

# MODELS, 42-1012, Code 121 42-1013W, Code 121 42-1013M, Code 121

## SPECIFICATIONS

### MODELS 42-1012, 42-1013, CODE 121

Models 42-1012, Code 121, 42-1013W, Code 121, and 42-1013M, Code 121, are radio-phonograph combinations, consisting of a ten (10) tube superheterodyne radio with electric push-button tuning, standard, shortwave and frequency modulation tuning bands, and an automatic phonograph record changer. These models are similar in design with the exception of the cabinets.

#### RADIO SECTION

The radio incorporates the PHILCO Built-in Super Aerial System for reception of standard and shortwave broadcast stations and a F. M. dipole aerial for reception of frequency modulation stations; ten (10) electric push-buttons for automatically tuning five (5) stations in the standard broadcast band, turning power off, and selecting phonograph circuit, standard, shortwave and frequency modulation tuning bands; two I. F. amplifier stages; two variable tone controls which vary the bass and treble audio frequencies; automatic volume control; push-pull beam power pentode audio output stage; Philco LOKTAL tubes; illuminated horizontal dial; illuminated tuning band and station indicators; concert grand balanced field electro-dynamic speaker; and a dual section tuning condenser for tuning the frequency modulation, standard and shortwave band. In addition, these models are designed to receive the sound of a television program tuned in by special Philco Television Receivers.

**Tuning Band Frequencies:** Brdcast, 540 to 1720 KC; S.W., 9 to 15.5 MC; F.M., 42 to 50 MC.

**Intermediate Frequencies:** Standard I. F., 455 KC; F. M. I. F., 4.3 MC.

**Audio Output:** 8 watts.

**Power Supply:** 115 volts, 60 cycles A. C.

#### 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 of the back of the chassis in place of the plug connected to the F. M. loop 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 F. M. loop. The aerial trans-

mission 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 F. M. band regardless of the position of the switch.

**Power Consumption:** 125 watts.

**Philco Tubes:** 7C5, oscillator; XXL, converter; two 7V7, I. F. amplifiers; XXFM, second detector, first audio, A. V. C.; 7A4, audio phase inverter; two 7C5, audio output; 5Y4G, rectifier, and a 7C6, phonograph preamplifier.

#### PHONOGRAPH SECTION

The phonograph of each model consists of the PHILCO Automatic Record Changer with a stroboscopic pitch and tempo control; a dual speed motor that can be adjusted to play not only normal speed records (78 RPM) but also slow speed records (33-1/3 to 39 RPM); the PHILCO Photo-Electric Reproducer with a floating jewel which reproduces sound on a beam of light, and a special phonograph amplifier stage for operation through the push-pull output tubes of the radio. The automatic record changer plays 12 ten-inch or 10 twelve-inch records at one loading. The automatic record changer is also equipped with provisions for attaching a Philco Home Recording Unit Model HR-2 for making phonograph records in the home. The Home Recording Units can be obtained from your Philco distributor with complete instructions for installation and operation.

#### AUTOMATIC RECORD CHANGER

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

3—For Additional Sensitivity on Standard Broadcast and Shortwave only in Areas where F. M. 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 F. M. Philco Outdoor Dipole Aerial, it is very important that the aerial compensating condensers of the standard and shortwave band are repadded.

#### ELECTRIC PUSH-BUTTON ADJUSTMENTS

The electric push button tuning mechanism consists of ten push buttons. Five push buttons control and select power supply, broadcast, police and shortwave bands and phonograph operation. The remaining five push buttons are used for automatically selecting five standard broadcast stations.

Select five of the most popular stations received in the locality. Insert the station call letters into the spaces above the buttons. The station with the lowest frequency is placed in the second button from the left and the highest frequency is placed in the sixth push button from the left. Each push button is adjusted by two adjusting screws located on the rear of the chassis. Each set of screws is numbered and labeled "Ant.", "Osc." and covers a frequency range as shown in Fig. 5.

