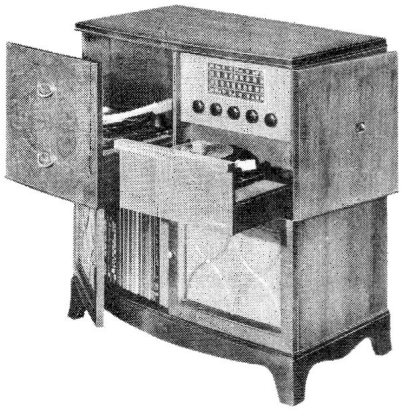


MODEL V-312

RCA VICTOR

"HIS MASTER'S VOICE"

RADIO & DUAL PHONOGRAPH COMBINATION

MODEL V-312

SERVICE DATA

— 1950 No. 19 —

GENERAL SERVICE DIVISION
RCA VICTOR COMPANY LIMITED
MONTREAL, QUE.

Electrical and Mechanical Specifications

Frequency Ranges:

Standard Broadcast	540-1600	KC.
Short Wave "SW_1"	5.8-10	MC.
Short Wave "SW_2"	11.4-18.2	MC
Frequency Modulation "FM"	88-108	MC

I.F. Frequencies

Amplitude Modulation	455	KC
Frequency Modulation	10.7	MC

Tube Complement

(1)	RCA	6BA6	R.F. Amplifier
(2)	RCA	6BE6	A.M. Converter
(3)	RCA	6J6	F.M. Converter
(4)	RCA	6BA6	A.M.—F.M. IF Amplifier
(5)	RCA	6AU6	F.M. IF Amplifier
(6)	RCA	6AL5	Ratio Detector
(7)	RCA	6AV6	Audio
(8)	RCA	6AV6	Det.—A.V.C. Phase Inverter
(9)	RCA	6C4	Driver
(10)	RCA	6V6GT	Output
(11)	RCA	6V6GT	Output
(12)	RCA	5Y3GT	Rectifier

DIAL LAMPS	(2) Mazda 51
PILOT LAMP	(1) Mazda 51
TUNING DRIVE RATIO	(19:1) or 9½ turns of knob.

POWER OUTPUT

Undistorted	8	Watts
Maximum	12	watts

Loudspeaker

Type	12" P.M.
Voice Coil Impedance	2.2 ohms at 400 cycles

Power Supply Ratings:

Rating A-105-125 volts, 60 cycles, 1.0 amp.	115	watts
Rating B-105-125 volts, 25 cycles, 1.0 amp.	115	watts

Cabinet Dimensions:

Height	34	inches
Width	35½	"
Depth	17	"

Phonograph (45 RPM)

Type	RP-168C
Record Capacity	Eight 7 inch
Turntable speed	45 R.P.M.
Pickup	Crystal (Medium Output)

Phonograph (33⅓ - 78 RPM)

Type	RP-201
Record capacity	Twelve 10 inch or Ten 12 inch
Turntable Speed	33⅓—78 R.P.M.
Pickup	Dual Stylus—Rotatable Crystal (Standard Output)

General Description

The RCA Victor Model V-312 receiver is a twelve tube, four bands, long and short wave AM-FM radio phonograph combination.

The receiver tunes the standard broadcast band (540-1600 KC); the short wave bands (16 M to 49 M) (in two ranges) and the F.M. band (88-108 MC). The receiver incorporates an R.F. amplifier on the AM, long and short wave bands, and a combined oscillator and mixer for the F.M. band. The A.M. section has one stage of I.F. amplification which gives good sensitivity and adequate gain for the audio stages. The F.M. section has two stages of I.F. amplification, the second being the driver for the Ratio Detector. The audio amplifier in this receiver is of the high quality type incorporating a "High" and "Low Frequency" tone control and delivers an undistorted output of eight watts.

The receiver also incorporates the latest RCA Victor 45 R.P.M. (RP-168C) record changer, and the new RP201 record changer, which may be selected by the range switch.

Antenna Connections

The Model V-312 receiver has two internal antennas housed in the cabinet. A loop antenna for standard broadcast; and a folded dipole for F.M. and short wave reception.

Standard Broadcast:

The loop antenna is very sensitive and therefore should result in good signal pickup, but in some cases, where the noise level is high or reception is weak, it is recommended that an external antenna be used. To connect an external antenna, connect the 'lead in' from the external antenna to terminal No. 3 on the antenna terminal board.

If reception is not improved, that is, the noise level still persists, it is advisable to check and see if the noise is being picked up by the loop antenna; if it is, terminal No. 1 and 2 of the antenna terminal board must be shorted. This short circuits the loop antenna and detunes the input circuit. It is then necessary to re-adjust the antenna core (L-1) at 580 KC and the trimmer (C-5) at 1500 KC. No other adjustments should be made.

Short Wave Antenna:

The short wave antenna consists of the F.M. folded dipole antenna, with the input terminals 3 and 4 short circuited by S-3 on Range switch position SW_1 and SW_2. This makes the FM dipole antenna act as the internal short wave antenna. Should the location be such, that short wave reception be poor, an external antenna is recommended. This external antenna should be connected to terminal No. 3 of the antenna terminal board.

Frequency Modulation:

The antenna used on the F.M. band, is the F.M. folded dipole, which is located in the cabinet. Should, due to receiver position in the house or other obstruction such as high buildings or being located at a great distance away from the transmitting antenna, cause poor or weak F.M. reception, an external dipole antenna is recommended. The internal dipole should be disconnected from terminal 3 and 4 of the antenna terminal board, and the external dipole lead-in should be connected in its place.

