



MODEL M47A

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

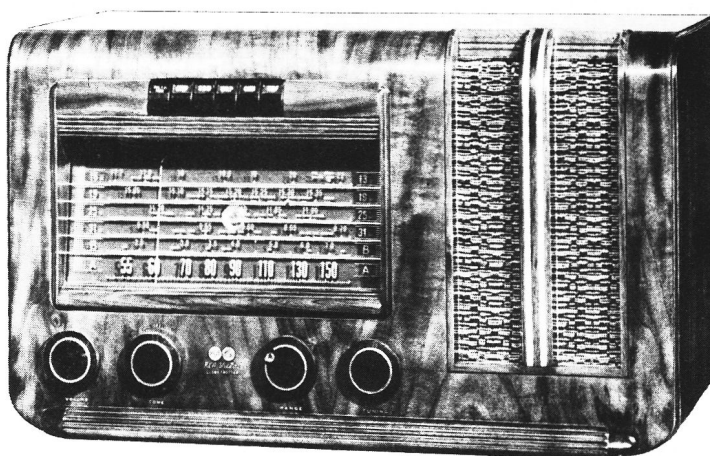
TECHNICAL INFORMATION AND SERVICE DATA

1945 No. 7

SERVICE DIVISION

RCA VICTOR COMPANY LIMITED

MONTREAL



Electrical and Mechanical Specifications

R. F. ALIGNMENT FREQUENCIES

(For order of alignment see Page 3.)

Standard Broadcast "A"	600 k.c. (osc.) 1400 k.c. (osc., det., ant.)
Medium Wave "B" (49 Meter)	6,100 k.c. (osc.)
31 M (31 Meter)	9,550 k.c. (osc., det., ant.)
25 M (25 Meter)	11,800 k.c. (osc.)
19 M (19 Meter)	15,200 k.c. (osc.)
16-13 M (16-13 Meter)	21,500 k.c. (osc., det., ant.)

Intermediate Frequency 455 k.c.

RADIOTRON COMPLEMENT

- (1) Type-6SK7 R-F Amplifier
- (2) Type-6SA7 First Detector-Oscillator
- (3) Type-6SK7 Intermediate Amplifier
- (4) Type-6SQ7 2nd Det., A. V. C. & A. F.

Pilot Lamps (2) Mazda No. 51, 7.5 volts, 0.2 amp.

Drive ratio 12:1

POWER SUPPLY RATINGS

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

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

LOUDSPEAKER (CRL-517-1)

Type.....6 inch Electrodynamic

FREQUENCY RANGES

Standard Broadcast (A) 540-1,570 k.c.

Medium Wave (B) 2,300-7,600 k.c.

31 M Spread band 9,450-9,700 k.c.

25 M Spread band 11,680-11,920 k.c.

19 M Spread band 15,030-15,380 k.c.

16-13 M Spread band 17,700-22,000 k.c.

(5) Type-6F6G Power Output

(6) Type-5Y4G Full Wave Rectifier

(7) Type-6U5 Tuning Tube

Impedance (V.C.) 3 ohms at 400 cycles

Electrical and Mechanical Specifications (continued)

CABINET DIMENSIONS	A25	A38
Width	22 inches	28 $\frac{3}{4}$ inches
Depth	10 $\frac{3}{4}$ inches	13 $\frac{1}{2}$ inches
Height	13 inches	39 $\frac{1}{4}$ inches
POWER OUTPUT		
Undistorted	3 watts	
Maximum	4.5 watts	

PUSH BUTTON TUNING RANGE

Button No. 1	Phonograph
Button No. 2	540—1,000 k.c.
Button No. 3	540—1,000 k.c.
Button No. 4	620—1,200 k.c.
Button No. 5	750—1,400 k.c.
Button No. 6	900—1,570 k.c.

