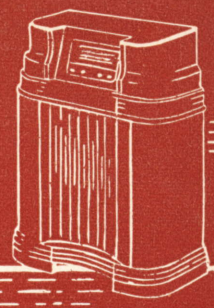
PHILCO SERVICE



PHILCO RADIO MODELS 48-141 AND 48-145

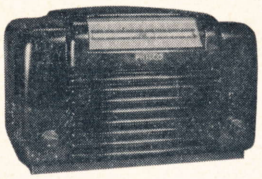
Circuit Description

Philco Models 48-141 and 48-145 are four-tube, battery-operated superheterodynes, providing reception on the standard broadcast band, 540–1720 kc. Manual tuning is employed. Both models are identical except for the cabinets, knobs, and dial scales, as indicated in the parts list. A 100-foot (over-all), outdoor aerial, such as Philco Part No. 45-1469, is recommended.

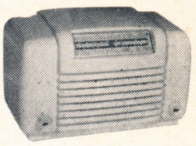
The converter stage employs a type 1LA6 pentagrid converter tube; in this tube, the oscillator signal is fed to the mixer section through the electron stream within the tube.

A type 1LN5 pentode tube is used in the i-f amplifier stage. The diode section of the 1LH4 tube provides detection and a-v-c voltage, and the triode section functions as the first audio amplifier.

The first audio stage is resistance-coupled to the type 3LF4 output tube, which drives the permanent-magnet dynamic loud-speaker.



MODEL 48-141



MODEL 48-145

SPECIFICATIONS

CABINET	
Model 48-141	Plastic, walnut finish
Model 48-145	Plastic, ivory finish
CIRCUIT	Four-tube superheterodyne
FREQUENCY RANGE	540–1720 kc.
AUDIO OUTPUT	220 mw.
POWER SUPPLY	Battery pack, Philco P-60B-6L
PLATE VOLTAGE AND CURRENT	90 volts, 10 ma.
FILAMENT VOLTAGE AND CURRENT,	1.5 volts, .25 amp.
POWER CONSUMPTION (total, plate and filament)	1 watt
AERIAL	External, Philco Part No. 45-1469
INTERMEDIATE FREQUENCY	455 kc.
PHILCO TUBES (4)	1LA6, 1LN5, 1LH4, 3LF4

TP-3125 & TP-933

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 "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

The following preliminary checks should be made before turning on the radio:

1. Carefully inspect 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 sources of trouble.

2. Disconnect the battery, and measure the resistance between B+ (red lead of battery plug) and chassis, with the ohmmeter polarity such that the highest resistance reading is obtained. If this reading is lower than 10,000 ohms, check condensers C100, C203, and C404 for leakage or shorts.

TROUBLE SHOOTING

Section 1

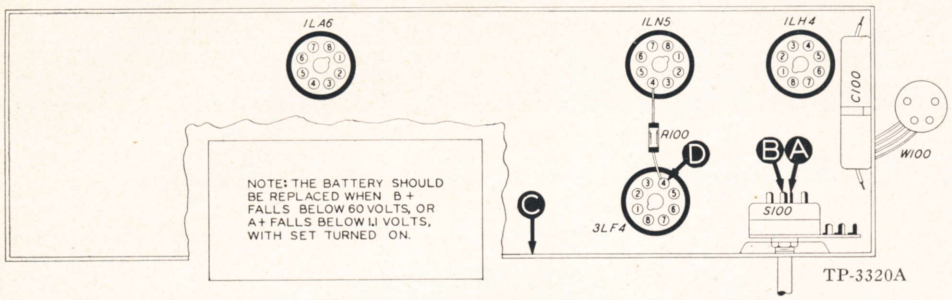


Figure 1. Bottom View, Showing Section 1 Test Points

For the tests in this section, use a d-c voltmeter, connecting the leads between the chassis, test point C, and the test points indicated in the chart. The voltages indicated were obtained from a fresh battery pack, and were measured with a 20,000-ohms-per-volt meter, with the radio turned on.

If the "NORMAL INDICATION" is obtained in the first step, proceed with the tests for Section 2; if not, isolate and correct the trouble in this section.

