



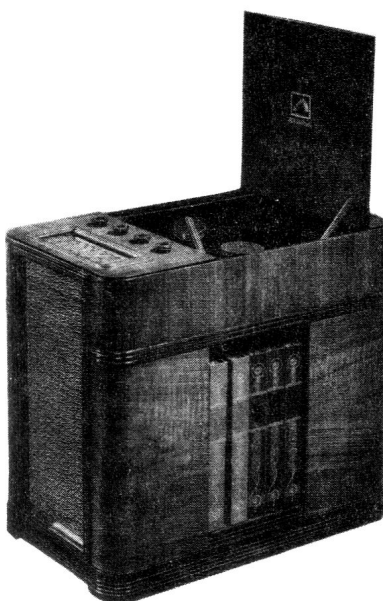
RCA Victor

MODEL VRA-45

**Six-Tube, Four-Band, A-C, Superheterodyne
Radio Phonograph Combination**

TECHNICAL INFORMATION AND SERVICE DATA

SERVICE DIVISION • RCA VICTOR COMPANY LIMITED • MONTREAL



Electrical and Mechanical Specifications

FREQUENCY RANGES

Standard Broadcast (A)	540-1,570 k.c.
31 M	9,450-9,700 k.c.
25 M	11,680-11,920 k.c.
19 M	15,030-15,380 k.c.

Intermediate Frequency

Tuning Drive Ratio

RADIOTRON COMPLEMENT

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

POWER SUPPLY RATINGS

Rating A	105-125 volts, 50-60 cycles, 95 watts
Rating B	105-125 volts, 25-60 cycles, 95 watts

POWER OUTPUT

Undistorted	3.5 watts
Maximum	5.0 watts

LOUDSPEAKER (CRL-523)

Type	12" Electrodynamic
Impedance (V.C.)	2.4 ohms at 400 cycles

CABINET DIMENSIONS

Height	24 $\frac{1}{4}$ inches
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R. F. ALIGNMENT FREQUENCIES

Standard Broadcast (A)	1,500 k.c. (osc., ant.)
31 M (31 Meters)	9,550 k.c. (osc., ant.)
25 M (25 Meters)	11,800 k.c. (osc.)
19 M (19 Meters)	15,200 k.c. (osc.)

Intermediate Frequency 455 k.c.

Tuning Drive Ratio 12:1

(4) Type-6AD7G	Inverter Power Output
(5) Type-6F6G	Power Output
(6) Type-5Y4G	Full Wave Rectifier
Pilot Lamps (2)	Mazda No. 51, 6.3 volts, 0.2 amp.

PHONOGRAPH

Type	Manual; self-starting constant-speed motor; Edge-driven Turntable.
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CRYSTAL PICKUP

Impedance	100,000 ohms at 1,000 cycles
Average Output	1 $\frac{1}{2}$ volts at 1,000 cycles across $\frac{1}{2}$ meg. resistor
Width	26 $\frac{1}{8}$ inches
Depth	15 $\frac{7}{8}$ inches

General Description

The Model VRA 45 Armchair type Victrola employs a six tube, four 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; three spread bands; stabilized oscillator circuit resulting in less frequency drift; magnetite core I.F. transformers; magnetite core oscillator coils; automatic volume control; two position

tone control circuit; inverter push pull output stage; dust proof electrodynamic loudspeaker; temperature stabilized capacitors in the oscillator circuits; and a large, edge lighted dial individually calibrated for each band. Features of the Phonograph include crystal pickup, edge drive constant speed synchronous motor and an automatic motor switch.

