.	45-3505-45*
C15	Condenser, antenna coupling, .001 μf.	45-3500-5
CR1	Selenium rectifier, 75 ma. at 117 volts	34-8003-1*
LA1	Loop aerial	
	Model 52-640 (flat loop)	32-4052-52
	Model 52-641 (Magnecor)	32-4455
LS1	Speaker, 4-inch p.m.	36-1627-21
R1	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	33-5566-21
R9	Resistor, grid return, 4.7 megohms	66-5478340*
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	66-2228340*
R14	Resistor, filament dropping and filter, 2100 ohms (center-tapped)	33-3445
R15	Resistor, filter, 820 ohms	66-1828340*
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
T1	Transformer, oscillator	32-4453-1
T2	Transformer, output	32-8434
W1	Line cord	L2183
WS	Wafer switch, voltage change-over	42-1925
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	54-4810
Clip (2), back	56-3807-3
Handle-and-bracket assembly	76-6967
Handle	54-4811-2
Knob assembly (2)	76-6206
Pointer	56-7973-1
Cabinet, Model 52-641, maroon	10799-1
Back, maroon	54-4767-1
Cabinet, Model 52-641, red	10799-2
Back, red	54-4767-2
Cabinet, Model 52-641, Nile	10799-4
Back, Nile	54-4767-4
Cabinet, Model 52-641, sand	10799-5
Back, sand	54-4767-5
Clip (2), back	56-9162
Fastener (2)	W2235-7FA9
Handle-and-bracket assembly	76-6061
Handle	56-7940FCP
Hinge, l.h.	56-7915
Hinge, r.h.	56-7915-1
Knob (2)	54-4773
Pointer	56-7973FCP
Scale, dial	54-5087
Baffle-and-cloth assembly	40-7884
Insulator, electrolytic-condenser mounting	27-9508
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	56-2617
Socket (2), tube, 1R5 and 1U4	27-6203
Socket (2), tube, 1U5 and 3V4	27-6203-12
Tube shield, 1U5	56-3978-1FA3
Tuning shaft	56-7906FA42

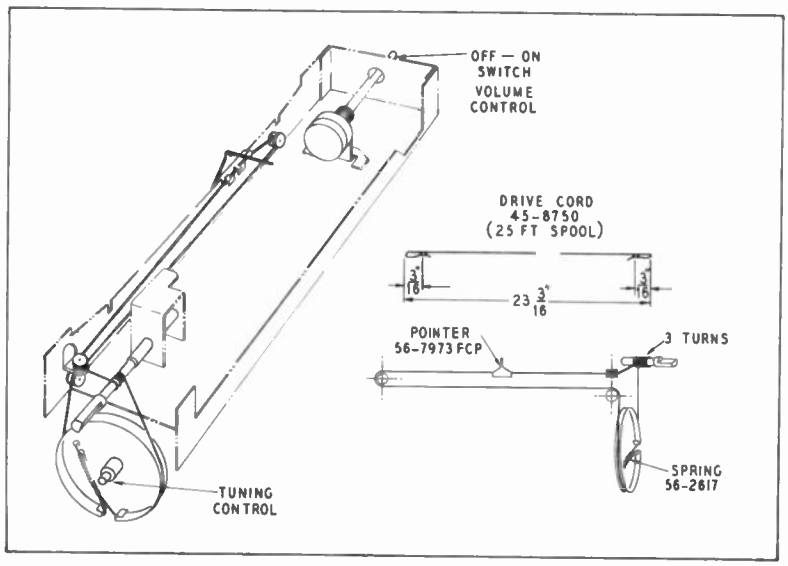


Figure 4. Drive-Cord-Installation Details

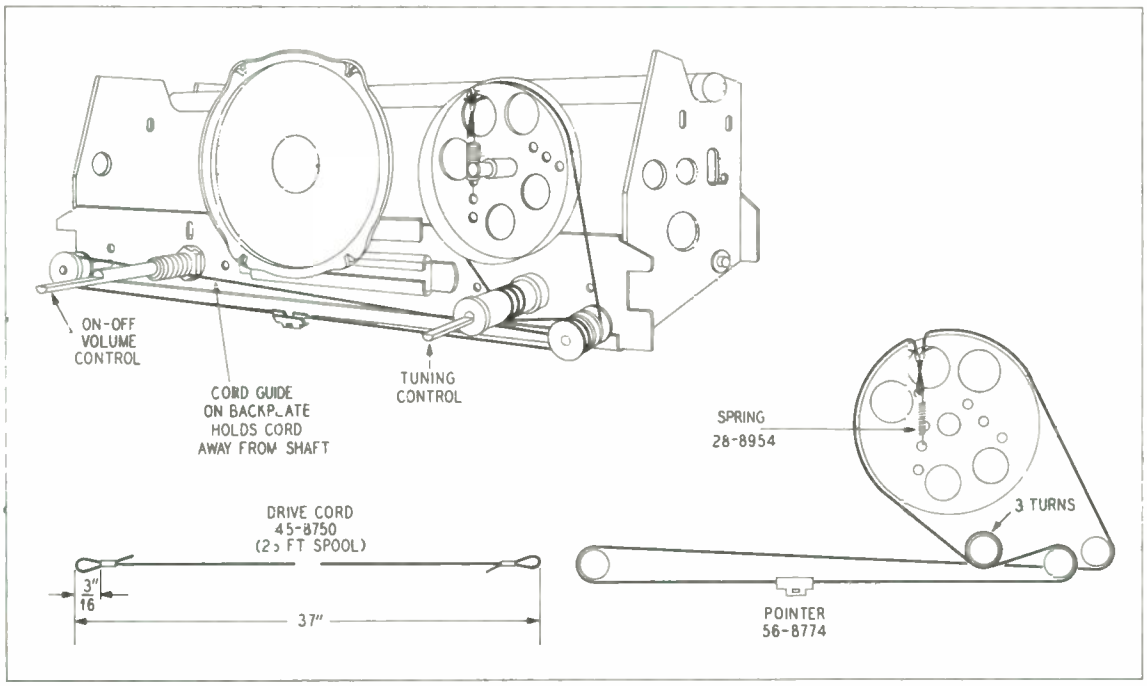
TP0-390

PHILCO RADIO MODEL 52-643

SPECIFICATIONS

CABINET	Molded plastic, brown
CIRCUIT	Five-tube superheterodyne (plus selenium rectifier)
FREQUENCY RANGE	540—1620 kc.
AUDIO OUTPUT	160 milliwatts
OPERATING VOLTAGES	117 volts, a.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	55 ma. at 9 volts, and 13 ma. at 90 volts
AERIAL	Magnecor high-impedance loop; provision for connecting external aerial
INTERMEDIATE FREQUENCY	265 kc.
PHILCO TUBES (5)	1T4 r-f ampl., 1R5 converter, 1U4 i-f ampl., 1U5 det.-a.v.c.—1st audio, 3V4 output
BATTERY TYPE	Philco P-363

MODEL 52-643



TP1-1711

Figure 1. Drive-Cord-Installation Details

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.

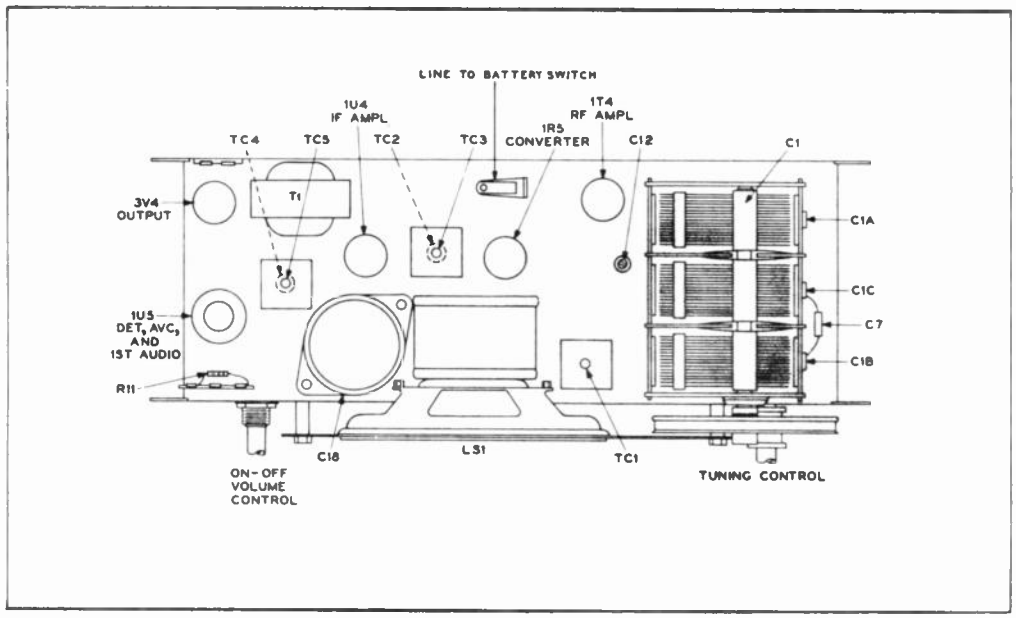
OUTPUT METER—Connect across voice-coil terminals.

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 ¼"-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.



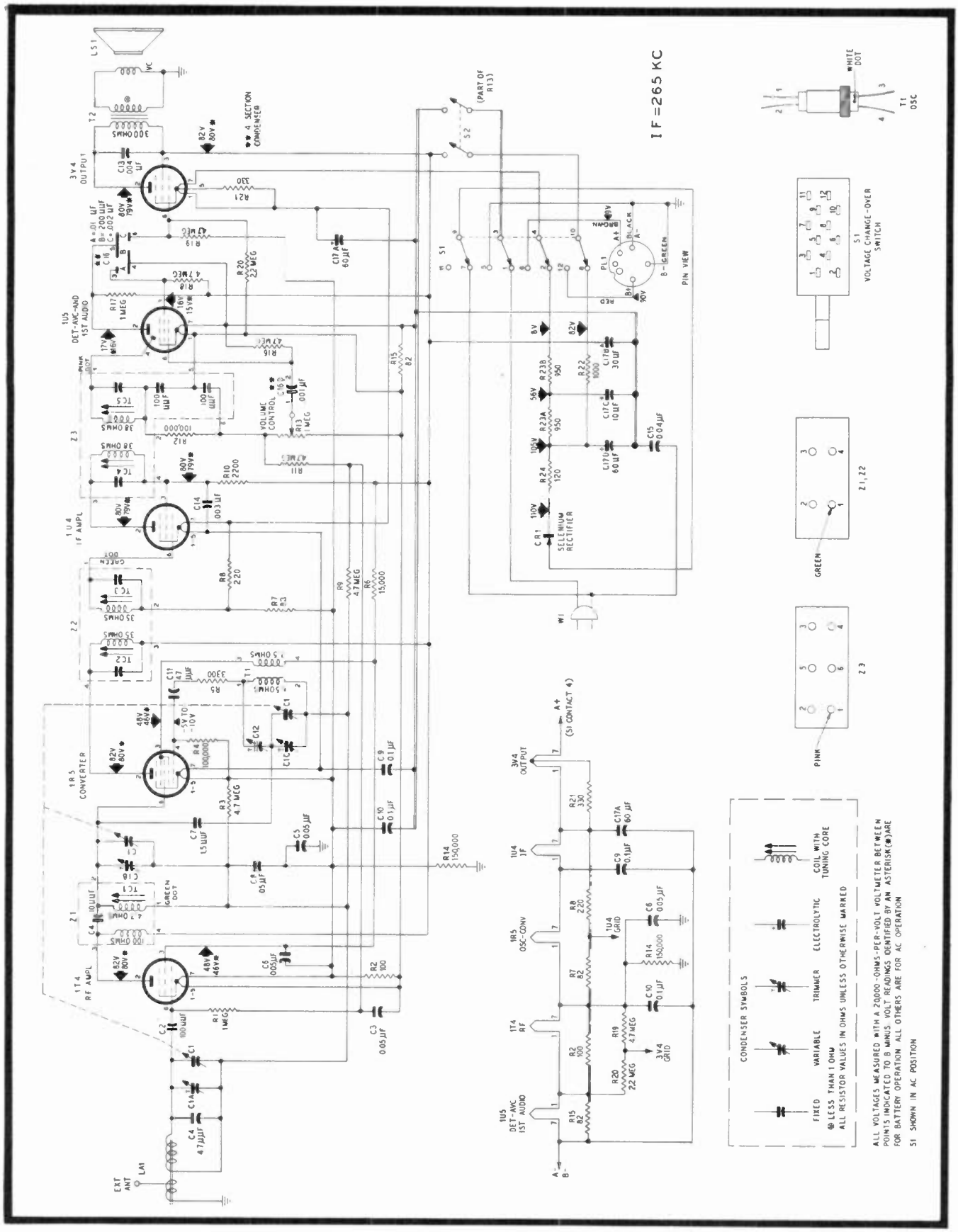
TP1-1712

Figure 2. Top View, Showing Trimmer Locations

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Through a .1-μf. condenser 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—1st i-f pri. TC3—1st i-f sec.
2	Radiating loop. See note below.	1620 kc.	1620 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.	C1C—osc. shunt
3	Same as step 2.	580 kc.	580 kc.	Adjust for maximum output while rocking tuning 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.).	TC1—r-f 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	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.



TP1-1713

Figure 3. Philco Radio Model 52-643, Schematic Diagram

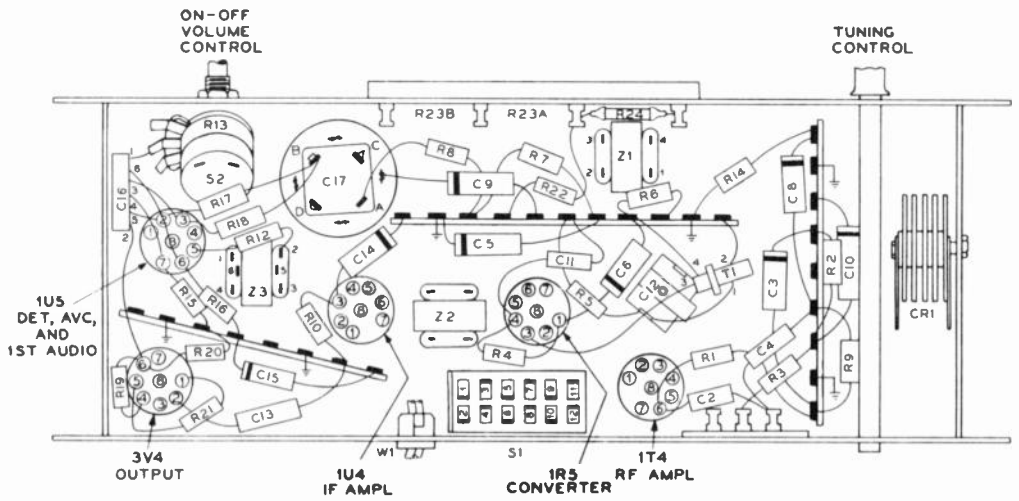
REPLACEMENT PARTS LIST

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 Symbol	Description	Service Part No.
C1	Consender, tuning gang, 3-section	31-2747-2
C1A	Condenser, antenna trimmer	Part of C1
C1B	Condenser, r-f trimmer	Part of C1
C1C	Condenser, osc. trimmer	Part of C1
C2	Condenser, d-c blocking, 100 μμf.	62-110009001*
C3	Condenser, bias filter, .05 μf.	61-0122*
C4	Condenser, fixed trimmer, 4.7 μμf.	30-1230
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 800 μμf.	31-6473-16
C13	Condenser, tone compensation, .004 μf.	61-0179*
C14	Condenser, screen neutralizing, .003 μf.	61-0109*
C15	Condenser, line by-pass, .04 μf.	45-3500-2*
C16	Condenser, ceramic, 4-section	30-1237
C16A	Condenser, screen by-pass, .01 μf.	Part of C16
C16B	Condenser, by-pass, 200 μμf.	Part of C16
C16C	Condenser, d-c blocking, .002 μf.	Part of C16
C16D	Condenser, d-c blocking, .001 μf.	Part of C16
C17	Condenser, electrolytic, 4-section	30-2568-26
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
CR1	Selenium rectifier	34-8003*
LA1	Coil, antenna	32-4455-4
LS1	Speaker, 5-inch	36-1625
PL1	Plug and cable, battery	41-3712-5
R1	Resistor, grid return, 1 megohm	66-5108340*
R2	Resistor, current limiting, 100 ohms	66-1108340*
R3	Resistor, grid return, 4.7 megohms	66-5478340*
R4	Resistor, grid return, 100,000 ohms	66-4108340*
R5	Resistor, oscillator coupling, 3300 ohms	66-2338340*
R6	Resistor, dropping, 15,000 ohms	66-3158340*
R7	Resistor, grid return, 82 ohms	66-0828340*
R8	Resistor, grid return, 220 ohms	66-1228340*
R9	Resistor, a-v-c filter, 4.7 megohms	66-5478340*
R10	Resistor, neutralization, 2200 ohms	66-2228340*
R11	Resistor, a-v-c filter, 4.7 megohms	66-5478340*
R12	Resistor, i-f filter, 100,000 ohms	66-4108340*
R13	Resistor, VOLUME control, 1 megohm	33-5566-11
R14	Resistor, leakage, 150,000 ohms	66-4158340*
R15	Resistor, current limiting, 82 ohms	66-0828340*
R16	Resistor, grid return, 4.7 megohms	66-5478340*
R17	Resistor, plate load, 1 megohm	66-5108340
R18	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 ohms	Part of R23
R23B	Resistor, filament dropping, 950 ohms	Part of R23
R24	Resistor, wire wound, current limiting, 120 ohms	33-1334-14
S1	Switch, change-over	42-1899
S2	Switch, on-off	Part of R13
T1	Transformer, oscillator	32-4263-2
T2	Transformer, output	32-8528
W1	Line cord	L2183
Z1	Transformer, r-f	32-4399A
Z2	Transformer, 1st i-f	32-4160-2A
Z3	Transformer, 2nd i-f	32-4240-6A

MISCELLANEOUS

Description	Service Part No.
Cabinet complete	10883
Back	54-4903
Clip (2), back	56-3807-3
Handle assembly	76-6970
Scale	54-5127
Dial backplate assembly	76-7042
Backplate	56-9190FCP
Drive cord, 25-ft. spool	45-8750*
Pointer	56-8774
Spring, drive cord	28-8954
Shaft-and-pulley assembly	76-3671-4
Bushing	27-9437
Clip (1)	56-7057FA3
Knob (2)	54-4773-1
Mount (3), rubber	27-4596
Spring, retaining	57-1468FA3
Shield, 1U5 tube	56-5629FA3
Socket (4)	27-6203
Socket (1), 1U5 tube	27-6203-22



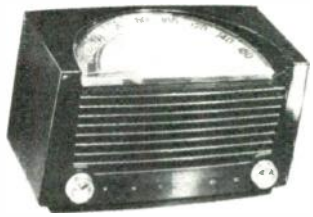
TP1-1710

Figure 4. Bottom View, Showing Symbolized Chassis

PHILCO RADIO MODELS 52-940, 52-941 AND 52-942

MODEL 52-940

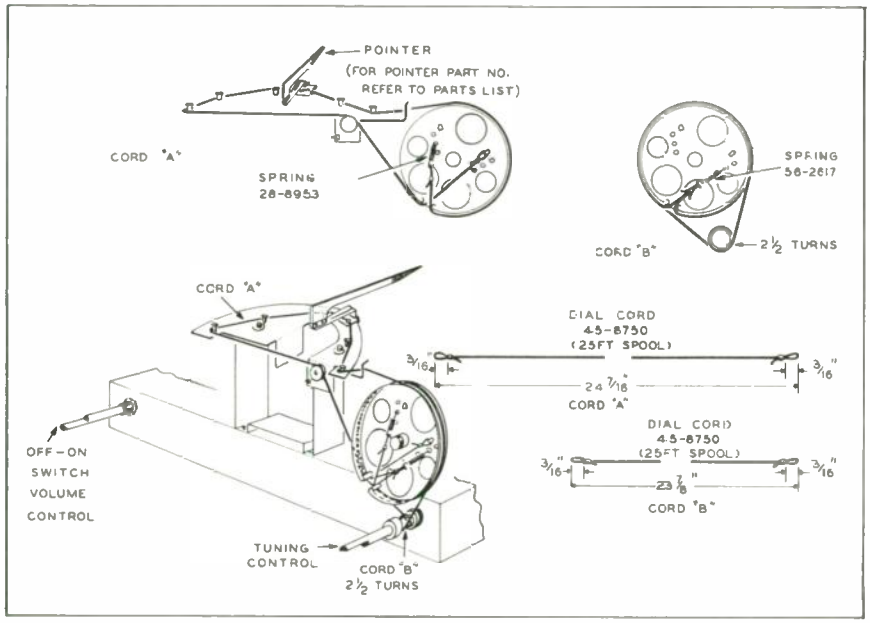
MODEL 52-941



MODEL 52-942

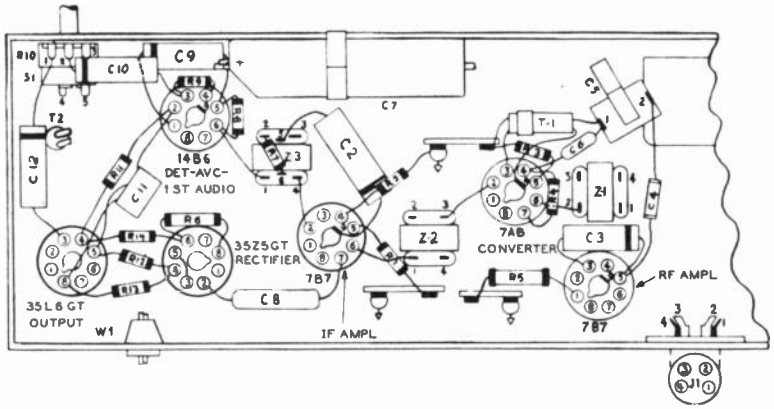
SPECIFICATIONS

CABINET	
Model 52-940	Molded plastic, mahogany or grey, 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 det.-a.v.c.-1st audio, 35L6GT output, 35Z5GT rectifier



TP9-636A

Figure 1. Dial-Cord Installation Details



TP1-1714

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.

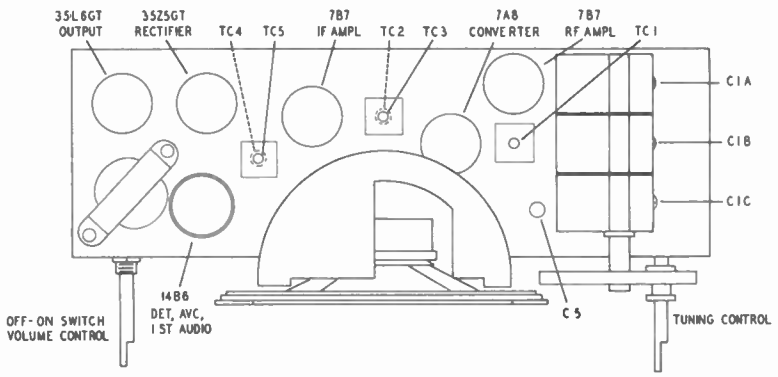
OUTPUT METER: Connect across speaker voice coil.

SIGNAL GENERATOR: Connect as indicated in chart. Use modulated output.

OUTPUT LEVEL: During alignment, attenuate signal-generator 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.



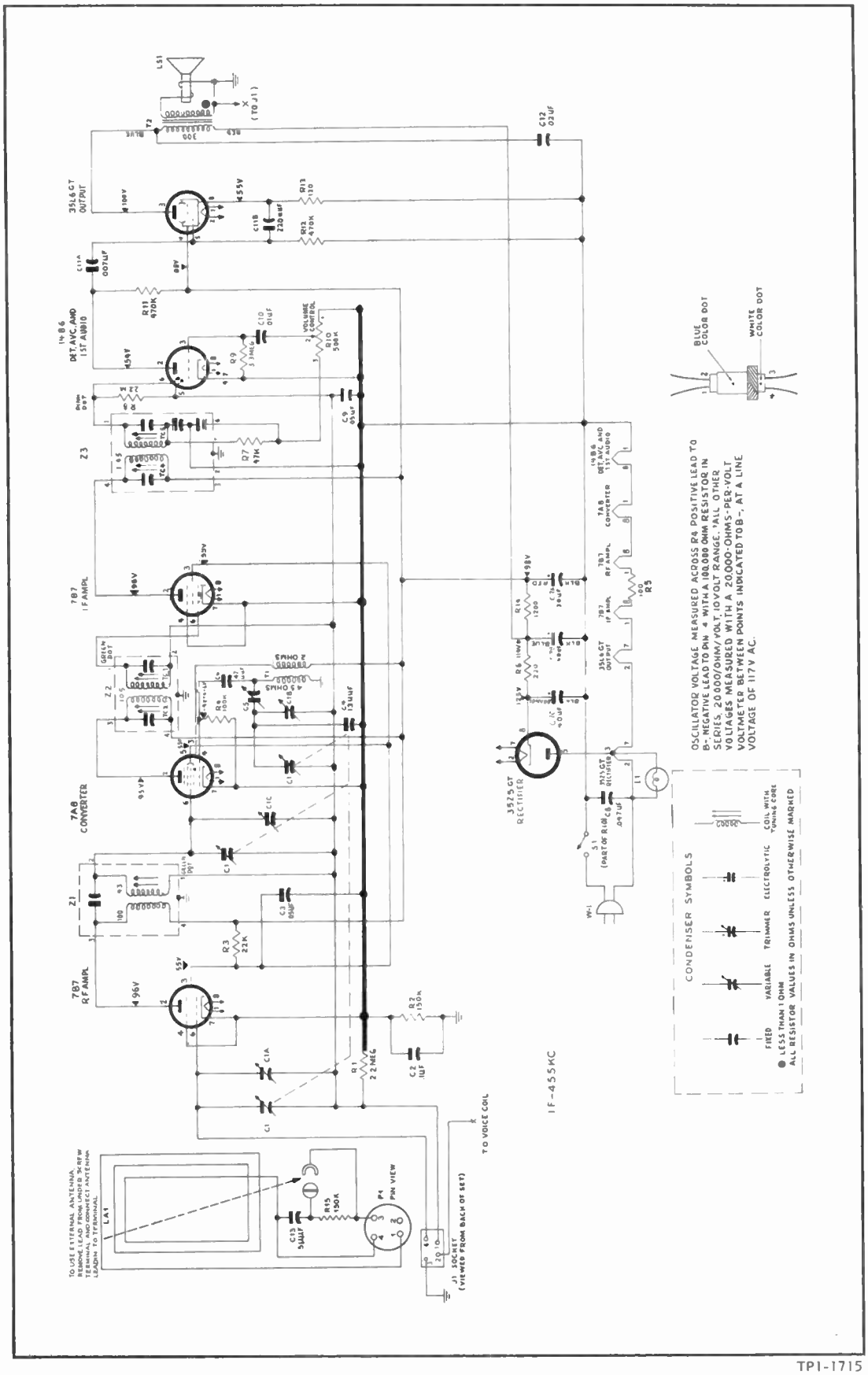
TP9-636B

Figure 3. Top View, Showing Trimmer Locations

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Through a .1-μf. condenser 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.	C5—osc. 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.	C1C—r-f C1A—aerial
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.



TP1-1715

Figure 4. Philco Radio Models 52-940, 52-941, and 52-942, Schematic Diagram

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, tuning, 3-section	31-2748-1
C1A	Condenser, trimmer, aerial	Part of C1
C1B	Condenser, trimmer, osc.	Part of C1
C1C	Condenser, trimmer, r-f	Part of C1
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
C11A	Condenser, d-c blocking, .007 μf.	Part of C11
C11B	Condenser, by-pass, 220 μμf.	Part of C11
C12	Condenser, tone compensation, .02 μf.	61-0108*
C13	Condenser, antenna coupling, 5 μμf.	30-1230
I1	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
LS1	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 switch), 500,000 ohms	33-5566-13
R11	Resistor, plate load, 470,000 ohms	66-4478340*
R12	Resistor, grid return, 470,000 ohms	66-4478340*
R13	Resistor, cathode bias, 130 ohms	66-1138340*
R14	Resistor, filter, 1200 ohms	66-2128340*
R15	Resistor, leakage, 150,000 ohms	66-4158340*
S1	Switch, off-on	Part of R10
T1	Transformer, oscillator	32-4263-2
T2	Transformer, output	32-8310-3
W1	Line cord	L-2183*
Z1	Transformer, r-f	32-4399-2A
Z2	Transformer, 1st i-f	32-4160A
Z3	Transformer, 2nd i-f	32-4240-3A

MISCELLANEOUS

Description	Service Part No.
Cabinet, Model 52-940, mahogany	10770-4
Cabinet, Model 52-940, gray	10770-3
Back	54-7917
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	54-7938-3
Fastener (4), baffle mtg.	W-2235-2FA9
Bezel, metal	56-7427
Speed nut (2), bezel mtg.	1W60196FE7
Dial scale, mahogany cabinet	54-5070-3
Dial scale, gray cabinet	54-5070-4
Clip, scale mtg.	36-7886FE7
Knob (2), mahogany cabinet	54-4718-4
Knob (2), gray cabinet	54-4718-7
Pointer	76-5341-1
Cabinet, Model 52-941	10771
Back	54-7921
Fastener (4), back	W-2235FA9
Backplate, ornamental	56-7434-1
Fastener, backplate mtg.	W-2235-2FA9
Baffle, cardboard	54-7922
Fastener (4), baffle mtg.	W-2235-2FA9
Dial scale	54-5071
Clip, dial mtg.	56-7808FE7
Knob (2)	54-4718-5
Pointer	76-5341-4
Cabinet, Model 52-942	10772
Back	54-7920
Fastener (4), back	W-2235FA9
Backplate, ornamental	56-7435
Fastener, backplate mtg.	W-2235-1FA9
Baffle, cardboard	54-7919-2
Fastener (4), baffle mtg.	W-2235-2FA9
Bezel, metal	56-7536
Speed nut, bezel mtg.	1W60196FE7
Dial scale	54-5072-1
Clip (2), dial mtg.	56-7572FE11
Knob (2)	54-4718-3
Pointer	76-5341-3
Backplate, pulley-and-clip assembly	76-5233
Clamp, electrolytic mtg.	56-1466FA5
Dial cord, 25-foot spool	45-8750*
Spring, gang drive	56-2617
Spring, pointer drive	28-8953
Drive shaft	76-3671-6
Bushing, drive shaft	27-9437
Spring (2), hairpin, drive shaft	57-1468FA3
Panel, wiring, external aerial	38-9837
Panel, wiring, 4-lug	38-9161-1
Plug, aerial, 4-pin	6214-1
Rubber mount (4), gang mtg.	27-4771-1
Shield, tube, 14B6	56-1566
Socket (4), Loktal	27-6269
Socket (2), octal	27-6174
Socket assembly, pilot lamp	27-6233-6

PR-1953

Printed in U. S. A.

PHILCO SERVICE

PHILCO Factory-Supervised Service

HOME RADIO

PHILCO RADIO MODEL 52-548

SPECIFICATIONS

CABINET	Molded plastic, maroon
CIRCUIT	Four-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
INTERMEDIATE FREQUENCY	455 kc.
AERIAL	Magnecor high-impedance loop; provision for connecting external aerial
PHILCO TUBES	7A8 converter, 7B7 i-f amplifier, 7C6 2nd det., avc., 1st audio, 50C5 output, 35W4 rectifier

TPI-1843

MODEL 52-548

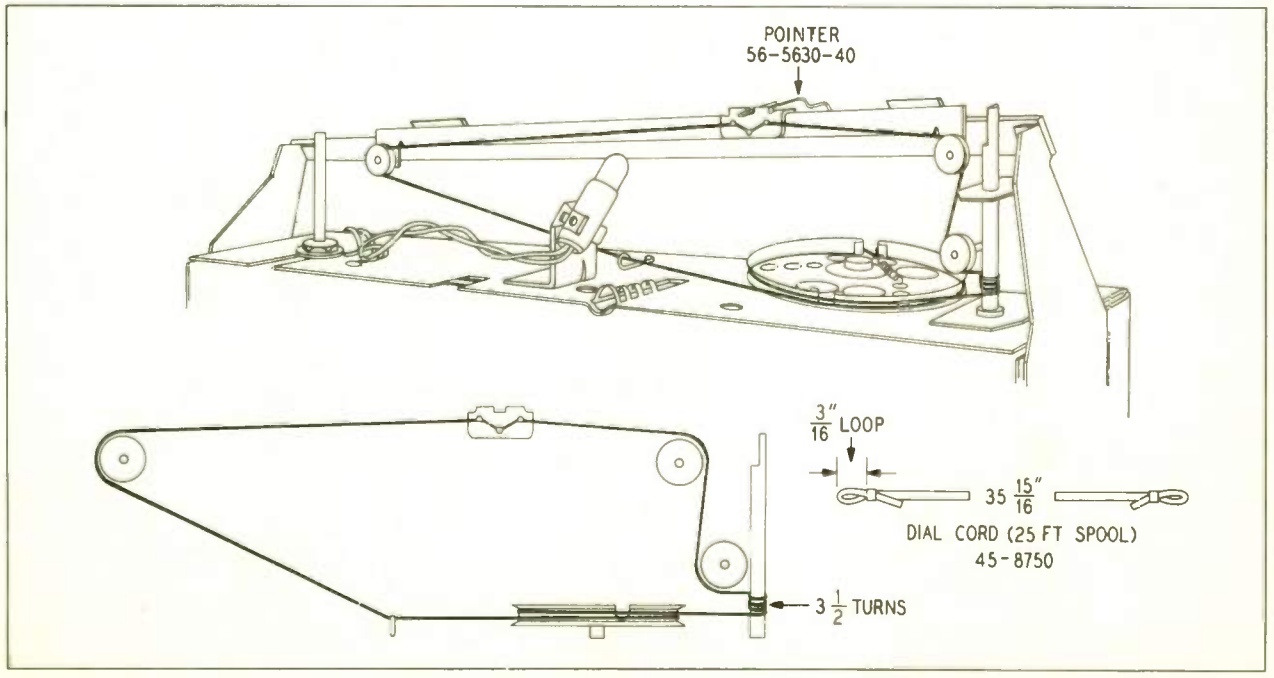


Figure 1. Drive-Cord Installation Details

TPI-1839

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.

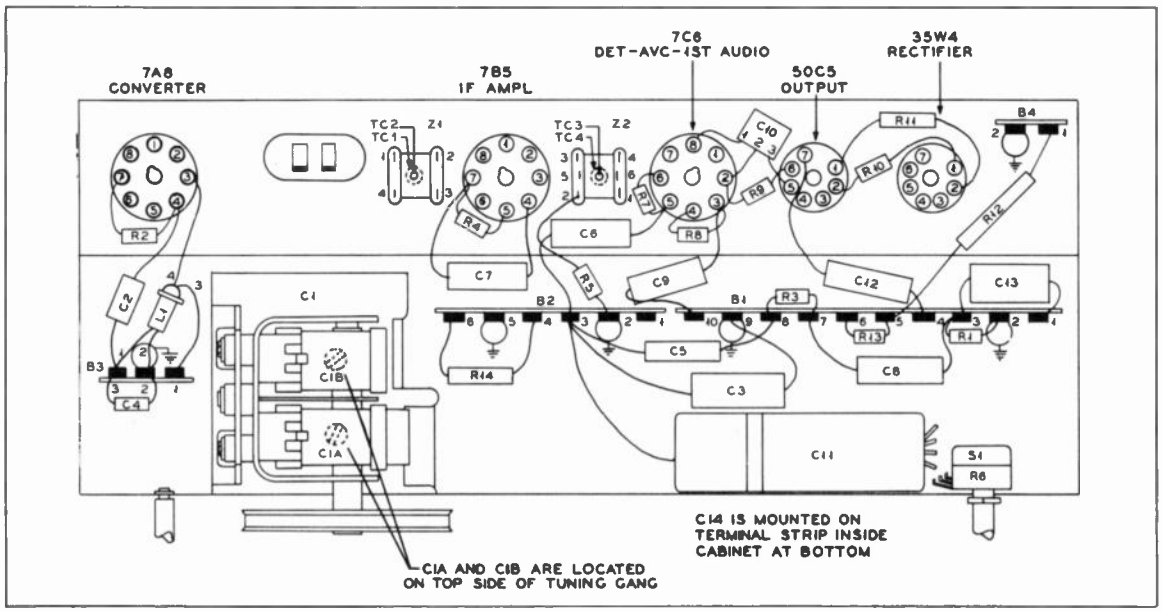
OUTPUT METER—Connect across voice-coil terminals.

SIGNAL GENERATOR—Ground lead to B—, output lead as indicated in chart.

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

STEP	SIGNAL GENERATOR		RADIO		ADJUST TRIMMER
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Through a .01-μf. condenser 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 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.	C1A—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.



TP1-1840

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

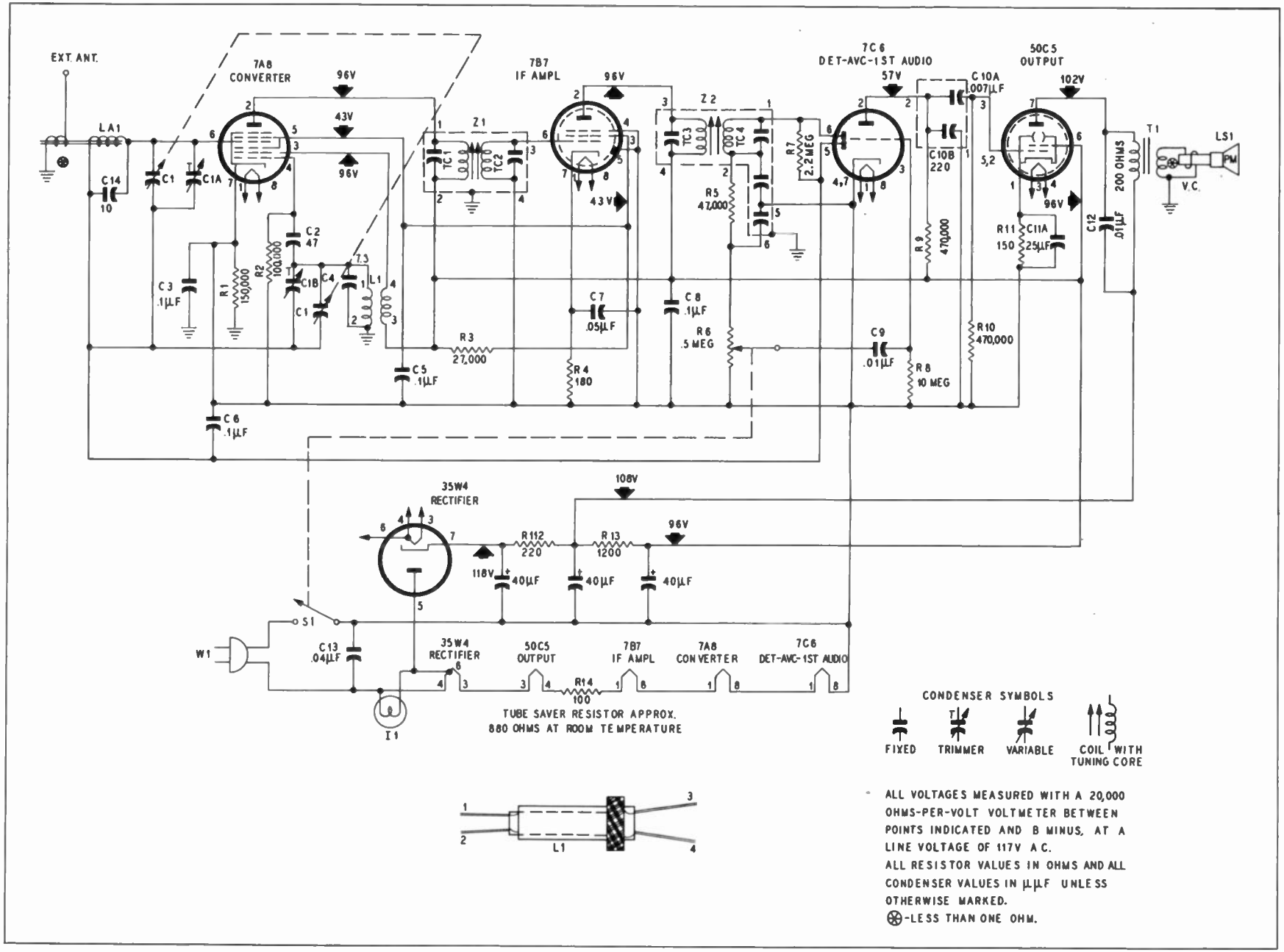


Figure 3. Philco Radio Model 52-548, Schematic Diagram

TP1-1842

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 Symbol	Description	Service Part No.
C1	Condenser, tuning gang	31-2751-10
C1A	Condenser, trimmer, aerial	Part of C1
C1B	Condenser, trimmer, oscillator	Part of C1
C2	Condenser, osc. grid, d-c blocking, 47 $\mu\mu f$.	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.	61-0113*
C6	Condenser, a-v-c by-pass, .1 μf.	61-0113*
C7	Condenser, cathode by-pass, .05 μf.	61-0122*
C8	Condenser, B+ by-pass, .1 μf.	45-3505-47*
C9	Condenser, audio coupling, .01 μf.	45-3505-58*
C10	Condenser, dual ceramic	30-1239-4
C10A	Condenser, audio coupling, .007 μf.	Part of C10
C10B	Condenser, grid by-pass, 220 $\mu\mu f$.	Part of C10
C11	Condenser, electrolytic, 4-section	30-2575-32*
C11A	Condenser, cathode by-pass, 25 μf.	Part of C11
C11B	Condenser, filter, 40 μf.	Part of C11
C11C	Condenser, filter, 40 μf.	Part of C11
C11D	Condenser, filter, 40 μf.	Part of C11
C12	Condenser, tone compensation, .01 μf.	45-3505-58*
C13	Condenser, line by-pass, .04 μf.	30-1226-17*
C14	Condenser, aerial, fixed trimmer, 10 $\mu\mu f$.	30-1224-26*
I1	Pilot lamp, type 47	34-2068
L1	Coil, oscillator	32-4263
LA1	Loop antenna (Magnecor)	32-4455-6
LS1	Speaker, 5¼" round	36-1639-9
R1	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
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
S1	Switch, off-on	Part of R6
T1	Transformer, output	32-8384*
W1	Line cord	L2183.
Z1	Transformer, 1st i-f	32-4160A
Z2	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Description	Service Part No.
Cabinet	10887
Fastener (5 required)	W2235-1FA9
Knob (2 required)	54-4774-9
Knob escutcheon (2 required)	54-4927
Dial backplate assembly	76-7056
Drive cord, 25-foot spool	45-8750
Dial scale	54-5128
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 SERVICE

PHILCO Factory-Supervised Service

HOME RADIO

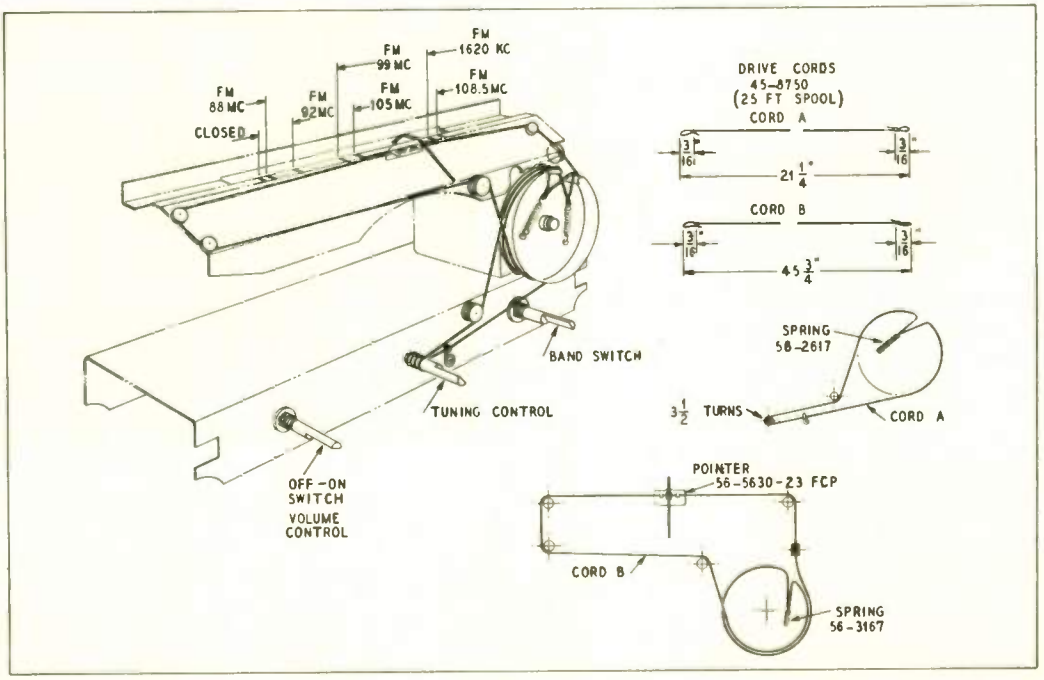
PHILCO RADIO MODEL 52-944

SPECIFICATIONS

CABINET	Plastic table model
CIRCUIT	Six-tube superheterodyne plus selenium rectifier
FREQUENCY RANGES	
Broadcast	540-1620 kc.
FM	88—108 mc.
AUDIO OUTPUT	1 watt
OPERATING VOLTAGE	105—125 volts, a.c./d.c.
POWER CONSUMPTION	45 watts
AERIAL	Built-in pancake loop for AM, line cord for FM; provision for connecting external aerial
INTERMEDIATE FREQUENCY	
AM	455 kc.
FM	9.1 mc.
PHILCO TUBES (6)	12AU6 r-f ampl., 12AT7 converter, 12BA6 1st i-f ampl., 12AU6 2nd i-f ampl., 19V8 det.—a.v.c.—1st audio, 35C5 output

TP1-1703

MODEL 52-944



TPO-373

Figure 1. Dial-Cord Installation Details

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

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
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 maximum 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 maximum output.	C1C—osc. trimmer
3	Same as step 2.	1500 kc.	1500 kc.	Adjust for maximum 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

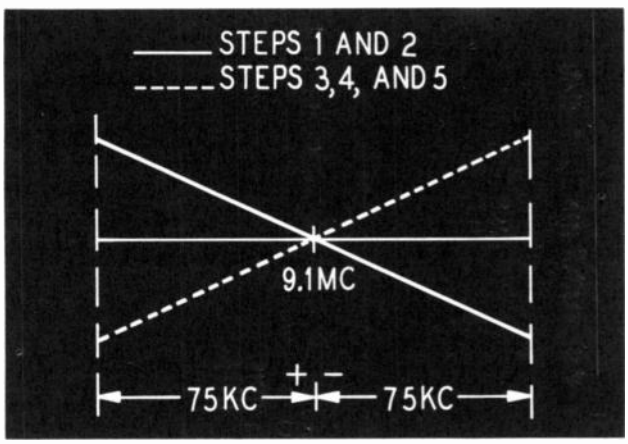
RADIO CONTROLS—Set volume control to maximum, set band switch for FM reception, and set tuning control as indicated in chart.

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 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.

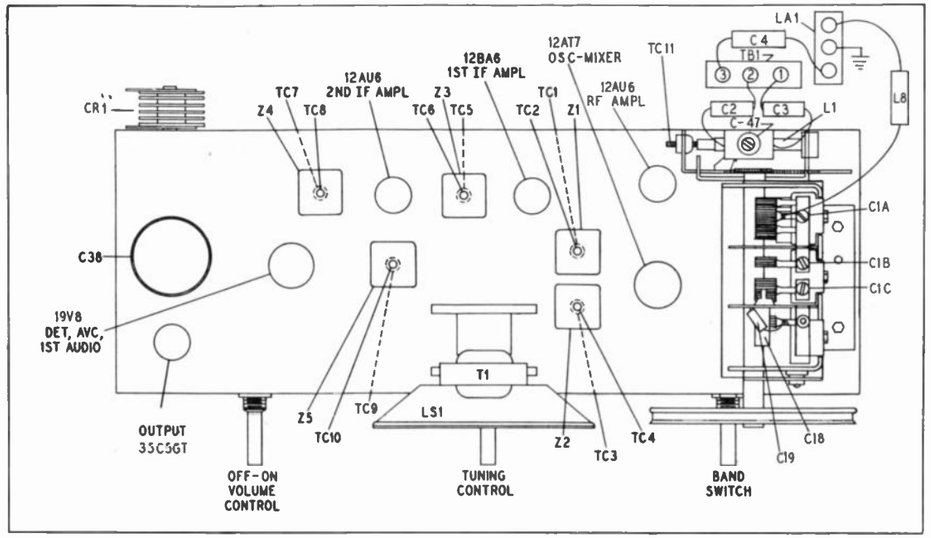


TP1-2111

Figure 2. Characteristic Curve of FM Detector

FM ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
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. deviation).	88 mc. (gang meshed).	Balance and adjust detector for maximum indication on scope as shown in figure 5.	TC8—detector sec. TC7—detector pri.



TP1-1762

Figure 3. Top View, Showing Trimmer Locations

FM ALIGNMENT CHART (Cont.)

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
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 1.	Adjust for maximum indication on scope as shown in figure 5.	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	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 condenser.	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 follows:					
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.