STEP	TEST POINT	NORMAL INDICATION	ABNORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A B D	85 volts 1.5 volts Negative 5 volts		Trouble within this section. Isolate by the following tests.
2	A	85 volts	No voltage Low voltage	Open battery cable. Defective S100. Open R100. Shorted C100. Weak battery. Change in value of R100. Leaky C100. Excessive current drain in Sections 2, 3, or 4.
3	B	1.5 volts	No voltage Low voltage	Open battery cable. Defective S100. Weak battery.
4	D	Negative 5 volts		Change in value of R100. Open R100. Excessive current drain in Sections 2, 3, or 4.

TROUBLE SHOOTING

Section 2

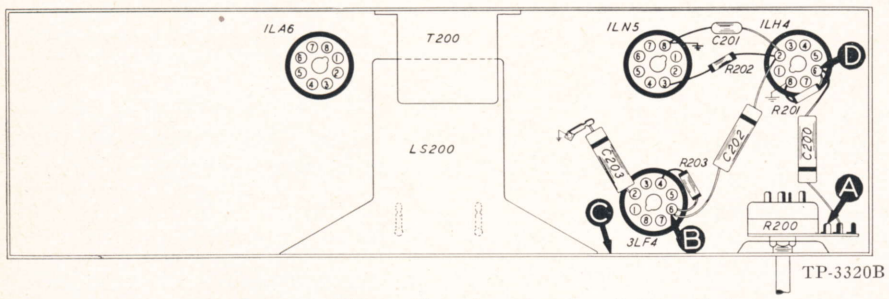


Figure 2. Bottom View, Showing Section 2 Test Points

For the tests in this section, use an audio signal. Connect the signal-generator ground lead to the radio chassis, test point C; connect the output lead through a .1-mf. condenser to the test points indicated in the chart. Set the radio volume control to maximum.

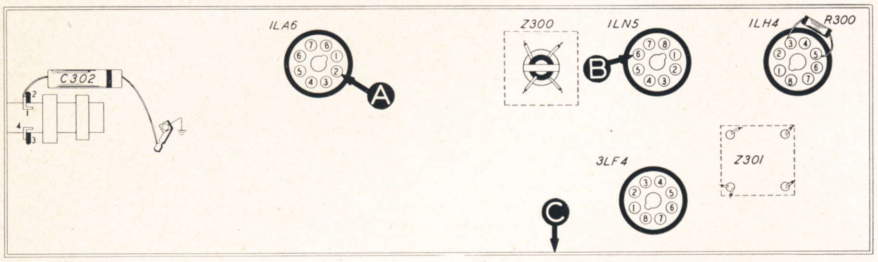
If the "NORMAL INDICATION" is obtained in the first step, proceed with the tests for Section 3; if not, isolate and correct the trouble in this section.

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Loud, clear signal with moderate signal input.	Trouble within this section. Isolate by the following tests.
2	B	Normal, clear signal with strong signal input.	Defective 3LF4 tube, T200, or LS200. Shorted or leaky C203 or C201.
3	D	Loud, clear signal with moderate signal input.	Defective 1LH4 tube. Open R202 or C202.
4	A	Loud, clear signal with moderate signal input.	Defective R200. Shorted C301D. Open C200.

Listening Test: Distortion may be caused by leaky C201, C202, C203, or C200, or by open R203 or R201.

TROUBLE SHOOTING

Section 3



TP-3320C

Figure 3. Bottom View, Showing Section 3 Test Points

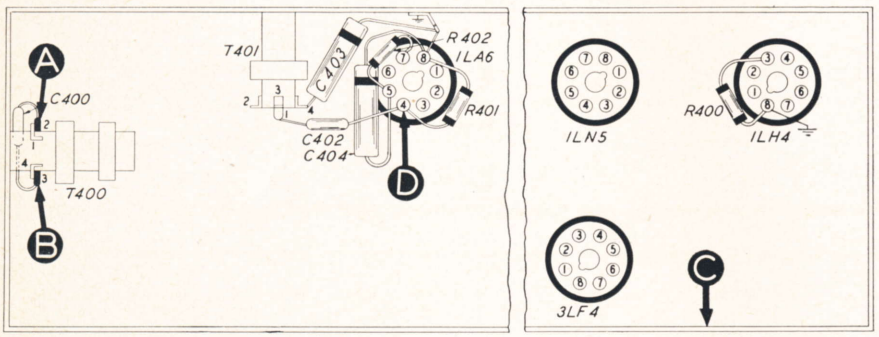
For the tests in this section, use an r-f signal generator with frequency set at 455 kc. (modulated output). Connect the generator ground lead to the chassis, test point C; connect the output lead through a .1-mf. condenser to the test points indicated in the chart. Set the radio volume control to maximum.