General Description

The M47A is a seven-tube, six band superheterodyne circuit, the arrangement of which is shown in the Schematic Circuit Diagram. Features of design include: —Loop antenna as the first tuned circuit; high gain R.F. stage; stabilized oscillator circuit resulting in less frequency drift; magnetite core I.F. transformers; magnetite core oscillator coils on all bands; automatic volume control; A.C. outlet on chassis back apron;

Tuning indicator tube for fine, accurate tuning on all bands; variable tone control circuit; push button tuning of five Standard Broadcast stations by means of pre-set oscillator coils; dust proof electrodynamic loudspeaker; temperature stabilized capacitors in the oscillator circuits; and a large, edge lighted dial individually calibrated for each band.

Circuit Arrangement

The circuit consists of an R.F. amplifier stage incorporating the Loop Antenna as the first tuned circuit; first detector (oscillator) stage; I.F. amplifier stage; second detector, A.V.C. and first Audio stage and a single pentode output operating in Class A-B; tuning indicator; and a well regulated power supply.

The Loop Antenna used as the first tuned stage is in the circuit on all bands; temperature compensated capacitors are used in the oscillator circuits to reduce oscillator drift.

Spread band tuning is accomplished electrically by shunting the oscillator section of the variable capacitor with relatively large temperature—stabilized fixed cap-

acitors for tuning the oscillator coils on the 16-13M, 19M, 25M, 31M bands. Antenna and detector coils are designed to be sufficiently broad-tuned to require no variable tuning over the narrow frequency range of the spread bands.

The intermediate frequency amplifier consists of a Type 6SK7 tube in a single stage transformer-coupled circuit. The windings of all I.F. Transformers are resonated by fixed capacitors and are adjusted by moulded magnetite cores to tune to 455K.C.

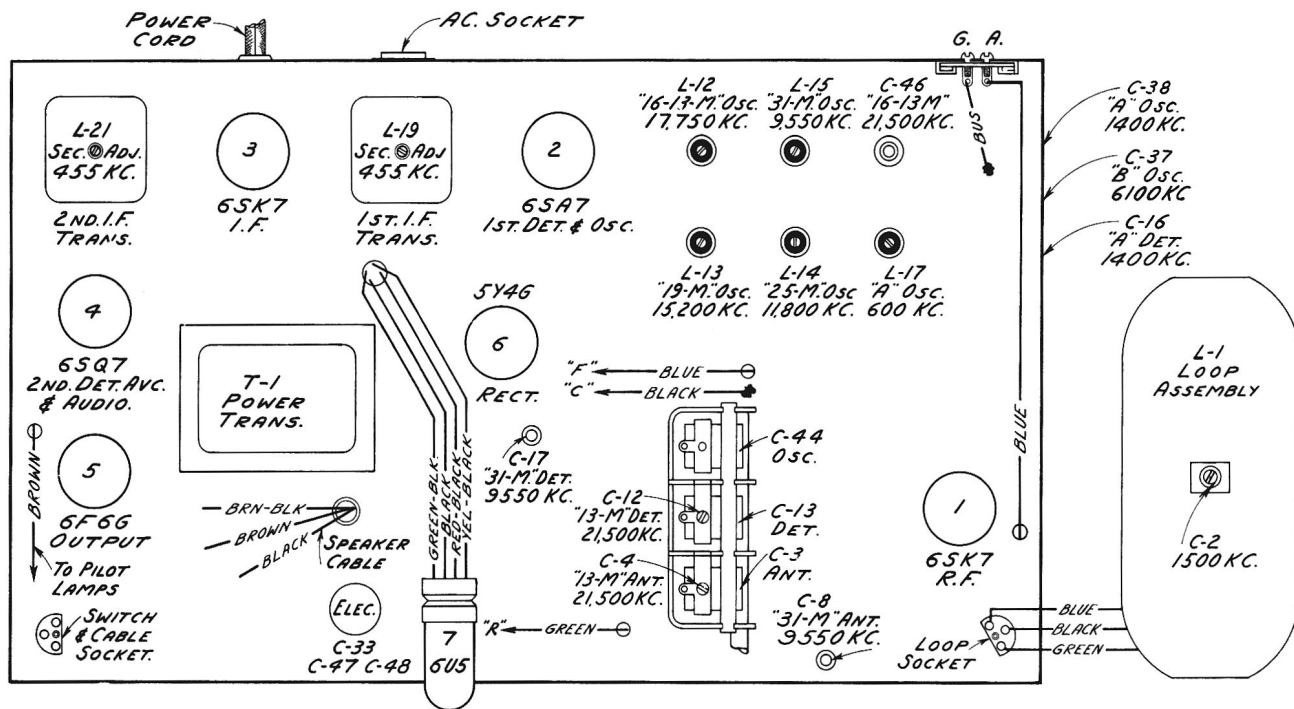


Fig. 1—Chassis Layout and Alignment Adjustments

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown on the schematic diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord-Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the tuning drum. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang

