MODELS 41-608 AND 41-609, CODE 121

SPECIFICATIONS

Models 41-608 and 41-609 are Radio-Phonograph combinations consisting of a nine (9) tube super-heterodyne radio and an automatic phonograph record changer. These models are similar in design with the exception of the type of cabinet.

RADIO SECTION

The radio incorporates the Philco Built-in American and Overseas Aerial system; six electric push-buttons for automatically tuning stations in addition to manual tuning; two tuning ranges, covering 540 to 1720 K. C. and 9 to 12 M. C.; variable tone control; automatic volume control; automatic bass compensation; push-pull pentode output tubes with screen phase inversion; loktal tubes; the new noise reducing XXL converter tube and a twelve (12) inch concert grand dynamic speaker.

INTERMEDIATE FREQUENCY: 455 K. C.

POWER SUPPLY: 115 volts; 50 or 60 cycles A. C. current. Power consumption 75 watts. These models are shipped for operation on 115 volt, 60 cycle current. To operate on 50 cycle current, the phonograph motor must be changed to Part No. 35-1251.

PHILCO TUBES USED: 7B5, Oscillator; XXL, Converter; two 7B7, I. F. Amplifiers; 7C7, Phonograph Amplifier; 7C6, 2nd Detector, 1st Audio, A. V. C.; two 41, Audio Output and a 7Y4, Rectifier.

ADJUSTING ELECTRIC PUSH BUTTON TUNING: Five push-buttons are used for automatically tuning stations including television sound and one push-button for the power control "OFF-ON".

The procedure for setting and operating electric push-button tuning for reception of stations will be found on page 78.

PHONOGRAPH SECTION

The Phonograph of each model includes an automatic record changer which plays twelve 10-inch records or ten 12-inch records at one loading. The new Philco Photo-Electric Reproducer with floating jewel which reproduces sound on a light beam and a special phonograph amplifier stage for operation through the push-pull output tubes of the radio. Connections (No. 84 on the Diagram) are also provided for installation of the Philco Home Recording Unit Kit, Model HR-1, Part No. 45-2820, for making phonograph records in the home. The units can be obtained from your Philco Distributor with complete instructions for installation and operation.

AUTOMATIC RECORD CHANGER

The Service Procedure for adjusting the Automatic Record Changer Mechanism will be found on Page 135.

LIGHT-BEAM REPRODUCER ADJUSTMENTS

To reproduce the sound from a record, the light beam of the reproducer must be carefully positioned on the light sensitive cell. If the light beam is not carefully set, the sound reproduction will be distorted, weak or, if the light beam is completely on or off the cell, the phonograph will be silent.

If any of these conditions exist, the following adjustment procedure should be made:—

NOTE — These adjustments should be made with the power line voltage at 118 volts A. C.

A. ADJUSTING WIDTH OF LIGHT BEAM

To make this adjustment push the lamp socket assembly into its holder until a clear image of the lamp filament appears on the light cell. The socket should then be slightly pushed in beyond this point until the rectangular spot of light is $\frac{1}{32}$" in width. The socket assembly is now rotated so that the spot of light is vertical.

B. POSITIONING THE LIGHT BEAM

To position the light beam on the light cell, turn the adjusting screw at the lower left side of the reproducer until the spot is half on the cell and half on the metal frame surrounding the cell.

