

PHILCO

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Service Bulletin—No. 161-B

(This Bulletin Supersedes Service Bulletin No. 161)

Model 17

PHILCO RADIO MODEL 17, a superheterodyne for operation on alternating current, uses the multiple-function, high-efficiency 6.3-volt tubes, and gives the performance of a set using several more than the eleven tubes it actually employs. Model 17 has Philco Interstation Noise Suppression, Bass-Compensating Tone Control, Automatic Volume Control, Shadow Tuning, and covers the frequency range from 520 to 4000 kilocycles (4.0 megacycles), with a Wave-Band Switch that gives standard broadcast reception (520-1500 K. C.) with the switch turned to the left; reception (1.5-4.0 megacycles) of police, airport and aircraft, and amateur stations when the switch is turned to the right. The Model 17 has Super Class "A" amplification, with an Auditorium Speaker giving 15 watts' undistorted output (Code 122 and 123); 10 watts (Code 121).

The tube sequence is: R. F., Philco Type 78 tube; Combination 1st Detector and Oscillator, Type 6A7; I. F., Type 78; 2nd Detector, Type 37; Automatic Volume Control, Type 37; Interstation Noise Suppression, Type 78. The 1st A. F. stage uses a Type 77; the Driver (2nd A. F.) is a Type 42; and the Output stage has two Type 42's connected as triodes. The Rectifier is a Type 5Z3 in chasses of Codes 122 and 123; a Type 80 in Code 121. The intermediate frequency used in the adjustment of the superheterodyne is 175 kilocycles. The power consumption of the receiver is 130 watts with chasses using the Type 5Z3 Rectifier; 120 watts with those using the Type 80.

Table 1—Tube Socket Data*—A. C. Line Voltage, 115

Circuit	R.F.	1st Det. Osc.	I.F.	2nd Det.	A. V. C.	Inter-Station Noise Suppr. Cr.	1st A.F.	Driver (2nd A.F.)	Output (Class A)		Rectifier †
Type Tube	78	6A7	78	37	37	78	77	42	42	42	5Z3
Filament Volts— F to F.....	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	4.7
Plate Volts—P to K	220	220	225	0	0	45	45	230	340	340	400
Screen Grid Volts— —Sg to K (6A7-1 G3-5 to K).....	75	58	75	—	—	50	50	230	340	340	...
Control Grid Volts— —CG to K (6A7- G4 to K).....	Neg- lig- ible	Neg- lig- ible	3.7	.25	.25	.24	.24	.24	34.	34.	...
Cathode Volts—K to F.....	0	0	3.7	0	11.	0	0	0	0	0	...
Type 6A7-G1 to K.	22	...	...	...	...	...	...	...	...	...	...
Type 6A7-G2 to K.	140	...	...	...	...	...	...	...	...	...	...

* The filament voltage values in Table 1 were gotten with an A. C. voltmeter; a high-resistance multi-range D. C. voltmeter was used for all the other values in Table 1. The readings were taken from the under side of the chassis, with test prods and leads. Philco Model 048 All-Purpose Set Tester is highly recommended for these readings and for many other tests of Model 17. The Volume Control of Model 17 was at maximum (all the way to the right); the Station Selector was at 520 K. C., with Wave-Band Switch turned to the left; Toggle Switch (S) in "S" position, and Interstation Noise Suppression Potentiometer (N) turned all the way to the right, when these values were obtained.

Readings taken with a plug-in adaptor will NOT be reliable.
† These values cover the use of Rectifier Tube Type 5Z3, in a Model 17-122 chassis. Model 17-121 uses a Type 80 Rectifier.

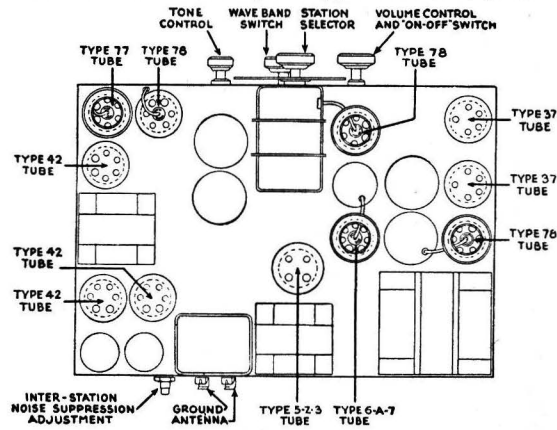


Fig. 1—Top View of Chassis, showing Tube Locations, and Major Parts

NEVER OPERATE RECEIVER WITH THE SHIELD REMOVED FROM OVER THE FIRST AUDIO FREQUENCY TUBE (TYPE 77), AS THE RESULTING AUDIO OSCILLATION MAY DAMAGE RESISTOR (R).