in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The O° mark on the drum scale must be vertical and directly above the center of the shaft of the tuning drum when the plates are fully meshed. The drum is held to the shaft by means of two set-screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the chassis, and bend the wire so that it points to the O° mark on the calibration scale when the plates are fully meshed.

Order of Alignment	Test Oscillator			Range Selector	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols
	Connection to Receiver	Dummy Antenna	Frequency Setting				
1	6SK7 2nd I.F. Grid	.1	455 kc	"A"	No Signal 550-750 kc	2nd I.F. Trans.	L20 & L21
2	6SA7 Det. Grid	.1	455 kc	"A"	No Signal 550-750 kc	1st I.F. Trans.	L18 & L19
3	Ant. terminal	300 Ohms	21,500 kc	"16-13 M"	21.5 mc (162°)	"16-13 M" Osc.	L46
4	Ant. terminal	300 Ohms	17,750 kc	"16-13 M"	17.75 mc (17°)	"16-13 M" Osc.	L12
5	Ant. terminal	300 Ohms	21,500 kc	"16-13 M"	21.5 mc (162°)	"16-13 M" Det.	C12
6	Ant. terminal	300 Ohms	21,500 kc	"16-13 M"	21.5 mc (162°)	"16-13 M" Ant.	C4
7	Ant. terminal	300 Ohms	15,200 kc	"19 M"	15.8 mc (94°)	"19 M" Osc.	L13
8	Ant. terminal	300 Ohms	11,800 kc	"25 M"	11.8 mc (99°)	"25 M" Osc.	L14
9	Ant. terminal	300 Ohms	9,550 kc	"31 M"	9.55 mc (73°)	"31 M" Osc.	L15
10	Ant. terminal	300 Ohms	9,550 kc	"31 M"	9.55 mc (73°)	"31 M" Det.	C17
11	Ant. terminal	300 Ohms	9,550 kc	"31 M"	9.55 mc (73°)	"31 M" Ant.	C8
12	Ant. terminal	300 Ohms	6,100 kc	"B"	6.1 mc (149°)	"B" Osc.	C37
13	Ant. terminal	300 Ohms	1,400 kc	"A"	1,400 kc (155°)	"A" H.F. Osc.	C38
14	Ant. terminal	300 Ohms	600 kc	"A"	600 kc (33°)	"A" LF Osc.	L17
15	Ant. terminal	300 Ohms	1,400 kc	"A"	1,400 kc (155°)	"A" Det.	C16
16	Radiation Loop	300 Ohms	1,500 kc	"A"	1,500 kc (163°)	Loop	C2*

NOTE:—Align the I.F. circuits by means of the oscillograph, for a symmetrical curve. Peak R.F. stages of all bands. * Radiation loop comprising two turns of wire 18 inches in diameter should be placed four feet from receiver loop before aligning "C2".

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal calibrator (RCA Stock No. 9572), or by zero-beating against standard broadcast stations.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave

stations of known frequency, and the magnetite-core oscillator coil for each band should be re-adjusted so that the stations come in at the correct points on the dial.

NOTE:—Whenever possible spread band adjustments should be made with the chassis fastened in the cabinet and the pointer accurately aligned to the dial.

Spread-band Adjustments.—Alignment of the spread bands requires special procedure since test oscillators used alone are not ordinarily sufficiently accurate for this purpose. The RCA Stock No. 9572 Crystal Calibrator affords a convenient and accurate alignment standard. Wrap a few turns of wire around the crystal calibrator and connect one free end to the antenna terminal of the receiver. Using the crystal calibrator to obtain the necessary accuracy, follow the tabulated alignment procedure for the "31M.", "25M.", and "19M." bands.

