

# PHILCO



# SERVICE

## HOME RADIO

### PHILCO RADIO-PHONOGRAPH, MODEL 46-1209

#### CIRCUIT DESCRIPTION

The Philco Model 46-1209 is a radio-phonograph combination incorporating an eight-tube superheterodyne radio receiver and a Philco Model D-10A Automatic Record Changer.

The radio receiver is designed with two tuning ranges, covering the standard broadcast and short-wave bands by manual tuning. Six push buttons are used, one for phono-radio switching, and five for automatic instant-tuning of stations in the broadcast band.

The band switch selects manual-tuning operation, broadcast or short wave, or push-button tuning. The on-off power switch is combined with the tone control.

A rotatable low-impedance loop aerial built into the cabinet provides adequate pickup of r-f signal energy for either band.

A high-frequency dual-triode tube, type 7F8, is employed as a converter. High conversion efficiency is obtained in a circuit having high signal-to-noise ratio. One triode section of this tube operates as a mixer, and the other as a local oscillator. Oscillator-signal voltage is applied to the mixer section of the tube by capacity coupling between the cathodes of the two sections. On the short-wave band, interlocking between antenna-circuit and oscillator circuit adjustments (the cause of oscillator frequency shift) is greatly minimized by a reverse-feedback circuit which neutralizes any oscillator-signal voltage, appearing at the grid of the mixer. This feedback is taken from a tap on the oscillator coil and injected into the mixer grid circuit through a 10 mmf. condenser (C405).

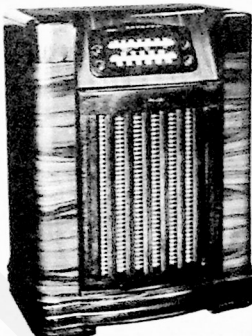
The intermediate-frequency signal is amplified by two transformer-coupled i-f stages, using type 7H7 high-transconductance pentode tubes.

The amplified i-f signal is applied to the diode section of a type 7X7 tube, the output of which develops the audio signal and the a-v-c voltage.

When the phono-radio push button is in radio position, the triode section of the 7X7 tube functions as the first audio amplifier. The output of this stage is applied to one triode section of the 7AF7 tube, which operates as a phase inverter to drive the two 6V6GT/G push-pull output tubes.

In the phono position, the phono-radio switch cuts off the output circuit of the second detector, opens the cathode circuit of the 2nd i-f amplifier, and, at the same time, connects the other section (phono pre-amplifier) of the 7AF7 tube to the volume-control circuit, where its output drives the amplifier section of the 7X7 tube.

**MODEL**  
**46-1209**



**SPECIFICATIONS**

<b>CABINET</b> .....	Wood, walnut finish
<b>CIRCUIT</b> .....	Eight-tube superheterodyne
<b>FREQUENCY RANGE</b> .....	Broadcast, 540 to 1720 kc. Short wave, 9.3 to 15.5 mc. Push buttons: Six; 1 for Phono-Radio, 5 for broadcast stations.
<b>INTERMEDIATE FREQUENCY:</b>	455 kc.
<b>AUDIO OUTPUT</b> .....	10 watts
<b>OPERATING VOLTAGE</b> .....	115 volts, 60 cycles, a.c.
<b>POWER CONSUMPTION</b> .....	100 watts
<b>AERIAL</b> .....	Low-impedance loop.
<b>PHILCO TUBES</b> .....	7F8, 7H7(2), 7X7, 7AF7, 6V6GT/G(2), 5Y3GT/G
<b>SPEAKER</b> .....	12-inch electrodynamic
<b>RECORD CHANGER</b> .....	Philco Model D-10A, automatic, 10- or 12-inch records, light-weight dynamic pickup.

#### PHILCO TROUBLE-SHOOTING PROCEDURE

In this manual, the circuit is divided into four sections which are shown both in schematic and chassis-base layouts, with test points for each section. A simplified trouble-shooting procedure is given in a chart for each section. The first step in each chart (with the exception of Section 4) makes it possible to determine whether trouble exists in that section without going through the entire test procedure. Wherever trouble is indicated, by failure to get the "NORMAL INDICATION" in a given test, it should be located by voltage, resistance, or capacity checks of the parts associated with the point under test, and remedied before testing further.

All components in the receiver circuits are symbolized; the significance of the symbol in identifying the type and circuit locations of parts may be understood by referring to the front page of the service manual for PHILCO RADIO, MODEL 46-350.

## AUTOMATIC RECORD CHANGER MODEL D-10A SERVICE INFORMATION

Service data on the Model D-10A Automatic Record Changer is not included in this manual. Complete service information on the record changer will be found in the service manual for Philco Automatic Record Changer Models D-10 and D-10A.

### PRELIMINARY CHECKS

Before starting the trouble-shooting procedure, the following steps are recommended:

1. Before connecting the receiver to a source of power, inspect both sides of the chassis. Make sure that all tubes are secure in their proper sockets, and look for any broken or shorted connections, burned resistors, or other obvious sources of trouble.
2. Measure the resistance between B+ (filament, terminal 8, of 5Y3GT/G rectifier tube) and the receiver chassis. When the ohmmeter test leads are connected in proper polarity, the highest resistance reading will be obtained. If this reading is lower than 50,000 ohms, check condensers C101, C102A, C102B, C303, C307, C308, C311, C312 for leakage or shorts.

### PUSH-BUTTON ALIGNMENT

1. Connect the output meter between terminal No. 3 on aerial terminal panel and receiver chassis.
2. Turn the receiver volume control to maximum position, and the tone control to its counterclockwise position.
3. Turn the receiver band switch to push-button position, and set the radio-phono push button in the radio position.

4. Couple the signal generator loosely through a coil of wire to the receiver loop aerial as described in the "SIGNAL GENERATOR" paragraph, page 188.
5. Turn on the power, and allow the receiver to warm up for 15 minutes before starting the adjustments.
6. Starting with the lowest frequency desired, push the button, and adjust the associated oscillator tuning core and aerial trimmer condenser (see figure 11) for maximum indication on output meter. Reset the signal-generator frequency, and repeat the procedure for each remaining push button.

The frequency ranges of the buttons and associated tuning cores and trimmer condensers are as follows:

7. Turn off the signal generator and make a final adjustment of all tuning cores and trimmer condensers while listening to the stations for which the adjustments are being made.

