PHILCO RADIO MODEL 53-960

SPECIFICATIONS

Circuit ..... **Superheterodyne**

Frequency ranges

Standard Broadcasts: .540 to 1.70 megacycles (555 to 176.5 meters)

Short Wave 1: 1.7 to 5.3 megacycles (176.5 to 56.5 meters)

Short Wave 2: 7.5 to 22.0 megacycles (40.0 to 13.62 meters)

Band Spread:

49-Meter Band: 5.2 to 7.6 megacycles (57.7 to 39.4 meters)

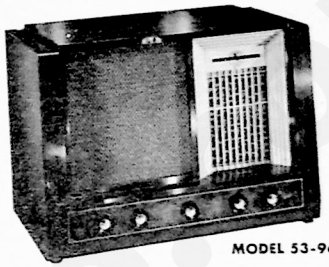
31-Meter Band: 9.4 to 9.9 megacycles (31.9 to 30.3 meters)

25-Meter Band: 11.4 to 12.0 megacycles (26.3 to 25 meters)

19-Meter Band: 14.8 to 15.6 megacycles (20.3 to 19.2 meters)

16-Meter Band: 17.3 to 18.2 megacycles (17.3 to 16.5 meters)

13-Meter Band: 20.8 to 21.9 megacycles (14.4 to 13.7 meters)



MODEL 53-960

Number of tubes (excluding rectifier)	7
Number of rectifier tubes	1
Tone control	Continuously variable
Aerial	Loop aerial for Standard Broadcast; whip aerial for Short Wave; provision for external aerial
Operating voltage	115 volts, 60 cycles, a.c.
Speaker	10-inch PM
Undistorted power output	7 watts
Total power consumption	110 watts

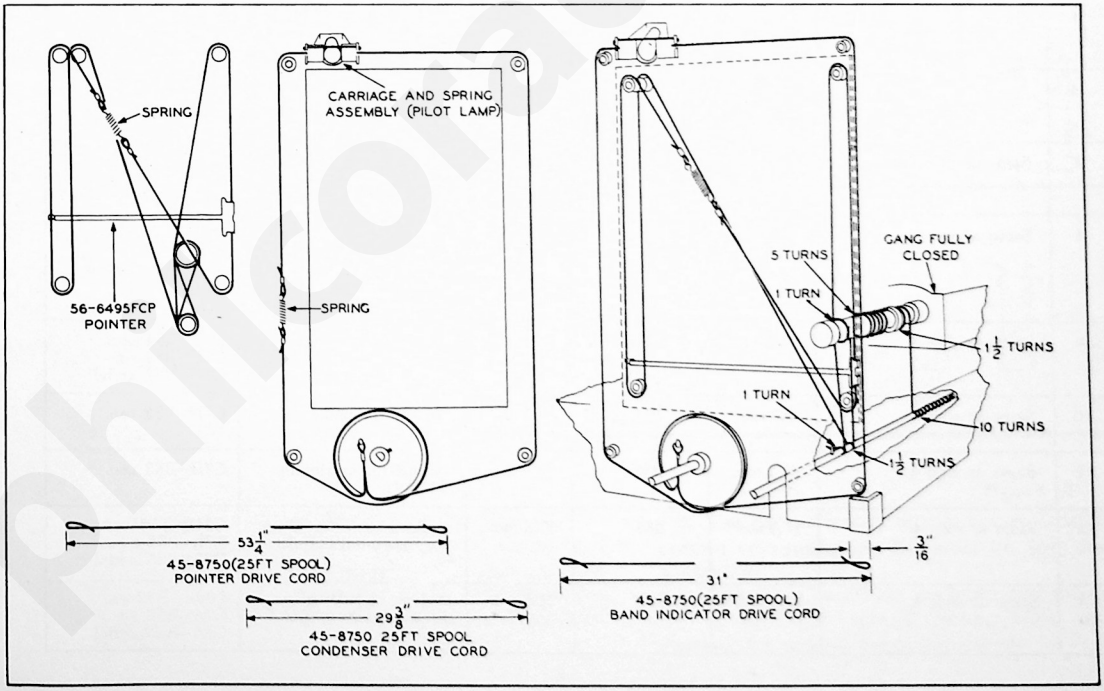


Figure 1. Drive-Cord Installation Details

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ALIGNMENT PROCEDURE

DIAL POINTER: With the tuning-condenser plates fully meshed, adjust the dial pointer to coincide with the index mark (the second mark below "55") at the low-frequency end of the dial.