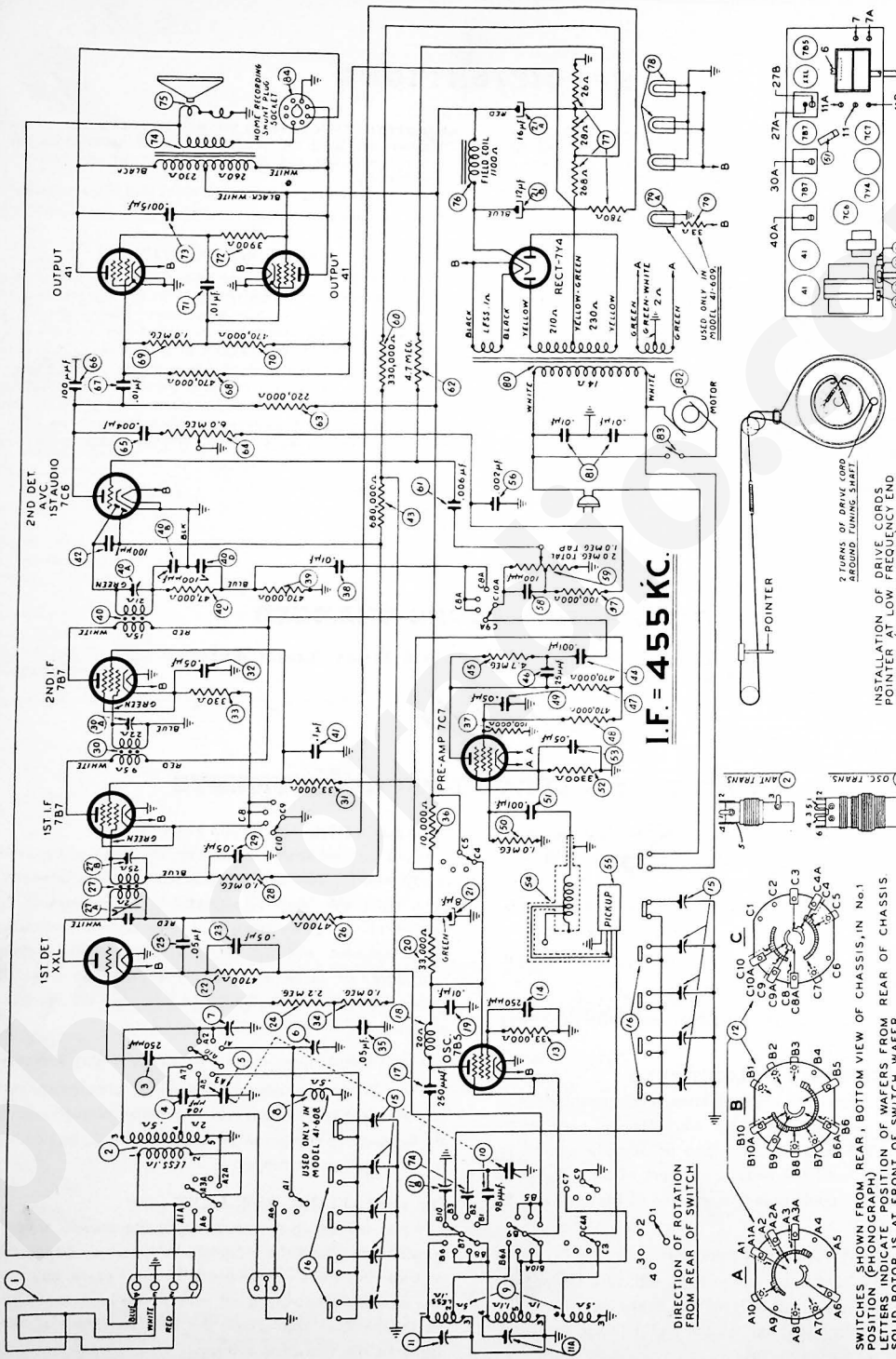
C. ADJUSTING INTENSITY OF LAMP

When shipped from the factory, the lamp of the reproducer is adjusted for best operating efficiency. The intensity of the light from the lamp is adjusted by Compensator No. 11B located on the radio chassis. Under ordinary circumstances, an adjustment will not be necessary. When replacing the reproducer or lamp, however, there may be a tendency towards microphonic feedback. In this case the compensator is adjusted as follows:

1. Turn volume control on full and play a record.
2. While the record is playing, turn compensator 11B in the direction necessary to eliminate microphonic feedback. By turning the compensator the strength of the pick-up output is increased or decreased.

D. INSTALLING NEW LAMP

When installing a new lamp in the socket, there are two positions in which the lamp can be inserted. Ordinarily, either of these positions can be used. In some cases, however, due to the lamp filament being off center, the lamp must be inserted in the position that gives the best centering of the spot of light on the vibrating mirror.