PUSH BUTTON (Left to Right from Front)	FREQUENCY RANGE	OSCILLATOR TUNING CORE	AERIAL TRIMMER
PB400F	(Phono-Radio)		
PB400A	540 to 1000 kc.	TC400A	C400A
PB400B	600 to 1200 kc.	TC400B	C400B
PB400C	650 to 1300 kc.	TC400C	C400C
PB400D	850 to 1500 kc.	TC400D	C400D
PB400E	900 to 1600 kc.	TC400E	C400E

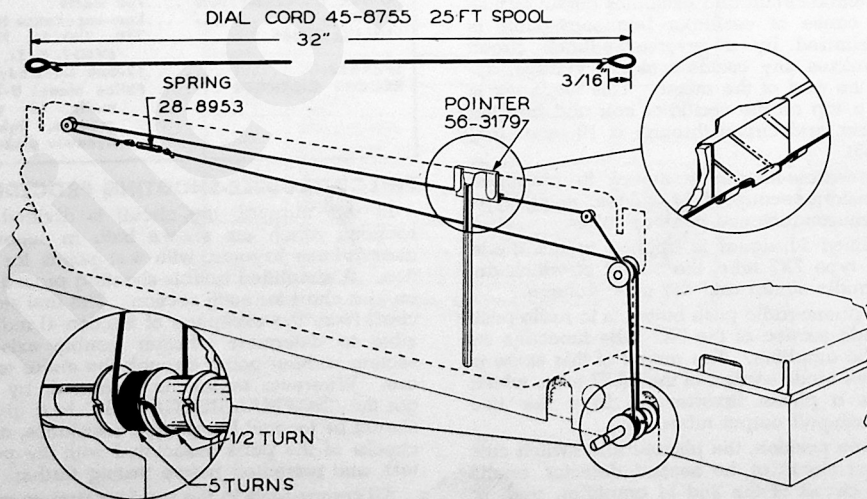


Figure 1. Drive-cord installation details.

TP-1380K

## TESTS TO ISOLATE TROUBLE WITHIN SECTION 1

Make all tests for this section with a volt-ohmmeter, using the applicable d-c ranges. Voltages were taken with a 20,000-ohms-per-volt meter at a line voltage of 117 volts, a.c. The volume control was set at minimum, tone control maximum counterclockwise, radio-phonograph switch in radio position; the band switch was

set in push-button position, and push button PB400E was depressed. See figures 2 and 3 for location of test points. Follow steps in proper sequence; if "NORMAL INDICATION" is obtained in step 1, proceed to Section 2.

STEP	TEST POINTS	NORMAL INDICATION	ABNORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	D to C E to C	205 volts 255 volts		Trouble in this section. Isolate by the following tests.
2	A to C	324 volts	No voltage Low voltage High voltage	Defective 5Y3GT/G, T100, S100, or power cord. Shorted C100A, C100B, or C101. Open R100. Defective 5Y3GT/G, C101, C303, C308, or C312. Shorted or leaky C102A or C102B. Open L100, R101, or T200.
3	B to C	Negative 16 volts	No voltage	Defective R100.
4	D to C	205 volts	No voltage Low voltage High voltage	Shorted C102B. Open R101. Leaky C102B, C307, or C311. Shorted L100. Open R406, R307, or R303.
5	E to C	255 volts	No voltage Low voltage High voltage	Shorted C102A. Open L100. Defective C209 or C211. Shorted C100. Leaky C102A. Grounded T200. Shorted L100.
Listening Test			Abnormal hum may be caused by open C101 or C102A.	

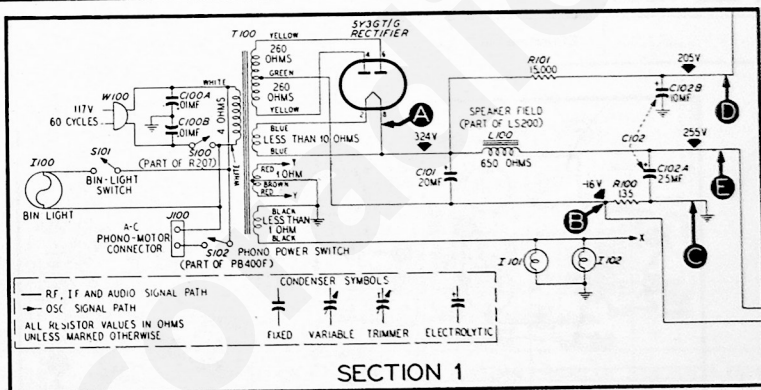


Figure 2. Section 1, power supply, schematic.

TP-453A

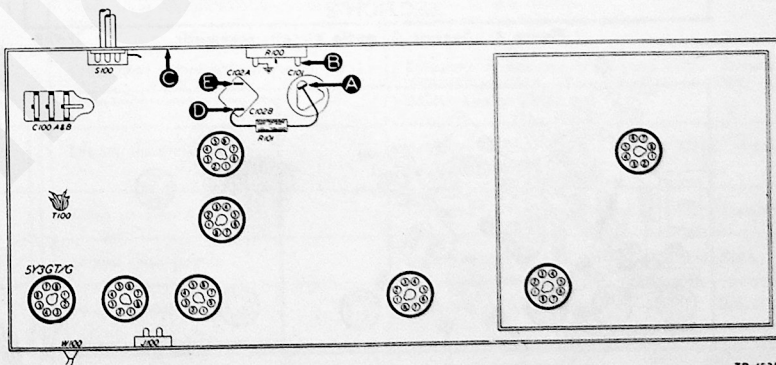


Figure 3. Bottom view, showing Section 1 test points.

TP-453E

## TESTS TO ISOLATE TROUBLE WITHIN SECTION 2

For all tests in this section, use an audio signal. Connect the signal-generator ground lead to the receiver chassis, test point "C"; connect the output lead through a .1- $\mu$ f condenser to the

points indicated in chart and figures 4 and 5. Set the receiver volume control at maximum. If "NORMAL INDICATION" is obtained in step 1, proceed to Section 3.

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A S200 in "Phono" position. G S200 in "Radio" position.	Loud, clear signal with low generator input. Somewhat weaker than above.	Trouble in this section. Isolate by the following tests.
2	B	Normal clear signal with moderate input.	Defective 6V6GT/G, T200, LS200, or R220. Shorted C213. Shorted or leaky C209.
3	D (7AF7 tube removed)	Normal, clear signal with moderate input.	Defective 6V6GT/G, T200, LS200, or R221. Shorted or leaky C211.
4	E (7AF7 tube replaced)	Much louder than step 3.	Defective 7AF7. Open R211, R212, R213, R219, C209, or C211. Shorted C205.
5	F	Much louder than step 4.	Defective R200, C201, or 7X7. Shorted C202 or C203. Open C205, R208, or R203.
6	A S200 (PB400F) in "Phono" position.	Much louder than step 5.	Defective 7AF7, S200 (PB400F), C208, R217, R218, R210, or R214. Shorted C206 or C210. Open R216.
7	G S200 in "Radio" Position.	Same as step 5.	Defective S200 (PB400F). Open C200. Shorted C309.
Listening Test.		Distortion may be caused by leaky C205, C209, or C211.	

