RADIO-PHONOGRAPH

Model 42-1016, Code 121

SPECIFICATIONS

MODEL 42-1016, CODE 121

Model 42-1016, Code 121, is a wireless remote control radio-phonograph, consisting of a sixteen (16) tube superheterodyne radio, a Philco De Luxe Automatic Record Changer and Frequency Modulation Band.

RADIO SECTION

The radio includes wireless remote control circuit; electric push button and manual tuning; four tuning bands for reception of standard, shortwave and frequency modulation stations; built-in superaerial system for standard and shortwave broadcasts and a FM Aerial for frequency modulation stations; two I. F. amplifier stages; two tone controls (Treble and Bass audio frequencies); motor driven volume control operated manually and by wireless remote control; automatic volume control; degenerated push-pull beam power audio output stage; XXL noise-reducing converter and oscillator tubes; XXFM balanced detector tube; concert grand balanced field electro-dynamic speaker; illuminated horizontal dial; illuminated tuning band and station indicators, and a dual section tuning condenser for tuning FM, standard and shortwave frequencies. In addition, the radio is designed to receive the sound of a television program tuned in by special Philco television receivers.

Tuning Band Frequencies: Brdcst, 540 to 1720 KC; SW-1, 9 to 12 MC; SW-2, 14.4 to 18 MC; FM, 42 to 50 MC.

Push-Button and Remote Control Frequencies: 540 to 950 KC; 590 to 1050 KC; 650 to 1250 KC; 700 to 1350 KC; 850 to 1500 KC; 950 to 1600 KC.

Intermediate Frequency: Standard I. F., 455 KC; FM I. F., 4.3 MC.

Audio Output: 20 watts.

Power Supply: 115 volts, 60 cycle A. C.

This model can also be operated on 115 volts, 50 cycle current by changing the phonograph motor parts as given in the parts list.

Power Consumption: 175 watts.

PHILCO Tubes: Radio Section—XXL, converter; XXL, radio oscillator; two 7V7, I. F. amplifiers; XXFM, second detector; A. V. C., first audio; 37, audio phase inverter amplifier; two 6L6G, audio output; 5X4G, rectifier; 7B5, phonograph light oscillator; a 7C6, phonograph preamplifier.

Wireless Remote Control Amplifier: 7B7, first control amplifier; 7C7, second control amplifier; 7A6, noise gate; 2A4G, Thyratron relay tube.

Remote Control Unit: One 30 tube, control oscillator.

PHONOGRAPH SECTION

The phonograph consists of a Philco De Luxe Automatic Record Changer, Part No. 35-1286; Philco Photo-electric Reproducer with a permanent floating jewel, which reproduces sound on a light beam, and a special phonograph amplifier stage for operation through the audio system of the radio. The phonograph can be operated from the remote control unit or at the radio cabinet.

The automatic record changer plays ten 12-inch or twelve 10-inch records at one loading.

Connections are also provided on the rear of the radio chassis (No. 105 on the diagram) for installation of the Philco Home Recording Unit, Model HR-2, Part No. 45-2932. With this unit records can be made in the home. The home recording unit can be obtained from your Philco distributor with complete instructions for installation and operation. The service procedure for adjusting the automatic record changer mechanism will be found in Radio Service Bulletin No. 402.

Cabinet Dimensions: Height, 42"; Width, 41"; Depth, 17⅜".

EXTERNAL AERIAL CONNECTIONS

The built-in aerial system is designed to operate without an outside aerial or ground and to give exceptionally high receiving performance of stations in the standard, shortwave, or FM bands.

To operate the radio in steel reinforced buildings and other shielded locations where signal strength is weak, an external aerial is recommended. Three different types of aerial combinations are available, to improve reception on the standard, shortwave, or FM bands.

1—For additional Sensitivity on Frequency Modulation only:

•Philco Dipole Outdoor Aerial, Part No. 45-2926.

The plug at the end of the transmission line is inserted in the socket at the back of the chassis in place of the plug connected to the FM dipole in the cabinet.

2—For Additional Sensitivity on ALL ranges:

•Philco Dipole Outdoor Aerial, Part No. 45-2926.

Philco Aerial Coupler, Part No. 45-1361.

The coupler plugs into the socket at the back of the chassis in place of the plug connected to the FM dipole. The aerial transmission line then connects to the terminals on the coupler marked "red" and "black." The local-distance switch on the coupler connects or disconnects the outdoor aerial from the standard broadcast and shortwave tuning ranges. The dipole remains connected to the FM band regardless of the position of the switch.

3—For Additional Sensitivity on Standard Broadcast and Shortwave only in Areas where FM reception is not available.

Philco Safety Aerial, Part No. 40-6370.

Philco Aerial Coupler, Part No. 45-1361.

Connect the single wire lead-in of the aerial to the "black" terminal on the aerial coupler.

• Accessories for this aerial are the Philco Aerial Mast Kit, the Philco Reflector Kit and Philco High Efficiency Transmission Line. See Service Bulletin No. 396 on Dipole Aerials.

NOTE: When installing the Philco FM Outdoor Dipole Aerial, it is very important that the aerial compensating condensers of the standard and shortwave band are repadded.

AUTOMATIC RECORD CHANGER

The Service Procedure for adjusting the Automatic Record Changer Mechanism will be found in Radio Service Bulletin No. 402.

PHONO 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 5/32" 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.

(Continued on page 2)

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. 23 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 110 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.

REPRODUCER JEWEL AND ARM ADJUSTMENTS

Three different tone arms have been used:

1—An aluminum arm (Part No. 35-2519).
2—A zinc arm (Part No. 35-2519).
3—A moulded bakelite arm (Part No. 35-2540).

Since the weight of each kind of arm is different, three counterbalance weights are required. The aluminum arm requires a 1½-ounce weight, the zinc arm a 5-ounce weight and the bakelite a 3-ounce weight. The zinc arm has a yellow paint mark under the tone arm.

Regardless of which tone arm is used, the weight of the tone arm on the record should be 1¼ ounces. The correct counterbalance weight must be used and the final adjustment made with the screw on the side of the tone arm swivel assembly. Do not use the incorrect counter balance weight and then adjust for the balance with the spring in the tone arm swivel, since this puts a side thrust on the tone arm spindle and will very likely cause tone arm drag.

Use only a 20 SAE grade oil mixed with 1/3 special Shaler Rislone oil for lubricating the spindle. Other lubricants will cause the spindle assembly to stick, resulting in tone arm drag. Tone arm drag may also be caused by the dress of the leads at the back of the tone arm. They should be dressed towards the turntable spindle at the end of the tone arm.

The tone arm spindle must be absolutely free. Any binding in either direction will cause the light beam to pull off the cell and produce WOW's and distortion. The drag should not exceed ⅛ ounce.

Do not, under any circumstances, try to adjust the angle of the jewel. The jewel normally extends 1/32" below the guard. It should be vertical with respect to the surface of the record when viewed from in front of the pick-up head. When viewed from the side, the jewel is at quite an angle to the surface of the record. On 1/3 stack of records, the jewel should be at an angle of approximately 20°. When playing the bottom record, the jewel will be at an angle of approximately 13°. Do not attempt to change this angle. It permits the jewel to track in the groove with a minimum surface noise. Any change from the original setting will affect the frequency response, and if the angle of the jewel is less than given above, it will cause record wear.

