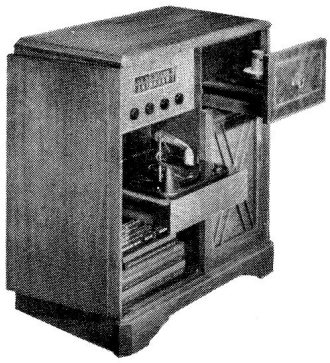


PHOTO OF MODEL V-309, V-310 SIMILAR

RCA VICTOR

"HIS MASTER'S VOICE"

A.M.-F.M. RADIO & DUAL PHONOGRAPH COMBINATION

MODEL V-310

SERVICE DATA

— 1950 No. 20 —

GENERAL SERVICE DIVISION
RCA VICTOR COMPANY LIMITED
MONTREAL, QUE.

Electrical and Mechanical Specifications

Tuning Range

Standard Broadcast (AM) ----------540-1,600 kc.
Frequency Modulation (FM) ----------88-108 mc.
Intermediate Frequencies ----AM—455 kc., FM—10.7 mc.

Tube Complement

(1) RCA 6CB6 ----------R-F Amplifier
(2) RCA 6J6 ----------Mixer and Oscillator
(3) RCA 6BA6 ----------I-F Amplifier
(4) RCA 6AU6 ----------Driver
(5) RCA 6AL5 ----------Ratio Detector
(6) RCA 6AV6 --------AM Det.—AVC—A-F Amplifier
(7) RCA 6C4 ----------Ph. Inv.
(8) RCA 6V6GT ----------Output
(9) RCA 6V6GT ----------Output
(10) RCA 5Y3GT ----------Rectifier

Dial Lamps (2) --------Type No. 51, 6-8 volts, 0.2 amp.
Jewel Lamp ----------Type No. 51, 6-8 volts, 0.2 amp.

Tuning Drive Ratio ----------10:1 (5 turns of knob)

Power Supply Rating ------115 volts, 60 cycles, 115 watts

Loudspeaker

Size and type ----------12 in. PM
Voice coil impedance ----------3.2 ohms at 400 cycles

Power Output

(Radio) Undistorted 8 watts ----------Maximum 9 watts
(Phono.) Undistorted 10 watts --------Maximum 11 watts

PHONOGRAPH (RP168)

Record capacity ----------Ten 7 in.
Turntable speed ----------45 R.P.M.
Pickup ------6 volts at 1000 cycles across 1 Megohm load

PHONOGRAPH (RP201)

Record capacity ------Ten twelve inch or twelve ten inch
Turntable speed ----------33⅓ or 78 R.P.M.
Pickup dual stylus, rotatable crystal

Refer to the RP168 issue two and RP201 Service Notes for information on the 45 and 33⅓-78 R.P.M. record changers respectively.