SCHEMATIC DIAGRAM MODELS 41-608 & 41-609

SWITCHES SHOWN FROM REAR, BOTTOM VIEW OF CHASSIS, IN No. 1 POSITION (PHONOGRAPH)
LETTERS INDICATE POSITION OF WAFERS FROM REAR OF CHASSIS
SOLID ROTOR IS AT FRONT OF SWITCH WAFER
SHADED ROTOR IS AT REAR OF SWITCH WAFER

SEE PAGE 109 FOR SOCKET VOLTAGES CODE 121; PAGE 111, CODE 122

Replacement Parts — Models 41-608 and 41-609

SCHE. No.	DESCRIPTION	PART No.
1	Loop Aerial (Model 41-608)	76-1124
	Loop Aerial (Model 41-609)	76-1127
2	Aerial Transformer (Model 41-608)	32-3531
	Aerial Transformer (Model 41-609)	32-3536
3	Mica Condenser (250 mmfd.)	60-125157
4	Mica Condenser (104 mmfd.)	30-1192
5	Tuning Condenser	31-2481
6	Compensator (Aerial, 12 M. C.)	31-6384
7	Compensator (Aerial, 1500 K. C.)	31-6365
7A	Compensator (580 K. C.) Part of 7	
8	R. F. Transformer (S.W.) Model 608 Only	32-3558
9	Oscillator Transformer	32-3559
10	Mica Condenser (98 mmfd.)	30-1186
11	Compensator (Oscillator, 12 M. C.)	31-6378
11A	Compensator (1500 K. C.) Part of 11	
11B	Comp. (Adj. Light Beam Rep.) Part of 11	
12	Bands Switch	42-1602
13	Resistor (33,000 ohms)	33-333339
14	Mica Condenser (250 mmfd.)	60-125157
15	Padder Strip (Push-buttons)	31-6377
16	Push-button and Power Switch Complete Power Switch, Part of 16	42-1576
17	Mica Condenser (250 mmfd.)	60-125157
18	R. F. Choke	32-3530
19	Condenser (.01 mfd., 400 volts)	30-4572
20	Resistor (33,000 ohms)	33-333339
21	Electrolytic Condenser (8-12-16 mfd.)	30-2488
22	Resistor (4700 ohms)	33-247339
23	Condenser (.05 mfd., 200 volts)	30-4519
24	Resistor (2.2 megohms)	33-522339
25	Condenser (.05 mfd., 400 volts)	30-4518
26	Resistor (4700 ohms)	33-247339
27	1st I. F. Transformer	32-3465
28	Resistor (1 megohm)	33-510339
29	Condenser (.05 mfd., 200 volts)	30-4519
30	2nd I. F. Transformer	32-3466
31	Resistor (33,000 ohms)	33-333339
32	Condenser (.05 mfd., 200 volts)	30-4519
33	Resistor (330 ohms)	33-133336
34	Resistor (1 megohm)	33-510339
35	Condenser (.05 mfd., 200 volts)	30-4519
36	Resistor (10,000 ohms)	33-310339
37	Resistor (100,000 ohms)	33-410339
38	Condenser (.01 mfd., 400 volts)	30-4572
39	Resistor (470,000 ohms)	33-447339
40	3rd I. F. Transformer	32-3534
40A	Compensator (Part of 40)	
40B	Mica Condenser (Part of 40)	
40C	Resistor (47,000 ohms, Part of 40)	33-347339
40D	Mica Condenser (Part of 40)	
41	Condenser (.1 mfd., 400 volts)	30-4455
42	Mica Condenser (100 mmfd.)	60-110157
43	Resistor (680,000 ohms)	33-468339
44	Condenser (.001 mfd., 200 volts)	30-4592
45	Resistor (4.7 megohms)	33-547339
46	Condenser (25 mmfd.)	30-1067
47	Resistor (470,000)	33-447339
48	Resistor (470,000)	33-447339
49	Condenser (.05 mfd., 200 volts)	30-4519
50	Resistor (1 megohm)	33-510339
51	Condenser (.001 mfd., 200 volts)	30-4592
52	Resistor (3300 ohms)	33-233339
53	Condenser (.05 mfd., 200 volts)	30-4519
54	Input Trans. (Light Beam Reproducer)	32-8135
55	Philco Light-Beam Reproducer Complete with Tone Arm	35-2175

MISCELLANEOUS PARTS

	Cover (Reproducer Head)	76-1104
	Jewel, Armature and Frame Assembly	318-2168
	Lamp	34-2408
	Lamp Shield	27-9782
	Lamp Socket Assembly	76-1107
	Light Sensitive Cell	76-1110
	Pivot Bracket Assembly (Mtg. Reproducer)	76-1111
	Reproducer Arm (Without Parts)	28-7316FC56
	Tube and Lens Assem. (For Lamp Socket)	76-1164
	Spring (Light Adjustment)	28-8968
	Screw (Light Adjustment)	W-2224
	Screw (Cover Mounting)	W-2204
	Screw (Cell Mounting)	W-2222
	Lock Washer (Cell Mounting)	W-2208

