MODELS F-71 & F-77

Seven-Tube, Three-Band, A-C Superheterodyne Receivers

Electrical Specifications

FREQUENCY RANGES

"Standard Broadcast" (A) ..... 540-1,720 kc
"Medium Wave" (B) ..... 2,300-7,500 kc
"Short-Wave" (C) ..... 7,500-22,000 kc

R-F ALIGNMENT FREQUENCIES

"Medium Wave" (B) ..... 6,000 kc (osc., ant.)
"Short Wave" (C) ..... 20,000 kc (osc.)
"Standard Broadcast" (A)..600 kc (osc.), 1,500 kc (osc.)

RADIOTRON COMPLEMENT

(1) Type-6A8 ..... First Detector—Oscillator
(2) Type-6K7 ..... Intermediate Amplifier
(3) Type-6H6 ..... Second Detector and A.V.C.
(4) Type-6F5 ..... Audio Voltage Amplifier
(5) Type-6F6 ..... Audio Power Amplifier
(6) Type-5W4 ..... Full-Wave Rectifier
(7) Type-6U5 ..... Tuning Tube

Pilot Lamps (2) ..... Mazda No. 46, 6.3 volts, 0.25 ampere

POWER SUPPLY RATINGS

Rating A ..... 105-125 volts, 50-60 cycles, 80 watts
Rating B ..... 105-125 volts, 25-60 cycles, 80 watts

LOUDSPEAKER

Model (F77)
Type ..... 12-inch Electrodynamic
Impedance (vc) at 400 cycles ..... 2.2 ohms

LOUDSPEAKER

Model (F71)
Type ..... 6-inch Electrodynamic
Voice coil impedance at 400 cycles... 2.5 ohms—84091—1

Mechanical Specifications

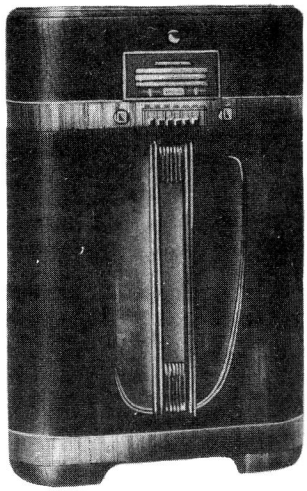
	Model F-71	Model F-77
Height	21⅜ inches	40 7/16 inches
Width	17¼ inches	26 7/16 inches
Depth	11 5/16 inches	14⅛ inches
Net Weight	30 pounds	60½ pounds
Shipping Weight	38 pounds	76 pounds
Chassis Base Dimensions	14½ inches x 7¾ inches x 3½ inches	
Over-all Chassis Height	8 inches	
Operating Controls	(1) Volume (large knob), Power Switch—Tone (small knob); (2) Tuning (large knob), Range Selector (small knob, left to right "Electric," "A," "B," "C")	
Tuning Drive Ratio	20 to 1	

General Description

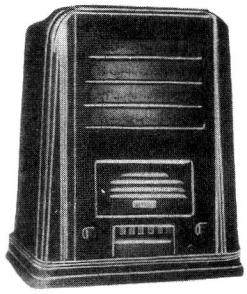
These receivers employ a seven-tube, three-band superheterodyne circuit. Features of design include "Electric Tuning" with push-button operation; "qumulative-wound" antenna "A" band coil; magnetite-core adjusted i-f transformers and low-frequency "A" oscillator tracking; phonograph terminal board; "Tuning Eye" tuning tube; aural-compensated volume control; tone control; and an edge-illuminated straight-line dial. Model F-77 incorporates a twelve-inch electrodynamic loudspeaker.

Circuit Arrangement

The circuit consists of a combined first-detector and oscillator stage, i-f amplifier stage, diode detector and automatic volume control stage, a-f amplifier stage, power amplifier stage, tuning indicator "Tuning Eye," and a full-wave rectifier. The antenna coil is constructed with a special type winding ("qumulative") to provide increased sensitivity and selectivity on the "Standard Broadcast" band. There is a fixed-tuned wave trap for reducing 460 kc interference.



Model F-77



Model F-71

Electric tuning is accomplished in a simple, trouble-free manner without the use of rotating parts. There are six trimmers for tuning the single antenna coil and six magnetite-core adjusted oscillator coils. A desired station is tuned accurately, quickly, and silently by pressing a push-button which puts the pre-adjusted coil and trimmer into use. Oscillator frequency drift is reduced to a negligible amount by use of a temperature-compensating capacitor across the oscillator coils.