For the "B" band, snap crystal calibrator "Hi-Lo" switch to "Hi", turn the range selector to "B" band, and set receiver dial pointer to 6.0 mc. Adjust oscillator padder C37 for minimum "Tuning Tube" opening. Use the peak indicated by the alignment table. Snap "Hi-Lo" switch to "Lo" and locate 6,100 kc (the first 100 kc harmonic above 6,000 kc) by slightly readjusting C37 with the dial pointer set at 6.1 mc. This method insures selection of correct crystal-calibrator harmonic.

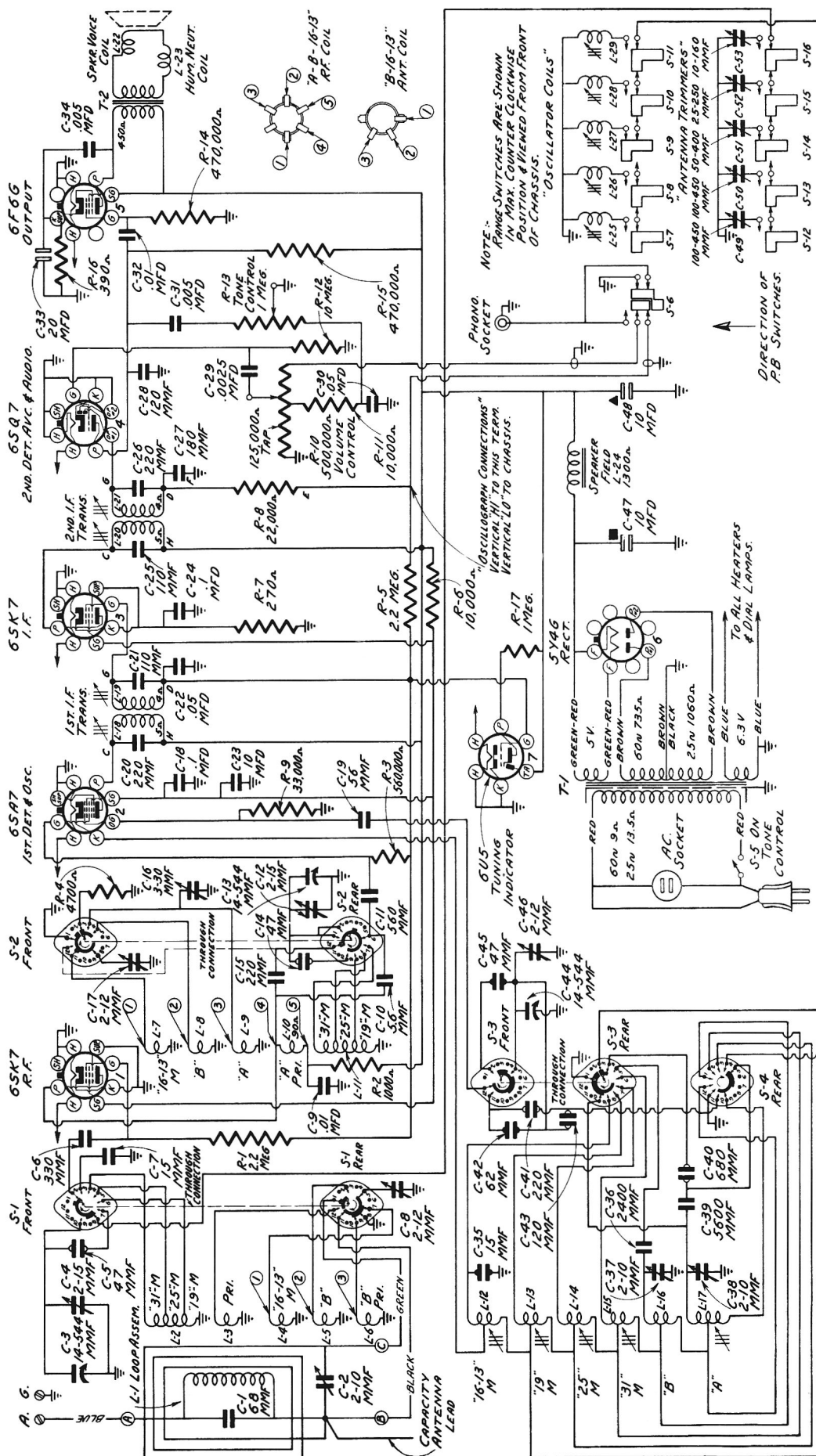


Figure 2—Schematic Circuit Diagram

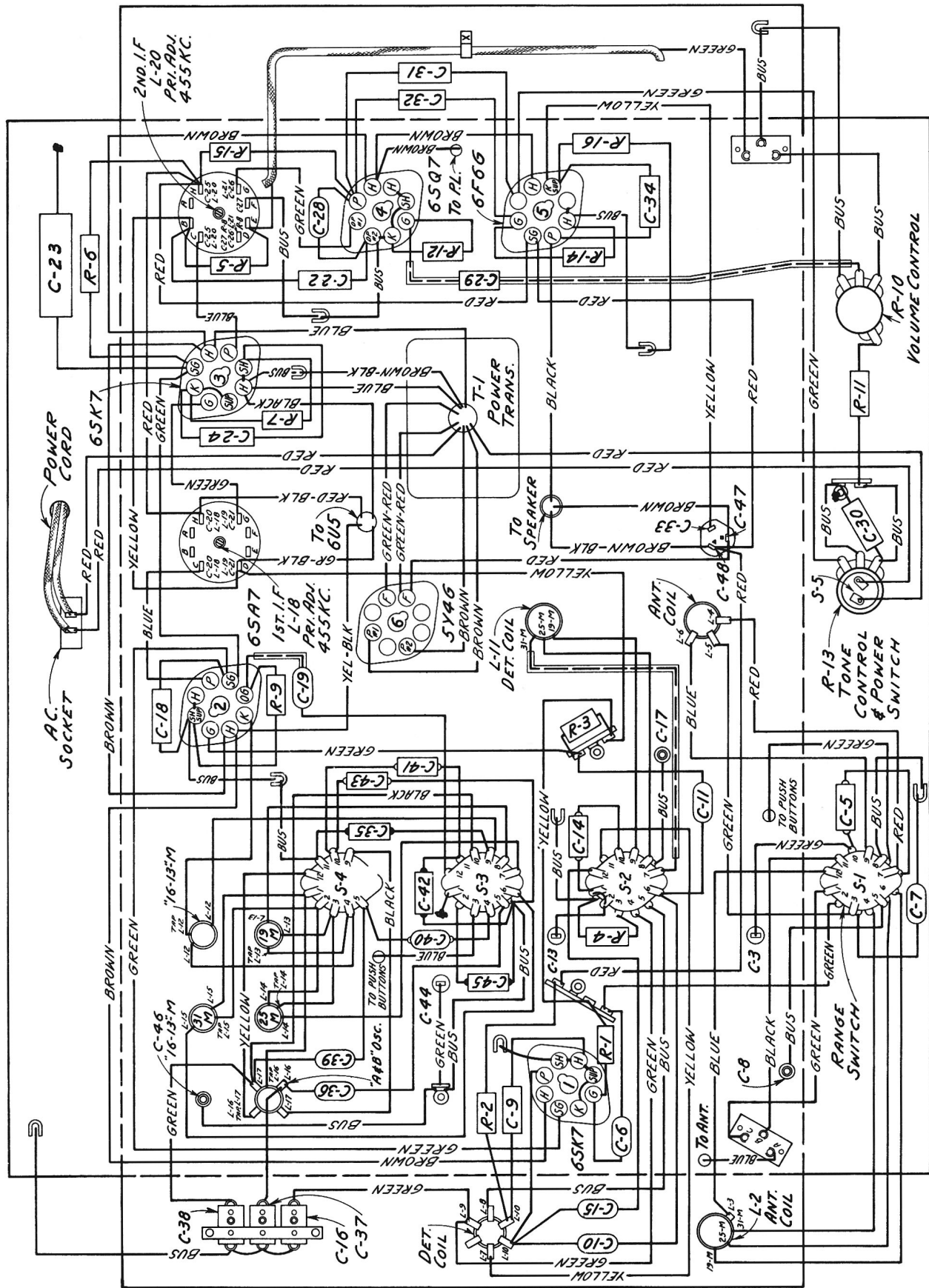