REPLACEMENT PARTS

56	Condenser (.004 mfd., 400 volts)	30-4578
57	Resistor (100,000 ohms)	33-410339
58	Condenser (100 mmfd.)	60-110157
59	Volume Control	33-5408
60	Resistor (330,000 ohms)	33-433339
61	Condenser (.006 mfd., 400 volts)	30-4591
62	Resistor (4.7 megohm)	33-547339
63	Resistor (220,000 ohms)	33-422339
64	Tone Control	33-5403
	Palnut	W-2157
65	Condenser (.004 mfd., 400 volts)	30-4578
66	Condenser (100 mmfd.)	60-110157
67	Condenser (.01 mfd., 400 volts)	30-4572
68	Resistor (470,000 ohms)	33-447339
69	Resistor (1 megohm)	33-510339
70	Resistor (470,000 ohms)	33-447339
71	Condenser (.01 mfd., 400 volts)	30-4572
72	Resistor (3900 ohms)	33-239339
73	Condenser (.0015 mfd.)	30-4616
74	Output Transformer	32-8133
75	Cone Assembly (For Spkr. 36-1528-4)	36-4176
76	Field Coil (For Speaker 36-1528-4)	
77	Resistor (780-268-28-26 ohms)	33-3396
78	Pilot Lamps (Push-buttons, Dial)	34-2064
79	Resistor (33 ohms) Model 41-609 Only	33-033339
79A	Pilot Lamp, Cabinet 41-609 Only	34-2210
80	Power Transformer (115 volts, 60 cycle)	32-8132
81	Condenser, Dual (.01-.01 mfd.)	3903-ODG
82	Phonograph Motor (115 volts, 60 cycle)	35-1252
	Phonograph Motor (115 volts, 50 cycle)	35-1251
83	Motor Switch	42-1628
84	Socket (Home Recording Connection)	27-6150
	Shunt Plug (Home Recording Connection)	76-1103

MISCELLANEOUS PARTS

	Automatic Record Changer with 115 volt, 60 cycle Motor	35-1233
	50 cycle Motor	35-1239
	Bezel (Push-button—41-608)	27-4843
	Bezel (Push-button—41-609)	56-1893
	Cable Assembly (Reproduces Transformer to Chassis)	41-3554
	Cable (Pickup Light)	41-3551
	Cable (Speaker)	41-3555
	Cable and Plug Assembly (Changer)	41-3549
	Cabinet (41-608)	10508A
	Cabinet (41-609)	10509A
	Clip (Coil Mounting)	28-5002
	Clip (Coil Mounting)	28-5003
	Connector (Input Transformer)	57-0591
	Dial Scale	27-5657
	Dial Pointer	56-1856
	Drive Cord (Pointer)	31-2487
	Drive Crod (Band Indicator)	31-2488
	Rrive Cord (Tuning Condenser)	31-2400
	Drive Drum (Tuning Condenser)	38-9883
	Indicator Bracket & Spring Assem. (Dial)	76-1075
	Jewel (41-609 Cabinet)	27-4777
	Knob (Tuning, Volume)	27-4332
	Knob (Push-buttons)	27-4824
	Plug Assembly (Shunt)	76-1103
	Speaker	36-1528
	Spring (Tuning Cond. Drive)	28-8751
	Spring (Pointer Drive Cord)	28-8953
	Spring (Tuning Cond., Dr. Shaft Grdg.)	28-8955
	Socket (Pilot Lamp) Cabinet	76-1128
	Socket (Pilot Lamp) Indicator	76-1077
	Socket (Pilot Lamp) Dial	76-1078
	Socket (6 prong tubes)	27-6168
	Socket—Rubber (Loktal type-osc. tube)	27-6129
	Socket (Loktal)	27-6158
	Socket (3 prong aerial)	27-6148
	Socket (Phonograph Reproducer)	27-6150
	Shaft (Tuning)	56-6086
	Shaft "C" Washer	28-2043
	Tab (Off-On)	27-5660
	Tab Kit (41-608)	40-6619
	Tab Kit (41-609)	40-6593

