

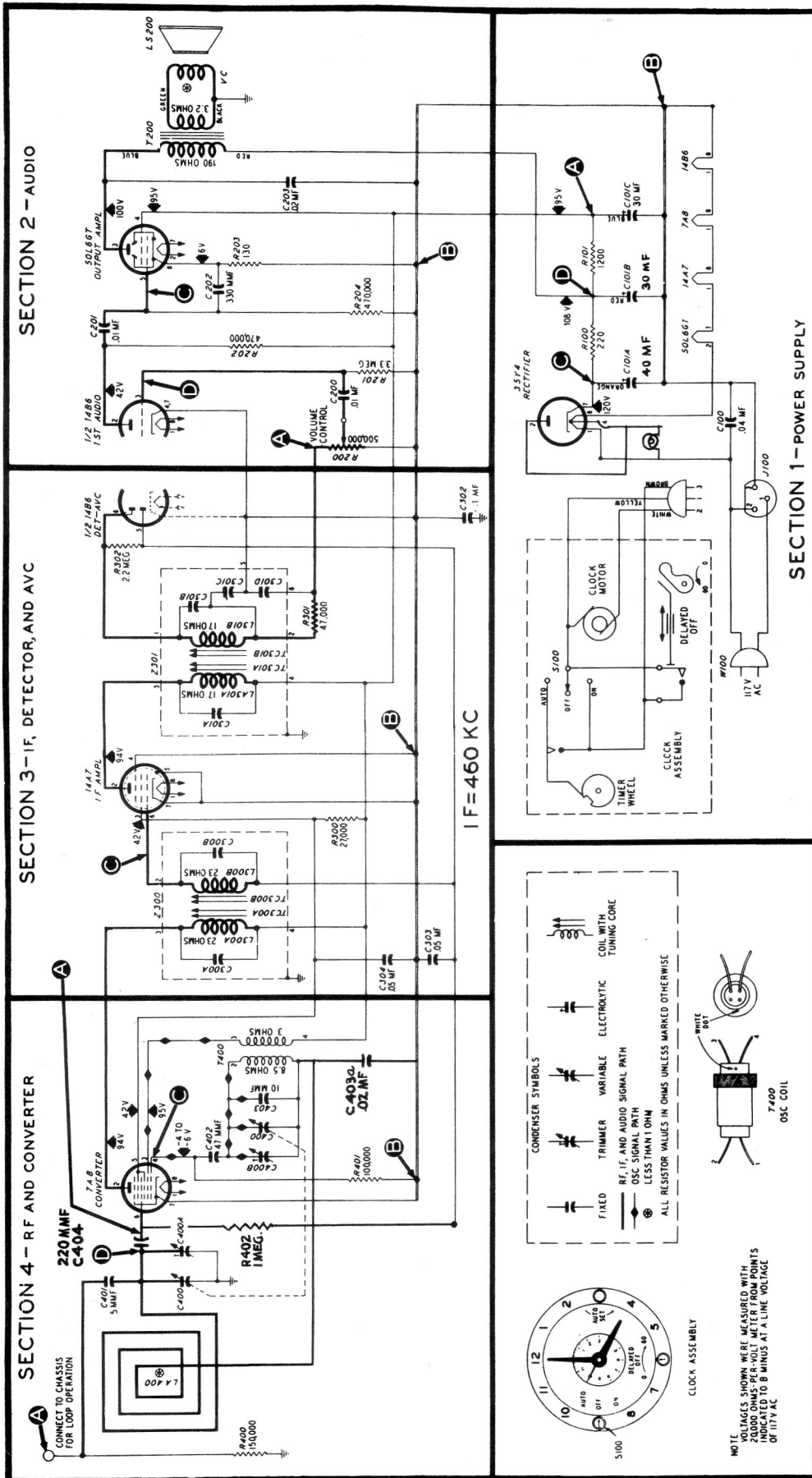


FIGURE 5. PHILCO RADIO-CLOCK MODEL 85 — 85-1 AND 85-2 — 85-1-2, SECTIONALIZED SCHEMATIC DIAGRAM, SHOWING TEST POINTS

Circuit Description

Philco Radio-Clock Models 85 and 85-1 are 5-tube table-model superheterodynes, providing reception in the standard broadcast band and the functions of an electric alarm clock.

A high-impedance loop aerial normally provides adequate signal pickup. An external aerial may be connected, if desired, by detaching the aerial lead from the chassis and connecting it to the external aerial lead. Do not use a ground.

The loop aerial is coupled to the 7A8 converter, the aerial and oscillator circuits are tuned by ganged variable condensers, and the oscillator rotation plates are properly shaped to obtain tracking, thus eliminating the necessity for a series padding condenser.