If the "NORMAL INDICATION" is obtained in the first step, proceed with the tests for Section 4; if not, isolate and correct the trouble in this section.

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Loud, clear signal with moderate signal input.	Trouble within this section. Isolate by the following tests.
2	B	Loud, clear signal with moderate signal input.	Defective 1LN5 or 1LH4 (diode section) tube. Defective or misaligned Z301. Open C302.
3	A	Loud, clear signal with moderate signal input.	Defective or misaligned Z300.

TROUBLE SHOOTING

Section 4



TP-3320D

Figure 4. Bottom View, Showing Section 4 Test Points

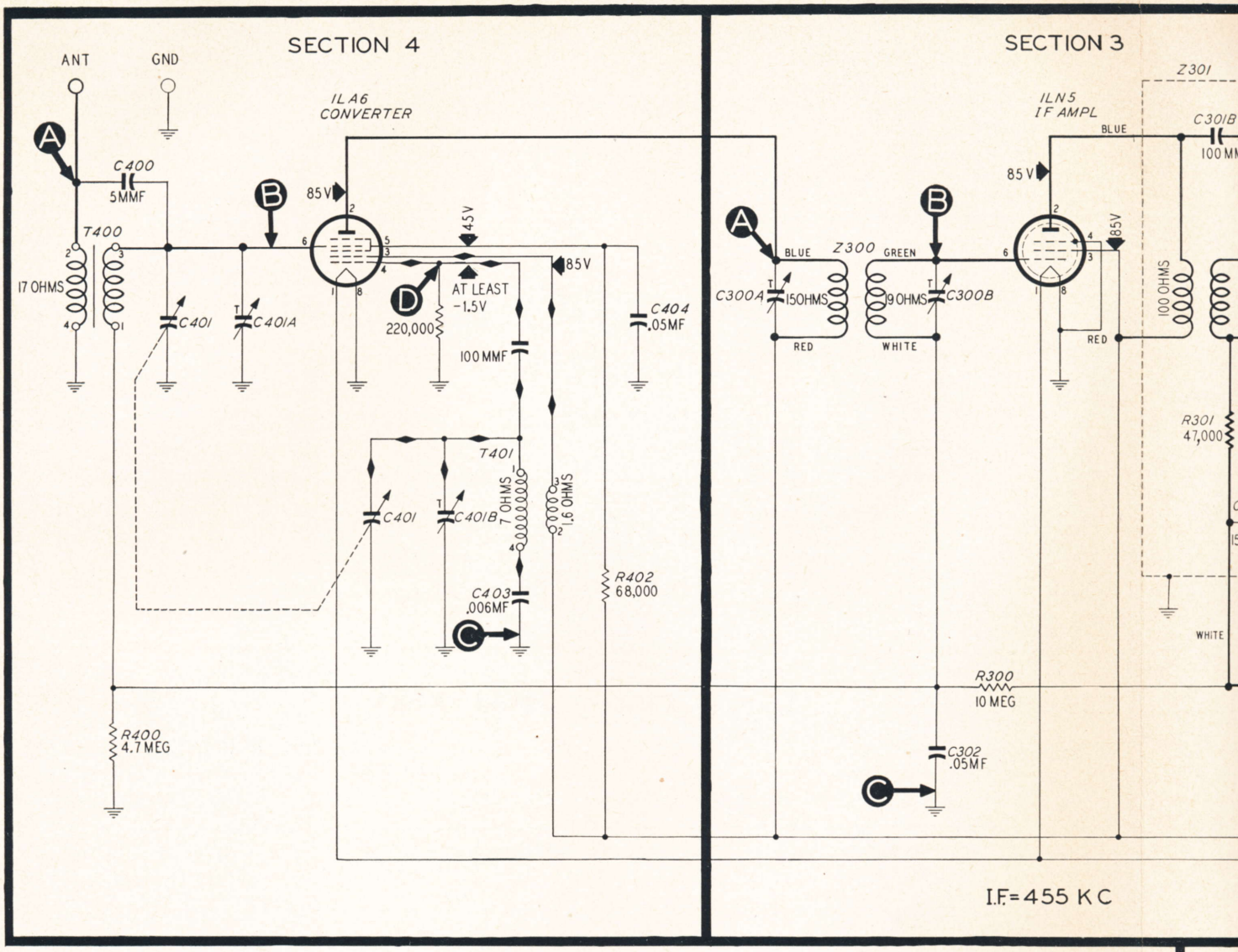
For the tests in this section, use an r-f signal generator with modulated output. Connect the generator ground lead to the chassis, test point C; connect the output lead through a .1-mf. condenser to the test points indicated in the chart. Set the generator and radio dials as noted in the chart.