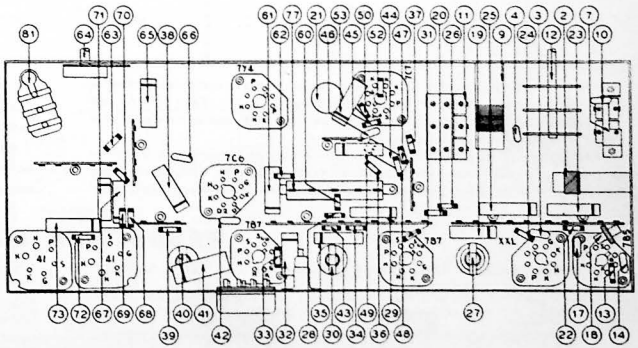
MOUNTING PARTS

	Clamp (Cable)	28-1867
	Palnut (1st, 2nd, 3rd I. F. Trans.)	W-1949
	Nut (Speaker Mounting)	W-124
	Nut (Changer Mounting)	W-149
	Rubber Corner Chassis	27-4564
	Rubber Grommet (Tuning Unit to Cabinet, P. B. S. W. Mounting)	27-4596
	Rubber Connector (Tuning Cond. Drive)	27-9432
	Rubber Washer (Chassis Mounting)	27-4571
	Rubber Washer (Changer Mounting)	54-4034
	Sleeve (Loop Mounting)	56-1907
	Sleeve (Tuning Unit to Cabinet)	28-2258
	Sleeve (P. B. S. W.)	28-5665
	Sleeve (Tuning Condenser)	56-1505
	Sleeve (Loop)	28-3257
	Sleeve (Loop)	28-3806
	Scale Strap	56-1861
	Screw (Loop)	W-1827
	Screw (Loop)	W-288
	Screw (Chassis)	W-1345
	Screw (Push-button Bezel)	W-2073
	Screw (Changer Mounting)	W-2225
	Spring (Mounting Changer)	28-8970
	Washers (Mounting Changer)	W-1715

TUBE SOCKET VOLTAGES

D. C. voltages indicated at the tube elements in the diagram were measured with a 1000 ohms per voltmeter, Philco Model 027. Line voltage 120 volts A. C. no signal being received — range switch broadcast.

Tube	Location	Radio Position D. C. Voltage	Phono. Position D. C. Voltage
7B5 Osc.	Plate	27	185
" "	Screen	27	185
" "	Bias (Grid Leak)	7	47
XXL 1st Det.	Plate	130	180
" " "	Bias (Cathode)	6	8
7B7 1st & 2nd I. F.	Plate	227	185
"	Screen	72	185
" 2nd I. F.	Bias (Cathode)	1.5	57
7C6 2nd Det. 1st Audio	Plate	165	140
7C7 Preamp.	Plate	45	65
" "	Screen	20	28
41 Output			
" Phase inverter	Plate	222	183
41-Output	Screen	213	177
41-Output	Plate	222	183
" "	Screen	227	185
	12 mf. elect. to ground	305	290
	16 mf. elect. to ground	227	185
	8 mf. elect. to ground	137	178



PART LOCATIONS — UNDERSIDE OF CHASSIS
MODELS 41-608, 41-609

NOTE — PARTS 51, 56, 57, 58 AND 59 LOCATED ON TOP OF CHASSIS

ALIGNING R. F. AND I. F. COMPENSATORS

The following procedure is the same for both models.

EQUIPMENT REQUIRED

1. **Signal Generator:** Covering the frequency range of the receiver, such as Philco Models 077 or 177.
2. **Aligning Indicator:** Either a vacuum tube voltmeter or an audio output meter may be used as an aligning indicator. Philco Models 027 and 028. Circuit testers contain both these meters.
3. **Tools:** Philco Fiber Screw Driver, Part No. 45-2610.

CONNECTING ALIGNING INSTRUMENTS

Vacuum Tube Voltmeter: To use the vacuum tube voltmeter as an aligning indicator, make the following connections: Attach the negative (—) terminal of the voltmeter to any point in the circuit where the A. V. C. voltage can be obtained. Connect the positive (+) terminal of the vacuum tube voltmeter to the chassis.