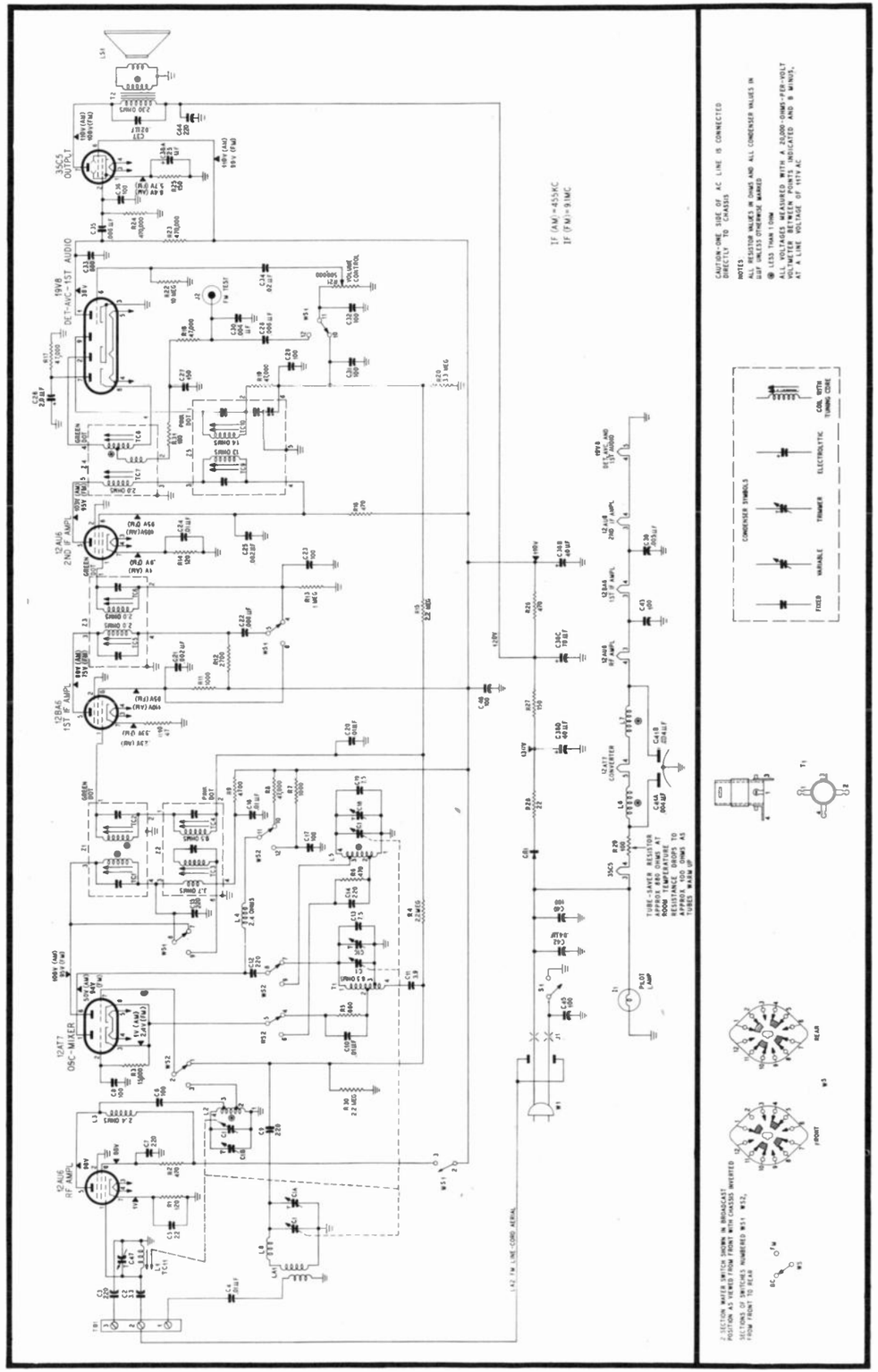


Figure 4. Philco Radio Model 52-944, Schematic Diagram

TP1-1763

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 Symbol	Description	Service Part No.
C1	Condenser, tuning gang, 5-section	31-2762
C1A	Condenser, trimmer, BC aerial	Part of C1
C1B	Condenser, trimmer, FM r-f	Part of C1
C1C	Condenser, trimmer, BC oscillator	Part of C1
C2	Condenser, aerial isolating, 3.3 μμf.	30-1224-49
C3	Condenser, aerial isolating, 220 μμf.	62-122001001*
C4	Condenser, aerial isolating, .01 μf.	45-3505-41
C5	Condenser, cathode by-pass, 22 μμf.	62-022009001
C6	Condenser, d-c blocking, 100 μμf.	62-110001001
C7	Condenser, screen by-pass, 220 μμf.	62-122001011*
C8	Condenser, oscillator grid, 100 μμf.	62-110001021*
C9	Condenser, d-c blocking, 220 μμf.	62-122001001
C10	Condenser, d-c blocking, .01 μf.	30-1226-10
C11	Condenser, neutralizing, 3.9 μμf.	30-1221-14
C12	Condenser, d-c blocking, 220 μμf.	62-122001001
C13	Condenser, fixed trimmer, temperature compensating, 7.5 μμf.	30-1224-8
C14	Condenser, d-c blocking, 220 μμf.	62-122001001*
C15	Condenser, r-f by-pass, 220 μμf.	62-122001001*
C16	Condenser, plate decoupling, .01 μf.	30-4572
C17	Condenser, r-f by-pass, 100 μμf.	62-110001001*
C18	Condenser, trimmer, FM oscillator	31-6511
C19	Condenser, fixed trimmer, temperature compensating, 7.5 μμf.	30-1224-8
C20	Condenser, a-v-c decoupling, .01 μf.	61-0120
C21	Condenser, screen by-pass, .002 μf.	61-0062*
C22	Condenser, neutralizing, .006 μf.	45-3500-7*
C23	Condenser, i-f by-pass, 100 μμf.	62-110001021*
C24	Condenser, cathode by-pass, .01 μf.	61-0120
C25	Condenser, screen by-pass, .002 μf.	61-0062*
C26	Condenser, electrolytic, diode-load filter, 2 μf., 50v	30-2417-7
C27	Condenser, i-f by-pass, 150 μμf.	60-10155407
C28	Condenser, d-c blocking, .006 μf.	45-3500-7*
C29	Condenser, i-f by-pass, 100 μμf.	62-110001021*
C30	Condenser, de-emphasis, .004 μf.	61-0179*
C31	Condenser, i-f by-pass, 100 μμf.	62-110001001*
C32	Condenser, i-f by-pass, 100 μμf.	62-110001001*
C33	Condenser, plate by-pass, 680 μμf.	62-168001001
C34	Condenser, d-c blocking, .02 μf.	61-0108*
C35	Condenser, d-c blocking, .006 μf.	61-0105*
C36	Condenser, grid by-pass, 100 μμf.	62-110001001*
C37	Condenser, tone compensation, .02 μf.	61-0108*
C38	Condenser, electrolytic, 4-section	30-2570-46
C38A	Condenser, cathode by-pass, 25 μf., 25v.	Part of C38
C38B	Condenser, filter, 40 μf., 150v	Part of C38
C38C	Condenser, filter, 70 μf., 150v	Part of C38
C38D	Condenser, filter, 40 μf., 150v	Part of C38
C39	Condenser, filament by-pass, .005 μf.	30-1238-1
C40	Condenser, line by-pass, 100 μμf.	62-110001021*
C41	Condenser, ceramic, 2-section	30-1239
C41A	Condenser, filament by-pass, .004 μf.	Part of C41
C41B	Condenser, filament by-pass, .004 μf.	Part of C41
C42	Condenser, line by-pass, .04 μf.	45-3500
C43	Condenser, filament by-pass, 100 μμf.	62-110001021*
C44	Condenser, plate decoupling, 220 μμf.	66-122001001
C45	Condenser, line by-pass, 100 μμf.	62-110001021*
C46	Condenser, r-f by-pass, 100 μμf.	62-110001001
C47	Condenser, FM aerial trimmer	45-3034
CR1	Selenium rectifier, 100 ma., 117v	34-8003-1
I1	Pilot lamp, frosted, 117v, 7 watts	34-2605
J1	Jack, male, a-c	27-4785-13
J2	Socket, FM test	27-6180
L1	Coil, FM aerial, complete with grommet	45-9613
L2	Coil, FM r-f	32-4415-2
L3	Choke, r-f, 3.3 μh.	32-4422-10
L4	Choke, r-f, 3.3 μh.	32-4422-10
L5	Coil, FM oscillator	32-4414-1
L6	Choke, filament, 2.2 μh.	32-4422-8
L7	Choke, filament, 2.2 μh.	32-4422-8
L8	Choke, r-f, 4.1 μh.	32-4061-3
LA1	AM loop and support assembly	76-7030
LA2	Line-cord aerial, FM	Part of W1
LS1	Speaker, 4" p-m, including output transformer	36-1614-6
R1	Resistor, cathode bias, 120 ohms	66-1128340*
R2	Resistor, screen decoupling, 470 ohms	66-1478340*
R3	Resistor, grid return, 15,000 ohms	66-3158340*
R4	Resistor, grid return, 2.2 megohms	66-5228340*
R5	Resistor, parasitic suppressor, 680 ohms.	66-1688340*
R6	Resistor, parasitic suppressor, 470 ohms.	66-1478340*
R7	Resistor, plate dropping, FM, 1000 ohms.	66-2108340*
R8	Resistor, plate dropping, AM, 47,000 ohms	66-3478340*
R9	Resistor, plate dropping, 4700 ohms	66-2478340*
R10	Resistor, cathode bias, 47 ohms	66-0478340*
R11	Resistor, screen decoupling, 1000 ohms	66-2108340*
R12	Resistor, plate decoupling, 2700 ohms	66-2278340*
R13	Resistor, grid return, 1 megohm	66-5108340*
R14	Resistor, cathode bias, 120 ohms	66-1128340*
R15	Resistor, a-v-c filter, 2.2 megohms	66-5228340*
R16	Resistor, decoupling, 470 ohms	66-1478340*
R17	Resistor, FM diode load, 47,000 ohms	66-3478340*
R18	Resistor, de-emphasis, 47,000 ohms	66-3478340*
R19	Resistor, i-f filter, 47,000 ohms	66-3478340*
R20	Resistor, a-v-c load, 3.3 megohms	66-5338340*
R21	Volume control (with off-on switch), 500,000 ohms	33-5566-20
R22	Resistor, grid return, 10 megohms	66-4478340*
R23	Resistor, plate load, 470,000 ohms	66-4478340*
R24	Resistor, grid return, 470,000 ohms	66-4478340*
R25	Resistor, cathode bias, 150 ohms	66-1158340*
R26	Resistor, filter, 470 ohms, 1 watt	66-1474340*
R27	Resistor, filter, 150 ohms, 2 watts	66-1155340*
R28	Resistor, current limiting, 22 ohms, 2 watts	66-0225360
R29	Resistor, current limiting, 100 ohms	33-1343-3
R30	Resistor, grid return, 2.2 megohms	66-5228340*
R31	Resistor, loading, 100 ohms	66-1108340*
S1	Switch, off-on	Part of R21
T1	Transformer, AM oscillator	32-4458-4
T2	Transformer, output	Part of LS1
W1	Line cord	L2183
W2	Cable, FM aerial, 72-ohm twin lead	41-3987
WS	Switch, band, 2-wafer	42-1924-1

(Continued on next page)

FOLD OUT

FOLD OUT

REPLACEMENT PARTS LIST (Cont.)

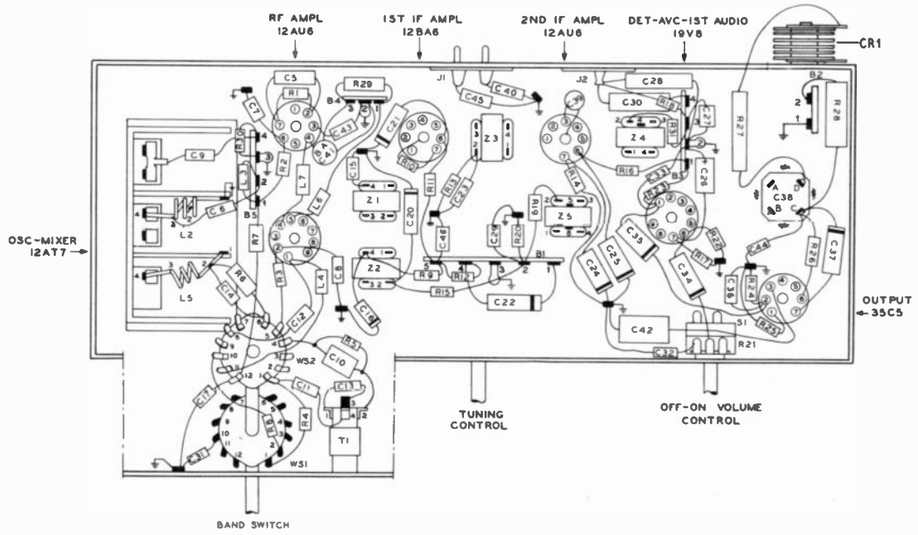
Reference Symbol	Description	Service Part No.
Z1	Transformer, FM, 1st i-f	32-4518A
Z2	Transformer, AM, 1st i-f	32-4516A
Z3	Transformer, FM, 2nd i-f	32-4518-1A
Z4	Transformer, FM, 3rd i-f	32-4310-4A
Z5	Transformer, AM, 2nd i-f	32-4517A

MISCELLANEOUS

Description	Service Part No.
Cabinet	10796
Back, flange, and socket assembly	76-5764
Fastener, back mtg. (4)	W-2235-FA9
Baffle and cloth assembly	40-7923
Fastener, baffle mtg. (2)	W-2235-2FA9
Dial scale	54-5089-2
Clip, scale mtg. (3)	56-7808FE11
Knob, FM-AM	54-4774-5
Knob, tuning	54-4774
Knob, volume-off-on	54-4774-4

MISCELLANEOUS (Cont.)

Description	Service Part No.
Dial backplate assembly	76-7040
Drive cord, 25-foot spool	45-8750*
Pointer	56-5630-23FCP
Shaft, drive	56-7931FA11
Spring, gang drive	56-2617
Spring, pointer drive	56-3167
Rubber mounts, gang (5)	27-4771-1
Rubber mounts, speaker (2)	54-4651-1
Socket, 12BA6 (i-f ampl.)	27-6265
Socket, 12AU6 (i-f ampl.)	27-6265
Socket, 12AU6 (r-f ampl.)	27-6275-1
Socket, 12AT7	27-6203-6
Socket, 19V8	27-6203-5
Socket, 35C5	27-6203-12
Spacer, "T", speaker mtg. (2)	1W29155FA3
Washer, speaker mtg. (2)	1W52265FA9



TP1-1761

Figure 5. Symbolized Chassis, Showing Parts Placement

PR-1955

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PHILCO SERVICE

PHILCO Factory-Supervised Service

HOME RADIO

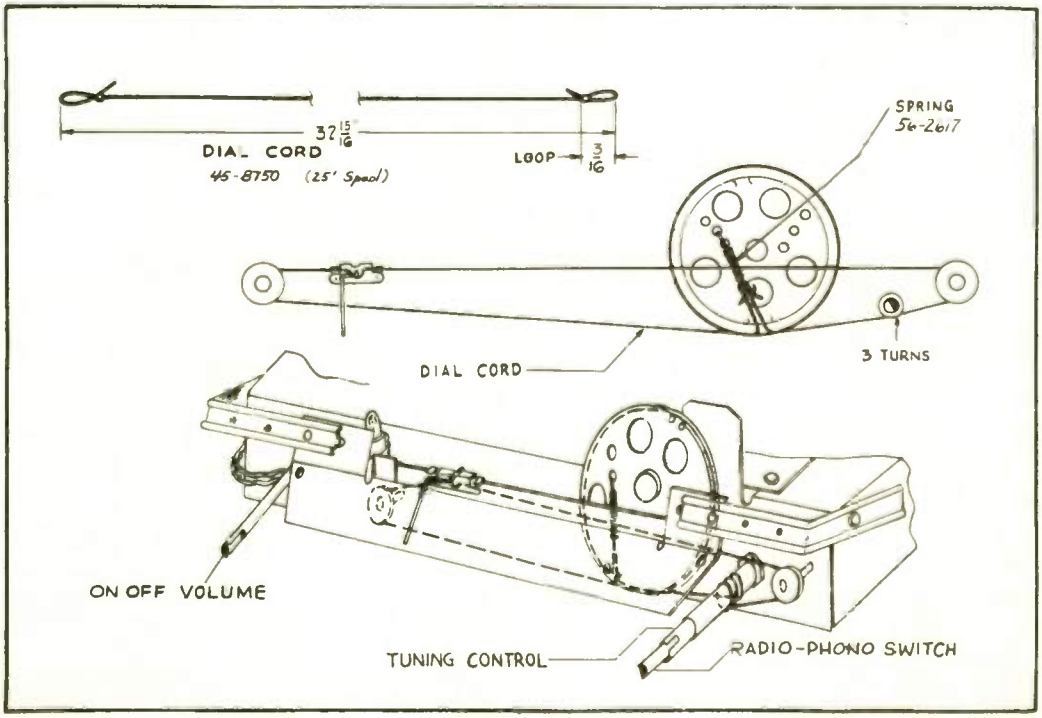
PHILCO RADIO-PHONOGRAPH
MODEL 52-1340, CODES 121 AND 122

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)	7A8 converter, 7B7 i-f amplifier, 7C6 2nd det. —a.v.c.—1st audio, 35L6GT output, 50Y7GT rectifier
PHONOGRAPH	Philco Model M-22 All-Speed Automatic Record Changer (for service information, refer to Service Manual PR-1923)

MODEL 52-1340

TP1-1836



TP1-1835

Figure 1. Drive-Cord Installation Details

ALIGNMENT PROCEDURE

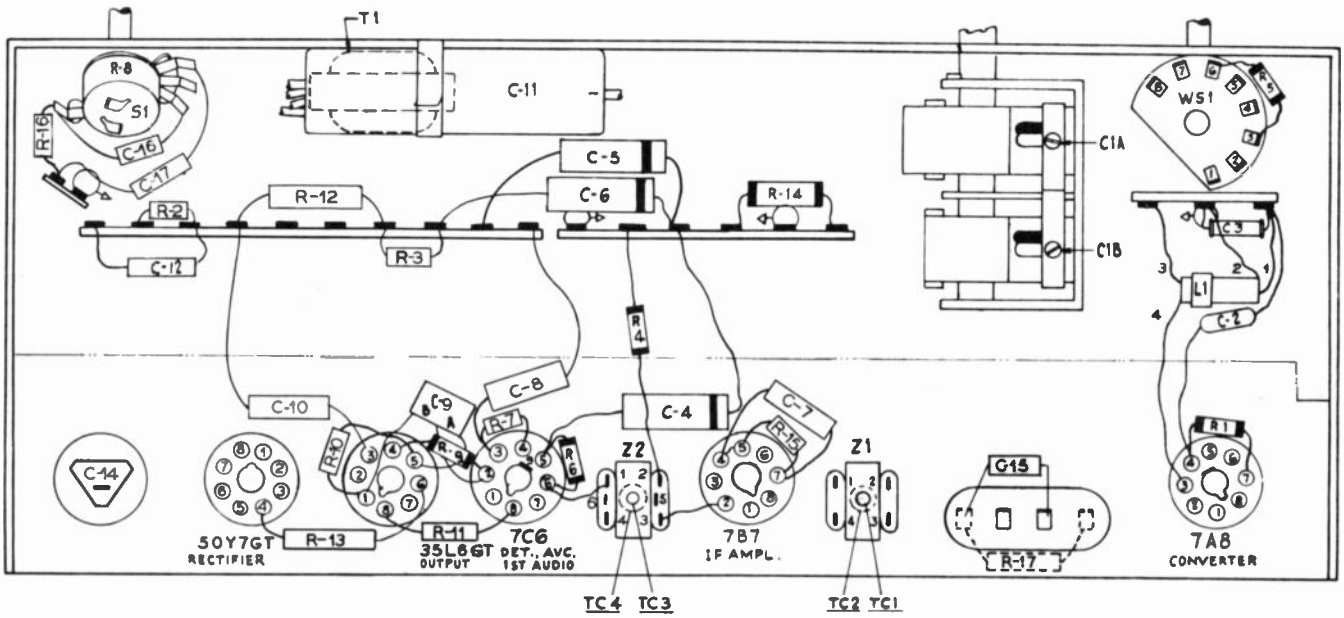
DIAL POINTER—Turn tuning condenser to full-mesh position. Set dial pointer to index mark, located to left of "55".

CONTROLS—Set volume control to maximum, radio-phono 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.



TP1-1837

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

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST TRIMMER
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Through a .01-μf. 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.	C1A—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.

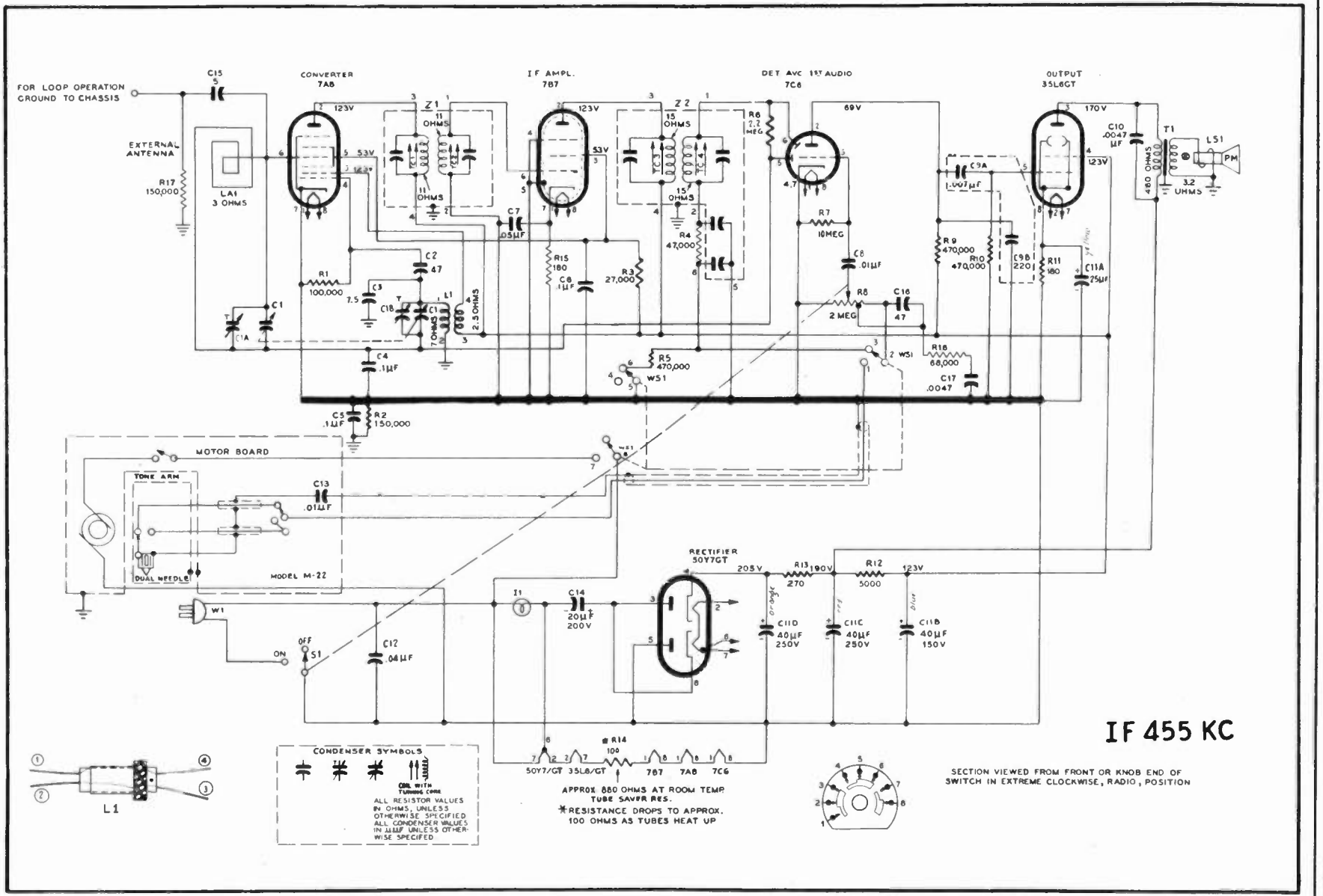


Figure 3. Philco Radio-Phonograph Model 52-1340, Schematic Diagram

TP1-1838

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.
C1	Condenser, tuning gang	31-2751-9
C1A	Condenser, trimmer, aerial	Part of C1
C1B	Condenser, trimmer, osc.	Part of C1
C2	Condenser, osc. grid, d-c blocking, 47 μμf.	60-00515307*
C3	Condenser, temperature compensating, 7.5 μμf.	30-1224-65
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 μf.	45-3505-56
C11	Condenser, electrolytic, 4-section	30-2575-32*
C11A	Condenser, cathode by-pass, 25 μf.	Part of C11
C11B	Condenser, filter, 40 μf.	Part of C11
C11C	Condenser, filter, 40 μf.	Part of C11
C11D	Condenser, filter, 40 μf.	Part of C11
C12	Condenser, line by-pass, .04 μf.	30-1226-17
C13	Condenser, phono isolation, .01 μf.	61-0120*
C14	Condenser, voltage doubling, 20 μf. 200v.	30-2568-22
C15	Condenser, aerial blocking, 5μμf.	30-1230
C16	Condenser, high-frequency compensation, 47 μμf.	60-00515307
C17	Condenser, bass compensation, .0047 μf.	45-3505-56
I1	Pilot lamp, type 47	34-2064
L1	Coil, oscillator	32-4263
LA1	Loop antenna (Code 121)	76-2127-13
LA1	Loop antenna (Code 122)	76-2127-14
LS1	Speaker, 5¼" round	36-1639-1
R1	Resistor, grid return, 100,000 ohms	66-4108340*
R2	Resistor, leakage, 150,000 ohms	66-4158340*
R3	Resistor, dropping, 27,000 ohms	66-3278340*
R4	Resistor, i-f filter, 47,000 ohms	66-3478340*
R5	Resistor, diode return, 470,000 ohms	66-4478340*
R6	Resistor, diode load, 2.2 megohms	66-5228340*
R7	Resistor, grid return, 10 megohms	66-6108340*
R8	Volume control, 2 megohms (with switch)	33-5564-11
R9	Resistor, plate load, 470,000 ohms	66-4478340*
R10	Resistor, grid return, 470,000 ohms	66-4478340*
R11	Resistor, cathode bias, 180 ohms	66-1184340
R12	Resistor, filter, 5000 ohms	33-1335-95
R13	Resistor, filter, 270 ohms, 2 watts	33-1335-91
R14	Resistor, surge limiting, 880 ohms cold, 100 ohms hot	33-1343-3
R15	Resistor, cathode bias, 180 ohms	66-1188340
R16	Resistor, bass compensation, 68,000 ohms.	66-3688340
R17	Resistor, aerial loading, 150,000 ohms.	66-4158340
S1	Switch, off-on	Part of R8
T1	Transformer, output	32-8384*
W1	Line cord	L2183
WS1	Wafer switch, radio-phono	42-1949
Z1	Transformer, 1st i-f	32-4160A
Z2	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Description	Service Part No.
Backplate assembly	76-6232
Cabinet, complete, Code 121	10840-2
Cabinet, complete, Code 122	10840-6
Hinge (2)	56-6603
Lid	54-4838
Lid support	56-6604
Changer Mounting Hardware	
Sleeve, rubber (3)	54-7798
Speed nut (3)	W-2554
Spring, heavy, top (3)	56-7059FA9
Spring, light, bottom (3)	56-7059-1FJ47
Dial scale	54-5107
Knob, off-on-volume	54-4843
Knob, radio-phono	54-4842
Knob, tuning	54-4841
Pilot-lamp socket assembly	76-1179-7
Fastener, pilot-lamp shield (2)	W2235-1FA9
Pointer	56-5630-31
Spring, pointer drive	56-2617
Socket, Loktal (3)	27-6207
Socket, octal (2)	27-6174
Tuning shaft	56-8370

PR-1956

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PHILCO SERVICE

PHILCO Factory-Supervised Service

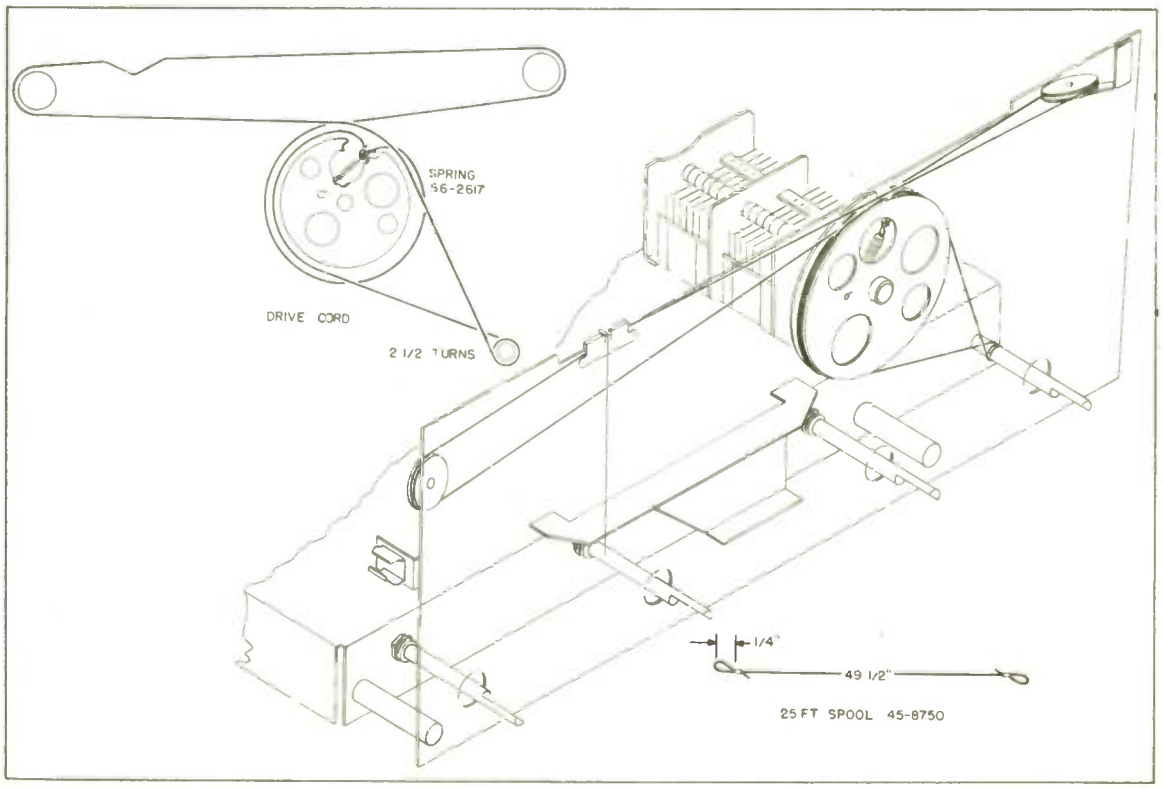
HOME RADIO

PHILCO RADIO-PHONOGRAPH MODEL 53-1754

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 ampl; 6BE6 converter, osc., phono preampl; 6BJ6 i-f ampl; 6AV6 detector, a.v.c., 1st audio; 6AQ5 output; 6X4 rectifier

MODEL 53-1754



TP2-3243

Figure 1. Drive-Cord Installation Details

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.

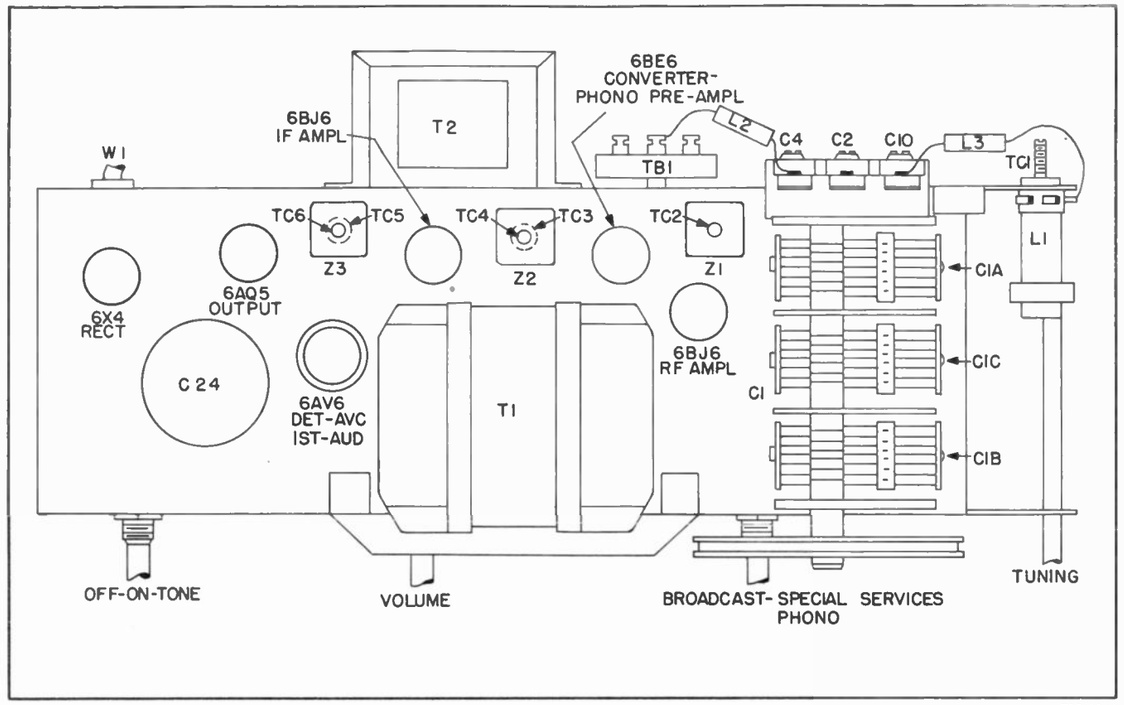
DIAL POINTER—Before the alignment is started, the dial pointer should be set to coincide with the dial scale mark to the left of "55" when the tuning gang is fully meshed.

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 .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-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)	TC2—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.	C10—special services mixer-grid trimmer C4—special services r-f trimmer
7	Same as step 2.	1800 kc.	Same as step 3.	Adjust for maximum output.	C2—special services r-f padder

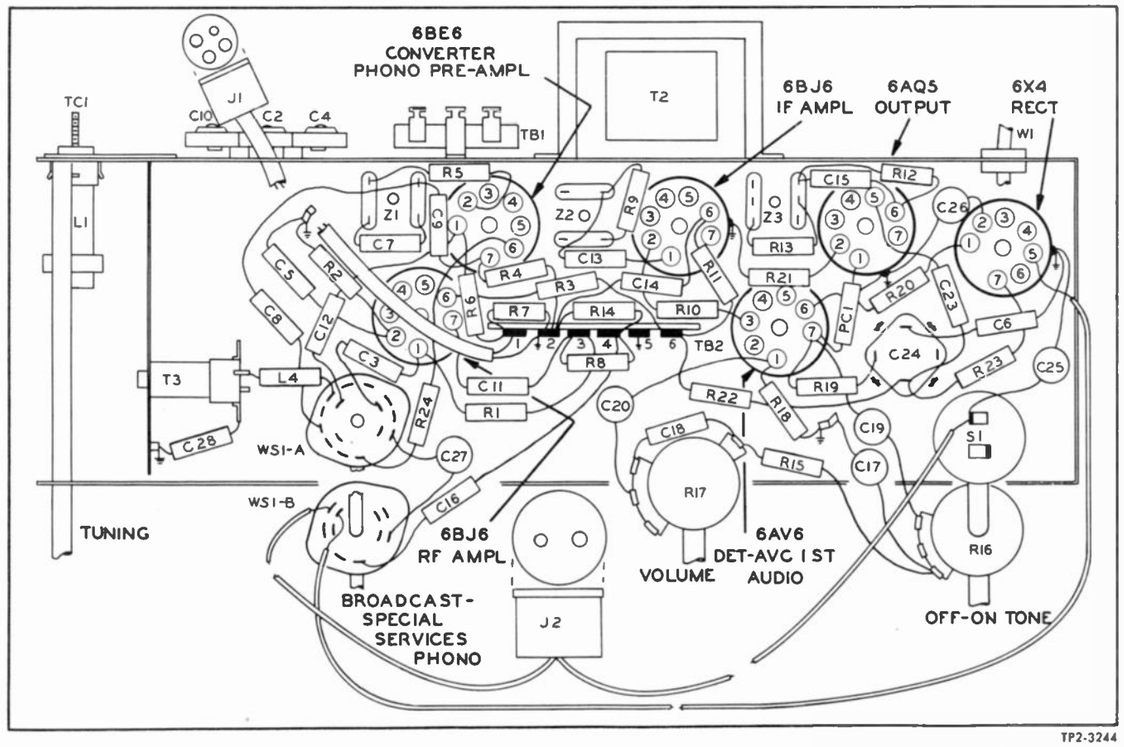
NOTE 1: Make up a 6—8 turn, 6-inch-diameter loop from insulated wire; connect to signal-generator leads and place about 1 foot from radio loop antenna. The position of the radio loop with respect to the chassis should be approximately the same as when both are mounted in the cabinet.

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.



TP2-3245

Figure 2. Top View, Showing Tuning Adjustments



TP2-3244

Figure 3. Base View, Showing Parts Placement

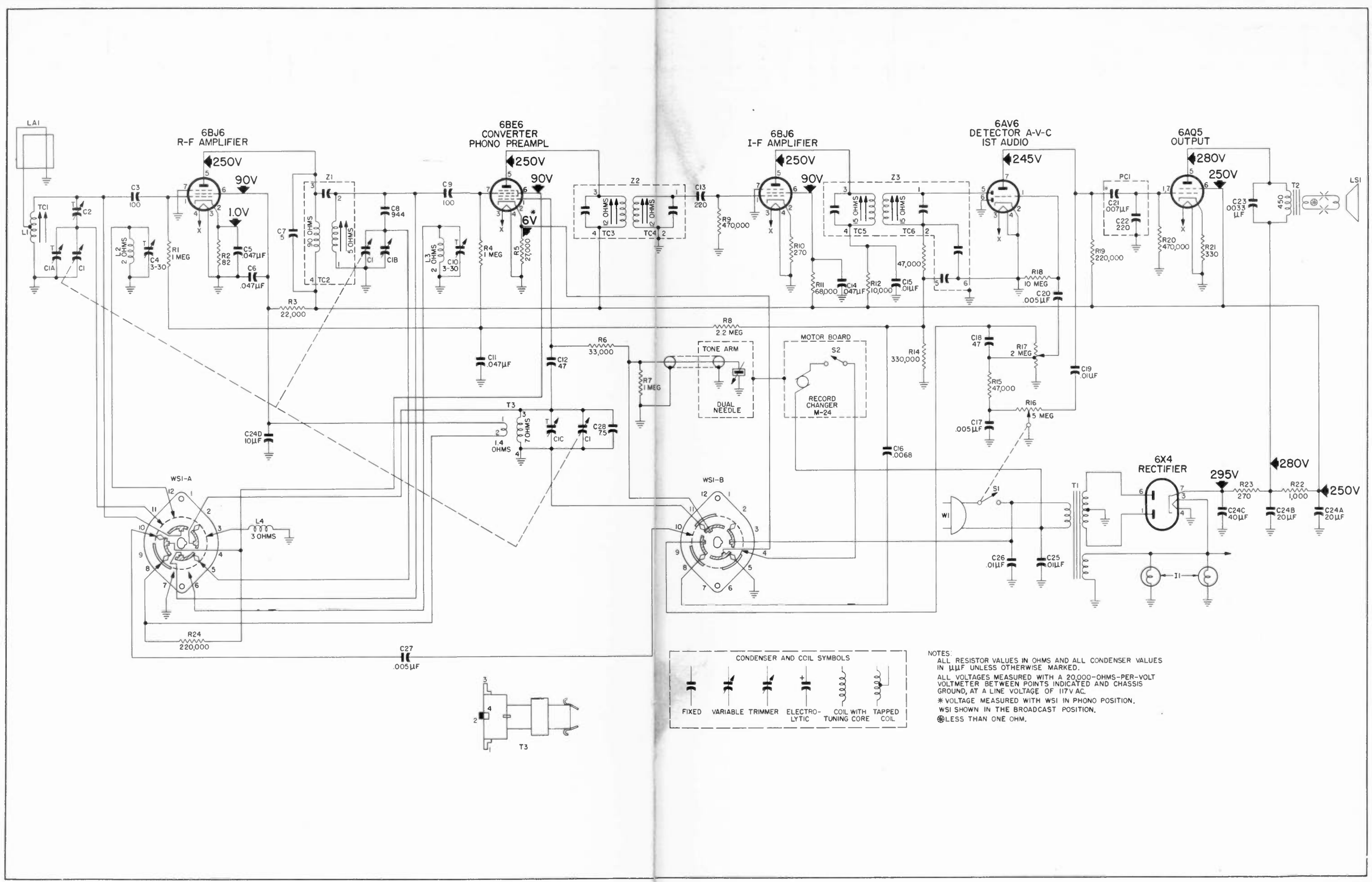
REPLACEMENT PARTS LIST

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.
C1	Condenser, tuning gang, 3-section	31-2771-3
C1A	Condenser, trimmer, antenna	Part of C1
C1B	Condenser, trimmer, r-f	Part of C1
C1C	Condenser, trimmer, oscillator	Part of C1
C2	Condenser, padder, special services r-f	Part of CA1
C3	Condenser, d-c blocking, 100 μμf.	62-110001001*
C4	Condenser, trimmer, special services r-f	Part of CA1
C5	Condenser, cathode by-pass, .047 μf.	30-4650-45
C6	Condenser, screen by-pass, .047 μf.	30-4650-45
C7	Condenser, r-f by-pass, 5 μμf.	60-90505020
C8	Condenser, fixed padder, 944 μμf.	30-1220-65
C9	Condenser, d-c blocking, 100 μμf.	62-110001001*
C10	Condenser, trimmer, special services mixer-grid	Part of CA1
C11	Condenser, a-v-c by-pass, .047 μf.	30-4650-45*
C12	Condenser, oscillator coupling, 47 μμf.	60-00475417
C13	Condenser, i-f coupling, 220 μμf.	62-122001001*
C14	Condenser, screen by-pass, .047 μf.	30-4650-45*
C15	Condenser, plate by-pass, .01 μf.	30-1238-2*
C16	Condenser, audio coupling, .0068 μf.	30-4650-57
C17	Condenser, tone compensation (bass boost), .005 μf.	30-1238-1*
C18	Condenser, tone compensation, 47 μμf.	60-00475417
C19	Condenser, tone compensation (high cut) .01 μf.	30-1238-2*
C20	Condenser, audio coupling, .005 μf.	30-1238-1*
C21	Condenser, d-c blocking, .007 μf.	Part of PC1
C22	Condenser, r-f by-pass, 220 μμf.	Part of PC1
C23	Condenser, tone compensation, .0033 μf.	30-4650-89*
C24	Condenser, electrolytic filter	30-2584-32
C24A	Condenser, filter, 20 μf.	Part of C24
C24B	Condenser, filter, 20 μf.	Part of C24
C24C	Condenser, filter, 40 μf.	Part of C24
C24D	Condenser, filter, 10 μf.	Part of C24
C25	Condenser, line by-pass, .01 μf.	30-1238-2
C26	Condenser, line by-pass, .01 μf.	30-1238-2
C27	Condenser, audio coupling (phono), .005 μf.	30-1238-1
C28	Condenser, fixed trimmer, 7.5 μμf.	30-1224-65
CA1	Condenser assembly, trimmer	31-6477-17
I1	Lamp assembly, pilot (2)	27-6233-4
J1	Connector, phono input	76-8262-1
J2	Connector, phono a-c	76-8366
L1	Coil, antenna	32-4413-2
L2	Coil, special services r-f	32-4561-5
L3	Coil, special services mixer grid	32-4561-5
L4	Coil, oscillator shunt	32-4562-1
LA1	Loop antenna	32-4394-13
LS1	Speaker (10")	36-1610-6
PC1	Printed circuit	30-1239-4
R1	Resistor, r-f a-v-c, 1 megohm	66-5108340*
R2	Resistor, cathode bias, 82 ohms	66-0828340*
R3	Resistor, screen dropping, 22,000 ohms	66-3225340*
R4	Resistor, grid leak, 1 megohm	66-5108340
R5	Resistor, cathode bias, 27,000 ohms	66-3278340*
R6	Resistor, oscillator grid leak, 33,000 ohms	66-3338340*
R7	Resistor, load (phono), 1 megohm	66-5108340*
R8	Resistor, a-v-c load, 2.2 megohms	66-5228340*
R9	Resistor, grid leak, 470,000 ohms	66-4478340*
R10	Resistor, cathode bias, 270 ohms	66-1275340*
R11	Resistor, screen dropping, 68,000 ohms	66-3688340*
R12	Resistor, plate dropping, 10,000 ohms	66-3108340*
R13	Resistor, i-f filter, 47,000 ohms	66-3478340*
R14	Resistor, diode load, 330,000 ohms	66-4338340*
R15	Resistor, tone compensation (bass boost)	66-3478340*
R16	Resistor, tone control, 5 megohms	33-5566-48
R17	Resistor, volume control, 2 megohms	33-5535-36
R18	Resistor, grid leak, 10 megohms	66-6108340*
R19	Resistor, plate load, 220,000 ohms	66-4228340*
R20	Resistor, grid leak, 470,000 ohms	66-4478340*
R21	Resistor, cathode bias, 330 ohms, 1 watt	66-1334340*
R22	Resistor, B+ filter, 1000 ohms	66-2105340*
R23	Resistor, B+ filter, 270 ohms	66-1275340*
R24	Resistor, plate load, preampl., 220,000 ohms	66-4228340*
S1	Switch, off-on	Part of R16
S2	Switch, off-on, phono motor	Part of M-24 Record Changer
T1	Transformer, power	32-8610
T2	Transformer, output	32-8242-13
T3	Transformer, oscillator	32-4453-2
W1	Line cord	L2183*
WS1	Switch, band	42-1997
Z1	Transformer, r-f	32-4399-7A
Z2	Transformer, 1st i-f	32-4160A
Z3	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Description	Service Part No.
Cabinet	10985
Back	54-8932
Dome (4)	45-6190
Door pull (2)	56-7062-1
Hinge, right hand (2)	56-9922
Hinge, left hand (2)	56-9922-1
Bullet catch (2)	45-6002
Strike plate (2)	45-6003
Changer frame ass'y.	76-6600-2
Rail ass'y., r.h. (changer drawer)	76-6597
Rail ass'y., l.h. (changer drawer)	76-6258
Spring, changer mtg. (3)	56-7059FA9
Spring, changer mtg. (3)	56-7059-1FCP
Sleeve, changer mtg. (3)	54-7798
Pull knob, changer drawer	56-8496
Frame ass'y.	45-9790
Dial backplate ass'y.	76-8321
Dial scale	54-5184
Clip, scale	56-4756FE11
Knob (3)	54-4718-20
Knob	54-4718-21
Spring, shaft retaining	28-8610
Pointer	56-5630-57
Socket (5)	27-6275
Socket (6AV6)	27-6203-14
Rubber mount, gang mounting	27-4596
Tube shield	56-5629FA3



CONDENSER AND COIL SYMBOLS

FIXED · VARIABLE · TRIMMER · ELECTRO-LYTIC · COIL WITH TUNING CORE · TAPPED COIL

NOTES:
ALL RESISTOR VALUES IN OHMS AND ALL CONDENSER VALUES IN µµF UNLESS OTHERWISE MARKED.
ALL VOLTAGES MEASURED WITH A 20,000-OHMS-PER-VOLT VOLTMETER BETWEEN POINTS INDICATED AND CHASSIS GROUND, AT A LINE VOLTAGE OF 117 V AC.
* VOLTAGE MEASURED WITH WSI IN PHONO POSITION.
WSI SHOWN IN THE BROADCAST POSITION.
⊛ LESS THAN ONE OHM.

TP2-1398

Figure 4. Philco Radio-Phonograph Model 53-1754, Schematic Diagram

PHILCO

PHILCO Factory-Supervised Service

SERVICE

HOME RADIO

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)	10925-9
Cabinet, sand (Model 53-562)	10926-16
Backplate, dial	54-4972-3
Cabinet, spruce green (Model 53-562)	10926-17
Backplate, dial	54-4972-2

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-$\mu\mu$f. 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, AND 53-707

Addition to Parts List

MODEL 53-702

Cabinet, spruce	10940-4

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 following figures give the lengths of the dial cords on each model, including a ¼" loop at each end.

53-702	10¾"
53-706	16½"
53-707	16½"

SUPPLEMENT TO SERVICE MANUAL PR-2420, FOR MODEL 53-956

Changes to Schematic Diagram and Parts List

Change cathode by-pass condenser C5, 22 μμf., Part No. 62-022009001, to 33 μμf., Part No. 62-033009001.
Change d-c blocking condenser C6, 220 μμf., Part No. 30-6002, to 470 μμf., 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

MODEL 53-1750 (MAHOGANY)

Center panel, top	45-6758

MODEL 53-1750 (BLOND)

Center panel, top	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

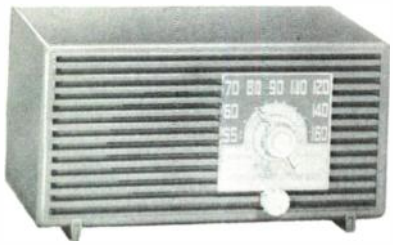
Change Cartridge, Part No. 45-9612, to: Cartridge and needle assembly, Part No. 45-9785.
Change part number of Needle from 45-9588 to 45-9784.

PHILCO SERVICE

PHILCO Factory-Supervised Service

HOME RADIO

PHILCO RADIO MODEL 53-559



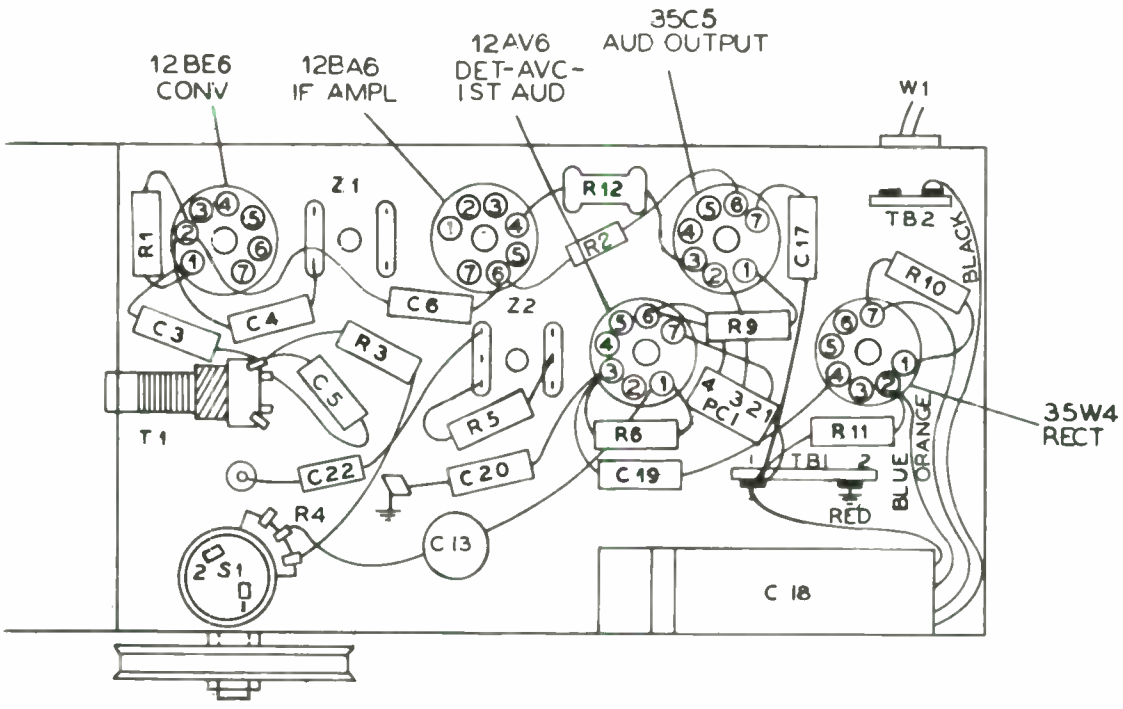
TP2-3229

MODEL 53-559

SPECIFICATIONS

CABINET	Molded plastic
CIRCUIT	Four-tube superheterodyne (plus rectifier)
FREQUENCY RANGE	
Standard Broadcast	540—1620 kc.
Special Services	1700—3400 kc.
AUDIO OUTPUT	1 watt
OPERATING VOLTAGE	105—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, detector-a.v.c.-1st audio; 35C5, output; 35W4, rectifier

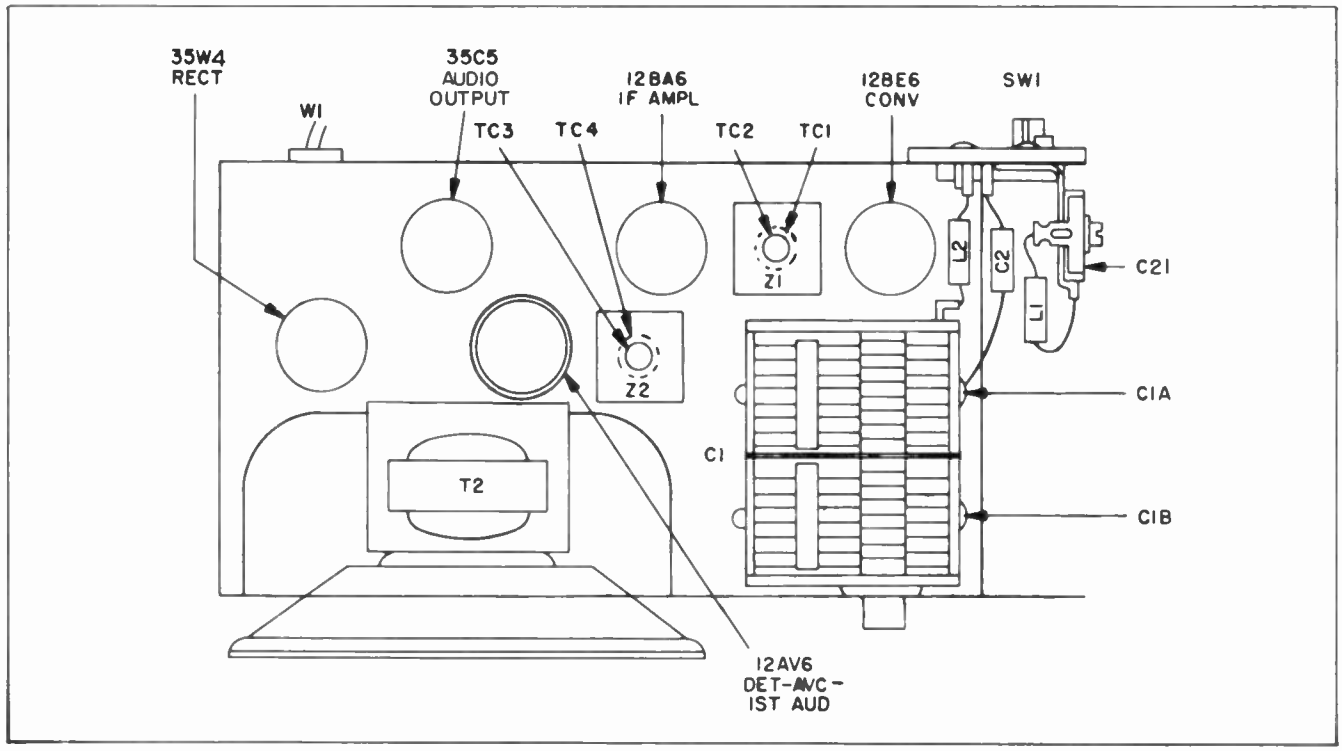
NOTE The antenna is mounted on the cabinet back. When removing the cabinet back, use care to avoid breaking the antenna leads.



TP2 3228

Figure 1. Base View, Showing Parts Placement

PHILCO RADIO MODEL 53-559 PR-2479



TP2-3227

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.

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.