Flutter, mistracking and distortion can all be caused by a stiff mirror and jewel assembly. Check the flexibility of this assembly. With the record changer stopped, put a record on the turntable and place the tone arm on the record. Open the peep hole in the pick-up cover—the light beam should be 5/32" wide and should be half "on" and half "off" the photo-electric cell. Hook the Philco Scale, Part No. 45-2851, under the cover at the nose and pull laterally, first toward the spindle and then away from the spindle. The jewel assembly should be sufficiently flexible to, allow the light beam to be pulled completely off the cell and completely on the cell with less than 1 ounce of lateral pull—from ½ ounce to ¾ ounce is the most desirable. Replace the mirror and jewel assembly if more than 1 ounce pull is required.

PUSH-BUTTON AND WIRELESS REMOTE CONTROL ADJUSTMENTS

WIRELESS REMOTE CONTROL AND ELECTRIC PUSH-BUTTON TUNING: The wireless remote control automatically tunes in six broadcast stations; increases and decreases sound volume; starts and stops record changer; rejects records; changes from radio to phonograph or phonograph to radio; turns the power supply of the radio and phonograph OFF and has a "Silent" position which silences the sound output without operating volume control. These operations are all controlled from the remote control unit without any connections with the radio.

The control positions on the remote control dial reading right to left around the control are as follows:—"LOUD," "SOFT," SILENT, Station No. 1, Station No. 2, Station No. 3, Station No. 4, Station No. 5, Station No. 6, "PHONO."

The twelve electric push-buttons on the chassis dial operate independently of the wireless remote control. Six of the push-buttons select stations, and six operate the wireless remote control, phonograph, and the standard, shortwave 1, shortwave 2 and FM bands. Viewing the push-buttons from the front of the radio, proceeding left to right: No. 1 button controls "Remote," Nos. 2-3-4-5-6 and 7 broadcast stations, No. 8 "Brdcst" band, No. 9 "SW-1" band, No. 10 "SW-2" band, No. 11, "FM" band and No. 12 phonograph.

The selected broadcast stations can be set up for push-button and remote tuning control operation by adjusting the padders and coils located in back of the push-button assembly. Three adjustments must be made for each broadcast station selected.

The bottom row marked "ANT" is for the antenna padder for remote control operation; the middle row of adjusting screws is for the oscillator coils used in remote control; the top row of adjusting screws is for the oscillator adjustment for push-button tuning. Each set of three padders is numbered from "1 to 6" corresponding to the numbers shown on the push-buttons in figure above.

To set up stations on these models for best reception, a Signal Generator PHILCO Model 070; Vacuum Tube Voltmeter and PHILCO Model 027 or 028 should be used. With this equipment proceed as follows:

1. Select and remove the desired six (6) station call letters from the receiver station tab card. Insert the station tabs in the windows of the bezel on the receiver. Place the lowest frequency station in the second window (No. 1 in diagram) on the left of the bezel, and the remaining station tabs in the windows in the order of increasing broadcast frequency.

2. Remove the tabs of the corresponding six stations from the wireless control call letter card. Insert the LOUD, SOFT and SILENT tabs in the first, second and third spaces, respectively, on the right hand side of the bezel. Insert the tab of the lowest frequency station in the fourth space on the right side of the bezel on the remote control unit dial. Transparent tabs are also supplied. These should be placed over each call letter. Place the remaining call letter tabs around the bezel from right to left (counter-clockwise) in the order of increasing frequency.

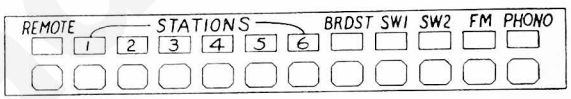

FIG. 1—TAB LOCATIONS

3. Insert the negative (—) terminal of the vacuum tube voltmeter into the Test socket on the rear of the chassis. Attach the positive (+) terminal to the chassis.

4. Turn volume control and power switch to the "ON" position, and allow the receiver to heat up. Attach a loop consisting of a few turns of wire to the output terminals of the Model 077 Signal Generator. Turn the signal generator power switch to "MOD ON". Press in the "Brdcst" push-button and manually tune in the lowest frequency station desired. This station should be between 540 to 950 K. C. Then tune the signal generator to the frequency of the same station and a beat note will be heard. Leave the signal generator pointer set at this frequency.

5. Press in the "Remote" push-button. Dial the first low frequency station on the remote control unit.

6. Using a padding screw driver adjust No. 1 "OSC Remote" (middle row) until the station identified by the modulated signal of the Signal Generator is tuned to maximum reading on the voltmeter. Next adjust the "No. 1 ANT" padder (bottom row) for maximum indication on the voltmeter.

Press in the No. 1 station push-button on the radio and adjust No. 1 "P.BUTTON OSC" padder (top row) for maximum output on the same station.

7. Turn the Signal Generator off the station frequency and readjust the No. 1 "OSC P.BUTTON" padder for maximum; then press REMOTE push-button, dial station on Remote Unit and readjust No. 1 "Remote OSC" and No. 1 "ANT" padders for maximum reading with the station signal. This should be done with the volume control of the receiver at low volume.

Repeat this procedure for each of the remaining stations to be set up. They should be set up in the order of their increasing frequency.

8. After all stations have been set up for push-button and remote control operation, press in the fifth (5) push-button and adjust the "ANT" compensator (36). See Fig. 4.