Record Changers

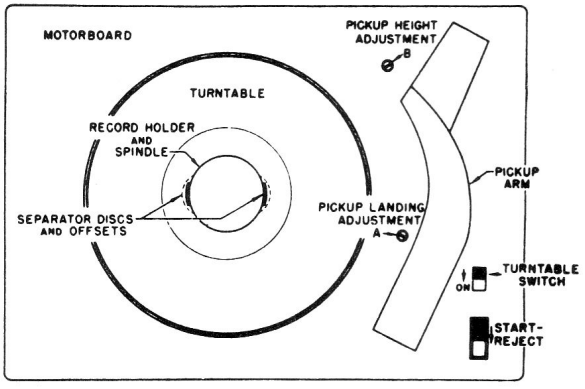


Fig. 1—RP 168 Record Changer

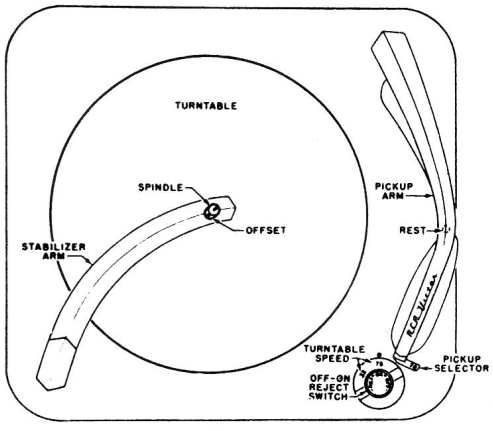


Fig. 2—RP201 Record Changer

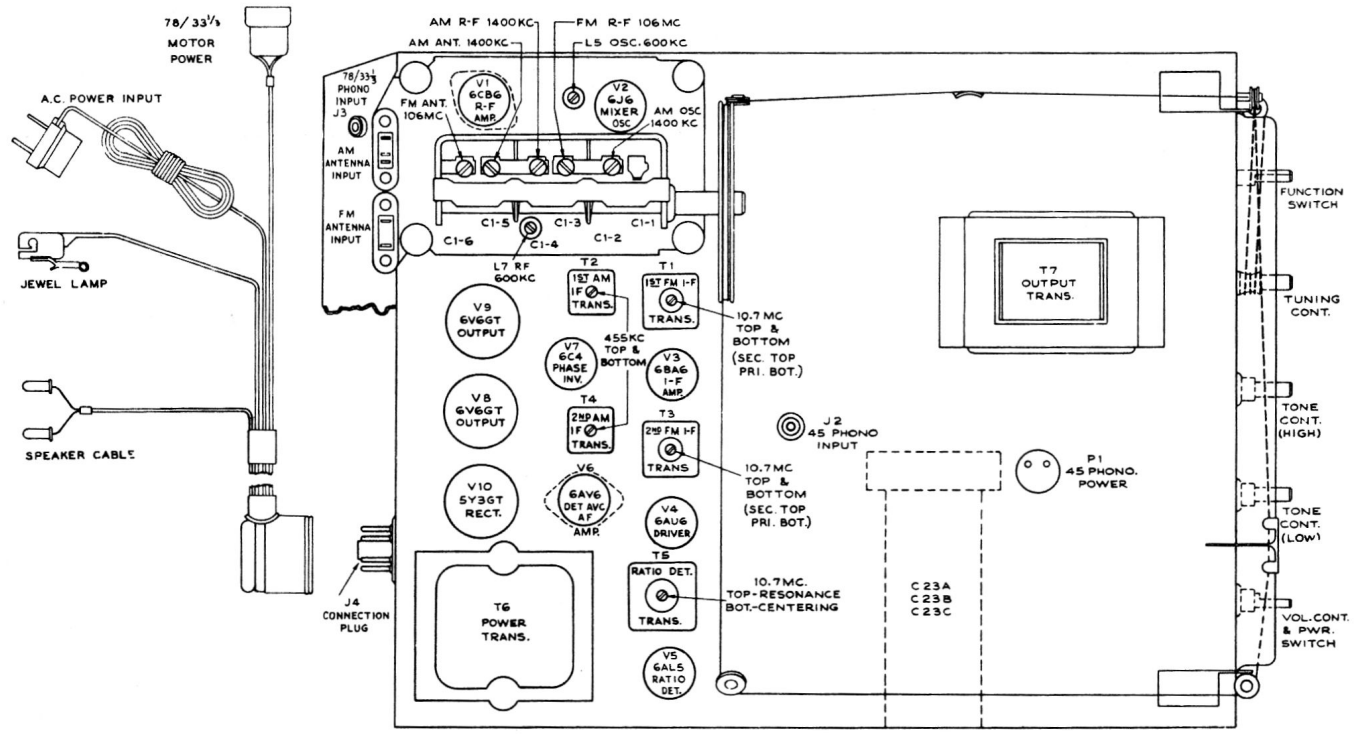


Fig. 3—Chassis Layout & Alignment Adj.