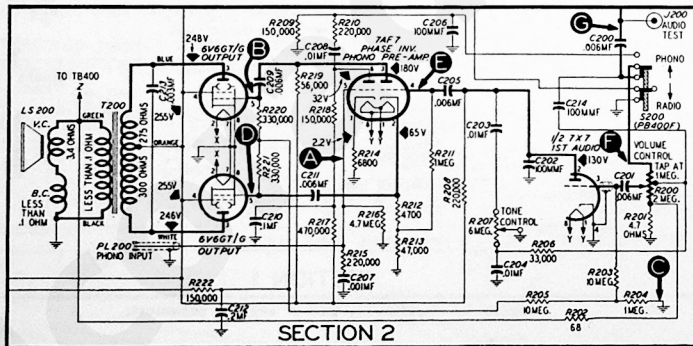


Figure 4. Section 2, audio circuit, schematic. TP-453B

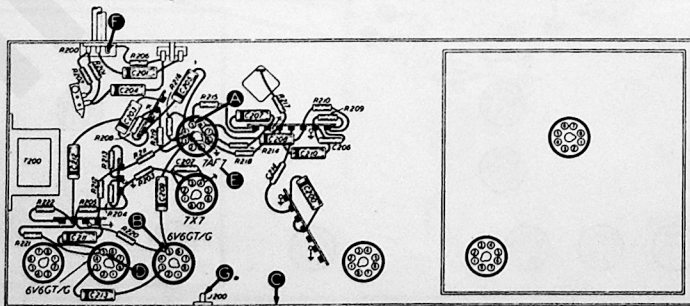


Figure 5. Bottom view, showing Section 2 test points. TP-453F

## TESTS TO ISOLATE TROUBLE WITHIN SECTION 3

For all tests in this section, use an r-f signal generator with modulated output; set the generator frequency to 455 kc. Connect the generator ground lead to the receiver chassis, test point "C"; connect the output lead through a .1-mf condenser to the test points indicated in chart and figures 6 and 7. Set the receiver volume control at maximum, and the Radio-Phono push-button S200 (PB400F) in "Radio" position. If "NORMAL INDICATION" is obtained in step 1, proceed to Section 4.

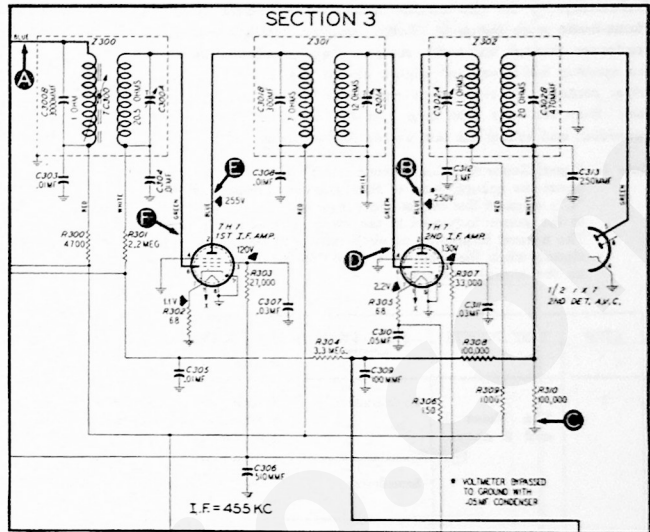


Figure 6. Section 3, i-f circuit, schematic.

TP-453C

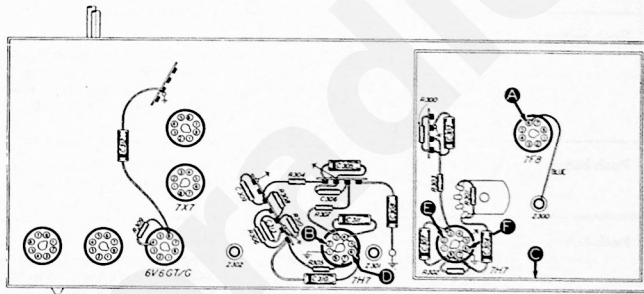


Figure 7. Bottom view, showing Section 3 test points.

TP-453G

STEP	TEST POINT	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A	Loud, clear signal with low generator input.	Trouble in this section. Isolate by the following tests.
2	B	Loud, clear signal with moderate input.	Defective or improperly aligned Z302. Defective 7X7, S200, (PB400F) or C312. Shorted C313 or C309. Open R308 or R310. Leaky C200.
3	D	Louder than step 2.	Defective 7H7 or C310. Shorted C311. Open R305, R306, R307 or R309.
4	E	Same as step 3.	Defective or improperly aligned Z301. Defective C308.
5	F	Louder than step 4.	Defective 7H7 or C307. Open R302 or R303.
6	A	Same as step 5.	Defective or improperly aligned Z300. Defective C303, C304, or R301.
Listening Test.		Motor-boating may be caused by open C307 or C311.	

## TESTS TO ISOLATE TROUBLE WITHIN SECTION 4

**Preliminary.** — Set the volume control at maximum, and the Phono-Radio push button in "Radio" position. Rotate the tuning condenser through its entire range. Any scraping noise from the speaker indicates bent plates, or dirt between plates or on wiper contacts. Remedy such conditions before proceeding further. Start the tests with step 1 of the chart, using the signal generator, and follow the test procedure indicated.

**Note 1** Signal-Generator Connections. — Connect the r-f signal generator ground lead to the receiver chassis, test point "C"; connect the output lead through a .1-mf condenser to the points indicated in the chart and figures 8 and 9. The normal indication in each case will be a loud, clear signal, when the receiver is tuned to the same frequency as the signal generator.

**Note 2** Push-Button Tests. — When testing push-button circuits, the signal generator should be tuned to the frequency of the push-button circuit being tested. The frequency coverage of each push-button circuit is listed on page 182.

**Note 3** Oscillator Tests. — Attach the positive lead of a 20,000-ohms-per-volt meter to test point "B", and the prod end of the negative lead through a 100,000-ohm resistor to test point "D". Set the meter on a 10-volt or similar range. Absence of voltage indicates that the oscillator is not functioning. When testing push-button oscillator circuits (test points "B" to "D"), rotate the tuning-core adjusting screw of each coil over its frequency range and note that oscillator still functions. When testing broadcast and short-wave oscillator circuits, rotate tuning condenser through its range and note that oscillator still functions.

STEP	TEST POINTS	BAND-SWITCH POSITION	NORMAL INDICATION	POSSIBLE CAUSE OF ABNORMAL INDICATION
1	A (See Notes 1 and 2 above)	Push-button	Loud, clear signal from speaker when each push button is depressed.	Trouble in push-button operation. Proceed with steps 2, 3 and 4.
		Broadcast	Loud, clear signal from speaker.	Trouble in broadcast manual operation. Proceed with steps 5 and 6.
		Short Wave	Loud, clear signal from speaker.	Trouble in short-wave operation. Proceed with steps 7 and 8.
2	B to D Osc. Test. (See Note 3 above).	Push-button	Approx. -2.5 to -4 volts with each push button depressed.	No voltage with a certain push button depressed indicates defective coil L400A to L400E or its push-button switch PB400A to PB400E. No voltage with any push button depressed indicates defective 7F8, S400C, R403, R405, R406, C407, C408, C409, C411 or C412.
3	E (See Note 2 above).	Push-button	Loud, clear signal from speaker when each push button is depressed.	No signal with any push button depressed indicates defective 7F8; open R401; R402 or C407.
4	A (See Note 2 above).	Push-button	Loud, clear signal from speaker when each push button is depressed.	No signal with a certain push button depressed indicates defective L401, C402A, C406, S400A (F), S400B, PB400A to PB400E, or C400A to C400E associated with the push button.
<b>BROADCAST MANUAL CHECKS</b>				
5	B to D Osc. Test. (See Note 3).	Broadcast	Approx. -4.5 to -6.5 volts.	Defective L403, C403A, C403B, C401, or S400C.
6	A (See Note 1).	Broadcast (Tune sig. gen. and receiver to 1000 kc.)	Loud, clear signal from speaker.	Defective L401, C401, C402A, C406, S400A, S400B, or R401.
<b>SHORT-WAVE CHECKS</b>				
7	B to D Osc. Test. (See Note 3):	Short Wave	Approx. -1.5 to -2 volts.	Defective L404, C403C, C405, C410 or S400C.
8	A (See Note 1).	Short Wave (Tune sig. gen. and receiver to 12 mc.)	Loud, clear signal from speaker.	Defective L402, C402B, C404, C405, R400, S400A or S400B.