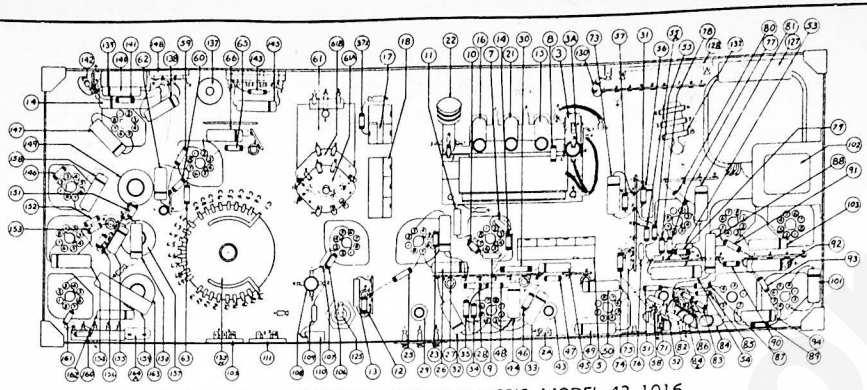

FIG. 2—PART LOCATIONS—UNDER CHASSIS, MODEL 42-1016

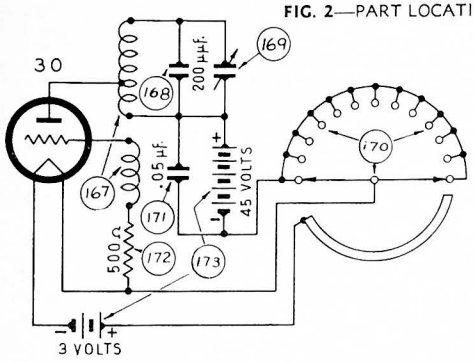

FIG. 3—SCHEMATIC DIAGRAM OF WIRELESS REMOTE CONTROL UNIT

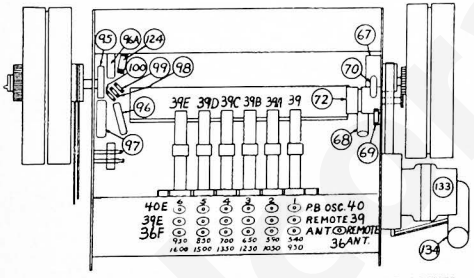

FIG. 4—LOCATIONS OF PARTS, TUNING UNIT

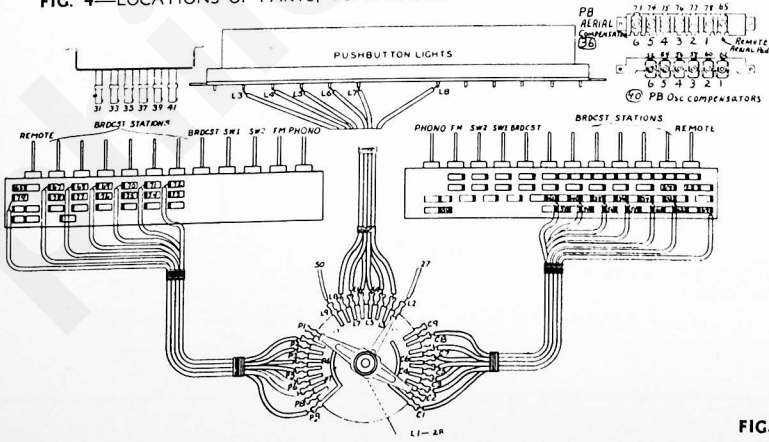

FIG. 7—CABLE WIRING FROM

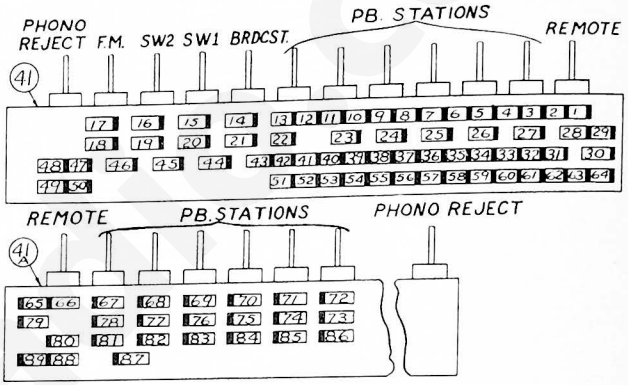

FIG. 5—CONTACT LOCATIONS OF STATIONS AND LIGHTS, P. B. SWITCH—TOP 41, BOTTOM 41A

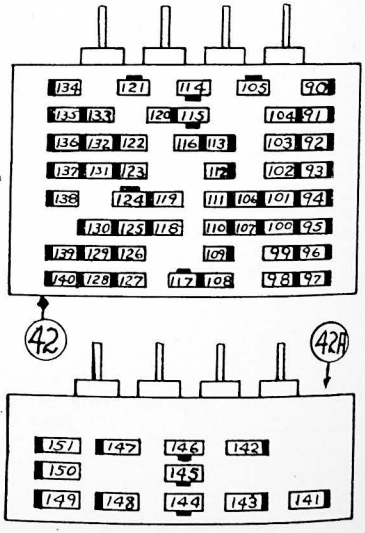

FIG. 6—CONTACT LOCATIONS OF TUNING BAND, P. B. SWITCH—42, BOTTOM; 42A, TOP SECTION

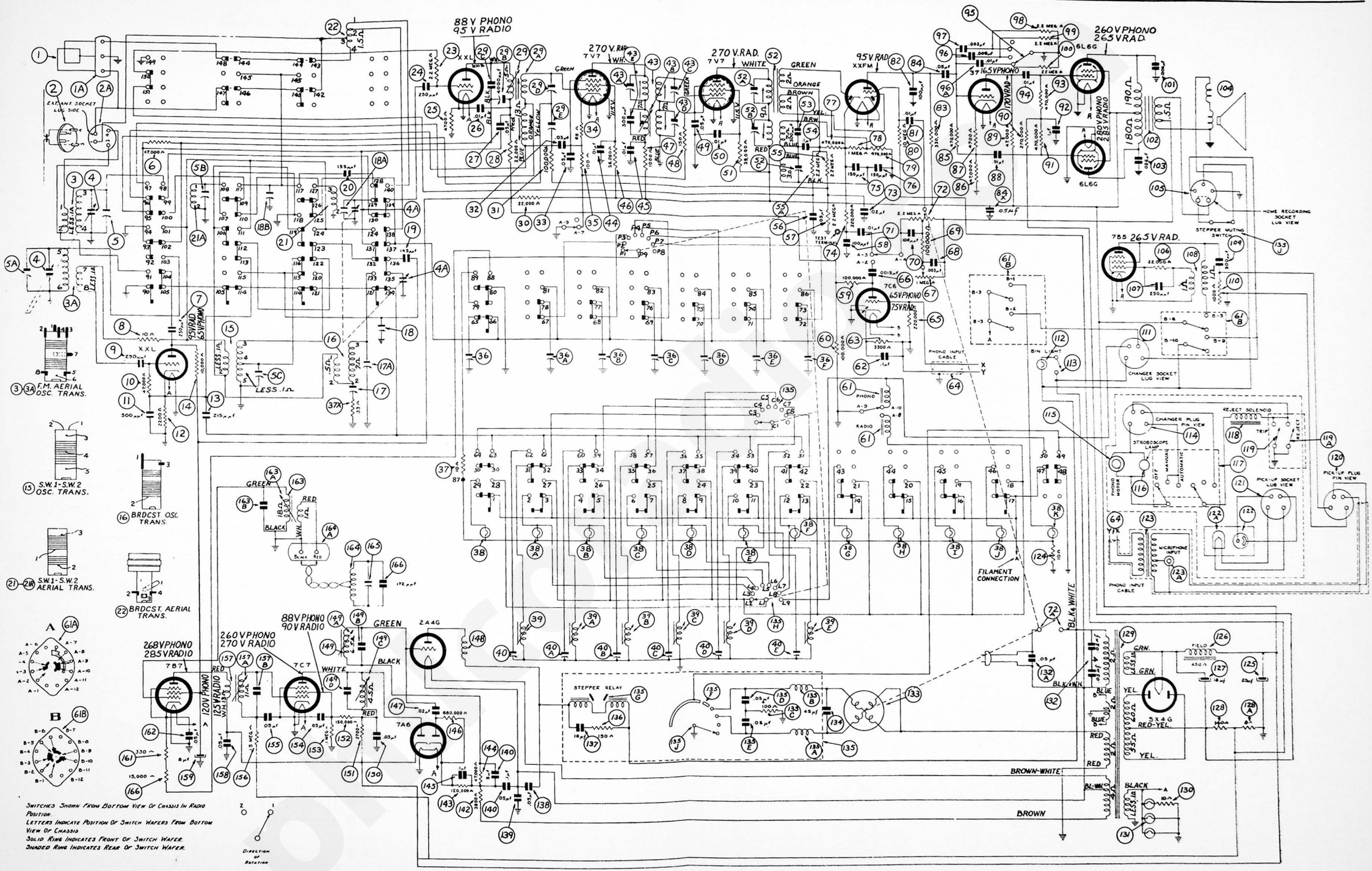

FIG. 8—SCHEMATIC DIAGRAM, MODEL 42-1016, CODE 121

The D. C. Voltages indicated at the tube elements in the above diagram were measured in the radio and phonograph position, with a 1,000 ohms per volt voltmeter, Philco Model 027; power line voltage 117 volts; no signal being received.

