



## FREQUENCY MODULATION Model 42-350, Code 121

### SPECIFICATIONS

**CIRCUIT DESCRIPTION:** Model 42-350, Code 121, is a seven (7) tube superheterodyne radio designed for reception of standard, shortwave and Frequency Modulation broadcast stations, and the sound of a television program tuned in by special Philco Television Radios. The radio incorporates six electric push-buttons for automatically tuning five stations in the standard broadcasting band, Philco built-in low impedance loop aerial for reception of standard and short-wave broadcast stations; separate Automatic Built-In F. M. Aerial for reception of Frequency Modulation stations; three tuning ranges; two intermediate frequency stages; tone control; illuminated band indicator; audio bass frequency compensation in the volume control circuit, and a pentode audio output.

**POWER SUPPLY:** 115 volts, 60 cycles A.C. This model can also be operated on 25-cycle current. To do this it is necessary to replace the power transformer as indicated in the parts list for 25-cycle operation.

**POWER CONSUMPTION:** 50 watts.

**INTERMEDIATE FREQUENCY:** Standard Tuning, 455 KC; F. M. channel, 4.3 MC.

**FREQUENCY TUNING RANGES:** 540 to 1720 KC; 9 to 15 MC and 42 to 50 MC (F. M.).

**AUDIO OUTPUT:** 1.5 watts.

**PHILCO TUBES USED:** XXL, oscillator; XXL, converter; 7V7, 1st I. F.; 7V7, 2nd I. F.; XXFM, 2nd detector-1st audio; 7B5, audio output, and a 7Y4 rectifier.

**CABINET DIMENSIONS:** Height, 11 inches; width, 18½ inches; depth, 10½ inches.

### ELECTRIC PUSH-BUTTON TUNING ADJUSTMENTS

The electric push-button tuning mechanism consists of six (6) push-buttons. Five of the push-buttons are used for selecting standard broadcast stations, and one for the power control (ON-OFF).

Viewing the front of the cabinet from left to right the first push-button is the power control (ON-OFF), the next five push-buttons for tuning standard broadcast stations.

When setting up stations on the push-buttons the lowest frequency station is set up in the second push-button from the left and the remaining stations according to increasing frequency in the next four push-buttons. These push-buttons are adjusted by the padders located on the rear of the chassis.

The frequency ranges covered by the station tuning push-buttons and procedure for adjusting are as follows:

Padders (right to left from rear)	Circuit	Buttons (left to right from front)	Frequency Range
1	Ant.	1	ON-OFF
2	Osc.	2	540 to 980 KC
3	Ant.	3	540 to 980 KC
4	Osc.	4	710 to 1185 KC
5	Ant.	5	850 to 1600 KC
6	Osc.	6	1185 to 1720 KC

### 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, short-wave, 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 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 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 F. M. band regardless of the position of the switch.

#### 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.

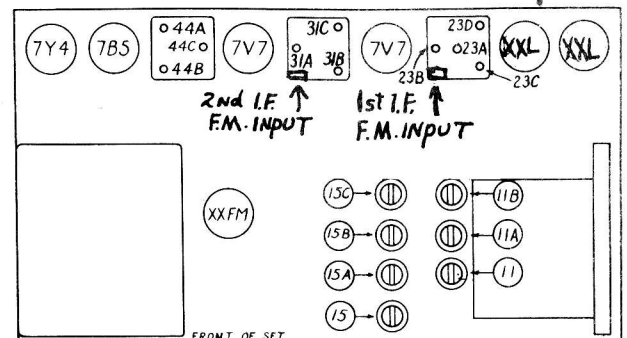
Philco Aerial Coupler, Part No. 45-1361.

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.

The second push-button from the left can also be adjusted for reception of the sound channel of a television program received by special Philco television radios. This push-button may also be used in conjunction with a Philco Wireless Record Player.