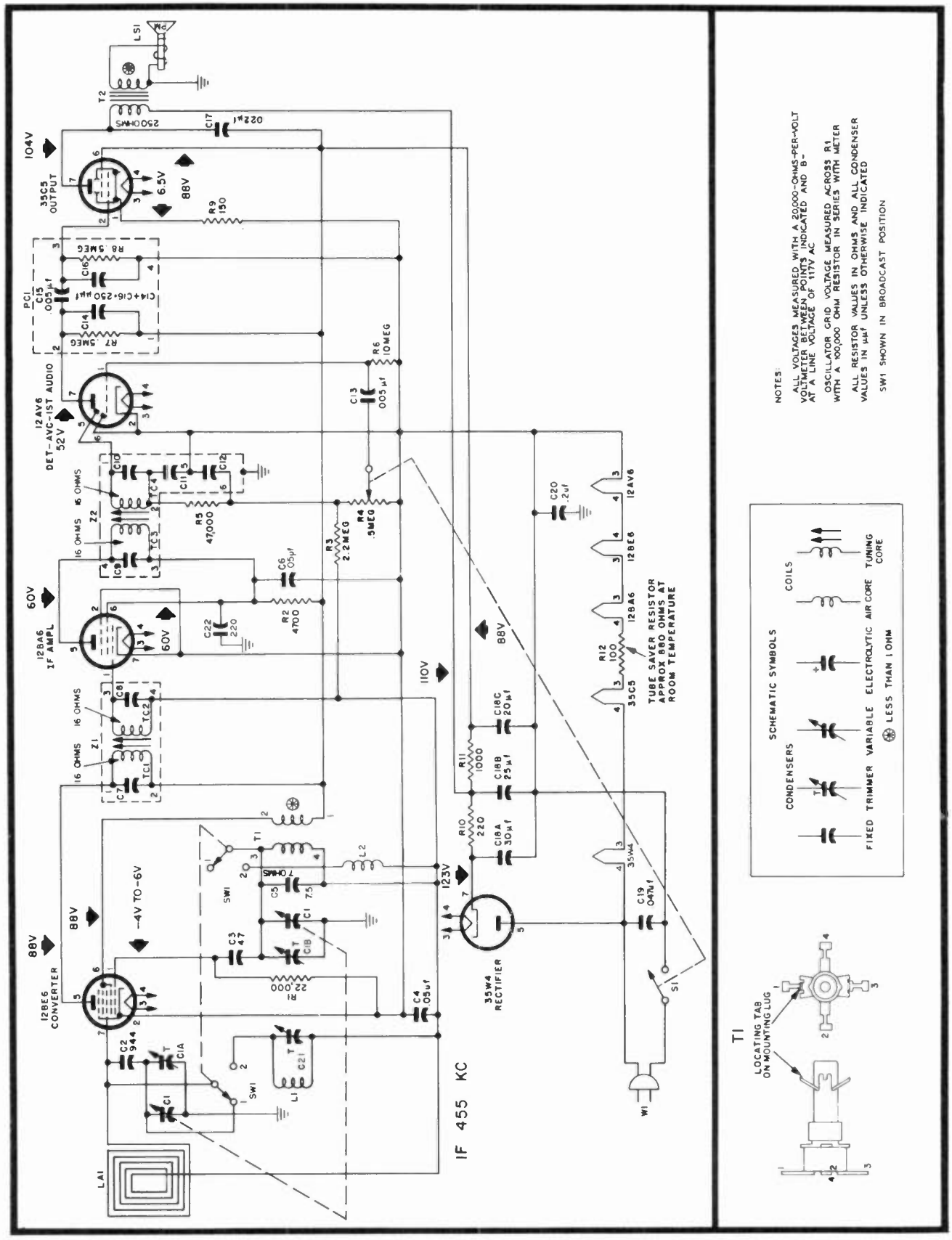
ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO			ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	BAND-SWITCH SETTING	SPECIAL INSTRUCTIONS	
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. 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.	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)

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.



TP2-3226

Figure 3. Philco Radio Model 53-559, Schematic Diagram

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.
C1	Condenser, tuning gang	31-2751-13
C1A	Condenser, r-f trimmer	Part of C1
C1B	Condenser, oscillator trimmer	Part of C1
C2	Condenser, antenna series tracker, 944 μμf.	30-1220-65
C3	Condenser, oscillator grid, 47 μμf.	30-1230-4
C4	Condenser, a-v-c by-pass, .05 μf.	30-4650-45*
C5	Condenser, drift compensation, 7.5 μμf.	30-1224-83
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 μf.	30-1238-1
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.	30-4650-43
C18	Condenser, electrolytic, 3-section	30-2573
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, .047 μf.	30-4650-45*
C20	Condenser, B– to chassis, .2 μf.	30-4650-49*
C21	Condenser, trimmer, special services	31-6473-29
C22	Condenser, r-f by-pass, 220 μμf.	60-10225417
L1	Coil, antenna, special services	32-4561-3
L2	Coil, oscillator shunt	32-4562-2
LA1	Loop	Part of cabinet back
LS1	Speaker, p-m	36-1627-8
PC1	Printed circuit	30-6001
R1	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 megohm	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	33-1343-3
S1	Switch, off-on	Part of R4
SW1	Switch, broadcast-special services	42-1796-2
T1	Transformer, oscillator	32-4453-6
T2	Transformer, output	32-8384-2*
W1	Line cord	L-2183*
Z1	Transformer, 1st i-f	32-4161A
Z2	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Description	Service Part No.
Back-and-loop ass'y.	76-7705-1
Cabinet	
Driftwood	10921-5
Mahogany	10921-6
Dial scale	28-9292
Drive cord (25-ft. spool)	45-8750*
Fastener, back	W2235FA9
Knob, tuning	54-4978-2
Knob, volume	54-4118
Shield, tube	56-5629FA3
Socket, tube (4)	27-6265*
Socket, tube (12AV6)	27-6203-14*

PHILCO SERVICE

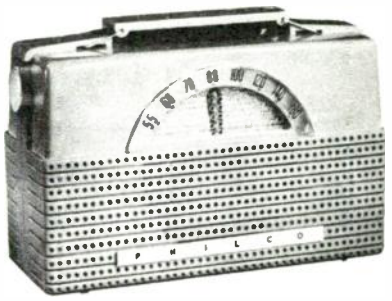
PHILCO Factory-Supervised Service

HOME RADIO

PHILCO PORTABLE RADIO MODEL 53-652

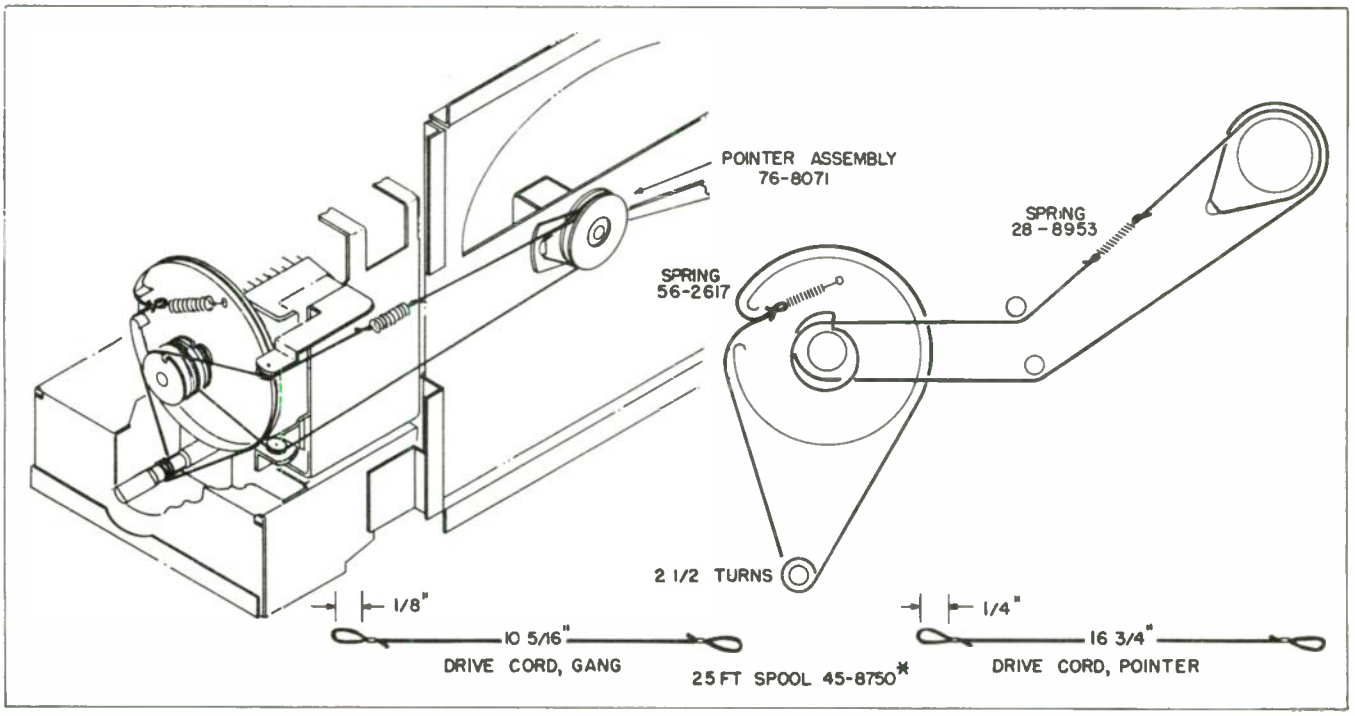
SPECIFICATIONS

CABINET	Plastic portable
CIRCUIT	Four-tube superheterodyne (plus selenium rectifier)
AUDIO OUTPUT	
A-C or d-c operation	150 milliwatts
Battery operation	90 milliwatts (75 milliwatts: battery-saver operation)
OPERATING VOLTAGE	117 volts, a.c. or d.c. 1.5-volt "A" battery and 75-volt "B" battery
POWER CONSUMPTION	
A-C or d-c operation	11 watts
Battery operation	10 ma. from 75-volt "B" Battery (9 ma.: battery-saver operation) 260 ma. from 1.5-volt "A" battery
ANTENNA	Magnecor high-impedance loop with provision for external antenna
INTERMEDIATE FREQUENCY	455 kc.
PHILCO TUBES	1R5 converter, 1U4 i-f amplifier, 1U5 detector-a.v.c. 1st audio, 3V4 output
BATTERY TYPE	P144 "B" battery P77 "A" battery



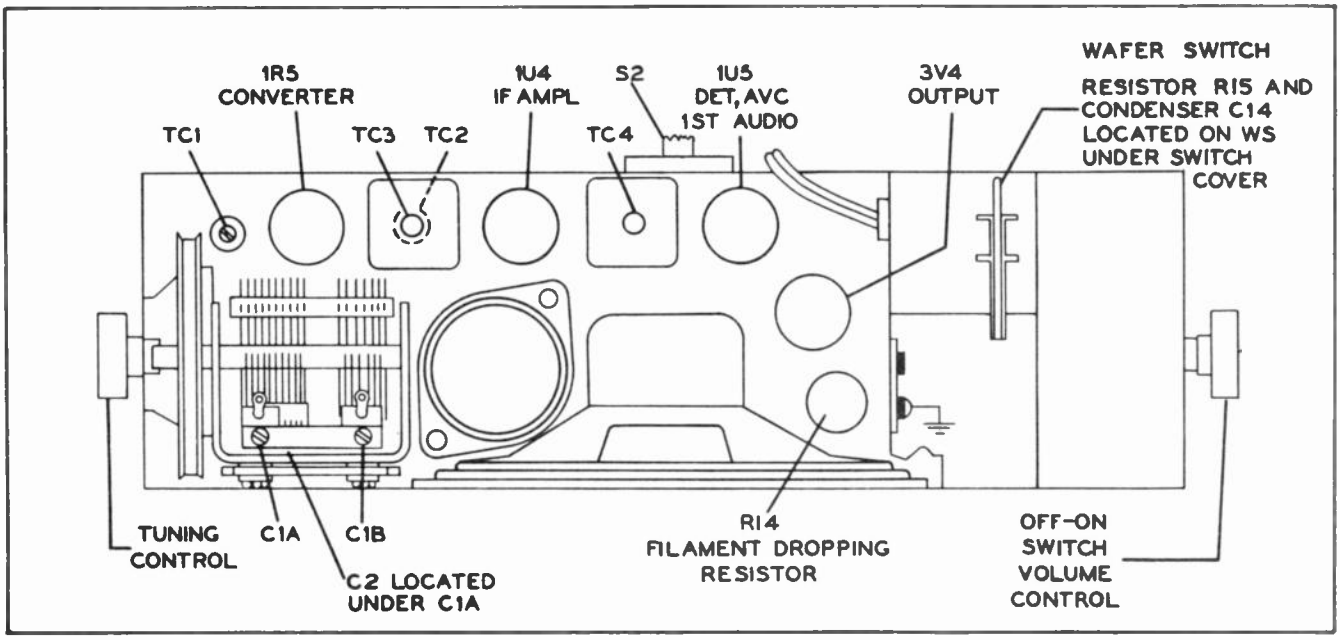
TP2-3223

MODEL 53-652



TP2-3225

Figure 1. Dial-Cord Stringing Arrangement



TP2-3168

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 generator. 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.

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Connect signal generator through a .1-μf. condenser to pin 6 (converter 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 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.	C1A—antenna trimmer
4	Same as step 2.	600 kc.	600 kc. (See NOTE 2 below.)	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 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.

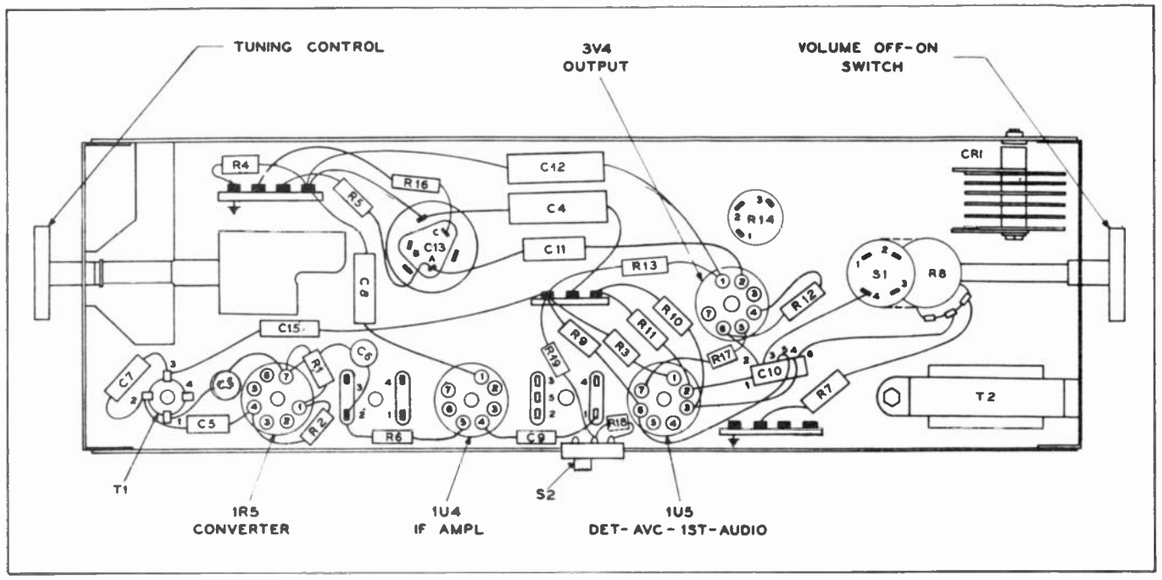


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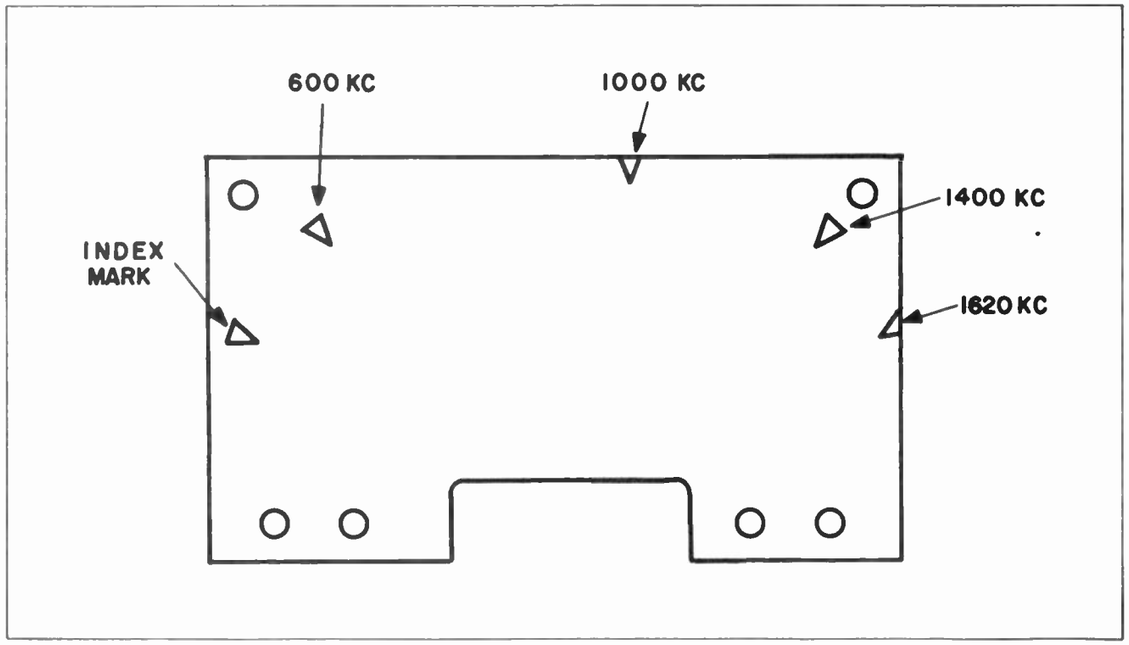
Figure 3. Base View, Showing Parts Placement



TP2-3224

Figure 4. Dial Backplate, Showing Alignment Marks

REPLACEMENT PARTS LIST

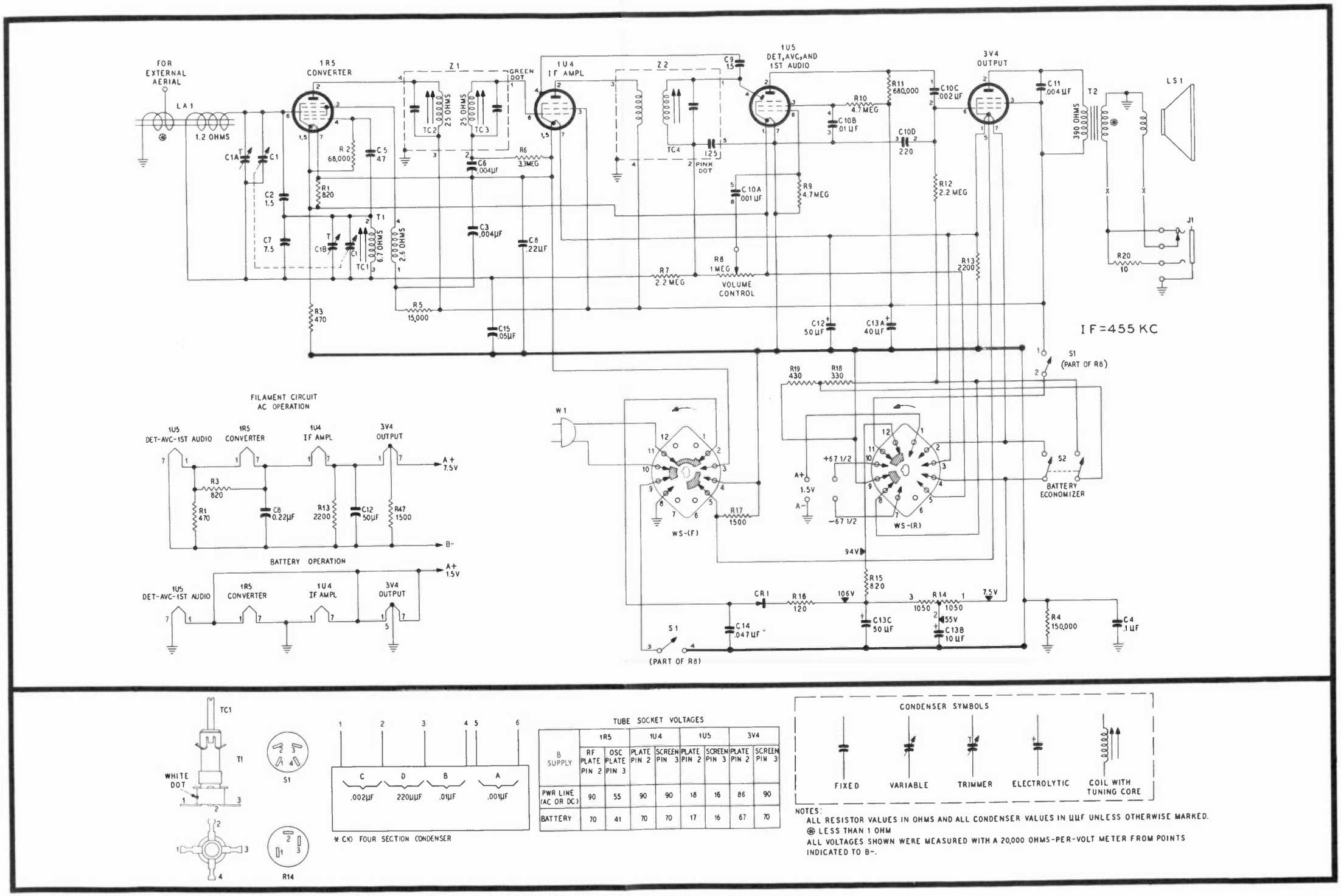
NOTE: Part numbers identified by an asterisk (*) are general replacement items. These numbers may not be identical with those on factory parts. Also, the electrical values of some replacement items may differ from the values indicated in the schematic diagram and parts list. The values substituted in 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.
C1	Condenser, tuning gang	31-2735-4
C1A	Condenser, trimmer, antenna	Part of C1
C1B	Condenser, trimmer, oscillator	Part of C1
C2	Condenser, i-f neutralizing, 1.5 μμf.	30-1221-7
C3	Condenser, screen by-pass, .004 μf.	30-1239*
C4	Condenser, B– to chassis, .1 μf.	30-4650-47*
C5	Condenser, d-c blocking, 47 μμf.	60-00475420*
C6	Condenser, grid by-pass, .004 μf.	30-1239*
C7	Condenser, temperature compensating, 7.5 μμf.	30-1224-83
C8	Condenser, filament by-pass, .25 μf.	30-4656-1
C9	Condenser, neutralizing, 1.5 μμf.	30-1221-7
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
C10C	Condenser, d-c blocking, .002 μf.	Part of C10
C10D	Condenser, grid by-pass, 220 μμf.	Part of C10
C11	Condenser, tone compensation, .004 μf.	30-4650-56*
C12	Condenser, electrolytic, filament by-pass, 50 μf.	30-2417-12
C13	Condenser, electrolytic, filter	30-2568-39
C13A	Condenser, filter, 40 μf.	Part of C13
C13B	Condenser, filter, 10 μf.	Part of C13
C13C	Condenser, filter, 50 μf.	Part of C13
C14	Condenser, line by-pass, .047 μf.	30-4650-45*
C15	Condenser, a-v-c by-pass, .05 μf.	30-4650-45*
CR1	Rectifier, selenium	34-8003
J1	Private listening unit	42-1975-2
LA1	Coil, antenna	32-4455-9
LS1	Loudspeaker	36-1637
R1	Resistor, filament dropping, 820 ohms	66-1828340*
R2	Resistor, grid leak, 68,000 ohms	66-3688340*
R3	Resistor, cathode bias, 470 ohms	66-1478340*
R4	Resistor, B– to chassis, 150,000 ohms	66-4158340*
R5	Resistor, screen dropping, 15,000 ohms	66-3158340*
R6	Resistor, grid leak, 3.3 megohms	66-5338340*
R7	Resistor, a-v-c load, 2.2 megohms	66-5228340*
R8	Volume control, 1 megohm	33-5566-21
R9	Resistor, grid leak, 4.7 megohms	66-5478340*
R10	Resistor, screen dropping, 4.7 megohms	66-5478340*
R11	Resistor, plate load, 680,000 ohms	66-4688340*
R12	Resistor, grid leak, 2.2 megohms	66-5228340*
R13	Resistor, filament dropping, 2200 ohms	66-2228340*
R14	Resistor, limiting, 2100 ohms	33-3445
R15	Resistor, B+ filter, 820 ohms	66-1828340*
R16	Resistor, limiting, 120 ohms	33-1334-14
R17	Resistor, filament dropping, 1500 ohms	66-2158340*
R18	Resistor, battery economizer, 330 ohms	66-1338340*
R19	Resistor, battery economizer, 560 ohms	66-1568340*
R20	Resistor, private listening unit, 10 ohms	66-0108340*
S1	Switch, on-off	Part of R8
S2	Switch, battery economizer	42-1796-3
T1	Transformer, oscillator	32-4453-1
T2	Transformer, output	32-8434
W1	Line cord	L 2183*
WS1	Switch, wafer, battery to line	42-1925-1
Z1	Transformer, 1st i-f	32-4160-4A
Z2	Transformer, 2nd i-f	32-4454-1A

MISCELLANEOUS

Description	Service Part No.
Cabinet, light beige	10954
Back, cabinet, light beige	54-6010
Handle, cabinet, light beige	54-6012
Cabinet, spruce green	10954-2
Back, cabinet, spruce green	54-6010-1
Handle, cabinet, spruce green	54-6012-1
Cable, battery	41-3988-1
Clip, cabinet back (2)	56-9162
Dial scale	56-9986
Backplate assembly, dial	76-8177
Window, dial	54-6011
Drive cord, 25-ft. spool	45-8750*
Spring, gang drive	56-2617*
Spring, pointer drive	28-8953
Fastener, speaker baffle (2)	W2235-7FA9
Hinge, cabinet (2)	56-5457
Insulator, tuning-condenser mtg.	27-9508
Knobs, (2) light beige or spruce green	54-6016
Pointer assembly	76-8071
Ring, handle mtg. (2)	56-9987
Rubber mount, tuning-condenser mtg. (3)	27-4099-3
Shaft, tuning	56-7906FA42
Shield, tube base	56-3978-1FA3
Socket, tube (2)	27-6203
Socket, tube (2)	27-6203-12
Spring, hairpin, shaft mtg.	28-8610
Spring, retaining	57-1868FA11

MODEL 53-652



TP2-3166

Figure 5. Philco Portable Radio Model 53-652, Schematic Diagram

PR-2436

Printed in U. S. A.

PHILCO

PHILCO Factory-Supervised Service

SERVICE

HOME RADIO

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.

Replacement Parts List Changes For Model 53-800

Description	*Service Part No.*
Bezel, clock	28-9128
Bezel, radio	28-9128-1
Ring, bezel	28-9171
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

SERVICE BULLETIN FOR PHILCO RADIO-CLOCK MODEL 53-800

PR-2437

Printed in U. S. A.

PHILCO SERVICE

PHILCO Factory-Supervised Service

HOME RADIO

PHILCO HOME RADIO MODEL 53-565

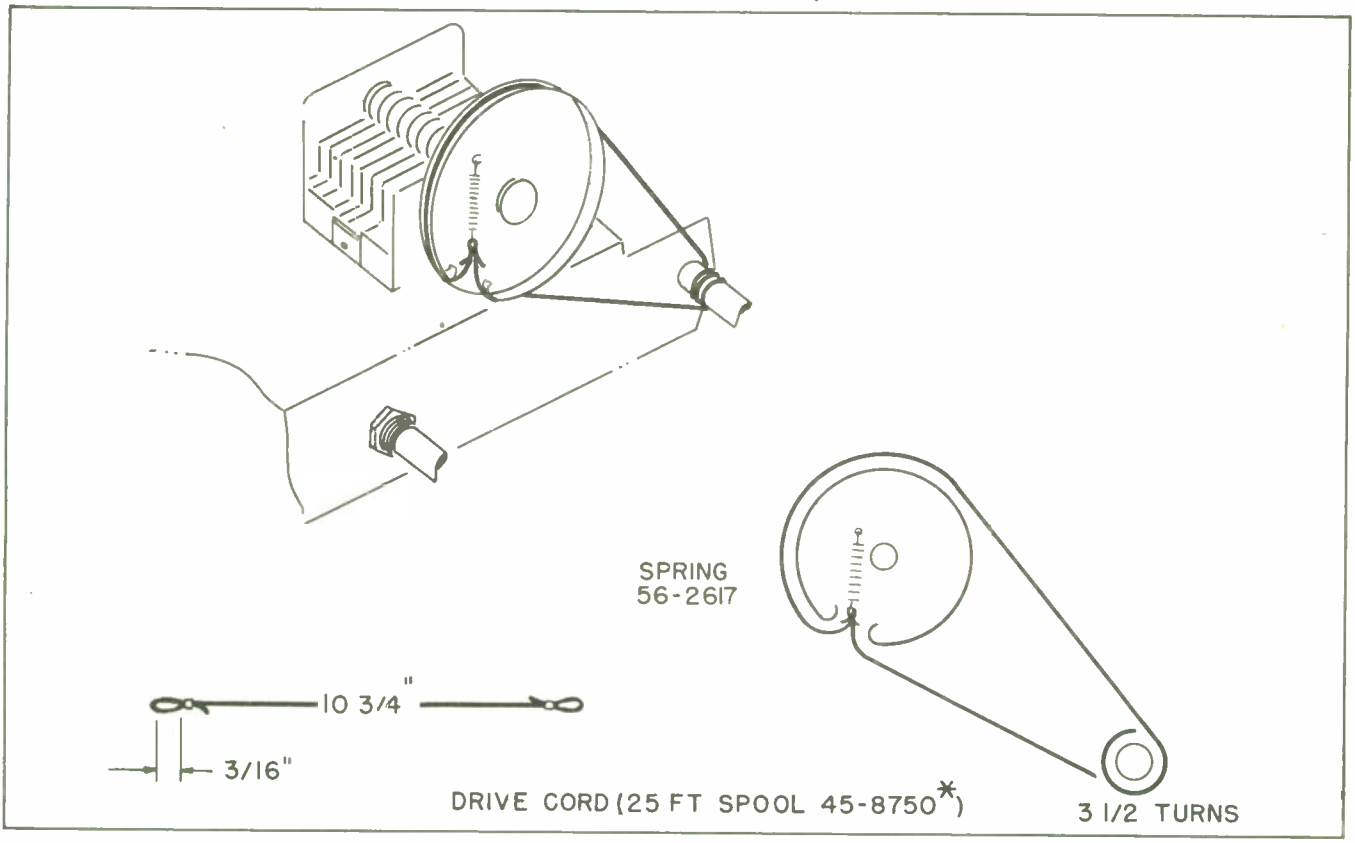
TP2-3248

MODEL 53-565

SPECIFICATIONS

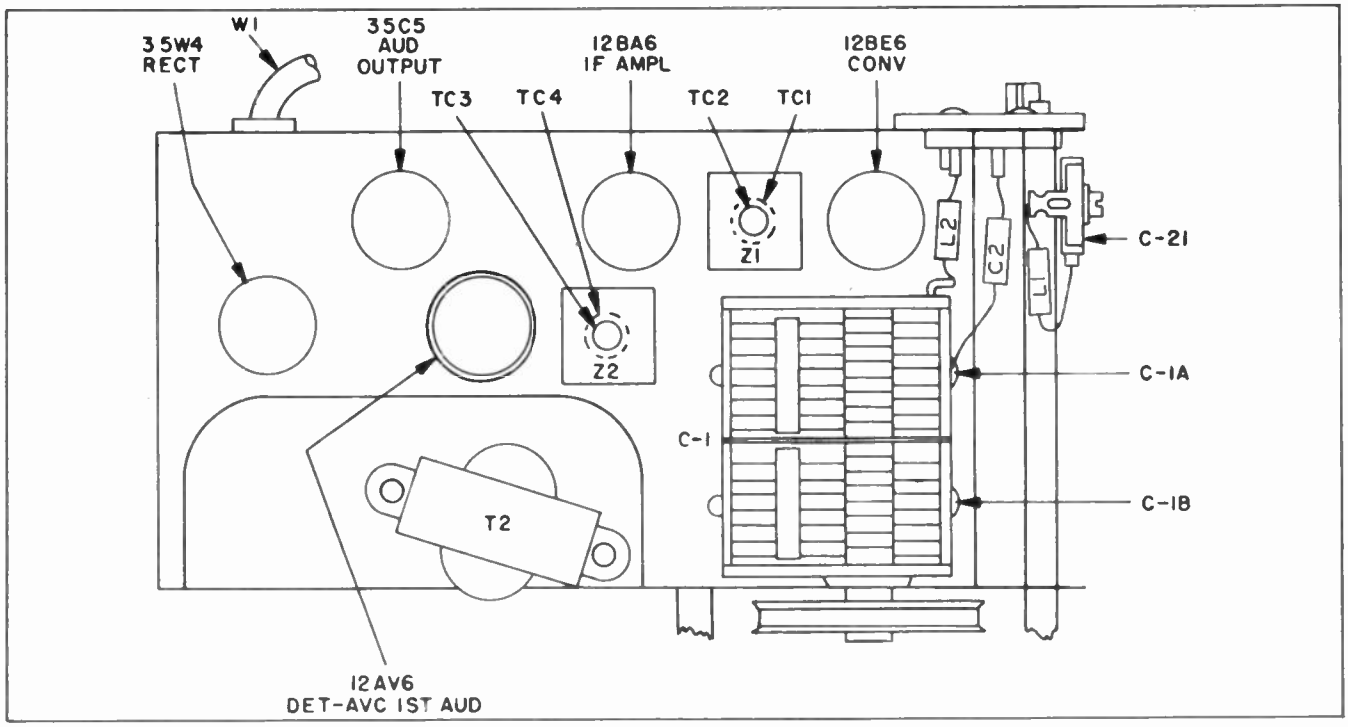
CABINET	Molded plastic
CIRCUIT	Four-tube superheterodyne (plus rectifier)
FREQUENCY RANGE	
Standard Broadcast	540 kc. to 1620 kc.
Special Services	1700 kc. to 3400 kc.
AUDIO OUTPUT	1 watt
OPERATING VOLTAGE	105 to 120 volts, a.c. or d.c.
POWER CONSUMPTION	30 watts
ANTENNA	High-impedance loop
INTERMEDIATE 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.



TP2-1405

Figure 1. Dial-Cord Installation Details



TP2-1407

Figure 2. Top View, Showing Tuning Adjustments

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.

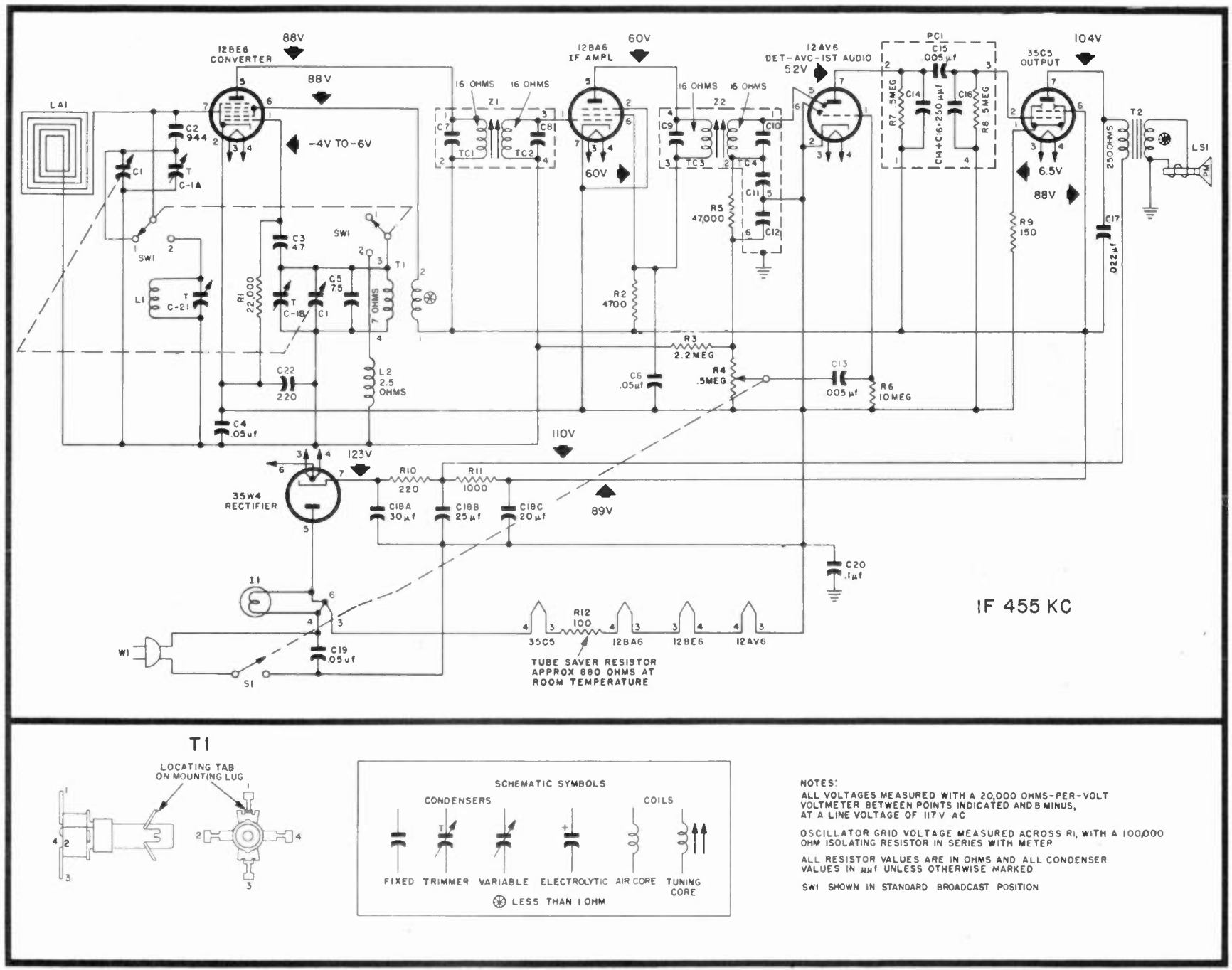
ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO			ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	BAND-SWITCH SETTING	SPECIAL INSTRUCTIONS	
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. 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 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)

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.

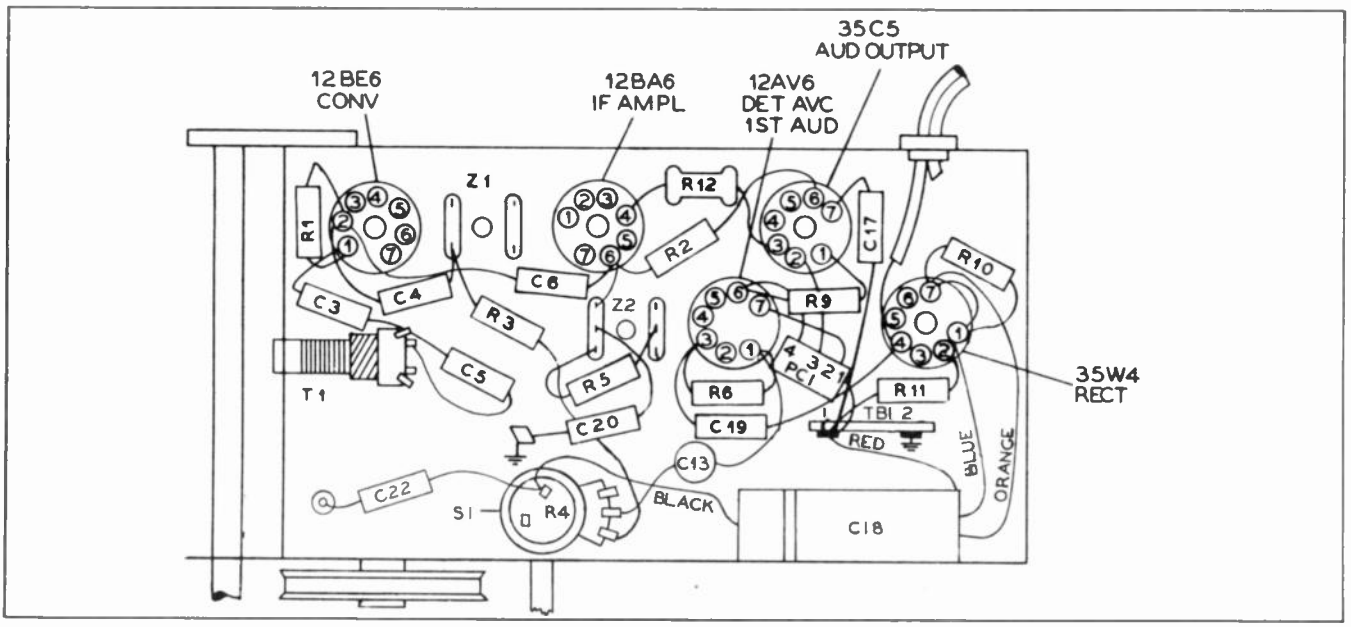
* To set the tuning gang to 1620 kc., fully open the gang and insert a .006-inch nonmetallic shim between the heel of the rotor and the top of the stator plates. Close the gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting.

† 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.



TP2-1408

Figure 3. Philco Radio Model 53-565, Schematic Diagram



TP2-1406

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.
C1	Condenser, tuning gang	31-2751-14
C1A	Condenser, antenna trimmer	Part of C1
C1B	Condenser, osc. trimmer	Part of C1
C2	Condenser, antenna series tracker, 944 μμf.	30-1220-65
C3	Condenser, oscillator grid, 47 μf.	30-1230-4
C4	Condenser, a-v-c by-pass, .05 μf.	30-4650-45*
C5	Condenser, drift compensation, 7.5 μμf.	30-1224-83
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 μf.	30-1238-1
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.	30-4650-43*
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 μf.	30-4650-45*
C20	Condenser, B- to chassis, .1 μf.	30-4650-47*
C21	Condenser, trimmer, special services	31-6473-29
I1	Lamp, pilot	34-2068
LA1	Loop, antenna	Part of cabinet back
L1	Coil, antenna, special services	32-4561-3
L2	Coil, oscillator shunt	32-4562-2
LS1	Speaker, p-m	36-1625-3
PC1	Printed circuit	30-6001
R1	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	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	33-1343-3
S1	Switch, off-on	Part of R4
SW1	Switch, broadcast-special services	42-1796-2
T1	Transformer, oscillator	32-4453-6
T2	Transformer, output	32-8384-4
W1	Line cord	L-2183*
Z1	Transformer, 1st i-f	32-4161A
Z2	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Description	Service Part No.
Cabinet	
Spruce	10927-4
Ebony	10927
Back-and-loop assembly	76-7769
Knob (2)	54-4982-1
Drive cord, 25-foot spool	45-8750*
Pointer, dial	54-4979
Shaft, tuning	56-9807FA11
Socket assembly, pilot lamp	27-6233-6
Socket, 7-pin miniature	27-6265*
Socket (12AV6)	27-6203-14*
Spring, retaining	28-8610
Spring, dial cord	56-2617

PHILCO RADIO-CLOCK MODEL 53-701X

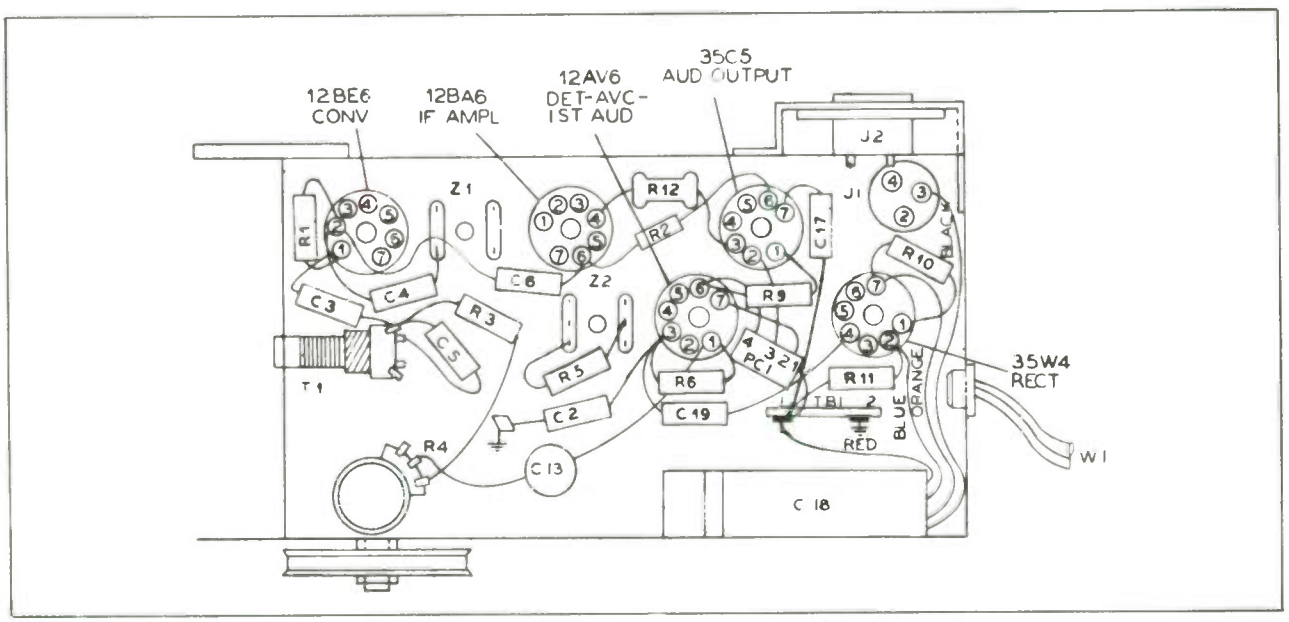
TP2-3233

MODEL 53-701X

SPECIFICATIONS

CABINET	Molded phenolic
CIRCUIT	Four-tube superheterodyne (plus rectifier)
FREQUENCY RANGE	540—1620 kc.
AUDIO OUTPUT	1 watt
OPERATING VOLTAGE	117 volts, a.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.



P2-3231

Figure 1. Base View, Showing Parts Placement

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.

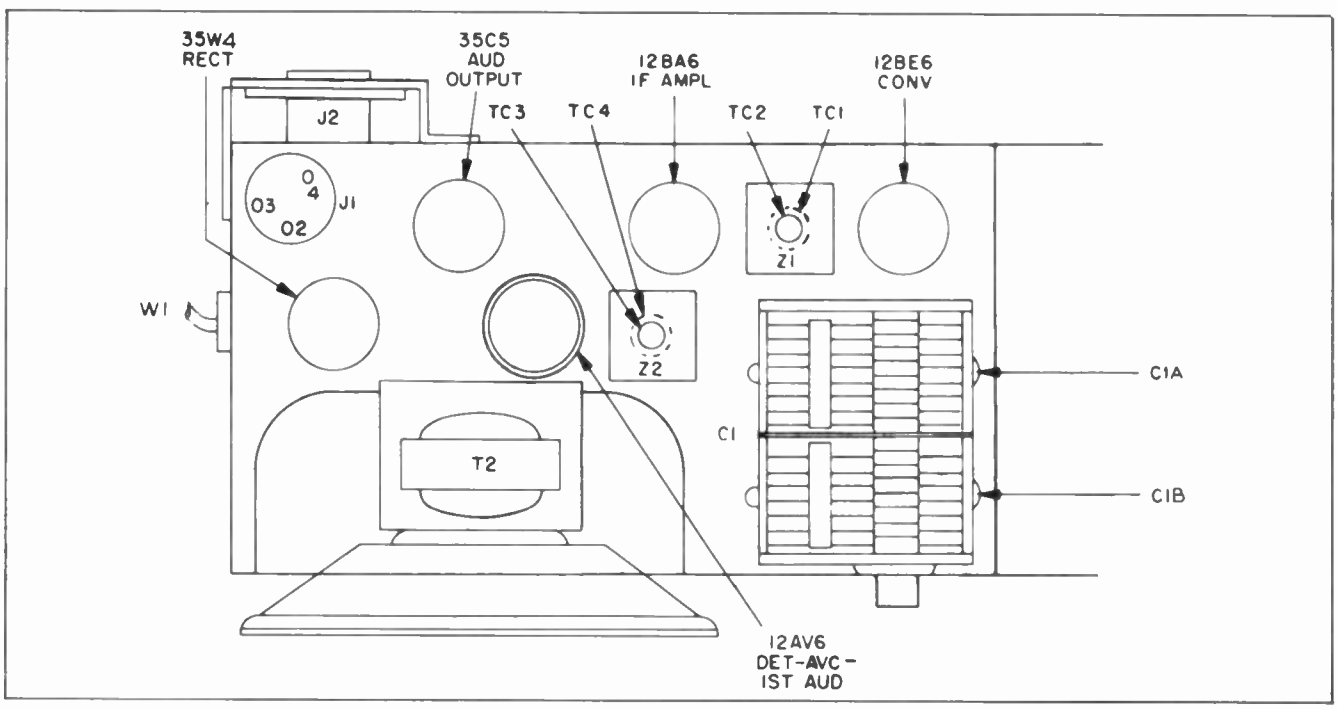
ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
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 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.

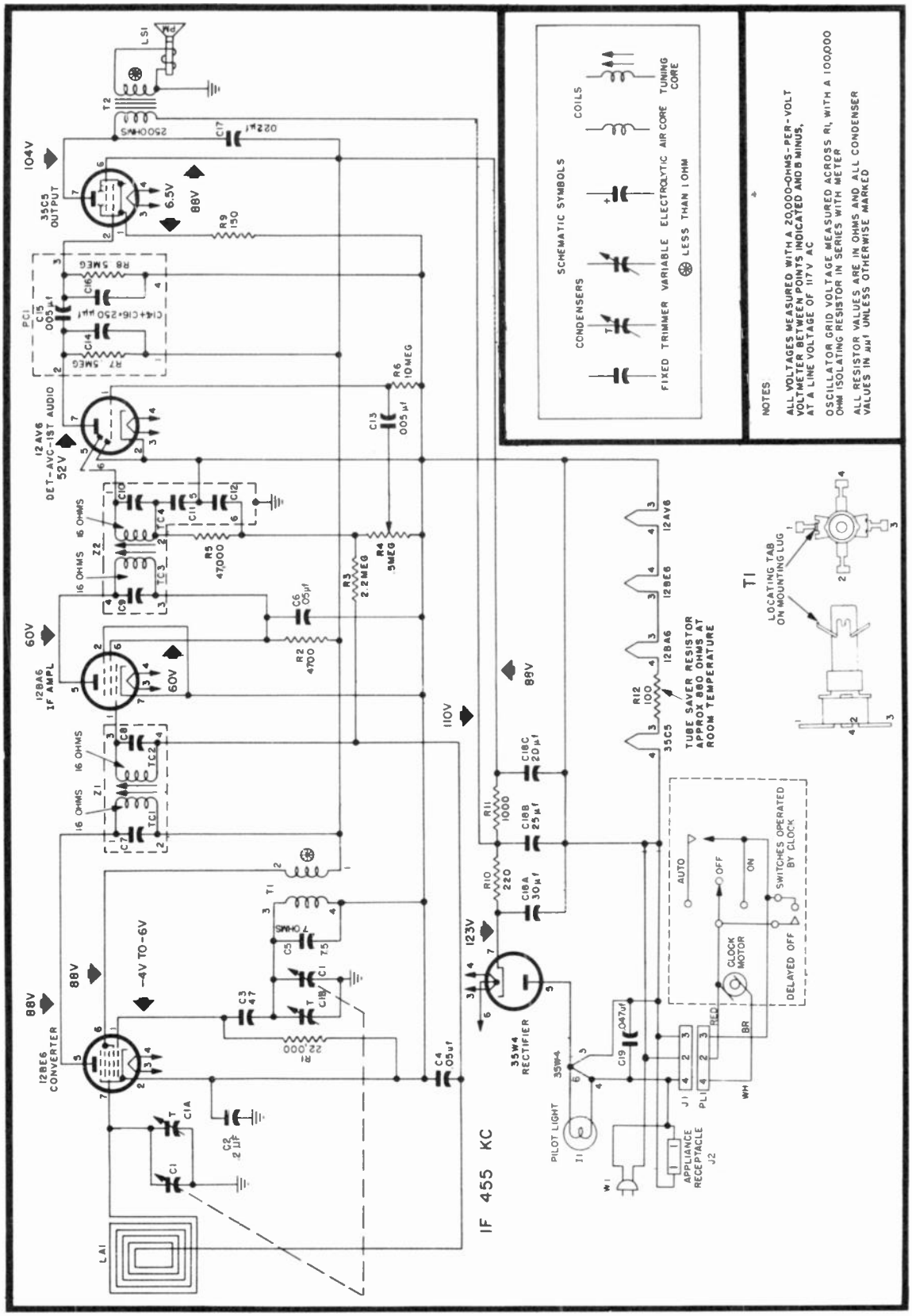
* To set the tuning gang to 1620 kc., fully open the gang and insert a .006-inch, nonmetallic shim between the heel of the rotor and the top of the stator plates. Close the gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting.

† 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.