Service Data

Loudspeaker.—Centering of the loudspeaker is made in the usual manner with three narrow paper feelers after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

Phonograph Attachment.—A terminal board is provided for connecting a phonograph into the audio-amplifying circuit. GE Model R-93 Record Player should be connected as follows: Remove the link from the phonograph terminal board. Connect green wire in Radio-Record switch cable to terminal 1; yellow to terminal 2; shield to terminal 3; and tape up the red and blue. Connect a 2-conductor twisted cable between the Record Player binding posts and the screw-terminals on Radio-Record switch. If additional volume is desired, connect a GE Stock No. 9632 transformer between the 2-conductor twisted cable and the screw-terminals on Radio-Record switch as follows: Yellow and brown transformer leads and one side of twisted cable to ground screw-terminal on switch; black transformer lead to other side of twisted cable; and blue transformer lead to other screw-terminal on switch.

Precautionary Lead Dress.—Maintain original length and size of the following: (1) all leads from range selector to antenna and oscillator coils; (2) lead from oscillator coil to ground; (3) leads from gang condenser to range selector. (4) Keep filament leads twisted and dressed away from 6F5 grid lead. (5) Keep leads from C2 as short as possible.

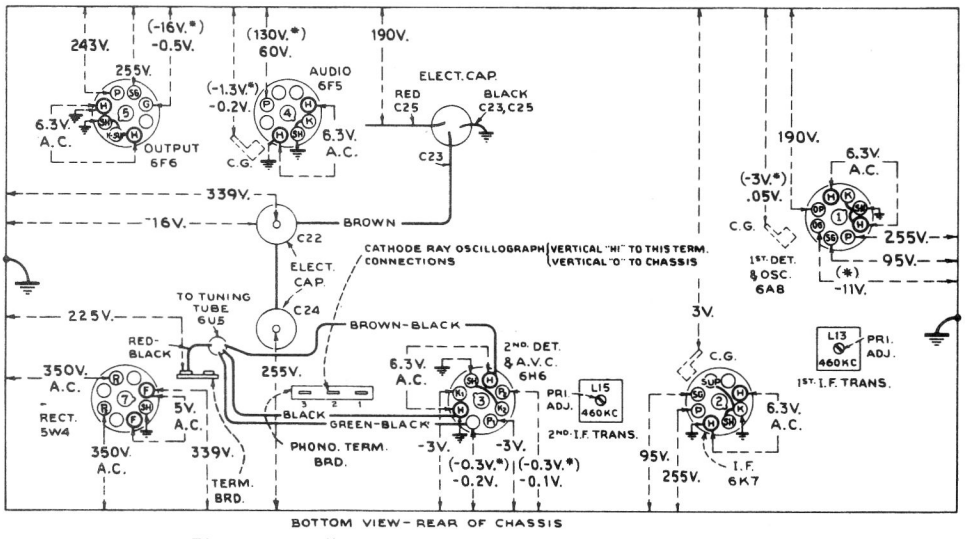


Figure 1—Radiotron Socket Voltages and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Standard Broadcast")—No signal being received—Volume control minimum—Tone control optional

Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading. The other value (generally lower) is the actual measured voltage and differs from the value shown in parentheses because of the additional loading of the voltmeter through the high series circuit resistance.

Voltage values as specified should hold within ±20% when the receiver is normally operative at its rated line voltage. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50, 250 and 500 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.

Radiotron Cathode Current Readings

Measured with Milliammeter Connected at Tube Socket Cathode Terminals Under Conditions Similar to Those of Voltage Measurements

(1) Type-6A8—1st Det.—Osc.	12	ma.
(2) Type-6K7—I-F Amp.	8	ma.
(3) Type-6H6—2nd Det.—A.V.C.	—	ma.
(4) Type-6F5—A-F Amp.	0.2	ma.
(5) Type-6F6—Output	41	ma.
(6) Type-5W4—Rectifier	63	ma.*
(7) Type-6U5—Tuning Tube	1.6	ma.