BAND-SPREAD TUNING CORES: With the tuning control at the extreme low-frequency setting, set oscillator core TC1C flush with the rear end of the oscillator coil form. Aerial core TC1A and r-f core TC1B should now extend approximately 1/16 inch beyond their coil forms.

SIGNAL GENERATOR: Connect the ground lead to the chassis, and the output lead as indicated in the chart. Set the signal-generator frequency as indicated in the chart, and use modulated output.

RADIO CONTROLS: Set the volume control to maximum, and the tone control fully clockwise. Set the band switch and tuning control as indicated in the chart.

OUTPUT METER: Connect between the voice-coil lug on the speaker and the chassis.

OUTPUT LEVEL: During alignment, the signal-generator output must be attenuated to maintain an output-meter reading below 1.5 volts.

STEP	SIGNAL GENERATOR		RADIO			ADJUST
	CONNECTION TO RADIO	DIAL SETTING	BAND SWITCH	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Through a .1-μf. condenser to stator of r-f (center) section of C1.	455 kc.	BC	Tuning gang fully open.	Adjust, in order given, for maximum output; then repeat.	C28—2nd i-f sec. C27—2nd i-f pri. C30—1st i-f sec. C29—1st i-f pri.
2	Through a 25-μμf. condenser to aerial terminal of TB1.	580 kc.	BC	580 kc.	Adjust for maximum output while rocking tuning control.	C14A—BC osc. (series)
3	Same as step 2.	1500 kc.	BC	1500 kc.	Adjust, in order given, for maximum output.	C13—BC osc. (shunt) C41—BC r-f C52—BC aerial
4	Through a 25-μμf. condenser to aerial terminal of TB1.	5.0 mc.	SW1	5.0 mc.	Adjust for maximum output.	C14B—SW1 osc.
5	Same as step 4.	7.5 mc.	BS1	7.5 mc.	Adjust, in order given, for maximum output.	C14C—BS1 osc. C7D—BS1 r-f C2D—BS1 aerial
6					Preset approximately ½ turn from tight position.	C7I—SW2 osc. C7E—SW2 r-f C2E—SW2 aerial
7	Same as step 4.	9.0 mc.	SW2	9.0 mc.	Adjust, in order given, for maximum output.	TC13—SW2 osc. TC9—SW2 r-f TC5—SW2 aerial
8	Same as step 4.	21.0 mc.	SW2	21.0 mc.	Adjust, in order given, for maximum output. Repeat steps 7 and 8 until maximum output is obtained.	C7I—SW2 osc. C7E—SW2 r-f C2E—SW2 aerial
9	Same as step 4.	15.2 mc.	BS4	15.2 mc.	Adjust, in order given, for maximum output.	C7F—BS4 osc. C7C—BS4 r-f C2C—BS4 aerial
10	Same as step 4.	9.7 mc.	BS2	9.7 mc.	Adjust for maximum output.	C7H—BS2 osc.
11	Same as step 4.	11.7 mc.	BS3	11.7 mc.	Adjust for maximum output.	C7G—BS3 osc.
12	Same as step 4.	17.8 mc.	BS5	17.8 mc.	Adjust, in order given, for maximum output.	C24B—BS5 osc. C7B—BS5 r-f C2B—BS5 aerial
13	Same as step 4.	21.5 mc.	BS6	21.5 mc.	Adjust, in order given, for maximum output.	C24A—BS6 osc. C7A—BS6 r-f C2A—BS6 aerial