TP2-3232

Figure 2. Top View, Showing Tuning Adjustments



TP2-3230

Figure 3. Philco Radio-Clock Model 53-701X, Schematic Diagram

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.
C1	Condenser, tuning gang	31-2751-13
C1A	Condenser, r-f trimmer	Part of C1
C1B	Condenser, oscillator trimmer	Part of C1
C2	Condenser, B - to chassis, .2 μf.	30-4650-49
C3	Condenser, oscillator grid, 47 μμf.	30-1230-4
C4	Condenser, a-v-c by-pass, .05 μf.	30-4650-45*
C5	Condenser, drift compensation, 7.5 μμf.	30-1224-83
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 μf.	30-1238-1
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, .022μf.	30-4650-43*
C18	Condenser, electrolytic, 3-section	30-2573
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, .047 μf.	30-4650-45*
I1	Lamp, pilot	34-2068
J1	Jack, clock	27-6273
J2	Jack, appliance receptacle, a-c	76-3931
LA1	Loop	Part of cabinet back
LS1	Speaker, p-m	36-1627-8
PC1	Printed circuit	30-6001
PL1	Plug, clock assembly	27-6273
R1	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 megohm	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, 1 watt	66-1224340*
R11	Resistor, B plus filter, 1000 ohms	66-2108340*
R12	Resistor, tube saver, 100 ohms	33-1343-3
T1	Transformer, oscillator	33-4453-6
T2	Transformer, output	32-8384*
W1	Line cord	L2183*
Z1	Transformer, 1st i-f	32-4161A
Z2	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

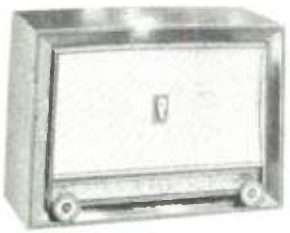
Description	Service Part No.
Cabinet	10924-6
Knobs	
Clock (4 required)	54-4983
Station selector	54-4978
Off-on	54-4118
Clock	41-2041-1
Back-and-loop assembly	76-7757-3
Shield, tube	56-5629FA3
Clip, pilot lamp	W2563FA3
Socket, miniature (5 required)	27-6265*
Socket assembly, pilot lamp	27-6233-6
Window, radio dial	54-4977-2

PHILCO SERVICE

PHILCO Factory-Supervised Service

HOME RADIO

PHILCO HOME RADIO MODEL 53-568

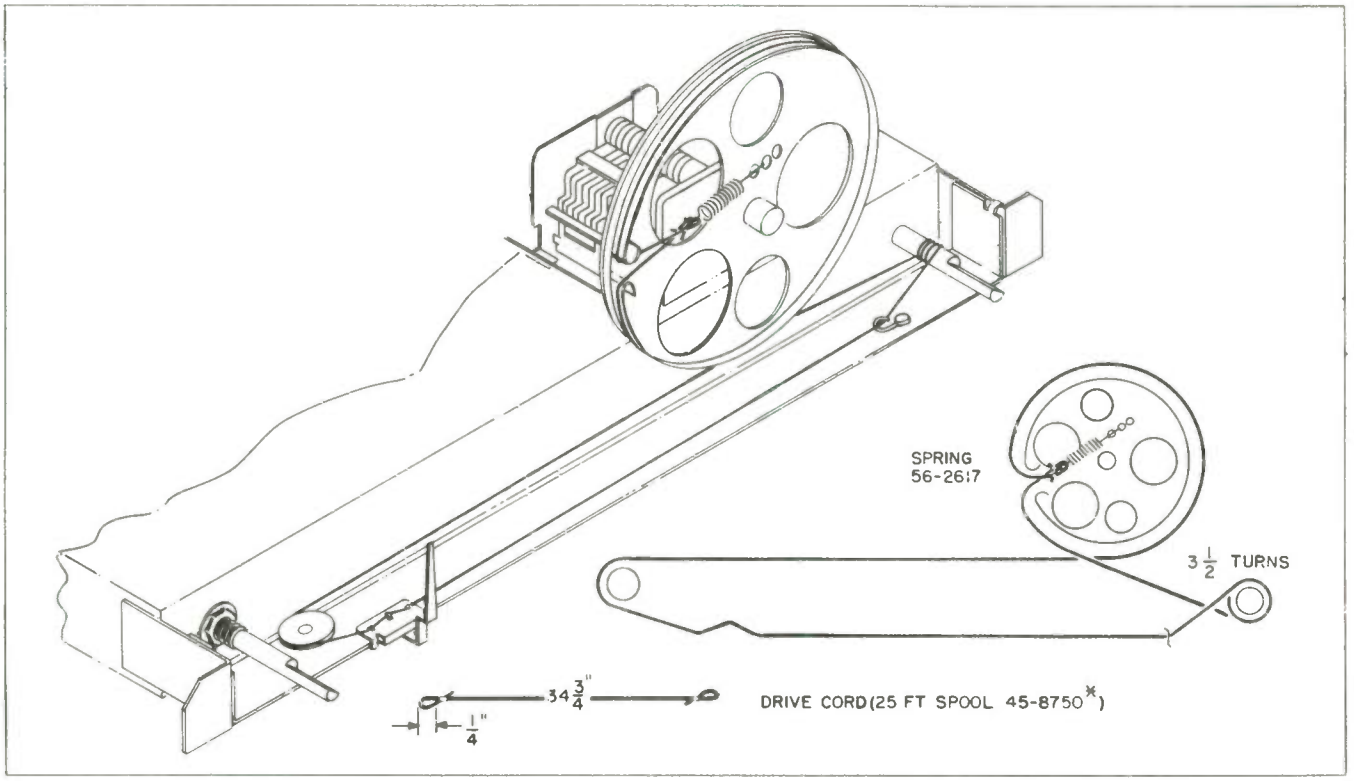


MODEL 53-568

SPECIFICATIONS

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.



TP2-3193

Figure 1. Dial-Cord Installation Details

PHILCO HOME RADIO MODEL 53-568 PR-2481

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.

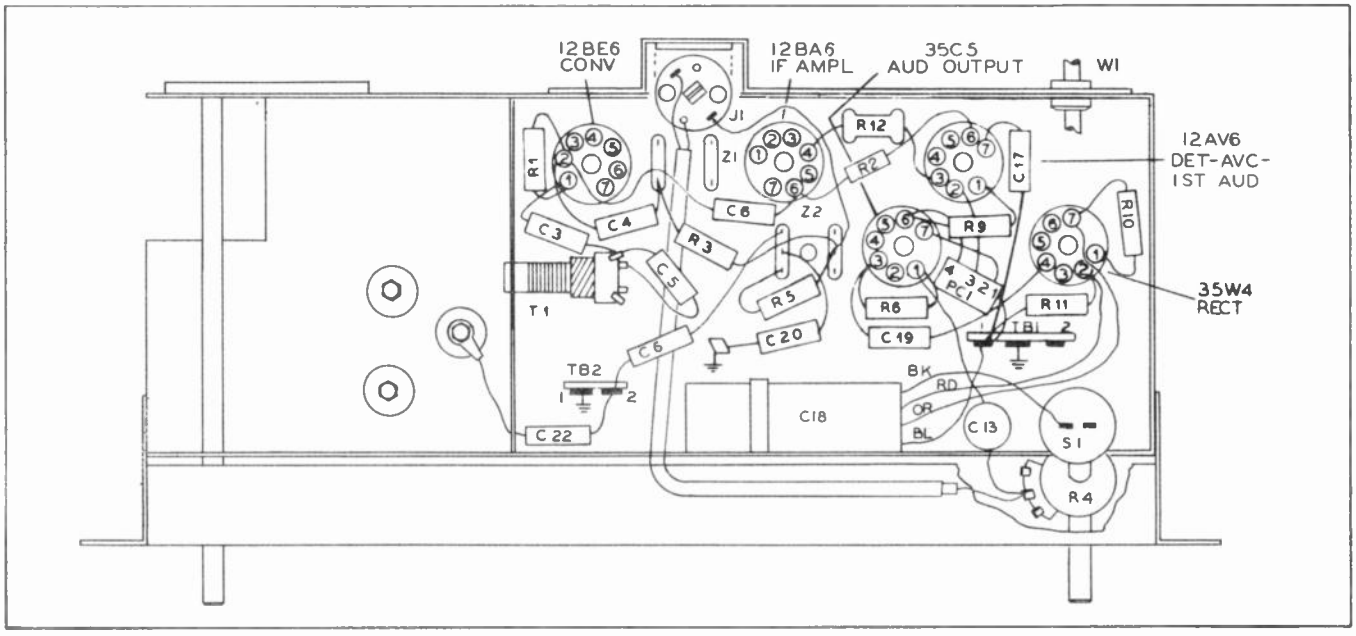
ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO			ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	BAND-SWITCH SETTING	SPECIAL INSTRUCTIONS	
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. 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.	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)

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.

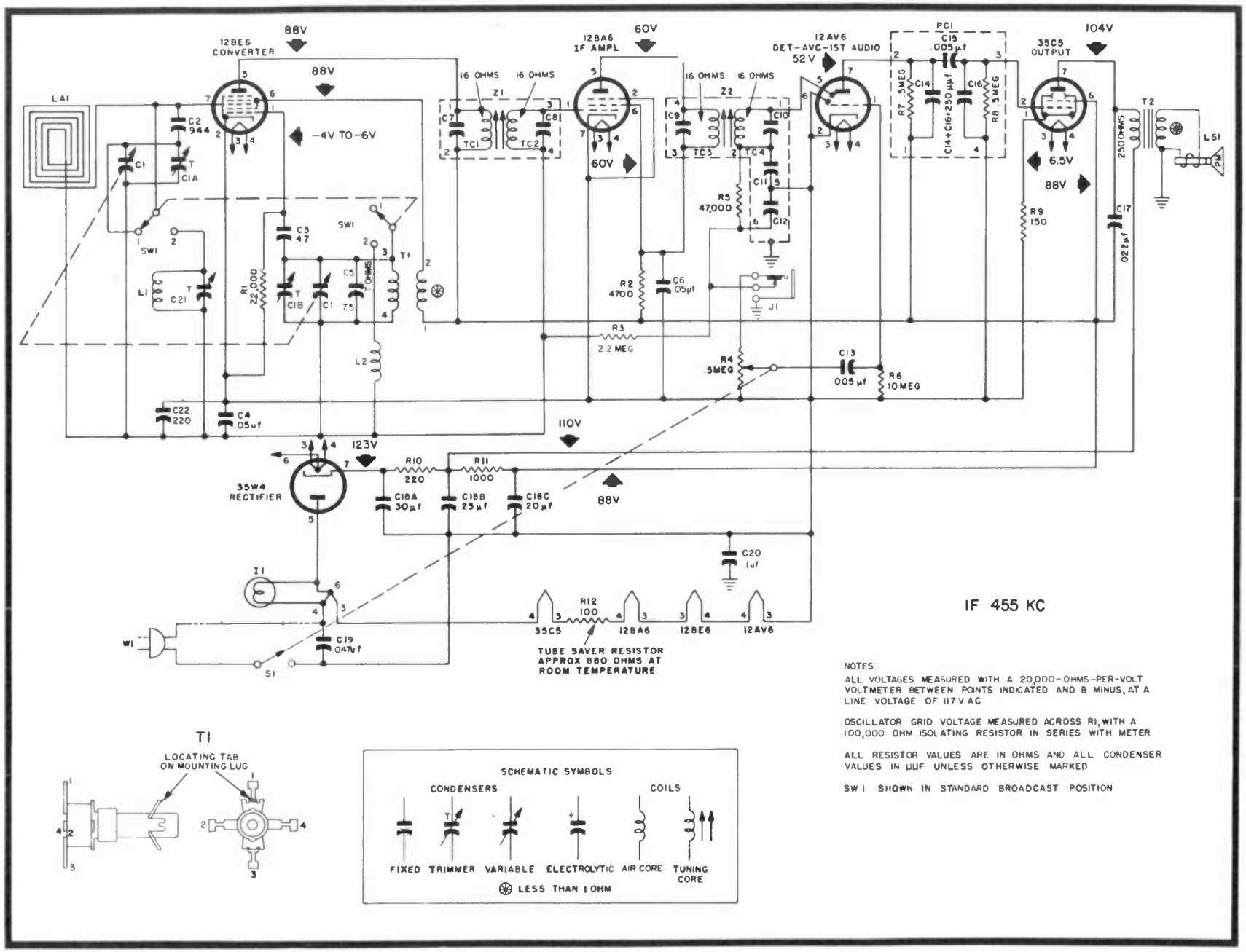
* To set the tuning gang to 1620 kc., fully open the tuning gang and insert a .006-inch nonmetallic shim between the heel of the rotor and the top of the stator plates. Close the tuning gang sufficiently to hold the shim in place, and then remove the shim without disturbing the gang setting. Then proceed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



TP2-3195

Figure 2. Base View, Showing Placement of Parts



NOTES:

ALL VOLTAGES MEASURED WITH A 20,000-OHMS-PER-VOLT VOLTMETER BETWEEN POINTS INDICATED AND B MINUS, AT A LINE VOLTAGE OF 117 V AC

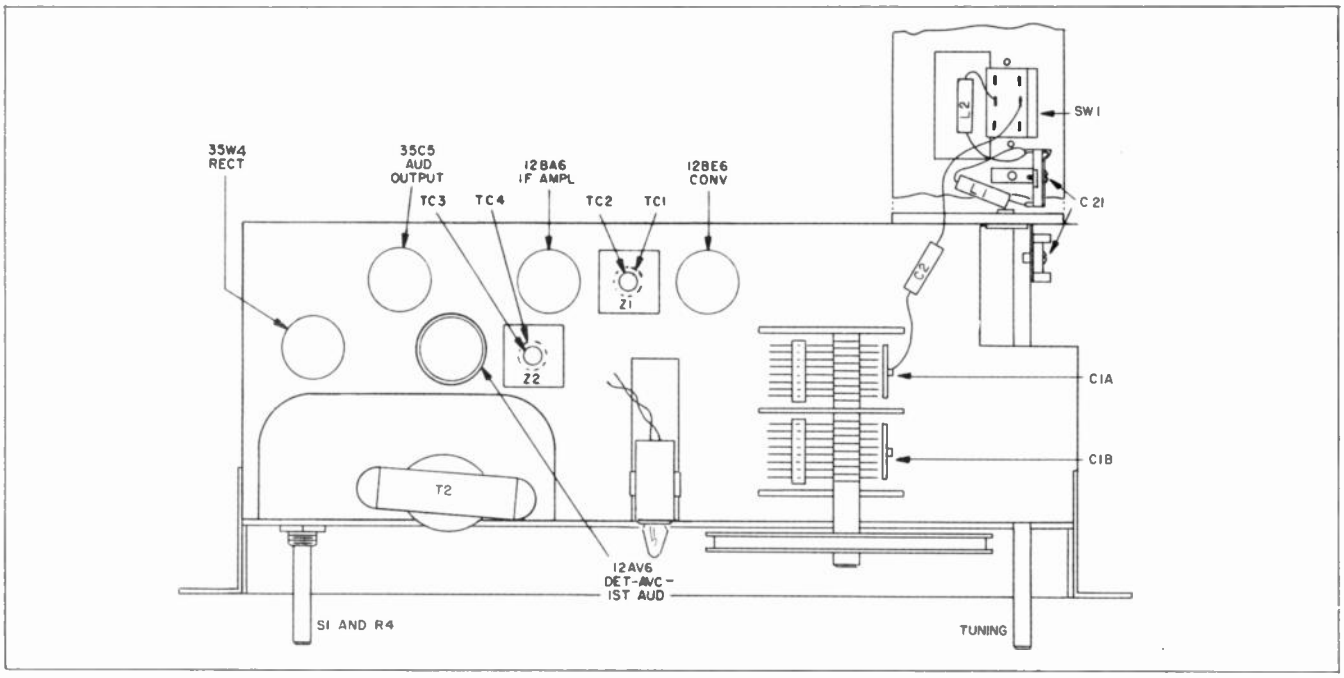
OSCILLATOR GRID VOLTAGE MEASURED ACROSS R1, WITH A 100,000 OHM ISOLATING RESISTOR IN SERIES WITH METER

ALL RESISTOR VALUES ARE IN OHMS AND ALL CONDENSER VALUES IN μμF UNLESS OTHERWISE MARKED

SW1 SHOWN IN STANDARD BROADCAST POSITION

TP2-3192

Figure 3. Philco Radio Model 53-568, Schematic Diagram



TP2-3196

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 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	31-2751-15
C1A	Condenser, antenna trimmer	Part of C1
C1B	Condenser, osc. trimmer	Part of C1
C2	Condenser, aerial series tracker, 944 μμf.	30-1220-65
C3	Condenser, oscillator grid, 47 μμf.	30-1230-4
C4	Condenser, a-v-c by-pass, .05 μf.	30-4650-45
C5	Condenser, drift compensation, 7.5 μμf.	30-1224-83
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 μf.	30-1238-1
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.	30-4650
C18	Condenser, electrolytic, 3-section	30-2753
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.	30-4650-47*
C21	Condenser, trimmer, special services	31-6473-29
C22	Condenser, r-f by-pass	60-10225417
I1	Lamp, pilot	34-2068
J1	Bracket and socket assembly, phono	76-8330
L1	Coil, antenna, special services	32-4561-3
L2	Coil, oscillator shunt	32-4562-2
LA1	Loop, antenna	76-7718
LS1	Speaker, p-m	36-1641-1
PC1	Printed circuit	30-6001
R1	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 megohm	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	33-1343-3
S1	Switch, off-on	Part of R4
SW1	Switch, broadcast-special services	42-1796-2
T1	Transformer, oscillator	32-4453-6
T2	Transformer, output	32-8384-2*
W1	Line cord	L-2183*
Z1	Transformer, 1st i-f	32-4161A
Z2	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Description	Service Part No.
Cabinet, gray	10969
Cabinet back-and-loop assembly	76-7705
Cabinet back	54-6038
Dial scale	54-5173
Backplate, dial	28-9110
Clip, scale mounting (4 required)	1W60211FE7
Knob (2 required)	54-6034
Drive cord (25-foot spool)	45-8750
Pointer, dial	56-5630-55FCP
Rail assembly, pointer	76-8202
Shaft, tuning	56-9807
Socket assembly, pilot lamp	27-6233-6
Bracket and clip, pilot lamp	76-8272
Socket, 7-pin miniature (4 required)	27-6265
Socket (12AV6)	27-6203-14
Shield, tube	56-5629FA3
Spring	56-2617
Spring, retaining	28-8610

PR-2481

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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.

PHILCO SERVICEMAN

Service News For Philco Servicemen

VOL. 1 NOVEMBER, 1951 NO. 12

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

(Continued on page 2)

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 high-quality 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)

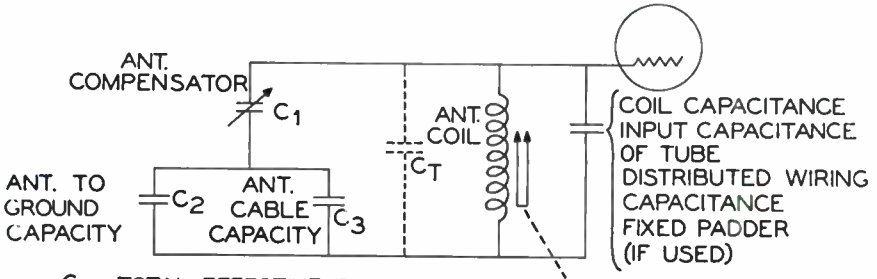
ADJUSTING AUTO RADIO ANTENNA COMPENSATORS

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 mid-point 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 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.



C_T = TOTAL EFFECTIVE CAPACITY OF THE ANTENNA SYSTEM AND COMPENSATOR AS IT APPEARS ACROSS THE TUNING CIRCUIT.

$$C_T = \frac{C_1 (C_2 + C_3)}{C_1 + (C_2 + C_3)}$$

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.

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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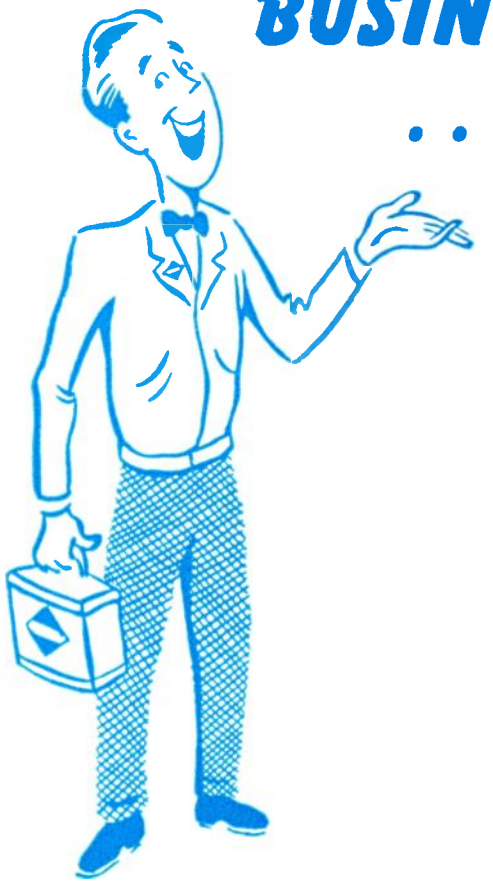

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3. Adjust back controls to assure maximum picture linearity.
4. Check range of all front controls to assure best tuning control by set owner.
5. Adjust picture tube focusing, centering beam bender for maximum brilliance.
6. Clean and polish safety glass panel and picture tube face.
7. Check test pattern to assure maximum height and width with good linearity.
8. Check oscillator and fine tuning range for maximum sound and picture clarity.
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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 re-install the oven units.

When servicing older or out-of-warranty 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 SERVICEMAN, 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.

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.

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.

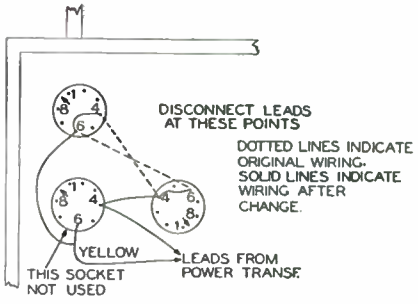


Figure 1.

1. Remove connection to pin 4 of socket A. Leave other end of wire connected.

2. Remove connection to pin 6 of socket B. Leave other end of 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)

PHILCO SERVICE

PHILCO Factory-Supervised Service

AUTO RADIO

SERVICE BULLETIN

PHILCO-MOPAR AUTO RADIOS

PHILCO MODEL NO.	MOPAR MODEL NO.
C-5211 (Special Custom-Built Radio for Chrysler Imperial 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 μμf. series—40 μμf. shunt)
INTERMEDIATE FREQUENCY	455 kc.
PHILCO TUBES USED	12BA6, r-f amplifier; 12BE6, converter; 12BA6, i-f amplifier; 12AV6, det.-a.v.c.-1st audio; 12G4, phase inverter; 12AQ5 (2), output; 12X4, rectifier

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).

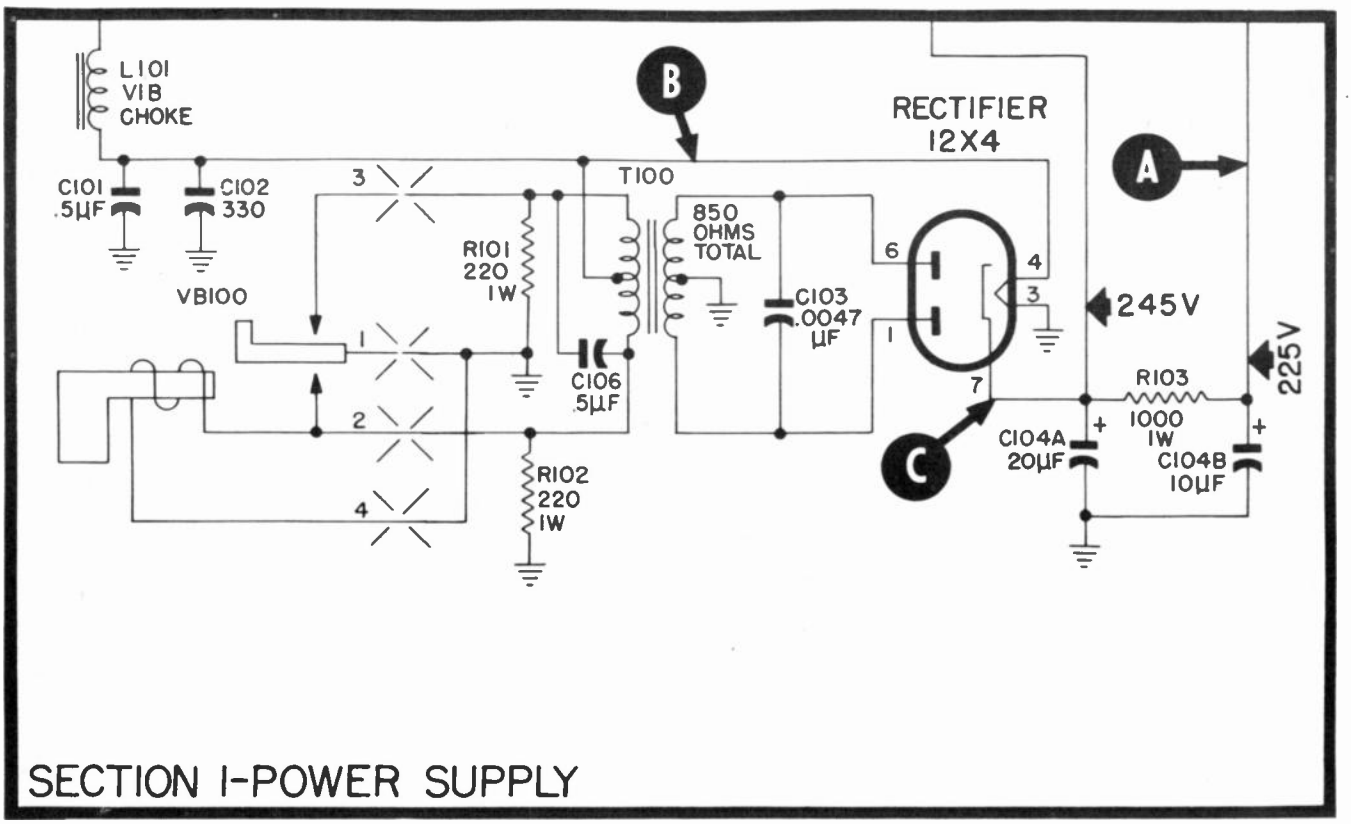
The parts and part numbers that are different from those in Model C-5209 are as follows:

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	76-7994
Lamp, pilot (2)	34-2397
Resistor, damping, 220 ohms, 1 watt (R101 and R102)	66-1224340
Transformer, power	32-8592
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	57-1682-6FA54
Push-button cover	56-6708-1FA54



TP2-3271

Models C-5211 and C-5212, Power Supply Schematic Diagram

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PHILCO SERVICE

PHILCO Factory-Supervised Service

AUTO RADIO

PHILCO AUTO RADIO MODEL S-5327

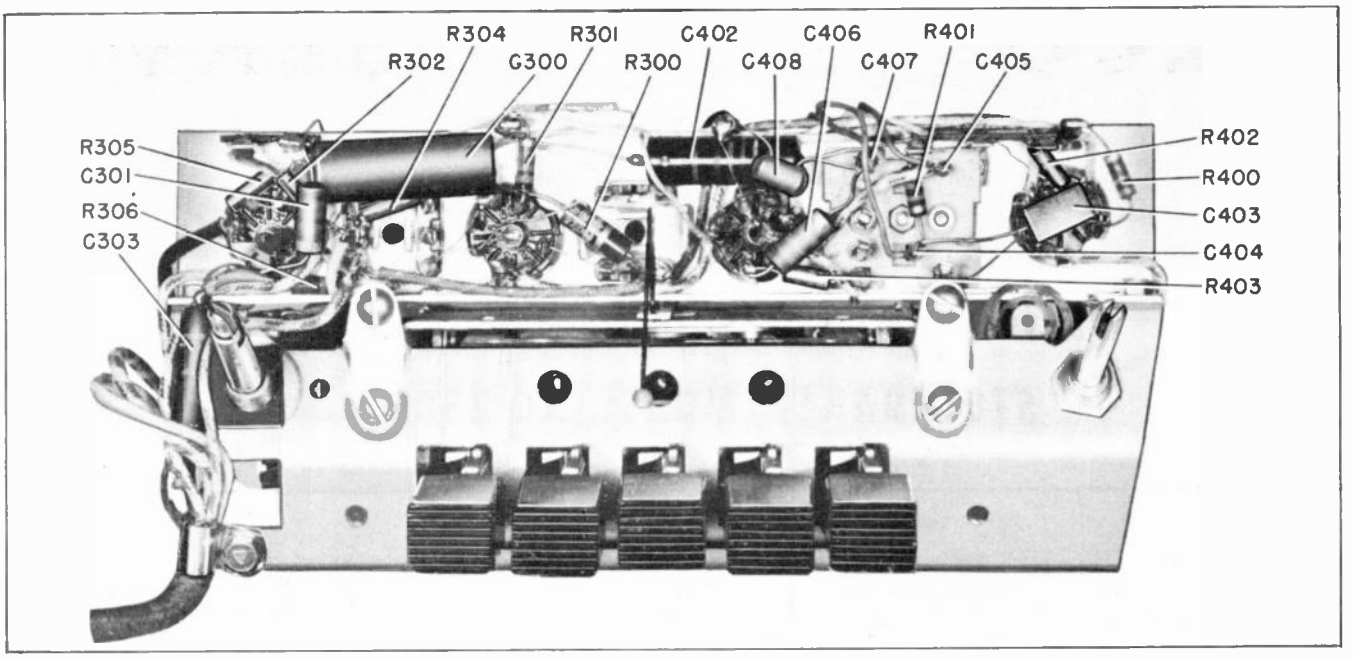
STUDEBAKER MODEL AC-2300

SPECIFICATIONS

HOUSING	Sheet metal
CIRCUIT	Seven-tube superheterodyne (plus rectifier)
FREQUENCY RANGE	535 kc. to 1605 kc.
AUDIO OUTPUT	5 watts
POWER INPUT	7.2 amperes at 6.6 volts, dc.
INTERMEDIATE FREQUENCY	455 kc.
ANTENNA	Vertical whip, cowl mounting (40 $\mu\mu$f. series, 40 $\mu\mu$f. shunt)
PHILCO TUBES	6BA6 r-f ampl.; 6BE6 converter; 6BA6 i-f ampl.; 6AV6 detector, a-v-c, 1st audio; 6C4 phase inverter; 6AQ5(2) output; 6 x 4 rectifier

TP2-2475

Figure 1. Model S-5327, Front View



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.

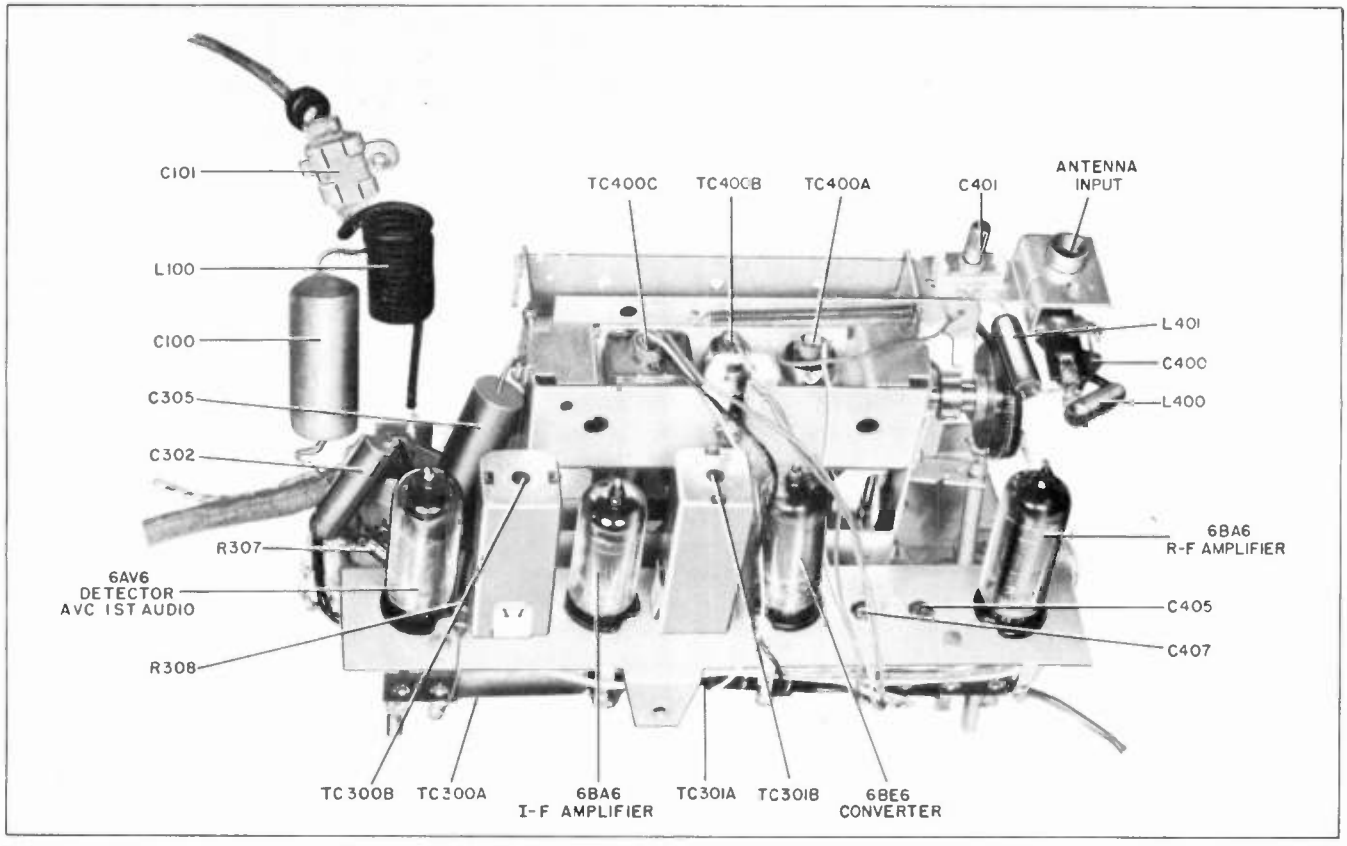
DUMMY ANTENNA—Connect the signal-generator output lead through a 40-$\mu\mu$f. capacitor to the antenna receptacle, and connect another 40-$\mu\mu$f. capacitor from the antenna receptacle to the chassis when making the r-f and antenna tuning adjustments.

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.

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Connect signal generator through a .05-μf. condenser to pin 7 (converter 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 dummy antenna as explained in notes preceding this chart.	1605 kc. (modulated)	Same as step 1.	Adjust for maximum output.	C407 osc. trimmer
3	Same as step 2.	1400 kc. (modulated)	1400 kc.	Adjust for maximum output.	C401—antenna padder C405—r-f trimmer



TP2-2752

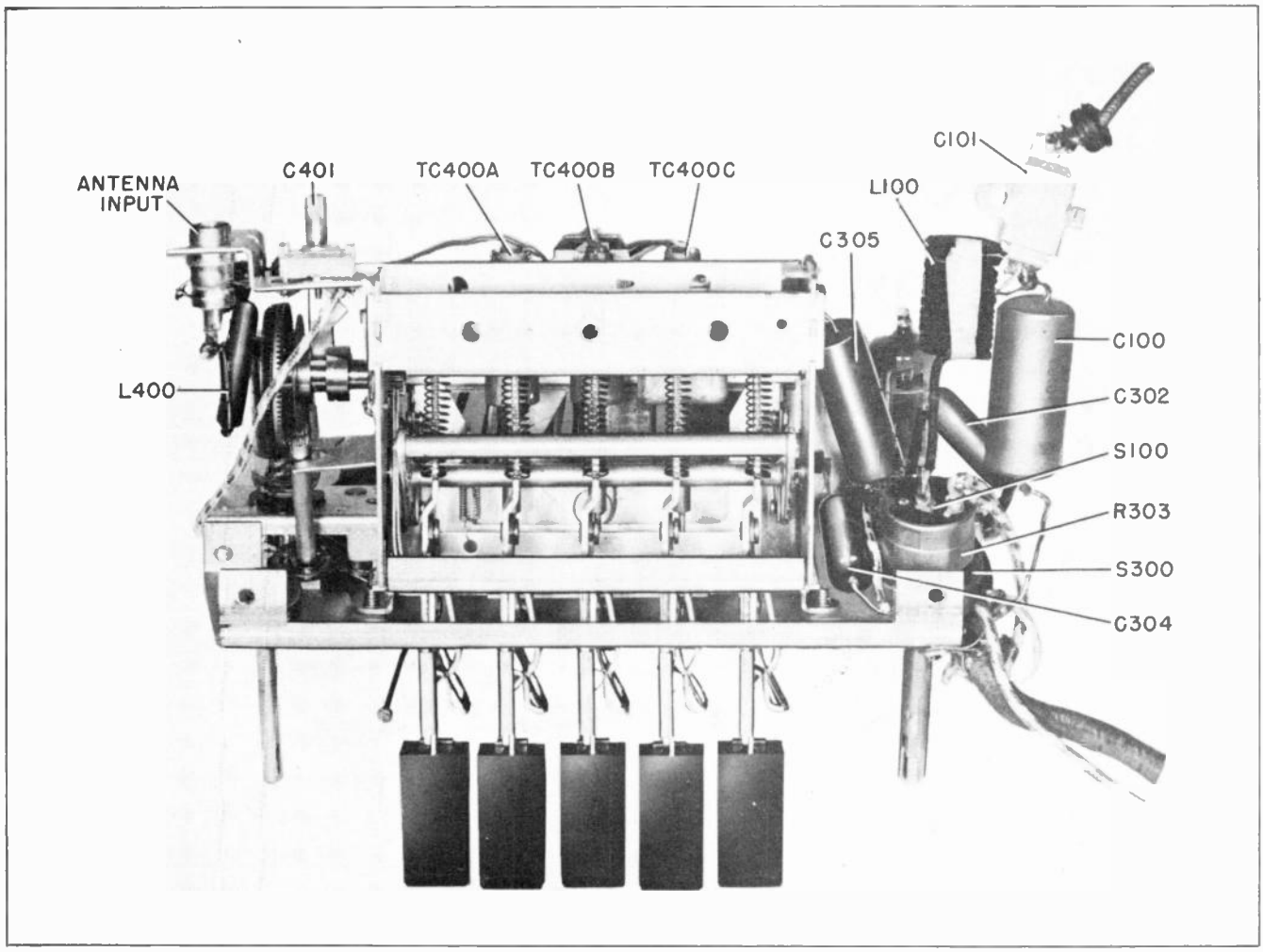
Figure 3. Top View of R-F Unit, Showing Parts Placement and Tuning Adjustments

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.

VOLTAGES WITH 6.0 VOLTS INPUT

TUBE TYPE	PLATE	SCREEN	CATHODE
6BA6 (r-f)	180	49	1.0
6BE6	205	49	
6BA6 (i-f)	205	49	1.4
6AV6	95		
6C4	113		92
6AQ5 (2)	218	205	15.1
6X4			220
Filter output—205			



TP2-2751

Figure 4. Bottom View of R-F Unit, Showing Parts Placement

VOLTAGES WITH 6.3 VOLTS INPUT

TUBE TYPE	PLATE	SCREEN	CATHODE
6BA6 (r-f)	193	51	1.05
6BE6	217	51	
6BA6 (i-f)	217	51	1.5
6AV6	98		
6C4	118		97
6AQ5 (2)	232	217	16
6X4			235
Filter output—217			

VOLTAGES WITH 6.6 VOLTS INPUT

TUBE TYPE	PLATE	SCREEN	CATHODE
6BA6 (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

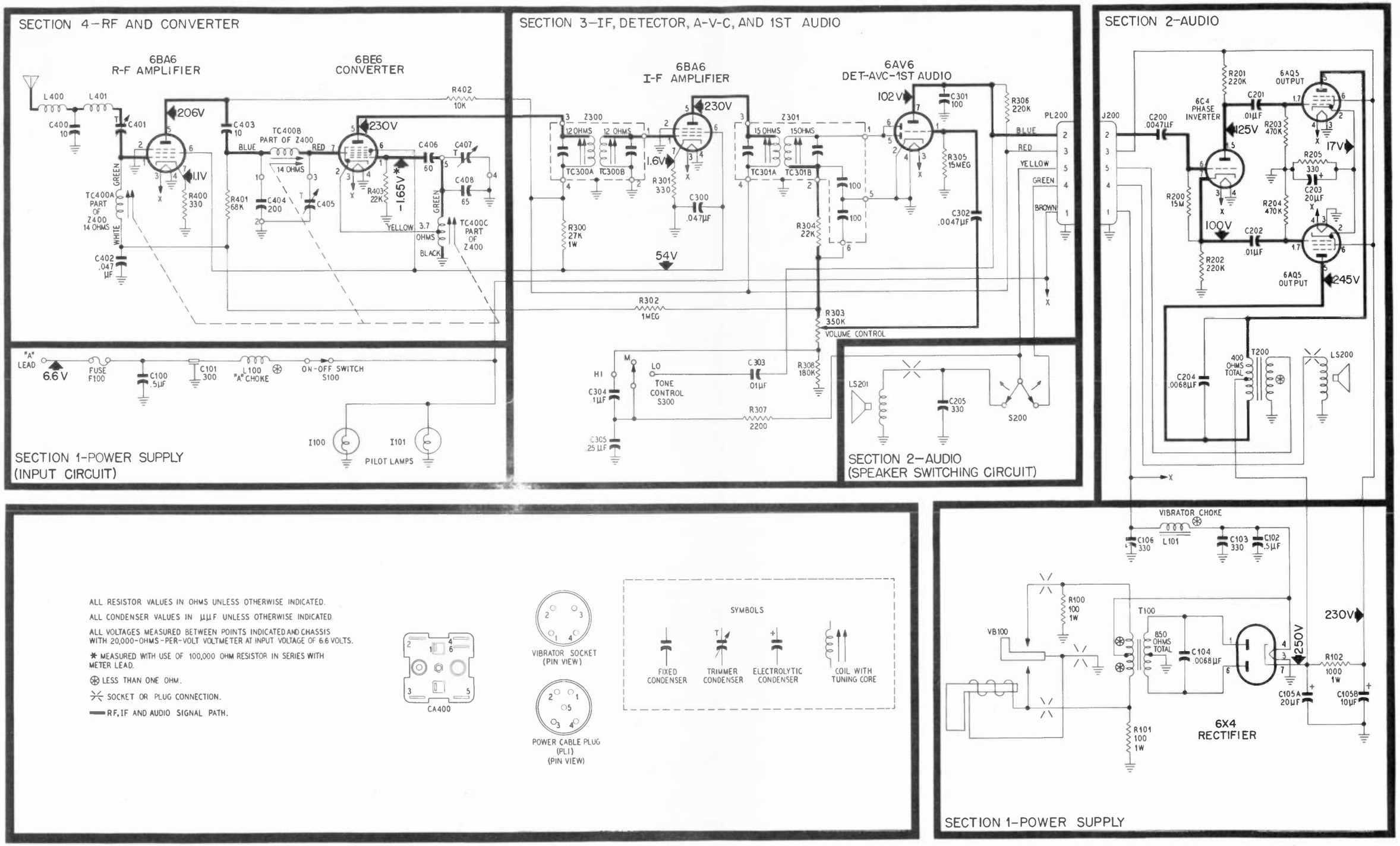
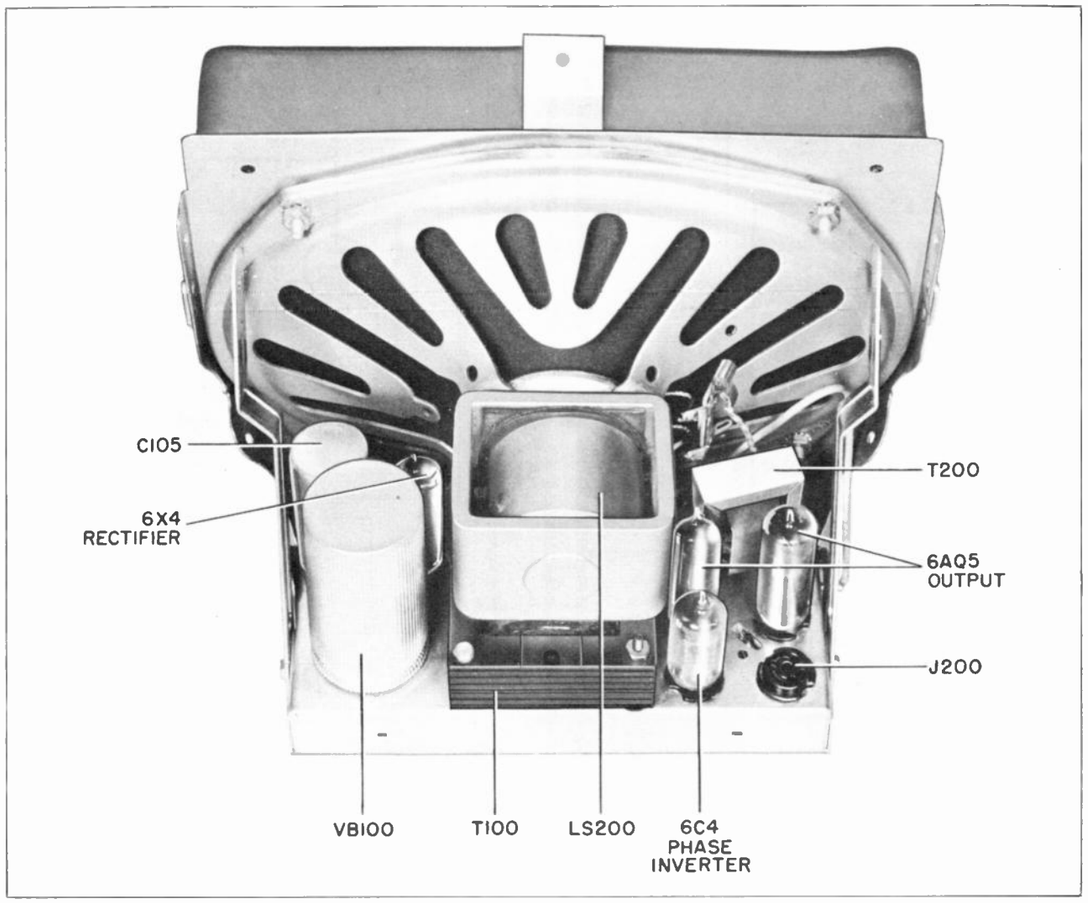


Figure 5. Philco Auto Radio S-5327, Schematic Diagram

TP2-3086



TP2-2473

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.
C100	Condenser, "A" lead filter, .5 μf.	61-0183
C101	Condenser, feed-through, 300 μμf.	30-1235-1
C102	Condenser, hash filter, .5 μf.	61-0183
C103	Condenser, spark filter, 330 μμf.	62-133001001*
C104	Condenser, buffer, .0068 μf.	30-4661-8
C105	Condenser, electrolytic filter.	61-0086
C105A	Condenser, filter, 30 μf	Part of C105
C105B	Condenser, filter, 10 μf.	Part of C105
C106	Condenser, by-pass, 330 μμf.	62-133001001*
F100	Fuse, 14-ampere	45-2559*
I100	Pilot lamp	34-6024
I101	Pilot lamp	34-6024
L100	Choke, "A" lead	32-1644
L101	Choke, vibrator	32-4170-4
R100	Resistor, damping, 100 ohms, 1 watt	66-1104340*

REPLACEMENT PARTS LIST (Continued)

SECTION 1—POWER SUPPLY (Continued)

Reference Symbol	Description	Service Part No.
R101	Resistor, damping, 100 ohms, 1 watt	66-1104340*
R102	Resistor, filter, 1000 ohms, 1 watt	66-2104340*
S100	Switch, off-on	Part of R303
T100	Transformer, power	32-8313-1
VB100	Vibrator	83-0035

SECTION 2—AUDIO

Reference Symbol	Description	Service Part No.
C200	Condenser, d-c blocking, .0047 μf.	30-4650-56*
C201	Condenser, d-c blocking, .01 μf.	30-4650-41*
C202	Condenser, d-c blocking, .01 μf.	30-4650-41*
C203	Condenser, cathode by-pass, 20 μf.	Part of C105
C204	Condenser, tone compensation, .0068 μf.	30-4650-91
C205	Condenser, by-pass, 330 μμf.	62-133001001*
LS200	Speaker	36-1631-2
R200	Resistor, grid lead, 15 megohms	66-6158340*
R201	Resistor, plate load, 220,000 ohms	66-4228340*
R202	Resistor, cathode load, 220,000 ohms	66-4228340*
R203	Resistor, grid leak, 470,000 ohms	66-4478340*
R204	Resistor, grid leak, 470,000 ohms	66-4478340*
R205	Resistor, cathode bias, 330 ohms, 1 watt	66-1334340*
S200	Switch, rear-seat speaker	42-2000
T200	Transformer, output	32-8316-7

SECTION 3—I-F, A-V-C, 1st AUDIO

Reference Symbol	Description	Service Part No.
C300	Condenser, screen by-pass, .047 μf.	30-4650-45*
C301	Condenser, r-f by-pass, 100 μμf.	62-110001021*
C302	Condenser, audio coupling, .0047 μf.	30-4650-56
C303	Condenser, tone compensation, .01 μf.	30-4650-41*
C304	Condenser, inverse feedback, .1 μf.	30-4650-47*
C305	Condenser, inverse feedback, .25 μf.	30-4650-49*
R300	Resistor, screen dropping, 27,000 ohms, 1 watt	66-3274340*
R301	Resistor, cathode bias, 330 ohms	66-1338340*
R302	Resistor, a-v-c load, 1 megohm	66-5108340*
R303	Resistor, volume control, 350,000 ohms	33-5570
R304	Resistor, a-v-c filter, 22,000 ohms	66-3228340*
R305	Resistor, grid leak, 15 megohms	66-6158340*
R306	Resistor, plate load, 220,000 ohms	66-4228340*
R307	Resistor, inverse feedback, 2200 ohms	66-2228340*
R308	Resistor, inverse feedback, 180 ohms	66-1188340*
S300	Switch, tone control	Part of R303
Z300	Transformer, 1st i-f	32-4160A
Z301	Transformer, 2nd i-f	32-4240A

SECTION 4—R-F AND CONVERTER

Reference Symbol	Description	Service Part No.
C400	Condenser, spark suppressor, 10 μμf.	60-00105417
C401	Condenser, antenna compensator	31-6502-3
C402	Condenser, a-v-c by-pass, .047 μf.	30-4650-45*
C403	Condenser, d-c blocking, 10 μμf.	60-00105417
C404	Condenser, r-f trap, 200 μμf.	Part of CA400
C405	Condenser, r-f trimmer.	Part of CA400
C406	Condenser, d-c blocking, 60 μμf.	30-1224-110
C407	Condenser, oscillator trimmer	Part of CA400

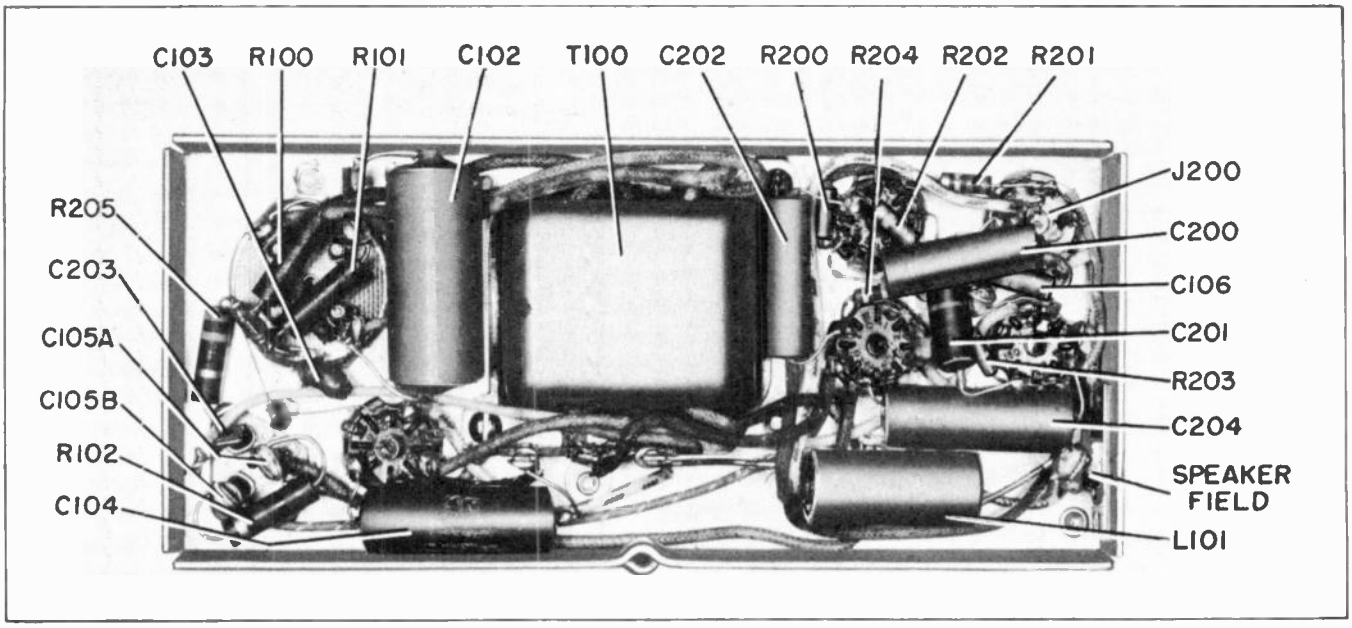


Figure 7. Base View of Power Unit, Showing Parts Placement

TP2-2753

REPLACEMENT PARTS LIST (Continued)

SECTION 4—R-F AND CONVERTER (Continued)

Reference Symbol	Description	Service Part No.
C408	Condenser, oscillator tank, 65 μμf.	30-1224-87
CA400	Condenser assembly	31-6522-21
L400	Choke, antenna	32-4422-24
L401	Choke, antenna	65-0378
R400	Resistor, cathode bias, 330 ohms	66-1338340*
R401	Resistor, grid return, 68,000 ohms	66-3688340*
R402	Resistor, plate load, 10,000 ohms	66-3108340*
R403	Resistor, grid leak, 22,000 ohms	66-3228340*
Z400	Tuning unit assembly, manual-push button	76-7856
Antenna coil assembly		32-4586
Oscillator coil assembly		32-4587
R-F coil assembly		32-4585
Tuning core (3)		28-9336

MISCELLANEOUS

Description	Part Number
"A" lead	41-3910-16
Back cover	56-9920
Background plate assembly, dial	76-7972
Bezel overlay	56-9855
Nut, retaining (2)	56-9910FA3
Cable, power	41-4075-2
Clip, fuse holder	56-3807-4
Connector, power cable (PL200)	Part of power cable
Dial glass	54-5153
Clip, dial retaining (2)	1W60196FE7
Drive Assembly	
Clutch, drive assembly	76-8375
C" washer	28-9335
Manual shaft assembly	76-8377
Pinion shaft and drive disk assembly	76-8376
Pointer arm assembly	76-8378
Spring, backlash	28-9334
Front cover and bushing assembly, r-f unit	76-7859
Fuse lead	41-3910-10
Housing, r-f unit	76-7851
Knob, manual (2)	27-4687-20
Knob, push-button (5)	54-4995
Spring, push button	56-9974
Knob, tone, rear-seat speaker (2)	56-9860
Lock washer, speaker mounting (4)	1W24257FA1
Master Kit	
Condenser, spark coil, .5 μf., 100v	30-4007-1
Condenser, generator .5 μf., 100v	30-4674

MISCELLANEOUS (Continued)

Description	Part Number
Screw, binding head (2)	1W18452FA3
Nut, speaker mounting (4)	1W19988FA3
Pointer, dial	56-9895
Pointer, tone	56-9890
Screw, 8″ x ¼″ hex head, cover mounting	1W19907FA3
Socket assembly, pilot lamp	27-6233-52
Socket, antenna	57-1243FA3
Socket, miniature (4)	27-6294
Socket, miniature (4)	27-6294-1
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)	36-1649-4
Reinforcement, grille	54-8907
Rim	28-9133
Screen	76-8172

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PHILCO SERVICE

PHILCO Factory-Supervised Service

AUTO RADIO

PHILCO AUTO RADIO MODEL S-5323

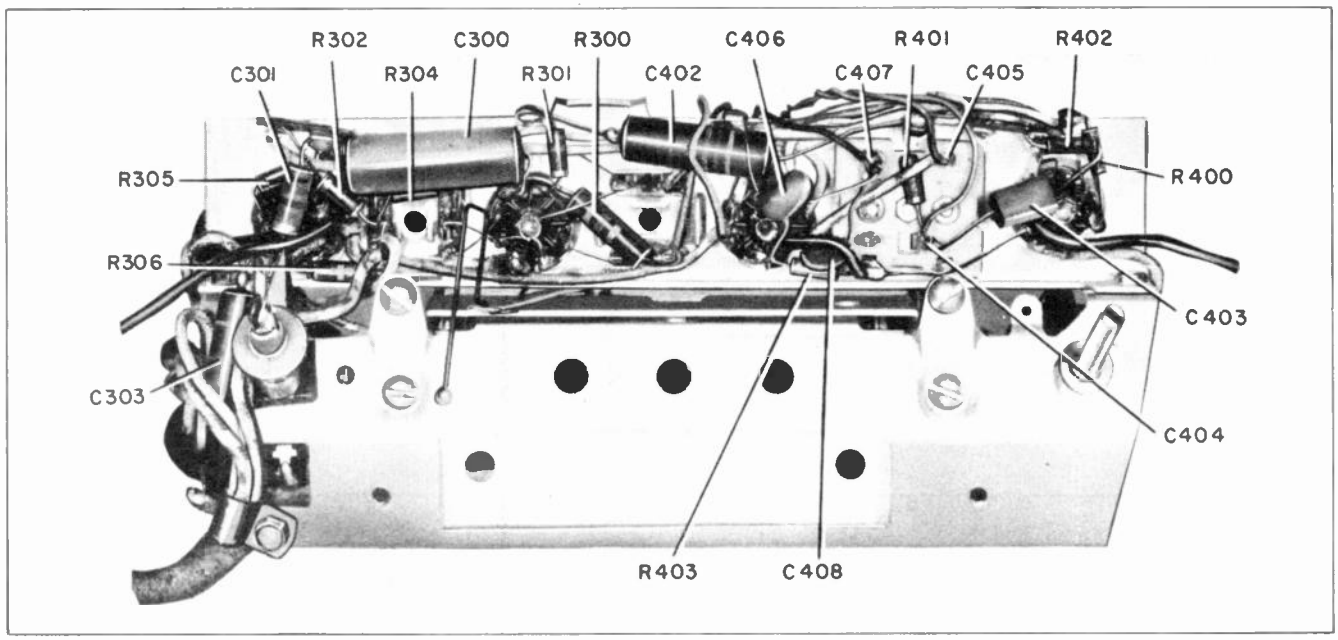
STUDEBAKER MODEL AC-2301

SPECIFICATIONS

CABINET	Sheet-metal housing
CIRCUIT	Five-tube superheterodyne (plus rectifier)
FREQUENCY RANGE	535 kc. to 1605 kc.
AUDIO OUTPUT	3 watts
POWER INPUT	6.8 amperes at 6.6 volts, d.c
INTERMEDIATE FREQUENCY	455 kc.
ANTENNA	Vertical whip, cowl mounting (40 $\mu\mu$f. series—40 $\mu\mu$f. shunt)
PHILCO TUBES	6BA6 r-f ampl.; 6BE6 converter; 6BA6 i-f ampl.; 6AV6 det., a-v-c, 1st audio; 6AQ5 output; 6X4 rectifier

TP2-2474

Figure 1. Philco Auto Radio S-5323, Front View



TP2-2790

Figure 2. Front 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 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.