(*Cannot be measured at socket)

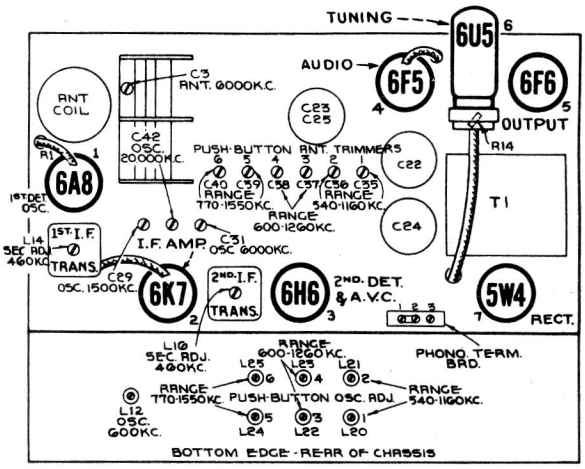


Figure 2—Radiotron, Component Part, and Trimmer Locations

Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the low-frequency (end) calibration mark on dial with the gang tuning-condenser plates in full-mesh position. The pointer is soldered in place on the drive cable.

Perform alignment in proper order, tabulated below, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown on figures 1 and 2.

Cathode-ray alignment is highly preferable; the connections to the chassis are shown on figure 1. If an output indicator is used, connect it across the loudspeaker voice-coil and advance the receiver volume control to full-volume position.

Connect the "low" output terminal of the test oscillator to the receiver "G" (ground) terminal for all alignment operations. Regulate the output of the test oscillator so that minimum signal is applied to the receiver to obtain an observable output indication. This will avoid a-v-c action.

The term "Dummy antenna" means the device which must be connected between the "high" test-oscillator output and the point of connection to the receiver in order to obtain ideal alignment. "No signal, 550-750 kc" means that the receiver should be tuned to a point between 550 and 750 kc where no signal or interference is received from a station or local (heterodyne) oscillator. "Min. Eye" means minimum width of dark sector of "Tuning Eye" or greatest deflection.

Order of Alignment	Test Oscillator			Range Selector	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols	Adjust to Obtain
	Connection to Receiver	Dummy Antenna	Frequency Setting					
1	6K7 I-F Grid Cap	.001 Mfd.	460 kc	"Standard Broadcast"	No Signal 550-750 kc	2nd I-F Trans.	L15 and L16	Max. (peak)
2	6A8 Det. Grid Cap	.001 Mfd.	460 kc	"Standard Broadcast"	No Signal 550-750 kc	1st I-F Trans.	L13 and L14	Max. (peak)
3	Ant. Term. A	300 Ohms	6,000 kc	"Medium Wave"	6 mc	"B" Osc.	C31	Max. (peak)
4	Ant. Term. A	300 Ohms	6,000 kc	"Medium Wave"	6 mc	"B" Ant.	C3	Max. (peak)
5	Ant. Term. A	300 Ohms	20,000 kc	"Short Wave"	20 mc	"C" Osc.	C42	Max. (peak)*
6	Ant. Term. A	200 Mmfd.	600 kc	"Standard Broadcast"	600 kc	"A" L-F Osc.	L12	Max. (peak)
7	Ant. Term. A	200 Mmfd.	1,500 kc	"Standard Broadcast"	1,500 kc	"A" H-F Osc.	C29	Max. (peak)
8	Ant. Term. A	200 Mmfd.	600 kc	"Standard Broadcast"	600 kc	"A" L-F Osc.	L10	Max. (peak)
9	Ant. Term. A	200 Mmfd.	1,500 kc	"Standard Broadcast"	1,500 kc	"A" H-F Osc.	C29	Max. (peak)
10	Connect an antenna to receiver Ant. Term. A. See Electric Tuning Alignment described below.		540-1,160 kc	"Electric Tuning"	540-1,160 kc	"A" Osc. 1 & Ant. 1	L20 and C35	Min. Eye
11			540-1,160 kc	"Electric Tuning"	540-1,160 kc	"A" Osc. 2 & Ant. 2	L21 and C36	Min. Eye
12			600-1,260 kc	"Electric Tuning"	600-1,260 kc	"A" Osc. 3 & Ant. 3	L22 and C37	Min Eye
13			600-1,260 kc	"Electric Tuning"	600-1,260 kc	"A" Osc. 4 & Ant. 4	L23 and C38	Min. Eye
14			770-1,550 kc	"Electric Tuning"	770-1,550 kc	"A" Osc. 5 & Ant. 5	L24 and C39	Min. Eye
15			770-1,550 kc	"Electric Tuning"	770-1,550 kc	"A" Osc. 6 & Ant. 6	L25 and C40	Min. Eye