NOTE:

If the receiver is connected to an external F.M. dipole antenna, it is not necessary to install any external short wave or broadcast band antenna. The reason being that the dipole and antenna lead in form a good antenna for the broadcast and short wave bands.

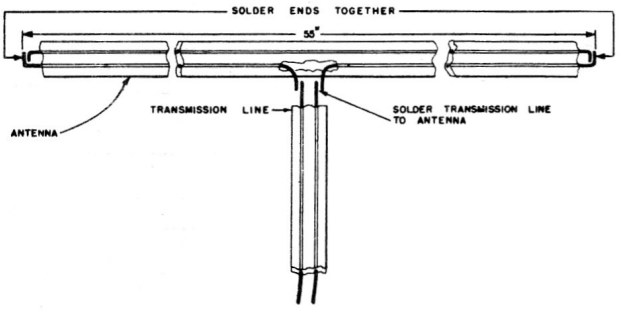


FIG. 1 F.M. FOLDED DIPOLE IN CABINET

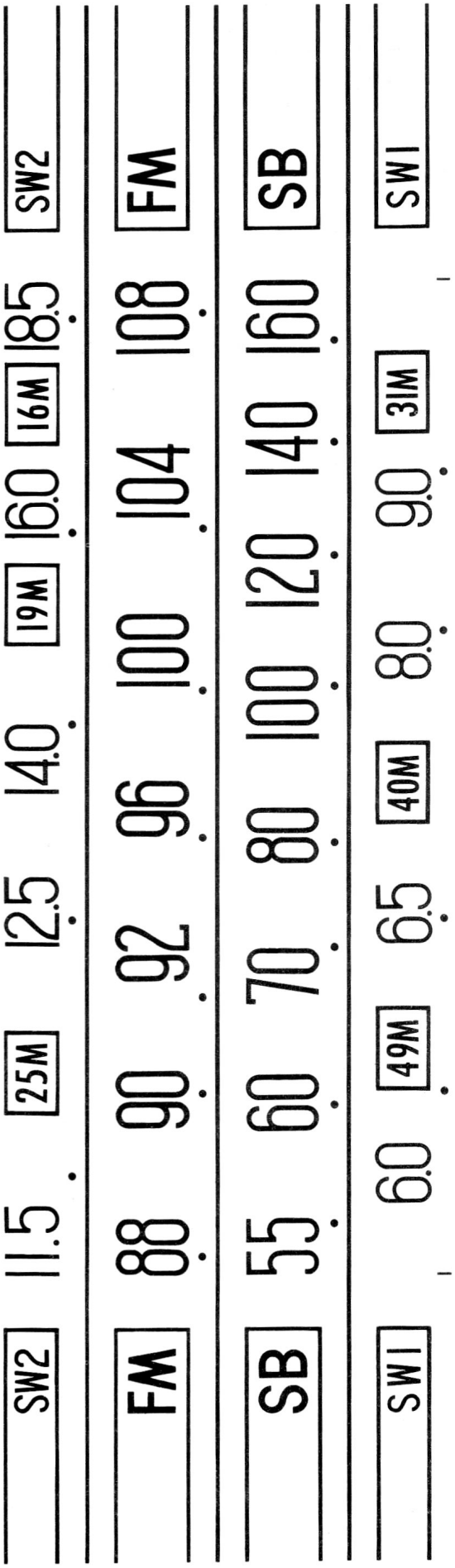


FIG. 2 DIAL SCALE DRAWING (FULL SCALE)

Critical Lead Dress

(1) Keep blue lead from ratio detector, pin "D" to 6AL5 Pin 5, as short as possible.

(2) Keep brown lead from 6AV6 and red from terminal board away from aforementioned blue lead.

(3) Keep B + lead, from pin 5 of S-4 (rear), away from FM antenna transmission line.

NOTE:

Make sure that the special "disc" type capacitors are always replaced by similar types. The reason being, that paper capacitors of the same value are not as efficient.