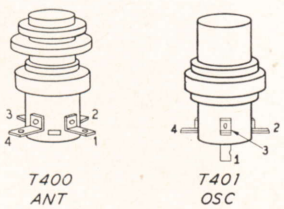
Inspect the tuning condensers for bent plates, dirt, or poor wiper contacts; any of these conditions will cause noise.

If the "NORMAL INDICATION" is not obtained in the first step, isolate the trouble by following the remaining steps.

STEP	TEST POINT	DIAL SETTINGS		NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
		SIG. GEN.	RADIO		
1	A	540 kc.	540 kc.	Loud, clear signal with low signal input.	Trouble within this section. Isolate by the following tests.
2	B	540 kc.	540 kc.	Loud, clear signal with moderate signal input.	Defective 1LA6 tube, C401, C401A, or oscillator circuit. Shorted C404. Misaligned Z300.
3	D Osc. test (See Note below.)		540 to 1720 kc.	Negative voltage (at least 1.5 volts) over complete range.	Defective 1LA6 tube, T401, C401, or C401B. Open R401, R402, C402, or C403. Shorted or leaky C402 or C403.
4	A	540 kc.	540 kc.	Loud, clear signal with low signal input.	Defective T400 or C401.

NOTE: Connect positive lead of 20,000-ohms-per-volt meter to the chassis, test point C; connect prod end of negative lead through 100,000-ohm isolating resistor to test point D (oscillator grid, pin 4 of 1LA6 tube).





NOTE: THE VOLTAGES INDICATED ON THE SCHEMATIC DIAGRAM ARE AVERAGE VALUES. THE VOLTAGES WERE MEASURED BETWEEN THE POINTS INDICATED AND THE CHASSIS, USING A 20,000-OHMS PER-VOLT METER, WITH A FRESH BATTERY.

OSCILLATOR GRID VOLTAGE WAS MEASURED BETWEEN THE CHASSIS AND OSC. GRID (PIN 4) OF THE 1LA6 TUBE, USING A 100,000-OHM ISOLATING RESISTOR IN SERIES WITH THE PROD END OF THE NEGATIVE VOLTMETER LEAD.