*** Use maximum capacity peak if two peaks can be obtained. Check for image signal by shifting receiver dial to 20.92 mc.**

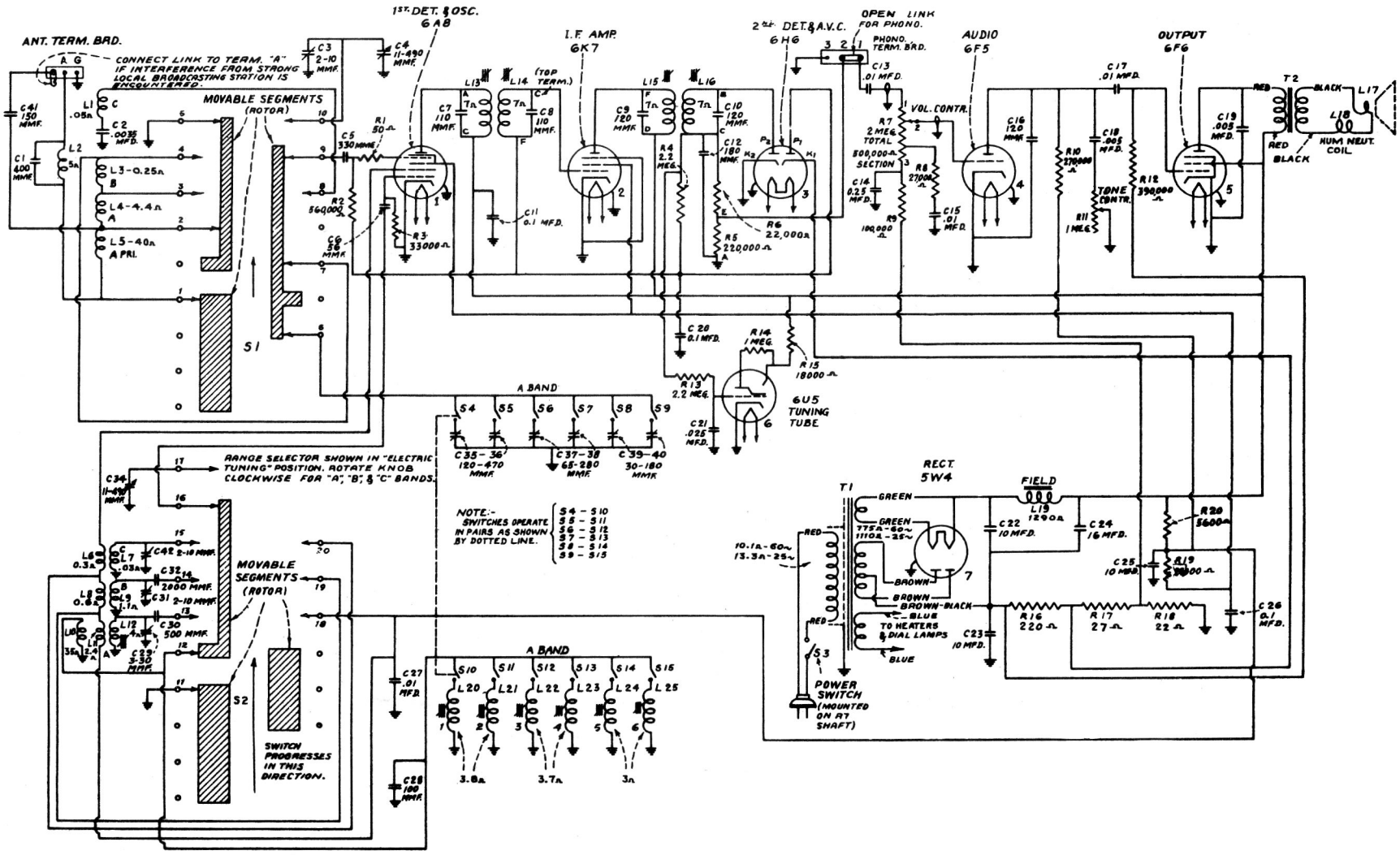
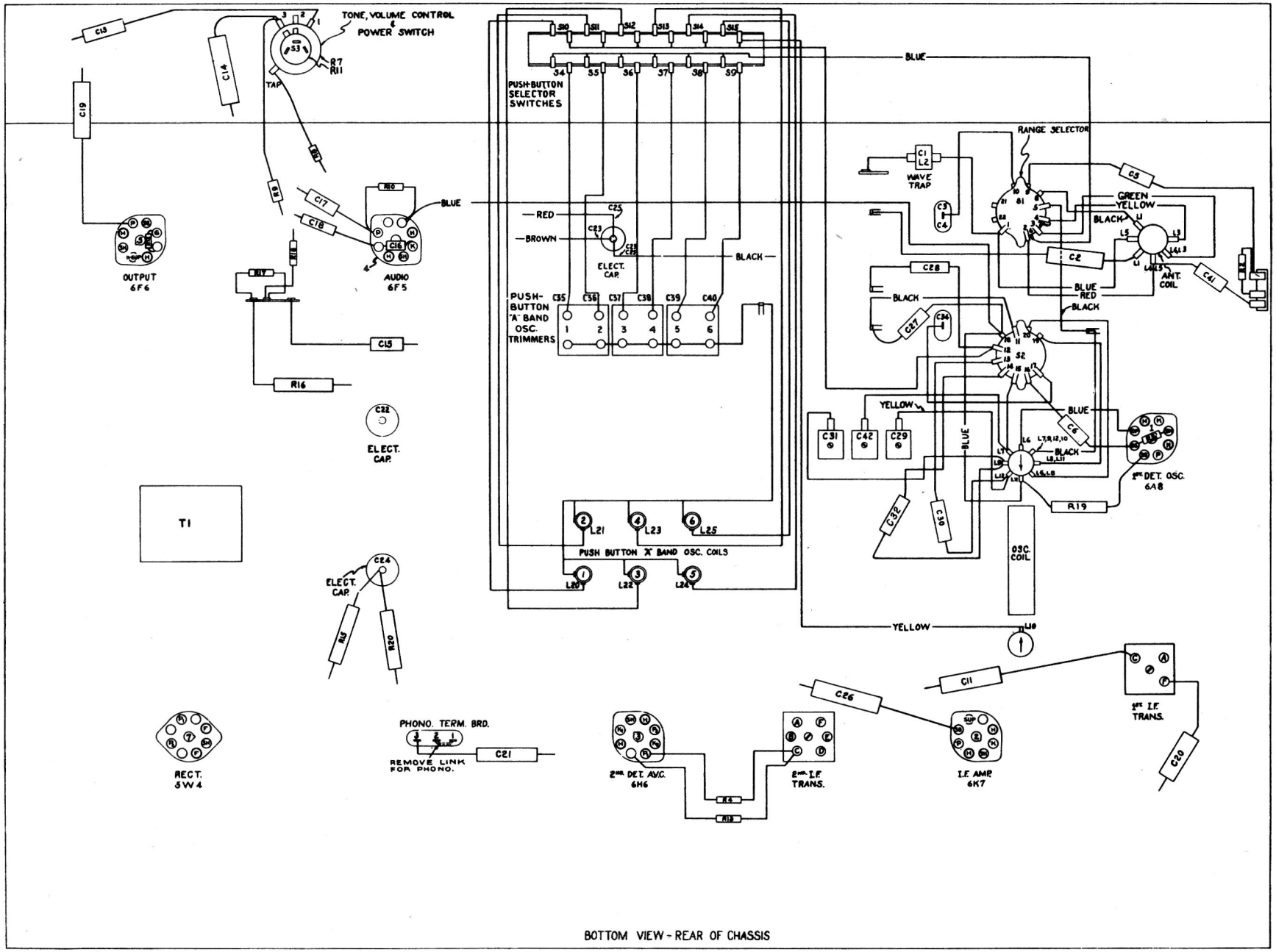