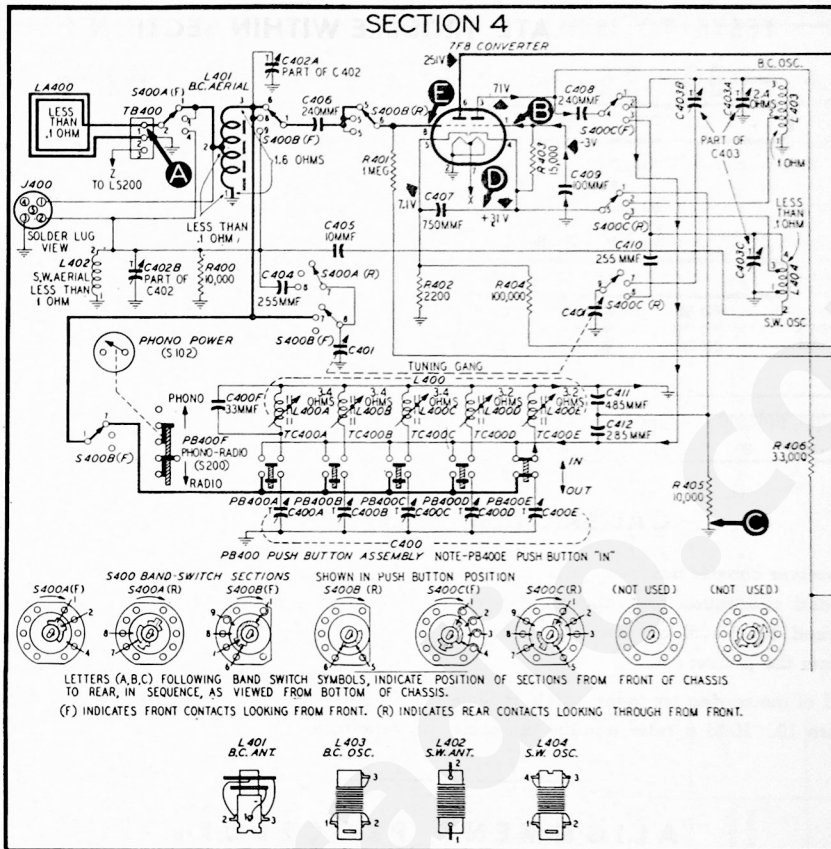


Figure 8. Section 4, r-f circuit, schematic.

TP-453D

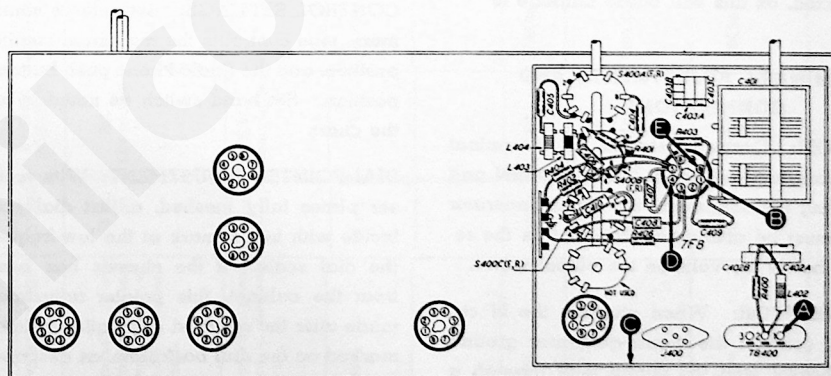


Figure 9. Bottom view, showing Section 4 test points.

TP-453H

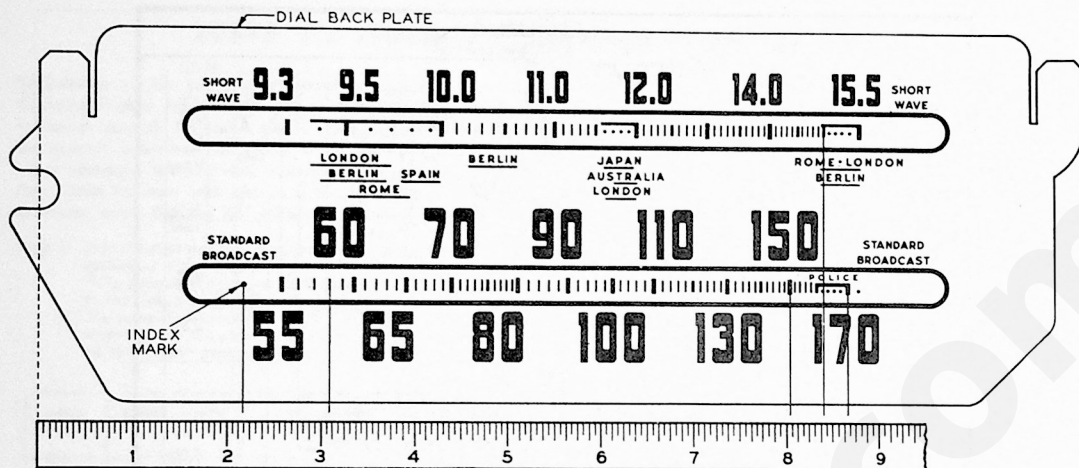


Figure 10. Dial Backplate.

TP-1084

## CALIBRATING DIAL BACKPLATE

After the receiver chassis has been removed from the cabinet, dial calibration and alignment points may be marked by pencil on the dial-backplate assembly below the pointer.

The method of measuring for these points is illustrated in Figure 10. Hold a ruler against the scale

backplate, with the start of the ruler scale at the reference line shown.

Make dots with pencil, on the dial backplate, at the proper points for the desired frequency settings. For example: The index point is  $2\frac{1}{10}$ " from the dotted reference line.

## ALIGNMENT PROCEDURE

### CAUTION

Do not turn on receiver power with speaker disconnected, as this will cause damage to the set.

### PRELIMINARY ADJUSTMENTS AND CONNECTIONS

**OUTPUT METER:** Connect between No. 3 terminal (voice-coil connection) on aerial terminal panel and chassis. During the alignment, the signal-generator input signal must be attenuated to maintain the receiver output below 1.5 volts on the output meter.

**SIGNAL GENERATOR:** When aligning the i-f circuits (step 1), connect the signal-generator ground lead to the chassis, and the output lead through a .1-mf condenser, as indicated in the alignment chart. When aligning r-f circuits, connect the signal generator to a coil of insulated wire (6 to 8 turns,

about 6 inches in diameter). Suspend coil near the receiver loop.

**CONTROL SETTINGS:** Set volume control to maximum, tone control to the maximum counterclockwise position, and the Radio-Phono push button in "Radio" position. Set band switch as noted in each step of the chart.

**DIAL-POINTER ADJUSTMENT:** With tuning condenser plates fully meshed, adjust dial pointer to coincide with index mark at the low-frequency end of the dial scale. If the chassis has been removed from the cabinet, this pointer adjustment may be made after the required calibration points have been marked on the dial backplate, as described in "CALIBRATING DIAL BACKPLATE" above.