Audio Output Meter: Terminal No. 1 is provided on the loop aerial panel for connecting one lead of the audio output meter to the voice coil of the speaker. The other lead of the meter is connected to the chassis. When using these connections, the lowest A. C. scale of the meter must be used. (0 to 10 volts).

The audio output meter can also be connected between the plate of the output tube and the ground of the chassis.

Signal Generator: When adjusting the "I. F." padders, the high side of the signal generator is connected through a .1 mfd. condenser to the antenna section of the tuning condenser. Connect the ground or low side of the generator to the chassis.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the signal generator is then placed close to the loop of the radio.

When adjusting the radio outside the cabinet the loop aerial should be placed in approximately the same position around or near the chassis as when assembled.

The receiver can be adjusted in the cabinet or removed from the cabinet. If adjustments are made outside the cabinet a Service Tuning Scale, Part No. 45-2825 will be required. This scale is placed underneath the pointer on the metal dial plate.

After connecting the aligning instruments, adjust the compensators as shown in the tabulation below. Locations of the compensators are shown in the schematic diagram. If the indicating meter pointer goes off scale when adjusting the compensator, reduce the strength of the signal from the generator. Keep volume control of radio at maximum position.

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in order	
1	Ant. Section of Tuning Cond. with .1 mfd. Cond.	455 K. C.	Tuning Cond. Closed	Vol. Max. Bands Switch S. W.	27A, 27B 30A, 40A	Note A
2	Loop Signal Generator	1500 K. C.	1500 K. C.	Bands Switch "Brdcst"	11A, 7	Note B
3	Loop Signal Generator	580 K. C.	580 K. C.	Bands Switch "Brdcst"	7A	Roll comp. (7A) to "max." Recheck Operation No. 2
4	Loop Signal Generator	12 M. C.	12 M. C.	Bands Switch S. W.	11, 6	Note C

NOTE A — Compensator (27A) must be adjusted before compensator (27B) and should be done in the following manner: Turn (27A) all the way up, then turn down selecting the first I. F. peak, compensator (27B) is now padded to maximum.

NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, set the tuning pointer on the extreme left index line at the low frequency end of the broadcast scale.

NOTE C — Adjust padder (11) to the first signal peak from the tight position. Roll padder (6) slowly to maximum on the second peak from loose position.

PRODUCTION CHANGES

MODELS 41-608, CODE 121; 41-609, CODE 121, RUN 5, 121

To improve the performance and prevent distortion in the phonograph amplifier circuit, the following changes were made. Models with these changes are marked Run 5.

1. Resistor (47) changed from 470,000 ohms to 330,000 ohms ½ watt, Part No. 33-433339.
2. Condenser (57) .001 mfd. Part No. 30-4592, replaced with a .002 mfd. condenser, Part No. 30-4579.
3. Remove condenser (44) .001 mfd. Part No. 30-4592, and connect switch contact C9A to condenser (46) and resistor (45). Connect a .004 mfd. condenser, Part No. 30-4578, between the switch contact C10A and the condenser (58) and volume control (59).
4. Remove condenser (38) Part No. 30-4572, and wire switch contacts C8A to the point where resistors 40C and 39 are connected.

CORRECTIONS

The Part Nos. of oscillator transformer (9) and R. F. choke (18) are reversed on the replacement parts list, page 109. (9) should be 32-3530 and (18) 32-3559.

LEAKAGE DUE TO HIGH HUMIDITY

If fuzzy or distorted reception has been encountered in the operation of the Model 608, on either radio or phonograph during humid weather, it is most likely due to leakage across the terminals on the sockets of the 7C6 and 7C7 tubes. When this condition is encountered, the sockets must be replaced in order to effect a proper cure. Special sockets for this purpose are available from the Service Division.

In order to prevent microphonics when operating the phonograph, the speaker and record changer mountings were changed in later production. The new parts used are as follows:

Spenker Parts (4 of each required)		Record Changer	
Grommet	Part No. 27-4506	Rubber Washer	Part 54-4034
Spacer	Part No. 56-2044		
Washer	Part No. 28-4481	changed to	Part 54-4048
Nut	Part No. W-124		

The record changer rubber washers are used under each corner of the record changer.

To mount the speaker with these parts, insert a rubber grommet with a metal sleeve into each mounting hole of the speaker. The flanged end of the sleeve should be towards the baffle. Mount the speaker on the four bolts of the baffle with the washer and nut.