REPLACEMENT PARTS—MODEL 42-1016, CODE 121

Sch. No.	Description	Part No.
1.	Loop Aerial (Broadcast and S. W. Bands)	
	Mtg. Washer	76-1351
	Mtg. Sleeve	W-151FA3
	Mtg. Sleeve	28-3806FA3
	Mtg. Screw	56-1907FA3
	Spring Washer	W-288-FE11
1A.	Terminal Panel	28-4184FA1
2.	Dipole Aerial (F. M., Mounted on Cabinet)	38-9942
2A.	Socket (F. M. Aerial—On Chassis)	76-1362
3.	F. M. Aerial Transformer	32-6181
3A.	F. M. Oscillator Transformer (Part of 3). Mtg. Clip	32-3805
4.	F. M. Tuning Condenser	28-5002
4A.	Broadcast and S. W. Tuning Condenser (Part of 4)	31-2596
	Mtg. Grommet	27-4771
	Drive Drum (Cable)	38-9716
	Drive Cord (Condenser)	31-2315
	Drive Cord (Pointer)	31-2316
	Springs	28-8913
	Pointer	56-2272
	Bearing (Drive Drum Mtg.)	38-9707
	Coupling (Condenser)	31-2291
5.	Compensator (F. M. Aerial)	31-6442
5A.	Compensator (F. M. Oscillator), Part of 5	
5B.	Compensator (S. W. 2 Aerial) Part of 5	
5C.	Compensator (S. W. 2 Oscillator) Part of 5	
6.	Resistor (47,000 ohms)	33-347339
7.	Mica Condenser (250 mmfd)	60-125157
8.	Resistor (10 ohms)	33-010339
9.	Mica Condenser (250 mmfd)	60-125157
10.	Resistor (47,000 ohms)	33-347339
11.	Silver Mica Condenser (500 mmfd)	30-113X
12.	Resistor (2,200 ohms)	33-222339
13.	Silver Mica Condenser (215 mmfd)	30-1215
14.	Resistor (10,000 ohms)	33-310339
15.	S.W.-1 and S.W.-2 Oscillator Transformer	32-3806
	Mtg. Clip	28-5002
16.	Broadcast Oscillator Transformer Mtg. Clip	32-3809
		28-5002
17.	Compensator (Broadcast 580 KC)	31-6365
17A.	Compensator (Broadcast 1500 KC), Part of 17	
18.	Compensator (S.W.-2 Oscillator)	31-6362
18A.	Compensator (Broadcast Aerial 1500 KC), Part of 18	
18B.	Compensator (S.W.-1 Aerial), Part of 18	
	Mtg. Clip	28-5002
19.	Silver Mica Condenser (145 mmfd)	20-014511
20.	Silver Mica Condenser (155 mmfd)	20-015511
21.	S.W.-1 Aerial Transformer	32-3808
21A.	S.W.-2 Aerial Transformer, Part of 21	
	Mtg. Clip	28-5002
22.	Broadcast Aerial Transformer	32-3807
	Mtg. Clip	28-5002
23.	Resistor (2.2 megohms)	33-522339
24.	Mica Condenser (250 mmfd)	60-125157
25.	Resistor (470M)	33-347339
26.	Condenser (.01 mfd. 400 volts)	30-4572
27.	Condenser (.05 mfd. 400 volts)	30-4519
28.	Resistor (22,000 ohms)	33-322339
29.	First I. F. Transformer	32-3801
	Mtg. Nut	W-1949
29A.	Primary Compensator (Iron Core 455 KC), Part of 29	
29B.	Primary Compensator (4.3 KC), Part of 29	
29C.	Condenser (4000 mmfd), Part of 29	
29D.	Secondary Compensator (455 KC), Part of 29	
29E.	Secondary Compensator (4.3 KC), Part of 29	
30.	Resistor (22,000 ohms)	33-322429
31.	Resistor (100,000 ohms)	33-410339
32.	Condenser (.03 mfd. 400 volts)	30-4517
33.	Condenser (.05 mfd. 400 volts)	30-4518
34.	Resistor (68 ohms)	33-068339
35.	Resistor (100 ohms)	33-110339
36.	Push-button Compensator ("Ant"—Remote)	31-6445
36A.	Push-button Compensator ("Ant"—540 to 950 KC) (Part of 36)	
36B.	Push-button Compensator ("Ant"—590 to 1050 KC) (Part of 36)	
36C.	Push-button Compensator ("Ant"—620 to 1250 KC) (Part of 36)	
36D.	Push-button Compensator ("Ant"—700 to 1350 KC) (Part of 36)	
36E.	Push-button Compensator ("Ant"—850 to 1500 KC) (Part of 36)	
36F.	Push-button Compensator ("Ant"—950 to 1600 KC) (Part of 36)	
37X.	Resistor (33 ohms)	33-033339
37.	Resistor (10 ohms)	33-010439
38.	Pilot Lamp (Remote Push-button)	34-2064
38A.	Pilot Lamp (Push-button—540 to 950 KC)	34-2064
38B.	Pilot Lamp (Push-button—590 to 1050 KC)	34-2064
38C.	Pilot Lamp (Push-button—650 to 1250 KC)	34-2064
38D.	Pilot Lamp (Push-button—700 to 1350 KC)	34-2064
38E.	Pilot Lamp (Push-button—850 to 1500 KC)	34-2064
38F.	Pilot Lamp (Push-button—950 to 1600 KC)	34-2064
38G.	Pilot Lamp (Push-button) (Broadcast Band)	34-2064
38H.	Pilot Lamp (Push-button) (S. W. Band)	34-2064
38I.	Pilot Lamp (Push-button) (S. W.-2 Band)	34-2064
38J.	Pilot Lamp (Push-button) (F. M.)	34-2064
38K.	(Push-button) (Phono. Reject)	34-2067
	Pilot Lamp Socket and Housing Assem.	76-1325
	Insulator	27-9925
	Mtg. Screw	W-601
39.	P.B.-Remote Oscillator Transformer (540 to 950 KC)	32-3042
39A.	P.B.-Remote Oscillator Transformer (590 to 1050 KC)	32-3042
39B.	P.B.-Remote Oscillator Transformer (650 to 1250 KC)	32-3597
39C.	P.B.-Remote Oscillator Transformer (700 to 1350 KC)	32-3597
39D.	P.B.-Remote Oscillator Transformer (850 to 1500 KC)	32-3041
39E.	P.B.-Remote Oscillator Transformer (950 to 1600 KC)	32-3041
	Iron Core	28-6916
	Cap	28-6936
	Clip	28-8910
	Transformer Ass'y Complete	32-3810
40.	P.B.-Oscillator Compensator (540 to 950 KC)	31-6389
40A.	P.B.-Oscillator Compensator (590 to 1050 KC), Part of 40	
40B.	P.B.-Oscillator Compensator (650 to 1250 KC), Part of 40	
40C.	P.B.-Oscillator Compensator (700 to 1350 KC), Part of 40	
40D.	P.B.-Oscillator Compensator (850 to 1500 KC), Part of 40	
40E.	P.B.-Oscillator Compensator (950 to 1600 KC), Part of 40	
41.	P.B. Switch (Stations and Lights—Top Section)	42-1689
41A.	P.B. Switch (Stations and Lights—Bottom Section), Part of 41	
	Mtg. Grommet	27-4596
	Mtg. Sleeve	28-3806
	Snap Fasteners	28-4342
