PHILCO RADIO MODELS 50-522, 50-522-I and 50-524

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.

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+ (test point C) and B— (test point B). See figure 1. 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, C101E, 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.

Section 1—Power Supply

TROUBLE SHOOTING

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.

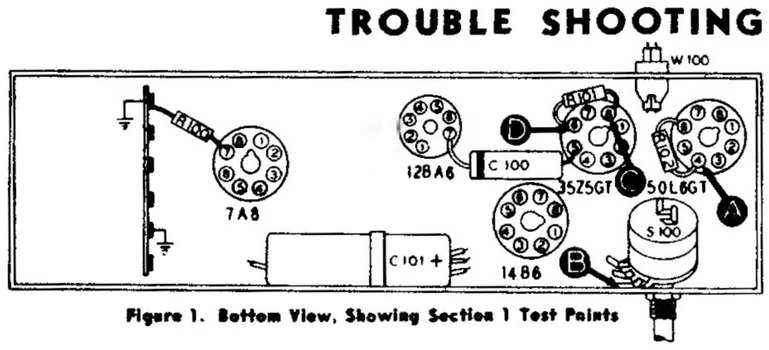

Figure 1. Bottom View, Showing Section 1 Test Points

STEP	TEST POINT	NORMAL INDICATION	ABNORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	105 volts		Trouble in this section. Isolate by the following tests.
2	C	130 volts	No voltage	Defective: 35Z5GT. Open: W100, S100. Shorted: C100, C101A.
			Low voltage	Defective: 35Z5GT. Open: C101A. Leaky: C101A.
			High voltage	Open: R101.
3	D	118 volts	No voltage	Open: R101. Shorted: C101B.
			Low voltage	Open: C101B. Shorted: C203* Leaky: C101B.
			High voltage	Open: R102, T200*, R204*.
4	A	105 volts	No voltage	Shorted: C101C. Open: R102.
			Low voltage	Leaky: C101C. Open: C101C.
			High voltage	Open: R204*.
Listening Test: Abnormal hum may be caused by open C101A, C101B, or C101C.				

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

Section 2—Audio Circuits

TROUBLE SHOOTING

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-μf. 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 Sections 3 (i-f, detector, and a-v-c circuits); if not, isolate and correct the trouble in this section.

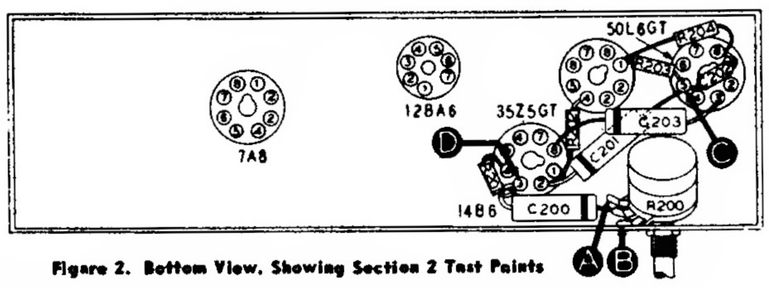

Figure 2. Bottom View, Showing Section 2 Test Points

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Loud, clear speaker output with weak signal input.	Trouble in this section. Isolate by the following tests.
2	C	Clear output with moderate signal input.	Defective: 50L6GT, LS200. Open: R204, T200. Shorted: C202, C203.
3	D	Same as step 1.	Defective: 14B6 (triode section). Open: C201, R202, R203. Shorted: C201.
4	A	Same as step 1.	Open: R200 (rotate through range), C200, R201. Shorted: C301D*.

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

Section 3—I-F, Detector, and A-V-C Circuits

TROUBLE SHOOTING

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

Set the volume control to maximum, and turn 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.