Table 2—Power Transformer Data

Ter- minal	A. C. Volts	Circuit	Color
1- 2	105- 125	Primary	White
3- 5	6.3		
6- 7	5.0	Filament of 5Z3	Blue
8-10	800	Plates of 5Z3	Yellow
4	...	Center Tap of 3-5	Black-Yellow Tracer
9	...	Center Tap of 8-10	Yellow-Green Tracer

ADJUSTMENT FOR INTERSTATION NOISE SUPPRESSION

The adjustment of the Interstation Noise-Suppression circuit is made with the knurled brass adjustment knob at the rear of the chassis (see Fig. 1). No tools are necessary. This adjustment occurs to Potentiometer (N). Tune the receiver to a moderately strong broadcasting station, adjusting the Station Selector to the exact point of best reception shown by the narrowing of the shadow thrown on the screen of the Shadow Tuning Meter. Place the Toggle Switch (S) in the "S" position. Turn the knurled brass knob of the Potentiometer (N) to the right (clockwise) to increase the sensitivity of the receiver; to the left (counter-clockwise) to decrease the sensitivity. The Volume Control (V) should be set at the point at which the station is comfortably received. The receiver then should be de-tuned, by turning the Station Selector slightly in either direction to a point between adjacent channels; that is, where no broadcasting station is received. The noise-level at this point should be reduced by turning the knurled brass knob to the left until the noise just disappears. Since the electrical noise-level varies in many localities, this adjustment should be made at the time when the between-channel noise-level is greatest. Placing the Toggle Switch (S) in the "D" position disconnects the Interstation Noise Suppression feature. The noise-level between stations will be increased, but distant stations can be received better. When returning to stronger signals, placing the Toggle Switch in the "S" position will again give interstation noise suppression.