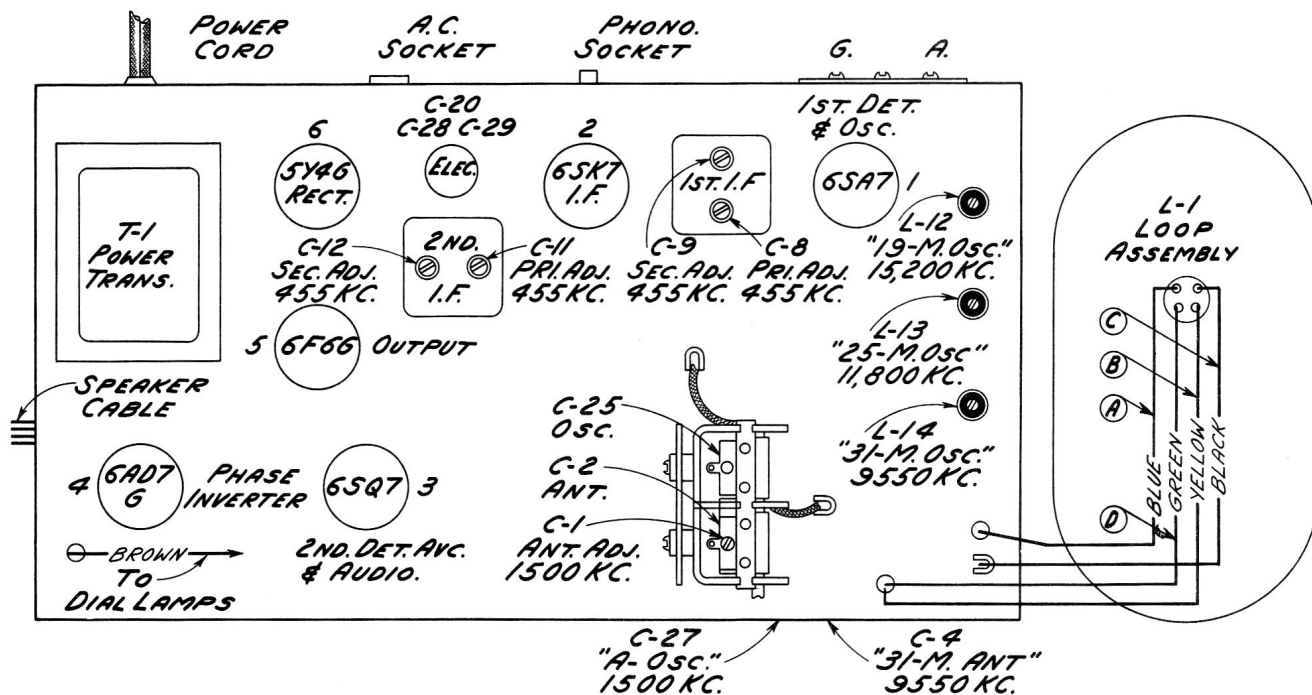
Circuit Arrangement

The circuit consists of a first detector (oscillator) stage incorporating the Loop Antenna as the first tuned circuit; I.F. amplifier stage; second detector, A.V.C. and first Audio stage; push pull pentode output stage; and a well regulated power supply.

The Loop Antenna used in the first tuned stage is in the circuit on the "A" band; temperature compensated

capacitors are used in the oscillator circuits to reduce oscillator drift.

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



RADIOTRON SOCKET VOLTAGES

Type	Function	Plate	Screen Grid	Cathode	Heater
6SA7	Det.	290 V	105 V		6.4 V
	Osc.			2.3 V	
6SK7	I.F.	290 V	105 V		6.4 V
6SQ7	2nd Det. Audio & A.V.C.	80*V			6.4 V
6AD7G	Inverter	285 V		24 V	6.4 V
	Output	285 V	290 V	24 V	6.4 V
6F6-G	Output	285 V	290 V	24 V	6.4 V
5Y4-G	Rectifier	Measured Across C-28		370 V	5.0 V

Rectifier A.C. Voltage per plate 350

Note:—All the above values hold within plus or minus 20% when measured with a 1000 ohm-per-volt meter, on a line voltage of 115 volts. All voltages are measured to chassis.

* Cannot be accurately measured with an ordinary voltmeter.

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph should be made to the chassis and the green lead on the volume control.

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 180° 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 condenser gang, and bend the wire so that it points to the 180° mark on the calibration scale when the plates are fully meshed.

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 scales. 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 final adjustments should be made with the chassis fastened in the cabinet and the pointer accurately aligned to the dial.