**LOOP AERIAL:** Connect to terminals 1 and 2 of aerial terminal panel TB400.



# ALIGNMENT CHART

SIGNAL GENERATOR		RECEIVER				
STEP	CONNECTIONS TO RECEIVER	DIAL SETTING	BAND SWITCH POSITION	DIAL SETTING	SPECIAL INSTRUCTIONS	ADJUST TRIMMERS
1	Through .1. mf condenser to terminal No. 1 of aerial terminal panel.	455 kc.	BC. (Broadcast)	1700 kc.	Align once only for maximum in order given.	C302A C301A C300A TC300
2	Loop loosely coupled to receiver loop.	15 mc.	S.W. (Short wave)	15 mc.	Maximum on first peak from loose position. Image should be heard at 14.1 mc.	C403C
3	Same	15 mc.	S.W.	15 mc.	Maximum, while rocking tuning control.	C402B
4					Pre-set C403B. (lighten, then back off 1/4 turn).	C403B
5	Same	1700 kc.	BC.	1700 kc.	Maximum.	C403A
6	Same	1500 kc.	BC.	1500 kc.	Maximum.	C402A
7	Same	580 kc.	BC.	580 kc.	Maximum, while rocking tuning control.	C403B
8	Repeat steps 5, 6, 7, 5, 6, in order until no further increase is noted.					

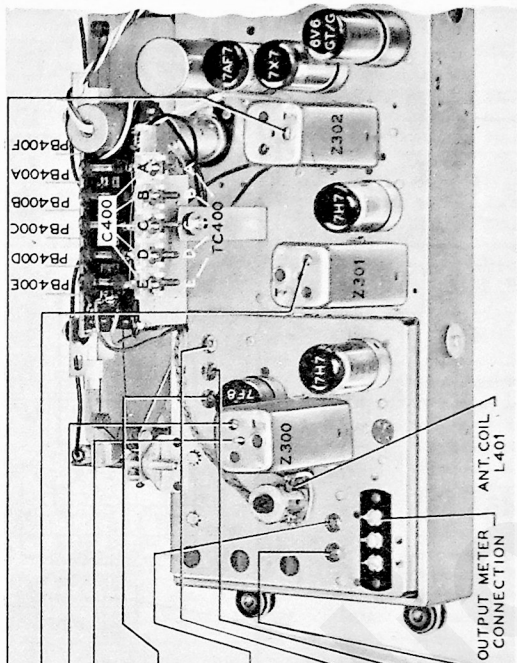
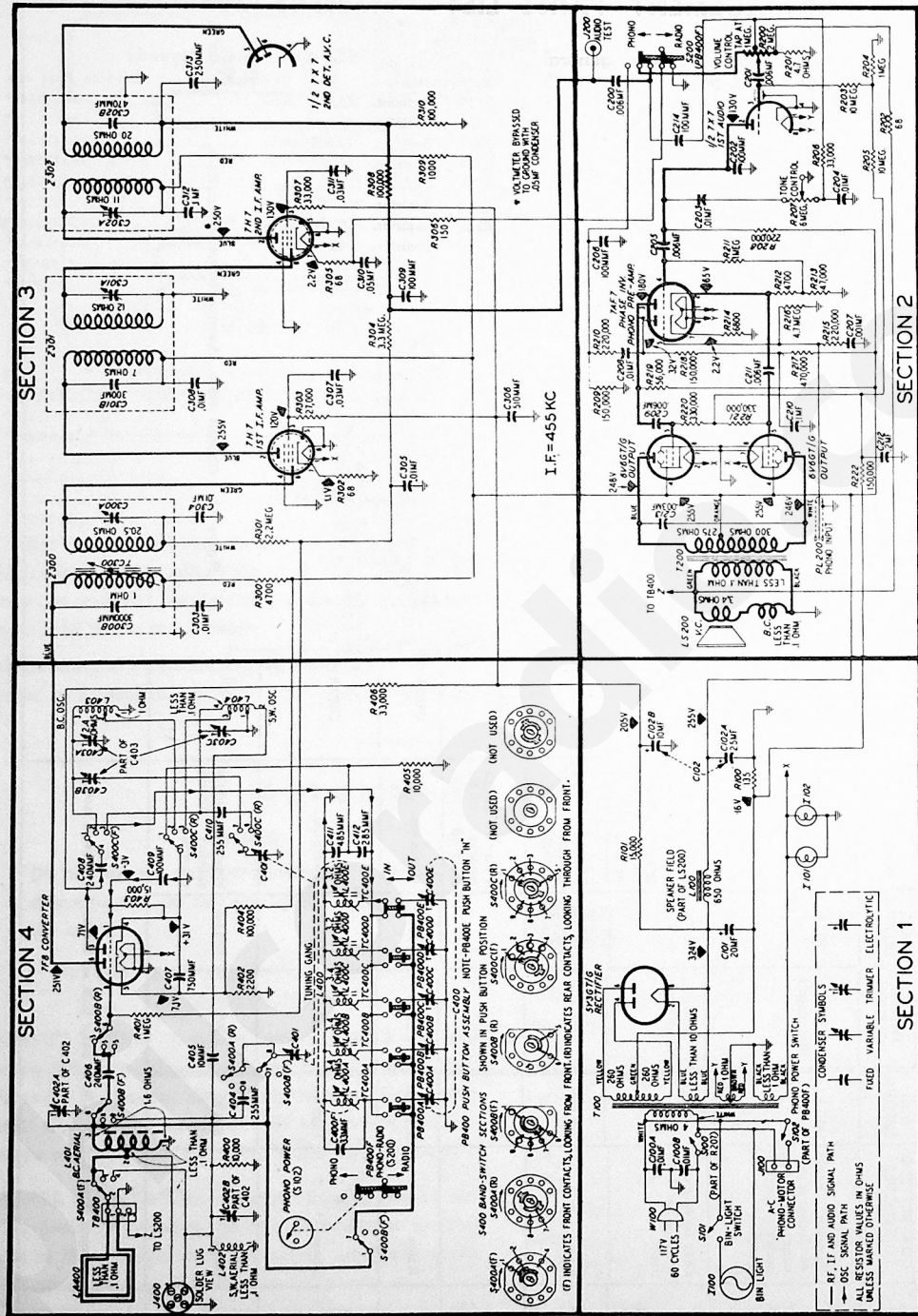


Figure 11. Chassis view, showing trimmer locations.

TP-4571A



TP-1848

Figure 12. Model 46-1209, complete schematic.

All voltage, capacity, and resistance values shown are average. The voltages shown were measured with a 20,000-ohms-per-volt meter, between the points indicated and the receiver chassis, with a line voltage of 117 volts A.C. The volume control was set at minimum, band switch at push-button position, and push button PB400E depressed. Oscillator grid voltage is read between grid and cathode with a 100,000-ohm resistor in series with a voltmeter on 10-volt range.

Letters (A, B, C) following band switch symbol, indicates position of section from front of chassis to rear, in sequence, as viewed from bottom of chassis.

# REPLACEMENT PARTS LIST — Model 46-1209

**NOTE:** Parts marked with an asterisk (\*) are general replacement items, and part numbers may not be identical with those used on factory assemblies. Use the "Service Part No." shown in the parts list when ordering replacements.