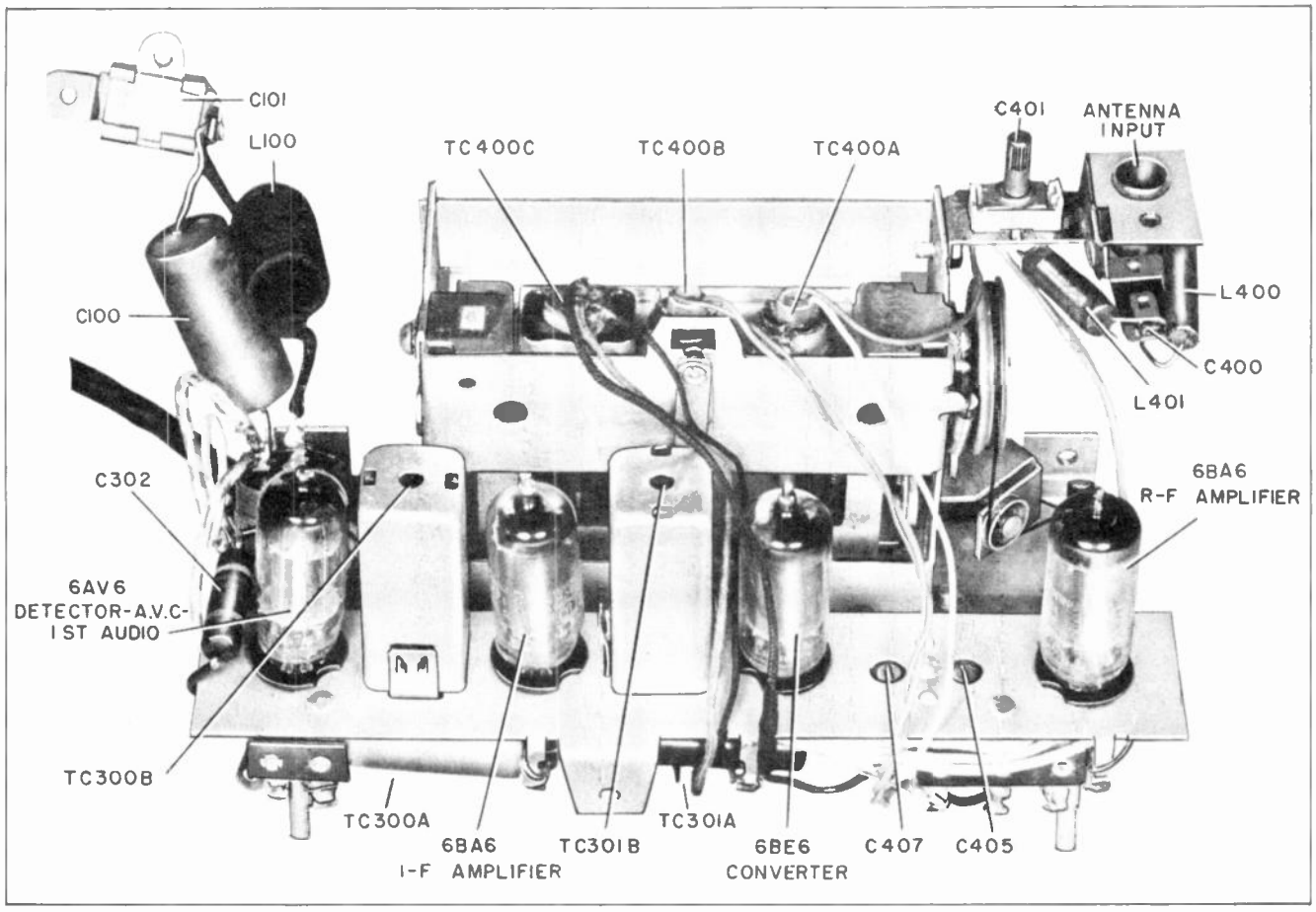
OUTPUT LEVEL—Attenuate the signal-generator output throughout the procedure to hold the output indication below 1 volt.

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-$\mu\mu$f. condenser to the antenna receptacle, and connect another 40-$\mu\mu$f. condenser from the antenna receptacle to the chassis when making the r-f and antenna tuning adjustments.

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Connect signal generator through a .05-μf. 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 output.	C407—osc. trimmer
3	Same as step 2.	1400 kc. (modulated)	1400 kc.	Adjust for maximum output.	C401—antenna padder C405—r-f trimmer



TP2-2469

Figure 3. Top View of R-F Unit, Showing Parts Placement and Tuning Adjustments

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
6BE6		190v	51.9v
6BA6 (i.f.)	1.3v	190v	51.9v
6AQ5	9v	215v	190v
6X4	225v		
Filter output, 190v			

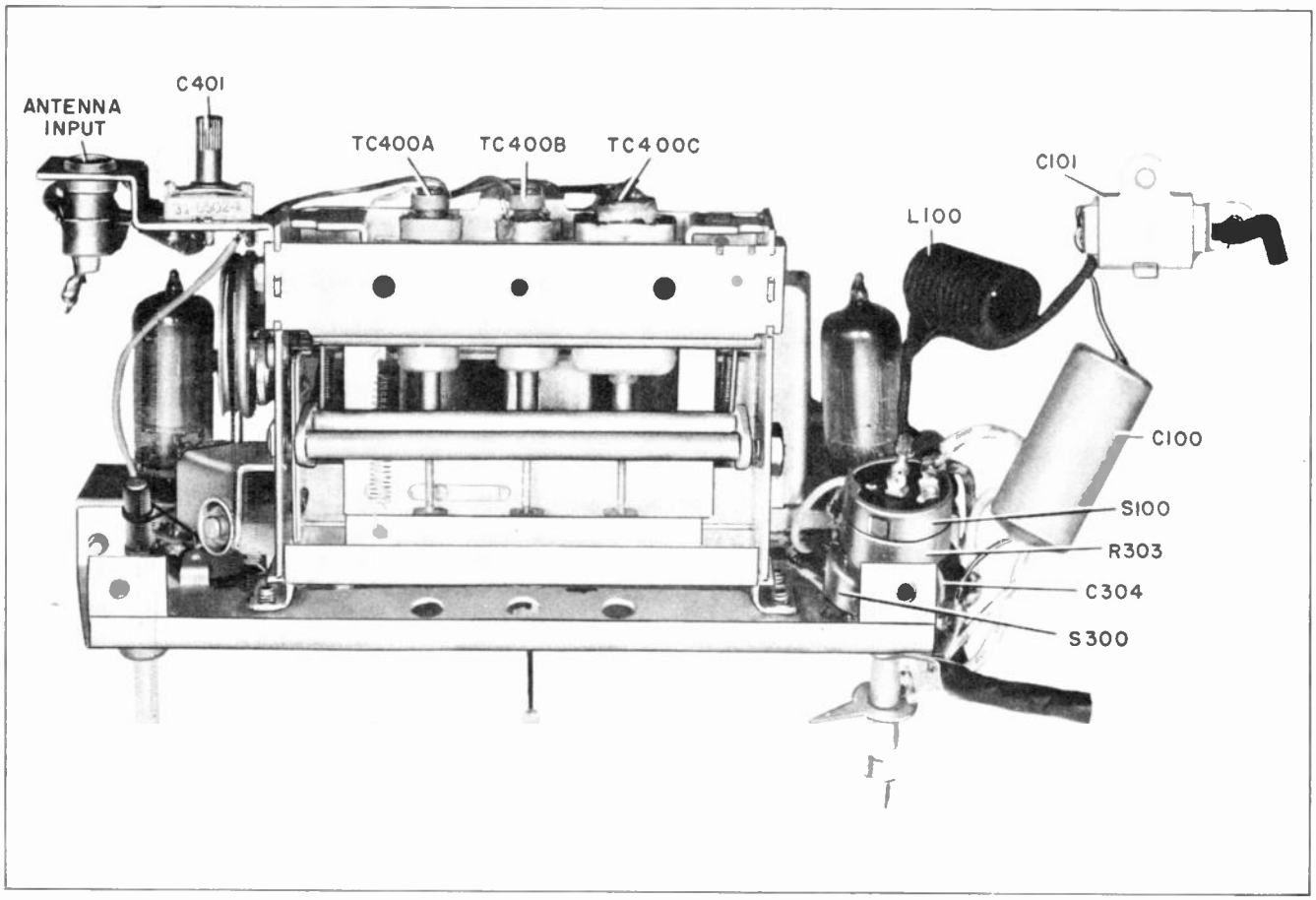


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Figure 4. Bottom View of R-F Unit, Showing Parts Placement

6.3 VOLTS INPUT

TUBE TYPE	CATHODE	PLATE	SCREEN
6BA6 (r.f.)	1.3v	175v	52v
6BE6		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
6BE6		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

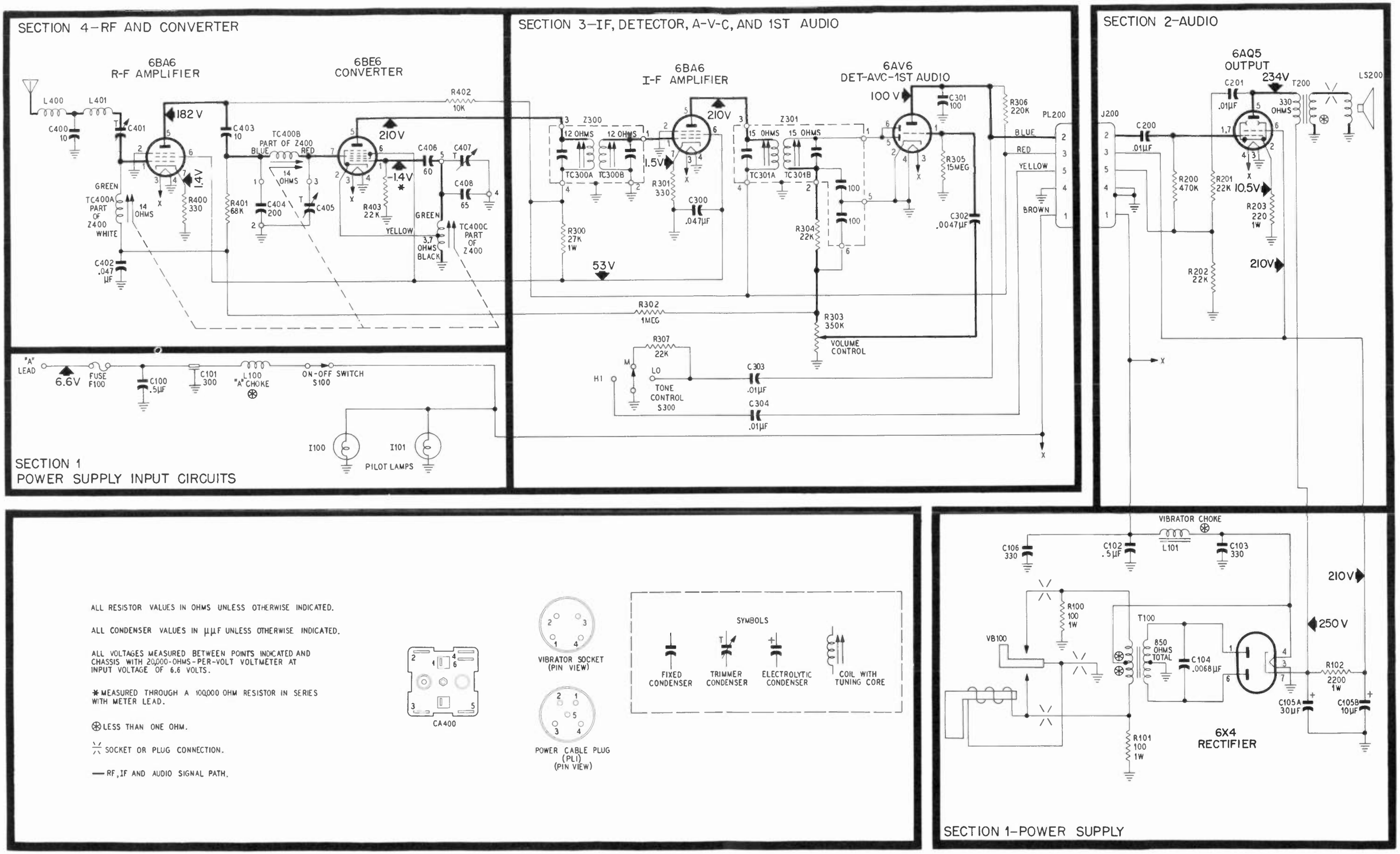
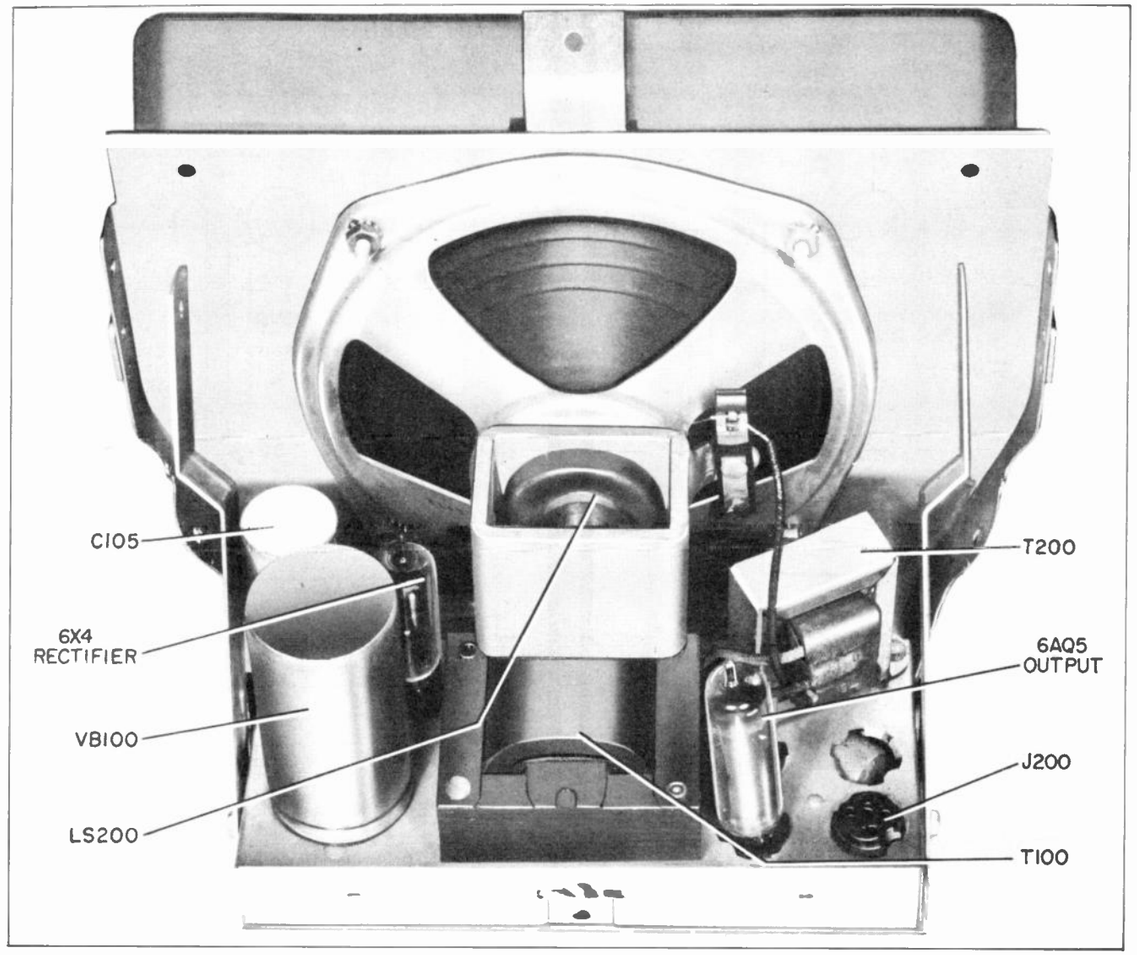


Figure 5. Philco Auto Radio S-5323, Schematic Diagram

TP2-3085



TP2-2476

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.
C100	Condenser, "A" lead filter, .5 μf.	61-0183
C101	Condenser, feed through, 300 μμf.	30-1235-1
C102	Condenser, hash filter, .5 μf.	61-0183
C103	Condenser, spark filter, 330 μμf.	62-133001001*
C104	Condenser, buffer, .0068 μf.	30-4661-8
C105	Condenser, electrolytic filter	61-0086-7
C105A	Condenser, filter, 30 μf.	Part of C105
C105B	Condenser, filter, 10 μf.	Part of C105
F100	Fuse, 14-ampere	45-2559*
I100	Pilot lamp	34-6024
I101	Pilot lamp	34-6024
L100	Choke, "A" lead	32-1644
L101	Choke, vibrator	32-4170-4
R100	Resistor, damping, 100 ohms, 1 watt	66-1104340*
R101	Resistor, damping, 100 ohms, 1 watt	66-1104340*

REPLACEMENT PARTS LIST (Continued)

SECTION 1—POWER SUPPLY (Continued)

Reference Symbol	Description	Service Part No.
R102	Resistor, filter, 2200 ohms, 1 watt	66-2224340*
S100	Switch, off-on	Part of R303
T100	Transformer, power	32-8313-1
VB100	Vibrator	83-0035

SECTION 2—AUDIO

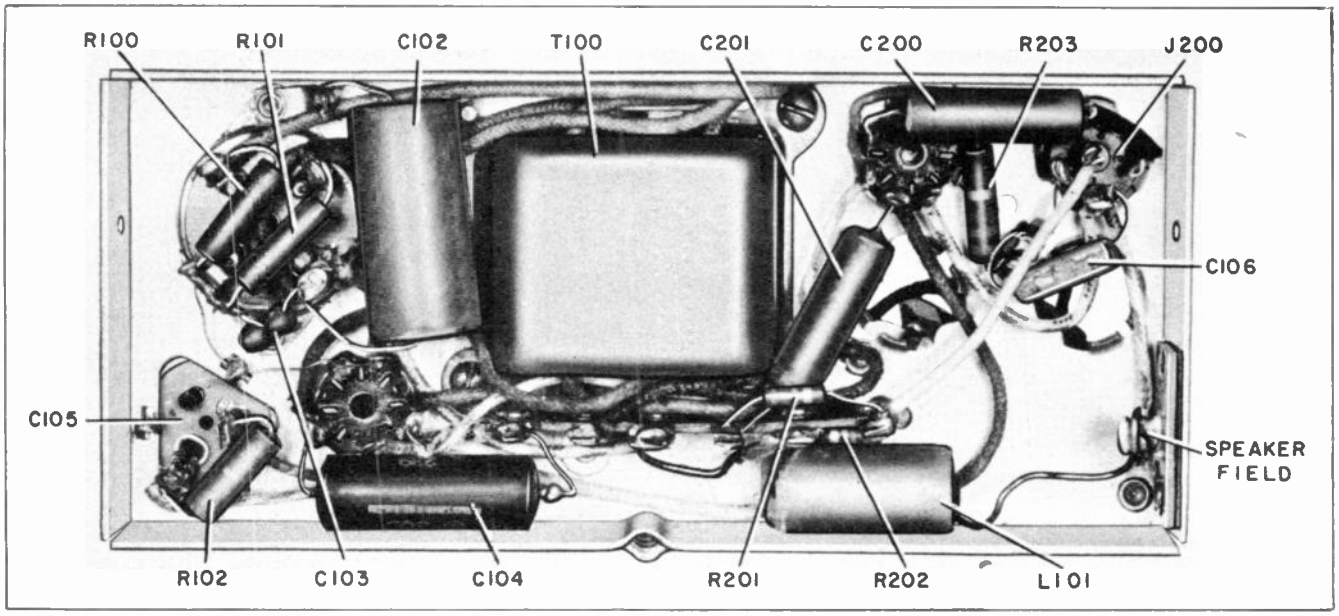
Reference Symbol	Description	Service Part No.
C200	Condenser, d-c blocking, .01 μf.	30-4650-41*
C201	Condenser, inverse feedback, .01 μf.	30-4650-41*
LS200	Speaker	36-1638-10
R200	Resistor, grid lead, 470,000 ohms	66-4478340*
R201	Resistor, inverse feedback, 22,000 ohms	66-3228340*
R202	Resistor, inverse feedback, 22,000 ohms	66-3228340*
R203	Resistor, cathode bias, 220 ohms, 1 watt	66-1224340*
T200	Transformer, output	32-8315-1

SECTION 3—I-F, A-V-C, 1st AUDIO

Reference Symbol	Description	Service Part No.
C300	Condenser, screen by-pass, .047 μf.	30-4650-45*
C301	Condenser, r-f by-pass, 100 μμf.	62-110001021*
C302	Condenser, audio coupling, .0047 μf.	30-4650-56
C303	Condenser, tone compensation, .01 μf.	30-4650-41*
C304	Condenser, tone compensation, .01 μf.	30-4650-41*
R300	Resistor, screen dropping, 27,000 ohms, 1 watt	66-3274340*
R301	Resistor, cathode bias, 330 ohms	66-1338340*
R302	Resistor, a-v-c load, 1 megohm	66-5108340*
R303	Resistor, volume control, 350,000 ohms	33-5570
R304	Resistor, a-v-c filter, 22,000 ohms	66-3228340*
R305	Resistor, grid leak, 15 megohms	66-6158340*
R306	Resistor, plate load, 220,000 ohms	66-4228340*
R307	Resistor, tone compensation, 22,000 ohms	66-3228340*
S300	Switch, tone control	Part of R303
Z300	Transformer, 1st i-f	32-4160A
Z301	Transformer, 2nd i-f	32-4240A

SECTION 4—R-F AND CONVERTER

Reference Symbol	Description	Service Part No.
C400	Condenser, spark suppressor, 10 μμf.	60-00105417
C401	Condenser, antenna compensator	31-6502-3
C402	Condenser, a-v-c by-pass, .047 μf.	30-4650-45*
C403	Condenser, d-c blocking, 10 μμf.	60-00105417
C404	Condenser, r-f trap, 200 μμf.	Part of CA400
C405	Condenser, r-f trimmer.	Part of CA400
C406	Condenser, d-c blocking, 60 μμf.	30-1224-110
C407	Condenser, oscillator trimmer	Part of CA400
C408	Condenser, oscillator tank, 65 μμf.	30-1224-87
CA400	Condenser assembly	31-6522-2
L400	Choke, antenna	32-4422-24
L401	Choke, antenna	65-0378
R400	Resistor, cathode bias, 330 ohms	66-1338340*
R401	Resistor, grid return, 68,000 ohms	66-3688340*
R402	Resistor, plate load, 10,000 ohms	66-3108340*
R403	Resistor, grid leak, 22,000 ohms	66-3228340*
Z400	Manual tuning unit	76-7920



TP2-2791

Figure 7. Base View of Power Unit, Showing Parts Placement

REPLACEMENT PARTS LIST (Continued)

MISCELLANEOUS

Description	Service Part No.
"A" lead	41-3910-16
Back cover	56-9920
Background plate assembly, dial	76-7972
Bezel overlay	56-9855-1
Nut, retaining (2)	56-9910FA3
Cable, power	41-4075-2
Coil assemblies:	
Antenna coil assembly	32-4586
Oscillator coil assembly	32-4587
R-F coil assembly	32-4585
Tuning core (3)	28-9336
Clip, fuse holder	56-3807-4
Dial glass	54-5153
Clip, dial retaining (2)	1W60196FE7
Front cover and bushing assembly, r-f unit	76-7859
Fuse lead	41-3910-10
Housing, r-f unit	76-7834
Knob, manual (2)	27-4687-20
Knob, tone	56-9860
Lock washer, speaker mounting (4)	1W24257FA1
Manual shaft assembly	76-8379
Master Kit	
Condenser, spark coil, .5 μf. 100v	30-4007-1
Condenser, generator, .5 μf. 100v	30-4674
Screw, binding head (2)	1W18452FA3
Nut, speaker mounting (4)	1W19988FA3
Plug, power cable (PL200)	Part of power cable
Pointer, dial	56-9895
Pointer, tone	56-9890
Pointer arm assembly	76-8378
Screw, 8 x 1/4", hex head, cover mounting	1W19907FA3
Socket assembly, pilot lamp (2)	27-6233-52
Socket, antenna	57-1243FA3
Socket, miniature tube (4)	27-6294
Socket, miniature tube (2)	27-6294-1
Socket, power unit (J200)	27-6273
Socket, speaker field	27-6252-4
Socket, vibrator	27-6245
Spring, backlash	28-9334
"C" washer	28-9335

PR-2426

Printed in U. S. A.

PHILCO SERVICE

AUTO RADIO

PHILCO AUTO RADIO MODEL S-5124

SPECIFICATIONS

CIRCUIT	Six-tube superheterodyne
FREQUENCY RANGE	540—1600 kc.
AUDIO OUTPUT	3.25 watts
PUSH BUTTONS	Four automatic preset station selectors
POWER INPUT	5.1 amperes at 6.6 volts, d.c.
INTERMEDIATE FREQUENCY	265 kc.
PHILCO TUBES	6BA6 (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.

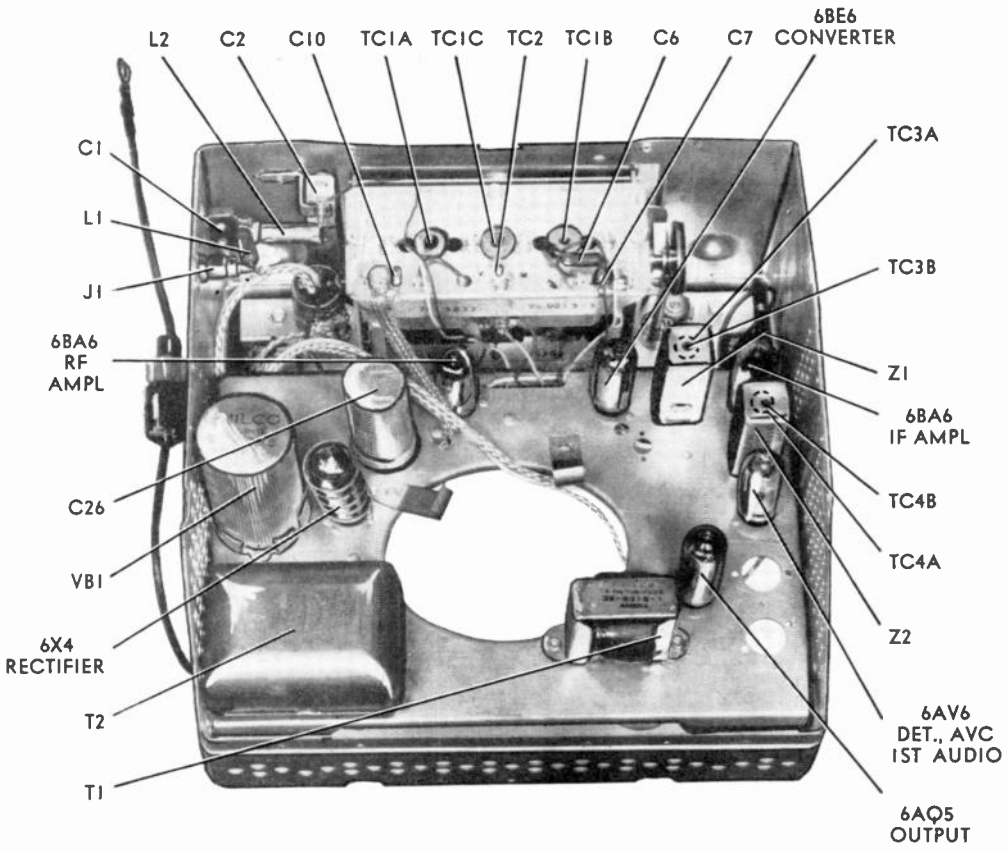


Fig. 2. Top View Showing Trimmer Location

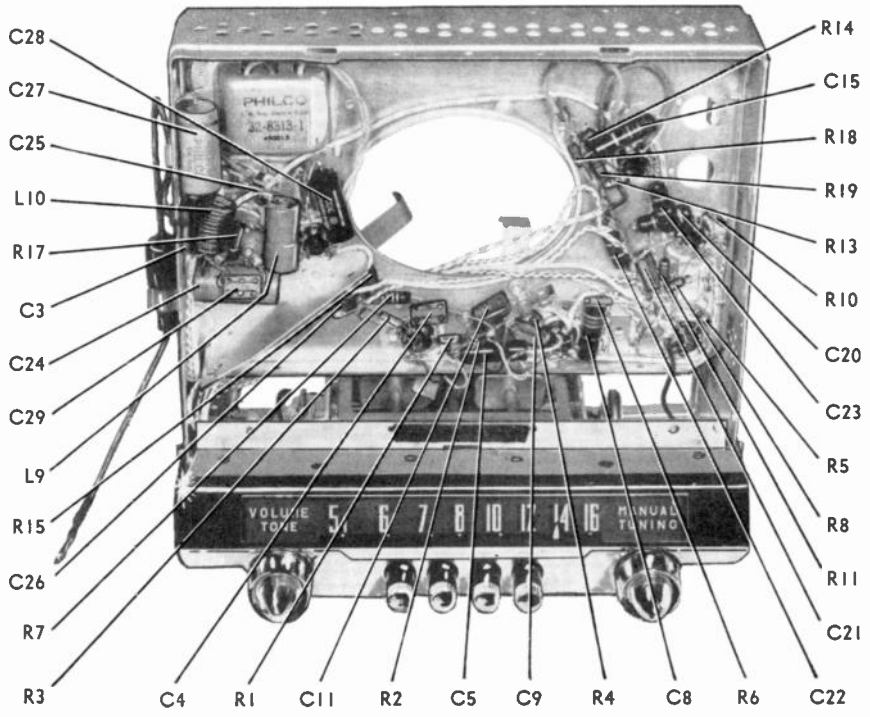


Fig. 3. Base View Showing Parts Placement

STEP	SIGNAL GENERATOR		RADIO		ADJUST TRIMMER
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Through a .05 μf. condenser 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.

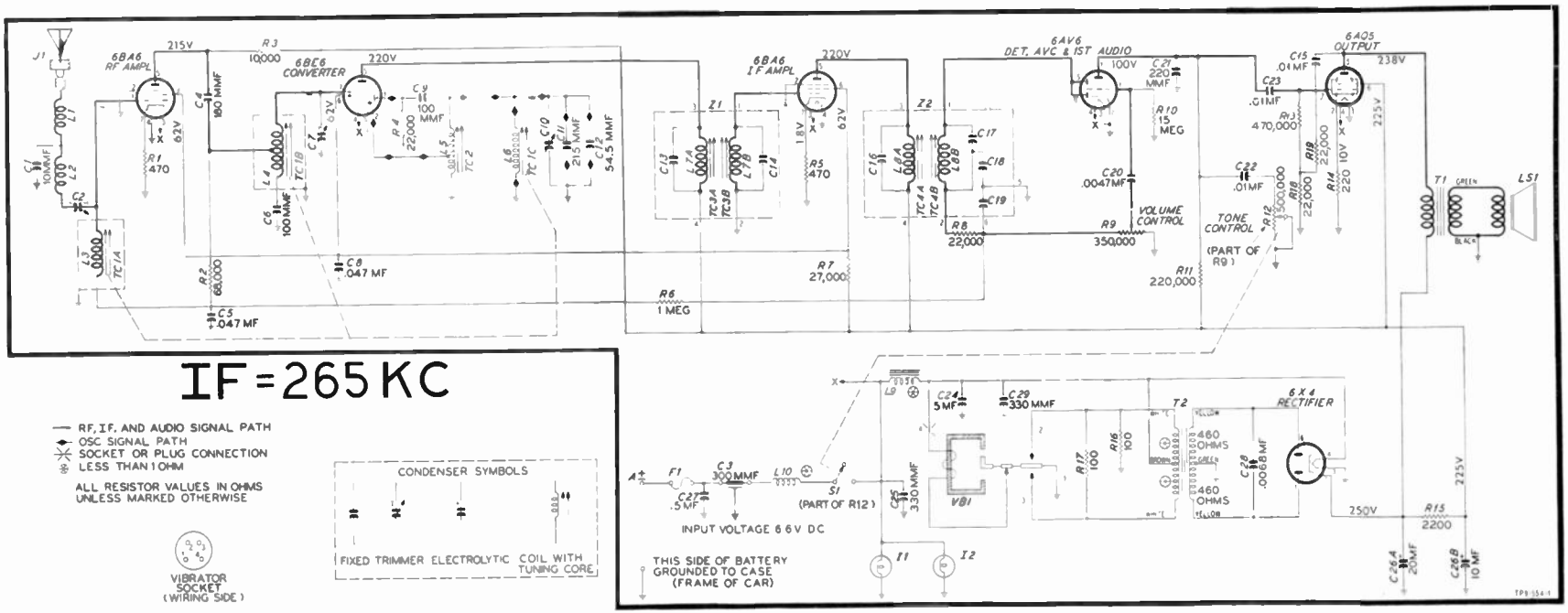


Figure 4. Schematic Diagram, Philco Auto Radio Model S-5124

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	30-1227-12
C2	Condenser, aerial trimmer	31-6472
C3	Condenser, hash filter, 300 $\mu\mu f$.	30-1235
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, 100 $\mu\mu f$.	62-110009001*
C7	Condenser, r-f trimmer	63-0055
C8	Condenser, screen by-pass, .047 μf.	45-3505-28*
C9	Condenser, d-c blocking, 100 $\mu\mu f$.	62-110009001*
C10	Condenser, osc. trimmer	63-0052
C11	Condenser, osc. tank, 215 $\mu\mu f$.	30-1220-4
C12	Condenser, temperature compensator, 54.5 $\mu\mu f$.	61-0149
C13	Condenser, i-f	Part of Z1
C14	Condenser, i-f	Part of Z1
C15	Condenser, inverse feedback, .01 μf.	45-3505-58*
C16	Condenser, i-f	Part of Z2
C17	Condenser, i-f	Part of Z2
C18	Condenser, i-f filter	Part of Z2
C19	Condenser, i-f filter	Part of Z2
C20	Condenser, d-c blocking, .0047 μf.	45-3505-56*
C21	Condenser, plate by-pass, 220 $\mu\mu f$.	62-122001001
C22	Condenser, tone control, .01 μf.	45-3505-41*
C23	Condenser, d-c blocking, .01 μf.	45-3505-41*
C24	Condenser, hash filter, .5 μf.	61-0137*
C25	Condenser, "A" lead filter, 330 μf.	62-133001001
C26	Condenser, electrolytic, 2 sections	61-0086-6
C26A	Condenser, filter, 20 μf., 350 wvdc	Part of C26
C26B	Condenser, filter, 10 μf., 350 wvdc	Part of C26
C27	Condenser, spark suppressor, .5 μf.	61-0137*
C28	Condenser, buffer, .0068 μf., 1600v	30-4661-8
C29	Condenser, vibrator filter, 330 μf.	62-133001001
F1	Fuse, 14 amp.	45-2559
I1	Pilot lamp, 6—8v, 150 ma., brown bead	34-2068
I2	Pilot lamp, 6—8v, 150 ma., brown bead	34-2068
J1	Socket, aerial	57-1243FA3
L1	Choke, aerial	32-4422-24
L2	Choke, aerial	65-0378
L3	Coil, aerial	65-0443-22
L4	Coil, r-f	65-0443-23
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	32-4170-4
L10	Choke, "A" filter	32-1374-2
LS1	Speaker, 6" round	36-1613-6
R1	Resistor, cathode bias, 470 ohms	66-1478340*
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, cathode bias, 470 ohms	66-1478340*
R6	Resistor, a-v-c filter, 1 megohm	66-5108340
R7	Resistor, dropping, 27,000 ohms, 1 watt	66-3274340*
R8	Resistor, i-f filter, 22,000 ohms	66-3228340*
R9	Volume control, 350,000 ohms	33-5557-8
R10	Resistor, grid return, 15 megohms	66-6158340*
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	66-1224340*
R15	Resistor, filter, 2200 ohms, 1 watt	66-2224340*
R16	Resistor, vibrator filter, 100 ohms, 1 watt	66-1104340*
R17	Resistor, vibrator filter, 100 ohms, 1 watt	66-1104340*
R18	Resistor, feedback, 22,000 ohms	66-3228340*
R19	Resistor, feedback, 22,000 ohms	66-3228340*
S1	Switch, off-on	Part of R9

Reference Symbol	Description	Service Part No.
T1	Transformer, output	32-8315-1
T2	Transformer, power	32-8313-1
TC1, A, B, C	Tuning core (3), ant. r-f osc.	56-3612-8
VB1	Vibrator	83-0026
Z1	Transformer, 1st i-f	32-4290-1A
Z2	Transformer, 2nd i-f	32-4293-1A

MISCELLANEOUS

Description	Service Part No.
"A" lead	41-3910-9
Back cover and clip assembly	76-6551
Background plate	56-8218
Bezel	76-5879
Bolt, set mounting (2)	56-7566
Bolt, speaker mounting, 8—32 x 5/8" (4)	W1582FA26
Lockwasher, #8 external (4)	1W24257FA1
Nut, 8—32 hex-head (4)	1W19988FA3
Clip, fuse holder	56-3807-4
Dial glass	54-5092
Clip, dial retaining (2)	1W56913FE7
Spring, dial retaining	56-7564FE11
Front cover	76-6377
Fuse lead	41-3910-8
Gasket, speaker	54-8266
Housing	76-6348FA2
Knob, manual	27-4687-14
Knob, tone and manual (2)	27-4687-11
Knob, volume	56-7556FA8
Master Kit	
Bolt, hook	56-7565FA3
Braid	95-0073
Condenser, spark 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, 1/4—20	19W23753
Resistor	33-1333
Screw, suppression	1W19828FA3
Screw, suppression	1W10636FA3
Strap, ground	76-5388
Washer	1W52237FA3
Pilot lamp socket assembly (2)	27-6233-4
Pilot lamp filter (2)	54-7974
Pilot lamp shield (2)	56-5735-1FA3
Push button (4)	76-5923
Screw, 8 x 1/4" hex head drive, cover mounting	1W19907FA3
Socket, miniature (3) with center shield	27-6203
Socket, miniature (3)	27-6203-12
Socket, vibrator	27-6245
Tuning unit complete	76-5837-1
Grommet (2), r-f and ant. coil	27-4596
Grommet, osc. coil	55-1480
Palnut (4), shield can to backplate mtg.	1W29084FA3
Spring nut, osc. shunt coil	W-1775FA3
Washer, bezel mounting (2)	54-8072

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 ..... 5.1 amperes at 6.6 volts, d.c.

INTERMEDIATE FREQUENCY ..... 455 kc.

PHILCO TUBES (6) 6BA6 (2), 6BE6, 6AV6, 6AQ5, 6X4

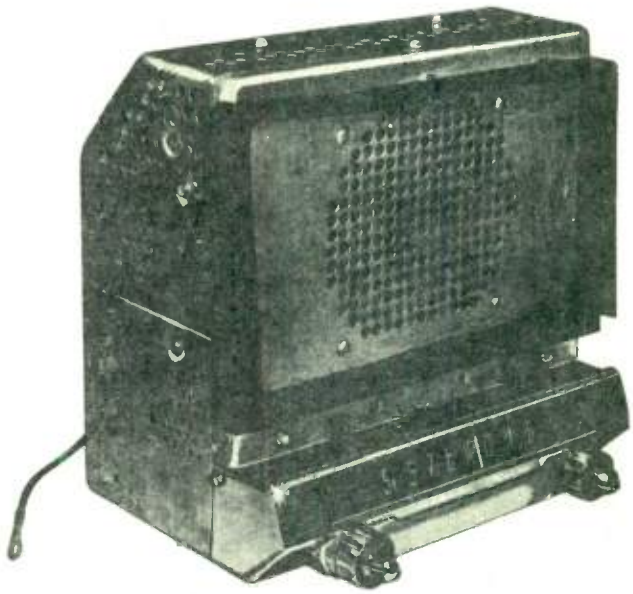


Figure 1. Philco Auto Radio Model S-5123

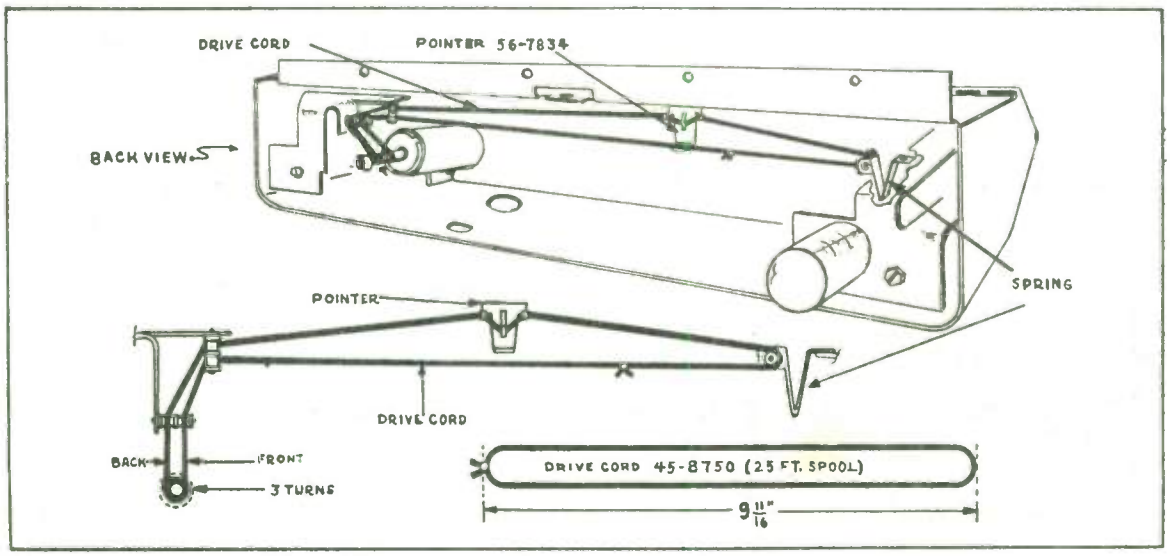


Figure 2. Drive-Cord Installation Details

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.

STEP	SIGNAL GENERATOR		RADIO		ADJUST TRIMMER
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Through a .05 μf. condenser to converter grid (pin 7 of 6BE6).	455 kc.	Maximum counterclockwise	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 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—antenna tuning core
4				Repeat steps 2 and 3 until no further improvement is noted and set trucks properly.	
5	Through dummy antenna.	580 kc.	580 kc.	Adjust for maximum output while rocking tuning control.	TC2—osc. shunt core
6			Tune to weak station near 1400 kc.	With radio installed in car and antenna fully extended.	C2—antenna compensator

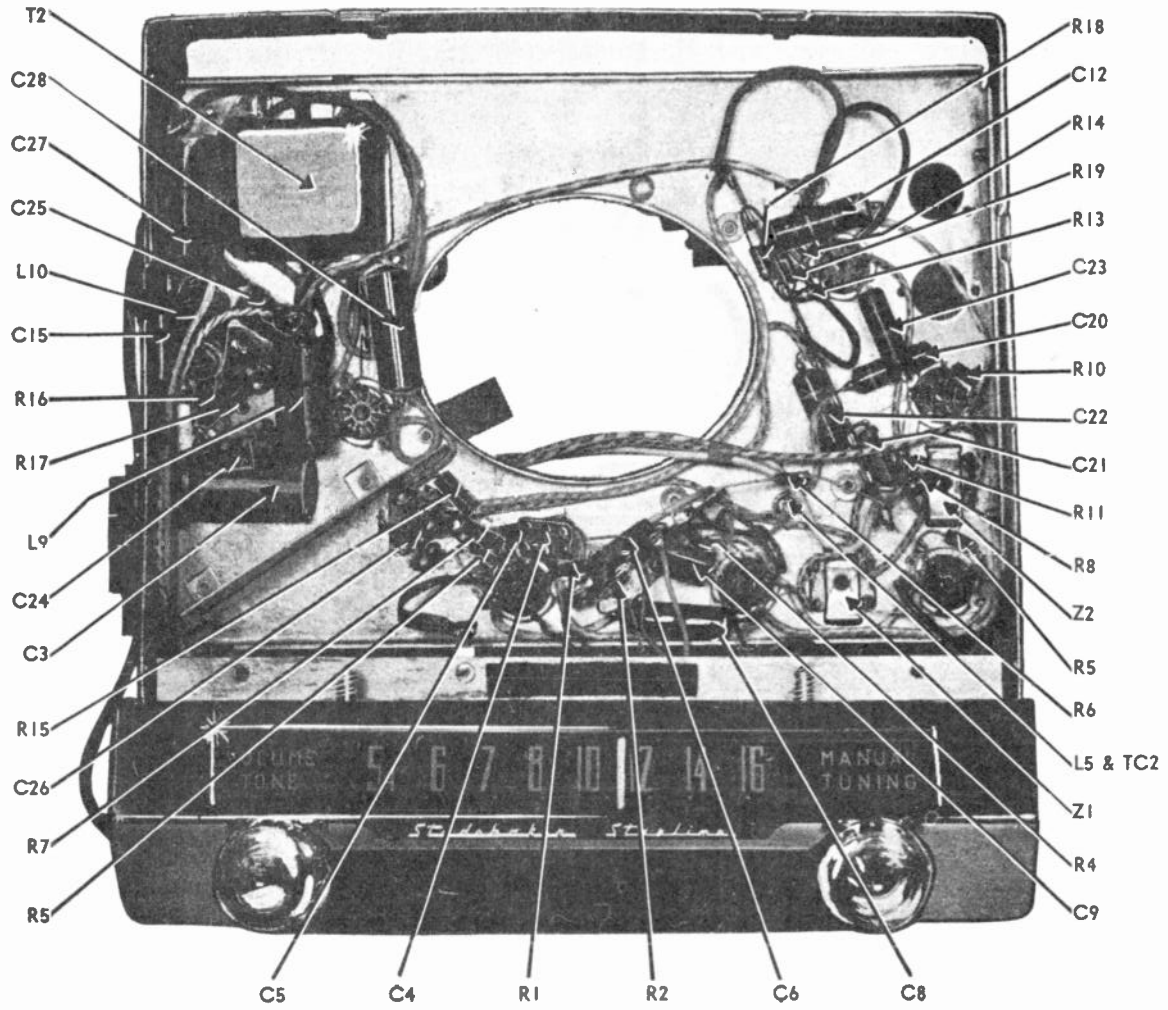


Figure 3. Base View Photo, Showing Parts Placement

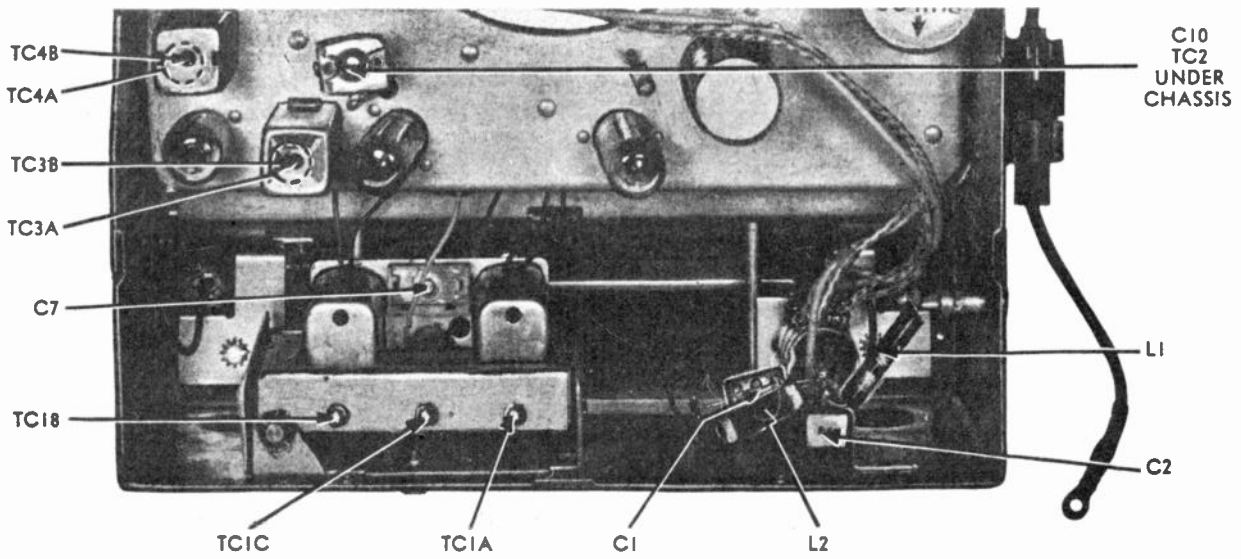


Figure 4. Alignment Photo, Showing Trimmer Locations

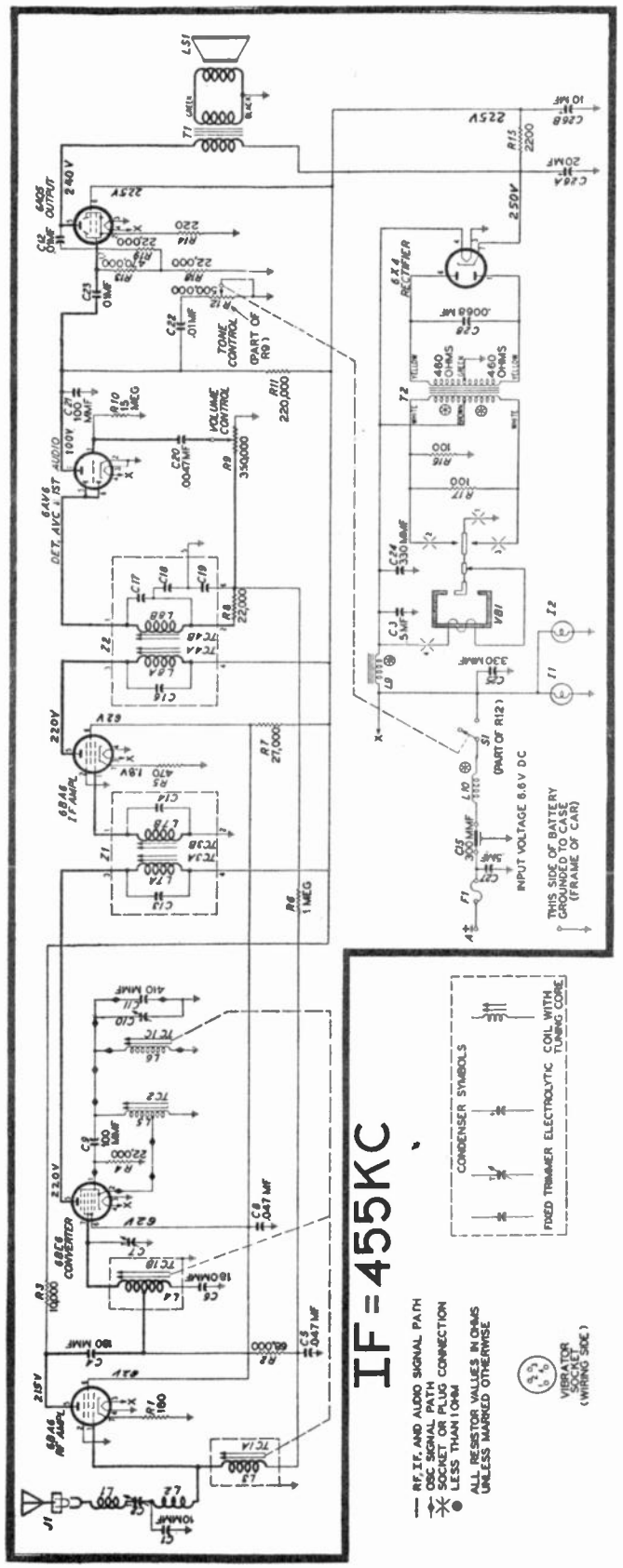


Figure 5. Schematic Diagram, Philco Auto Radio Model S-5123

REPLACEMENT PARTS LIST

Item No.	Description	Part Number
C1	Condenser, spark suppressor, 10 μμf.	60-00105407*
C2	Condenser, antenna trimmer	31-6472
C3	Condenser, hash filter, .5 μf.	61-0137*
C4	Condenser, d.c. blocking, 180 μμf.	60-10185417*
C5	Condenser, a-v-c by-pass, .047 μf.	45-3505-28*
C6	Condenser, image trap, 180 μμf.	Part of C7
C7	Condenser, r.f. trimmer	31-6513
C8	Condenser, screen by-pass, .047 μf.	45-3505-28*
C9	Condenser, d.c. blocking, 100 μμf.	60-10105407*
C10	Condenser, oscillator trimmer	31-6473-23
C11	Condenser, oscillator tank, 410 μμf.	60-10405237*
C12	Condenser, inverse feedback, .01 μf.	45-3505-58*
C13	Condenser, i.f.	Part of Z1
C14	Condenser, i.f.	Part of Z1
C15	Condenser, feed through, 300 μμf.	30-1235
C16	Condenser, i.f.	Part of Z2
C17	Condenser, i.f.	Part of Z2
C18	Condenser, i.f. filter	Part of Z2
C19	Condenser, i.f. filter	Part of Z2
C20	Condenser, d.c. blocking, .0047 μf.	45-3505-56*
C21	Condenser, plate by-pass, 100 μμf.	60-10105407*
C22	Condenser, tone control, .01 μf.	45-3505-41*
C23	Condenser, d.c. blocking, .01 μf.	45-3505-41*
C24	Condenser, vibrator filter	62-133001001*
C25	Condenser, "A" filter	62-133001001*
C26	Condenser, electrolytic, 2 section	61-0086
C26A	Condenser, filter, 20 μf., 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	30-4661-8
F1	Fuse, 14 amp	45-2559
I1	Pilot lamp, 6—8 volt	34-2068
I2	Pilot lamp, 6—8 volt	34-2068
J1	Antenna socket	57-1243FA3
L1	Choke, antenna	32-4422-24
L2	Choke, antenna	65-0378
L3	Coil, antenna	65-0443-25
L4	Coil, r.f.	65-0443-26
L5	Coil, oscillator	65-0443-27
L6	Coil, oscillator, shunt	32-4110-4

Continued on next page

MODEL S-5123

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."