TOP OF VIEW OF CHASSIS  
FIG. 1—LOCATIONS OF R. F. AND I. F. COMPENSATORS

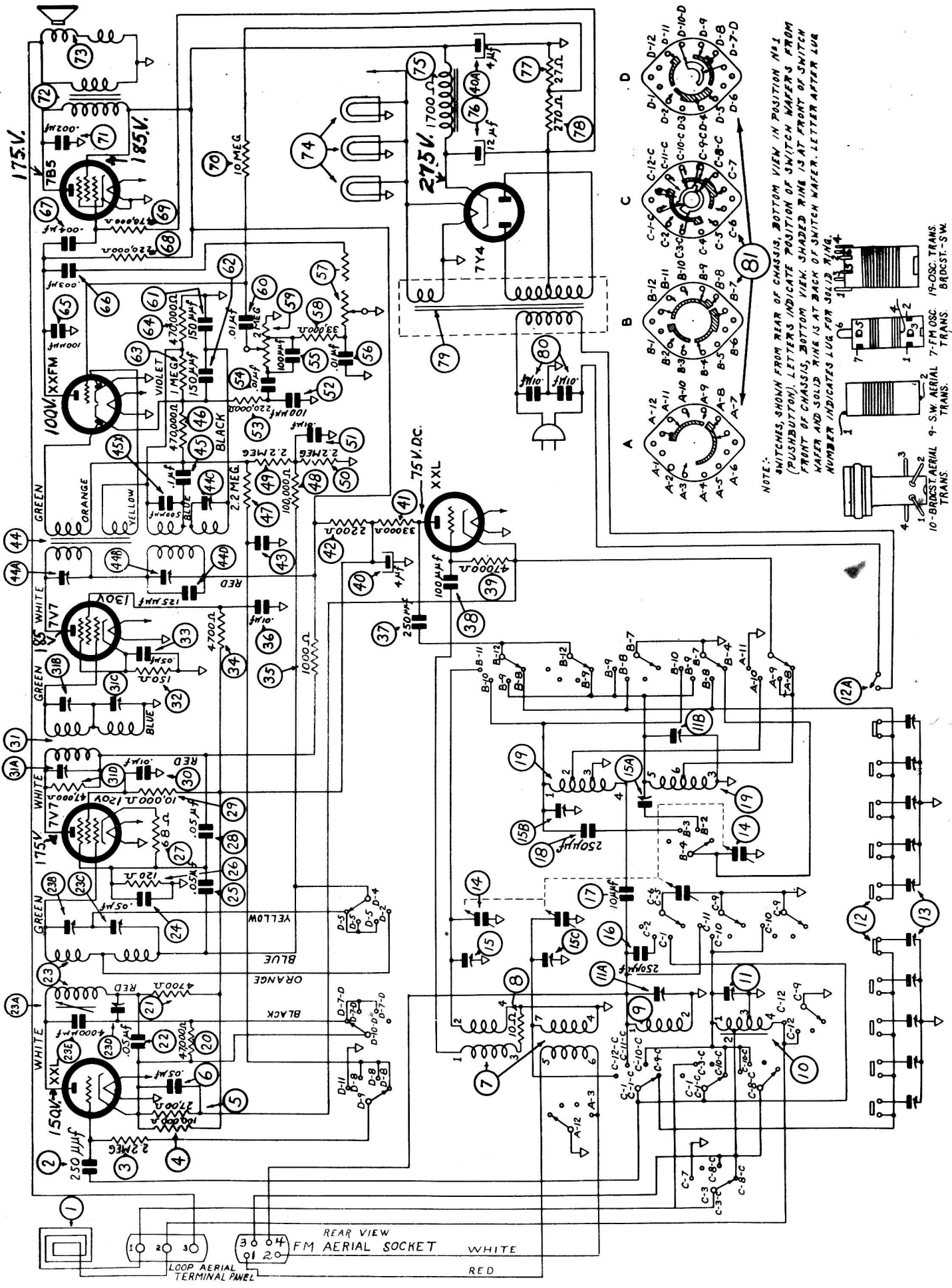


FIG. 2.—SCHEMATIC DIAGRAM 42-350, Code 121

The D. C. voltages indicated at the tube elements in the above diagram were measured with a 1000 ohms per voltmeter, Philco Model 027. Line voltage 117 volts A. C. No signal being received, range switch broadcast.

## 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. 3 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 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 in Fig. 1. 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		Adjust Compensators in Order	Special Instructions	
	Output Connections	Dial Setting	Dial Setting	Control Settings				
1	High side to No. 1 terminal loop panel	455 KC	580 KC	Vol. max, Band Switch "Brdcst."		44B, 31C, 23A, 23B		
2	Use loop on generator	1500 KC	1500 KC	"		15A, 11B	Note A	
3	Use loop on generator	580 KC	580 KC	"		11	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	Band Switch "S.W."		15B, 11A	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 this set are critical for location and position. See Figs. 4 and 5, Page 4, for locations of wires and parts.