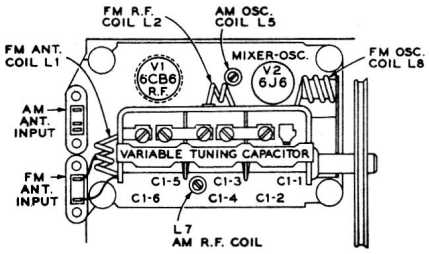


Fig. 4—F.M. Coil Locations

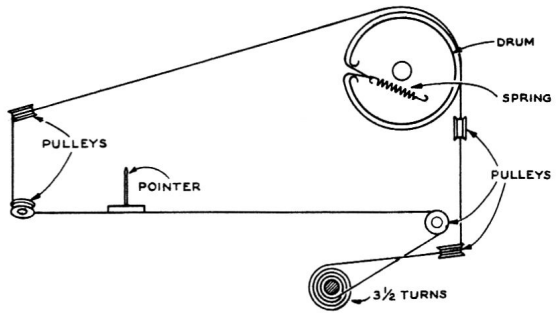


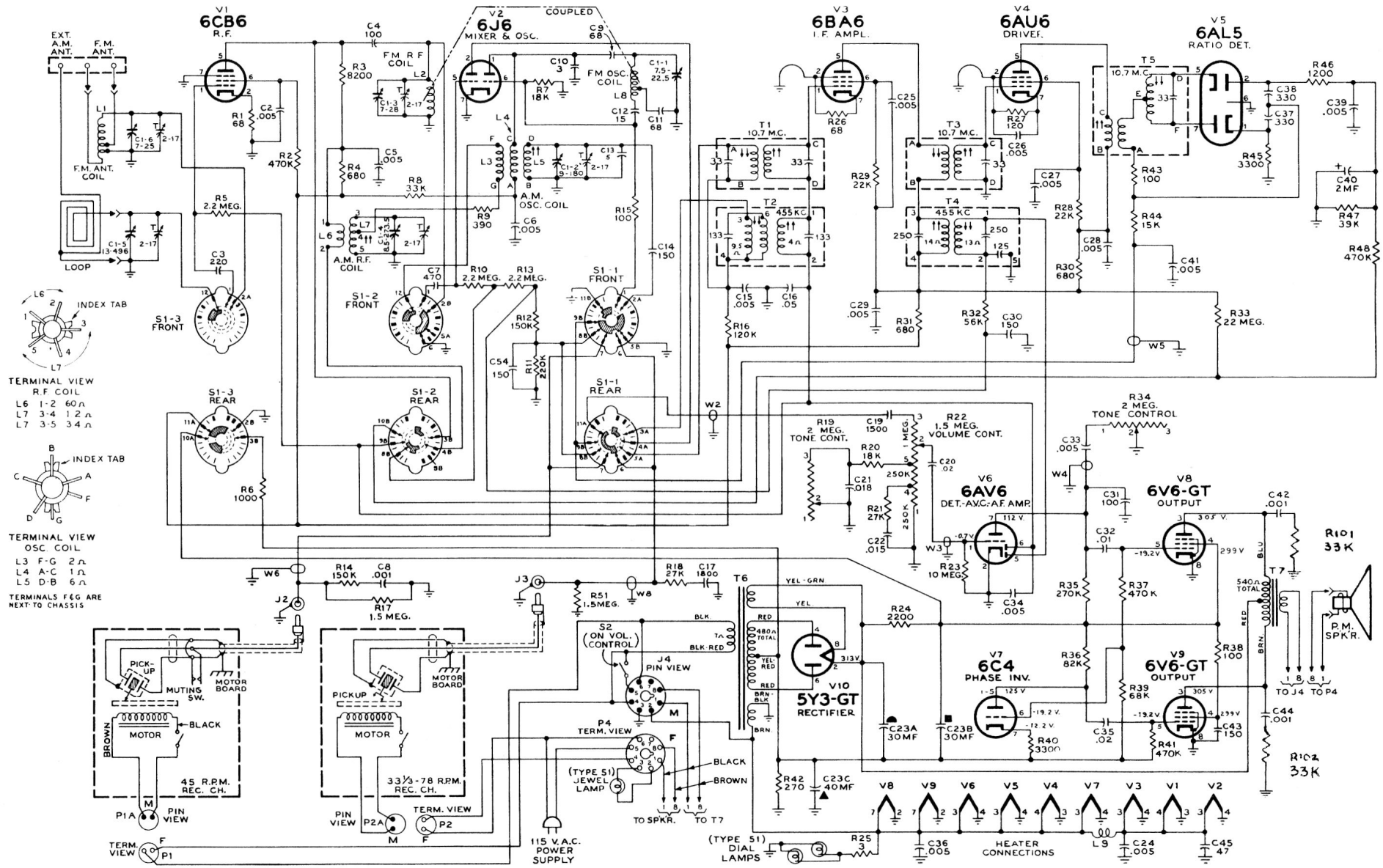
Fig. 5—Dial Cord Stringing

SOCKET VOLTAGES AND CATHODE CURRENT CHART

TUBE	TERMINAL	PHONO V (Volts)	PHONO I	A.M. A.M. V	A.M. A.M. I (MA)	F.M. V	F.M. I (MA)
V1 6CB6 R.F. Amp.	#5 Plate #6 Screen #2 Cathode #1 Grid			203 48 .2 -1.1	3	132 39 .2 -0.9	3
V2 6J6 Mixer & Osc.	#2 Plate #5 Grid #1 Plate #6 Grid #7 Cathode			55 -1.4 33 -2.1	2.6	51 -1.2 27 -1.9	2.6
V3 6BA6 I.F. Amp.	#5 Plate #6 Screen #7 Cathode #1 Grid			192 106 0.9 -1.1	13.2	188 101 -0.35	14.7
V4 6AU6 Driver	#5 Plate #6 Screen #7 Cathode			186 122 1.05	9.3	180 120 1.07	9.0