Item No.	Description	Part Number
L7A, B	Coils, 1st i.f.	Part of Z1
L8A, B	Coils, 2nd i.f.	Part of Z2
L9	Choke, vibrator	32-4170-4
L10	Choke, "A" filter	32-1374-2
LS1	Speaker, p-m, 6"	36-1613-6
R1	Resistor, cathode bias, 180 ohms	66-1188340*
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, cathode bias, 470 ohms	66-1478340
R6	Resistor, a-v-c filter, 1 megohm	66-5108340*
R7	Resistor, dropping, 27,000 ohms, 1 watt	66-3274340*
R8	Resistor, i-f filter, 22,000 ohms	66-3228340*
R9	Volume control, 350,000 ohms	33-5557-8
R10	Resistor, grid return, 15 megohms	66-6158340*
R11	Resistor, plate load, 220,000 ohms	66-4228340*
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	66-1104340*
R18	Resistor, inverse feedback, 22,000 ohms	66-3228340*
R19	Resistor, inverse feedback, 22,000 ohms	66-3228340*
S1	Switch, off-on	Part of R9
T1	Transformer, output	32-8315-1
T2	Transformer, power	32-8313-1
TC1A, B, C	Tuning cores, tuner	56-3612-7
VB1	Vibrator	83-0026
Z1	Transformer, 1st i-f	32-4160A
Z2	Transformer, 2nd i-f	32-4240A

MISCELLANEOUS

Description	Part Number
"A" lead	41-3910-9
Background plate assembly	76-5632
Bezel	76-5635
Washer, bezel mounting	54-8072
Bolt, set mounting (2)	56-7566FA3
Clip, fuse holder	56-3807-4
Cover, rivet assembly	76-6377
Cover, tube side	76-5269-2FA2
Dial Glass	54-5085
Spring, dial retaining	56-7564FE11
Filter, pilot lamp (2)	54-7974
Fuse lead	41-3910-8
Knob and Shaft Assy, Volume and Tone	76-5279-1
Knob, tuning	27-4687-11
Master Kit:	
Bolt, hook	56-7565FA3
Braid	95-0073
Condenser	30-4632
Condenser	30-4007-1
Ground strap	76-5388
Lockwasher	1W24257FA1
Lockwasher, ¼" external teeth	1W24260FA1
Nipple, distributor cable	54-7159
Nut	1W19988FA3
Resistor	33-1333
Screw	1W18828FA3
Screw	1W1063FA3
Washer	1W52237FA3
Wing Nut, ¼"—20	19W23753
Pilot lamp socket assembly	27-6233-4
Pointer	56-7834FCP
Shield, pilot lamp (2)	56-5733-1FA3
Shunt coil and padder assembly	76-4818-3
Socket, miniature (3)	27-6203
Socket, miniature (3)	27-6203-12
Socket, vibrator	27-6245
Speaker gasket	54-8266
Bolt (4) speaker mounting	W1582FA3
Lockwasher (4), speaker mounting	1W24257FA1
Nut (4), speaker mounting	1W19988FA3
Tuning unit assembly	76-4564-2
Backlash nut	56-6731
Backlash spring	57-1705FA1
Grommet (2)	27-4596
Grommet	55-1480
Pinion and shaft assembly	76-4562
Retaining spring (2)	57-1868FA1
Spiral and shaft assembly	76-5631
Spring (2)	56-6696FA1
Vibrator clamp	57-1637-3FA11

PHILCO SERVICE

AUTO RADIO

PHILCO RADIO MODEL S-5127

STUDEBAKER MODEL AC 2111

SPECIFICATIONS

CIRCUIT	Eight-tube superheterodyne
FREQUENCY RANGE	540—1600 kc.
AUDIO OUTPUT	5 watts
PUSH BUTTONS	Six for automatic station selection
POWER INPUT	7.2 amperes at 6.6 volts, d.c.
INTERMEDIATE FREQUENCY	265 kc.
PHILCO TUBES (8)	6BA6 (2), 6BE6, 6AV6, 6C4, 6AQ5 (2), 6X4

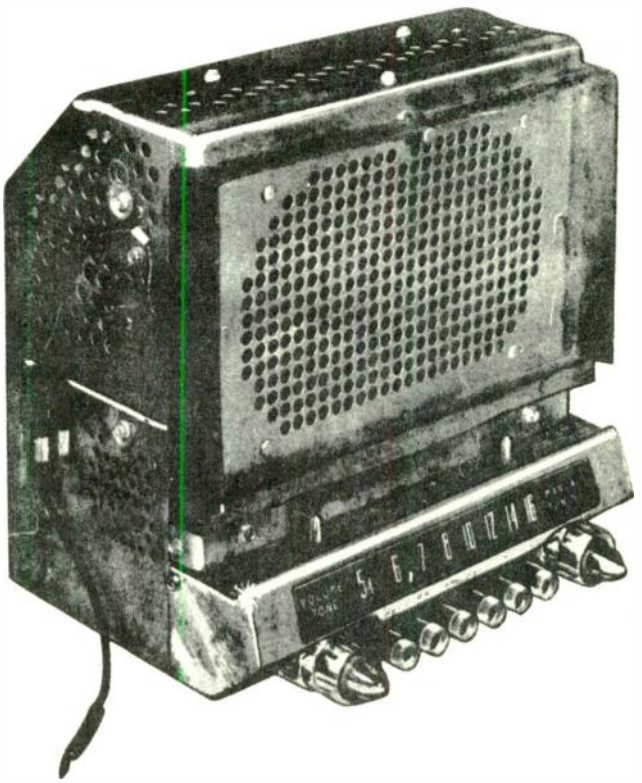


Figure 1. Philco Auto Radio Model S-5127

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.

STEP	SIGNAL GENERATOR		RADIO		ADJUST TRIMMER
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Through a .05 μf. condenser to converter grid (pin 7 of 6BE6).	255 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 i-f sec. TC4A—2nd i-f pri. TC3B—1st i-f sec. TC3A—1st i-f pri.
2	Through dummy aerial.	1605 kc.	Maximum clockwise	Adjust trimmers, in order given, for maximum output.	C9—osc. trimmer C6—r-f trimmer C1—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 core
6				Recheck C9 at 1605 kc. Repeat adjustment 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 installed and aerial fully extended.	C1—aerial trimmer

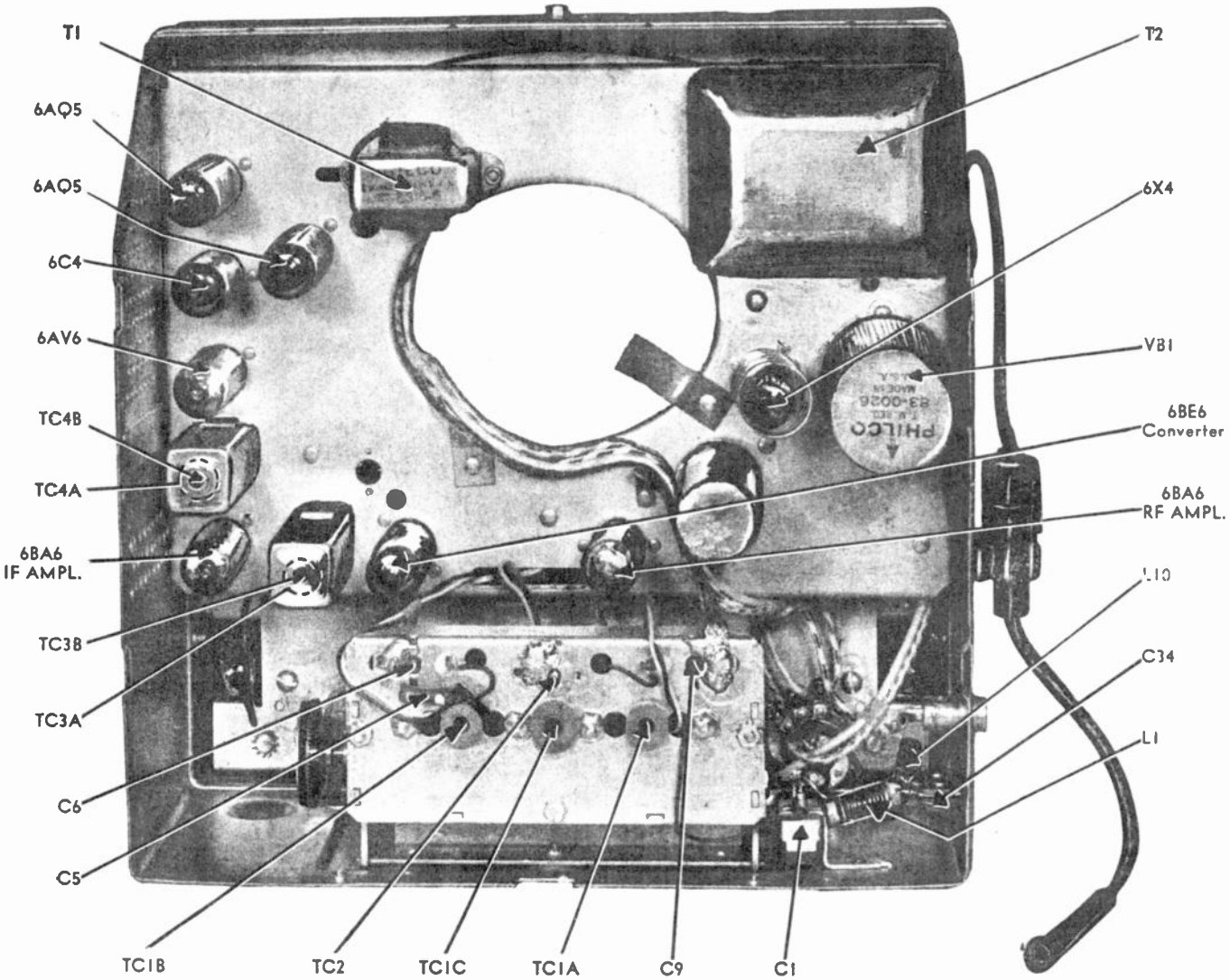


Figure 2. Alignment Photo, Showing Trimmer Locations

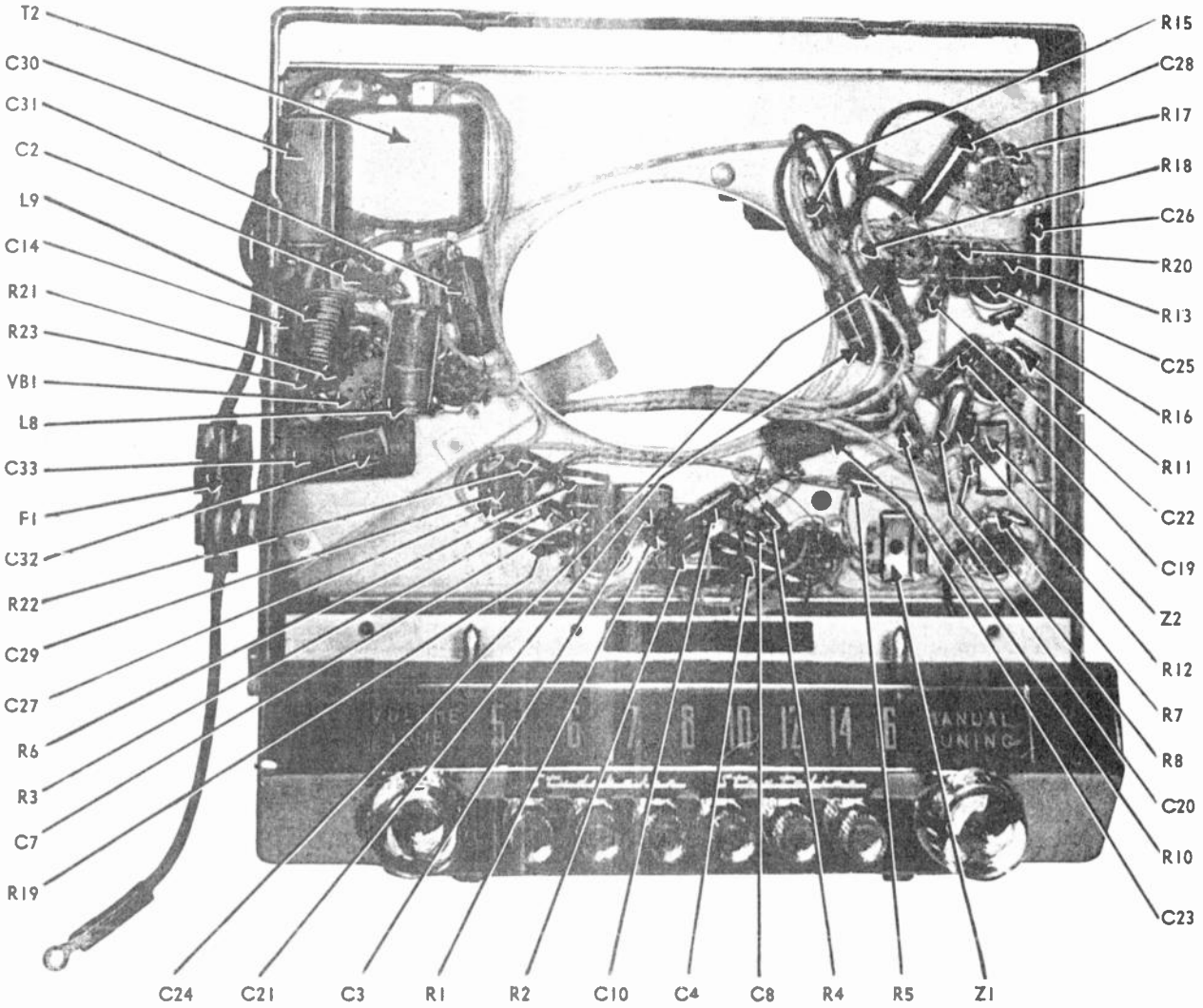


Figure 3. Base View Photo, Showing Parts Placement

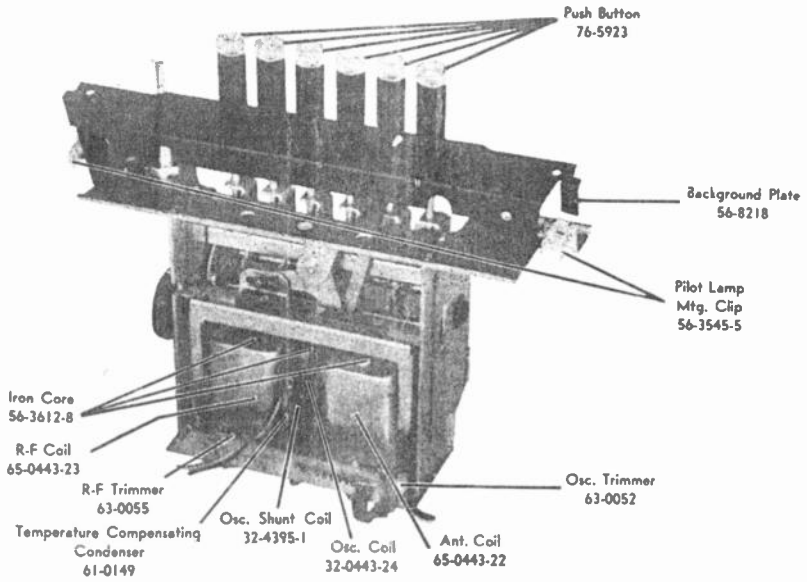


Figure 4. Detail Photo of Tuner

MODEL S-5127

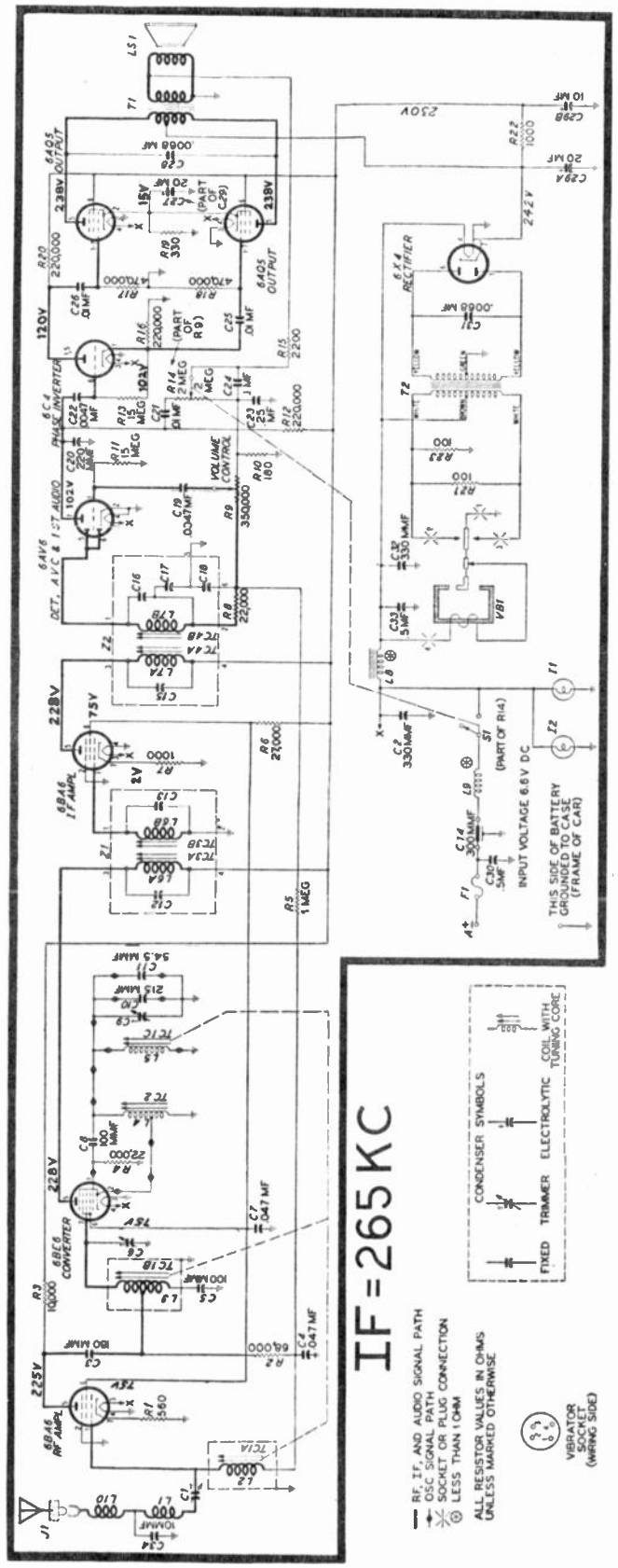


Figure 5. Schematic Diagram, Philco Auto Radio Model S-5127

REPLACEMENT PARTS LIST

Item No.	Description	Part Number
C1	Condenser, antenna padder	31-6472
C2	Condenser, hash filter, 330 $\mu\mu f$.	62-133001001*
C3	Condenser, d.c. blocking, 180 $\mu\mu f$.	60-10185417*
C4	Condenser, a-v-c filter, .047 μf.	45-3505-28*
C5	Condenser, image trap, 100 $\mu\mu f$.	62-110009001*
C6	Condenser, r-f trimmer	63-0055
C7	Condenser, screen by-pass, .047 μf.	45-3505-28*
C8	Condenser, d.c. blocking, 100 $\mu\mu f$.	62-110009001*
C9	Condenser, osc. trimmer	63-0052*
C10	Condenser, osc. tank, 215 $\mu\mu f$.	30-1220-4
C11	Condenser, temperature compensation, 54.5 $\mu\mu f$.	61-0149
C12	Condenser, i-f	Part of Z1
C13	Condenser, i-f	Part of Z1
C14	Condenser, feed through, 300 $\mu\mu f$.	30-1235
C15	Condenser, i-f	Part of Z2
C16	Condenser, i-f	Part of Z2
C17	Condenser, i-f filter	Part of Z2
C18	Condenser, i-f filter	Part of Z2
C19	Condenser, d.c. blocking, .0047 μf.	45-3505-56*
C20	Condenser, plate by-pass, 220 $\mu\mu f$.	62-122001001
C21	Condenser, tone control, .01 μf.	45-3505-41*
C22	Condenser, d.c. blocking, .0047 μf.	45-3505-56*
C23	Condenser, inverse feedback, .25 μf.	61-0125
C24	Condenser, inverse feedback, .1 μf.	45-3505-30*
C25	Condenser, d.c. blocking, .01 μf.	45-3505-41*
C26	Condenser, d.c. blocking, .01 μf.	45-3505-41*
C27	Condenser, cathode by-pass, 20 μf., 25v	Part of C29
C28	Condenser, output transformer, .0068 μf.	45-3505-91*
C29	Condenser, electrolytic, 3 section	61-0086A
C29A	Condenser, filter, 20 μf., 350v	Part of C29
C29B	Condenser, filter, 10 μf., 250v	Part of C29
C30	Condenser, "A" lead filter, .5 μf.	61-0137*
C31	Condenser, buffer, .0068 μf., 1600v	30-4661-8
C32	Condenser, hash filter, 330 $\mu\mu f$.	62-133001001
C33	Condenser, hash filter, .5 μf.	61-0137*
C34	Condenser, spark suppressor, 10 $\mu\mu f$.	62-010409001
F1	Fuse	45-2559
I1	Pilot lamp	34-2068
I2	Pilot lamp	34-2068

Continued on next page

MODEL S-5127

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."

Item No.	Description	Part Number
J1	Socket, antenna	57-1243FA3
L1	Choke, antenna	65-0378
L2	Choke, antenna	65-0443-22
L3	Coil, r-f	65-0443-23
L4	Coil, osc. shunt	32-4395-2
L5	Coil, osc.	65-0443-24
L6, A, B	Coils, 1st i-f	Part of Z1
L7, A, B	Coils, 2nd i-f	Part of Z2
L8	Choke, vibrator	32-4170-4
L9	Choke, spark filter	32-1374-2
L10	Choke, antenna	32-4422-24
LS1	Speaker, 6" x 9" oval	36-1631
R1	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, 1 megohm	66-5108340*
R6	Resistor, screen dropping, 27,000 ohms	66-3278340*
R7	Resistor, cathode bias, 1000 ohms	66-2108340*
R8	Resistor, i-f filter, 22,000 ohms	66-3228340*
R9	Volume control, 350,000 ohms	33-5557-7
R10	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*
R14	Tone control, 2 megohms	Part of R9
R15	Resistor, inverse feedback, 2200 ohms	66-2228340*
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, cathode bias, 330 ohms, 1w	66-1334340*
R20	Resistor, plate load, 220,000 ohms	66-4228340*
R21	Resistor, vibrator filter, 100 ohms, 1w	66-1104340*
R22	Resistor, filter, 1000 ohms, 1w	66-2104340*
R23	Resistor, vibrator filter, 100 ohms, 1w	66-1104340*
S1	Switch, off-on	Part of R9
T1	Transformer, output	32-8315
T2	Transformer, power	32-8313-1
TC1A, B, C	Tuning core (3), ant. r-f and osc.	56-3612-8
VB1	Vibrator	83-0026
Z1	Transformer, 1st i-f	32-4290-1A
Z2	Transformer, 2nd i-f	32-4293-1A

MISCELLANEOUS

Description	Part Number
"A" lead	41-3910-9
Back cover	76-5269-2FA2
Background plate	56-8218
Bezel	76-5880
Bolt, set mounting (2)	56-7566
Bolt, speaker mounting, 8—32 x 5/8" (4)	W-1582FA26
Lockwasher #8 external (4)	1W24257FA1
Nut 8—32 hex head	1W19988FA3
Clip, fuse holder	56-3807-4
Dial glass	54-5092
Clip, dial retaining (2)	1W56913FE7
Spring, dial retaining	56-7564FE11
Front cover	76-6381
Fuse lead	41-3910-8
Gasket, speaker	54-8266
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, spark 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, 1/4—20	19W23753
Resistor	33-1333
Screw, suppression	1W19828FA3
Screw, suppression	1W10636FA3
Strap, ground	76-5388
Washer	1W52237FA3
Pilot lamp socket assembly (2)	27-6233-4
Pilot lamp filter (2)	54-7974
Pilot lamp shield (2)	56-5735-1FA3
Push button (6)	76-5923
Screw, 8 x 1/4" hex washer head, cover mounting	1W19907FA3
Socket, miniature (3) with center shield	27-6203
Socket, miniature (5)	27-6203-12
Socket, vibrator	27-6245
Tuning Unit Complete	76-5837
Grommet (2), r-f and ant. coils	27-4596
Grommet, osc. coil	55-1480
Palnut (4), backplate mounting	1W29084FA3
Spring nut, osc. shunt coil	W-1775FA3
Washer, bezel mounting (2)	54-8072

PHILCO AUTO RADIO MODEL C-4908

Circuit Description

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.

MODEL C-4908

SPECIFICATIONS

CABINET	All-steel housing; speaker separately mounted
CIRCUIT	8-tube superheterodyne
FREQUENCY RANGE	535—1605 kc.
AUDIO OUTPUT	5 watts
PUSH BUTTONS	5 station selectors, 1 manual-tuning selector, and 1 "off" switch
POWER INPUT	8.6 amp. at 6.6 volts, d.c.
INTERMEDIATE FREQUENCY	455 kc.
PHILCO TUBES (8)	6BA6 (2), 6BE6, 6AV6, 6C4, 6AQ5 (2), 6X4

TP-8099

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, and look for any broken or shorted connections, burned resistors, or other obvious indications of trouble.

2. Measure the resistance between B+, test point D (pin 7 of 6X4 rectifier) and 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 3600 ohms, check condensers C105A, C105B, 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 fuse must be used in the "A" circuit when testing the receiver.

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 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 depressing PB6. 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.

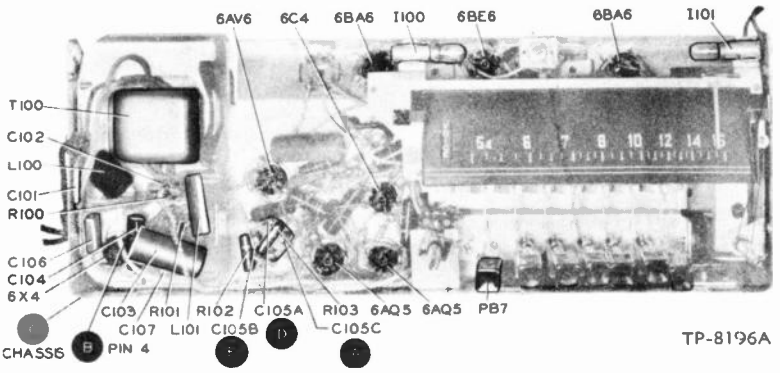


Figure 1. Bottom View, Showing Section 1 Test Points

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	B	6.3v	No voltage Low voltage	Open: L100, L101, F100, PB7. Shorted: C101, C102, C103, C107. Leaky: C102, C103, C107, weak battery.
3	D	250v	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	A	210v	No voltage Low voltage	Shorted: C105C. Open: R103. Leaky: C105C. Changed resistance: R103.
Listening Test: Abnormal hum may be caused by open C105A, 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 "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.

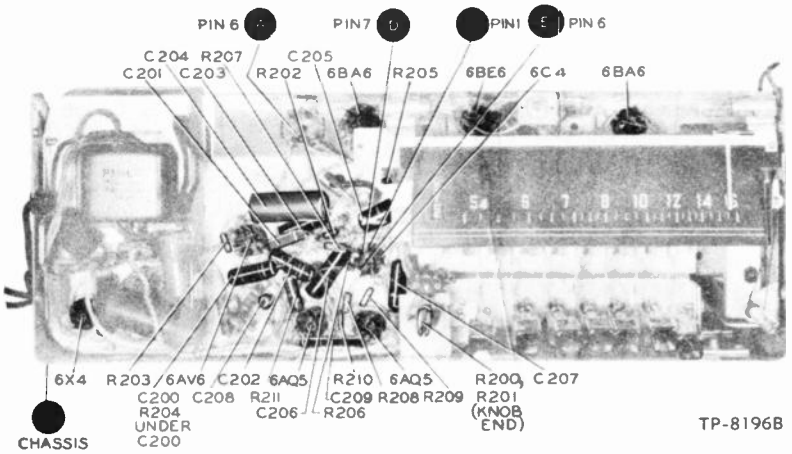


Figure 2. Bottom View, Showing Section 2 Test Points

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: C209, 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 input.	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 control 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 C205. Distortion may be caused by leaky C200, C202, C206, or C207.			

* This part, located in another section, may cause abnormal indication in this section.

ALIGNMENT PROCEDURE

DIAL POINTER—With tuning core 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 connect output lead as indicated in chart.

OUTPUT LEVEL—During alignment, signal-generator output must be attenuated to hold output-meter reading below 1.5 volts.

STEP	CONNECTION OF GENERATOR TO RADIO	GENERATOR DIAL SETTING	RADIO CONTROL SETTING	SPECIAL INSTRUCTIONS	ADJUST TRIMMER
1	Through .05-mf. condenser to mixer grid, pin 7 of 6BE6.	455 kc.	Depress manual push button.	Adjust, in order given, for maximum output. (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.
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.	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
5	Same as step 2.	580 kc.	Depress manual push button.	Adjust for maximum output while rocking tuning control.	TC403—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 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
9			Depress manual push button.	With the radio and aerial installed, adjust for maximum, using a weak signal at or near 1400 kc.	C400B—manual aerial trimmer
10			Depress PB5.	Same as step 9 except use a station at or near 1200 kc.	C400A—PB aerial trimmer

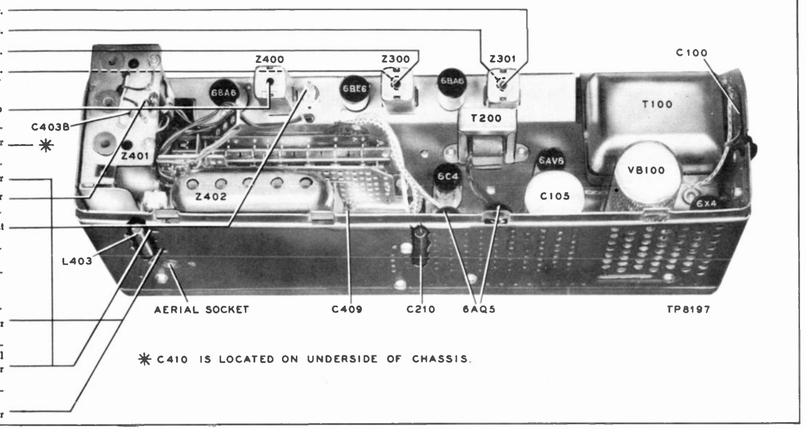


Figure 6. Top View of Chassis, Showing Trimmer Locations

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.

* 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 PROCEDURE chart.
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 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	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.	60-10335407
C103	Condenser, filter, "A," .5 mf.	61-0137*
C104	Condenser, buffer, .0033 mf.	61-0109*

REPLACEMENT PARTS LIST (Continued)

SECTION 1 (Continued)
POWER SUPPLY

Reference Symbol	Description	Service Part No.
C105	Condenser, electrolytic (4 sections)	61-0150
C105A	Condenser, filter, 20 mf., 350v	Part of C105
C105B	Condenser, filter, 10 mf., 350v	Part of C105
C105C	Condenser, filter, 5 mf., 300v	Part of C105
C106	Condenser, 330 mmf.	60-10335407
C107	Condenser, 330 mmf.	60-10335407
F100	Fuse, 14 amp.	45-2559
I100	Pilot lamp, 6.6v	34-2064*
I101	Pilot lamp, 6.6v	34-2064*
I102	Pilot lamp, 6.6v	34-2064*
L100	Choke, "A" lead	32-1644
L101	Choke, hash	32-4170-2
PB7	Switch assembly	Part of 85-0157-1
R100	Resistor, damping, 100 ohms, 1 watt	66-1104340
R101	Resistor, damping, 100 ohms, 1 watt	66-1104340
R102	Resistor, filter, 1000 ohms, 1 watt	66-2104340
R103	Resistor, filter, 4700 ohms, 1 watt	66-2474340
T100	Transformer, power	32-8313-1
VB100	Vibrator	83-0026

SECTION 2
AUDIO CIRCUITS

Reference Symbol	Description	Service Part No.
C200	Condenser, d-c blocking, .0047 mf.	45-3502*
C201	Condenser, r-f by-pass, 100 mmf.	60-10105407*
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*
C206	Condenser, d-c blocking, .01 mf.	61-0120*
C207	Condenser, d-c blocking, .01 mf.	61-0120*
C208	Condenser, cathode by-pass, 10 mf., 25v	Part of C105
C209	Condenser, tone compensation, .0068 mf.	45-3500-7
C210	Condenser, 330 mmf.	60-10335407
LS200	Speaker	36-1632
R200	Resistor, volume control, 350,000 ohms	33-5557-5
R201	Resistor, tone control, 2 megohms each side of center	Part of R200
R202	Resistor, voltage divider, inverse feedback, 180 ohms	66-1183340

(Continued on page 8)

REPLACEMENT PARTS LIST (Continued)

SECTION 2 (Continued)
AUDIO CIRCUITS

Reference Symbol	Description	Service Part No.
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, 1 watt	66-1334340
T200	Transformer, output	32-8316-4

SECTION 3
I-F, DETECTOR, AND A-V-C CIRCUITS

C300A	Condenser, fixed, silver mica	Part of Z300
C300B	Condenser, fixed, silver mica	Part of Z300
C301A	Condenser, fixed, silver mica	Part of Z301
C301B	Condenser, fixed, silver 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*
L300A	Coil, 1st i-f primary	Part of Z300
L300B	Coil, 1st i-f secondary	Part of Z300
L301A	Coil, 2nd i-f primary	Part of Z301
L301B	Coil, 2nd i-f secondary	Part of Z301
R300	Resistor, cathode bias, 1500 ohms	66-2153340
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, 1 watt	66-3274340
TC300A	Tuning core	Part of Z300
TC300B	Tuning core	Part of Z300
TC301A	Tuning core	Part of Z301
TC301B	Tuning core	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 sections	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.	30-1220-3
C402	Condenser, cathode by-pass, .047 mf.	61-0122*
C403	Condenser, trimmer assembly	31-6513
C403A	Condenser, trimmer, r-f variable	Part of C403
C403B	Condenser, fixed, silver mica, 180 mmf.	Part of C403
C404	Condenser, band-pass	Part of Z400
C405	Condenser, i-f trap	Part of Z400
C406	Condenser, a-v-c filter, .047 mf.	61-0122*
C407	Condenser, d-c blocking, 100 mmf.	60-10105407
C408	Condenser, screen by-pass, .047 mf.	61-0122*
C409	Condenser, osc. temp. comp. 54.5 mmf.	61-0149
C410	Condenser, osc. trimmer and shunt	31-6473-12
R400	Resistor, cathode bias, 330 ohms	66-1338340
R401	Resistor, cathode bias (PB only), 330 ohms	66-1338340
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
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 L402E	Coil, oscillator, push button	Part of Z402
L402F through L402J	Coil, aerial, push button	Part of Z402
L403	Choke, hash-interference elimination	65-0437
L404	Coil, osc. shunt	32-4110-2

SECTION 4 (Continued)
R-F AND CONVERTER CIRCUITS

Reference Symbol	Description	Service Part No.
PB1 through PB6	Switch assembly	Part of 85-0157-1
TC400	Core, iron, i-f trap	Part of Z400
TC401A through TC401C	Tuning core, r-f, osc., aerial (manual)	56-3612-7
TC402	Core-and-key assembly	77-0915-4
TC403	Tuning core, osc. shunt	Part of L404
Z400	Transformer assembly, r-f band-pass, i-f trap	32-4349A
Z401	Manual-tuning-unit assembly	78-4564-1
Z402	Push-button-tuning-unit assembly	78-4560-1

MISCELLANEOUS

Description	Service Part No.
"A" lead	41-3910-7
Fuse lead	41-3910-6
Aerial socket	57-0590-1FA3
Bezel	56-6743FA8
Nut, bezel mounting (2)	97-0091FA3
Indicator strip (push button)	56-6743FA8
Diffusing screen	54-4675
Nut (Indicator-strip and diffusing-screen mounting)	1W60193FA3
Cable, speaker	41-3908
Chassis mounting nut (2)	97-0091FA3
Control knob (2)	27-4687-9
Tone knob	56-6846FA8
Dummy knob (nut cover)	56-6847FA8
Cover assembly, front	76-4610FA2
Spring clip, grounding	57-1335
Cover, tube side	56-6734FA2
Cover, push button	56-6708FA8
Coil-adjusting nut, brass, push button	57-1681
Coil-adjustment spring, push-button osc. coil	57-1680FA3
Condenser, generator-interference	76-5061
Coupling, brass, push-button adjusting sleeve	57-1700
Dial cord (25-foot spool)	45-8750*
Dial-background plate	56-6865
Dial scale, glass	54-5057
Dial clip	56-6760FE11
Drive-shaft-and spiral assembly	76-4625
Drum assembly, tone	76-4568
Filter, pilot lamp	54-7806
Fuse	45-2559
Gasket screen (speaker-mounting assembly)	55-1447
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	34-2064
Pinion-and-shaft assembly (manual tuner)	76-4562
Pointer	56-6761
Push-button assembly, complete	76-4560-1
Socket, miniature (8)	27-6203
Socket, pilot lamp (3)	76-1677-3
Socket, speaker	27-6149
Socket, vibrator	27-6245
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	54-7770
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 mtg.-stud nut (4)	1W19988FA3
Radio speaker mtg.-stud lock washer (4)	1W24257FA1

PR-1691

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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."

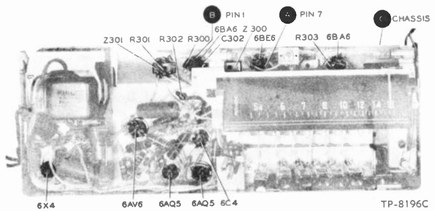

Figure 3. Bottom View, Showing Section 3 Test Points

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	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	A	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.

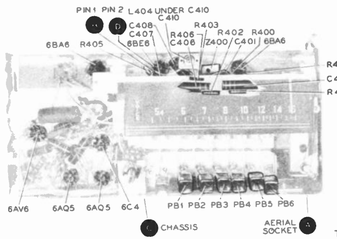

Figure 4. Bottom View, Showing Section 4 Test Points

STEP	TEST POINT	SIG. GEN. FREQ.	RADIO TUNING	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1(a)	A	1000 kc.	Depress manual push button. Tune to signal.	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)	A	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	A	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 associated with push button. Shorted: oscillator coil associated with push button.
5	A	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.

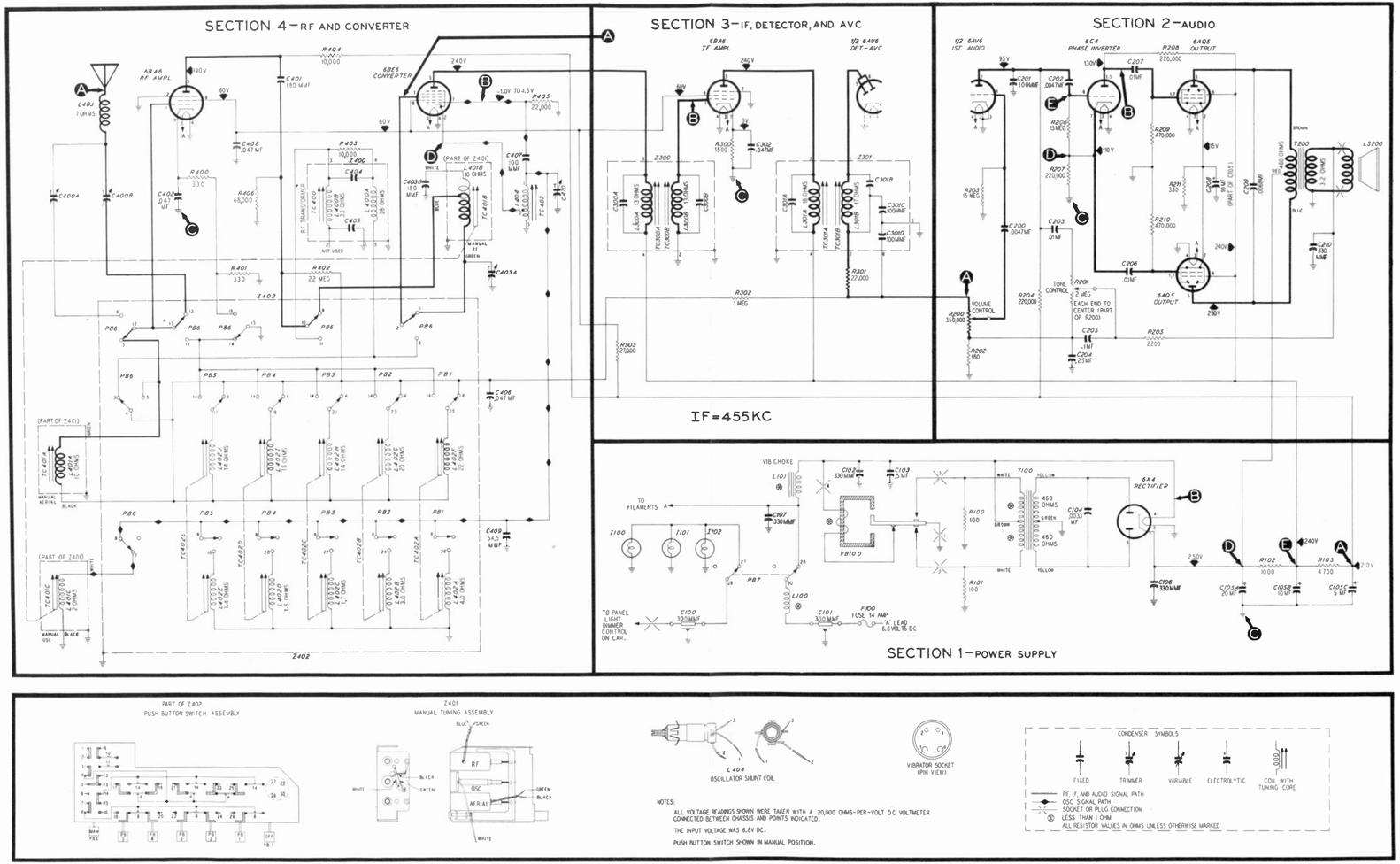

Figure 5. Philco Auto Radio Model C-4908, Sectionalized Schematic Diagram, Showing Test Points TP-7700-1

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.

PHILCO AUTO RADIO MODEL PD-4908

Circuit Description

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 push-button 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.

MODEL PD-4908

SPECIFICATIONS

CABINET	All steel housing; speaker self-contained
CIRCUIT	8-tube superheterodyne
FREQUENCY RANGE	530—1605 kc.
AUDIO OUTPUT	5 watts
PUSH BUTTONS	5 station selectors, 1 manual-tuning selector, 1 "off" switch
OPERATING VOLTAGE	6.6 volts, d.c.
POWER CONSUMPTION	53 watts
AERIAL	Cowl mounting
INTERMEDIATE FREQUENCY	455 kc.
PHILCO TUBES (8)	6BA6 (2), 6BE6, 6AV6, 6C4, 6AQ5 (2), 6X4

TP-8100

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, and look for any broken or shorted connections, burned resistors, blown fuse, or other obvious 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 ohms, 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.

Section 1 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	B	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	240v	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 Test: Abnormal hum may be caused by open C105A, C105B, or C104.				

* This part, located in another section, may cause abnormal indication in this section.

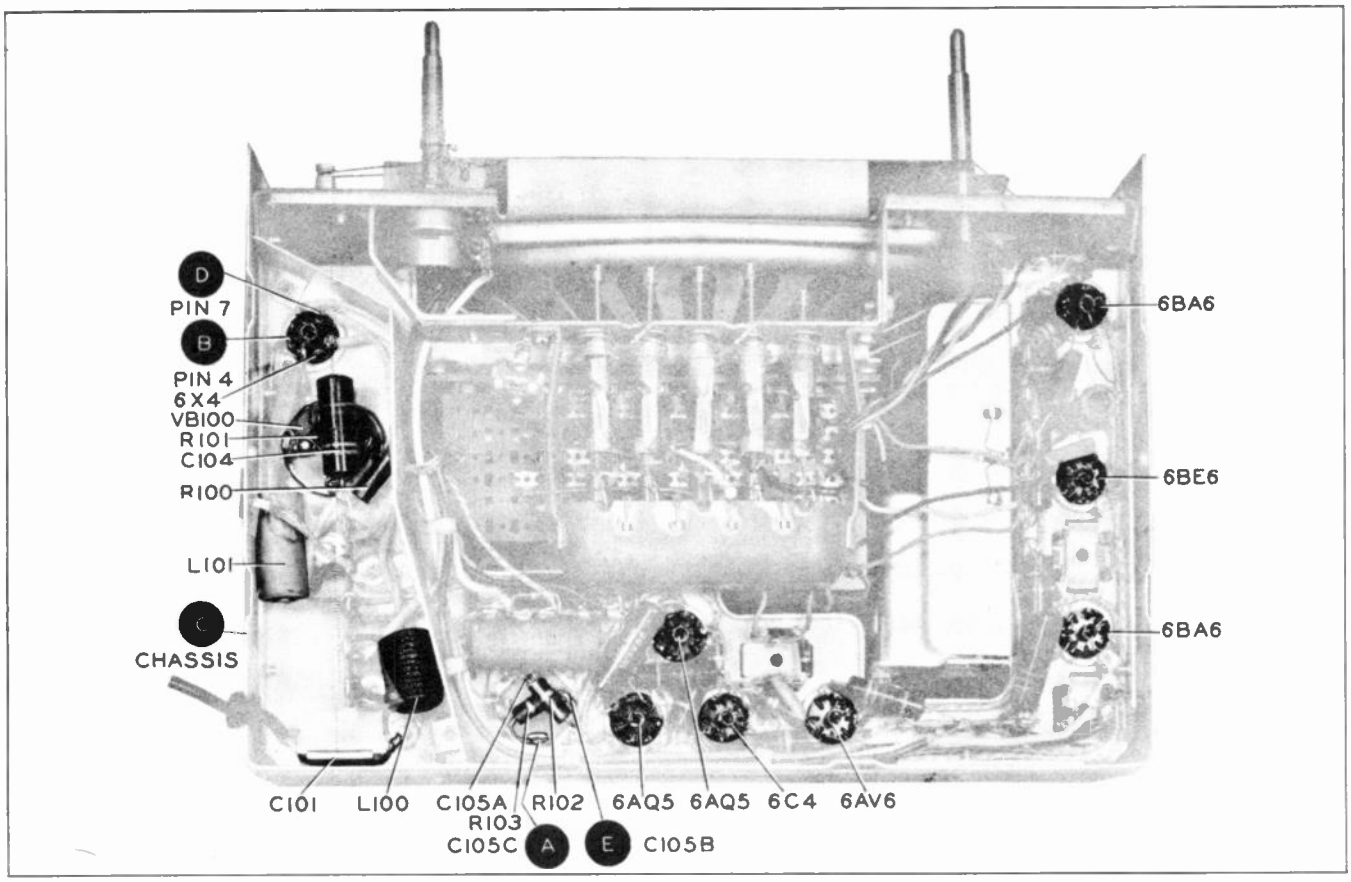

Figure 1. Bottom View, Showing Section 1 Test Points

Section 2 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	A	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	A	Same as step 1.	Defective: 6AV6, R200 (rotate through range). Open: R200, R204, C200.
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.			