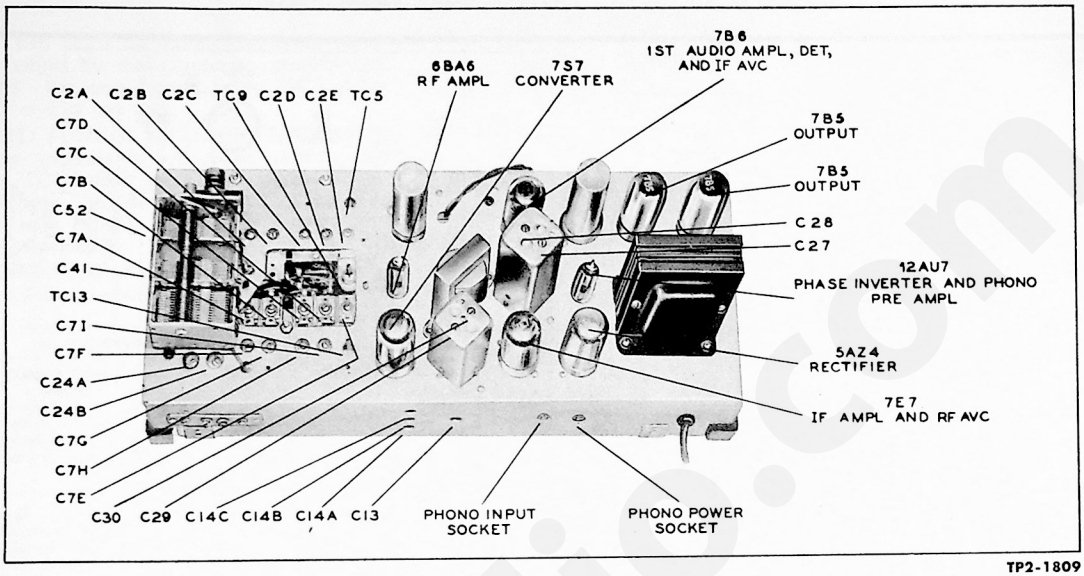

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Figure 2. Top View, Showing Trimmer Locations

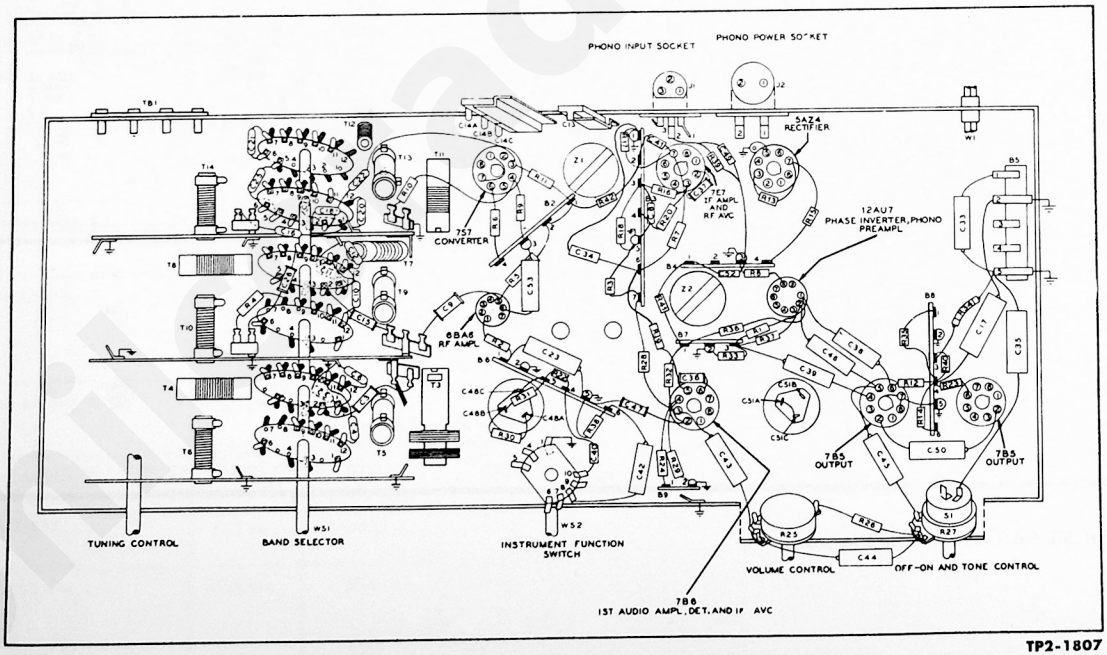

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Figure 3. Bottom View, Showing Symbolized Chassis