## SECTION 1

Reference No.	Description	Service Part No.
C100	Condenser, line filter	3903-ODG
	C100A: condenser, .01 mf.	(Part of C100)
	C100B: condenser, .01 mf.	(Part of C100)
C101	Condenser, electrolytic, 20 mf.	30-2555*
C102	Condenser, electrolytic	30-2556*
	C102A: condenser, 25 mf.	(Part of C102)
	C102B: condenser, 10 mf.	(Part of C102)
I100	Lamp, bin	34-2484*
I101	Lamp, pilot	34-2040*
I102	Lamp, pilot	34-2040*
J100	Socket, a-c, phono motor	27-6200*
L100	Field, speaker	(Part of LS200)
R100	Resistor, 135 ohms	33-3435-2*
R101	Resistor, 15,000 ohms	66-3155340*
S100	Switch, power on-off	(Part of R207)
S101	Switch, bin-light	42-1702*
S102	Switch, phono a-c power	(Part of PB400)
T100	Transformer, power	32-8248*
W100	Cord, line	L3351

## SECTION 2

C200	Condenser, .006 mf.	45-3500-7*
C201	Condenser, .006 mf.	45-3500-7*
C202	Condenser, 100 mmf.	60-10105407*
C203	Condenser, .01 mf.	61-0120*
C204	Condenser, .01 mf.	61-0120*
C205	Condenser, .006 mf.	45-3500-7*
C206	Condenser, 100 mmf.	60-10105407*
C207	Condenser, .001 mf.	45-3500-5*
C208	Condenser, .01 mf.	61-0120*
C209	Condenser, .006 mf.	45-3500-7*
C210	Condenser, .1 mf.	61-0113*
C211	Condenser, .006 mf.	45-3500-7*
C212	Condenser, .2 mf.	45-3500-3*
C213	Condenser, .003 mf., 1000v	61-0117*
C214	Condenser, 100 mmf.	60-10105407*
J200	Socket, audio-test	27-6180*
LS200	Speaker	36-1595*
PL200	Cable and plug assembly, phono input	41-3735-2
R200	Control, volume, 2-meg., tap at 1 meg.	33-5535-1*
R201	Resistor, 4.7 ohms	66-9473340*
R202	Resistor, 68 ohms	66-0683340*
R203	Resistor, 10 meg.	66-6103340*
R204	Resistor, 1 meg.	66-5103340*
R205	Resistor, 10 meg.	66-6103340*
R206	Resistor, 33,000 ohms	66-3333340*
R207	Control, tone, 6 meg., and a-c power switch	33-5538-1*
R208	Resistor, 220,000 ohms	66-4223340*
R209	Resistor, 150,000 ohms	66-4153340*
R210	Resistor, 220,000 ohms	66-4223340*
R211	Resistor, 1 meg.	66-5103340*
R212	Resistor, 4700 ohms	66-2473340*
R213	Resistor, 47,000 ohms	66-3473340*
R214	Resistor, 6800 ohms	66-2683340*

## SECTION 2 (Continued)

Reference No.	Description	Service Part No.
R215	Resistor, 220,000 ohms	66-4223340*
R216	Resistor, 4.7 meg.	66-5473340*
R217	Resistor, 470,000 ohms	66-4473340*
R218	Resistor, 150,000 ohms	66-4153340*
R219	Resistor, 56,000 ohms	66-3563340*
R220	Resistor, 330,000 ohms	66-4333340*
R221	Resistor, 330,000 ohms	66-4333340*
R222	Resistor, 150,000 ohms	66-4153340*
S200	Switch, phono-radio	(Part of PB400F)
T200	Transformer, output	32-8274*

## SECTION 3

C303	Condenser, .01 mf.	61-0120*
C304	Condenser, .01 mf.	61-0120*
C305	Condenser, .01 mf.	61-0120*
C306	Condenser, 510 mmf.	60-10515307*
C307	Condenser, .03 mf.	45-3500-1*
C308	Condenser, .01 mf.	61-0120*
C309	Condenser, 100 mmf.	60-10105407*
C310	Condenser, .05 mf.	61-0122*
C311	Condenser, .03 mf.	45-3500-1*
C312	Condenser, .1 mf.	61-0113*
C313	Condenser, 250 mmf.	60-10245307*
†R300	Resistor, 4700 ohms	66-2473340*
R301	Resistor, 2.2 meg.	66-5223340*
R302	Resistor, 68 ohms	66-0683340*
R303	Resistor, 27,000 ohms	66-3273540*
R304	Resistor, 3.3 meg.	66-5333340*
R305	Resistor, 68 ohms	66-0683340*
R306	Resistor, 150 ohms	66-1153340*
R307	Resistor, 33,000 ohms	66-3333340*
R308	Resistor, 100,000 ohms	66-4103340*
R309	Resistor, 1000 ohms	66-2103340*
R310	Resistor, 100,000 ohms	66-4103340*
Z300	Transformer, 1st I-F	32-4106*
	C300A: condenser, trimmer	(Part of Z300)
	C300B: condenser, 3000 mmf.	(Part of Z300)
	TC300: tuning core	(Part of Z300)
Z301	Transformer, 2nd I-F	32-4107*
	C301A: condenser, trimmer	(Part of Z301)
	C301B: condenser, 300 mmf.	(Part of Z301)
Z302	Transformer, 3rd I-F	32-4108*
	C302A: condenser, trimmer	(Part of Z302)
	C302B: condenser, 470 mmf.	(Part of Z302)

## SECTION 4

C401	Condenser, gang tuning	31-2719
C402	Padder strip, 2 section	31-6476
	C402A: condenser, BC aerial trimmer	(Part of C402)
	C402B: condenser, S-W aerial trimmer	(Part of C402)
C403	Padder strip, 3 section	31-6464
	C403A: condenser, BC osc. shunt trimmer	(Part of C403)
	C403B: condenser, BC osc. series trimmer	(Part of C403)
	C403C: condenser, S-W osc. shunt trimmer	(Part of C403)
C404	Condenser, 255 mmf.	30-1220-24*
C405	Condenser, 10 mmf.	60-00105407*
C406	Condenser, 240 mmf.	60-10245307*
†C407	Condenser, 750 mmf.	60-10755301*
C408	Condenser, 240 mmf.	60-10245307*
C409	Condenser, 100 mmf.	30-1225-2*
C410	Condenser, 255 mmf.	30-1220-24*

†Refer to GENERAL INFORMATION and PRODUCTION CHANGES.