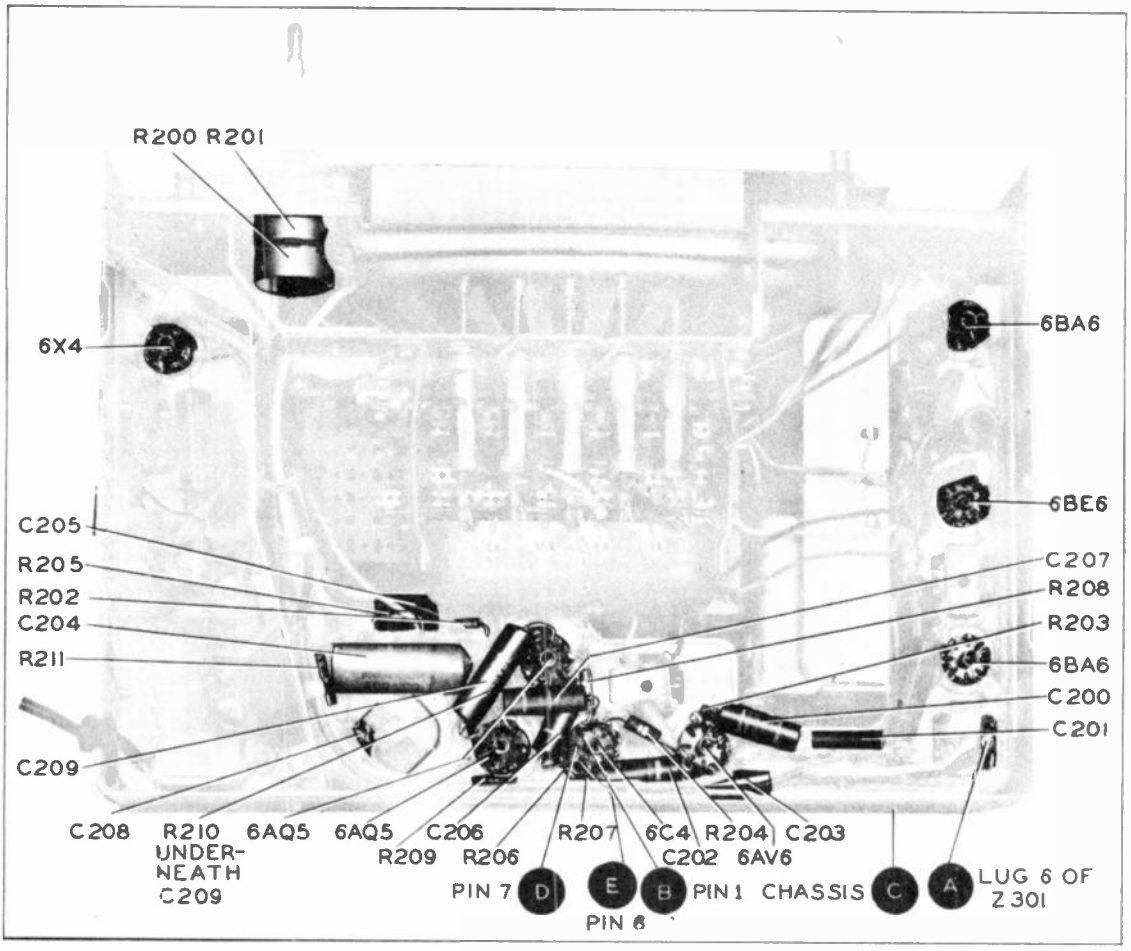

Figure 2. Bottom View, Showing Section 2 Test Points

Section 3 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	A	Loud, clear speaker output with weak signal input.	Trouble in this section. Isolate by the following tests.
2	B	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	A	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.

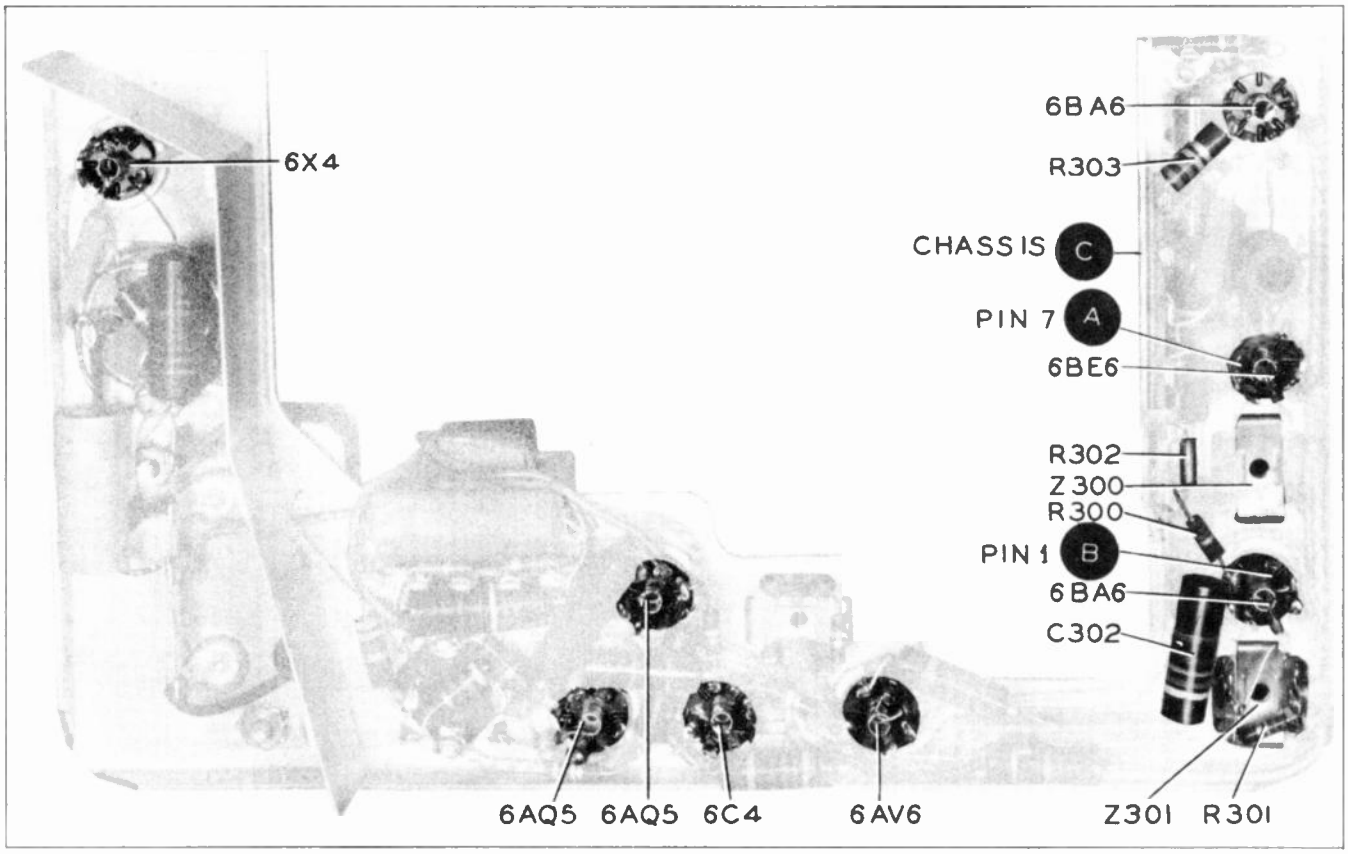

Figure 3. Bottom View, Showing Section 3 Test Points

STEP	SIGNAL GENERATOR		RADIO		
	CONNECTION TO RADIO	DIAL SETTING	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 extreme 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 until no further improvement 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	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.

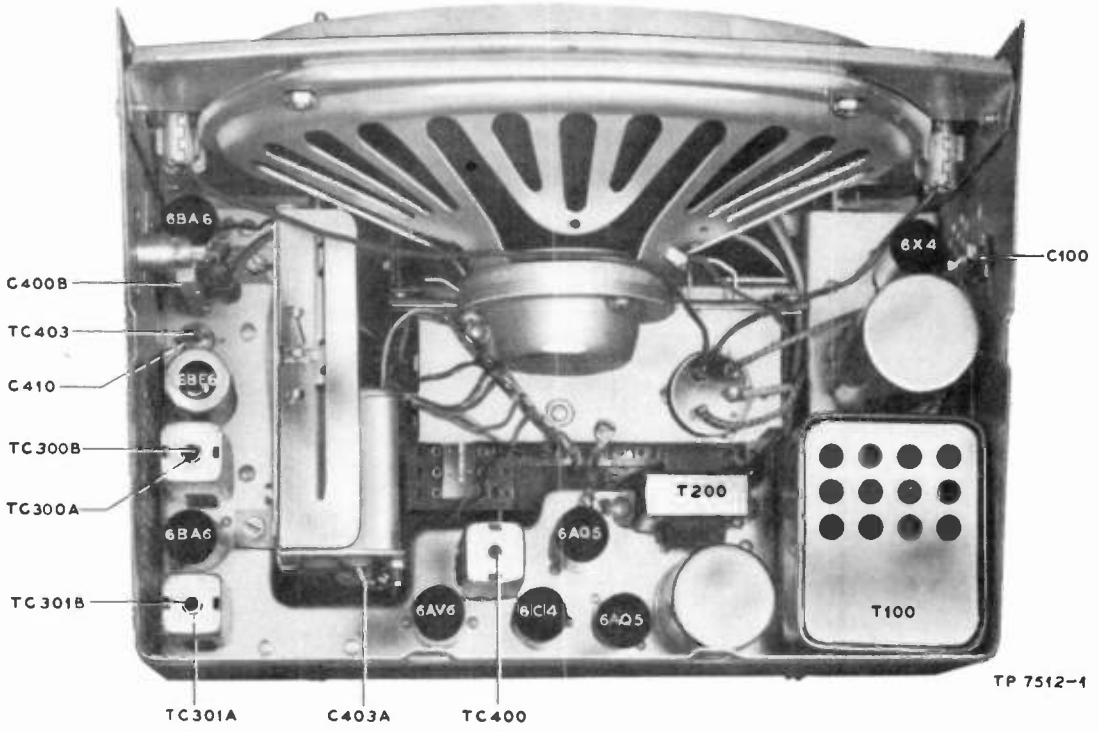

Figure 6. Top View, Showing Trimmer Locations

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Section 4 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(a)	A	1000 kc.	Depress manual push button. Tune to signal.	Loud, clear speaker output with weak signal 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)	A	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, C408.
3	A	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.
4	B (Osc. test; see note below.)		Same as step 1(b).	Negative 1 to 1.5 volts.	Open: oscillator coil or switch associated with push button. Shorted: oscillator coil associated with push button.
5	A	Same as step 1(b).	Same as step 1(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.

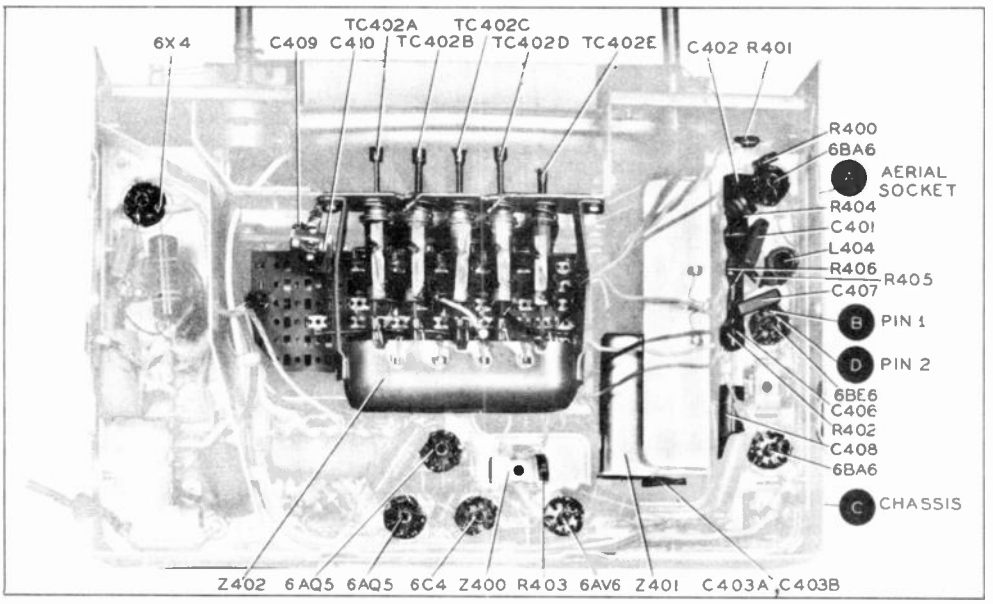


Figure 4. Bottom View, Showing Section 4 Test Points

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*
C105A	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
VB100	Vibrator or	83-0025 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*
C206	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 feedback, 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-f 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

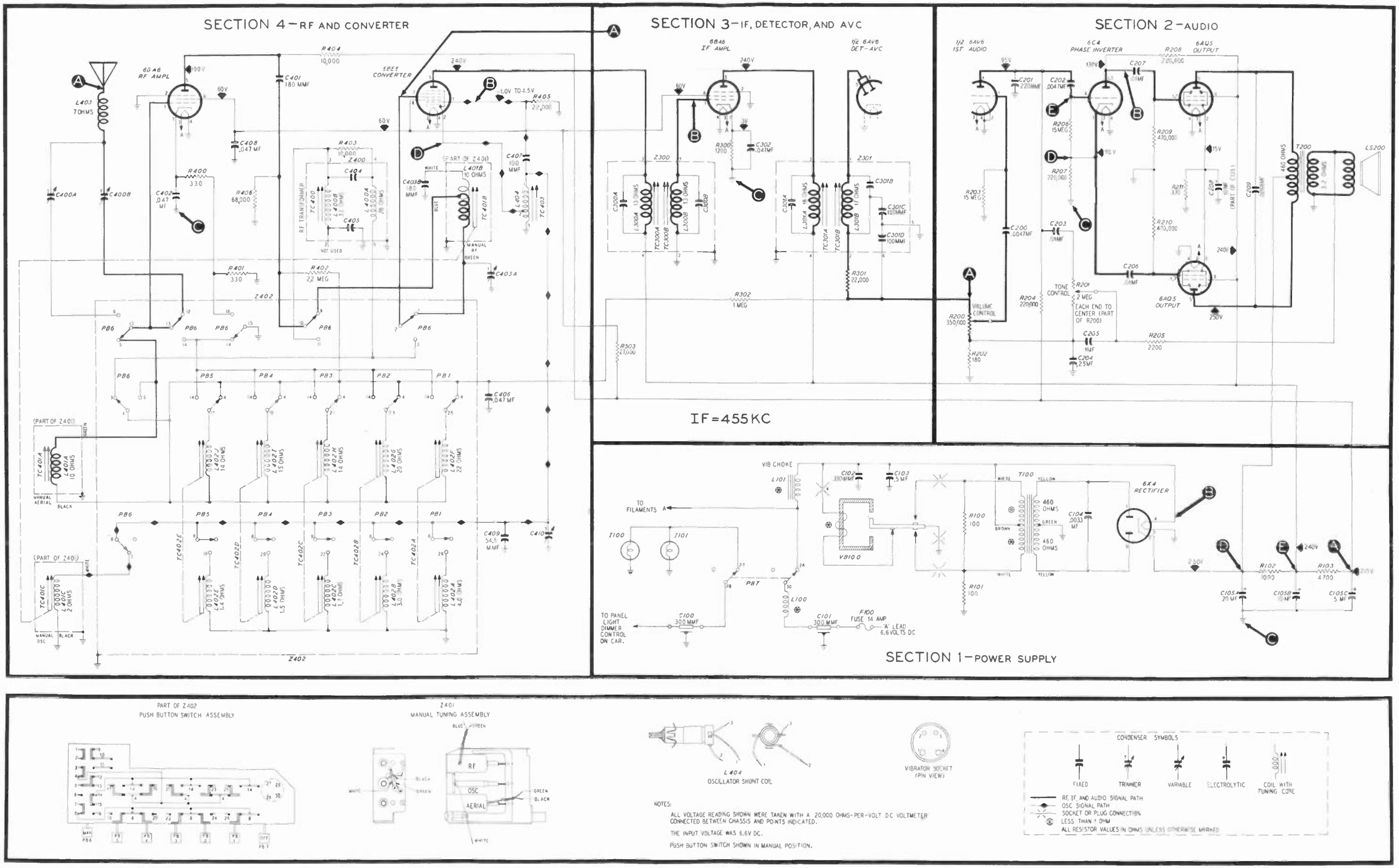
SECTION 4—R-F AND CONVERTER CIRCUITS

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*
C403	Condenser, trimmer, 2-section	31-6513
C403A	Condenser, variable trimmer	Part of C403
C403B	Condenser, fixed trimmer, silvered mica, 180 mmf.	Part of C403
C404	Condenser, band-pass	Part of Z400
C405	Condenser, i-f trap	Part of Z400
C406	Condenser, a-v-c filter, .047 mf.	61-0122*
C407	Condenser, d-c blocking, 100 mmf.	60-10105407*
C408	Condenser, screen by-pass, .047 mf.	61-0122*
C409	Condenser, osc. temp. comp., 54.5 mmf.	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 L402E	Coil, osc., PB	Part of Z402
L402F through L402J	Coil, aerial, PB	Part of Z402
L403	Choke, interference elimination	65-0437
L404	Coil, osc., shunt	32-4110-2
PB1 through PB6	Switch assembly, PB	85-0157
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

MISCELLANEOUS

Description	Service Part No.
"A"-cable assembly	76-4674-2
Antenna socket	57-0590-1FA3
Bezel	56-6685FA8
Nut, bezel mounting (2 required)	97-0091FA3

Continued on Page 10



NOTES:

ALL VOLTAGE READING SHOWN WERE TAKEN WITH A 20,000 OHMS-PER-VOLT DC VOLTMETER CONNECTED BETWEEN CHASSIS AND POINTS INDICATED.

THE INPUT VOLTAGE WAS 6.6V DC.

PUSH BUTTON SWITCH SHOWN IN MANUAL POSITION.

Figure 5. Philco Auto Radio Model PD-4908, Sectionalized Schematic Diagram, Showing Test Points

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 signal-generator output to maintain output-meter indication below 1.5 volts.

STEP	SIGNAL GENERATOR		RADIO		
	CONNECTION TO RADIO	DIAL SETTING	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 .05-mf. condenser to aerial receptacle.	455 kc.	Depress any station-selector push button.	Adjust for minimum output.	TC400—i-f trap
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 rocking tuning control.	TC403—osc.
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
5	Same as step 3.	1605 kc.	Depress high-frequency push button, previously tuned to signal.	Adjust for maximum output.	C400A—aerial series
6	Repeat steps 3, 4, and 5 until no further improvement is obtained.				
7	After installing aerial in car and connecting aerial, depress manual push button and tune to a station near 1400 kc. Adjust aerial series trimmer C400B for maximum output. Depress high-frequency-station-selector push button, tune it to a station near 1400 kc., and adjust aerial series trimmer C400A for maximum output.				

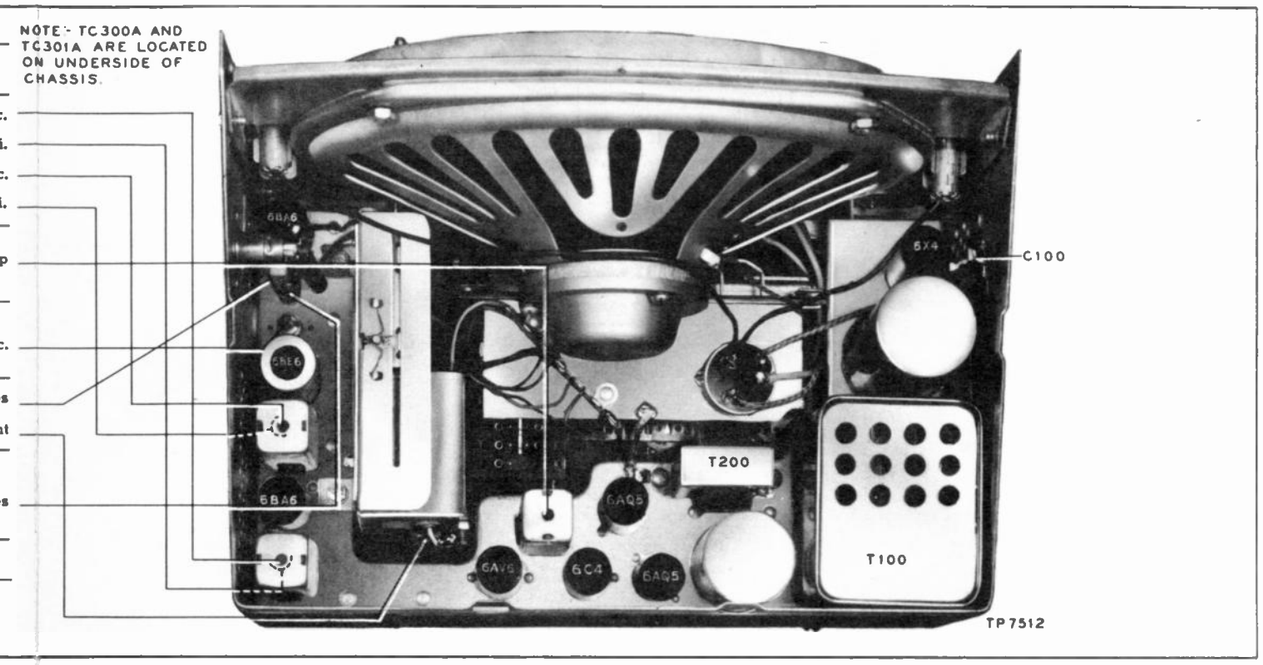


Figure 6. Top View, Showing Trimmer Locations

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:

PB1	530—1020 kc.
PB2	610—1200 kc.
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	S—switch
L—choke or coil	T—transformer
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.

REPLACEMENT PARTS LIST—Continued

MISCELLANEOUS (Continued)

Description	Service Part No.
Clip, ground	28-3445
Coil-adjusting nut, brass, PB	57-1681
Coil-adjustment spring, osc. coil, PB	57-1680FA3
Coupling, brass, push-button-adjusting sleeve	57-1700
Cover assembly, front	76-4559FA2
Cover, tube side	56-6672FA2
Cover, wiring side	76-4667
Cover, push button	56-6708FA8
Dial cord (25-ft. spool)	45-8750*
Dial scale	56-6681
Drive-shaft-and-spiral assembly	76-4563
Drum assembly, tone	76-4568
Fuse	57-4273*
Gasket, speaker, rubber	54203-1
Housing assembly	76-4557FA2
Link, PB adjustment	56-4034
Master kit	13-5182
Chassis-mtg. nut (2 required)	97-0091FA3
Chassis-mtg. nut cover	56-6713FA8
Control knob (2 required)	27-4687-8
Distributor interference suppressor	76-2270
Interference capacitor	76-2705
Lock washer, mounting	1W35050FA1
Lock washer, mounting bolt	1W35049FA1
Mounting bolt	1W16109FA3

MISCELLANEOUS (Continued)

Description	Service Part No.
Mounting-stud-and-ext.-lock-washer assembly	56-6693FA3
Nut, mounting	1W21293FA3
Nut, mounting bolt	1W21291FA3
Tone-control knob	56-6712FA8
Washer, plain	1W52793FA3
Pilot lamp	34-2039*
Pinion-and-shaft assembly (manual)	76-4562
Pointer	56-6684
Screw, dial scale mtg.	1W19802FA15
Shaft, manual tuning	56-6688FA3
Shield base, tube	56-3978FA3
Shield, tube	56-3979-1FA3*
Socket, miniature (8 required)	27-6203*
Socket, pilot lamp (2 required)	76-1677-3
Socket, vibrator	27-6245
Spring, backlash	57-1705FA1
Spring clip, grounding	57-1335
Spring, cord anchor, tone shaft	57-1701FA38
Spring, manual tuner, core-bar support	56-6696FA1
Spring, pointer cord	57-0992-1FA1
Spring, tone drum	57-1701FA38
Spring, window retaining (2 required)	56-6687FE11
Washer, "C," manual shaft	56-2793FA38
Window, glass	54-7755

PR-1689

Printed in U. S. A.

PHILCO SERVICE

AUTO RADIO

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	6BA6, r-f amp.; 6BE6, osc. converter; 6BA6, i-f amp.; 6AV6, det. 1st audio; 6C4, phase converter; 6AQ5 (2), output; 6X4, rectifier

PLYMOUTH

DODGE

CHRYSLER

Figure 1. Philco-Mopar Auto Radios

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, 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.

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 depressing 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.

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-μf. condenser to the test points indicated in the chart.

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.

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.

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."

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 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.

* SEE CHARTS ON PAGE THREE

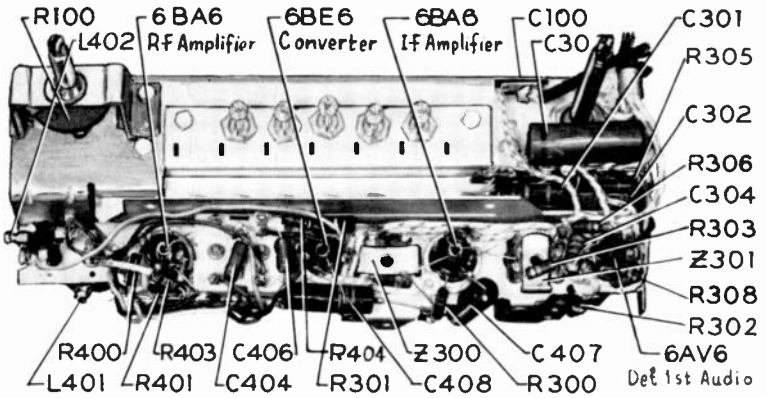


Figure 2. Front View, Showing Parts Placement in Radio Control Unit

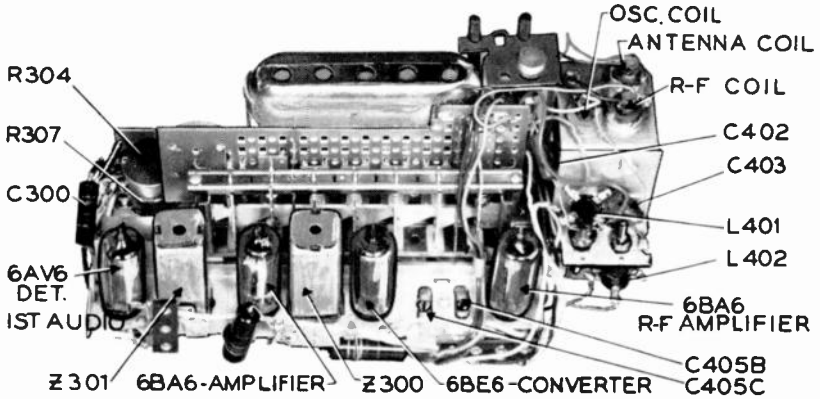


Figure 3. Top View, Showing Parts Placement in Radio Control Unit

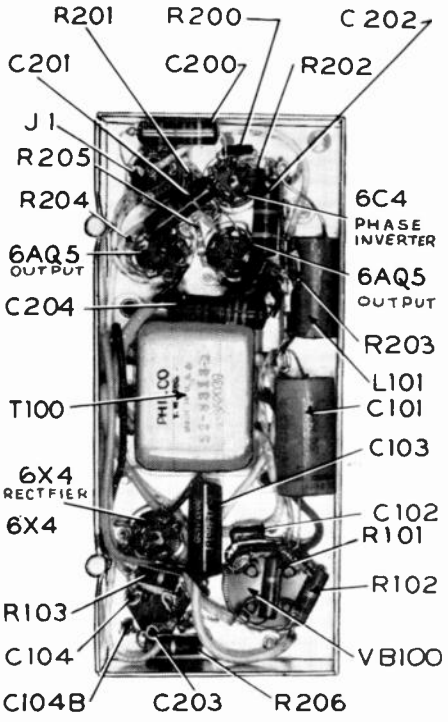


Figure 4. Base View, Showing Parts Placement in Power Unit

RADIO CONTROL CHASSIS

POWER UNIT AND SPEAKER

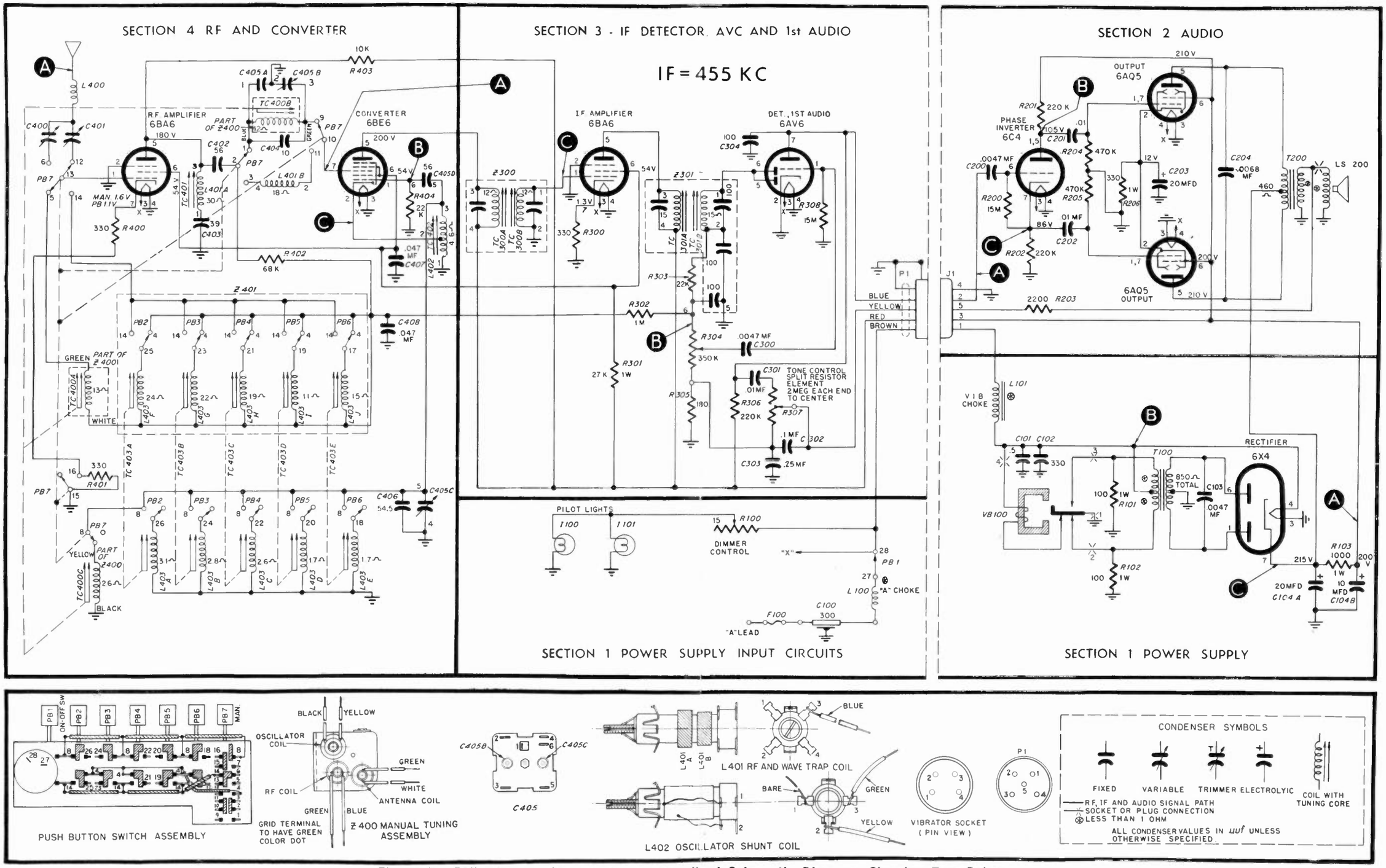


Figure 5. Philco-Mopar Auto Radio, Sectionalized Schematic Diagram, Showing Test Points

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 $\mu\mu f$. 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.

STEP	SIGNAL GENERATOR		RADIO		ADJUST TRIMMER
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Through a .05 pf condenser to mixer grid, pin 7 of 6BE6.	455 kc	Depress manual push button. 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 antenna to antenna receptacle. See Alignment Procedure Note above:	455 kc	Depress any station - selector button.	Adjust for minimum output.	TC401 - i-f trap.
3	Same as Step 2. See Note below.	1605 kc	Depress manual push button.	Set pointer to 1605 kc. Adjust for maximum output.	C405C - osc. trimmer.
4	Same as Step 2.	1400 kc	Depress manual push button.	Set pointer to 1400 kc. Adjust for maximum output.	C401 - Ant. Comp. C405B - r-f trimmer.
5	Same as Step 2.	580 kc	Depress manual push button	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 manual push button.	With the radio and antenna installed, adjust for maximum, using a weak signal 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.

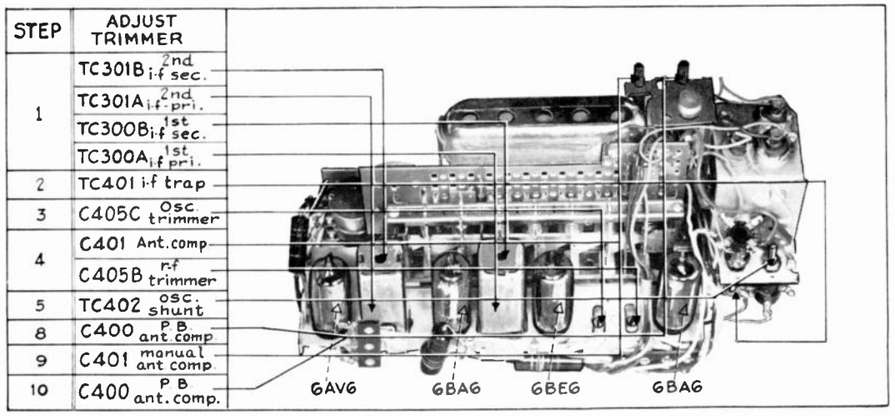


Figure 6. Top View, Showing Trimmer Locations

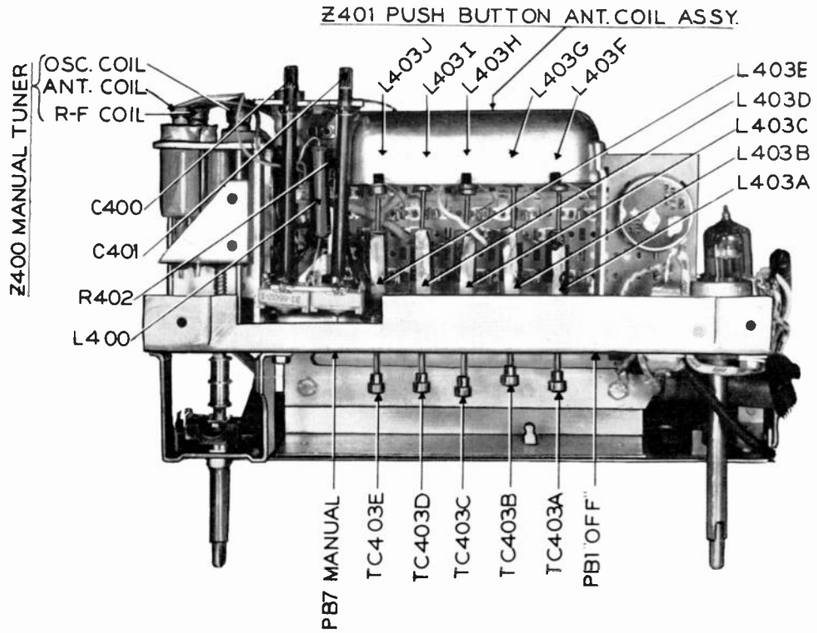


Figure 7. Bottom View, Showing Trimmer Locations

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.

TUNING RANGES OF PUSH BUTTONS

PB2	530 — 1020 kc.	TC403A
PB3	610 — 1200 kc.	TC403B
PB4	700 — 1410 kc.	TC403C
PB5	740 — 1480 kc.	TC403D
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.

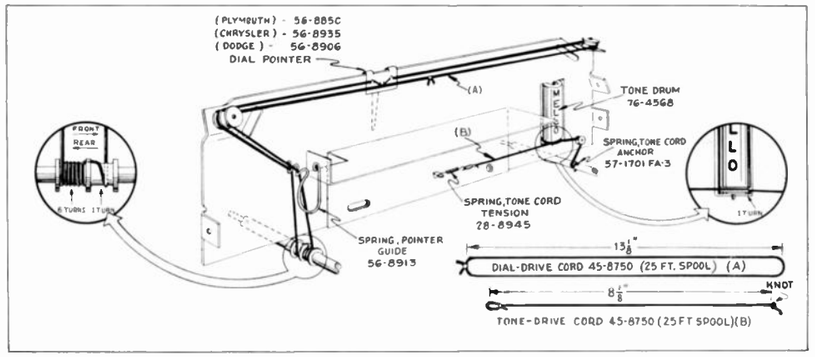


Figure 8. Dial-Cord Installation Details

SECTION 1

STEP	TEST POINT	NORMAL INDICATION	ABNORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	200 V		Trouble in this section. Isolate by the following tests.
2	B	6.3 V	No Voltage Low Voltage	Open: L100, L101, F100, PB1. Shorted: C100, C101, C102. Leaky: C102, C101, weak battery.
3	C	215 V	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*, 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.				

*This part, located in another section, may cause abnormal indication in this section.

SECTION 2

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 Test: Distortion may be caused by leaky C200, C201, or C202.			

*This part, located in another section, may cause abnormal indication in this section.

SECTION 3

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	C	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: 6BE6*. Misaligned: Z300. Open: Z300, L402*. Shorted: Z300.
†Listening Test: While performing the test under step 2 rotate tone control R307 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.

SECTION 4

STEP	TEST POINT	SIG. GEN. FREQ.	RADIO TUNING	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1(a) 1(b)	A A	1000 kc Tune to freq. each push button.	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	B (ocs. test; see note below)		Depress manual push button. 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. 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.

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 ordering 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.*	61-0137
C102	Condenser, spark filter, 330 *uuf.*	62-133001001*
C103	Condenser, buffer, .0047 *uf.*, 1600v	30-4661-1
C104	Condenser, 3-section, electrolytic	61-0086
C104A	Condenser, filter, 20 *uf.*, 350v	Part of C104
C104B	Condenser, filter, 10 *uf.*, 350v	Part of C104
F100	Fuse, 14 amp.	45-2559
I100	Pilot lamp, 6.6v	34-2064
I101	Pilot lamp, 6.6v	34-2064
L100	Choke, "A" lead	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-5107	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*
	Transformer, 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
C204	Condenser, tone compensation, .0068 *uf.*	45-3505-91*
LS200	Speaker	36-1631*
R200	Resistor, grid return, 15 megohms	66-6158340*
R201	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, Cathode bias, 330 ohms, 1 watt	66-1334340*
T200	Transformer, output	32-8316*

SECTION 3

C300	Condenser, d-c blocking, .0047 *uf.*	45-3505-56*
C301	Condenser, tone compensation, hi-cut, .01 *uf.*	45-3505-41*
C302	Condenser, inverse feedback, .1 *uf.*	45-3505-30*
C303	Condenser, inverse feedback, .25 *uf.*	61-0125*
C304	Condenser, r-f by-pass, 100 *uuf.*	60-10105407*
R300	Resistor, cathode bias, 330 ohms	66-1338340*
R301	Resistor, dropping, 27,000 ohms, 1 watt	66-3274340*
R302	Resistor, a-v-c filter, 1 megohm	66-5108340*
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	66-1188340*
R306	Resistor, plate load, 220,000 ohms	66-4228340*
R307	Tone control, 2 megohms each side of center	Part of R305
R308	Resistor, grid return, 15 megohms	66-6158340*
Z300	Transformer, 1st i-f	32-4160A
Z301	Transformer, 2nd i-f	32-4240A

SECTION 4

C400	Condenser, antenna compensator, PB	Part of Z401
C401	Condenser, antenna compensator, man.	Part of Z401
C402	Condenser, d-c blocking, 56 *uuf.*	60-00565417
C403	Condenser, i-f trap, 39 *uuf.*	60-00395417
C404	Condenser, manual r-f shunt, 10 *uuf.*	60-00105407*
C405	Condenser, trimmer assembly	31-6522-2
C405A	Condenser, fixed	Part of C405
C405B	Condenser, r-f trimmer	Part of C405
C405C	Condenser, osc. trimmer	Part of C405
C405D	Condenser, d-c blocking, 56 *uuf.*	Part of C405
C407	Condenser, by-pass, .047 *uf.*	45-3505-28*
C408	Condenser, a-v-c filter, .047 *uf.*	45-3505-28*
C409	Condenser, osc. temp. comp., 54.5 *uuf.*	61-0149
L400	Choke, hash-interference elimination	32-4422-24
L401	Coil, i-f trap and PB r-f	32-4510
L402	Coil, osc. shunt	32-4110-5
L403A - E	Coil, antenna	Part of Z401
L403F	Coil, osc. PB2	32-4179-5
L403G	Coil, osc. PB3	32-4179-6
L403H	Coil, osc. PB4	32-4179-7
L403I	Coil, osc. PB5	32-4179-8
L403J	Coil, osc. PB6	32-4179-9
PB2 through PB7	Switch, push button	42-1956
R400	Resistor, cathode bias, 330 ohms	66-1338340*

SECTION 4 (Continued)

Reference Symbol	Description	Service Part No.
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—All Chryslers	76-6634-1
	P-5106 and D-5107	76-6634
Z401	Antenna coil assy., PB	76-4602-1

MISCELLANEOUS

Description	Service Part No.
P-5106	
Bezel and stud assy.	76-6636
Dial scale and background assy.	76-6631
Housing, radio control unit	56-8889
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)	27-4687-8
Knob assy., tone and dimmer (2)	76-5590
Nut, 10—32 (4), power unit mtg.	1W19991FA3
Nut (2), radio control unit mtg., front	97-0091FA3
Screw and cup washer, radio control unit mtg., side	56-6190-13FA1
D-5107	
Bezel and stud assy.	76-6662
Dial scale and background assy.	76-6655
Housing, radio control unit	76-6666
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	56-8928FA3
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)	1W11513FA1
Wing nut, hook bolt	1W23750FA3
Chrysler, All Models	
Bezel	56-8934
Dial scale and background assy.—C-5109	76-6656
C-5110	76-6656-1
C-5111	76-6656-2
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
C-5111	57-1682-6FA54
Window, plastic	54-8370
Master Kit	
Condenser, interference	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
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.	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

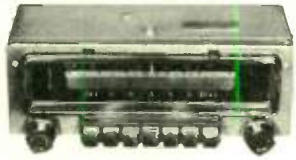
PHILCO SERVICE

PHILCO Factory-Supervised Service

AUTO RADIO

SERVICE INFORMATION FOR PHILCO-MOPAR AUTO RADIOS

PLYMOUTH



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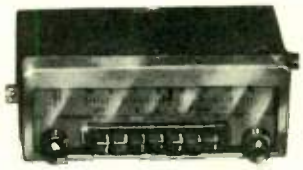

CHRYSLER

Figure 1. Philco-Mopar Auto Radios

PHILCO MODEL NO.	MOPAR MODEL NO.
P-5206	819
D-5207	820
C-5209	824

SPECIFICATIONS

CABINET	Die cast or sheet metal housing for Radio Control Unit
CIRCUIT	7-tube superheterodyne (plus rectifier)
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	6BA6, r-f amp.; 6BE6, osc. converter; 6BA6, i-f amp.; 6AV6, det. a-v-c 1st audio; 6C4, phase inverter; 6AQ5 (2), output; 6X4, rectifier

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.

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 voltmeter at an input voltage of 6.6 volts, d.c.

Turn on the power and select manual operation by depressing 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.

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-μf. condenser to the test points indicated in the chart.

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, a-v-c, and 1st audio circuits); if not, isolate and correct the trouble in this section.

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.

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."

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 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.

* SEE CHARTS ON PAGE THREE

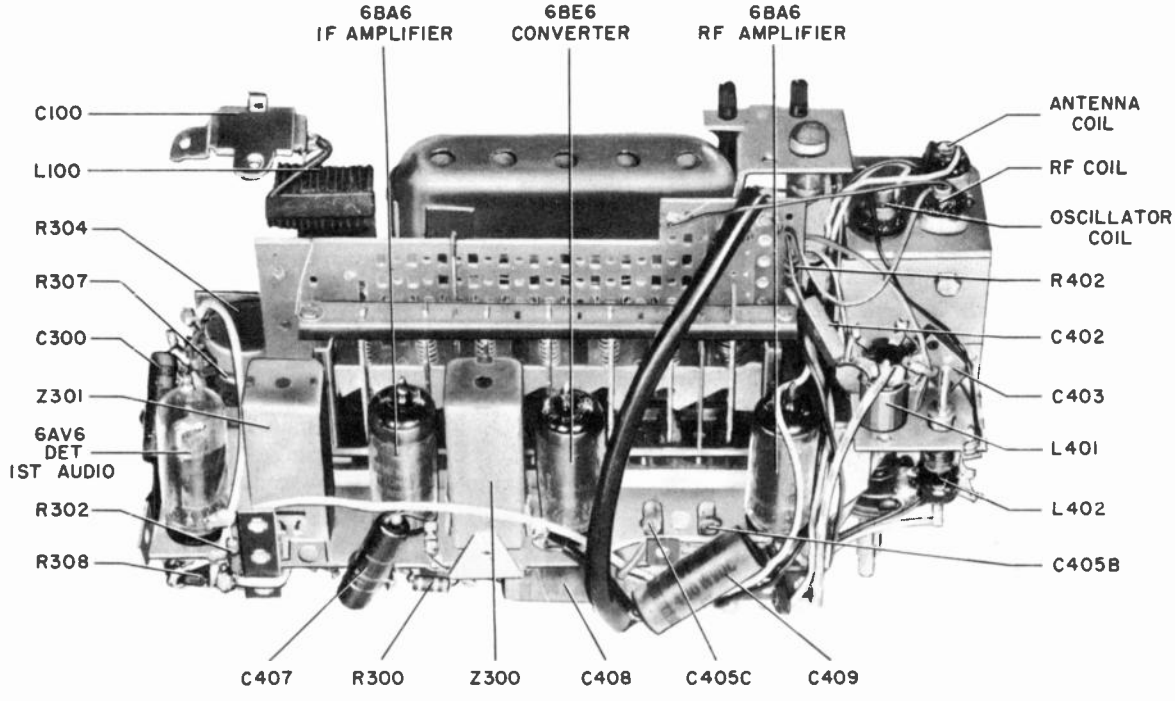

Figure 2. Top View, Showing Parts Placement in Radio Control Unit

SECTION 1

STEP	TEST POINT	NORMAL INDICATION	ABNORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	200v		If the indication is abnormal, proceed with step 2.
2	B	6.3v	No voltage Low voltage	Open: L100, L101, F100, PB1. Shorted: C100, C101, C102. Leaky: C102, C101. Weak battery.
3	C	215v	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*, T200*.
4	A	200v	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.

SECTION 2

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Loud, clear speaker output with moderate generator input.	If the indication is abnormal, 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.

Listening Test: Distortion may be caused by leaky C200, C201, or C202.

SECTION 3

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 output with weak input.	Defective: 6AV6. Open: R304, C300, R308, R306. Shorted: C300, C301, C304.
3	C	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: 6BE6*. Misaligned: Z300. Open: Z300, L402*. Shorted: Z300.

† Listening Test: While performing the test under step 2, rotate tone control R307 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.

SECTION 4

STEP	TEST POINT	SIG. GEN. FREQ.	RADIO TUNING	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1(a)	A	1000 kc.	Depress manual push button. Tune to signal.	Loud, clear speaker output with weak generator input.	Trouble in manual-tuning circuits. Isolate by the tests in steps 2 and 3, and correct before proceeding with step 1(b).
1(b)	A	Tune to freq. 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)		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. 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 (osc.test; see note below)		Same as step 1(b).	Negative 1 to 1.5 volts.	Open: L403F-J, PB2-6. Shorted: L403F-J.
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 high-resistance 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 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 trouble-shooting chart (measured with 20,000-ohms-per-volt voltmeter) throughout the tuning range.

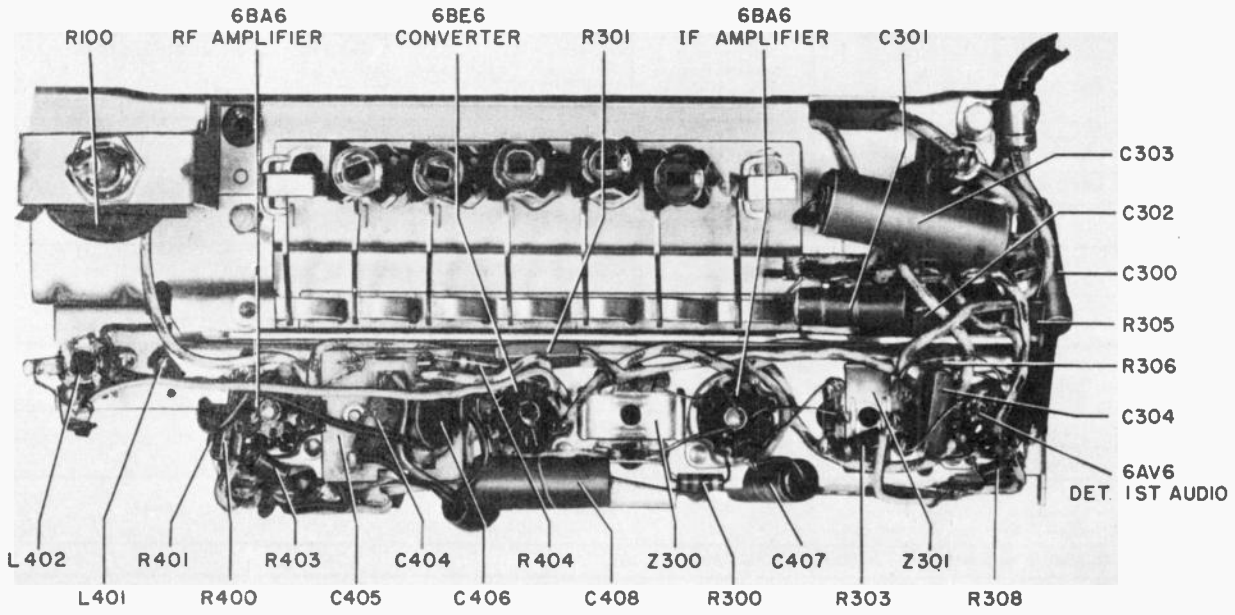

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Figure 3. Front View, Showing Parts Placement in Radio Control Unit

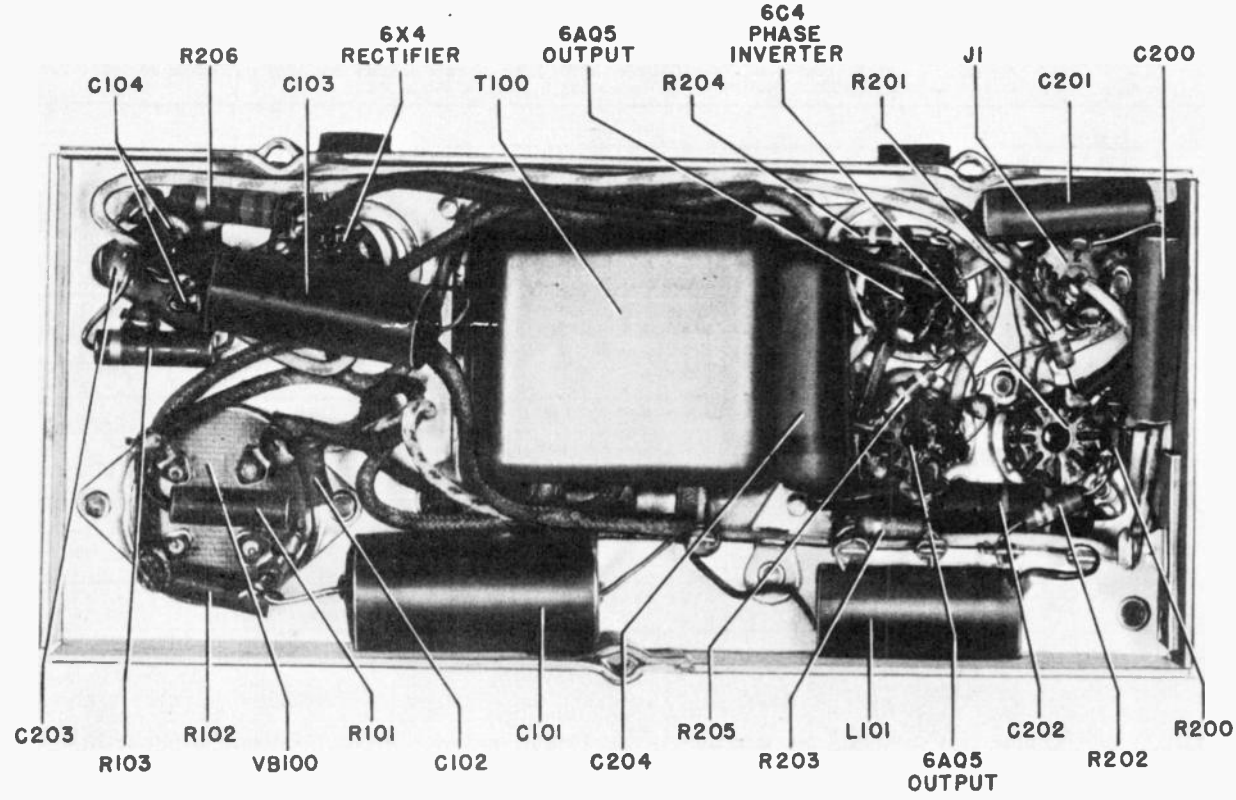

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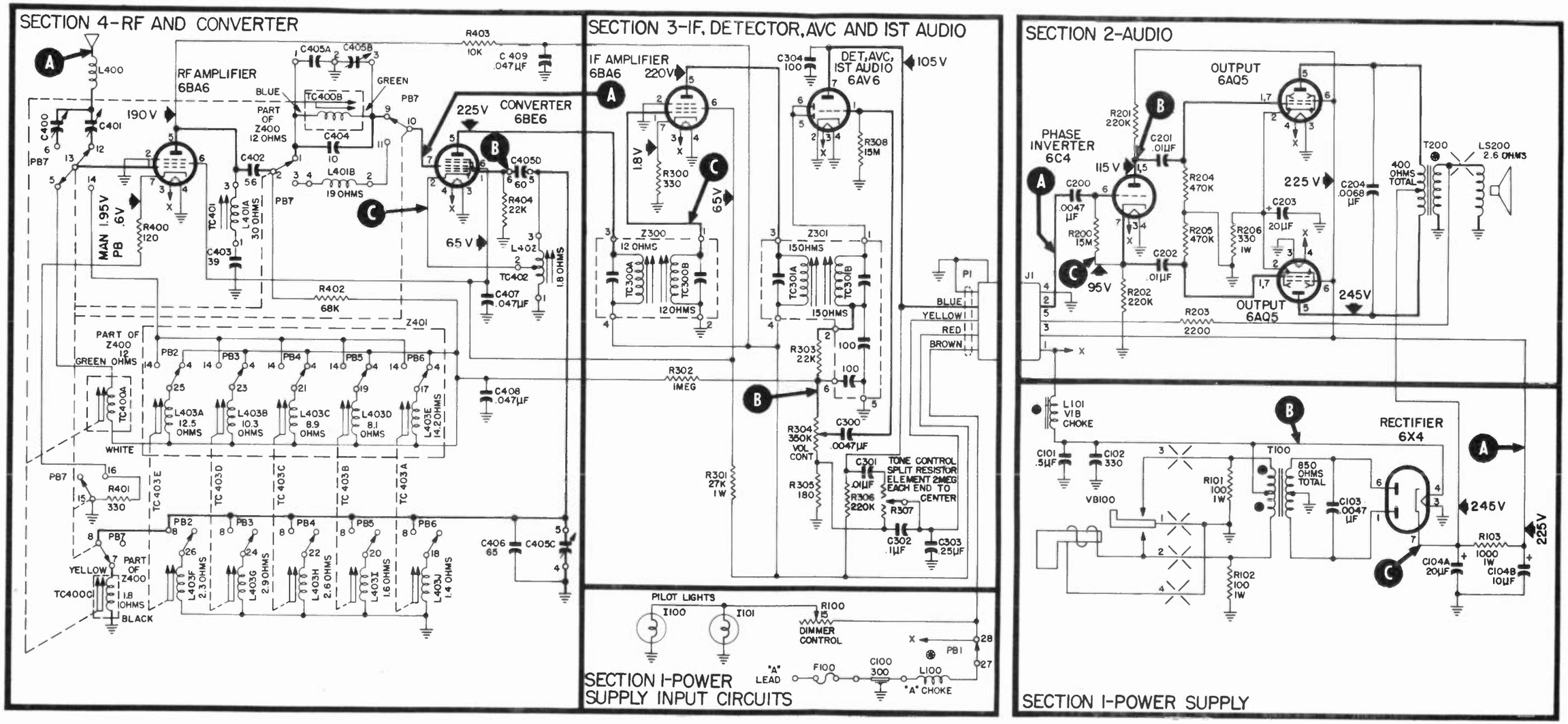
Figure 4. Base View, Showing Parts Placement in Power Unit

RADIO CONTROL CHASSIS

POWER UNIT AND SPEAKER



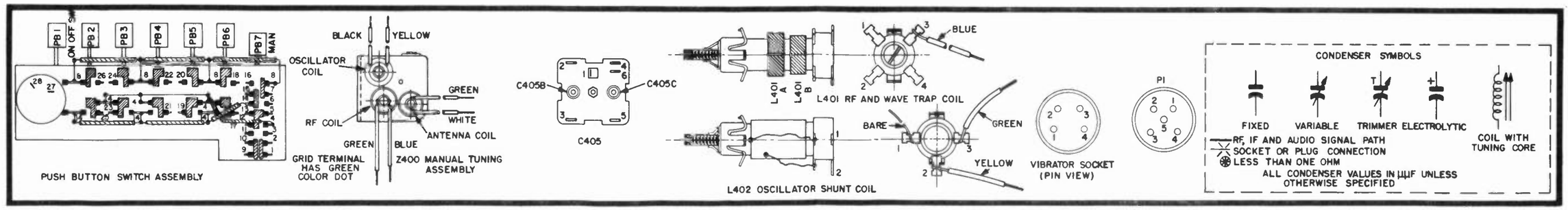


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Figure 5. Philco-Mopar Auto Radio, Sectionalized Schematic Diagram, Showing Test Points

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.