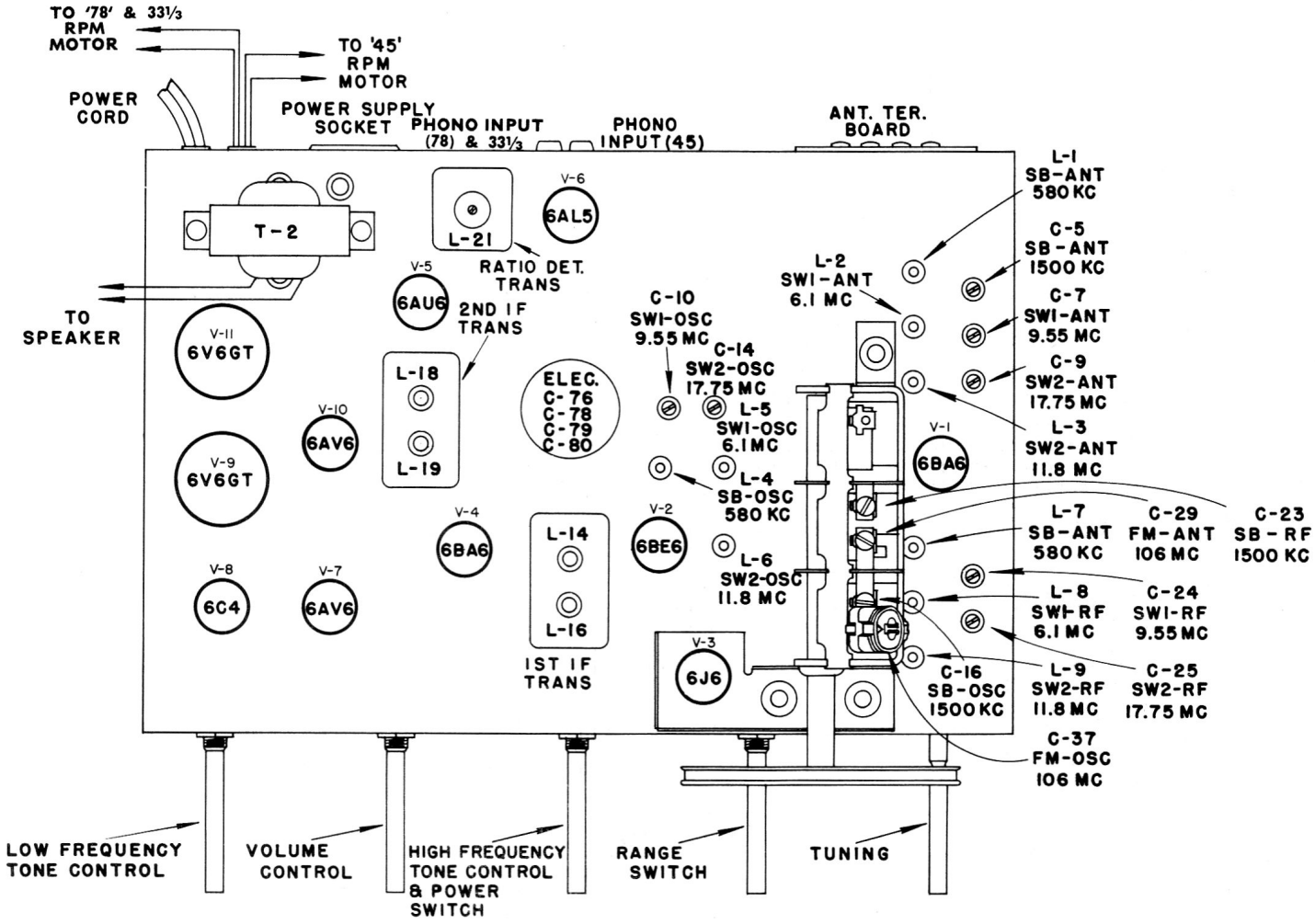


FIG. 3 CHASSIS LAYOUT & ALIGNMENT ADJUSTMENTS

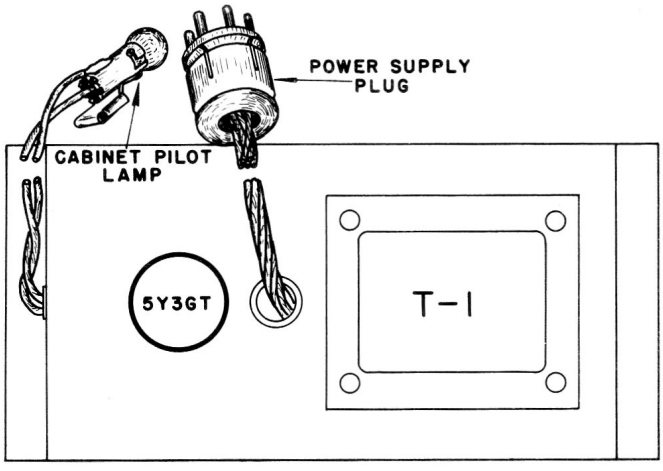


FIG. 4 POWER SUPPLY CHASSIS LAYOUT

Alignment Procedure

Before aligning the receiver follow procedure outlined below:

(1) Set pointer opposite 60 on the dial scale.

(2) Unhook the pointer from the dial cord, without disturbing its position.

(3) Set gang at maximum capacity, fully meshed.

(4) Move pointer one inch to the right.

(5) Hook up pointer to dial cord.

This gives the initial position of the pointer before alignment.

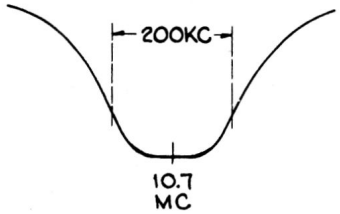
When only a portion of the circuit is to be aligned, select the required portion and perform all the remaining steps.

It is recommended that the I.F.'s be aligned with a cathode ray oscilloscope and sweep generator. If this equipment is not available, use the method outlined in the alignment chart.