- Note 1. Dipole aerial leads from socket to be twisted and dressed over wave switch directly to F. M. aerial-oscillator transformer No. 7.
2. Ground braid from gang to chassis to be wired and soldered on top side of subbase in such a manner so that there is a floating bond between ground and the condenser.
  3. Short wave aerial transformer (No. 9) to be wired directly between terminal panel 4 and band switch contact C-11-C so that there is a minimum of slack in the wires.
  4. Wire from broadcast aerial transformer (No. 10) to ground to be dressed under short wave aerial transformer (No. 9).
  5. Wire from band switch contact B-11 to compensator 15 to be direct and away from switch and other wires.
  6. Red and white wires from 1st I. F. transformer to be dressed on base and not twisted with other wires from same coil. Green wire to be free of other wires and direct to contact 6 of the 7V7, 1st I. F. tube.
  7. Wires from 3rd I. F. transformer (44) to be brought out proper holes and not twisted together inside of can.
  8. Green and yellow wires of 3rd I. F. transformer 44 to run from hole in subbase between terminal panel 5, contacts 2 and 3 and direct to contacts of the XXFM tube 5 and 6. Orange, blue, black and brown leads to be free of other wires and dressed off base.

9. Condenser (45) to be dressed off base.
10. A.C. switch leads to be twisted.
11. Wire from prong 5 of the 7Y4 tube to lug 3 of the loop aerial terminal panel to be dressed between Electrolytic Condenser 76 and Mounting Strap and to rear of chassis across bottom contacts of F. M. socket.
12. White, red and black wires of 1st I. F. transformer to be dressed with excess out of coil shield, and towards rear of chassis, and close to base. Black lead to be dressed around and under all leads going to XXL converter tube socket. Orange, yellow, green and blue leads to be dressed with excess out of coil shield and away from the white, red and black leads.
13. Wire from band switch contact C-12-C to compensator 15-C to be dressed free of other wires.
14. Dress wire from band switch contact B-12 to wiring panel 4, lug 4 with excess toward front of set, under shortwave aerial transformer (9), keeping wire between the terminal panel 4 and wires coming through subbase which connect to F. M. aerial-oscillator transformer (7) and band switch.
15. Keep wires from terminal panel No. 5 contact No. 5 to band switch contact D8 and terminal panel No. 6 to terminal panel No. 4 between padder strip and mounting stud of 1st I. F. transformer so that they are kept clear of leads from the 1st I. F. transformer.

### F. M. BAND ALIGNING PROCEDURE

Operations in Order	SIGNAL GENERATOR			RECEIVER		Adjust Compensators in Order	Special Instructions
	Output Connections	Dial Setting	Dial Setting	Control Settings			
1	2nd I. F., F. M. input connection	4.3 MC	580 KC	Vol. max, Band Switch "F.M."		44C (Note D) 44A (Note E)	
2	1st I. F., F. M. input connection	4.3 MC	580 KC	Band Switch "F.M."		31A, 31B (Note F)	
3	High side to No. 1 contact, F. M. socket. Ground to No. 2 contact	4.3 MC	580 KC	Band Switch "F.M."		23D, 23C (Note F)	
4	Use test loop on generator; place near dipole aerial	48.5 MC	85 (Note G)	Band Switch "F.M."		15 (Note G) 15C (Note H)	Roll tuning condenser when adjusting 15C. See Note B.
5	"	48.5 MC	85	Band Switch "F.M."		15 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.

**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 compensator (15B) to the second signal peak from the closed position (maximum capacity).

The aerial compensator (11A) 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 (44C) 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 (44A) 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 (44C) until zero reading is obtained on the meter. After this adjustment is made padder No. 44A should be reset for equal peaks as given above.

**NOTE F.—**Adjust padders 31A, 31B, 23C, and 23D for equal signal peaks and equal frequency spacing each side of 4.3 M.C.

**NOTE G.—**The dial scale numbers are listed in tenths of megacycles, less the first digit; i. e., 49 MC is 90, 53.5 is 85. Set the tuning dial pointer to 90 on the F. M. scale. Adjust padder (15) to the point where minimum signal indication is observed on the output meter.