Figure 3—Chassis Wiring Diagram

RADIOTRON SOCKET VOLTAGES

Type	Plate	Screen Grid	Control Grid	Cathode	Heater
6SK7 R.F.	210	82V			6.3V
6SA7 Conv.	220	82V			6.3V
6SK7 I.F.	220	82V	-.2V		6.3V
6SQ7 Audio	195				6.3V
6F6G Output	205V	220V		13V	6.3V
5Y4G Rectifier	D.C. output measured across C47 340V				5.0V

Note:—All the above values hold within plus or minus 20% when measured with a 1,000 ohm-per-volt meter, on a line voltage of 115 volts. All voltages are measured to chassis.

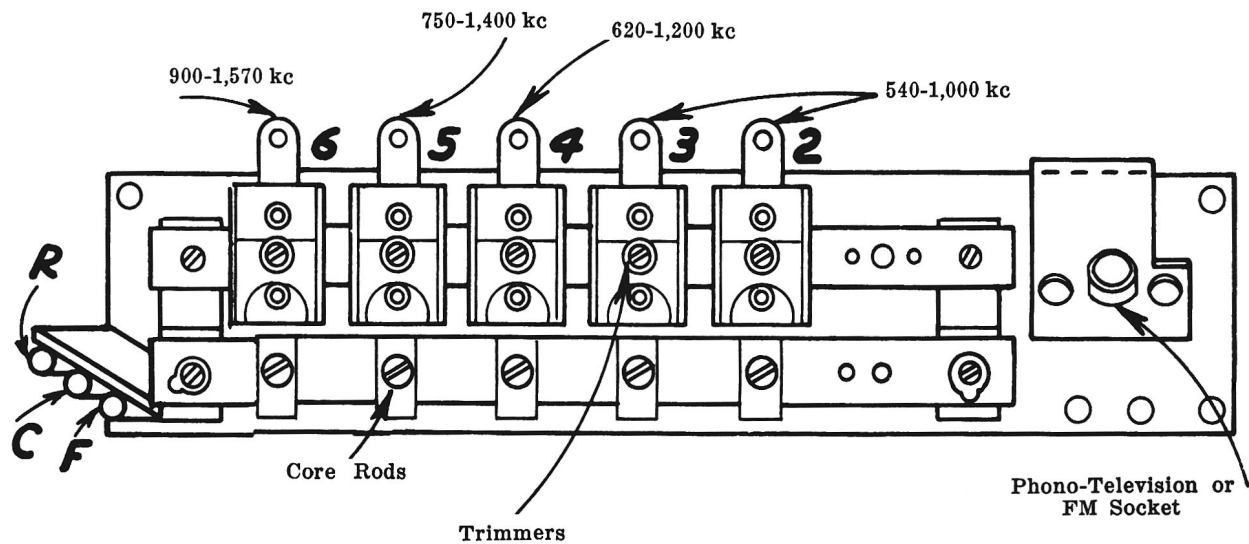


Fig. 4

Push Button Adjustment

The push buttons may be adjusted for any five stations on the "A" band. The preferable arrangement is to adjust for stations in order of frequency.

Proceed as follows:—

(1) Turn "Range selector" to "A" position and manually tune in the first station, say 560 k.c.

(2) Turn "Range selector" to "P.B." position, press button No. 2 located second from left on front panel.

(3) Referring to Figure 4, adjust core and trimmer No. 2 for a peak at 560 k.c.

(4) Proceed to adjust the other four stations in order of frequency, as outlined above.

When a station is inaudible due to reception conditions a test oscillator should be substituted for the station signal.