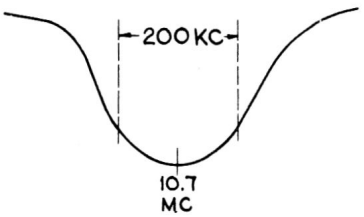
ALIGNMENT CHART

ORDER OF ALIGNMENT		TEST OSCILLATOR				RECEIVER				
		CONNECT "HI" SIDE TO	CONNECT "LO" SIDE TO	DUMMY ANTENNA	FREQUENCY SETTING	RANGE SELECTOR	DIAL SETTING	CIRCUIT TO ADJUST	ADJUSTMENT SYMBOLS	NOTES
A.M.-I.F. ALIGNMENT	1	V-4 6BA6 Pin 1	Gnd	.1 mfd.	455 Kc	S.B.	"HI END"	2nd I.F. Trans.	L-19 L-20	Max. Out
	2	S-1 Rear Pin 1	Same	Same	Same	Same	Same	1st I.F. Trans.	L-15 L-16	Same
	3	Repeat Steps 1 & 2.								
S.B. ALIGNMENT	4	Ter. Board Ter. 1	Gnd	220 mmf	580 Kc	S.B.	580 Kc	Osc. R.F. Ant.	L-4 L-7 L-1	Max. Out
	5	Same	Same	Same	1500 Kc	Same	1500 Kc	Osc. R.F. Ant.	C-16 C-23 C-5	Same
	6	Repeat Steps 4 & 5.								
S.W.1 ALIGNMENT	7	Ter. Board Ter. 3	Gnd	300 Ohms	6.1 Mc	S.W.1	6.1 Mc	Osc. R.F. Ant.	L-5 L-8 L-2	Max. Out
	8	Same	Same	Same	9.55 Mc	Same	9.55 Mc	Osc. R.F. Ant.	C-10 C-24 C-7	Same
	9	Repeat Steps 7 & 8.								
S.W.2 ALIGNMENT	10	Ter. Board Ter. 3	Gnd	300 Ohms	11.8 Mc	S.W.2	11.8 Mc	Osc. R.F. Ant.	L-6 L-9 L-3	Max. Out
	11	Same	Same	Same	17.75 Mc	Same	17.75 Mc	Osc. R.F. Ant.	C-14 C-25 C-9	Same
	12	Repeat Steps 10 & 11.								
F.M.-RATIO DET. ALIGNMENT	13	Connect Voltohmyst probe to negative side of 2 mfd. electrolytic (C-60) Capacitor and low side to chassis.								
	14	V-5 6AU6 Pin 1	Gnd	.1 mfd.	10.7 Mc (Standard)	F.M.	"HI End"	Ratio Det. Trans.	L-21	Max. Out On Voltohmyst
	15	Same	Same	Same	Same	Same	Same	Same	L-22	Min. Out.*
	16	Repeat Steps 14 & 15								
F.M.-I.F. ALIGNMENT	17	V-4 6BA6 Pin 1	Gnd	.1 mfd.	10.7 Mc (Standard)	F.M.	"HI End"	2nd I.F. Trans.	L-17 L-18	Max. Out. on Voltohmyst
	18	Connect 1000 Ohm Resistor across 2nd I.F. Primary Ter. A. & H. Re-Adjust secondary L-18 at 10.7 Mc for maximum D.C. Voltage on Voltohmyst.								
	19	Remove 1000 Ohm Resistor and connect across 2nd I.F. Trans. Primary Ter. C.& E. Re-Adjust Primary L-17 at 10.7 Mc for maximum D.C. Voltage on Voltohmyst								
	20	Remove Resistor								
	21	Ter. Board Ter. 4	Gnd	.1 mfd.	10.7 Mc (Standard)	F.M.	"HI End"	1st I.F. Trans.	L-13 L-14	Max. Out. on Voltohmyst
	22	Connect 1000 Ohm Resistor across 1st I.F. Trans. Primary Ter. A. & C. Re-Adjust Secondary L-14. at 10.7 Mc for Maximum D.C. Voltage on Voltohmyst.								
	23	Remove 1000 Ohm Resistor and Connect across 1st I.F. Secondary Ter. D. & E. Re-Adjust Primary L-13 at 10.7 Mc for Maximum D.C. Voltage on Voltohmyst.								
F.M.-ANT. & OSC. ALIGNMENT	24	Ter. Board Ter. 4	Gnd	300 Ohms	106 Mc (Standard)	F.M.	106 Mc	Osc. Ant.	C-37 C-29 (Rock In)	Max. Out.
	25	Same	Same	Same	89 Mc (Standard)	Same	89 Mc	Osc. Ant.	Adj. Spacing L-11 " " L-10	Same
	26	Repeat Steps 24 & 25.								

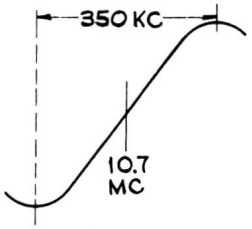
* Two or more points may be found which lower the audio output; at the correct point the minimum audio output is approached rapidly and is much lower than at any incorrect point. Due to this fact it is advisable to first, determine the correct peak by feeding in a 10.7 Mc (F.M.) signal with a sweep of about 20 Kc., then align the bottom core for maximum output. Switch the generator to A.M. and retouch the core for minimum audio output. Always check the response of the ratio detector on the scope to obtain best results.