**NOTE H.—**In order to adjust padder (15C) the signal generator should be set to either the signal peak approximately 125 KC below 49 MC (48.875 MC), or 125 KC above 49 MC (49.125 MC). Adjust padder (15C) to maximum output reading on either of these peak signals. As padder 15C is being adjusted roll the tuning condenser as given in Note B.

# REPLACEMENT PARTS—Model L42-350, Code 121

Schem. No.	Description	Part No.	Schem. No.	Description	Part No.	Schem. No.	Description	Part No.
1.	Loop Aerial	76-1383	42.	Resistor (2200 ohms)	33-222339	74.	Mtg. Washer	27-7467
1a.	Mtg. Screw	W-2071	43.	Condenser (.07 mfd., 200 volts)	30-4519		Mtg. Nut	W-124
	F.M. Loop Aerial	27-6181	44.	3rd I.F. Transformer	32-3796	75.	Dial and Indicator Lamps	34-2064
	Socket	27-6181	44a.	Mtg. Nut	W-1949	76.	Field Coil (Replace Speaker 36-1548)	
2.	Mica Condenser (250 mmfd.)	60-125257		Primary Compensator (4.3 M.C.)			Electrolytic Condenser (12 mfd., 400 volts)	30-2409
3.	Resistor (2.2 megohms)	33-522339		Part of 44			Mtg. Clip	56-1466
4.	Resistor (100,000 ohms)	33-410339	44b.	Primary Compensator (455 K.C.)		77.	Resistor (27 ohms)	33-027336
5.	Resistor (2700 ohms)	33-227339		Part of 44		78.	Resistor (270 ohms)	33-127436
6.	Condenser (.05 mfd., 200 volts)	30-4519	44c.	Secondary Compensator (4.3 M.C.)		79.	Power Transformer (115 volts, 60 cycle)	32-8183
7.	F.M. Oscillator Transformer	32-3797		Part of 44			Mtg. Screw	W-453
	Mtg. Clip	28-5002	44d.	Mica Condenser (125 mmfd.)			Shield	56-2285
8.	Resistor (10 ohms)	33-010336		Part of 44			Shield Base	56-2286
9.	Short Wave Aerial Transformer	32-3764	45.	Condenser (.1 mfd.)	30-4586		Power Transformer (115 volts, 25 cycles)	32-8210
10.	Broadcast Aerial Transformer	32-3763	45x.	Mica Condenser (500 mfd.)	60-150227		Shield	56-1547
	Mtg. Clip	28-5002	46.	Resistor (470,000 ohms)	33-447339		Shield Base	56-1548
11.	Compensator (Brdcst. Band, 580 K.C.)	31-6428	47.	Resistor (2.2 megohms)	33-522339		Power Transformer (115 volts, 25 cycles)	32-8210
11a.	Compensator (S.W. Aerial, 15 M.C.)		48.	Resistor (100,000 ohms)	33-410339		Shield	56-1547
	Part of 11		49.	Resistor (2.2 megohms)	33-522339		Shield Base	56-1548
11b.	Compensator (Brdcst. Band, 1500 K.C.)		50.	Resistor (2.2 megohms)	33-522339		Power Transformer (115/230 volts, 60 cycle)	32-8211
	Part of 11		51.	Condenser (.01 mfd., 400 volts)	30-4572		Condenser (.01-.01 mfd.)	3903-ODG
12.	Push-button Switch & A.C. Switch	42-1695	52.	Mica Condenser (100 mmfd.)	60-110257	80.	Band Switch	42-1696
12a.	A.C. Switch (Part of 12)		53.	Resistor (220,000 ohms)	33-422339	81.	Mtg. Nut	W-2157
	Mtg. Sleeve	28-5665	54.	Condenser (.01 mfd., 400 volts)	30-4572		MISCELLANEOUS PARTS	
	Mtg. Screw	W-523	55.	Mica Condenser (100 mmfd.)	60-110257		Arm and Link (Band Indicator)	76-1353
13.	Push-button Padder Strip	31-6372	56.	Condenser (.01 mfd., 400 volts)	30-4572		Cable (Power)	L-3199
	Mtg. Screw	W-1974	57.	Tone Control	33-5471		Cabinet	10562A
14.	Tuning Condenser	31-2595		Mtg. Nut	W-2157		Dial Scale	27-5736
	Drive Cord (Tuning Cond.)	31-2546	58.	Resistor (33,000 ohms)	33-333339		Dial Pointer	56-1856
	Spring	28-3751	59.	Volume Control	33-5470		Escutcheon (Push Buttons)	56-2233
	Drive Cord (Pointer)	31-2594		Mtg. Nut	W-2157		Mtg. Screw	W-2071
	Spring	28-8933	60.	Condenser (.01 mfd., 400 volts)	30-4572		Knob Assembly (Vol. Tone Band)	54-4102