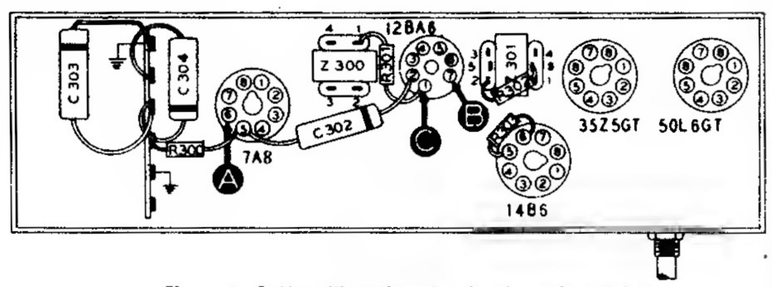

Figure 3. Bottom View, Showing Section 3 Test Points

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 "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	C	Loud, clear output with moderate input.	Defective: 12BA6, 14B6, (diode section). Misaligned: Z301. Open: R300, C301A, C301B, L301A, L301B, R302, R303. Shorted: C302, C300B, C301A, C301B, C301C.
3	A	Same as step 1.	Defective: 7A8*. Misaligned: Z300. Open: L300A, L300B, R301, C300A, C300B. Shorted: C300A, C400, C400A.

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

Section 4—R-F and Converter Circuits

TROUBLE SHOOTING

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

Set the volume control to maximum. 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.

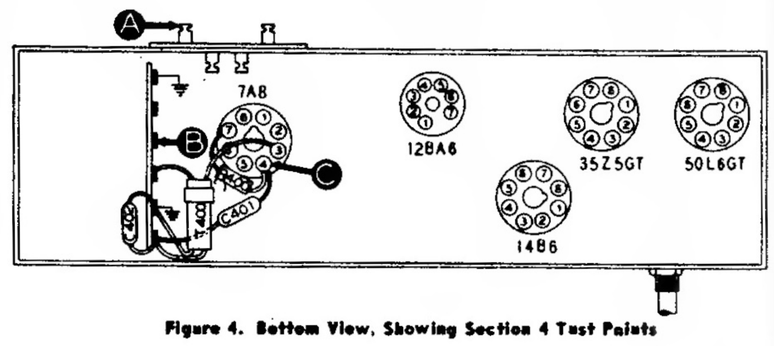

Figure 4. Bottom View, Showing Section 4 Test Points

STEP	TEST POINT	SIG. GEN. FREQ.	RADIO TUNING	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	1000 kc.	1000 kc.	Loud, clear speaker output with weak signal input.	Trouble in this section. Isolate by the following tests.
2	C Osc. test; see note below.		Tune through range.	Negative 4.5 to 7.5 volts.	Defective: 7A8. Open: C401, T400, R400. Shorted: T400, C401, C400, C400B, C402.
3	A	1000 kc.	1000 kc.	Same as step 1.	Defective: 7A8. Open: LA400. Shorted: C400, C400A, LA400.

OSCILLATOR TEST: Connect the positive lead of a high-resistance voltmeter to 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 D. 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.