2nd I.F. Response



1st and 2nd I.F. Response



Ratio Det. Response

Fig. 5—F.M. Response Curves

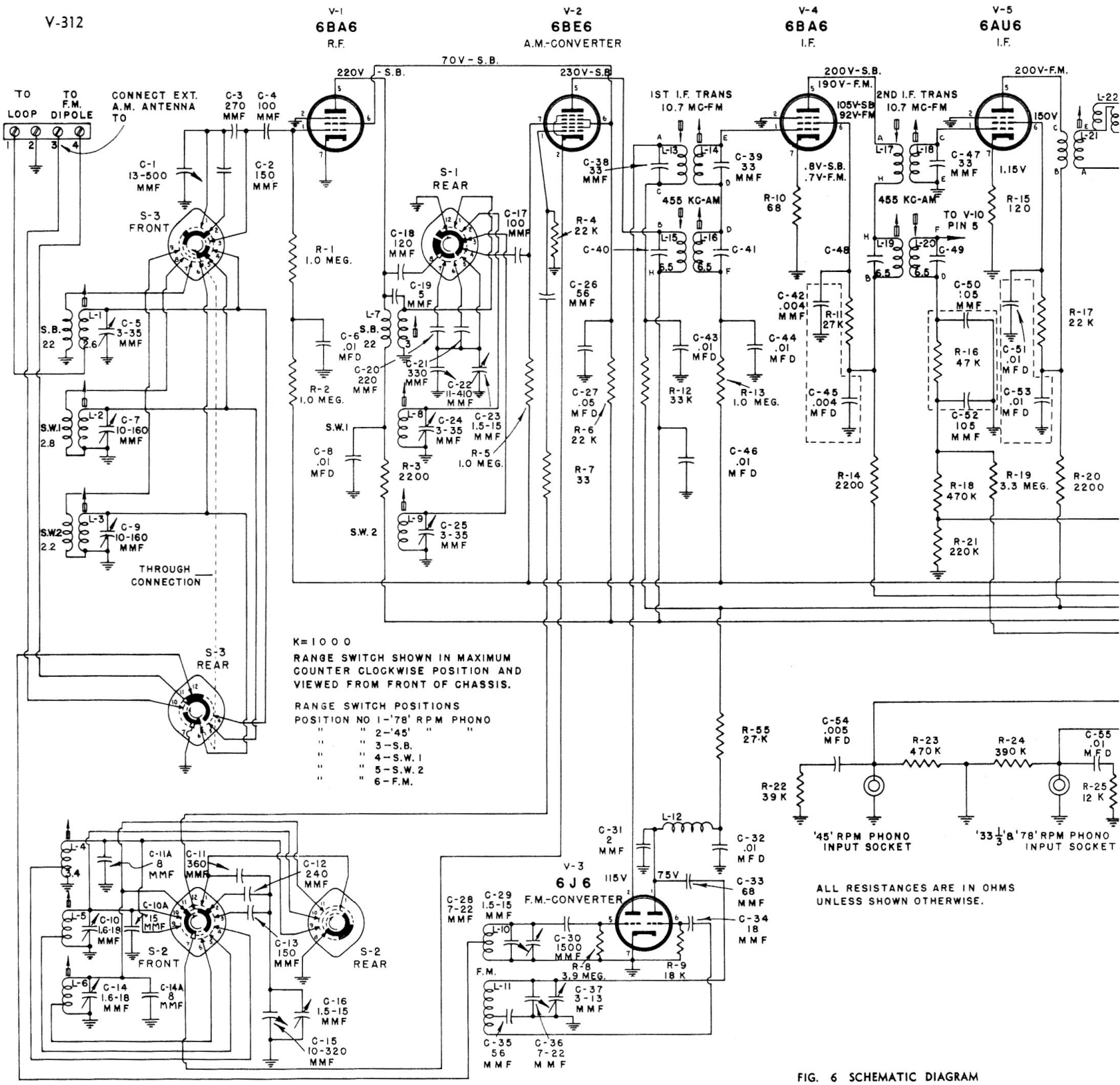
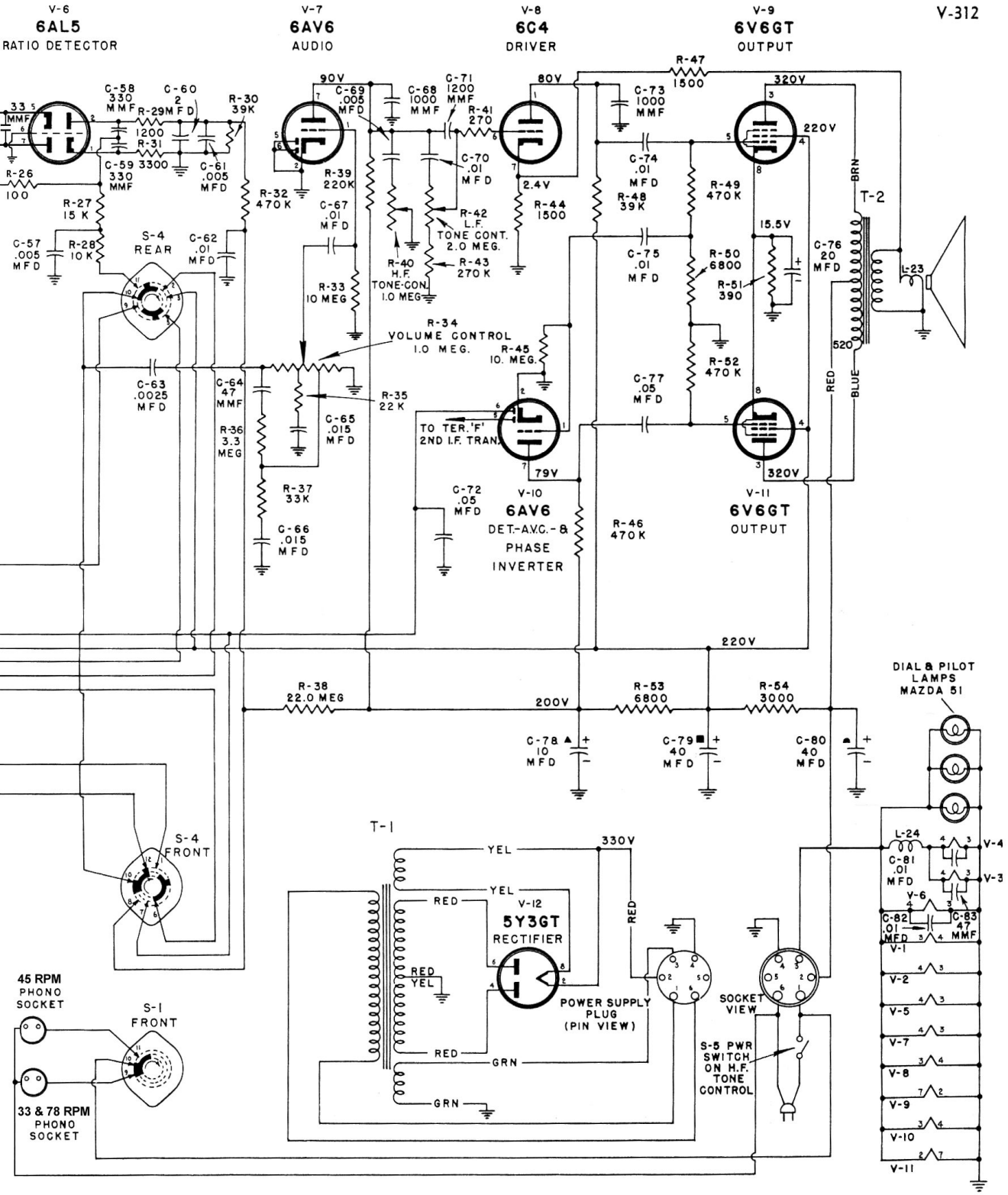
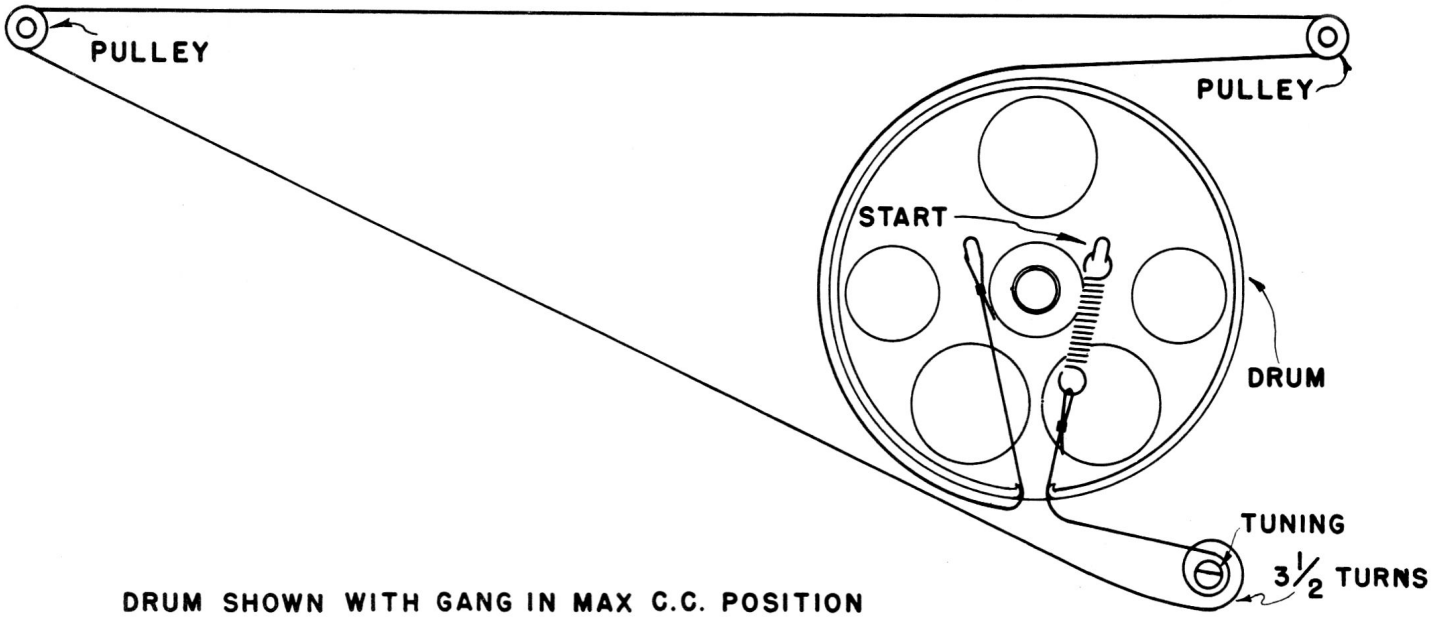