Figure 3—Schematic Circuit Diagram



BOTTOM VIEW - REAR OF CHASSIS

Figure 4—Component Part Locations and R-F Wiring Diagram

Electric Tuning Alignment.—Select six "A" band stations to be tuned with push-buttons. It is usually preferable to choose stations not on the same network. For push-buttons 1 and 2, choose stations from 540 kc to 1,160 kc; for 3 and 4, stations from 600 kc to 1,260 kc; and for 5 and 6, stations from 770 kc to 1,550 kc. The push-buttons are numbered consecutively from left to right.

Allow the receiver to operate about five minutes before proceeding with "Electric Tuning" alignment.

To align so that push-button 1 will tune CFCF, e.g., first set "Range Selector" to "Standard Broadcast" position and manually tune CFCF at a dial setting near 600 kc. Then set "Range Selector" for "Electric Tuning," press push-button 1, and again tune CFCF for maximum output by carefully adjusting first L20 and then C35. If there is difficulty in recognizing the desired station it should be borne in mind that clockwise rotation of trimmer and magnetite-core screws lowers the frequency to which the radio is tuned. Preliminary setting of the adjustments may be made with the use of a test oscillator. In any case final adjustment should be made on the desired station. Use "Tuning Eye" indication of maximum output; tune for minimum width of dark sector of the eye. Proceed similarly, following the above table for the remaining push-buttons.

The first-detector trimmer adjustment will appear to be broad when tuning strong local signals because of a.v.c. action, so to obtain accurate adjustment on strong signals it will be necessary during adjustment to use an antenna only a few inches long. Use enough antenna to not more than half close the "Tuning Eye."

REPLACEMENT PARTS Models F71-F77

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
14623	Board-Antenna and ground terminal board.
12717	Board-Phonograph terminal board.....
13615	Bracket-Tuning lamp mounting bracket and clamp.....
S-1980	Cable-Station indicator cable.....
11350	Cap-Grid contact cap - Pkg. of 5.....
30751	Capacitor-Trimmer-Comprising two sections each 2-10 Mmfd. and one section 3-30 Mmfd.....
30750	Capacitor-Dual trimmer,30-180 Mmfd. each section (C-39,C-40).....
12723	Capacitor-56 Mmfd. (C6).....
30764	Capacitor-Dual trimmer 65-280 Mmfd. each section (C37,C38).....
30769	Capacitor-100 Mmfd. (C28).....
14262	Capacitor-110 Mmfd. (C7,C8).....
12404	Capacitor-120 Mmfd. (C9,C10).....
12724	Capacitor-120 Mmfd. (C16).....
30765	Capacitor-Dual trimmer,120-470 Mmfd.each section (C35,C36).....
12725	Capacitor-150 Mmfd. (C41).....
12406	Capacitor-180 Mmfd. (C12).....
12952	Capacitor-330 Mmfd. (C5).....
30768	Capacitor-500 Mmfd. (C30).....
30767	Capacitor-2,000 Mmfd. (C32).....
30303	Capacitor-.0035 Mfd. (C2).....
4838	Capacitor-.005 Mfd. (C18,C19).....
14393	Capacitor-.01 Mfd. (C13,C15,C17,C27).
4870	Capacitor-.025 Mfd. (C21).....
4839	Capacitor-0.1 Mfd. (C11,C21,C26).....
12484	Capacitor-0.25 Mfd. (C14).....
11203	Capacitor-10 Mfd. (C25).....
30577	Capacitor-Comprising two sections each 10 Mfd. (C22,C23).....
5212	Capacitor-16 Mfd. (C24).....
30745	Coil-Antenna coil and shield A,B and C bands (L1,L3,L4,L5).....
30747	Coil-Oscillator coil A band (L20 or L21)
30748	Coil-Oscillator coil A band (L22 or L23)
30749	Coil-Oscillator coil A band (L24 or L25)
30746	Coil-Oscillator coil A,B,C bands (L6,L7, L8,L9,L10,L11,L12).....
S-1963	Condenser-2-gang variable tuning condenser (C3,C4,C34).....
30743	Control-Volume control,tone control,and power switch in one unit (R7,R11,S3)...
S-1981	Cord-Tuning condenser drive cord-Pkg. of 5.....
S-1982	Cord-Volume indicator drive cord-Pkg. of 5.....
S-1965	Dial-Station selector dial scale.....
S-1964	Drum-Indicator cable drum-fastens on variable condenser rotor shaft.....
S-1983	Indicator-Tuning indicator pointer assembly.....
S-1984	Indicator-Volume indicator pointer.....
5226	Lamp-Dial lamp.....
S-1967	Pulley-Pulley for tuning indicator cable located at top of dial bracket.....
S-1968	Pulley-Small size brass pulley for volume indicator cord.....,