TUBE	TERMINAL	PHONO V	PHONO I	A.M. V	A.M. I	F.M. V	F.M. I
V5 6AL5 Ratio Det	-			-	-	-	-
V6 6AV6 A.F. Amp.	#7 Plate #1 Grid #2 Cathode	112 -0.7	0.8	94 -0.7	0.5	94 -0.7	0.5
V7 6C4 Ph. Inverter	#1-5 Plate #6 Grid #7 Cathode	125 -19.2 -11.1	2.2	87 -16 -11.4	1.5	85 -16 -11.4	1.5
V8 & V9 6V6GT Output	#3 Plate #4 Screen #5 Grid #8 Cathode	305 299 -19.2	35.6	295 208 -16	17.8	298 204 -16	17.7
V10 5V3GT Rectifier	#2 Filament #2 "	314	74.2	313	73.6	313	74.2

The cathode neutralizing loops of V3 (6BA6) and V4 (6AU6) are insulated wires approx. 2 in. long. Do not alter length.



Function switch viewed from front and shown in "Phono 78/33" position (max. c/clockwise).

CAPACITOR VALUES LESS THAN 1 ARE IN MF., VALUES GREATER THAN 1 ARE IN MMF. UNLESS OTHERWISE SPECIFIED.

RESISTANCE VALUES IN OHMS. K = 1000.

VOLTAGES MEASURED TO CHASSIS WITH VOLTOHMYST WITH NO SIGNAL INPUT AND SHOULD HOLD WITHIN ±20% WITH 117-VOLT POWER SUPPLY.

Fig. 6—Schematic Diagram.

Service Data

RECORD CHANGERS

It should be noted, that when the radio is installed in a customer's home, the shipping screws holding the two record changers securely to their respective bases should be removed. This is necessary in order to have both record changers free floating.
When these screws are removed, the record changers are only supported by their mounting grommets and therefore render the mechanism serviceable without too much dismantling.

REMOVAL OF RADIO CHASSIS FROM ITS COMPARTMENT:

The following procedure should be followed in removing the radio chassis from the radio compartment portion of the cabinet:

(a) Remove cabinet back.
(b) Remove spring and pins at the ends of the roll-out carriage.
(c) Pull receiver out of cabinet, from front.

45 R.P.M. CHANGER

REPLACEMENT OF STYLUS

Caution: Never bend the stylus support wire.

CRYSTAL PICKUPS (Stock Nos. 74067)

Remove the two screws holding sapphire guard in place and remove the guard. Remove the small nut and washer on the threaded shaft of the sapphire holder and gently push the shaft through the hole in the armature shaft until the sapphire holder assembly comes free.
Extreme care should be used when loosening the nut so that the twisting motion does not break the crystal. Take hold of the lower end of the shaft with a pair of pliers while loosening or tightening the nut, being very careful so as not to strip the threads or break the crystal.
Insert threaded shaft of replacement sapphire holder through armature shaft and replace the washer and nut. Make sure that the sapphire is in the correct position.
Replace the sapphire guard, position it by means of the oversize screw slots. Make certain that the sapphire and its supporting wire are centered in the guard. Tighten the guard screws. Before using, check to see that the sapphire projects far enough beyond the guard so that the guard will not touch the record. If necessary, bend the guard a little.

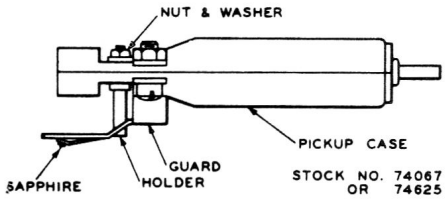
REMOVAL OF RADIO CABINET FROM RECEIVER CHASSIS

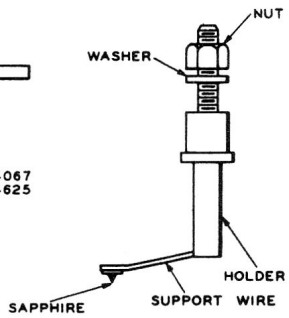
(a) Remove the two screws from the sides of the cabinet.
(b) Remove the knobs.
(c) Lift cabinet up.