Order of Alignment	Test Oscillator			Range Selector	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbols
	Connection to Receiver	Dummy Antenna	Frequency Setting				
1	Control Grid 6SK7 Pin No. 4	.1 Mfd.	455 k.c.	"A"	No Signal 550-750 k.c.	2nd I.F. Transformer	C11 & C12
2	Control Grid 6SA7 Pin No. 8	.1 Mfd.	455 k.c.	"A"	550-750 k.c.	1st I.F. Transformer	C8 & C9
3	Ant. Terminal	300 Ohms	1,500 k.c.	"A"	1,500 k.c. 22°	"A" Osc.	C27
4	Radiated signal *	—	1,500 k.c.	"A"	1,500 k.c. 22°	"A" Ant.	C1
5	Ant. Terminal	300 Ohms	15,200 k.c.	19 M	15,200 k.c. 93°	19 M Osc.	L12
6	Ant. Terminal	300 Ohms	11,800 k.c.	25 M	11,800 k.c. 82°	25 M Osc.	L13
7	Ant. Terminal	300 Ohms	9,550 k.c.	31 M	9,550 k.c. 104°	31 M Osc.	L14
8	Ant. Terminal	300 Ohms	9,550 k.c.	31 M	9,550 k.c. 104°	31 M Ant.	C4

All adjustments indicated above except operation 4, are made with antenna link in the open position.

*Radiation loop comprising two turns of wire 18 inches in diameter should be connected to test oscillator and placed approximately 4 feet from receiver before adjusting C1.

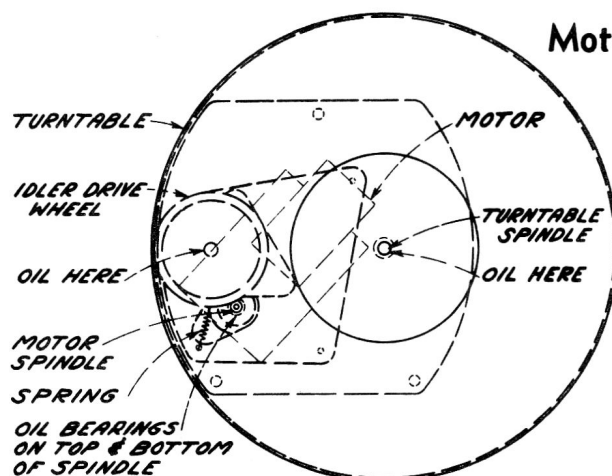
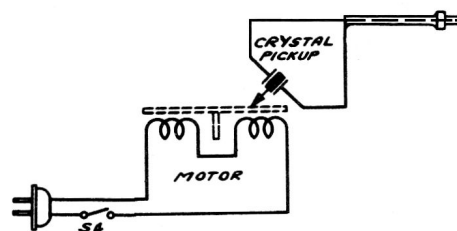


Figure 1—Motor Top View

Phonograph Motor Service Data:—

The phonograph motor is of the self starting synchronous type and operates the turntable through friction drive between the motor drive spindle and the rubber tired idler on the rim of the turntable.

Motor and Pickup Data



Motor & Pickup Circuit

The motor should be lubricated once or twice a year by placing a few drops of S. A. E. 20 (or equivalent) on the turntable spindle and saturating the oil retaining felt pads on the motor shaft with S. A. E. 10 oil. **Caution**—The motor drive spindle and the rubber tire on the idler must be kept clean and entirely free from oil and grease at all times.