42.	P.B. Switch (Tuning Bands—Under Chassis—Bottom Section)	42-1690
42A.	P.B. Switch (Tuning Bands—Under Chassis—Top Section), Part of 42	
	Mtg. Grommet	27-4596
	Mtg. Sleeve	28-3806
43.	Second I. F. Transformer	32-3802
	Mtg. Nut	W-1949
43A.	Primary Compensator (4.3 KC) (Part of 43)	
43B.	Primary Compensator (Iron Core—455 KC) (Part of 43)	
43C.	Secondary Compensator (4.3 KC) (Part of 43)	
43D.	Secondary Compensator (455 KC) (Part of 43)	
43E.	Mica Condenser (500 mmfd) (Part of 43)	
44.	Condenser (.01 mfd. 400 volts)	30-4572
45.	Condenser (.01 mfd. 400 volts)	30-4572
46.	Resistor (56,000 ohms)	33-356339
47.	Resistor (1000 ohms)	33-210339
48.	Resistor (150 ohms)	33-115339
49.	Condenser (.05 mfd. 400 volts)	30-4518
50.	Condenser (.01 mfd. 400 volts)	30-4572
51.	Resistor (39,000 ohms)	33-339339
52.	Third I. F. Transformer	32-3803
	Mtg. Nut	W1949
52A.	Primary Compensator (4.3 KC) (Part of 52)	
52B.	Primary Compensator (455 KC) (Part of 52)	
52C.	Secondary Compensator (4.3 KC) (Part of 52)	
53.	Mica Condenser (500 mmfd)	60-150137
54.	Condenser (.1 mfd. 200 volts)	30-4586
55.	Resistor (2.2 megohms)	33-522339
55A.	Resistor (2.2 megohms)	33-522339
56.	Condenser (.05 mfd. 200 volts)	30-4519
57.	Resistor (2.2 megohms)	33-522339
58.	Mica Condenser (100 mmfd.)	60-110157
59.	Resistor (100,000 ohms)	33-410339
60.	Resistor (100,000 ohms)	33-410339
61.	Phono-Radio Relay	42-1691-6
61A.	Changerover Switch (Wafer A)	42-1720
61B.	Changerover Switch (Wafer B) (Part of 61A)	
62.	Condenser (.1 mfd. 200 v.d.c.)	30-4586
63.	Resistor (3300 ohms)	33-233339
64.	Phono Input Cable	41-3632
65.	Resistor (220,000 ohms)	33-422339
66.	Condenser (.0015 mfd. 600 volts)	30-4621
67.	Tone Control (Bass—1 megohm)	33-5475
68.	Condenser (.003 mfd. 1000 volts)	30-4469
69.	Resistor (100,000 ohms)	33-410339
70.	Mica Condenser (100 mmfd)	60-110157
71.	Condenser (.01 mfd. 400 volts)	30-4572
72.	Volume Control	33-5417
	Drive Pulley	56-6111
	Set Screw	W-2105
73.	Condenser (.02 mfd. 200 volts)	30-4584
74.	Resistor (220,000 ohms)	33-422339
75.	Mica Condenser (150 mmfd)	60-115157
76.	Mica Condenser (150 mmfd)	60-115157
77.	Resistor (470,000 ohms)	33-447339
78.	Resistor (1 megohm)	33-510339
79.	Resistor (470,000 ohms)	33-447339
80.	Resistor (10 megohms)	33-610339
81.	Condenser (.01 mfd. 400 volts)	30-4572
82.	Mica Condenser (100 mmfd)	60-110157
83.	Resistor (330,000 ohms)	33-433339
84.	Condenser (.05 mfd. 400 volts)	30-4518
84X	Condenser (.05 mfd. 400 volts)	30-4518
85.	Resistor (470,000 ohms)	33-447339
86.	Resistor (47,000 ohms)	33-347339
87.	Resistor (4700 ohms)	33-347339
88.	Condenser (.01 mfd. 400 volts)	30-4572
89.	Resistor (47,000 ohms)	33-347339
90.	Resistor (270,000 ohms)	33-427339
91.	Resistor (470,000 ohms)	33-447339
92.	Condenser (.1 mfd. 200 volts)	30-4586
93.	Resistor (470,000 ohms)	33-447339
94.	Condenser (.01 mfd. 400 volts)	30-4572
95.	Tone Control Switch (Treble Audio)	42-1700
	Mtg. Nut	W-2157FA3
96.	Condenser (.006 mfd. 400 volts)	30-4591
96A	Condenser (.01 mfd. 400 volts)	30-4572
97.	Condenser (.003 mfd.)	30-4567
98.	Resistor (2.2 megohms)	33-522339
99.	Resistor (2.2 megohm)	33-522339
100.	Resistor (2.2 megohms)	33-522339
101.	Condenser (.006 mfd. 1000 volts)	30-4024
102.	Output Transformer	32-3184
103.	Condenser (.006 mfd. 1000 volts)	30-4024
104.	Speaker	36-1553-4
	Cone Assembly	36-4181
	Cable	41-3662
	Mtg. Grommet	27-4596
	Mtg. Sleeve	56-2044FA3
	Mtg. Nut	W-124FA3
105.	Home Recording Socket (Mounted on Chassis)	27-6179
106.	Resistor (22,000 ohms)	33-322339
107.	Mica Condenser (250 mmfd)	60-125157
108.	Oscillator Transformer (Phono Replacement Light)	32-3804
109.	Mica Condenser (500 mmfd)	60-150137
110.	Light Control (Phono Reproducer)	33-5435
111.	Record Changer Power Socket (Mounted in Chassis)	27-6182
112.	Record Compartment Lamp Cable Assembly	34-2484
113.	Switch and Cable Assembly (Record Compartment Light)	76-1364
114.	Record Changer Power Plug and Cable (Mounted on Changer)	
115.	Motor (Record Changer—115 volts, 60 cycle)	35-2553
	Pulley (60 cycle)	218-1448
	Pulley (50 cycle)	56-6173
	Screw	218-1450
	Turntable (60 cycle)	35-2554
	Turntable (50 cycle)	35-3059
116.	Neon Lamp (Turntable Speed)	34-2483
117.	Changeover Switch (Record Changer)	35-2547
118.	Reject Solenoid (Record Changer)	-318-2875
119.	Trip Switch Assembly (See Parts 39 and 48 in Radio Service Bulletin 402)	
119A.	Reject Switch (Record Changer)	35-2555
120.	Phono Reproducer Plug (Part of 64)	
121.	Phono Reproducer Socket (Record Changer)	217-1396
122.	Photo Electric Reproducer (See Bulletin 402 for Mounting Parts)	35-2519
122A.	Photo Electric Lamp	34-2478
122B.	Photo Electric Cell	318-2478
123.	Phono Input Transformer	32-8196
123A.	Microphone Input (Part of 123)	
124.	Resistor (10 ohms) (Mounted on Tuning Unit)	33-010439
125.	Electrolytic Condenser (25 mfd, 300 volts)	30-2532
126.	Field Coil (Replace Speaker)	36-1553-4
127.	Electrolytic Condenser (18 mfd, 475 volts)	30-2519
128.	Bias Resistor (140 ohms)	33-3416
128A.	Bias Resistor (8 ohms) (Part of 129)	