The 7A8 converter is transformer-coupled to the 1A7 IF amplifier, which is also transformer-coupled to the diodes of the 1A6 second detector—first audio amplifier. A-vc voltage is applied to the control grids of both the IF amplifier and converter tubes. The triode section of the 1A6 is the first audio stage, and is resistance-coupled to the 50L6GT output tube. The output tube works into a permanent-magnet speaker.

D-c operating voltages are supplied from a 35Y4 half-wave rectifier, and filtered by a three-section resistor-condenser network.

In addition to the normal features of a table-model radio and an electric clock, a radio alarm is included, which turns the radio on at any preset time; there is also a "delayed off" feature that automatically shuts the set off after any desired period up to an hour. These functions are available by the following control settings: For alarm action, the AUTO-OFF-ON switch is set to the AUTO position, and the alarm is set to the desired time. When the delayed off action is required, as when retiring, the DELAYED OFF switch is turned to the right, and the AUTO-OFF switch is set to the AUTO position. The two actions may be combined, i.e., before retiring, the alarm may be set for the morning time, and the DELAYED OFF switch also set. The radio then plays for an hour, shuts its off, and comes on again in the morning. When the AUTO-OFF-ON switch is set to the ON position, the radio operates independently of the clock. When the switch is set to the OFF position, the radio is turned off, and is not under the control of the clock.

SEE PARTS LIST ON PAGE 58**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 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+ (pin 7 of the 35Y4) and B- (test point B). When the ohmmeter test leads are connected in the proper polarity, the highest resistance reading will be obtained. If the reading is lower than 1500 ohms, check condensers C101A, C101B, C101C, and C203 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.

TROUBLE SHOOTING

Section 1 POWER SUPPLY

For the tests in this section, use a d.c. voltmeter. Connect the negative lead to B-, test point B; 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 a line voltage of 117 volts, a.c.

Turn on the power, and set the volume control to minimum.

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.

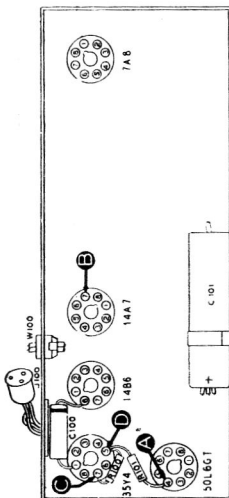


FIGURE 1. BOTTOM VIEW, SHOWING SECTION 1 TEST POINTS

STEP	TEST POINT	NORMAL INDICATION	ABNORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	94v	No voltage	Trouble within this section. Isolate by the following tests.
2	C	120v	Low voltage	Defective: 35Y4. Shorted: C101A. Open: S100, W100, J100.
			High voltage	Defective: 35Y4. Open: C101A. Leaky: C101A.
3	D	108v	No voltage	Open: R100.
			Low voltage	Shorted: C101B. Open: R100.
			High voltage	Open: C101B. Leaky: C101B, C203*.
4	A	95v	No voltage	Open: R101, T200*, R201*.
			Low voltage	Shorted: C101C. Open: R101.
				Leaky: C101C.

Listening Test: Abnormal hum may be caused by open C101 A, C101B, or C101C.

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

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 460 kc. Connect the generator ground lead to B-, test point B; connect the output lead through a .1-mf. condenser to the test points indicated in the chart.

Set the volume control to maximum, and 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-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 "POSSIBLE CAUSE OF ABNORMAL INDICATION."

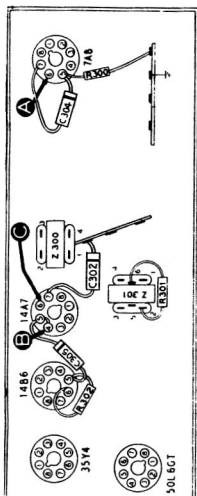


FIGURE 3. BOTTOM VIEW, SHOWING SECTION 3 TEST POINTS

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Loud, clear speaker output with weak signal-generator input.	Trouble within this section. Isolate by the following tests.
2	C	Same as step 1.	Defective: 14A7, 14B6 (diode section). Shorted: L300B, C300B, L301A, C301A, L301B, C301B, C301C, C301D. Open: L301A, L301B, C301A, C301B, R300, R301, C304. Misaligned: Z301.
3	A	Same as step 1.	Defective: 7A8*. Shorted: C400*, C400A*, L300A, C300A. Open: L300A, L300B, C300A, C300B. Misaligned: Z300.

Listening Test: Hum and instability may be caused by open C302.

* 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 B-, test point B; connect the output lead through a .1-mf. condenser to the test points indicated in the chart.

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.