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, 3-section	31-2741-2
C2	Condenser, trimmer, 5-section	31-6507-5
C2A	Condenser, aerial trimmer, 21.5 mc.	Part of C2
C2B	Condenser, aerial trimmer, 17.8 mc.	Part of C2
C2C	Condenser, aerial trimmer, 15.2 mc.	Part of C2
C2D	Condenser, aerial trimmer, 7.5 mc.	Part of C2
C2E	Condenser, aerial trimmer, SW2	Part of C2
C3	Condenser, d-c blocking, 100 μμf.	62-110009001*
C4	Condenser, tracking, BS1, 485 μμf.	30-1220-23
C5	Condenser, shunt, BS3, 62 μμf.	30-1220-62
C6	Condenser, shunt, BS2, 131 μμf.	30-1220-38
C7	Condenser, trimmer, 9-section	31-6507-4
C7A	Condenser, r-f trimmer, 21.5 mc.	Part of C7
C7B	Condenser, r-f trimmer, 17.8 mc.	Part of C7
C7C	Condenser, r-f trimmer, 15.2 mc.	Part of C7
C7D	Condenser, r-f trimmer, 7.5 mc.	Part of C7
C7E	Condenser, r-f trimmer, SW2	Part of C7
C7F	Condenser, oscillator trimmer, 15.2 mc.	Part of C7
C7G	Condenser, oscillator trimmer, 11.7 mc.	Part of C7
C7H	Condenser, oscillator trimmer, 9.7 mc.	Part of C7
C7I	Condenser, oscillator trimmer, SW2	Part of C7
C8	Condenser, bias filter, 220 μμf.	62-122001001
C9	Condenser, d-c blocking, 220 μμf.	62-122001001*
C10	Condenser, tracking, BS1, 485 μμf.	30-1220-23
C11	Condenser, shunt, BS3, 62 μμf.	30-1220-62
C12	Condenser, shunt, BS2, 131 μμf.	30-1220-38
C13	Condenser, oscillator trimmer, BC	31-6308
C14	Condenser, trimmer, 3-section	31-6477-4
C14A	Condenser, oscillator padder, BC	Part of C14
C14B	Condenser, oscillator trimmer, SW1	Part of C14
C14C	Condenser, oscillator trimmer, 7.5 mc.	Part of C14
C15	Condenser, d-c blocking, 100 μμf.	62-110009001*
C16	Condenser, fixed tracker, SW1, 3600 μμf.	60-20365314
C17	Condenser, bias filter, .25 μf.	30-4588
C18	Condenser, oscillator divider, BS1, 180 μμf.	30-1220-30*
C19	Condenser, oscillator divider, BS2, 330 μμf.	60-10335317
C20	Condenser, oscillator divider, BS3, 82 μμf.	60-00825237
C21	Condenser, tracking, BS1, 540 μμf.	30-1220-61
C22	Condenser, d-c blocking, 270 μμf.	60-10275417
C23	Condenser, a-v-c filter, .047 μf.	45-3505-28
C24	Condenser, trimmer, 2-section	31-6476-19
C24A	Condenser, oscillator trimmer, 21.5 mc.	Part of C24
C24B	Condenser, oscillator trimmer, 17.8 mc.	Part of C24
C25	Condenser, d-c blocking, 100 μμf.	60-10105417
C26	Condenser, shunt, SW1, 3.3 μμf.	30-1221
C27	Condenser, primary trimmer, 2nd i-f	Part of Z2
C28	Condenser, secondary trimmer, 2nd i-f	Part of Z2
C29	Condenser, primary trimmer, 1st i-f	Part of Z1
C30	Condenser, secondary trimmer, 1st i-f	Part of Z1