129.	Power Transformer (115 volts, 6 cycles)	32-8188
130.	Resistor (10 ohms—Cabinet Pilot Lamp)	33-010439
131.	Dial Lamps	34-2064
	Cabinet Pilot Lamp	34-2210
	Socket Assembly (Dial Lamp)	38-9694
	Socket Assembly (Dial Lamp)	38-9695
	Socket Assembly (Cab. Pilot Lamp)	76-1335
132.	Condenser (.05-.05 mfd, 400 volts)	3615-08G
132A.	Condenser (.05 mfd) (Part of Power Cord)	L-3176
133.	Volume Control Motor and Gears Complete	35-1237
	Drive Belt	27-9770
134.	Electrolytic Condenser (45 mfd)	30-2495
135.	Remote Control Stepper Unit Complete	76-1144
	Mtg. Grommet	27-4596
	Rubber Cushion (Bottom)	27-4789
	Rubber Liner (end-stepper cover)	27-4800
	Rubber Liner (top-stepper cover)	27-4801
	Rubber Liner (side-stepper cover)	54-4041
	Mtg. Sleeve	28-3806
	Cover Assembly	76-1160
135A.	R. F. Choke	32-3276
135B.	R. F. Choke	32-3276
135C.	Resistor (100 ohms)	33-110339
135D.	Condenser (.05 mfd)	30-4444
135E.	Condenser (.05 mfd)	30-4444
135F.	Contact Wafer	39-9761
135G.	Stepper Relay Coil (Holding Coil)	38-9921
135G.	Stepper Relay Coil (Stepping Coil)	38-9921
135H.	Stepper Rotary Switch	42-1620
	Insulating Washer	27-7397
	Insulating Washer	27-8040
	Mtg. Stud	28-6992
	Mtg. Screw	W-1549A3
	Contact Arm	38-9764
	Drive Arm	38-9763
135J.	Stepper Muting Switch	38-9760
	Spark Filter Complete. Consisting of 135A, 135C, 135D, 135E	28-9898
136.	Resistor (150 ohms)	33-2362
137.	Electrolytic Condenser (16 mfd, 150 volts)	30-2387
	Mtg. Nut	W-1743
138.	Condenser (.05 mfd. 400 volts)	30-4518
139.	Condenser (.05 mfd. 400 volts)	30-4518
140.	Condenser (.1 mfd. 200 volts)	30-4586
141.	Condenser (.5 mfd. 200 volts)	30-4590
142.	Resistor (3900 ohms)	33-239339
143.	Resistor (120,000 ohms)	33-412339
144.	Resistor (47000 ohms)	33-347339
145.	Condenser (.1 mfd. 200 volts)	30-4586
146.	Resistor (680,000 ohms)	33-468339
147.	Condenser (.02 mfd. 400 volts)	30-4516
148.	Spark Filter Choke Coil	32-1281
149.	Third Control Amplifier Transformer	32-3275
	Mtg. Nut	W-1949
149A.	Secondary Compensator (Iron Core) (Part of 149)	
149B.	Condenser (Part of 149)	
149C.	Primary Compensator (Iron Core) (Part of 149)	
149D.	Condenser (Part of 149)	
150.	Condenser (.05 mfd. 400 volts)	30-4518
151.	Resistor (2700 ohms)	33-227339
152.	Resistor (150,000 ohms)	33-415339
153.	Resistor (1 megohm)	33-510339
154.	Condenser (.05 mfd. 400 volts)	30-4518
155.	Condenser (.05 mfd. 200 volts)	30-4519
156.	Resistor (1.5 megohms)	33-515339
157.	Second Control Amplifier Transformer	32-3800
	Mtg. Nut	W-1949
157A.	Secondary Compensator (Iron Core)	
157B.	Condenser (Part of 157)	
158.	Condenser (.05 mfd. 400 volts)	30-4518
159.	Electrolytic Condenser (18 mfd, 400 volts)	30-2522
160.	Resistor (15,000 ohms)	33-315339
161.	Resistor (330 ohms)	33-133339
162.	Condenser (.05 mfd. 200 volts)	30-4519
163.	First Control Amplifier Trans. Mtg. Nut	32-3799
		W-1949
163A.	Compensator (Iron Core) (Part of 163)	
163B.	Condenser (Part of 163)	
164.	Secondary Inductor Loop	76-1155
	Mtg. Screw	W-2087
164A.	Terminal Panel	38-6533
165.	Compensator (Secondary Inductor)	
166.	Mica Condenser (172 mmfd—Secondary Inductor)	
167.	Primary Inductor	32-3097
168.	Mica Condenser (200 mmfd)	30-1115
169.	Compensator	31-6765
170.	Tuner Unit Complete	39-9704
171.	Condenser (.05 mfd)	30-4519
172.	Resistor (500 ohms)	33-150339
173.	Remote Control Battery Pack	41-5023
	Bezel	56-1240
	Dial Tuning Disc	27-4792
	Dial Cap	27-4793
	Finger Stop	27-4794
	Screw	W-2139
	Spacer	27-4795
	Socket (Tube)	27-6119
	Cable (Battery)	41-3447
	Miscellaneous Parts—Model 42-1016, Code 121	
	Automatic Record Changer and Tone Arm	35-1286
	(See Bulletin 402 for Complete Replacement Parts on this Record Changer)	
	Bezel (Cabinet)	40-6632
	Mtg. Screw	W-2073FA9
	Cabinet	16516-C
	Jewel (Pilot Light)	27-4777
	Cable (Shielded—7C6 to Phono Switch)	L-3269
	Cable (Shielded—Vol. Cont. to 7C6 Tube)	L-3270
	Cable (Shielded—Vol. Cont. to Phono Switch)	L-3271
	Cable Shielded—I.F. to Phono Switch	L-3272
	Control Drum (Tuning)	54-4119
	Control Drum (Volume)	54-4151
	Control Drum (Bass and Treble)	54-4149
	Washer (Between Controls)	56-1976
	Key Washer (Between Controls)	56-10299FA3
	Spring Washer (Volume Drum)	56-1355
	Spring Washer (Tuning Drum)	56-1659
	Dial Scale	27-5760
	Clamp	56-1034FA3
	Knob (Push-buttons)	54-4144
	Remote Control Unit	45-2910
	Rubber Grommet (Chassis Mtg.)	27-4571
	Rubber Grommet (Tuning Unit Mtg.)	3915
	Rubber Grommet (Tuning Unit Mtg.)	3914
	Rubber Corner (Chassis)	54-4040
	Screw (Chassis Mtg.)	W-1345FA3
	Spring (Dial Light)	28-5991
	Sleeve (Tuning Unit Mtg.)	28-3267
	Shield (2A4G)	28-2726
	Shield Base (2A4G)	28-2725
	Socket (Loktal Tubes—Control Amp.)	27-6153
	Mtg. Eyelet	W-1468
	Socket (Loktal Tubes—Radio)	27-6127
	Socket (37 Tube)	27-6167
	Socket (Output and Rectifier Tubes)	27-6173
	Socket (Test)	27-6150
	Tab Kit (Stations)	40-6674
	Tab Cover	27-5771
	Tab (Remote)	27-5772
	Tab (Broadcast)	27-5773
	Tab (SW-1)	27-5774
	Tab (SW-2)	27-5775
	Tab (FM)	27-5776
	Tab (Television)	27-5780
	Washer Chassis Mtg.	28-5114FA3