Looking at the front of the cabinet, the second button from the left is adjusted by adjusting screws No. 1. The next push button by adjusting screws No. 2, and the remaining push buttons in order.

To adjust the electric push buttons accurately for reception of broadcast stations, a vacuum tube voltmeter such as Philco Models 027 and 028 should be used. In addition, an insulated padding screw driver, Part No. 45-2610, and a Philco Model 070 signal generator are required. With this equipment at hand proceed as follows:

1. Press in "Broadcast" push button.

2. Set up a Model 070 Signal Generator near the receiver and connect a loop aerial (made from a few turns of wire 12 inches in diameter) to the high and ground output jacks of the signal generator. Turn the output controls to maximum and set the modulation control to "MOD. ON."

Connect the negative (-) terminal of the vacuum tube voltmeter to the aligning test socket at the rear of the chassis. Attach the positive (+) terminal of the voltmeter to the chassis.

3. Manually tune in the station to be set up on the first station push button. After doing this set the indicator of the 070 Signal Generator to the frequency of the station being received. As the indicator approaches the frequency of the station a whistle will be heard; leave the indicator at this point.

4. Press "in" the second push button from the left of cabinet. Using the insulated screw driver, turn the No. 1 "Osc." screw until the broadcast station identified by the signal generator is heard; at this point, turn the indicator of the signal generator away from the frequency of the station. Readjust No. 1 "Osc." and "Ant." screws for maximum deflection of the vacuum tube voltmeter pointer.

(Continued on page 2)

After setting up the first station the same procedure as outlined above is used for the remaining stations. When these models are set up to receive the sound of a television program tuned in by the special type Philco Television Sets or if it is to be used in conjunction with a Philco Record Player, the lowest frequency push

button should be used. To tune in these programs, the same procedure as given for broadcast stations above is used.

Further details for setting up these radios for operation with Philco Television Sets or Record Players are supplied with the instruments.

## PHONOGRAPH 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 must be made with the power line voltage at 117 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 spotlight 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. 11 located on the radio chassis. Under ordinary circumstances, an adjustment will not be necessary. When replacing the reproducer or lamp, however, it may be necessary to readjust the light intensity. 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 11 in the direction necessary to obtain the best operating point without distortion. 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.

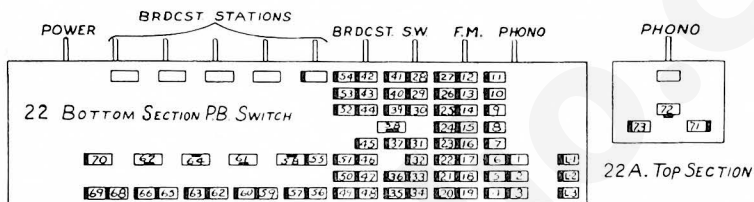


FIG. 1—P. B. SWITCH, TOP AND BOTTOM SECTIONS  
Contact numbers correspond to contact numbers shown on the Schematic Diagram

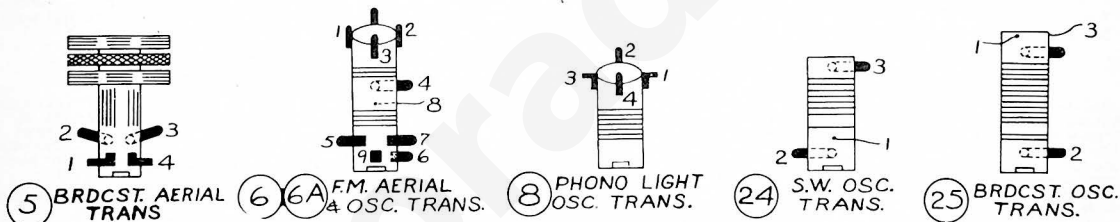


FIG. 2—PHYSICAL LOCATIONS OF CONNECTIONS ON R. F. TRANSFORMERS  
Numbers at lugs correspond to numbers on Schematic Diagram at the transformer symbols