C31	Condenser, i-f filter, 100 μμf. (part of Z2)	Part of Z2
C32	Condenser, i-f filter, 100 μμf. (part of Z2)	Part of Z2
C33	Condenser, line filter, .01 μf.	45-3505-92*
C34	Condenser, a-v-c filter, .047 μf.	45-3505-28*
C35	Condenser, line filter, .01 μf.	45-3505-92*
C36	Condenser, diode coupling, 100 μμf.	62-110009001*
C37	Condenser, diode coupling, 100 μμf.	62-110009001*
C38	Condenser, d-c blocking, .006 μf.	30-4591
C39	Condenser, d-c blocking, .006 μf.	30-4591
C40	Condenser, coupling, .003 μf.	30-4639
C41	Condenser, d-c blocking, .01 μf.	30-1238-6
C42	Condenser, d-c blocking, .05 μf.	30-4519
C43	Condenser, d-c blocking, .047 μf.	45-3505-28*
C44	Condenser, bass compensation, .006 μf.	30-4591
C45	Condenser, tone compensation, high-cut, .01 μf.	30-4572
C46	Condenser, d-c blocking, .006 μf.	30-4591
C47	Condenser, plate by-pass, 220 μμf.	62-122001001
C48	Condenser, electrolytic, 3-section	30-2570-15
C48A	Condenser, filter, 20 μf., 450v	Part of C48
C48B	Condenser, filter, 10 μf., 450v	Part of C48
C48C	Condenser, filter, 10 μf., 450v	Part of C48
C49	Condenser, grid return, .001 μf.	30-4620
C50	Condenser, plate by-pass, .0015 μf.	30-4616
C51	Condenser, electrolytic, 3-section	30-2570-15
C51A	Condenser, filter, 10 μf., 450v	Part of C51
C51B	Condenser, filter, 20 μf., 450v	Part of C51
C51C	Condenser, filter, 10 μf., 450v	Part of C51
C52	Condenser, screen by-pass, .05 μf.	30-4638
C53	Condenser, screen by-pass, .05 μf.	30-4638
I1	Pilot lamp, 6.3v	34-2064
J1	Socket, phono input	27-6126
J2	Socket, phono power	27-6200
LS1	Speaker, p-m, 10-inch	36-1610-17
R1	Resistor, grid return, 470,000 ohms	66-4478340*
R2	Resistor, grid return, 470,000 ohms	66-4478340*
R3	Resistor, voltage divider, 120,000 ohms	66-4128340
R4	Resistor, loading, 4700 ohms	66-2478340*
R5	Resistor, plate load, 22,000 ohms, 2 watts	66-3225340*
R6	Resistor, a-v-c divider, 1.8 megohms	66-5188340*
R7	Resistor, a-v-c filter, 1.5 megohms	66-5158340*
R8	Resistor, cathode bias, 22,000 ohms	66-3228340*
R9	Resistor, grid return, 47,000 ohms	66-3478340*
R10	Resistor, parasitic suppressor, 68 ohms	66-0688350*
R11	Resistor, plate load, 22,000 ohms, 1 watt	66-3224340*
R12	Resistor, grid return, 470,000 ohms	66-4478340*
R13	Resistor, filter, 330 ohms, 3 watts	33-1334-8
R14	Resistor, a-v-c delay, 3.3 megohms	66-5338340*
R15	Resistor, filter, 470 ohms, 1 watt	66-1474540*
R16	Resistor, a-v-c load, 2.2 megohms	66-5228340*
R17	Resistor, cathode bias, 1000 ohms	66-2108240*