ALIGNING R. F. AND I. F. COMPENSATORS

EQUIPMENT REQUIRED

1. SIGNAL GENERATOR: Covering the frequency of the receiver, such as the Philco Model 070.
2. ALIGNING INDICATOR: Audio Output Meter. Philco Models 027 and 028. Circuit testers contain a sensitive output meter and are recommended.
3. TOOLS: Philco Fiber Screw Driver. Part No. 45-2610.

CONNECTING ALIGNING INSTRUMENTS

Audio Output Meter: Connect the output meter to the plates of the 6L6G output tubes. The 0 to 30 volt scale of the meter should be used.

Signal Generator: When adjusting the "I. F." padders, the high side of the signal generator is connected through a .1 mfd condenser to the points indicated in signal generator column "output connections" to receiver in the tabulations below.

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 loop is then placed two or three feet from the loop in the cabinet and dipole aerial lead. Do not remove the receiving loops from the cabinet. It is necessary when adjusting the padders, that the receiver be left in the cabinet.

After connecting the aligning instruments adjust the compensators in the order shown in the tabulation below. Location of the compensators are shown on the schematic diagram. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

STANDARD AND S. W. BANDS ALIGNING PROCEDURE

	SIGNAL GENERATOR		RECEIVER			
Operations In Order	Output Connections	Dial Setting	Dial Setting	Control Settings	Adjust Compensators In Order	Special Instructions
1	1st I.F. Input Connection	455 KC	580 KC	Vol. max. push-button Brdcst. "IN"	52B	
2	1st I.F. Input Connection	455 KC	580 KC	Brdcst. Push-button "IN"	43D, 43B	
3	Aerial Tuning Condenser Lug.	455 KC	580 KC	Brdcst. Push-button "IN"	29D, 29A	
4	Use loop on generator	1500 KC	1500 KC	Brdcst. Push-button "IN"	17A, 18A	Note A
5	Use loop on generator	580 KC	580 KC	Brdcst. Push-button "IN"	17	Roll Tuning Condensers Note B
6	Use loop on generator		Readjust as given in Operation 4			
7	Use loop on generator	12 M.C.	12 M.C.	SW-1 Push-button "IN"	18, 18B Note C	Roll Tuning Condenser
8	Use loop on generator	18 M.C.	18 M.C.	SW-2 Push-button "IN"	5C, 5B Note C	Roll Tuning Condenser

FREQUENCY MODULATION ALIGNING PROCEDURE

NOTE: The Frequency Modulation Circuits Must Be Adjusted With the Dipole Aerial Connected.

	SIGNAL GENERATOR		RECEIVER			
Operations In Order	Output Connections	Dial Setting	Dial Setting	Control Settings	Adjust Compensators In Order	Special Instructions
1	2nd I. F., F. M. input connection	4.3 MC	580 KC	Vol. max. F. M. push-button "IN"	52C (Note D) 52A (Note E)	
2	1st I. F., F. M. input connection	4.3 MC	580 KC	F. M. push-button "IN"	43C, 43A (Note F)	
3	F. M. aerial tuning condenser lug	4.3 MC	580 KC	F. M. push-button "IN"	29E, 29B (Note F)	
4	Use test loop on generator; place near dipole aerial	48.5 MC	85 (Note G)	F. M. push-button "IN"	5A (Note G) 5 (Note H)	Roll tuning condenser when adjusting 5. See Note B
5	"	48.5 MC	85	F. M. push-button "IN"	5A oscillator	

NOTE A.—DIAL CALIBRATION: In order to adjust the receiver correctly, the dial pointer must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. See Fig. 11 for cord arrangement.

NOTE B.—When adjusting the low frequency compensator of the broadcast or the aerial padders of the high frequency tuning range; the receiver tuning condenser must be adjusted (rolled) as follows: First, tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until maximum output reading is obtained.

NOTE C.—Adjust compensators (18 and 5C) to the second signal peak from the closed position (maximum capacity). The aerial compensators (18B and 5B) must also be adjusted to maximum on the first signal peak by rolling the tuning condenser. (See Note B.)

NOTE D.—With the signal generator set to 4.3 MC, padder (52C) is adjusted to the point where minimum signal indication is observed on the output meter.

NOTE E.—Turn the signal generator first to approximately 125 KC below 4.3 MC (4.17 MC) and then 125 KC above 4.3 MC (4.42 MC). A signal peak should be observed on the output meter at approximately each of these points (4.17 and 4.42). The two peak signals should be of equal reading on the output meter and equally spaced in frequency each side of 4.3 MC. If the peaks are unequal in amplitude, padder (52A) must be adjusted in the direction necessary to make both peaks equal. This is done by slightly turning padder and then turning signal generator above and below 4.3 to observe peaks. After equal peaks readings are obtained set the signal generator to 4.3 MC. The output meter should show zero reading at 4.3 MC. If a signal indication is observed, readjust padder (52C) until zero reading is obtained on the meter. After this adjustment is made padder No. 52A should be reset for equal peaks as given above.

NOTE F.—Adjust padders 43C, 43A, 29E, and 29B for equal signal peaks and equal frequency spacing each side of 4.3 MC.