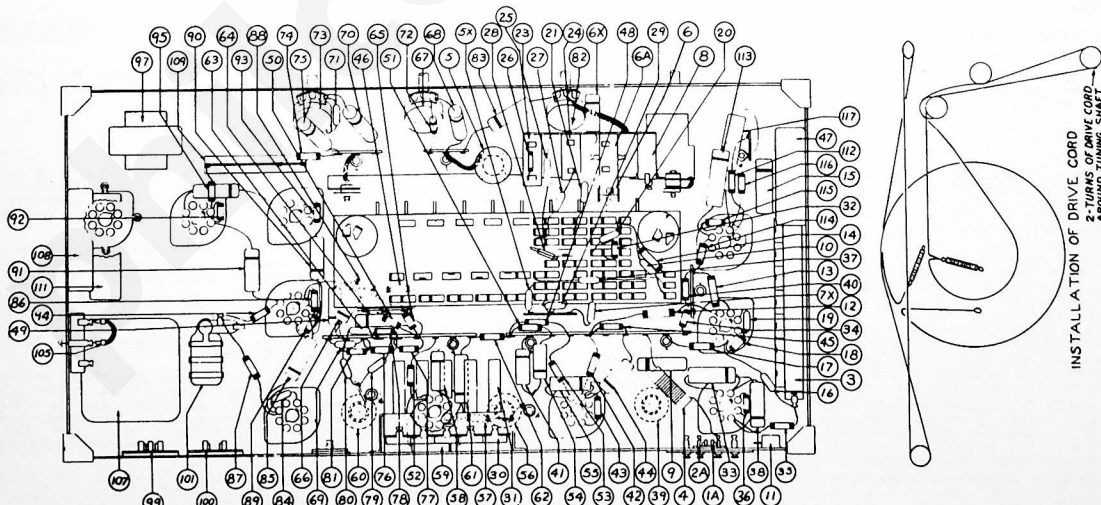


FIG. 3—LOCATIONS OF PARTS—UNDER CHASSIS

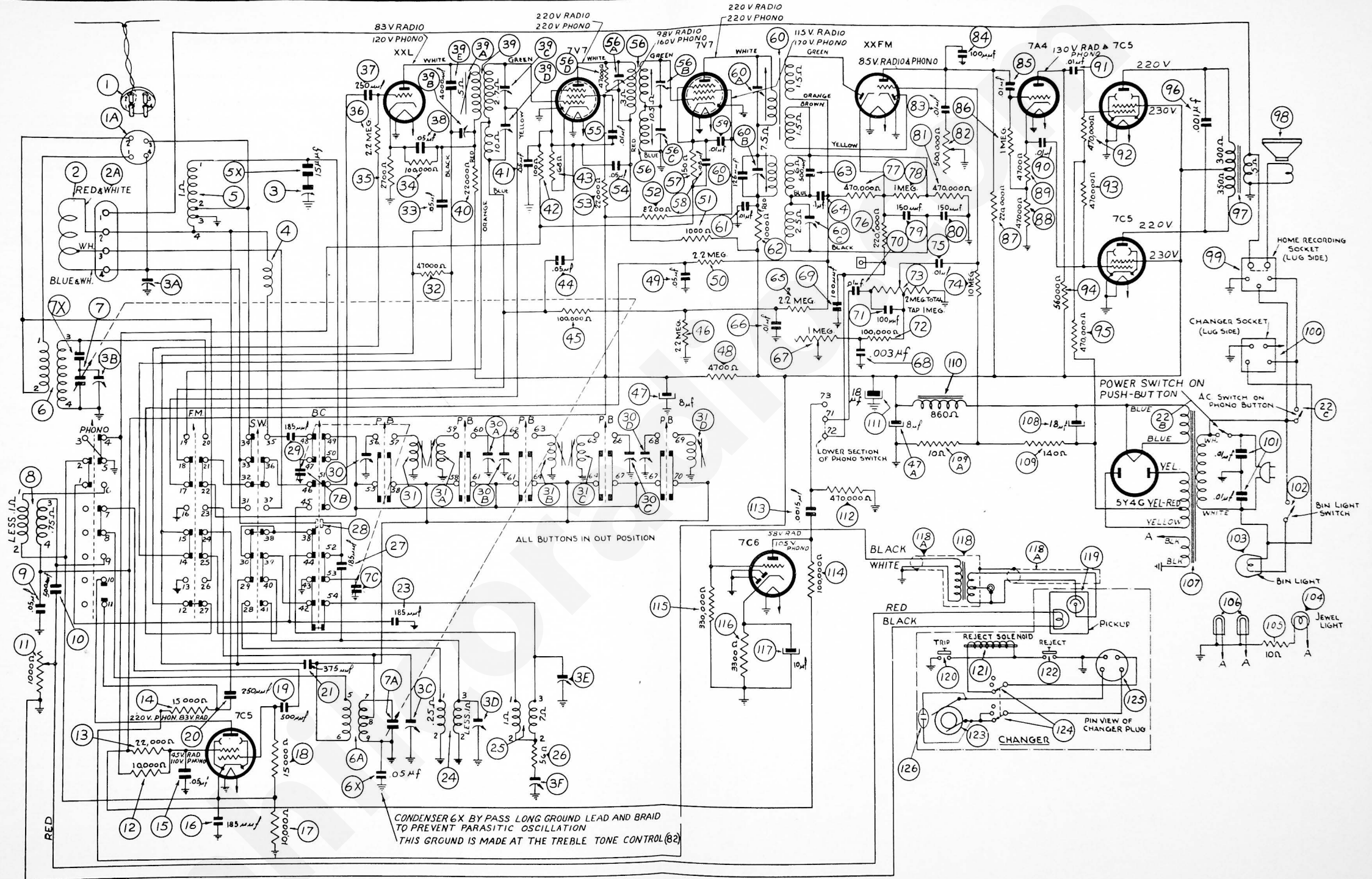


FIG. 4—SCHEMATIC DIAGRAM—MODELS 42-1012, CODE 121; 42-1013, CODE 121  
TUBE SOCKET VOLTAGES

The D. C. voltages indicated at the tube elements in the above diagram were measured in the Radio and Phonograph positions. The voltages were measured with a 1,000-ohms per volt voltmeter, Philco Model 027, using the 300-volt scale.—Line voltage, 117 volts A. C.—No signal being received.