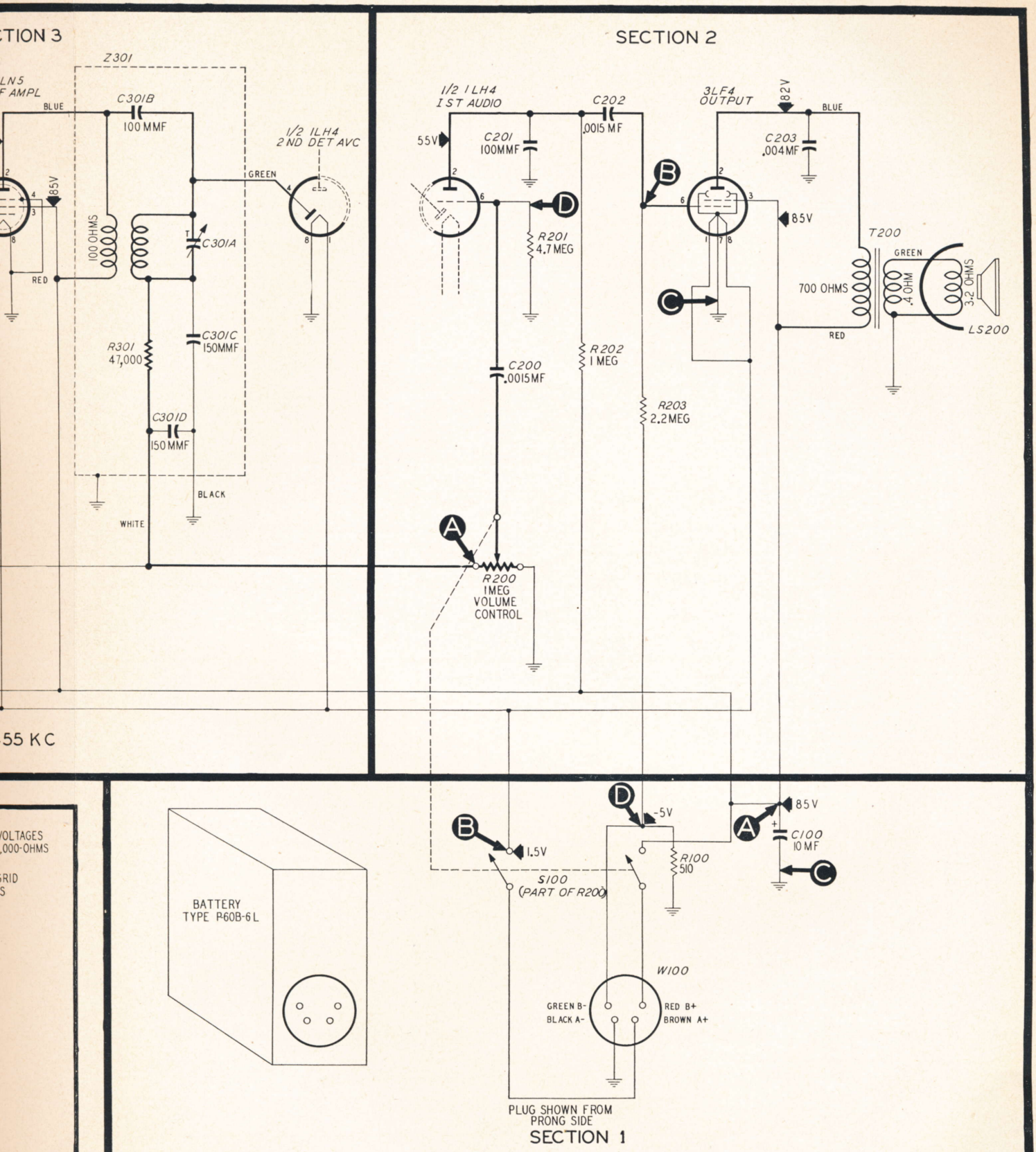
— R-F, I-F, AND AUDIO SIGNAL PATH

— OSC. SIGNAL PATH

ALL RESISTOR VALUES IN OHMS UNLESS MARKED OTHERWISE

CONDENSER SYMBOLS

FIGURE 5. PHILCO RADIO MODELS 48-141 AND 48-145, COMPLETE SEC



TP-3320

-145, COMPLETE SECTIONALIZED SCHEMATIC, SHOWING ALL TEST POINTS

ALIGNMENT PRO

TURN ON RADIO POWER, AND SET VOLUME

DIAL—Alignment points should be marked on the dial backplate. Measurements for these points are shown in the composite dial-and-backplate photo, figure 8. With tuning condensers fully meshed, set dial pointer to index mark.

OUTPUT METER—Connect across speaker voice coil.