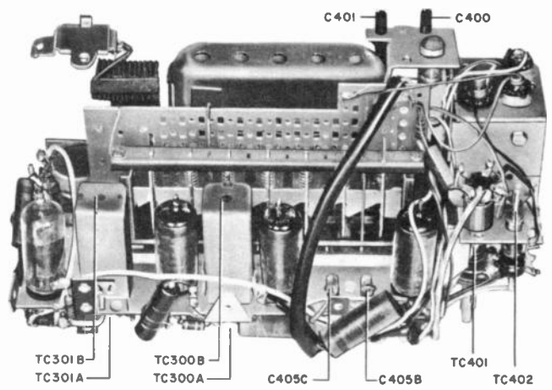
OUTPUT LEVEL—During alignment, signal-generator output must be attenuated to hold output-meter indication below 1.5 volts.

DUMMY ANTENNA—Connect signal-generator output lead through 40-$\mu\mu$f. 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.

STEP	SIGNAL GENERATOR		RADIO		ADJUST TRIMMER
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Through a .05-μf. condenser to mixer grid, pin 7 of 6BE6.	455 kc.	Depress manual push button. 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 antenna to antenna receptacle. See Alignment Procedure Note above.	455 kc.	Depress any station-selector button.	Adjust for minimum output.	TC401 - i-f trap.
3	Same as step 2. See Note below.	1605 kc.	Depress manual push button.	Set pointer to 1605 kc. Adjust for maximum output.	C405C - osc. trimmer.
4	Same as step 2.	1400 kc.	Depress manual push button.	Set pointer to 1400 kc. Adjust for maximum output.	C401 - ant. comp. C405B - r-f trimmer.
5	Same as step 2.	580 kc.	Depress manual push button.	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 manual push button.	With the radio and antenna installed, adjust for maximum, using a weak signal 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.

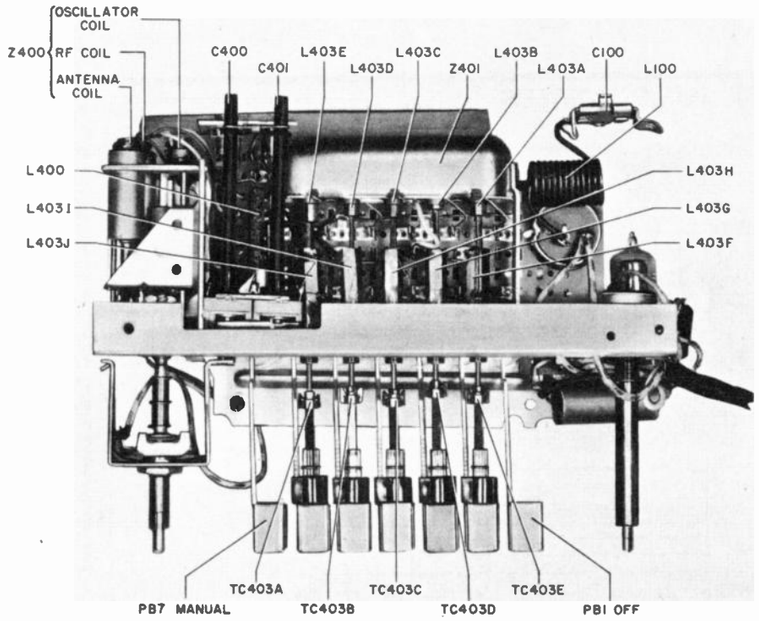
NOTE: While performing steps 3 through 8 inclusive, the housing MUST be fastened in place.

STEP	ADJUST TRIMMER
1	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.



TP2-1975A

Figure 6. Top View, Radio Control Unit, Showing Trimmer Locations



TP2-1974

Figure 7. Bottom View, Radio Control Unit, Showing Trimmer Locations

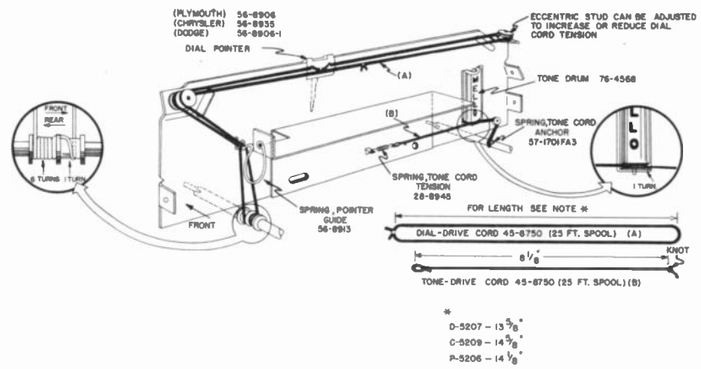
SETTING PUSH BUTTONS

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.

TUNING RANGES OF PUSH BUTTONS

PB2	530 — 1020 kc.	TC403A
PB3	610 — 1200 kc.	TC403B
PB4	700 — 1410 kc.	TC403C
PB5	740 — 1480 kc.	TC403D
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.



TP2-2226

Figure 8. Drive-Cord Installation Details

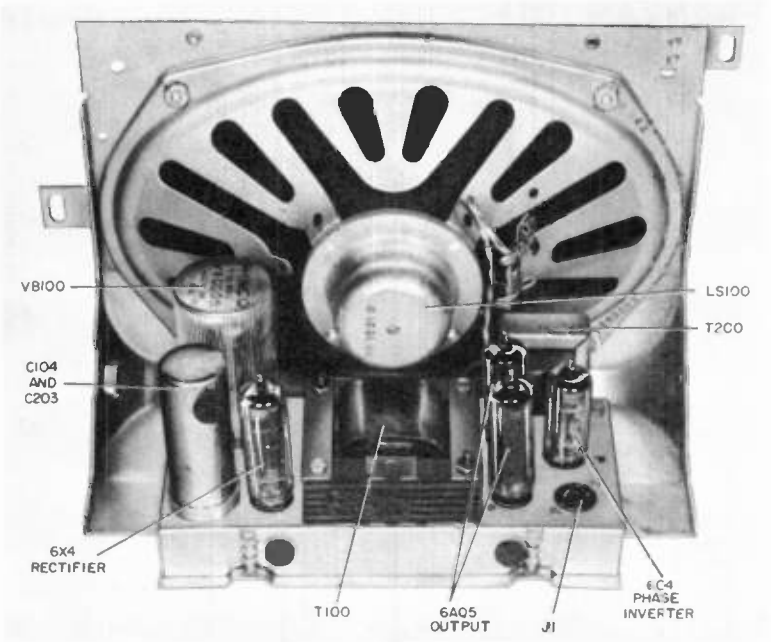


Figure 9. Power Unit, Top View

TP2-2003

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	Service Part No.
	SECTION 1—POWER SUPPLY	
C100	Condenser, feed-through, 300μμf.	30-1235-1
C101	Condenser, "A" filter, .5 μf.	61-0137
C102	Condenser, spark filter, 330 μμf.	62-133001001*
C103	Condenser, buffer, .0047 μf., 1600v	30-4661-1
C104	Condenser, 3-section, electrolytic	61-0086
C104A	Condenser, filter, 20 μf., 350v	Part of C104
C104B	Condenser, filter, 10 μf., 350v	Part of C104
F100	Fuse, 14 amp.	45-2559
I100	Pilot lamp, 6.3v	34-2064
I101	Pilot lamp, 6.3v	34-2064
L100	Choke, "A" lead	32-1644
L101	Choke, vibrator	32-4170-4
PB1	Switch, off-on (part of push button switch assembly)	67-0046-1
R100	Dimmer control, 15 ohms	
	Model P-5206	33-5568-2
	Model D-5207	33-5568-3
	Model C-5209	33-5568-1
R101	Resistor, damping, 100 ohms, 1 watt	66-1104340*
R102	Resistor, damping, 100 ohms, 1 watt	66-1104340*
R103	Resistor, filter, 1000 ohms, 1 watt	66-2104340*
T100	Transformer, power	32-8313-1
VB100	Vibrator	45-6711
	SECTION 2—AUDIO CIRCUITS	
C200	Condenser, d-c blocking, .0047 μf.	45-3505-56*
C201	Condenser, d-c blocking, .01 μf.	45-3505-41*
C202	Condenser, d-c blocking, .01 μf.	45-3505-41*
C203	Condenser, electrolytic, cathode by-pass, 20μf., 25v	Part of C104
C204	Condenser, tone compensation, .0068 μf.	45-3505-91*
LS200	Speaker	36-1631-2

Reference Symbol	Description	Service Part No.
R200	Resistor, grid return, 15 megohms	66-6158340*
R201	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, cathode bias, 330 ohms, 1 watt	66-1334340*
T200	Transformer, output	32-8316-7
	SECTION 3—I-F, DET., A-V-C, AND 1st AUDIO CIRCUITS	
C300	Condenser, d-c blocking, .0047 μf.	45-3505-56*
C301	Condenser, tone compensation, hi-cut, .01 μf.	45-3505-41*
C302	Condenser, inverse feedback, .1 μf.	45-3505-30*
C303	Condenser, inverse feedback, .25 μf.	61-0125*
C304	Condenser, r-f by-pass, 100 μμf.	60-10105407*
R300	Resistor, cathode bias, 330 ohms	66-1338340*
R301	Resistor, dropping, 27,000 ohms, 1 watt	66-3274340*
R302	Resistor, a-v-c filter, 1 megohm	66-5108340*
R303	Resistor, i-f filter, 22,000 ohms	66-3228340*
R304	Volume control, 350,000 ohms	
	Model P-5206	33-5557-11
	Model D-5207	33-5557-12
	Model C-5209	33-5557-13
R305	Resistor, voltage divider, inverse feedback, 180 ohms	66-1188340*
R306	Resistor, plate load, 220,000 ohms	66-4228340*
R307	Tone control, 2 megohms each side of center	Part of R304
R308	Resistor, grid return, 15 megohms	66-6158340*
Z300	Transformer, 1st i-f	32-4160A
Z301	Transmormer, 2nd i-f	32-4240A

REPLACEMENT PARTS LIST (Continued)

Reference Symbol	Description	Service Part No.
	SECTION 4—R-F AND CONVERTER CIRCUITS	
C400	Condenser, antenna compensator, PB	Part of Z401
C401	Condenser, antenna compensator, man.	Part of Z401
C402	Condenser, d-c blocking, 56 μμf.	60-00565417
C403	Condenser, i-f trap, 39 μμf.	60-00395417
C404	Condenser, manual r-f shunt, 10 μμf.	60-00105407*
C405	Condenser, trimmer assembly	31-6522-2
C405A	Condenser, fixed	Part of C405
C405B	Condenser, r-f trimmer	Part of C405
C405C	Condenser, osc. trimmer	Part of C405
C405D	Condenser, d-c blocking, 60 μμf.	Part of C405
C406	Condenser, osc. temp. comp., 65 μμf.	30-1224-87
C407	Condenser, by-pass, .047 μf.	45-3505-28*
C408	Condenser, a-v-c filter, .047 μf.	45-3505-28*
C409	Condenser, B+ decoupling, .047 μf.	30-4650-62
L400	Choke, spark-interference elimination	32-4422-24
L401	Coil, i-f trap and PB r-f	32-4510
L402	Coil, osc. shunt	32-4110-5
L403A-E	Coil, antenna	Part of Z401
L403F	Coil, osc. PB2	32-4179-5
L403G	Coil, osc. PB3	32-4179-6
L403H	Coil, osc. PB4	32-4179-7
L403I	Coil, osc. PB5	32-4179-8
L403J	Coil, osc. PB6	32-4179-9
PB2 through PB7	Switch assembly, push button	42-1956
R400	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)	312-5129
	Coil, r-f (all models)	312-5129-1
	Coil, oscillator (all models)	312-5131
Z401	Antenna coil ass'y, PB	76-4602-1

MISCELLANEOUS

MODEL P-5206 ONLY

Description	Service Part No.
Bezel and bushing ass'y.	76-7895
Dial scale	54-5157
Background plate	56-9953-1
Frame, push-button ass'y.	56-9956
Housing ass'y., radio control unit	76-8164
Pointer	56-8906
Window, glass	54-8774
Master Kit	
Bracket, angle	28-9029FA3
Bracket, strap	28-9028FA3
Condenser, interference	30-4007-5
Lock washer, No. 10 split, power unit mtg.	1W52427FA3
Knob ass'y. (2), tuning and volume	27-4687-19
Knob ass'y. (2), tone and dimmer	57-1682-1FA8
Nut, 10-32 (2), power unit mtg.	W2589-4FA3
Stud ass'y., power unit mtg.	76-7897
Nut (2), radio control unit mtg., front	97-0091FA3
Spacer (2), mounting boss	56-9957
Screw and cup washer (2), radio control unit mtg., side	56-6190-17
Screw and lock, 10-32, power unit mtg.	1W31813FA1

MODEL D-5207 ONLY

Description	Service Part No.
Bezel and bushing ass'y.	76-7914
Dial scale	54-5158
Background plate	56-9938
Housing, radio control unit	76-8164FA3
Pointer	56-8906-1
Bezel overlay	54-8769
Master Kit	
Bracket, strap	28-9026FA3
Bracket, mtg.	28-9027FA3
Condenser, interference	30-4007-5
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
Screw	W2600FA1
Screw (2), 10-32, power unit mtg., lower	1W11514FA3
Screw and cupped washer ass'y. (2)	56-6190-17

MODEL C-5209 ONLY

Description	Service Part No.
Bezel	56-8934
Dial scale and background ass'y.	76-6656-3
Escutcheon PB	56-8938FA8
Housing, bracket, and rivet ass'y., radio control unit	76-6680
Pointer	56-8935
Knob ass'y. (2), tuning and volume	27-4687-9
Knob ass'y. (2), tone and dimmer	57-1682-7FA8
Window, plastic	54-8370
Master Kit	
Condenser, interference	30-4007-5
Lock washer (4), No. 10 split, radio control unit mtg. and speaker lower mtg.	1W24258FA1
Lock washer (2), speaker upper mtg.	1W35047FA1
Nut (5), 10-32, radio control unit mtg. and speaker upper mtg.	1W19991FA3
Screw, power unit mtg., lower	1W11882FA3
Stud and spacer (2), speaker upper mtg.	77-0400-1
Stud (3), radio control unit mtg.	56-8937FA3

PARTS COMMON TO ALL MODELS

Description	Service Part No.
"A" lead	41-3910-16
Adjusting shaft (2), ant. comp.	54-4872
Retainer spring, adj. shaft	56-8965
Clip (2), dial lamp mtg.	56-3545-5
Cover, tube side, radio control unit	56-8851
Drive cord, 25-ft. spool	45-8750*
Foot, disk	55-0890
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.	27-6233-55
Power cable and plug ass'y.	
Model D-5207	41-4075-2
Models C-5209, P-5206	41-4075-1
Power socket	27-6273
Push button cover (7)	56-6708FA8
Core and key ass'y.	
Models P-5206, D-5207 (5)	77-0915-7
Model C-5209(7)	77-0915-6
Key (2), Models P-5206, D-5207	56-7637-3
Link (5)	56-8852
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 anchor	57-1701FA3
Shaft and pully ass'y., manual tuning	
Model D-5207	318-5312-2
Models P-5206, C-5209	318-5312-3

PHILCO AUTO RADIO
MODELS P-5506 and C-5509

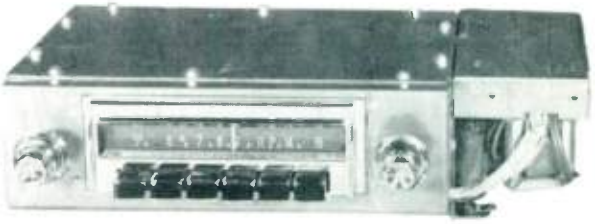
PHILCO Factory-Supervised Service

AUTO RADIO

SPECIFICATIONS

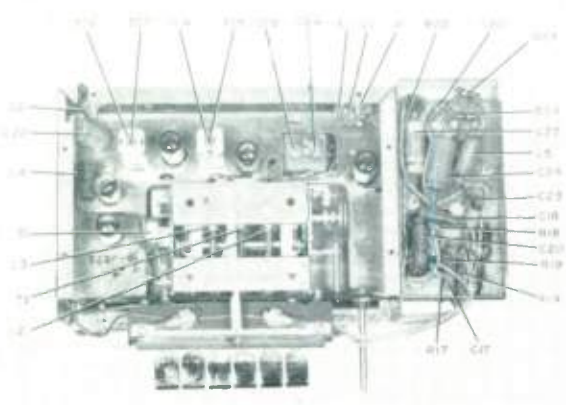
CIRCUIT	7 tube superhetrodyne (plus rectifier)
FREQUENCY RANGE	540 kc. to 1605 kc.
AUDIO OUTPUT	5.5 watts
PUSH BUTTONS (6)	5 station selectors and 1 "off" switch
POWER INPUT	8.6 amp. at 6.6 volts, d.c.
AERIAL	Vertical whip, fender mounting (40mmf series — 40mmf shunt)
INTERMEDIATE FREQUENCY	265 kc
PHILCO TUBES USED	6BA6, r-f amp.; 6BE6, osc. converter; 6BA6, i-f amp.; 6AV6, det. avc. 1st audio; 6C4, phase inverter; 6AQ5 (2), audio output; 6X4, rectifier.

MOPAR MODEL NO.	PHILCO MODEL NO.
832	P-5506
835	C-5509

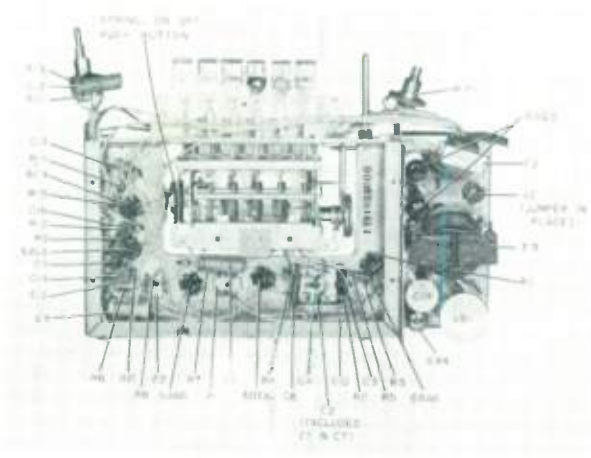


Model C-5509

Model P-5506



Top View Showing Component Layout



Bottom View Showing Component Layout

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.

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Connect signal generator through a .05-mf. condenser to pin 7 (mixer grid) of 6BE6.	265 kc. (modulated)	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 explained in notes preceding this chart.	1605 kc. (modulated)	1605 kc.	Adjust for maximum output.	C2B—osc. trimmer
3	Same as step 2.	1400 kc. (modulated)	1400 kc.	Adjust for maximum output.	C1—antenna padder C2A—r-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 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.

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. 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.

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.

PUSH BUTTON BINDING

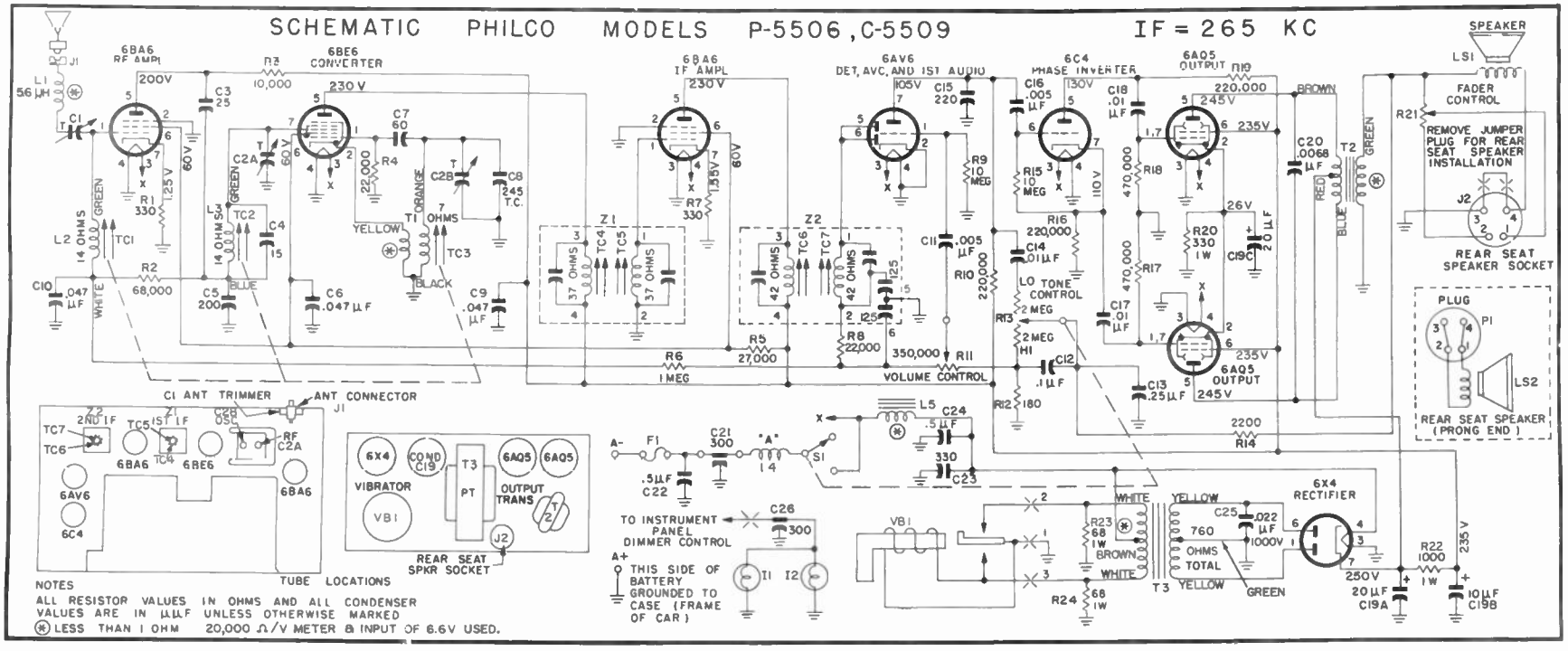
If the push buttons are not free moving so that they don't return to their full out position, there is a possibility that the drive latch will not be sufficiently engaged and the manual tuning will slip. If such occurs, relieve the binding around the offending push button. Such binding may be caused by the anti-rattle 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

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.

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.



Schematic Diagram for Models C-5509 and P-5506

REPLACEMENT PARTS LIST

FOR MODELS P-5506 and C-5509

Reference Symbol	Description	Service 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-pass, .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	30-4650-45
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 and B+ filter	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
I1	Pilot Lamp, type 44, bayonet base, 6-8 volts	34-2064
I2	Pilot Lamp	34-2064
J1	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
L5	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
	Volume Control, 350,000 ohms (Plus Tone Control) C-5509	33-5557-15
R12	Resistor, feedback voltage divider, 180 ohms	66-1188340
R13	Tone Control, 2 megohms each side of center	Part of R11
R14	Resistor, inverse feedback, 2200 ohms	66-2228340
R15	Resistor, grid 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
S1	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
VB1	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	28-10323
Cover, wiring side, C-5509	76-9273
Dial Scale, P-5506	28-10333
Dial Scale, C-5509	54-9351
Frame	28-10324
Fuse Lead	41-3910-10
Gasket, speaker mounting, P-5506	54-9337
Gasket, speaker mounting, C-5509	54-9353
Glass, window	54-6167
Housing assy., P-5506	76-9350
Housing assy., C-5509	28-10080
Knob, tone and fader (2), P-5506	28-10341
Knob, tone and fader (2), C-5509	28-10342
Knob, tuning and volume (2), P-5506	27-4687-22
Knob, tuning and volume (2), C-5509	27-4687-23
Master Kit	
Bracket, set mounting, P-5506 only	28-10352
Condenser, generator	30-4007-3
Condenser, ignition	30-4007-5
Nut and washer assy., mounting bracket to panel (2) and speaker mtg. (3)	W2589-4FA3
Nut, set mounting (with bracket) (P-5506 only) (2)	28-10337
Screw, mtg. bracket to radio	56-6190-17
Pilot lamp socket assy. (2)	27-6233-4
Plate, dial mounting	28-10332
Push buttons (6), P-5506	54-6176
Push buttons (6), C-5509	28-10338-1
Socket, 7 pin min. (3) 6BA6 (2) and 6BE6	27-6294
Socket, 7 pin min. (5) 6AV6, 6C4, 6AQ5 (2) and 6X4	27-6294-1
Socket, vibrator	27-6245
Tuner Assembly	
Cores, tuning, powered iron, ant. and r-f	28-10522
Cores, tuning, powered iron, oscillator	28-10522-1
Clutch assembly	76-9451
Drive shaft and bearing assembly (front) P-5506	76-9448
Drive shaft and bearing assembly (front) C-5509	76-9448-1
Drive shaft and gear assembly (rear)	76-9450
Pointer arm assembly	76-9452
Torsion spring	28-10520
"C" washer	28-10523

Printed in U.S.A.

AUTO RADIO SERVICE MANUAL

PHILCO MODEL: C-5595, (MOPAR 902)
PHILCO MODEL: C-5596, (MOPAR 903)

PHILCO Factory-Supervised Service

AUTO RADIO

SPECIFICATIONS

CIRCUIT	8 tube superheterodyne (plus rectifier)
FREQUENCY RANGE	540 kc. to 1605 kc.
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 function is operating, motor and solenoid will draw an additional 4 amps.
AERIAL	Vertical whip, fender mounting (40 mmf series - 40 mmf shunt)
INTERMEDIATE FREQUENCY	265 kc.
PHILCO TUBES USED	6BA6, r-f amp.; 6BE6, osc. converter; 6BA6, i-f amp.; 6AV6, det. a-v-c 1st audio; 6CS6, search tune phase det.; 12AU7, search tune relay control and audio phase inverter; 6AQ5(2), audio output; 6X4, rectifier.

Figure 1 — Philco Model C-5595 (MOPAR 902)

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 rapidly 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.

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.

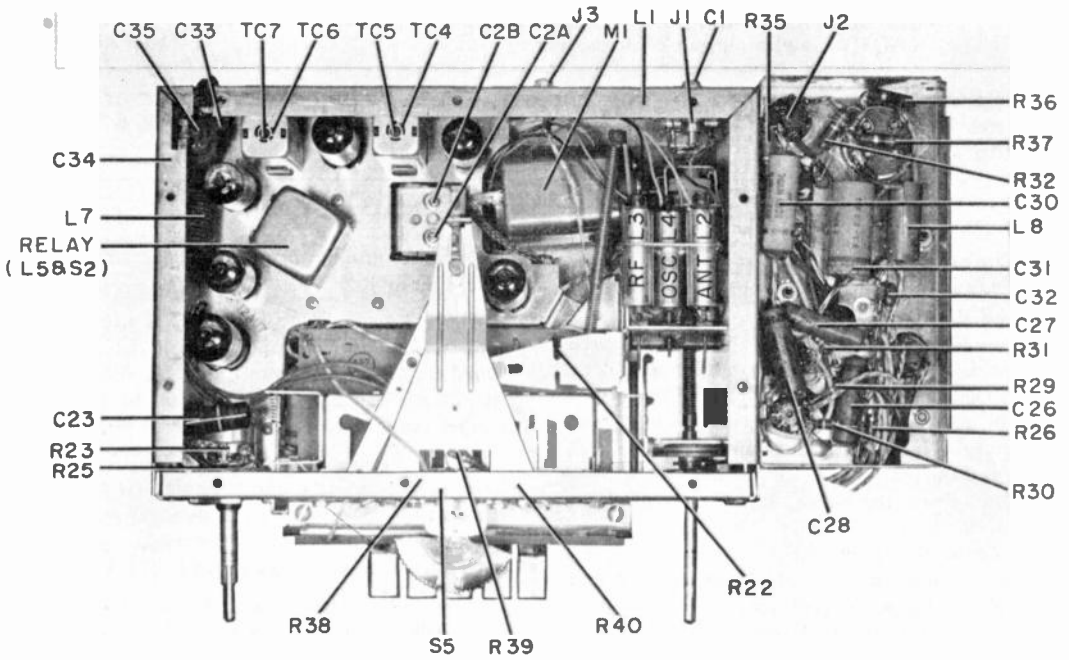


Figure 2 — Top View, Showing Component Layout of Power and Audio Chassis

VOLTAGE CHART MODEL C-5595 (MOPAR 902)

	R-F 6BA6	1ST. DET. 6BE6	I-F 6BA6	2ND. DET. 6AV6	PHASE INV. ½ 12AU7	TRIGGER CONT. ½ 12AU7	PHASE DET. 6CS6	OUTPUT 6AQ5	OUTPUT 6AQ5	RECT. 6X4
PLATE	+205V	+225V	+225V	+95V	+110V	+220V	+70V	+235V	+235V	250V AC
SCREEN	+60V	+60V	+60V	—	—	—	+50V	+225V	+225V	—
GRID	—.4V	—	PHASE	—.6V	—12V	—96V	—	PHASE	PHASE	—
CATHODE	+2.8V	PHASE	+1.5V	PHASE	+90V	+220V	+4.2V	+25V	+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.

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.

ALIGNMENT CHART

STEP	SIGNAL GENERATOR		RADIO		ADJUST TRIMMER
	Connection to Radio	Dial Setting	Dial Setting	Special Instructions	
1	Through a .05 mfd. condenser to mixer grid, pin 7 of 6BE6.	265 kc.	See Note 1	Adjust, 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 Procedure above.	1605 kc.	See Note 1	Adjust for maximum output.	C2B—osc. trimmer
4	Same as Step 3.	1400 kc.	1400 kc.	Adjust 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

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	34-2397
M1	Motor, 12 volt	41-2050-1
R36, R37	Resistor, vibrator damping, 22 ohms	66-1224340
T2	Transformer, power	32-8592-1
VB1	Vibrator, 12 volt type	83-0035-1
	Solenoid, 12 volt	42-4027-1

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.

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.

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 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.

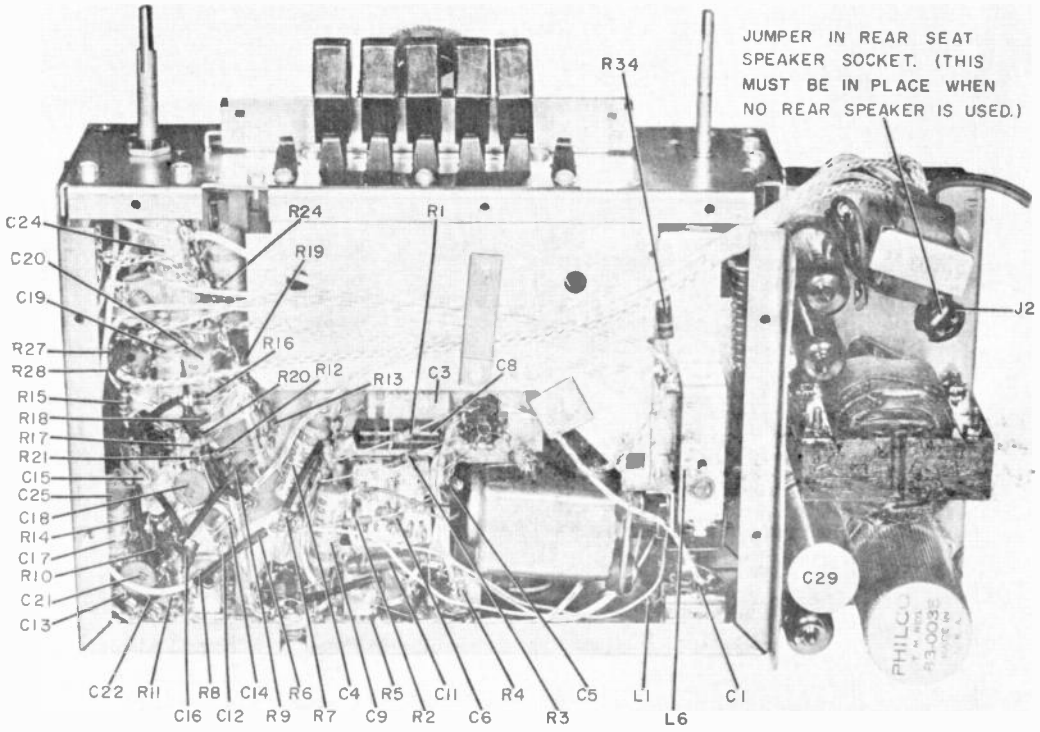


Figure 3 — Component Layout in Tuner Chassis

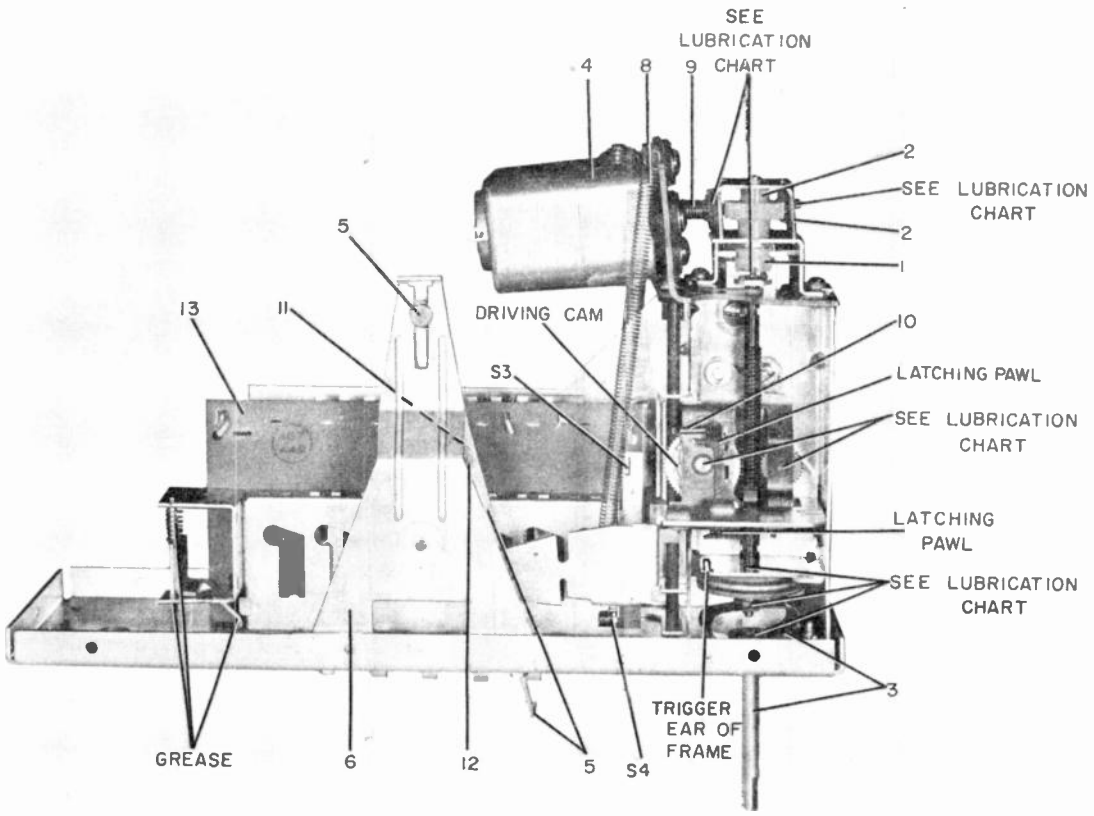


Figure 4 — Top View of Tuner Assembly Parts. Identification and Lubrication Numbers Refer to Tuner Assembly in Parts List

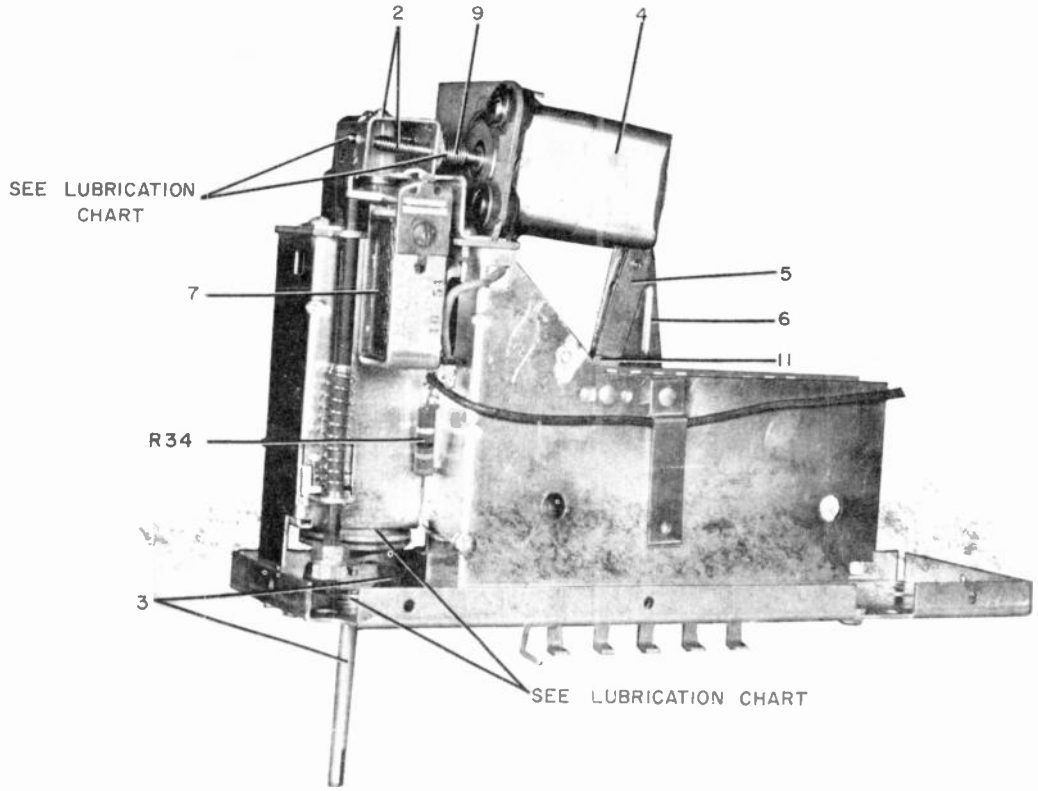


Figure 5 — Bottom View of Tuner Assembly Parts. Identification and Lubrication Numbers Refer to Tuner Assembly in Parts List

REPLACEMENT PARTS LIST — MODELS C-5595 AND C-5596

Reference Symbol	Description	Service Part No.
C1	Condenser, antenna padder	31-6502-5
C2	Condenser, 2 section padder, r-f and osc.	31-6522-5
C3	Condenser, cathode by-pass, .047 mfd., 200v.	30-4650-45
C4	Condenser, a-v-c by-pass, .047 mfd., 200v.	30-4650-45
C5	Condenser, r-f plate coupling, 18 mmf.	62-022409001
C6	Condenser, r-f tank image rejection, 15 mmf.	62-015409011
C7	Condenser, i-f trap, 200 mmf.	Part of C2
C8	Condenser, screen by-pass, .1 mfd., 400v.	30-4650-47
C9	Condenser, cathode by-pass, .047 mfd., 200v.	30-4650-45
C10	Condenser, oscillator coupling, 60 mmf.	Part of C2
C11	Condenser, temperature compensating, 245 mmf.	30-1224-129
C12	Condenser, phase detector a-v-c, 5 mmf.	30-1221-5
C13	Condenser, i-f by-pass, 220 mmf.	62-122001001
C14	Condenser, phase detector coupling 100 mmf.	62-110009001
C15	Condenser, phase detector coupling, 100 mmf.	62-110009001
C16	Condenser, phasing (i-f de-tuning) 20 mmf.	62-020309011
C17	Condenser, cathode by-pass, .047 mfd., 200v.	30-4650-45
C18	Condenser, screen by-pass, .01 mfd.	30-1238-2
C19	Condenser, differentiating network, .033 mfd.	30-4650-44
C20	Condenser, differentiating network, .047 mfd.	30-4650-45
C21	Condenser, tone control, high cut, .01 mfd.	30-1238-2
C22	Condenser, audio coupling, .005 mfd.	30-1238-1
C23	Condenser, inverse feed back, .1 mfd.	30-4650-47
C24	Condenser, inverse feed back, .25 mfd.	30-4650-49
C25	Condenser, audio coupling, .005 mfd.	30-1238-1
C26	Condenser, audio coupling, .01 mfd., 600v.	30-4650-58
C27	Condenser, audio coupling, .01 mfd., 600v.	30-4650-58
C28	Condenser, tone compensation, .0068 mfd.	30-4650-91
C29	Condenser, electrolytic, 3 section	61-0086A
C30	Condenser, buffer, .022 mfd., 1600v.	30-4650-128
C31	Condenser, hash filter, .5 mfd., 100v.	61-0183
C32	Condenser, crackle filter, 330 mmf.	62-133001001
C33	Condenser, feed through, 300 mmf.	30-1235-2
C34	Condenser, spark plate, 300 mmf.	30-1254
C35	Condenser, hash filter, .5 mfd., 100v.	61-0183
F1	Fuse, 14 amp.	AD-2243-4
I1	Pilot lamp	34-2064
I2	Pilot lamp	34-2064
J1	Socket, antenna	57-1243FA3
J2	Socket, rear seat speaker	27-6273-17
J3	Socket, foot switch	27-6149
L1	Choke, antenna	32-4422-24
L2	Coil, antenna tuning	Part of Coil Ass'y. 76-9238
L3	Coil, r-f tuning	Part of Coil Ass'y. 76-9238
L4	Coil, osc. tuning	Part of Coil Ass'y. 76-9238
L5	Relay, search	42-4026
L6	Solenoid, clutch, C-5595, 6 volts	42-4027
	C-5596, 12 volts	42-4027-1
L7	Choke, "A" lead	32-1374-5
L8	Choke, vibrator	32-4170-4
LS1	Speaker	36-1632-7
M1	Motor, C-5595, 6 volts	41-2050
	C-5596, 12 volts	41-2050-1
R1	Resistor, r-f cathode, 1000 ohms	66-2108340
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, i-f cathode, 330 ohm	66-1338340
R8	Resistor, i-f filter, 22,000 ohm	66-3228340
R9	Resistor, a-v-c voltage divider, phase det., 1 megohm	66-5108340
R10	Resistor, grid return, 10 megohms	66-6108340
R11	Resistor, audio plate load, 220,000 ohms	66-4228340
R12	Resistor, grid return, phase det., 1 megohm	66-5108340
R13	Resistor, a-v-c voltage divider, phase det., 1 megohm	66-5108340
R14	Resistor, grid return, phase det., 1 megohm	66-5108340
R15	Resistor, cathode bias, 3300 ohms	66-2338340
R16	Resistor, voltage divider, phase det. cathode, 100,000 ohms	66-4108340
R17	Resistor, screen dropping, 68,000 ohms	66-3688340
R18	Resistor, plate load, 1 megohm	66-5108340
R19	Resistor, voltage divider, 100,000 ohms	66-4108340
R20	Resistor, grid return, 1 megohm	66-5108340
R21	Resistor, cathode bias, 680 ohms	66-1688340
R22	Resistor, relay starting, 15,000 ohms	66-3158340
R23	Volume control, 350,000 ohms	33-5557-16
R24	Resistor, inverse feed back, 180 ohms	66-1188340
R25	Tone Control	Part of R23
R26	Resistor, inverse feed back, 2200 ohms	66-2228340
R27	Resistor, grid return, 10 megohms	66-6108340
R28	Resistor, cathode load, 220,000 ohms	66-4228340
R29	Resistor, plate load, 220,000 ohms	66-4228340
R30	Resistor, grid return, 470,000 ohms	66-4478340
R31	Resistor, grid return, 470,000 ohms	66-4478340
R32	Resistor, cathode bias, 330 ohms, 1 watt	66-1334340
R33	Fader control, rear seat speaker, 25 ohms	33-5576-1
R34	Resistor, 68 ohms, 1 watt	66-0684340
R35	Resistor, B+ filter, 1000 ohms, 1 watt	66-2104340
R36	Resistor, vibrator damping, 68 ohms, 1 watt	66-0684340
R37	Resistor, vibrator damping, 68 ohms, 1 watt	66-0684340
R38	Resistor, sensitivity control, 820 ohms	66-1828340
R39	Resistor, sensitivity control, 820 ohms	66-1828340
R40	Resistor, sensitivity control, 5600 ohms	66-2568340
S1	Switch, off-on	Part of R23
S2	Relay contacts, Part of 42-4026	Part of L5
S3	Switch, auto. start, motor search	Part of Tuner Switch Assembly
S4	Switch, start, search tone	Part of Tuner Switch Assembly
S5	Switch, sensitivity control, includes knob	42-2040
S6	Switch, push button control	Part of Tuner Switch Assembly
T1	Transformer, audio output	32-8316-10
T2	Transformer, power, C-5595	32-8314-5
	C-5596	32-8592-1
VB1	Vibrator, C-5595	83-0035
	C-5596	83-0035-1
Z1	Transformer, 1st i-f	32-4160-17A
Z2	Transformer, 2nd i-f	32-4240-12A

Miscellaneous

Reference Symbol	Description	Service Part No.
	"A" Lead	41-3910-11
	Background, dial	28-10320
	Bezel and Bushing assembly	76-9284
	Cable and disconnect assy., pilot light dimmer	41-4060-3
	Clamp, vibrator	57-1637-3
	Clip, pilot light (2)	56-3545-5
	Cover, tube side	28-10392
	Cover, wiring side	76-9273
	Dial Scale	54-9352
	Fuse Lead	41-3910-10
	Housing	28-10080
	Knob, tone and fader (2)	28-10342
	Knob, volume and tuning (2)	27-4687-23
	Master Kit	
	Condenser, generator	30-4007-3
	Condenser, ignition	30-4007-5
	Gasket, speaker mtg.	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 mtg.	28-10335
	Stud, short, speaker mtg.	28-10335-1
	Pilot lamp socket assy. (2)	27-6233-4
	Push Bar	28-10343
	Push Button assy. (5)	76-9288
	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)	28-10347
	Tuner Assembly	
	Coil assy., includes ant., r-f and osc.	76-9238
	Clutch, ratchet, nylon	28-10452
	Gear housing assy. (nylon gear and worm)	76-9366
	Manual shaft assy.	76-9368
	Motor, 6 volt	41-2050
	12 volt	41-2050-1
	Pointer arm assy.	76-9365
	Pointer support assy.	76-9364
	Solenoid, 6 volt	42-4027
	12 volt	42-4027-1
	Spring, carriage (approx. 4" long)	28-10450
	Spring, coupling (motor to worm)	28-10451
	Spring, lever (high frequency end release)	28-10449
	Spring, plate (on pointer arm assy.)	28-10447
	Spring, torsion (on pointer arm assy.)	28-10448
	Switch assy.	76-9367
	Tuning core, osc., ant. and r-f (2)	28-10485
	Window, glass	54-6167

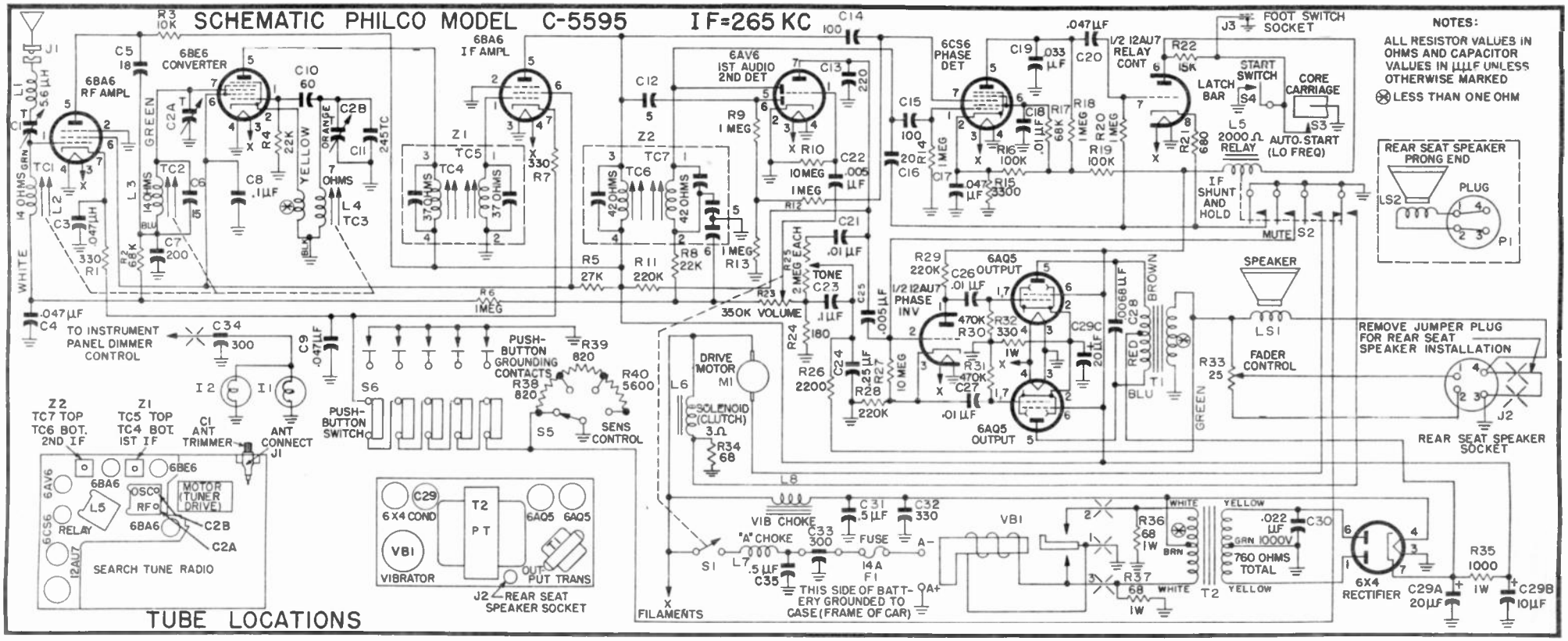


Figure 6 — Schematic Diagram — Philco Model C-5595 (Mopar 902)

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