REPLACEMENT PARTS—MODELS 42-1012, 42-1013, CODE 121

Beh. No.	Description	Part No.	Beh. No.	Description	Part No.	Beh. No.	Description	Part No.
1.	F. M. Dipole Aerial (42-1012)	76-1387	34.	Resistor (100,000 ohms)	33-410339	100.	Phono Power Socket	27-4182
F. M. Dipole Aerial (42-1013W, 42-1013M)	76-1846	35.	Resistor (2,700 ohms)	33-22139	101.	Mig. Rivet	W-209FA5	34-2564
1A. F. M. Aerial Bracket	76-1846	36.	Resistor (2.2 megohms)	33-522339	102.	Power Line Condenser (01-01 mfd)	3903-030	34-2564
2. Loop Aerial (Bracket & S. W. Bands)	76-1386	37.	Mica Condenser (150 mfd, 400 volts)	30-4518	103.	Compartment Light Switch and Cable	76-1390	34-2564
Mig. Screw	W-721-2721	38.	Primary Transformer	33-2843			W-560P211	34-2564
Mig. Sleeve	28-5806	39A.	Primary Compensator (4.3 MC) (Part of 39)	W-1949FA3	103.	Compartment Light	41-3838	34-2564
Spring Washer	28-5806	39B.	Secondary Compensator (455 KC) (Part of 39)		104.	Cable and Socket Assembly	41-3838	34-2564
Washer	W-426FA3	39C.	Secondary Compensator (455 KC) (Part of 39)		105.	Cable and Socket (42-1012)	76-1392	34-2564
2A. Terminal Panel	38-9870	39D.	Secondary Compensator (4.3 MC) (Part of 39)		106.	Cable and Socket (42-1013)	76-1378	34-2564
3A. Compensator (S. W. Aerial) (Part of 3)	31-4443	39E.	Condenser (4,900 mmfd) (Part of 39)		107.	Resistor (10 ohms)	33-21033	34-2564
3B. Compensator (F. M. Aerial) (Part of 3)		40.	Resistor (22,000 ohms)	33-322339	108.	Electrolytic Condenser (18 mfd, 50 cycle)	32-8226	34-2564
3C. Compensator (F. M. Osc.) (Part of 3)		41.	Condenser (.002 mfd, 200 volts)	33-110336	109.	Bias Resistor (140 ohms)	30-2517	34-2564
3D. Compensator (S. W. Osc.) (Part of 3)		42.	Resistor (100 ohms)	33-068339	109A.	Bias Resistor (10 ohms)	30-2517	34-2564
3E. Compensator (Bracket, Osc.) (Part of 3)		43.	Resistor (68 ohms)	33-410339	110.	Field Coil (Replace Speaker) (Part of 109)	36-1565	34-2564
4. S. W. Aerial Transformer	32-3838	44.	Condenser (.05 mfd, 200 volts)	33-022339	111.	Electrolytic Condenser (18 mfd, 475 volts)	30-2527	34-2564
Bracket, Aerial Transformer	32-3838	45.	Resistor (100,000 ohms)	30-2536	112.	Resistor (470,000 ohms)	33-447339	34-2564
Mig. Clip	28-5802	47A.	Electrolytic Condenser (8 mfd, 475 volts) (Part of 47)		113.	Condenser (.0015 mfd, 1000 volts)	30-4616	34-2564
6. F. M. Aerial Transformer	28-5802	47B.	Resistor (4700 ohms)	33-247339	114.	Resistor (100,000 ohms)	33-410339	34-2564
F. M. Oscillator Transformer	28-5802	49.	Condenser (.05 mfd, 200 volts)	30-4519	115.	Resistor (330 ohms)	33-210339	34-2564
(Part of 6)		51.	Resistor (1000 ohms)	33-210339	116.	Resistor (3300 ohms)	33-210339	34-2564