**REPLACEMENT PARTS LIST (continued from page 191)**

**SECTION 4 (Continued)**

Reference No.	Description	Service Part No.
†C411	Condenser, 485 mmf. ....	30-1224-15
†C412	Condenser, 285 mmf. ....	30-1224-14
J400	Socket, 5-prong external aerial .....	27-6214*
L401	Coil, BC, aerial .....	32-4033-1
L402	Coil, S-W aerial .....	32-4050-4
L403	Coil, BC, oscillator .....	32-4019-2
L404	Coil, S-W oscillator .....	32-3996-1
LA400	Loop assembly, broadcast .....	76-1989
PB400	Push-button switch and Phono a-c switch assembly .....	42-1756*
C400:	Push-button padder-strip assembly .....	31-6479-1
C400A:	condenser, trimmer, (540 to 1000 KC.) .....	(Part of PB400)
C400B:	condenser, trimmer, (600 to 1200 KC.) .....	(Part of PB400)
C400C:	condenser, trimmer, (650 to 1300 KC.) .....	(Part of PB400)
C400D:	condenser, trimmer, (850 to 1500 KC.) .....	(Part of PB400)
C400E:	condenser, trimmer, (900 to 1600 KC.) .....	(Part of PB400)
†C400F:	condenser, 33 mmf. ....	(Part of PB400)
L400:	Push-button coils	
L400A:	coil, push button- (Part of PB400) (540 to 1000 KC.) .....	32-4059-2
L400B:	coil, push button- (Part of PB400) (600 to 1200 KC.) .....	32-4059-2
L400C:	coil, push button- (Part of PB400) (650 to 1300 KC.) .....	32-4059-2
L400D:	coil, push button- (Part of PB400) (850 to 1500 KC.) .....	32-3779
L400E:	coil, push button- (Part of PB400) (900 to 1600 KC.) .....	32-3779
TC400A:	tuning core, (540 to 1000 kc.) .....	56-6100
TC400B:	tuning core, (600 to 1200 kc.) .....	56-6100
TC400C:	tuning core, (650 to 1300 kc.) .....	56-6100
TC400D:	tuning core, (850 to 1500 kc.) .....	56-6100
TC400E:	tuning core, (900 to 1600 kc.) .....	56-6100
†R400	Resistor, 10,000 ohms .....	66-3103340*
R401	Resistor, 1 meg. ....	66-5103340*
R402	Resistor, 2200 ohms .....	66-2223340*
†R403	Resistor, 15,000 ohms .....	66-3153340*
†R404	Resistor, 100,000 ohms .....	66-4103340*
R405	Resistor, 10,000 ohms .....	66-3103340
R406	Resistor, 33,000 ohms .....	66-3333340*
S400	Switch, band .....	42-1788*
TB400	Terminal panel, aerial .....	38-9942

**MISCELLANEOUS**

	Description	Service Part No.
<b>Band-Switch Hardware</b>		
	Link assembly for band switch .....	76-2186
	Shaft, link assembly .....	56-3271FA11
	Washer, "C" .....	1W42535FA3
<b>Bin-Light Parts</b>		
	Bin-light cable, socket, and switch assembly .....	76-2223-2
	Bracket, lamp .....	56-2332
	Cord, pull (25 ft. spool) .....	45-1A46*
	Cover, bin-light switch .....	56-2344
	Socket assembly, bin-light lamp .....	41-3742
	Spring, pull-cord .....	28-8991

**MISCELLANEOUS (Continued)**

	Description	Service Part No.
<b>Cabinet Hardware</b>		
	Back, cardboard .....	40-6825
	Stud, mounting .....	W2235FA9
	Cabinet complete .....	10645D
	Baffle, wood .....	219054
	Baffle and cloth assembly .....	40-6772
	Bezel, wood .....	16601
	Bin mechanism, left-hand .....	76-2176
	Bin mechanism, right-hand .....	7F-2174
	Dial scale and backplate assembly .....	76-2580
	Dome .....	45-6042
	Frame, mounting assembly .....	76-2199
	Front, tilt .....	45-6308
	Hinge .....	45-6200
	Grommet (2), superstructure mtg., scale-plate assy. ....	27-4596
	Clip, BC aerial coil .....	28-5002FA1
	Clip (2), BC or S-W oscillator coils .....	56-2927FA1
<b>Dial-Scale Hardware</b>		
	Cord, pointer-drive (25-foot spool) .....	45-1459*
	Pointer .....	56-3179
	Scale backplate and pulley assembly .....	76-2005
	Spacer (2), scale backplate .....	56-3279FA3
	Spring, pointer-drive-cord .....	28-8953
	Knob (4) .....	54-4105
<b>Loop Assembly, Mounting Hardware</b>		
	Spacers .....	1W29184FA3
	Spring washer .....	28-4186
<b>Push-Button Assembly Hardware</b>		
	Bracket and lug assembly, rear mounting .....	76-2214
	Cover, A.C. Switch (push-button switch assembly) .....	76-1343
	Grommet (3), push-button switch mounting .....	27-4596
	Knob, push-button .....	54-4217
	Screw (3) push-button switch mounting .....	1W19674FA3
	Spring strip, tuning-core stabilizer .....	56-2249
	Tab-kit assembly .....	40-6766
	Tab cover .....	27-5737
	Tab, phono on-off .....	54-4321
<b>R.F. Unit Hardware</b>		
	Grommet .....	54-4295
	Spacers .....	1W29158FA3
	Screws .....	1W19673FA3
	Washers .....	1W52224FA3
	Socket, 5-prong, external aerial .....	27-6214*
	Socket, audio test .....	27-6180*
	Socket (4), Loktal .....	27-6199*
	Socket, Loktal .....	27-6213*
	Socket (3), octal .....	27-6138*
	Socket, phono power .....	27-6200
	Socket assembly, pilot-lamp .....	76-1985*
<b>Speaker Hardware</b>		
	Bolt, mounting .....	W1587
	Cable and plug assembly .....	41-3701
	Nut (4), speaker-mounting .....	1W19988FA3
	Plug, speaker-cable .....	27-4419-2*
	Washers, speaker mounting .....	27-7467
	Transformer, phono-input .....	32-8256*
	Wafer, electrolytic-condenser mounting .....	45-6239*

The parts list and service procedure for adjusting the Model D-10A Automatic Record Changer in Model 46-1209 will be found in the service manual for Philco Automatic Record Changer Models D-10 and D-10A.

†Refer to GENERAL INFORMATION and PRODUCTION CHANGES.

## PRODUCTION CHANGES FOR MODEL 46-1209

### CODE 121

#### RUNS 2 and 3

The 33-mmf. condenser, C400F, Part No. 60-00305307\* (connected across L400A), was used in 5000 sets.  
RUN 4

Frequency drift in push-button operation may be reduced by changing condensers C411 and C412 as directed under GENERAL INFORMATION.

### CODE 122

#### RUN 1

All circuit details were as indicated in the accompanying schematic diagram. The following changes from Code 121 were made:

- a. Resistor R300 was changed to 10,000 ohms, Part No. 66-3103340.
- b. The oscillator-mixer coupling condenser, C407, was changed to .05 mf., Part No. 61-0122.
- c. Resistor R400 was removed.
- d. Resistor R403 was changed to 47,000 ohms, Part No. 66-3473340.

#### RUN 2

Condenser C407, .05 mf., was changed to .006 mf., Part No. 45-3500-7.

## GENERAL INFORMATION ON MODEL 46-1209

### REDUCING FREQUENCY DRIFT

Frequency drift may be reduced, and operation of the mixer improved, by making the following changes:

1. Remove the 100,000-ohm resistor, R404, connected between the mixer cathode (pin 5 of 7F8 tube) and the B+.
2. Change the mixer plate dropping resistor, R300, from 4700 ohms to 47,000 ohms, Part No. 66-3473340\*.