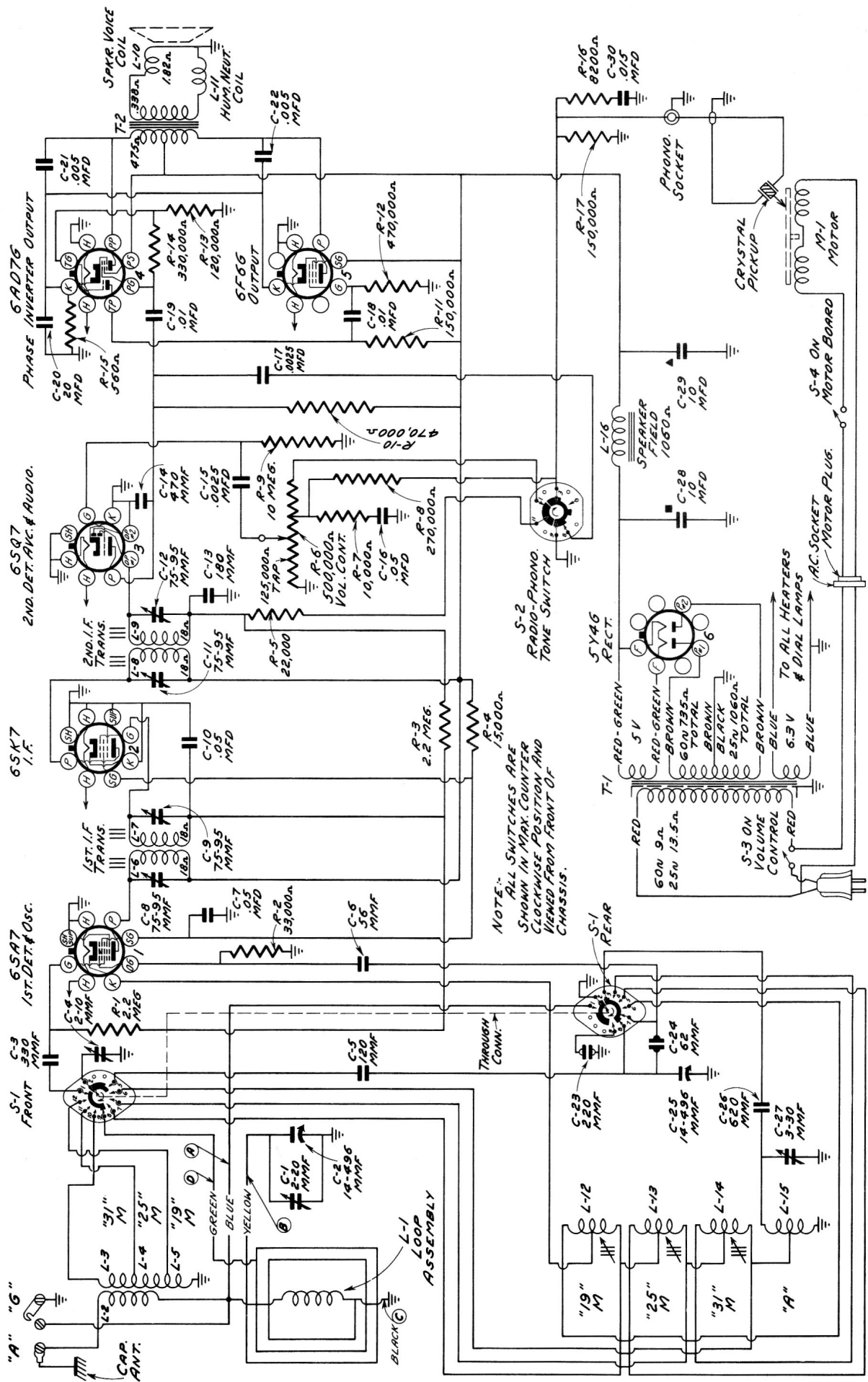


Figure 2—Schematic Circuit Diagram

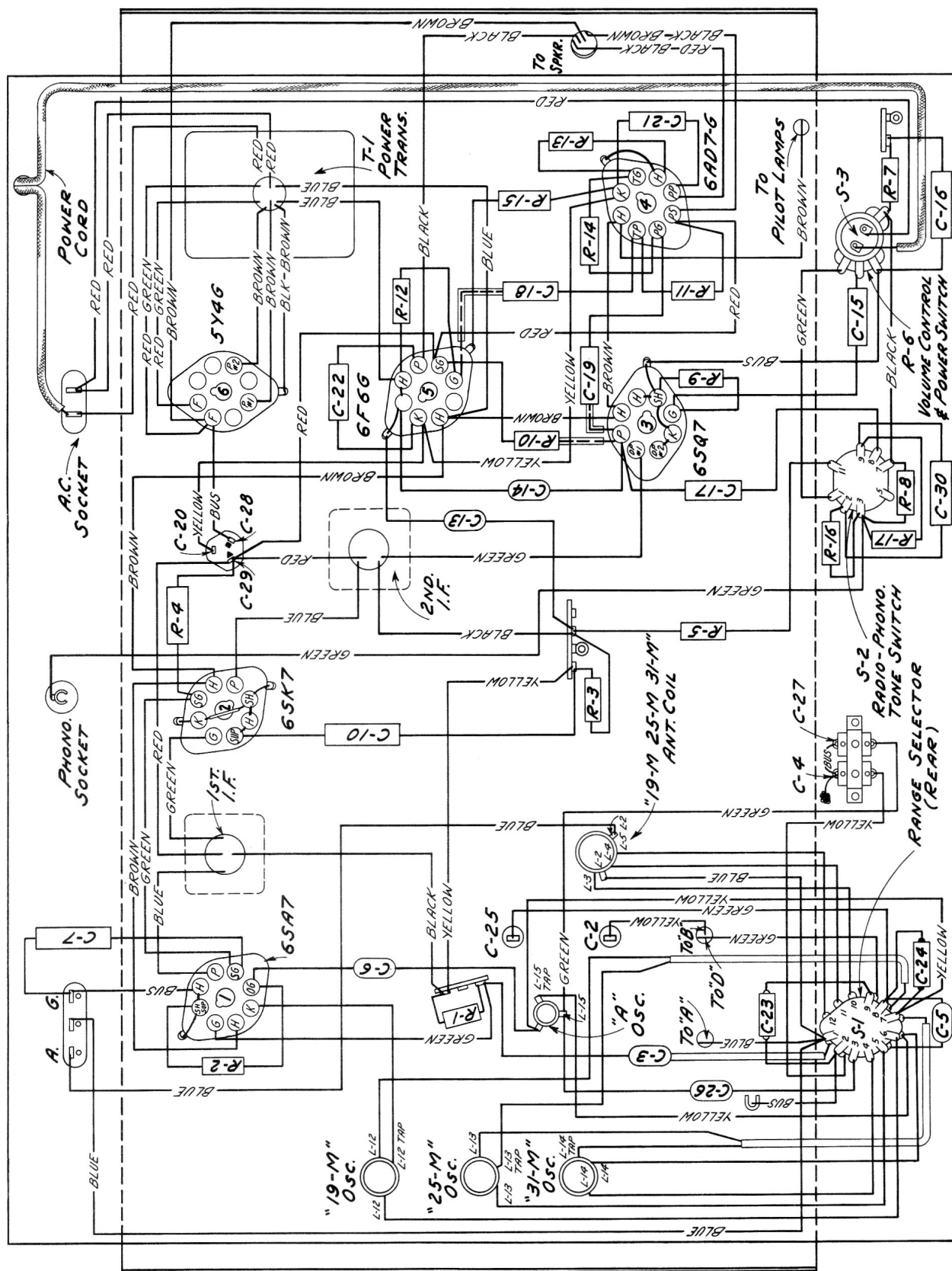


Figure 3—Chassis Wiring Diagram

REPLACEMENT PARTS FOR MODEL VRA-45

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

STOCK NO.	DESCRIPTION	STOCK NO.	DESCRIPTION
RECEIVER ASSEMBLIES			
34025	Board-Ant.and Ground Terminal Board	S-3240	Transformer-2nd I.F. transformer
S-3099	Capacitor-Adjustable trimmer bank (C4,C27).....	(L8,L9,C11,C12).....	
12723	Capacitor- 56 mmfd. (C6).....	S-2457	Transformer-Power 105/125 volt, 60 cycle (T1).....
S-3123	Capacitor- 62 mmfd. (Temp.comp.)(C24)	33618	Transformer-Power 105/125 volt, 25/60 cycle (T1).....
12724	Capacitor-120 mmfd. (C5).....	S-3150	Volume Control-and Power Switch (R6,S3).....
13003	Capacitor-180 mmfd. (C13).....	SPEAKER ASSEMBLIES	
S-2895	Capacitor-220 mmfd. (Close Tol.)(C23)	(CRL-523) - 12"	
12952	Capacitor-330 mmfd. (C3).....	31825	Cap-Dust cap for cone centre(Pkg.5)
30433	Capacitor-470 mmfd. (C14).....	S-2458	Coil-Field coil (L16).....
31381	Capacitor-620 mmfd. (C26).....	31275	Cone-Speaker cone and voice coil (L10).....
34459	Capacitor-.0025 mfd. (C15,C17).....	5039	Plug-4 contact male plug.....
33584	Capacitor-.005 mfd. (C21,C22).....	S-3036	Speaker-complete.....
4937	Capacitor-.01 mfd. (C18,C19).....	S-2934	Transformer-Output (T2).....
11315	Capacitor-.015 mfd. (C30).....	MOTOR ASSEMBLIES	
32787	Capacitor-.05 mfd. (C7,C10,C16)....	S-3077	Motor-110 volt,60 cycle motor complete.....