Mig. Clip	28-5802	52.	Resistor (5200 ohms)	33-252339	117.	Electrolytic Condenser (10 mfd, 25 volts)	30-2500	34-2564
7A. Tuning Condenser (F. M. Aerial)	31-2592	53.	Condenser (.25 mfd, 400 volts)	30-4618	118.	Phono Input Transformer	32-8196	34-2564
7B. Tuning Condenser (Bracket & S. W. Aerial) (Part of 7)		55.	Condenser (.05 mfd, 400 volts)	30-4512	119A.	Cable (Phono Input Transformer)	41-3637	34-2564
7C. Tuning Condenser (Bracket & S. W. Aerial) (Part of 7)		56.	Second I. F. Transformer	33-2844			35-2518	34-2564
Drive Cord (Top)	31-2576	56A.	Primary Compensator (4.3 MC) (Part of 56)	W-1949FA3				34-2564
Spring	28-8963	56B.	Secondary Compensator (4.3 MC) (Part of 56)					34-2564
Drive Cord (Cond. Drive)	31-2803	56C.	Secondary Compensator (455 KC) (Part of 56)					34-2564
Spring	28-8761	56D.	Resistor (47,000 ohms) (part of 56)					34-2564
Drive Shaft	66-8195	57.	Resistor (150 ohms)	33-115339				34-2564
"C" Washer	27-4596	58.	Condenser (.05 mfd, 200 volts)	30-4515				34-2564
Drive Drum (Tuning Condenser)	76-1293	59.	Condenser (.01 mfd, 400 volts)	30-4512				34-2564
Mig. Grommet	27-4596	60.	Third I. F. Transformer	33-2846				34-2564
Mig. Sleeve	58-1205FA3	60A.	Primary Compensator (4.3 MC) (Part of 60)	W-1949FA3				34-2564
Mig. Screw	W-1321A3	60B.	Primary Compensator (455 KC) (Part of 60)					34-2564
Pointer	58-2381	60C.	Secondary Compensator (4.3 MC) (Part of 60)					34-2564
8. Phonograph Oscillator Transformer	32-3838	60D.	Condenser (125 mmfd) (Part of 60)					34-2564
Mig. Clip	28-5802	61.	Condenser (.01 mfd, 400 volts)	30-4572				34-2564
Condenser (.05 mfd, 400 volts)	30-4518	62.	Resistor (1000 ohms)	33-210339				34-2564
Mica Condenser (500 mmfd)	60-10057	63.	Mica Condenser (500 mmfd)	60-10057				34-2564
Phono Light Control	33-5435	64.	Condenser (.1 mfd, 200 volts)	30-4596				34-2564
Resistor (10,000 ohms)	33-316439	65.	Resistor (2.2 megohms)	33-522339				34-2564
Resistor (22,000 ohms)	33-22439	66.	Condenser (.01 mfd, 400 volts)	30-4672				34-2564
Resistor (15,000 ohms)	33-316439	67.	Tone Control (Audio Bass)	W-2187FA3				34-2564
Condenser (.05 mfd, 400 volts)	30-4518	68.	Condenser (.003 mfd, 1000 volts)	30-4469				34-2564
Mica Condenser (105 mmfd)	20-018511	69.	Mica Condenser (100 mmfd)	30-110157				34-2564
Resistor (10,000 ohms)	33-310339	70.	Mica Condenser (100 mmfd)	30-4572				34-2564
Resistor (15,000 ohms)	33-310339	71.	Mica Condenser (100 mmfd)	30-110157				34-2564
Mica Condenser (150 mmfd)	33-310339	72.	Resistor (30,000 ohms)	33-410339				34-2564