NOTE G.—The dial scale numbers are listed in tenths of megacycles less the first digit; i. e., 49 MC is 90, 48.5 is 85. Set the tuning dial pointer to 85 on the F. M. scale. Adjust padder (5A) to the point where minimum signal indication is observed on the output meter.

NOTE H.—In order to adjust padder (5) the signal generator should be set to either the signal peak approximately 125 KC below 48.5 MC (48.375 MC), or 125 KC above 48.5 MC (48.625 MC). Adjust padder (5) to maximum output reading on either of these peak signals. As padder 5 is being adjusted roll the tuning condenser as given in Note B.

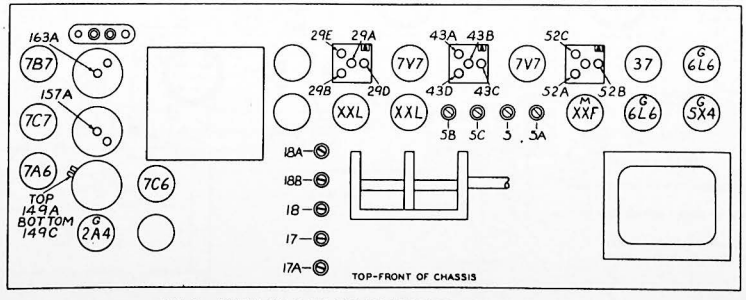

FIG. 9—LOCATIONS OF COMPENSATORS, TOP OF CHASSIS

ADJUSTMENT OF WIRELESS REMOTE CONTROL CIRCUITS

MODEL 42-1016, CODE 121

ADJUSTING CONTROL FREQUENCY AMPLIFIER

The wireless remote control models are shipped with 5 different control frequencies which range from 350 to 400 K. C. These frequencies are identified by the code number appearing on the serial number ticket and on the rear of the chassis. The code numbers and frequencies are as follows:

Code 5.....355 K. C.	Code 7.....375 K. C.
Code 6.....367 K. C.	Code 8.....383 K. C.
Code 9.....395 K. C.	

The purpose of the different control frequencies is to prevent interaction between two or more wireless remote control models which are on the same floor or exceptionally close together. When several wireless remote control models are to be located close together, it will be necessary to use different control frequencies. These frequencies should be 20 KC apart. For example, if three models are to be operated at the same time and are closely situated, it will be advisable to adjust the control frequency of the first set to 355 KC, the second set to 375 KC, and the third set to 395 KC.

In order to realign or change the control frequency of these models, the following equipment is required:

1. Philco Model 070 signal generator with a loop attached to the output terminal. (A few turns of wire 12 inches in diameter). Vacuum tube voltmeter, Philco Model 027.

2. Philco wireless remote control aligning adapter. Part No. 45-2769.

3. Philco aligning screw driver, Part No. 45-2610.

With this apparatus the control frequency is adjusted as follows:

1. Remove the 2A4G control tube from its socket and replace with the aligning adapter. Connect the red lead of the aligning adapter to the positive terminal of the vacuum tube voltmeter. The black lead of the adapter is connected to the negative terminal of the vacuum tube voltmeter.

2. Connect the high side of the signal generator through a 100-ohm resistor to the "Red" terminal of the remote control secondary inductor loop panel. Connect the "grd" of the signal generator to the "Blk" terminal.

3. Apply power to the set and press in the "remote" push button. Turn the generator modulation control to "Mod ON" and turn the attenuator control about one fourth on.

4. The control frequency to which the control amplifier is tuned can now be determined by tuning the signal generator between 350 and 400 KC. When the signal generator is tuned to the control frequency, the vacuum tube voltmeter will show maximum deflection. If this frequency is to be used, leave the signal generator at this point or turn the indicator to any other frequency desired between 350 and 400 KC.

5. After the control frequency has been found or changed, compensators (149A) (149C) are adjusted for maximum indication on the vacuum tube voltmeter.

6. Remove the signal generator output leads and 100-ohm resistor from the terminal panel. Connect the remote secondary inductor loop to the terminal panel.

7. Place the small loop mentioned above into the "high" and "ground" terminals of the signal generator output and place the signal generator near the secondary inductor loop in the bottom of the cabinet. When doing this, do not disturb the setting of the signal generator indicator. The compensators (157A) and (163A) are now adjusted for maximum reading on the vacuum tube voltmeter.

8. Next adjust the secondary inductor loop compensator (165) located in the bottom of the cabinet. This compensator is encased in a cardboard container that is attached to one corner of the loop. Extreme care should be used in adjusting the compensator to the exact point of resonance as the secondary inductor is a very sharply tuned circuit.

9. If the vacuum tube voltmeter pointer goes off scale when adjusting the compensators, turn the attenuator control of the signal generator toward the "off" position.

ADJUSTING WIRELESS REMOTE CONTROL UNIT

The wireless remote control unit is now adjusted to the control frequency of the amplifier as follows:

1. Turn off the signal generator, then dial any one of the stations indicated on the remote control unit by pulling the selector to the stop position; release the selector and at the same time press the stop down and hold it in this position.

2. Now bring the wireless remote control unit close to the receiver. Using a padding wrench, Philco Part No. 3164, tune the compensator (169), Fig. 3, located on the bottom of the remote control unit until a maximum voltage reading is indicated on the vacuum tube voltmeter. When tuning this compensator, it should be done very slowly so as not to pass over the frequency to which the control amplifier is tuned.

3. The remote control unit is now moved a short distance from the radio (several feet). Compensator (169) is then readjusted for maximum voltage reading.

4. After making these adjustments, remove the aligning adapter from the socket and replace the 2A4G tube. The wireless remote control unit should now be adjusted to the same frequency as the control frequency in the receiver.

ADJUSTING REMOTE CONTROL UNIT OPERATING DISTANCE

When shipped from the factory the wireless remote control circuit is adjusted to control the radio from an average distance that has been found to be satisfactory in most installations. In some special cases, however, where the radio and control are situated near large metal objects or installed in metal shielded areas, it may be necessary to change the control circuit to get adequate remote control (increase sensitivity) from certain distances. In these cases, the value of resistor (160), 15,000 ohms, located underneath the radio chassis, should be changed to a lower value that will give the desired range of control. The resistor, however, should not be lowered in value more than is found necessary for the special installation. If the control range is too sensitive, the resistor should be changed to a higher value (more resistance).

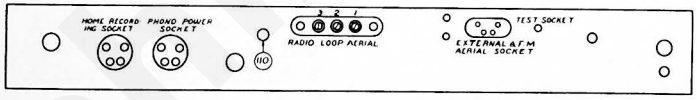

FIG. 10—TERMINAL AND SOCKET LOCATIONS, REAR OF CHASSIS

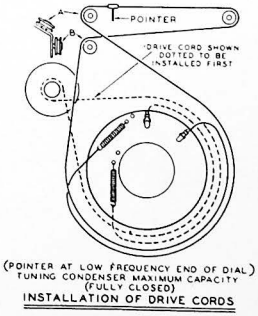

FIG. 11—DRIVE CORD ARRANGEMENT