FIG. 6 SCHEMATIC DIAGRAM


V-6
6AL5
RATIO DETECTOR
V-7
6AV6
AUDIO
V-8
6C4
DRIVER
V-9
6V6GT
OUTPUT
R-47
1500
320V
C-58
330
MMF
C-60
2
MFD
R-30
39K
R-29
1200
R-31
3300
C-59
330
MMF
C-61
.005
MFD
R-26
100
R-27
15 K
R-28
10 K
C-57
.005
MFD
S-4
REAR
C-62
.01
MFD
90V
C-69
.005
MFD
C-68
1000
MMF
C-71
1200
MMF
R-41
270
80V
C-73
1000
MMF
220V
C-74
.01
MFD
R-48
39K
R-49
470K
BRN
T-2
R-32
470K
R-39
220K
C-67
.01
MFD
C-70
.01
MFD
2.4V
R-44
1500
R-42
L.F.
TONE CONT.
2.0 MEG.
R-40
H.F.
TONE CON.
1.0 MEG
R-43
270 K
C-75
.01
MFD
R-50
6800
15.5V
C-76
20
MFD
R-51
390
L-23
520
R-33
10 MEG
R-34
VOLUME CONTROL
1.0 MEG.
R-45
10. MEG.
R-52
470 K
RED
BLUE
C-63
.0025
MFD
C-64
47
MMF
R-35
22 K
C-65
.015
MFD
TO TER. 'F'
2ND I.F. TRAN.
C-77
.05
MFD
R-36
3.3
MEG
R-37
33K
C-72
.05
MFD
V-10
6AV6
DET.-A.V.C.-1ST
PHASE
INVERTER
R-46
470K
V-11
6V6GT
OUTPUT
79V
320V
C-66
.015
MFD
220V
DIAL & PILOT
LAMPS
MAZDA 51
R-38
22.0 MEG
200V
R-53
6800
R-54
3000
C-78 ▲
10
MFD
C-79 ■
40
MFD
C-80
40
MFD
T-1
S-4
FRONT
YEL
330V
YEL
RED
V-12
5Y3GT
RECTIFIER
RED
YEL
RED
L-24
C-81
.01
MFD
V-4
V-3
V-6
C-82
.01
MFD
C-83
47
MMF
V-1
V-2
V-5
V-7
V-8
V-9
V-10
V-11
45 RPM
PHONO
SOCKET
S-1
FRONT
POWER SUPPLY
PLUG
(PIN VIEW)
SOCKET
VIEW
S-5 PWR
SWITCH
ON H.F.
TONE
CONTROL
RED
GRN
GRN
33 & 78 RPM
PHONO
SOCKET



DRUM SHOWN WITH GANG IN MAX C.C. POSITION

FIG. 7 DIAL CORD STRINGING

REPLACEMENT PARTS FOR MODEL V-312

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

STOCK NO.	DESCRIPTION
	CHASSIS ASSEMBLIES
	Capacitor-Mica Trimmer, 2 sections 2 (1.6 - 18 MMF)(C10,C14) 500 V.
S-3611	" -Ceramic Trim.3-13 MMF. (C37)
	" -Mica Trim. 2 sections
S-5093	" -2(3-35 MMF)(C24,C25) 500 V.
S-5538	" -Mica Trimmer 3 Sections 2 (10-160 MMF) (C5,C7) 3-35 MMF (C9) 500 V.
73866	" -Ceramic, 2 MMF. 500 V. (C31)
S-5539	" -Ceramic, 5 MMF. ± 1 MMF (C19)
S-5540	" - " , 8 MMF. ± .5 MMF (C14A)
S-5540	" - " , 8 MMF. ± 5% 500 V. (C11A)
39044	" - " ,15 MMF. ± 5% 500 V. (C10A)
36463	" - " ,18 MMF.+ -10% 500 V. (C34)
S-5543	" - " ,47 MMF.+ -20% 500 V. (C83)
S-5544	" -Mica 47 MMF.+ -10% (C64)
	" -Ceramic 56 MMF.500V.(C35)
73867	Capristor-56 MMF.33 ohms 1/4 W.(C26,R4)
33103	Capacitor-Ceramic,68 MMF.+ -10% 500 V. (C33)
	" - " 100 MMF.+ -20% 500 V. (C4,C17)
S-4614	Capristor-2 (105) MMF. & 47,000 ohms ½ W. (C50,C52,R16)
S-5546	Capacitor-Mica 120 MMF.+ -10% (C18)
S-5547	" - " 150 MMF.+ - 5% (C2,C13)
S-5548	" - " 220 MMF.+ - 5% (C20)
S-5549	" - " 240 MMF.+ - 5% 500V.(C12)
S-5550	" - " 270 MMF.+ - 5% (C3)
	" - " 330 MMF.+ - 5% 500 V.
	" - " 330 MMF.+ -10% 500 V.
	" - " 360 MMF.+ - 5% (C11)500V.

STOCK NO.	DESCRIPTION
	CHASSIS ASSEMBLIES-(Cont'd.)
S-5370	Capacitor-Ceramic,1,000 MMF.+ - 20% 350 V. (C68, C73)
S-5552	" -Mica,1200 MMF. ±10% (C71)
71501	" -Ceramic 1500 MMF. 350 V.(C30)
	" -Paper .0025 Mfd. ±10% 200 V. (C63)
74009	" -"Disc" 2 (.004 Mfd.) 500 V. (C42,C45)
	" -Paper .005 Mfd.+ -10% 400V. (C29)
	" -Paper .005 Mfd. ±20% 200 V. (C54,C57)
	" -Paper .005 Mfd.+ -10% 200 V. (C61,C57)
73960	" -"Disc" .01 Mfd. 500 V. (C8, C6,C32,C46,C43,C44,C81, C51,C53,C62) (C82)
	" -Paper .01 Mfd.+ -10% 400 V. (C70)
	" -Paper .01 Mfd.+ -20% 200 V. (C67) (C75,C55)
	" -Paper .01 Mfd.+ -20% 400 V. (C74)
	" -Paper .015 Mfd.+ -10% 200 V. (C65,C66)
	" -Paper .05 Mfd.+ -20% 200 V. (C72)
	" -Paper .05 Mfd.+ -20% 400 V. (C27,C77)
73747	" -Electrolytic,2 Mfd. 50V.(C60)
S-5336	" - " 10 Mfd.300V.(C78) 20 Mfd. 50V(C76) 40 Mfd.450V.(C79,C80)
S-5333	Condenser-Gang condenser (C1) (C15,C16, C22,C23,C28,C29,C36)
S-5318	Coil-S.B. Antenna Coil (L1)
S-5321	" -S.B. R.F. Coil (L7)