Mica Condenser (250 mmfd)	60-125256	73.	Volume Control	33-5478				34-2564
Push-Button Switch (Bottom Section)	20-037517	74.	Mig. Nut	W-2187FA3				34-2564
22A. Push-Button Switch (Top Section) (Part of 22)	42-1701	75.	Resistor (10 megohms)	33-810339				34-2564
22B. Main Power Switch (Part of 22)		76.	Condenser (.01 mfd, 400 volts)	30-4572				34-2564
22C. Phono Power Switch (Part of 22)		77.	Resistor (470,000 ohms)	33-510339				34-2564
Mica Condenser (185 mmfd)	20-018511	78.	Resistor (1 megohm)	33-447339				34-2564
Shortwave Oscillator Transformer	32-3793	79.	Mica Condenser (150 mmfd)	60-115137				34-2564
Mig. Clip	28-5802	80.	Mica Condenser (150 mmfd)	60-115137				34-2564
Bracket Oscillator Transformer	32-3793	81.	Resistor (470,000 ohms)	33-447339				34-2564
Mig. Clip	28-5802	82.	Tone Control (Audio Treble)	33-5480				34-2564
Resistor (68 ohms)	33-068339	83.	Condenser (.01 mfd, 400 volts)	30-4572				34-2564
Mica Condenser (185 mmfd)	20-018511	84.	Mica Condenser (100 mmfd)	60-110157				34-2564
Condenser (1 mmfd, consist of wire and lug)		85.	Condenser (.01 mfd, 400 volts)	30-4572				34-2564
Mica Condenser (185 mmfd)	20-018511	86.	Resistor (1 megohm)	33-510339				34-2564
P. B. Aerial Compensator (900 to 1600 KC)	31-6439	87.	Resistor (220,000 ohms)	33-422339				34-2564
P. B. Aerial Compensator (850 to 1500 KC) (Part of 30)		88.	Resistor (47,000 ohms)	33-247339				34-2564
P. B. Aerial Compensator (850 to 1500 KC) (Part of 30)		89.	Resistor (4700 ohms)	33-210339				34-2564
P. B. Aerial Compensator (50 to 1000 KC) (Part of 30)		90.	Condenser (.01 mfd, 400 volts)	30-4572				34-2564
P. B. Oscillator Transformer (900 to 1600 KC)	32-3779	91.	Condenser (.01 mfd, 400 volts)	30-4572				34-2564
P. B. Oscillator Transformer (850 to 1500 KC)	32-3779	92.	Resistor (470,000 ohms)	33-447339				34-2564
P. B. Oscillator Transformer (850 to 1500 KC)	32-3779	93.	Resistor (15,000 ohms)	33-356339				34-2564
P. B. Oscillator Transformer (600 to 1000 KC)	32-3780	94.	Resistor (50,000 ohms)	33-447339				34-2564
P. B. Oscillator Transformer (600 to 1000 KC)	32-3780	95.	Resistor (470,000 ohms)	33-447339				34-2564
P. B. Oscillator Transformer (50 to 1000 KC)	32-3780	96.	Condenser (.001 mfd, 1000 volts)	30-4601				34-2564
Clip	16-2850	97.	Output Transformer	32-8191				34-2564
Iron Core	32-8780	98.	Speaker	36-1545 or 36-1824				34-2564
Cap	28-4936		Cone Assembly	36-4178				34-2564
Mig. Screw	16-2850		Cable	41-3846				34-2564
32. Resistor (47,000 ohms)	33-447339	99.	Home Recording Socket	27-8179				34-2564
Condenser (.05 mfd, 400 volts)	30-4518		Mig. Rivet	W1209FA5				34-2564