SIGNAL G
sis; conne

STEP	SIGNAL GENERATOR		RADIO		ADJUST
	CONNECTIONS TO RADIO	DIAL SETTING	DIAL SETTING	SPECIAL INSTRUCTIONS	
1	Through .1-mf. condenser to stator of aerial tuning condenser.	455 kc.	Tuning condenser fully meshed.	Adjust trimmers, in order given, for maximum output.	C301A C300A C300B
2	Through 200-mmf. condenser to external aerial connector.	1700 kc.	1700 kc.	Adjust for maximum output.	C401B
3	Same as Step 2.	1500 kc.	1500 kc. (approx.)	Tune radio to generator signal, and adjust trimmer for maximum output.	C401A

SYMBOLIZATION AND TERMINOLOGY

All components in the radio circuit are symbolized and located as follows:

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

100-series components are in Section 1—the power supply.

200-series components are in Section 2—the audio amplifier.

300-series components are in Section 3—the i-f amplifier, detector, and a-v-c circuits.

400-series components are in Section 4—the aerial and oscillator circuits.

PROCEDURE

T VOLUME CONTROL TO MAXIMUM

SIGNAL GENERATOR—Connect ground lead to chassis; connect output lead as indicated in chart.

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

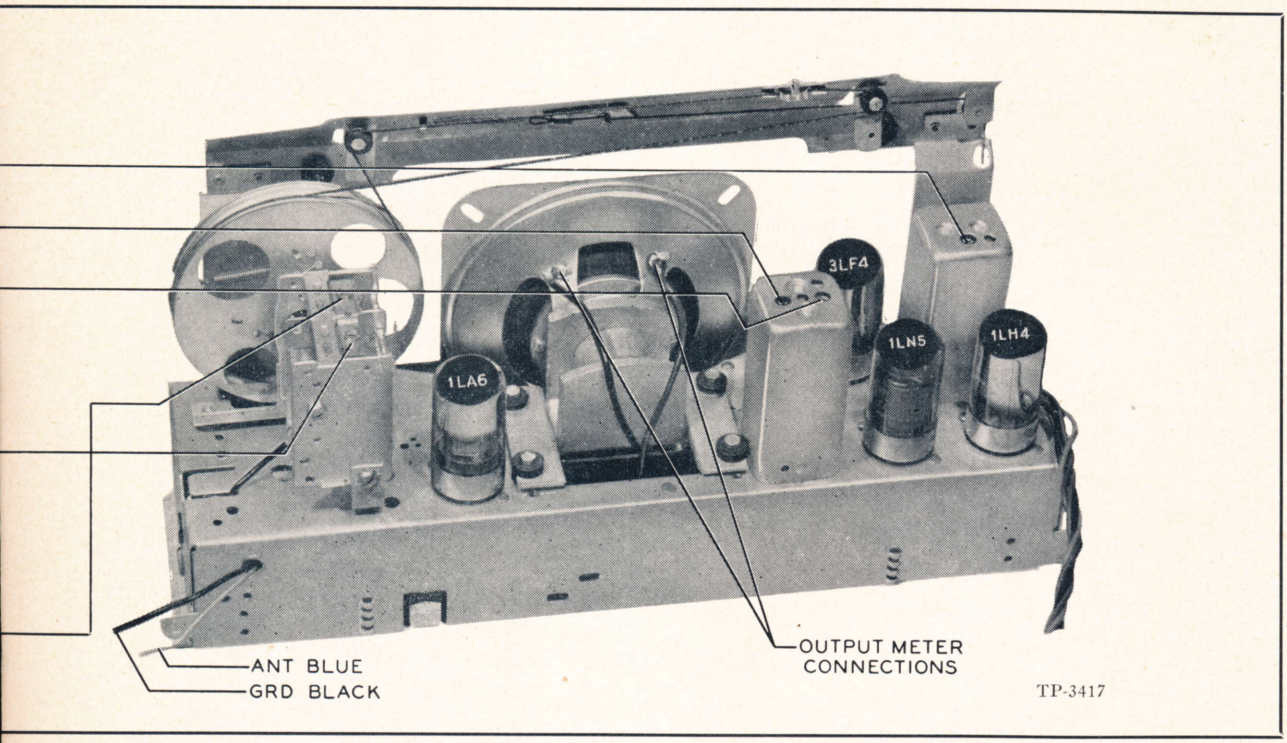


Figure 6. Top View, Showing Trimmer Locations

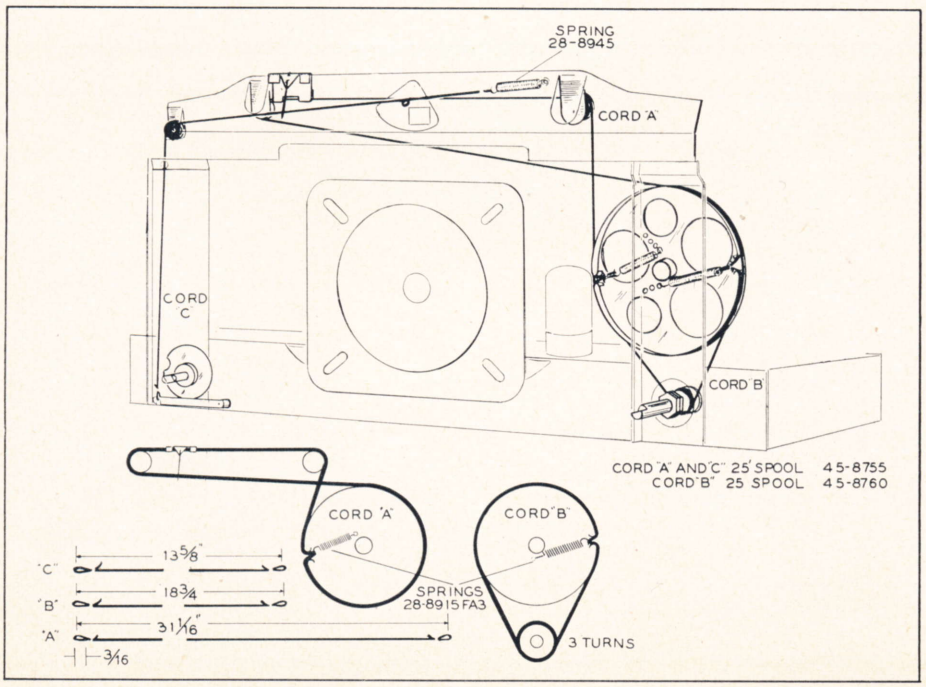
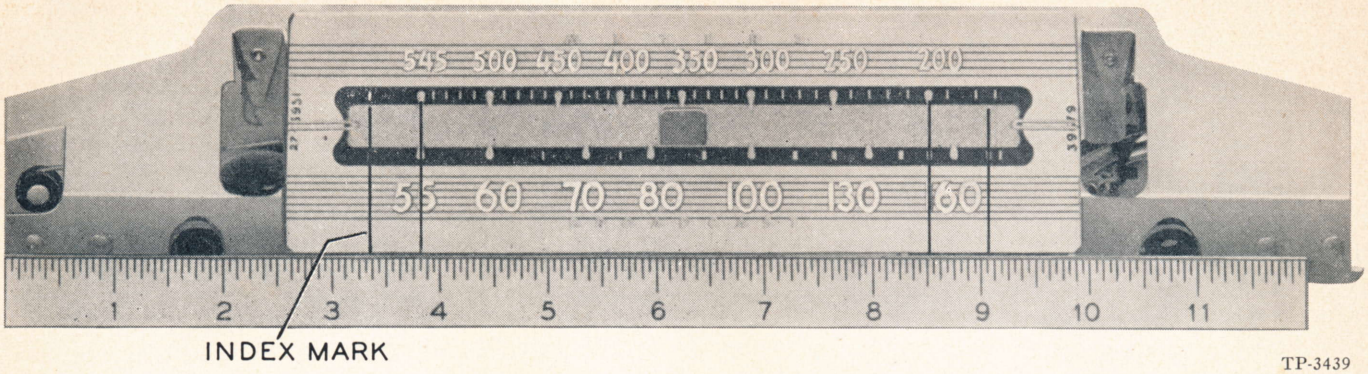


Figure 7. Drive-Cord Installation Details

TP-3320E



TP-3439

Figure 8. Composite Dial and Backplate, Calibration Details

REPLACEMENT PARTS LIST

NOTE: Part numbers marked with an asterisk (*) in the following parts list 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