STOCK No.	DESCRIPTION
14525	Resistor-22 ohms, carbon type,1/4 watt (R18).....
11955	Resistor-27 ohms, carbon type,1/4 watt (R17).....
30771	Resistor-50 ohms, flexible type,2-1/2 watts (R1).....
16293	Resistor-220 ohms,carbon type,1watt (R16).....
11298	Resistor-5,600 ohms,carbon type,1 watt (R20).....
14078	Resistor-18,000 ohms,insulated, 1 watt (R15).....
14284	Resistor-22,000 ohms,carbon type,1/10 watt (R6).....
12011	Resistor-27,000 ohms,carbon type,1 watt (R19).....
11400	Resistor-27,000 ohms,carbon type,1/4 watt (R8).....
13735	Resistor-33,000 ohms,carbon type,1/4 watt (R3).....
14560	Resistor-100,000 ohms,insulated,1/4 watt (R9).....
11398	Resistor-220,000 ohms,carbon type,1/10 watt (R5).....
11323	Resistor-270,000 ohms,carbon type,1/4 watt (R10).....
13005	Resistor-390,000 ohms,carbon type,1/10 watt (R12).....
11397	Resistor-560,000 ohms,carbon type,1/10 watt (R2).....
12013	Resistor-1 Megohm,carbon type,1/10 watt (R14).....
12679	Resistor-2.2 Megohm,insulated,1/4 watt (R4,R13).....
S-1966	Shaft-Tuning knob shaft and pulley....
5119	Socket-3-contact socket for speaker cable.....
13871	Socket-6-contact tuning tube socket...
11196	Socket-8-contact Radiotron socket.....
14114	Socket-Dial lamp socket.....
S-1978	Spring-Station indicator cable spring-Pkg. of 5.....
S-1979	Spring-Volume indicator cord spring-Pkg. of 5.....
30742	Switch-Range switch (S1,S2).....
S-1969	Switch-Tuning push button switch (S4, S5,S6,S7,S8,S9,S10,S11,S12,S13,S14, S15).....
14376	Transformer-First I.F. transformer (L13,L14,C7,C8).....
14283	Transformer-Second I.F.transformer (L15,L16,C9,C10,C12,R5,R6).....
30607	Transformer-Power transformer 105-125 volts,60 cycle (T1).....
30571	Transformer-Power transformer 105-125 volts,25 cycle (T1).....
13838	Trap-Wave trap (L2,C1).....
	REPRODUCER ASSEMBLIES (TABLE)
S-2021	Cap-Dust cap for cone center-Pkg.of 5.
S-2019	Coil-Field coil for speaker marked 101069-501.....
13677	Cone-Reproducer cone and dust cap(for speaker marked 84091-1 (L14).....

REPLACEMENT PARTS Models F71-F77

STOCK No.	DESCRIPTION	
S-2020	Cone-Reproducer cone and dust cap (for speaker marked 101069-501 (L14).....	
14613	Reproducer complete.....	
14615	Transformer-Output transformer(for speaker marked 84091-1.....	
14355	Transformer-Output transformer(for speaker marked 101069-501.....	
	REPRODUCER ASSEMBLIES (CONSOLE)	
13866	Cap-Dust cap for cone center-Pkg. of 5.....	
14354	Coil-Field coil (L-20).....	
11469	Coil-Hum neutralizing coil (L19).....	
12667	Cone-Reproducer cone and dust cap (L18).....	
5118	Connector-3-contact male plug for reproducer.....	
14395	Reproducer-Reproducer complete.....	
14355	Transformer-Output transformer (T2).....	
14357	Washer-Spring washer to hold field coil-Pkg. of 5.....	

STOCK No.	DESCRIPTION	
	MISCELLANEOUS ASSEMBLIES	
S-1970	Button-Automatic station selector push button-Pkg. of 4.....	
S-1974	Clamp-Station selector window clamp, screw,lockwasher and nut assembly-Pkg. of 4.....	
S-1973	Cushion-Rubber cushion for station selector escutcheon window-Pkg. of 10.	
S-1971	Escutcheon-Station selector escutcheon.	
S-1975	Escutcheon-Station marker escutcheon...	
S-1976	Escutcheon-Tuning tube escutcheon.....	
30773	Knob-Volume control knob.....	
14269	Knob-Range switch knob.....	
14359	Knob-Station selector knob.....	
30772	Knob-Tone control and power switch knob	
11210	Screw-Chassis mounting screw and washer assembly-Pkg. of 4.....	
30330	Spring-Retaining spring for knob stock #30772-Pkg. of 10.....	
14270	Spring-Retaining spring for knobs stock #30773 and 14269-Pkg. of 10.....	
4982	Spring-Retaining spring for knob stock #14359-Pkg. of 10.....	
S-1972	Window-Station selector escutcheon window.....	