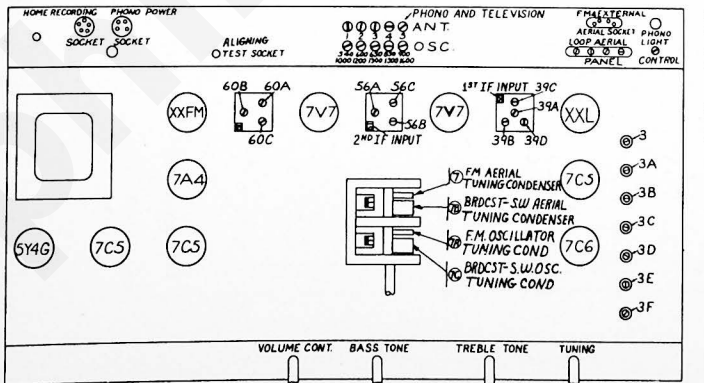
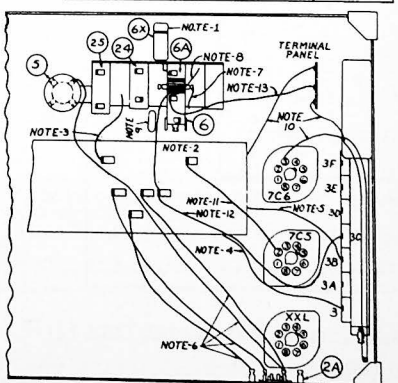


FIG. 5 - LOCATIONS OF COMPENSATORS, TOP OF CHASSIS— MODELS 42-1012, 42-1013 148





## 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:** 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 chassis.

**SIGNAL GENERATOR:** When adjusting the "I. F." padders, the high side of the signal generator is connected through a 1 mf. 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 in Fig. 5. 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

Operations in Order	SIGNAL GENERATOR		RECEIVER			Special Instructions
	Output Connections	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in Order	
1	High side to No. 2 terminal loop panel	455 KC	580 KC	Vol. max. P. B. Switch "Brdest."	60B, 56C, 39C, 39A	
2	Use loop on generator	1500 KC	1500 KC	P. B. Switch "Brdest."	3E, 3	Note A
3	Use loop on generator	580 KC	580 KC	P. B. Switch "Brdest."	3F	Roll Tuning Condensers Note B
4	Use loop on generator	Readjust as given in Operation 2				
5	Use loop on generator	15 MC	15 MC	P. B. Switch "S. W."	3D, 3A	Note C