	Mtg. Rubber	27-4596	61.	Mica Condenser (150 mmfd.)	60-115327		Knob Assembly (Push Buttons)	54-4126
	Mtg. Sleeve	28-3806	62.	Mica Condenser (150 mmfd.)	60-115327		Mtg. Screw (Chassis)	W-763
	Mtg. Washer	W-151	63.	Resistor (1 megohm)	33-510339		Mtg. Washer (Chassis)	W-425
	Mtg. Screw	W-2002	64.	Resistor (470,000 ohms)	33-447339		Socket Assembly (Indicator Lamps)	76-1078
	Tuning Shaft	56-6156	65.	Mica Condenser (100 mmfd.)	60-110257		Socket Assembly (Dial Lamps)	76-1287
	Tuning Drive Drum	38-9883	66.	Condenser (.003 mfd., 1000 volts)	30-4469		Socket (Single Prong)	27-6180
15.	Compensator (F.M. Osc., 48.5 M.C.)	31-6444	67.	Condenser (.004 mfd.)	30-4623		Socket (Tubes)	27-6177
15a.	Compensator (Brdcst. Osc., 1500 K.C.)		68.	Resistor (220,000 ohms)	33-422339		Socket (4 Prong F.M. Aerial)	27-6181
	Part of 15		69.	Resistor (470,000 ohms)	33-447339		Mtg. Rivets	W-239
15b.	Compensator (S.W. Osc., 15 M.C.)		70.	Resistor (10 megohms)	33-610339		Tab Kit	40-8660
	Part of 15		71.	Condenser (.002 mfd., 600 volts)	30-4622		Tab (Television)	27-5776
15c.	Compensator (F.M. Aerial, 48.5 M.C.)		72.	Output Transformer	32-8172		Terminal Panel (Loop)	38-9942
	Part of 15		73.	Speaker	36-1548		Wiring Panel (8 lugs)	38-9007
16.	Silver Mica Condenser (250 mmfd.)	20-025011		Cone Assembly (for Speaker 36-1548)	36-4206		Wiring Panel (5 lugs)	38-9579
17.	Mica Condenser (10 mmfd.)	60-010337		Cable	41-3613		Mtg. Rivets	W-239
18.	Mica Condenser (250 mmfd.)	20-025011						
19.	Oscillator Transformer (Brdcst., S.W.)	32-3799						
	Mtg. Clip	28-5003						
20.	Resistor (47,000 ohms)	33-347339						
21.	Resistor (4700 ohms)	33-247339						
22.	Condenser (.05 mfd., 400 volts)	30-4518						
23.	1st I.F. Transformer	32-3794						
	Mtg. Nut	W-1949						
23a.	Primary Compensator (455 K.C.)							
	Part of 23							
23b.	Secondary Compensator (455 K.C.)							
	Part of 23							
23c.	Secondary Compensator (4.3 M.C.)							
	Part of 23							
23d.	Primary Compensator (4.3 M.C.)							
	Part of 23							
23e.	Mica Condenser (4000 mmfd.)	60-240214						
	(Part of 23)							
24.	Condenser (.05 mfd., 200 volts)	30-4519						
25.	Condenser (.05 mfd., 200 volts)	30-4519						
26.	Resistor (120 ohms)	33-112336						
27.	Resistor (68 ohms)	33-068336						
28.	Condenser (.05 mfd., 400 volts)	30-4518						
29.	Resistor (10,000 ohms)	33-310339						
30.	Condenser (.01 mfd., 400 volts)	30-4572						
31.	2nd I.F. Transformer	32-3798						
	Mtg. Nut	W-1949						
31a.	Primary Compensator (4.3 M.C.)							
	Part of 31							
31b.	Secondary Compensator (4.3 M.C.)							
	Part of 31							
31c.	Secondary Compensator (455 K.C.)							
	Part of 31							
31d.	Resistor (47,000 ohms) (Part of 31)	33-347339						
32.	Resistor (150 ohms)	33-115336						
33.	Condenser (.05 mfd., 200 volts)	30-4519						
34.	Resistor (4700 ohms)	33-247339						
35.	Resistor (1000 ohms)	33-210339						
36.	Condenser (.01 mfd., 400 volts)	30-4572						
37.	Mica Condenser (250 mmfd.)	60-125257						
38.	Mica Condenser (100 mmfd.)	60-110257						
39.	Resistor (47,000 ohms)	33-347339						
40.	Electrolytic Condenser (4-4 mfd., 400 volts)	30-2477						
40a.	Electrolytic Condenser (4 mfd., 400 volts) (Part of 40)							
	Mtg. Clip	56-1466						
41.	Resistor (33,000 ohms)	33-333339						