Reference Symbol	Description	Service Part No.
BA100	Battery pack	P-60B-6L
C100	Condenser, electrolytic, 10 mf., a-f and r-f by-pass	30-2540*
R100	Resistor, 510 ohms, bias	66-1513340*
S100	Switch, power	Part of R200
W100	Battery-cable assembly	41-3477-1

SECTION 2

C200	Condenser, .0015 mf., d-c blocking	45-3500-6*
C201	Condenser, 100 mmf., r-f by-pass	60-10105407*
C202	Condenser, .0015 mf., d-c blocking	45-3500-6*
C203	Condenser, .004 mf., tone compensation	61-0179*
LS200	Speaker	36-1507-3
R200	Volume control, 1 megohm	33-5554
R201	Resistor, 4.7 megohms, d-c grid return	66-5473340*
R202	Resistor, 1 megohm, plate load	66-5103340*
R203	Resistor, 2.2 megohms, d-c grid return	66-5223340*
T200	Output transformer	32-8323

SECTION 3

C300A	Condenser, trimmer	Part of Z300
C300B	Condenser, trimmer	Part of Z300
C301A	Condenser, trimmer	Part of Z301
C301B	Not used	
C301C	Condenser, 150 mmf., i-f filter	Part of Z301
C301D	Condenser, 150 mmf., i-f filter	Part of Z301
C302	Condenser, .05 mf., a-v-c filter	61-0122*
C303	Condenser, 100 mmf., coupling, part of Z301	60-10105407*
R300	Resistor, 10 megohms, a-v-c filter	66-6103340*
R301	Resistor, 47,000 ohms, i-f filter, part of Z301	66-3473340*
Z300	Transformer, 1st i-f, includes C300A and C300B	32-3949-1
Z301	Transformer, 2nd i-f, includes C301A, C301C, C301D, C303, and R301	32-3897

SECTION 4

C400	Condenser, 5 mmf., coupling	30-1221-5
C401	Condenser, main tuning	31-2721
C401A	Condenser, trimmer, aerial coil	Part of C401
C401B	Condenser, trimmer, osc. coil	Part of C401
C402	Condenser, 100 mmf., osc. grid	60-10105407*

SECTION 4 (Continued)

C403	Condenser, .006 mf., osc. tracking	45-3500-7*
C404	Condenser, .05 mf., r-f by-pass	61-0122*
R400	Resistor, 4.7 megohms, a-v-c voltage divider	66-5473340*
R401	Resistor, 220,000 ohms, osc. grid leak	66-4223340*
R402	Resistor, 68,000 ohms, screen dropping	66-3683340*
T400	Transformer, aerial	32-3919-2
T401	Transformer, oscillator	32-3385-2

MISCELLANEOUS

Description	Service Part No.
Cabinet, Less Dial Scale	
Model 48-141	10618A
Model 48-145	10618D
Cabinet Hardware	
Baffle and cloth assembly	40-6910
Dial Scale	
Model 48-141	27-5951
Model 48-145	27-5951-1
Dial-Scale Hardware	
Band, rubber, dial scale	54-4025
Screw, strap mtg.	1W23129FA3
Strap, scale mtg., r.h.	56-2672FA3
Strap, scale mtg., l.h.	56-2671FA3
Knob	
Model 48-141	54-4323
Model 48-145	54-4375
Stud, baffle mtg.	W2235-2FA9
Scale Plate, Flag and Upright Assembly	76-3131
Cord, drive (25-ft. spool), for flag	45-8755
Cord, drive (25-ft. spool), for pointer	45-8755
Pointer	56-2896
Spring, flag drive	28-9011FA3
Spring, cam plate, flag drive	57-0701FA1
Spring, retaining	57-1468FA1
Transfer-lever assembly	76-1655-1
Socket, Loktal	27-6138
Tuning-Condenser Hardware	
Cord, drive (25-ft. spool), for tuning condenser	45-8760
Drum, drive assembly	76-2485
Mounts, rubber, tuning condenser	27-4596
Spring, tuning-condenser drive	28-8913FA3
Tuning-shaft assembly	31-2640