### FREQUENCY MODULATION ALIGNING PROCEDURE

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

#### CRITICAL WIRING LOCATIONS

The following items on these models are critical for location and position. See Fig. 6, Page 5 for locations of wires and parts:

**NOTE 1.** Wire from condenser (6X) to F. M. oscillator transformer 6A must be kept short.

**NOTE 2.** Wire from push-button switch contact (22) to tap on F. M. oscillator transformer 6A must be dressed away from the push-button switch.

**NOTE 3.** Wire from standard and S. W. Band tuning section 7C of the oscillator tuning condenser must be dressed through the push-button switch between the S. W. oscillator transformer (24) and the standard broadcast transformer (25).

**NOTE 4.** Wire from compensator (3) to contact (50) of push-button switch must be dressed away from chassis.

**NOTE 5.** Wire from compensator (3B) to terminal panel must be dressed away from chassis.

**NOTE 6.** Wires from loop terminal panel (2A) to push-button switch must be dressed away from chassis.

**NOTE 7.** Wire from F. M. oscillator section (7A) of tuning condenser to F. M. oscillator transformer 6A must be as short as possible.

**NOTE 8.** Dress ground braid wire to F. M. oscillator transformer (6A) away from the oscillator windings.

**NOTE 9.** Dress Mica Condenser (21) away from the F. M. oscillator transformer (6 and 6A).

**NOTE 10.** Dress wires to contact 3 of 7C6 tube and terminal panel away from other wires and 7C5 oscillator tube socket.

**NOTE 11.** Dress wire from plate contact (2) of 7C5 oscillator tube socket to push-button switch contact (10) away from other leads and other push-button switch contact.

**NOTE 12.** Dress wire from compensator 3C to contact (23) of push-button switch away from the chassis and other wiring.

**NOTE 13.** Dress ground wire braid from terminal panel to F. M. aerial transformer (6) over winding.

**NOTE 14.** Red wire from F. M. oscillator section (7A) of tuning condenser must be dressed away from chassis bases.

### F. M. BAND ALIGNING PROCEDURE

Operations in Order	SIGNAL GENERATOR		RECEIVER			Special Instructions
	Output Connections	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in Order	
1	2nd I. F., F. M. input connection	4.3 MC	580 KC	Vol. max P. B. Switch "F. M."	60C (Note D) 60A (Note E)	
2	1st I. F., F. M. input connection	4.3 MC	580 KC	P. B. Switch "F. M."	56B, 56A (Note F)	
3	Ant. Section of F. M. Tuning Cond. and Grd.	4.3 MC	580 KC	P. B. Switch "F. M."	39D, 39B (Note G)	
4	Use test loop on generator; place near dipole aerial	48.5 MC	85 (Note G)	P. B. Switch "F. M."	3C (Note F) 3B (Note H)	Roll tuning condenser when adjusting 3B. See Note B.
5	"	48.5 MC	85	P. B. Switch "F. M."	3C 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 at the low frequency end of the broadcast scale.

**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 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 compensator (3D) to the second signal peak from the closed position (maximum ca-

capacity). Check image at 15,910 m.c. by turning signal generator pointer to 15,910 mc.

The aerial compensator (3A) 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 (60C) 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 (60A) 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 peak 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 (60C) until zero reading is obtained on the meter. After this adjustment is made padder No. 60A should be reset for equal peaks as given above.

**NOTE F.—**Adjust padders 56B, 56A, 39D, and 39B 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 (3C) to the point where minimum signal indication is observed on the output meter.

**NOTE H.—**In order to adjust padder (3B) 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 (48.825 MC). Adjust padder (3B) to maximum output reading on either of these peak signals. As padder 3B is being adjusted roll the tuning condenser as given in Note B.