32240	Capacitor-Electrolytic, comprising 2 sections of 10 mfd. and one of 20 mfd. (C20,C28,C29).....	S-3078	Motor-110 volt,25 cycle motor complete.....
S-3109	Coil-Antenna 19,25 & 31 M bands (L2,L3,L4,L5).....	4577	Plug-2 contact male motor plug.....
S-3111	Coil-Oscillator "A" Band (L15).....	S-3079	Spindle-Turntable spindle.....
S-3114	Coil-Oscillator 19M band (L12).....	S-3080	Spring-Drive wheel tension spring (Pkg.2).....
S-3112	Coil-Oscillator 25M band (L13).....	S-3081	Turntable-(9" diameter).....
S-3113	Coil-Oscillator 31M band (L14).....	S-3082	Wheel-Rubber tired drive wheel.....
S-3149	Condenser-Two gang tuning condenser (C1,C2,C25).....	AUTOMATIC SWITCH ASSEMBLY	
32634	Cord-Drive cord.....	36772	Cam-Cam Assembly comprising main and auxiliary cam, hub and set screw.....
35627	Drum-Drive cord drum.....	32869	Screw-Set screw for cam hub(Pkg.10)
S-3152	Indicator-Station selector indicator pointer.....	36521	Spring-Actuating lever tension spring (Pkg.2).....
11765	Lamp-Dial lamp Mazda #51.....	36529	Switch-Contact and plunger.....
S-3179	Plug-4 contact male loop plug.....	PICKUP AND ARM ASSEMBLIES	
S-3178	Pulley-Dial cord pulley (Pkg.2)....	S-3043	Arm-Pickup arm.....
30735	Resistor- 560 ohm 1 watt (R15).....	S-3233	Base-Pivot shaft and base assembly.
14075	Resistor-8200 ohm 1/4 watt (R16)....	34307	Crystal-Pickup crystal and needle screw.....
14559	Resistor-10,000 ohm 1/4 watt (R7)...	31048	Plug-Pickup cable plug.....