REPLACEMENT PARTS FOR MODEL V-312 (Cont'd)

STOCK NO.	DESCRIPTION
	CHASSIS ASSEMBLIES-(Cont'd.)
S-5324	Coil-S.B. Oscillator (L4)
S-5319	" -S.W.1 - Ant. coil (L2)
S-5322	" -S.W.1 - R.F. coil (L8)
S-5325	" -S.W.1 - Oscillator(L5)
S-5320	" -S.W.2 - Ant. coil (L3)
S-5080	" -S.W.2 - R.F. coil (L9)
S-5326	" -S.W.2 - Oscillator (L6)
S-5329	Control-Volume Control (R34)
S-5331	" -Low Frequency tone control(R42)
S-5330	" -High Frequency tone control & power switch (R40,S5)
	Resistor-68 ohms ±20% ½ W. (R10)
	" -100 " ± 5% ½ W. (R26)
	" -120 " ±10% ½ W. (R15)
	" -270 " ±10% ½ W. (R41)
	" -390 " ±10% 2 W. (R51)
	" -1200 " ± 5% ½ W. (R29)
	" -1500 " ±10% ½ W. (R44,R47)
	" -2200 " ±20% ½ W. (R3,R14,R20)
	" -3000 " ±10% 5 W. (R54)
	" -3300 " ± 5% ½ W. (R31)
	" -6800 " ±10% ½ W. (R50)
	" -6800 " ±20% ½ W. (R53)
	" -10,000 " ±10% ½ W. (R28)
	" -12,000 " ±10% ½ W. (R25)
	" -15,000 " ±10% ½ W. (R27)
	" -18,000 " ±10% ½ W. (R9)
	" -22,000 " ±10% 2 W. (R6,R35)
	" -22,000 " ±10% ½ W.
	" -22,000 " ±20% ½ W.(R4,R17)
	" -27,000 " ±10% ½ W.(R55,R11)
	" -33,000 " ±10% ½ W.(R37)
	" -33,000 " ±20% ½ W.(R12)
	" -39,000 " ± 5% ½ W.(R30)
	" -39,000 " ±10% 1 W.(R48)
	" -39,000 " ±10% ½ W.(R22)
	"-220,000 " ±10% ½ W.(R21)
	"-220,000 " ±20% ½ W.(R39)
	"-270,000 " ±10% ½ W.(R43)
	"-390,000 " ±10% ½ W.(R24)
	"-470,000 " ±10% ½ W.(R18,R23,R49)
	"-470,000 " ±20% ½ W.(R32,R46,R52)
	"-1 Megohm + -20% ½ W. (R1,R2,R5,R13)
	"-3.3 Meg. + -20% ½ W. (R19)
	"-3.3 " ±10% ½ W. (R36)
	"-3.9 " ±10% ½ W. (R8)

STOCK NO.	DESCRIPTION
	CHASSIS ASSEMBLIES-(Cont'd.)
	Resistor-10.0 Meg. ±20% ½ W.(R33,R45)
	" -22.0 " ±20% ½ W.(R38)
*S-5903	Switch-Range Switch (S1,S2,S3,S4)
S-5327	Transformer-1st I.F. trans. (L13,L14, L15,L16)
S-5328	" -2nd I.F. trans. (L17,L18, L19,L20)
S-5332	" -Output trans. (T2)
S-4379	" -Power trans.(60 cy.)(T1)
S-4381	" -Power " (25 cy.)(T1)
S-5554	" -Ratio Det. trans. & driver (L21,L22)
	SPEAKER ASSEMBLY
S-4288	Speaker (12")
S-4299	Cone & voice coil assy.
	MISCELLANEOUS ASSEMBLIES
S-5530	Bezel
S-4313	Cord-Dial Cord (Std.)
*S-5902	Dial-Dial Scale
S-3870	Knob-(Walnut) all knobs except for range switch
S-5075	Knob-(Walnut) range switch knob
S-5531	Knob-(Mahogany) All knobs except for range switch
S-5532	Knob-(Mahogany) range switch knob
S-5316	Loop-Loop antenna assy.
S-5335	Pointer-Station selector
*S-5990	Handle-Record drawer handle
*S-5991	Door Pulls - ALBUM DRAWER PULLS
*S-5901	Cabinet Back Cover
S-5344	Phono Socket
	AUTOMATIC RECORD CHANGER
	Refer to: RP-168 (Second Issue) & RP-201 Service Notes for replacement parts and Service Data.
	*Indicates new Stock Items.

Only items listed under Stock Numbers are available as Replacement Parts.
All parts subject to change or withdrawal without notice.