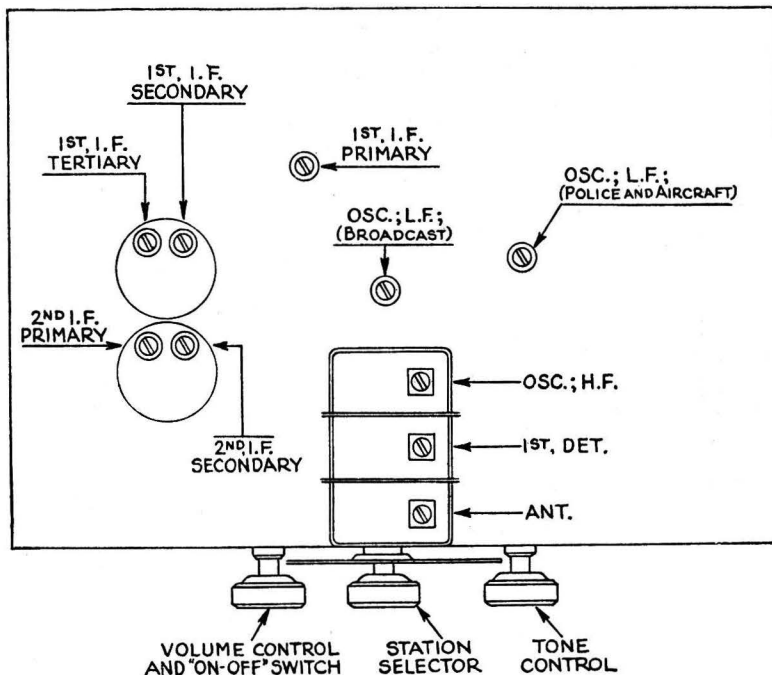


Fig. 2—Top View of Chassis, showing Location of Compensating Condensers



Terminal Arrangement of Tube Sockets Viewed from Under Side of Chassis,

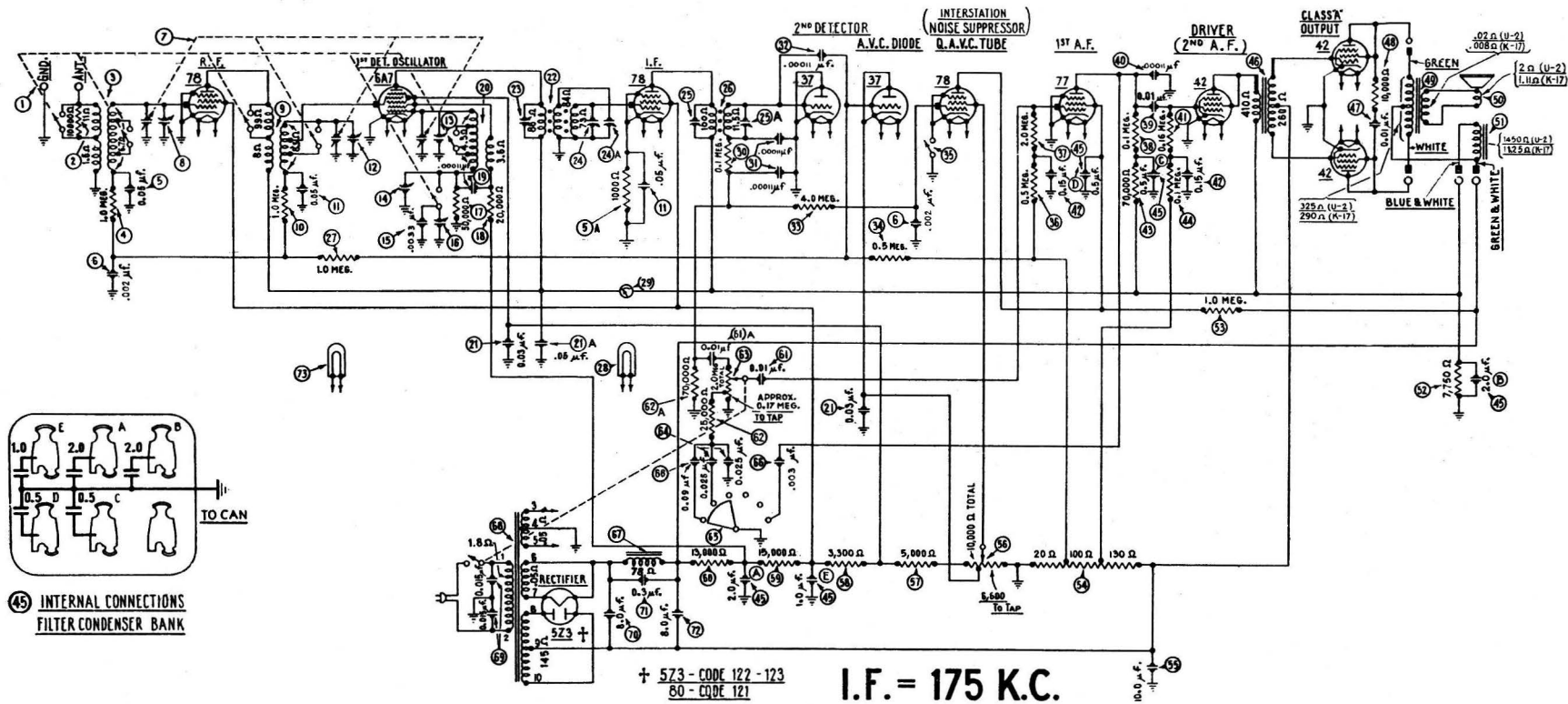


Fig. 3—Schematic Wiring Diagram

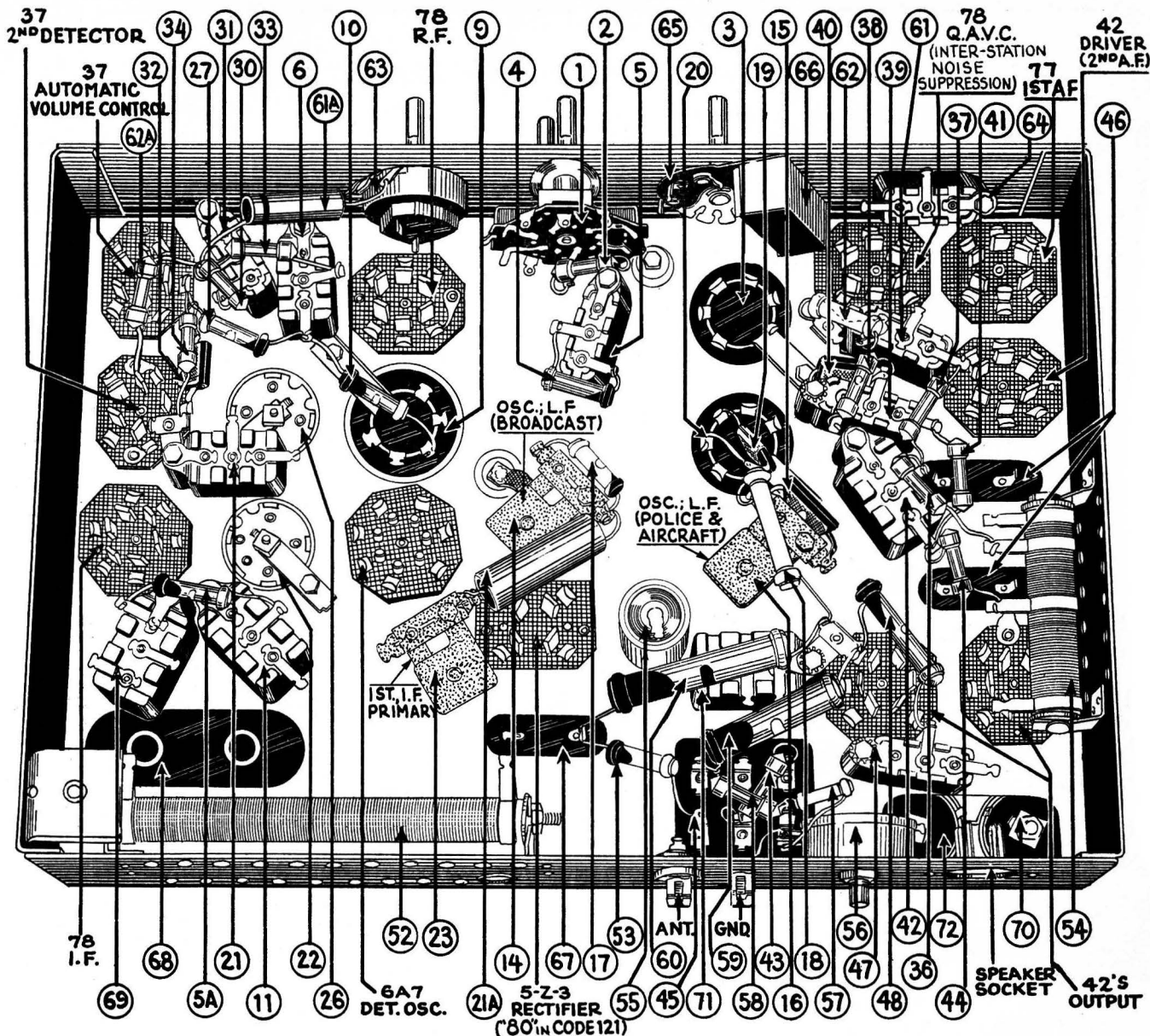


Fig. 4—Bottom View of Chassis, showing Parts, and Position of Compensating Condensers Located Underneath Chassis

ADJUSTMENT OF MODEL 17 COMPENSATING CONDENSERS

Adjustment of the compensating condensers of Philco Model 17 is the same generally as the method described in Service Bulletin No. 120-C, "Adjusting Philco Superheterodynes." The procedure should be understood thoroughly before any adjustment is undertaken.

These adjustments require an accurately calibrated signal generator. The Philco Model 048 All-Purpose Set Tester includes a precision signal generator supplying frequencies from 105 K. C. to 2000 K. C., and is recommended. Your distributor is in a position to supply the Model 048 and full instructions for the adjustment of Model 17

Receivers are adjusted accurately before they are shipped from the Factory. If later re-alignment is required, it is necessary in most cases only to adjust the intermediate frequency compensating condensers. Fig. 2 shows their location. The intermediate frequency is 175 kilocycles.

If further adjustment is needed, the high frequency and low frequency compensating condensers are re-aligned in the following order:

The OSC.; H. F. (13) compensating condenser is adjusted with the signal generator delivering a frequency of 1500 kilocycles. Next in order, the OSC.; L. F.; (Broadcast) (14) at 600 kilocycles, "rocking" the Tuning Condenser (7) as this adjustment is made; then the OSC.; L. F.; (Police and Aircraft) (16) at 1700 kilocycles. The OSC.; H. F. (13) is readjusted at 1500 kilocycles. Finally, the 1st, Detector (12) and Ant.; H. F. (8) compensating condensers are adjusted at 1400 kilocycles with the signal generator.