R18	Resistor, bias divider, 150,000 ohms	66-4158340*
R19	Resistor, a-v-c filter, 2.2 megohms	66-5228340*
R20	Resistor, a-v-c filter, 2.2 megohms	66-5228340*
R21	Resistor, i-f filter, 47,000 ohms (part of Z2)	66-3478340*
R22	Resistor, phono preamplifier plate, 56,000 ohms	66-3565340*
R23	Resistor, grid return, 470,000 ohms	66-4478340*
R24	Resistor, inverse feedback, 150 ohms	66-1158350*
R25	Resistor, volume control, 2 megohms	33-5535-34
R26	Resistor, bass compensation, 68,000 ohms	66-3688540*
R27	Resistor, tone control, 5 megohms	33-5566-38
R28	Resistor, grid return, 10 megohms	66-6108340*
R29	Resistor, cathode degeneration, 4.7 ohms	66-9478340*
R30	Resistor, filter, 1000 ohms, 1 watt	66-2104540*
R31	Resistor, filter, 22,000 ohms, 2 watts	66-3224540*
R32	Resistor, plate load, 270,000 ohms	66-4278340*
R33	Resistor, cathode load, 22,000 ohms	66-3228340*
R34	Resistor, bias voltage divider, 330 ohms, 3 watts	33-1334-8
R35	Resistor, load, 3 megohms	66-5338340
R36	Resistor, plate load, 22,000 ohms	66-3228340*
R37	Resistor, cathode bias, 2200 ohms	66-2228340*
R38	Resistor, diode load, 330,000 ohms	66-4338340*
R39	Resistor, grid return, 470,000 ohms	66-4478340*
R40	Resistor, bias, 100,000 ohms	66-4108340*
R41	Resistor, screen dropping, 220,000 ohms	66-4228340
R42	Resistor, plate filter, 470 ohms	66-1478340
S1	Switch, off-on	Part of R27
T1	Transformer, power	32-8584
T2	Transformer, output	32-8585
T3	Transformer, BC aerial	32-4033-15
T4	Transformer, SW1 and BS1 aerial	32-4364
T5	Transformer, SW2 aerial	32-4208
T6	Transformer, BS2, BS3, BS4, BS5, and BS6 aerial	32-3670
T7	Transformer, BC r-f	32-4369
T8	Transformer, SW1 and BS1 r-f	32-4364-1
T9	Transformer, SW2 r-f	32-4208-7
T10	Transformer, BS2, BS3, BS4, BS5, and BS6 r-f	32-3671
T11	Transformer, BC oscillator	32-4370-2
T12	Transformer, SW1 and BS1 oscillator	32-4207-2
T13	Transformer, SW2 oscillator	32-4208-2
T14	Transformer, BS2, BS3, BS4, BS5, and BS6 oscillator	32-4212-2
TB1	Terminal board, aerial connection	38-9870
TC1	Tuning-core assembly, 3-section	76-5958
TC1A	Tuning core, band spread, aerial	Part of TC1
TC1B	Tuning core, band spread, r-f	Part of TC1
TC1C	Tuning core, band spread, osc.	Part of TC1
TC2	Tuning core, SW2 aerial	Part of T5
TC3	Tuning core, SW2 r-f	Part of T9
TC4	Tuning core, SW2 osc.	Part of T13
W1	Line cord	41-3821
WS1	Wafer switch, band-change	42-1883-2
WS2	Wafer switch, radio-phono	42-1971
Z1	Transformer, 1st i-f	32-3976
Z2	Transformer, 2nd i-f	32-4346-1