REPLACEMENT PARTS FOR MODEL M47A

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK NO.	DESCRIPTION	STOCK NO.	DESCRIPTION
RECEIVER ASSEMBLY			
S-2876	Board-Ant. Ground Terminal Board...	12679	Resistor-2.2 meg. 1/4 watt (R1, R5)
12714	Capacitor-Adjustable Trimmer 2-12 mmfd. (C8, C17-C46).....	30992	Resistor-10. meg. 1/4 watt (R12)...
34783	Capacitor Trimmer Condenser 2-10 mmfd. one 3-30 mmfd. (C16-C37-C38)	S-2824	Socket-A.C. Socket.....
12814	Capacitor 5.6 mmfd. (C10).....	31364	Socket-Dial lamp socket.....
12896	Capacitor 15 mmfd. (C7).....	36422	Socket-Loop Antenna & Push Button switch cable socket.....
36012	Capacitor 15 mmfd. (Temp.Comp)(C35)	5119	Socket-Speaker Cable female connector.....
S-3008	Capacitor 47 mmfd. (Close Tol.) (C5-C14).....	31251	Socket-Tube Socket.....
35644	Capacitor 47 mmfd.(Temp.Comp.)(C45)	13638	Spring-Drive cord tension spring (Pkg. 2).....
12723	Capacitor 56 mmfd. (C19).....	S-2889	Switch-Range switch (S1, S2, S3,S4)
S-3123	Capacitor 62 mmfd.(Temp.Comp.)(C42)	S-2891	Tone control and Power Switch (R13, S5).....
39624	Capacitor 68 mmfd. (On loop) (C1)...	S-2899	Transformer-1st I.F. Transformer (L18, L19, C20, C21).....
12724	Capacitor 120 mmfd. (C28).....	S-2900	Transformer-2nd I.F. Transformer (R8, L20, L21, C25, C26, C27)....
S-3100	Capacitor 120 mmfd. (Close Tol.) (C43).....	S-2903	Transformer-Power - 110 volt-25/60 cycle (T1).....
12694	Capacitor 220 mmfd. (C15).....	S-2904	Transformer-Power - 110 volt-50/60 cycle (T1)
S-2895	Capacitor 220 mmfd. (Close Tol.) (C41).....	S-2905	Volume control (R10).....
12952	Capacitor 330 mmfd. (C6).....	SPEAKER ASSEMBLIES (CRL-517-1)	
12537	Capacitor 560 mmfd. (C11).....	32907	Cap-Dust Cap for cone centre(Pkg.5)
S-2988	Capacitor 680 mmfd. (Close Tol.) (C40).....	33077	Coil-Field coil (L24).....
4881	Capacitor 2400 mmfd. (C36).....	35441	Cone-Speaker cone & voice coil(L22)
13895	Capacitor 5600 mmfd. (C39).....	5118	Plug-3-contact male plug connector.
5107	Capacitor .0025 mfd. (C29).....	S-2875	Speaker-complete.....
4838	Capacitor .005 mfd. (C31-C34).....	S-2377	Transformer-Output transformer (T2)
4937	Capacitor .01 mfd. (C9-C32).....	PUSH BUTTON SWITCH ASSEMBLY	
32787	Capacitor .05 mfd. (C22-C30).....	S-3241	Cable-shielded phono cable, less plug.....
4839	Capacitor .1 mfd. (C18-C24).....	S-2908	Capacitor-Trimmer capacitor bank (C49, C50, C51, C52, C53).....
S-2894	Capacitor-Electrolytic-10 mfd.(C23)	35803	Coil-Oscillator coil (L25, L26, L27, L28, L29).....
32240	Capacitor-Electrolytic comprising two sections 10 mfd.(C33,C47-C48) one section 20 mfd.....	35871	Core-Oscillator coil core.....
S-2877	Coil-Antenna coil 'B-16-13' bands (L4, L5, L6).....	32641	Plug-Three prong male plug for Phono cable.....
S-2878	Coil-Antenna coil '31-25-19' bands (L2, L3).....	14278	Socket-Phono input socket.....
S-2879	Coil-R.F. Coil 'A-B-16-13' bands (L7, L8, L9, L10).....	MISCELLANEOUS ASSEMBLIES	
S-2880	Coil-R.F. Coil '31-25-19' bands(L11)	35883	Button-Station selector push button
S-2884	Coil-Oscillator 16-13 M. Band (L12)	S-2913	Dial-Station selector dial scale...
S-2881	Coil-Oscillator 19 M. Band (L13)...	34489	Knob-Volume, tone or tuning control knob.....
S-2882	Coil-Oscillator 25 M. Band (L14)...	S-3316	Knob-Range switch knob (Outer section only).....
S-2883	Coil-Oscillator 31 M. Band (L15)...	S-2914	Knob-Range switch knob (Inner section only).....
S-2885	Coil-Oscillator 'A & B' Band (L16, L17).....	S-2915	Loop-Antenna loop assembly (L1, C1, C2).....
S-2898	Condenser-3 gang variable tuning condenser (C3, C4, C12).....	36149	Marker-Push button call letter marker (1 set).....
S-2897	Cord-Indicator pointer drive cord 53-1/2" (C13, C44).....	S-2887	Shaft-Station selector drive shaft (RCA).....
31273	Drum-Drive cord drum assembly.....	34053	Spring-Push Button retaining spring (Pkg. 5).....
S-2886	Indicator-Station selector indicator pointer.....	14270	Spring-Knob retaining spring (Pkg. 2).....
11765	Lamp-Mazda #51.....	S-2911	Switch-Push Button switch assembly (S1 to S16 inc.).....
31280	Pulley-Drive cord pulley.....	S-2542	Tool-Push Button tuning set up tool
14887	Retainer-Drive cord pulley retainer (Pkg. 10).....		
30929	Resistor-270 ohms 1/2 watt (R7)....		
31388	Resistor-390 ohms 1 watt (R16).....		
14720	Resistor-1000 ohms 1/4 watt (R2)...		
30146	Resistor-4700 ohms 1/4 watt (R4)...		
3078	Resistor-10,000 ohms 1/4 watt (R11)		
S-2587	Resistor-10,000 ohms 4 watt (R6)...		
30685	Resistor-33,000 ohms 1/4 watt (R9).		
14659	Resistor-470,000 ohms 1/4 watt (R14, R15).....		
12486	Resistor-560,000 ohms 1/4 watt (R8)		
30652	Resistor-1 meg. 1/10 watt (R17)....		