Compensating condensers (13), (12), and (8) are mounted upon Tuning Condenser (7); all of the compensating condensers can be adjusted from above the chassis. Each individual adjustment should be made with extreme care.

REPLACEMENT PARTS FOR MODEL 17

(THESE PRICES ARE EFFECTIVE SEPTEMBER 15, 1933)

No. on Figs.	Description	Part No.	List Price	No. on Figs.	Description	Part No.	List Price
1	Wave-Band Switch	42-1035	\$0.78	57	Resistor (5,000) (Green-Black-Red)	5310	.24
2	Resistor (10,000) (Brown-Black-Orange)	4412	.24	58	Resistor (3,300) (Orange-Orange-Red)	7238	.24
3	Antenna Transformer	32-1170	.84	59	Resistor (15,000) (Brown-Green-Orange)	{ (Code 122) } { (Code 123) } 5718	.48
4	Resistor (1.0 meg.) (Brown-Black-Green)	4409	.24		Resistor (10,000) (Brown-Black-Orange) (Code 121)	33-1024	.30
5	Condenser	3615-BC	.19	60	Resistor (13,000) (Brown-Orange-Orange)	{ (Code 122) } { (Code 123) } 6450	.42
5a	Resistor (1,000) (Brown-Black-Red)	5837	.24		Resistor (10,000) (Brown-Black-Orange) (Code 121)	33-1024	.30
6	Condenser (Double) (.002-.002)	7296-E	.19	61	Condenser (.01)	3903-L	.19
7	Tuning Condenser Assembly	31-1041	4.50	61a	Condenser (.05)	30-4020	.14
8	Compensating Condenser (Ant.; H. F.; Part of 7)			62	Resistor (25,000) (Red-Green-Orange)	4516	.24
9	First Detector Transformer	32-1171	.84	62a	Resistor (70,000) (Violet-Black-Orange)	5385	.24
10	Resistor (1.0 meg.) (Brown-Black-Green)	4409	.24	63	Volume Control and "On-Off" Switch	33-5023	1.00
11	Condenser (Double) (.05-.05)	3615-AP	.22	64	Condenser (Double) (.025-.025) (External to 60)	7653-C	.14
12	Compensating Cond. (1st Det.; Part of 7)			65	Tone Control	30-4070	.45
13	Compensating Cond. (Osc., H. F.; Part of 7)			66	Condensers (.09 and .003) (Internal to 65)		
14	Compensating Cond. (Osc.; L. F.; Broadcast)	04000-R	.42	67	Filter Choke	32-7056	2.22
15	Condenser (.0033)	7301	.42	68	Power Transformer (50-60 cycles) { (Code 122) } { (Code 123) }	32-7058	6.00
16	Compensating Cond. (Osc.; L.F.; Police and Aircraft)	04000-R	.42		Power Transformer (50-60 cycles) (Code 121)	32-7080	5.40
17	Resistor (50,000) (Green-Brown-Orange)	4518	.24	69	Condenser (Double) (.015-.015)	3793-R	.30
18	Resistor (20,000) (Red-Black-Orange)	6649	.24	70	Condenser (Electrolytic) (8.0 mfd.) { (Code 122) } { (Code 123) }	30-2011 30-2014	1.50 1.25
19	Condenser (.00011)	4519	.22		Condenser (Electrolytic) (8.0 mfd.) (Code 121)	30-2023	1.00
20	Oscillator Transformer	32-1172	.90	71	Condenser (.3)	6287-F	.14
21	Condenser (Double) (.03-.03)	8318-C	.22	72	Condenser (Electrolytic) (8.0 mfd.) { (Code 122) } { (Code 123) }	30-2026 30-2014	1.10 1.25
21a	Condenser (.05)	30-4012	.18		Condenser (Electrolytic) (8.0 mfd.) (Code 121)	30-2022	1.00
22	First I. F. Transformer	32-1173	.90	73	Pilot Lamp (Station Selector)	6608	.14
23	Compensating Cond. (1st I. F. Primary)	04000-M	.19		Tube Shield	28-1107	.12
24	Compensating Condenser (1st I. F. Secondary)	31-6001	.42		Four-Prong Tube Socket	7545	.10
24a	Compensating Condenser (1st I. F. Tertiary)				Five-Prong Tube Socket	7546	.12