MISCELLANEOUS

Description	Service Part No.
Cabinet	10898
Back assembly	76-7502-1
Baffle assembly (part of cabinet)	40-8774
Cable, speaker	41-3714-2
Cord, drive (25-ft. spool)	45-8750
Dial-plate assembly	76-7333
Dial-scale assembly	76-4437
Pointer	56-6495FCP
Spring, indicator (2)	56-3066FA38
Spring, indicator (part of 76-5616)	56-2155
Drive-shaft-and-bearing assembly	Part of WS1
Drum assembly (band indicator)	76-1246-2FA33
Knob, phono-radio	54-4774-11
Knob, band-selector	54-4774-12
Knob, tone, on-off	54-4774-13
Knob, tuning	54-4774
Knob, volume	54-4774-14
Loop, BC aerial	76-7493
Pilot-lamp assembly	76-1236-1
Pilot-lamp-carriage-and-spring assembly	76-5616
Shield, tube	56-2731
Socket, Loktal (6)	27-6207
Socket, 9-pin miniature	27-6203-18
Socket, 7-pin miniature	27-6275
Whip aerial	76-7503
Lead assembly, aerial	76-7504

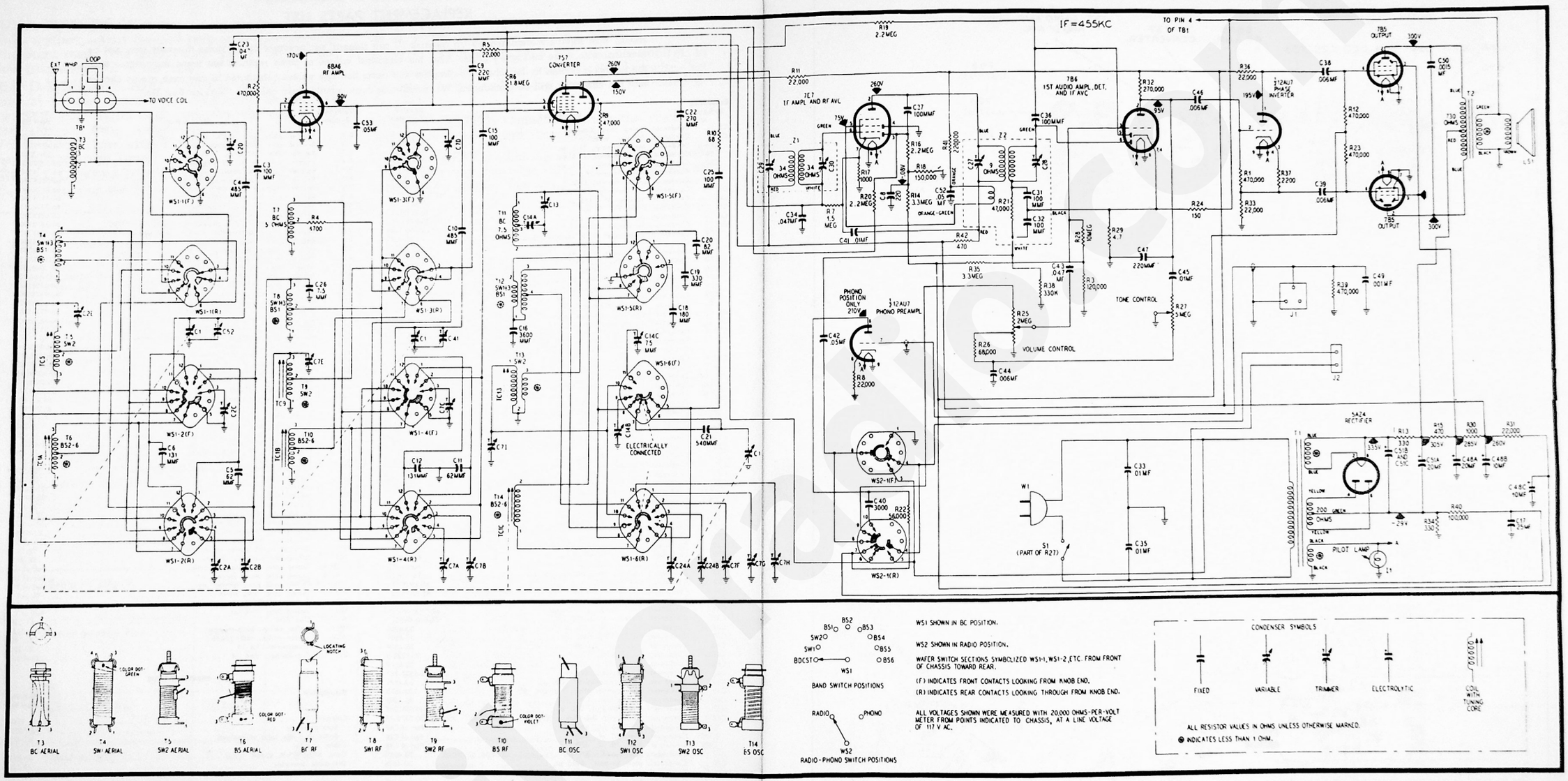

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Figure 4. Philco Radio Model 53-960, Schematic Diagram

CRITICAL LEAD DRESS INFORMATION

1. The black and green leads from the second i-f transformer, Z2, to pins 6 and 7 of the 7B6 tube socket must be transposed at least three times outside the shield can, and must be kept as close together as possible.

2. The excess length of the orange lead from the second i-f transformer, Z2, must be kept inside the shield can.

3. The green lead from the broadcast antenna coil, T3, to the band change switch, WS1, should be dressed away from the metal shield.