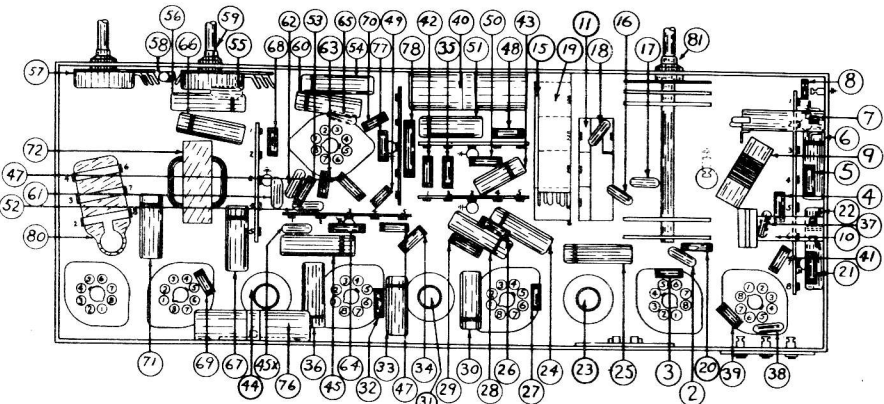


FIG. 4—LOCATIONS OF PARTS—UNDER CHASSIS

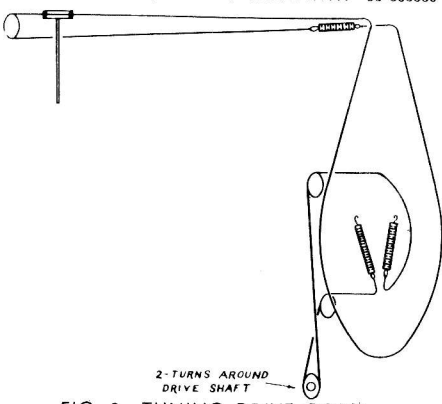


FIG. 3—TUNING DRIVE CORD ARRANGEMENT

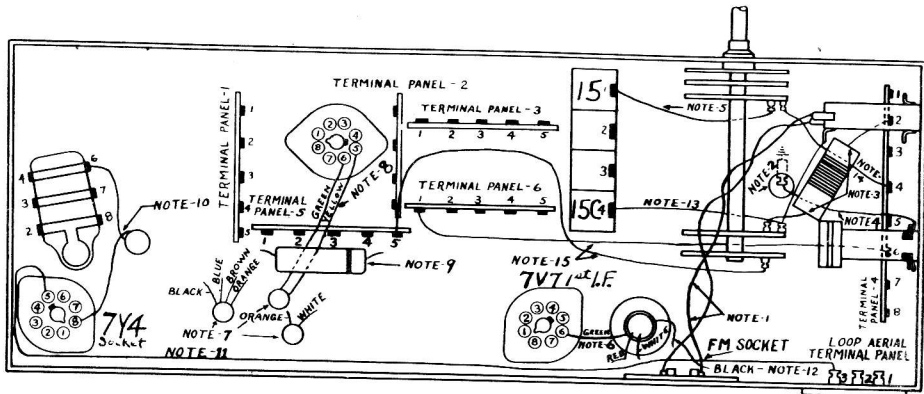


FIG. 5—CRITICAL WIRING AND PART LOCATIONS—UNDER CHASSIS  
(See Notes 1 to 15, Page 2)