25	Compensating Cond. (2nd I. F. Primary)	31-6000	.48		Six-Prong Tube Socket	7547	.12
25a	Compensating Cond. (2nd I. F. Secondary)				Seven-Prong Tube Socket	27-6005	.12
26	Second I. F. Transformer (Orange-Yellow Dot)	32-1174	.72		Speaker Socket	4957	.10
27	Resistor (1.0 meg.) (Brown-Black-Green)	4409	.24		Speaker Socket Hole Cover (Code 121)	7084	.90 Per C
28	Pilot Lamp (Part of 20 Shadow Tuning Meter)				Speaker Cable (Code 121)	L-1632	.24
29	Shadow Tuning Meter	6497	2.70		Knob (large)	27-4025	.10
30	Resistor (0.1 meg.) (White-White-Orange)	4411	.24		Knob (medium)	03063	.10
31	Condenser (Double) (.00011-.00011)	8035-C	.19		Knob (small)	03064	.07
32	Condenser (.00011)	4519	.22		Spring (Knob)	5262	.42 Per C
33	Resistor (4.0 meg.) (Yellow-Black-Green)	6010	.24		Screw (Brass); (Secures Large Knob to Station Selector)	W-267	.53 Per C
34	Resistor (0.5 meg.) (Yellow-White-Yellow)	3769	.24		Dial Scale (Station Selector) (Tuning Condenser)	27-5013	.20
35	Switch (Toggle); (Interstation Noise Suppression Circuit)	3253	.48		Drive Cord (Tuning Condenser)	4020	.10 Per Foot
36	Resistor (0.5 meg.) (Yellow-White-Yellow)	4517	.24		Drive Bracket (Tuning Condenser)	6504	.04
37	Resistor (2.0 meg.) (Red-Black-Green)	5872	.24		Drive Shaft (Tuning Condenser)	6503	.04
38	Resistor (0.1 meg.) (White-White-Orange)	4411	.24		Drive Cord Spring (Tuning Condenser)	6508	1.92 Per C
39	Condenser (.01)	3903-L	.19		Drive Pulley (Tuning Condenser)	6439	.04
40	Condenser (.00011)	4519	.22		Cable Drum (Tuning Condenser)	6501	.08
41	Resistor (0.16 meg.) (Brown-Blue-Yellow)	5331	.24		Cable Drum Hub (Tuning Condenser)	6832	.04
42	Condenser (.15)	6287-H	.24		Eyelet (Dial Mounting) (Tuning Condenser)	W-637	.20 Per C
43	Resistor (70,000) (Violet-Black-Orange)	5385	.24		Bezel	6418	.24
44	Resistor (0.1 meg.) (White-White-Orange)	4411	.24		Bezel Mask	27-4043	.12
45	Filter Condenser Bank	30-4026	3.60		Bezel Mounting Screw	W-452	.42 Per C
46	Input Transformer	32-7057	2.70		Mounting Screw (Chassis), (Front)	W-669	1.02 Per C
47	Condenser (.01)	3903-F	.18		Mounting Screw (Chassis), (Rear)	W-826	1.80 Per C
48	Resistor (10,000) (Brown-Black-Orange)	3524	.24		Mounting Washer (Steel), (Chassis)	5058	.82 Per C
49	Output Transformer	{ (U-2 Speaker) 32-7052 } { (K-17 Speaker) 32-7078 }	1.80 1.25		Mounting Washer (Rubber), (Chassis)	5189	.04
50	Voice Coil and Cone Assembly (U-2)	36-3061	.90		A. C. Shielded Cable (Used to connect the "On-Off" Switch)	L-1655	.25
	Voice Coil and Cone Assembly (K-17)	36-3020	.48		"Stand-off" Insulator ("Terminal Panel"; used for connection of Power Transformer Primary lead)	.03103	.02
51	Speaker Field, Assembled with Pot (U-2)	36-3088	6.75				
	Speaker Field, Assembled with Pot (K-17)	36-3104	2.25				
52	Resistor (Wire-Wound) (7,750 ohms)	33-3020	.36				
53	Resistor (1.0 meg.) (Brown-Black-Green)	4409	.24				
54	Voltage-Divider Resistor (Wire-Wound)	33-3021	.19				
55	Condenser (Electrolytic) (10.0 mfd.)	33-2003	.84				
56	Potentiometer (Interstation Noise Suppression Circuit)	33-5015	.96				

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