All parts and prices subject to change or withdrawal without notice.

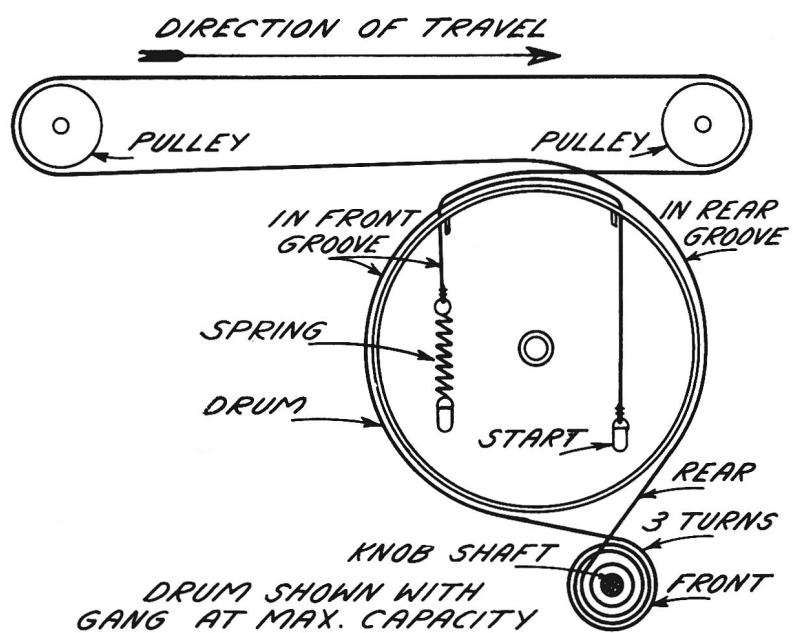


Fig. 5—Dial Drive Cord.