33489	Resistor-15,000 ohm 2.5 watt (R4)...	33529	Screw-Screw for needle.....
13998	Resistor-22,000 ohm 1/4 watt (R5)...	MISCELLANEOUS ASSEMBLIES	
12454	Resistor-33,000 ohm 1/4 watt (R2)...	S-3148	Dial scale.....
13734	Resistor-120,000 ohm 1/4 watt (R13)..	36246	Holder-Needle package holder.....
14020	Resistor-150,000 ohm 1/4 watt (R17)..	S-3086	Knob-Phono radio tone switch knob..
30493	Resistor-150,000 ohm 1/2 watt (R11)..	S-3184	Knob-Range switch knob.....
30651	Resistor-270,000 ohm 1/4 watt (R8)...	S-3101	Knob-Tuning or Volume Knob.....
14983	Resistor-330,000 ohm 1/4 watt (R14)..	S-3399	Loop-Antenna Loop Assembly.....
30648	Resistor-470,000 ohm 1/4 watt (R10,R12).....	S-3180	Socket-Loop Socket (on loop Ant.) (L1).....
12679	Resistor-2.2 megohms-1/4 watt(R1,R3)	30900	Spring-Knob retaining spring (Pkg.5).....
30992	Resistor-10. megohms-1/4 watt (R9)...	33673	Support-Pickup Arm Support.....
33726	Retainer-"C" washer for drive shaft (Pkg.5).....		
34373	Retainer-"C" washer for pulleys(Pkg.5)		
S-3155	Shaft-Station selector drive shaft..		
S-2824	Socket-A.C. socket.....		
31364	Socket-Dial Lamp Socket.....		
14278	Socket-Phono input socket.....		
5040	Socket-Speaker cable connector (Female).....		
31319	Socket-Tube socket.....		
30585	Spring-Drive cord tension spring (Pkg.2).....		
S-3151	Switch-Range switch (S1).....		
S-3232	Switch-Phono radio tone switch (S2).		
S-3239	Transformer-1st I.F. transformer (L6,L7,C8,C9).....		