### REDUCING FREQUENCY DRIFT IN PUSH-BUTTON OPERATION

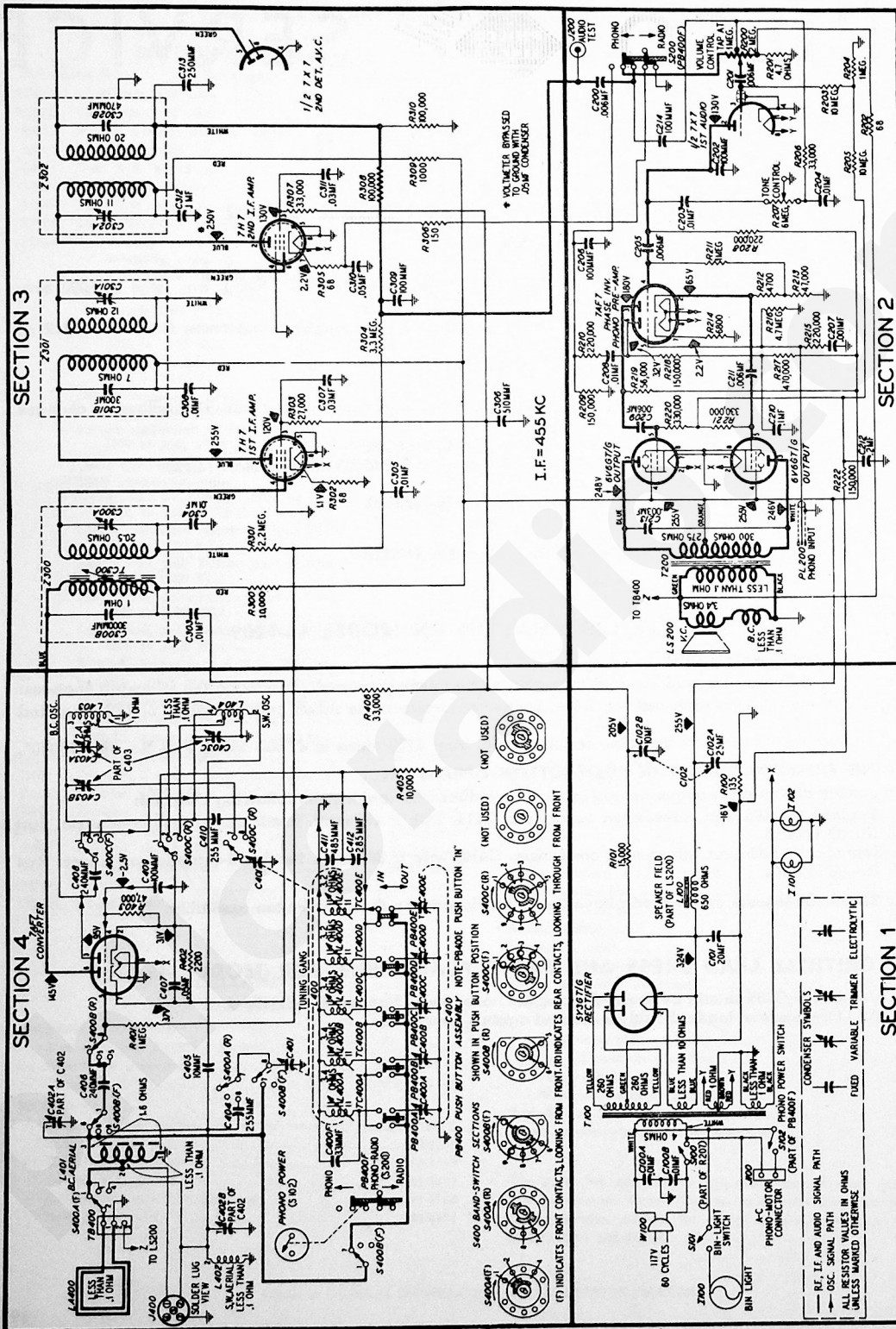
Frequency drift in push-button operation may be reduced by making the following changes:

1. Replace the 485-mmf. silver-mica condenser, C411, with a 485-mmf. insulated-ceramic condenser, Part No. 30-1224-15.
2. Replace the 285-mmf. silver-mica condenser, C412, with a 285-mmf. insulated-ceramic condenser, Part No. 30-1224-14.

NOTE: These condensers are located above the radio chassis, on the push-button assembly.

## CRITICAL LEAD DRESS AND PARTS PLACEMENT FOR MODEL 46-1209

1. Condenser C205 should be dressed along the base, away from resistor R217.
2. All i-f transformer leads should be dressed against the chassis.



Schematic Diagram for Code 122

SECTION 1

SECTION 2

SECTION 3

SECTION 4

I. F. = 455 KC

(F) INDICATES FRONT CONTACTS, LOOKING FROM FRONT; (R) INDICATES REAR CONTACTS, LOOKING THROUGH FROM FRONT

CONDENSER SYMBOLS  
 — BE I.E. AND AUDIO SIGNAL PATH  
 — DC SIGNAL PATH  
 ALL RESISTOR VALUES IN OHMS UNLESS MARKED OTHERWISE

PHONO POWER (S102)  
 PHONO MOTOR SWITCH (PART OF P800)  
 BIN LIGHT SWITCH (PART OF R200)  
 700V TELLER RECTIFIER  
 320V TELLER RECTIFIER  
 280 OHMS TELLER  
 280 OHMS TELLER  
 60 OHMS TELLER  
 117V TELLER  
 W100 TELLER  
 700V TELLER  
 320V TELLER  
 280 OHMS TELLER  
 280 OHMS TELLER  
 60 OHMS TELLER  
 117V TELLER  
 W100 TELLER

PHONO MOTOR SWITCH (PART OF P800)  
 BIN LIGHT SWITCH (PART OF R200)  
 700V TELLER RECTIFIER  
 320V TELLER RECTIFIER  
 280 OHMS TELLER  
 280 OHMS TELLER  
 60 OHMS TELLER  
 117V TELLER  
 W100 TELLER

PHONO MOTOR SWITCH (PART OF P800)  
 BIN LIGHT SWITCH (PART OF R200)  
 700V TELLER RECTIFIER  
 320V TELLER RECTIFIER  
 280 OHMS TELLER  
 280 OHMS TELLER  
 60 OHMS TELLER  
 117V TELLER  
 W100 TELLER

PHONO MOTOR SWITCH (PART OF P800)  
 BIN LIGHT SWITCH (PART OF R200)  
 700V TELLER RECTIFIER  
 320V TELLER RECTIFIER  
 280 OHMS TELLER  
 280 OHMS TELLER  
 60 OHMS TELLER  
 117V TELLER  
 W100 TELLER

PHONO MOTOR SWITCH (PART OF P800)  
 BIN LIGHT SWITCH (PART OF R200)  
 700V TELLER RECTIFIER  
 320V TELLER RECTIFIER  
 280 OHMS TELLER  
 280 OHMS TELLER  
 60 OHMS TELLER  
 117V TELLER  
 W100 TELLER

PHONO MOTOR SWITCH (PART OF P800)  
 BIN LIGHT SWITCH (PART OF R200)  
 700V TELLER RECTIFIER  
 320V TELLER RECTIFIER  
 280 OHMS TELLER  
 280 OHMS TELLER  
 60 OHMS TELLER  
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