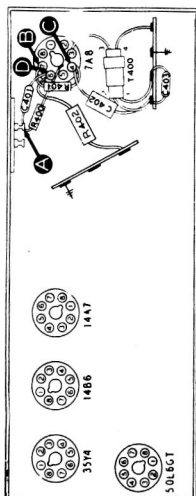


FIGURE 4. BOTTOM VIEW, SHOWING SECTION 4 TEST POINTS

STEP	TEST POINT	SIG. GEN. FREQUENCY	RADIO TUNING	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	1000 kc.	1000 kc.	Clear speaker output with weak signal-generator input.	Trouble within this section. Isolate by the following tests.
2	C	(Osc. test; see note below.)	Rotate through range.	Negative 4v to 6v.	Defective: 7A8*. Open: C402, R401, Shorted: T400, C400, C400B, C403.
3	D	1000 kc.	1000 kc.	Same as step 1.	Defective: 7A8. Open: LA400. Shorted: C400, C400A, LA400.
4	A	1000 kc.	1000 kc.	Same as step 1.	Open: C401.

Listening Test: Distortion may be caused by shorted or leaky C201.

* 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 B-, test point B; connect the output lead through a .1-mf. condenser to the test points indicated in the chart. Set the volume control to maximum, and set 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.

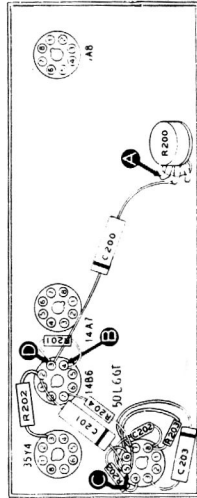


FIGURE 2. BOTTOM VIEW, SHOWING SECTION 2 TEST POINTS

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Loud, clear speaker output with weak signal-generator input.	Trouble within this section. Isolate by the following tests.
2	C	Clear output with strong input.	Defective: 50L6GT, L5200. Shorted: C202, C203. Open: R203, T200.
3	D	Clear output with moderate input.	Defective: 14B6. Shorted: C201. Open: C201, R202, R204.
4	A	Same as step 1.	Shorted: C301D*. Open: R200, R201, C200.

Listening Test: Distortion may be caused by shorted or leaky C201.

* 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 B-, test point B; connect the prod end of the negative lead through a 100,000-ohm isolating resistor to the 7A8 oscillator grid (pin 4), test point C. 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.

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

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTION TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Connect ground lead to B; output lead through .1-mf. condenser to grid (pin 6) of 7A8.	460 kc.		Tuning condenser fully meshed.	TC301B—2nd i-f sec. TC301A—2nd i-f pri. TC300B—1st i-f sec. TC300A—1st i-f pri.
2	Radiating loop (see note below).	1600 kc.	1600 kc.	Adjust trimmer for maximum output.	C400B—Osc.
3	Same as step 2.	1500 kc.	1500 kc.	Adjust trimmer for maximum output.	C400A—Aerial

NOTE: TC300A AND TC301A ARE ON UNDERSIDE OF CHASSIS.

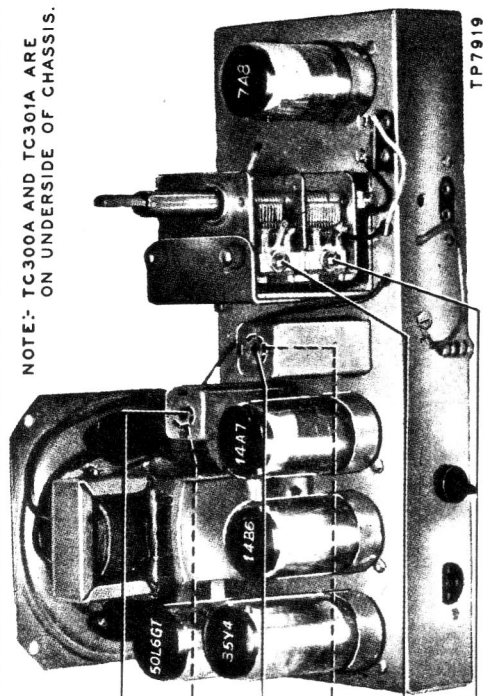


FIGURE 6. TOP VIEW, SHOWING TRIMMER LOCATION

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

SYMBOLIZATION

The components in the radio circuit are symbolized according to the types of parts and the sections of radio in which the parts are located. The prefix letter of the symbol designates the type of part, as follows:

C—condenser	LA—loop aerial	T—transformer
I—pilot lamp	LS—loud-speaker	W—line cord
L—choke or coil	R—resistor	Z—electrical assembly
	S—switch	

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

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.



SPECIFICATIONS	
CABINET	Molded Phenolic, brown
Model 85	Molded Phenolic, ivory
FREQUENCY RANGE	540—1600 k.c.
AUDIO OUTPUT	1 watt
OPERATING VOLTAGE	117 volts, a.c.
POWER CONSUMPTION	85 & 85-1—60 cycle
AERIAL	85-2 & 85-1-2—25 cycle
INTERMEDIATE FREQUENCY	460 kc.
PHILCO TUBES (5)	7A8, 14A7, 14B6, 50L6GT, 35Y4

TP-7964