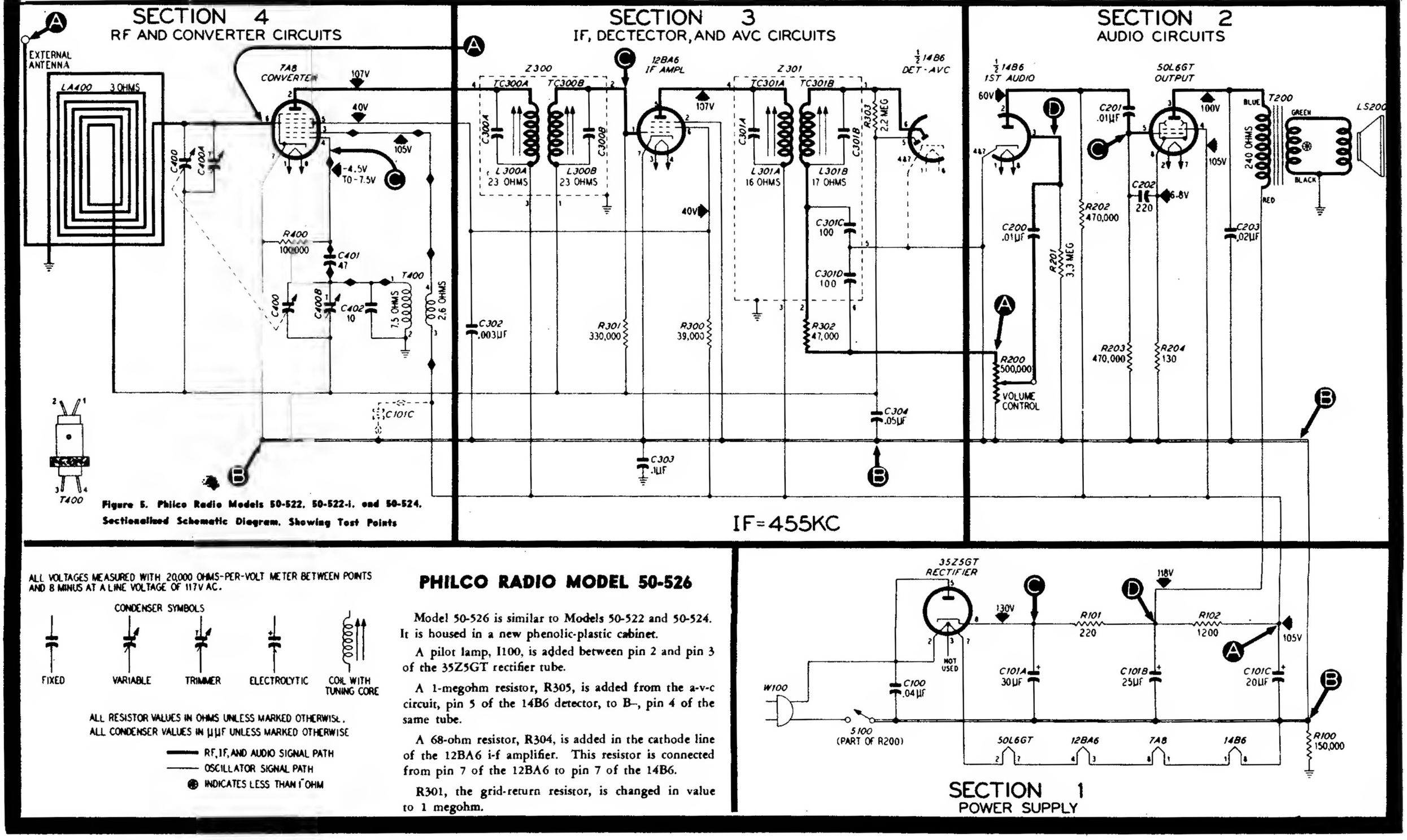

Figure 5. Philco Radio Models 50-522, 50-522-I, and 50-524, Sectionalized Schematic Diagram, Showing Test Points

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

CONDENSER SYMBOLS

ALL RESISTOR VALUES IN OHMS UNLESS MARKED OTHERWISE.
ALL CONDENSER VALUES IN µµF UNLESS MARKED OTHERWISE

RF, IF, AND AUDIO SIGNAL PATH
OSCILLATOR SIGNAL PATH
INDICATES LESS THAN 1 OHM

PHILCO RADIO MODEL 50-526

Model 50-526 is similar to Models 50-522 and 50-524. It is housed in a new phenolic-plastic cabinet.

A pilot lamp, I100, is added between pin 2 and pin 3 of the 35Z5GT rectifier tube.

A 1-megohm resistor, R305, is added from the a-v-c circuit, pin 5 of the 14B6 detector, to B–, pin 4 of the same tube.

A 68-ohm resistor, R304, is added in the cathode line of the 12BA6 i-f amplifier. This resistor is connected from pin 7 of the 12BA6 to pin 7 of the 14B6.

R301, the grid-return resistor, is changed in value to 1 megohm.