For technical information on record changers, please refer to the RP-168 Record Changer Service Note, Issue No. 2 and the RP-201 Record Changer service note.

REINSERTING RADIO CHASSIS & CABINET INTO RADIO COMP.

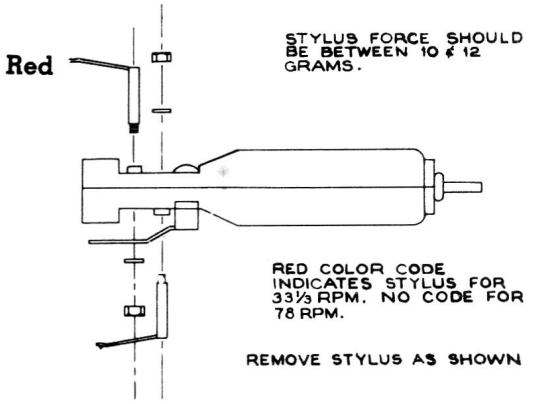
(1) Move bearing carriages to the front of the runners.
(2) Hold in this position.
(3) Insert radio chassis runner into carriage, keeping bearing carriages in place, and push receiver chassis unit until the runner is in line with the bearing carriages.
(4) Then remove hold of bearing carriages.
(5) And slide the receiver chassis to the back of the receiver.
(6) Mount pins & spring in runner.
If the chassis has been properly inserted into the carriage, the chassis runner will hit the stop located at the rear left hand side of the radio chassis compartment when receiver unit is pushed in.





33-1/3—78 R.P.M. CHANGER

Removing Stylus



Alignment Procedure

Correct Alignment of the FM Band Requires That the AM Band be Aligned First

Alignment Indicators:

An RCA VoltOhmyst or equivalent meter is necessary for measuring developed d-c voltage during FM alignment. Connections are specified in the alignment tabulation. An output meter is also necessary to indicate minimum audio output during FM Ratio Detector alignment. Connect the output meter across the speaker voice coil.

The RCA VoltOhmyst can also be used as an AM alignment indicator, either to measure audio output or to measure a-v-c voltage.

When audio output is being measured the volume control should be turned to maximum.

Signal Generator:

For all alignment operations connect the low side of the signal generator to the receiver chassis. The output should be adjusted to provide accurate resonance indication at all times. If output measurement is used for AM alignment the output of the signal generator should be kept as low as possible to avoid a-v-c action.

Critical Lead Dress

Note: The leads listed may not be critical in all receivers. However, by dressing the leads as specified, unusual difficulties will be minimized.

1. The 2.2 meg mixer grid resistor (R10) should have a minimum practicable amount of lead extending on the grid end.
2. The first A.M. and first F.M. I.F. plate leads should be dressed away from the range switch wafer.
3. The ground strap between the R.F. shelf and the main chassis should be well soldered and kept as short as practicable.
4. Arrange wiring to prevent the filament wire between the mixer (6J6) and 1st I.F. (6BA6) tubes from passing near either the mixer grid, or the A.V.C. wiring.
5. Dress filament wires away from all audio coupling condensers.

Critical Lead Dress (Cont'd)

6. Dress A.C. power switch wires away from the audio coupling condenser (C20) which is wired to the volume control.

7. Dress the mixer grid coupling condenser (C7) away from the lugs on the front range switch wafer.

8. The 1st I.F. tube A.V.C. by-pass condenser (C16) should ground at the same point as the cathode neutralizing loop.

9. The driver tube plate and screen by-pass condensers (C27, C28) should ground at the same point as the neutralizing loop.

10. The mixer plate by-pass condenser (C15) should ground as close to the R.F. shelf ground strap as practicable.

11. The shielded audio leads connecting to the front function switch wafer should have a minimum of exposed lead on the function switch end.

ALIGNMENT CHART

ORDER OF ALIGNMENT		TEST OSCILLATOR				RECEIVER				
		CONNECT 'H' SIDE TO	CONNECT 'LO' SIDE TO	DUMMY ANTENNA	FREQUENCY SETTING	RANGE SELECTOR	DIAL SETTING	CIRCUIT ADJUST	ADJUSTMENT SYMBOLS	NOTES
AM-I.F. Alignment	1	C1-4 Stator	Gnd	Mfd	455 K.C.	A.M.	'LO' End	I.F. Trans.	†T-4 ‡T-2	Max. Out
	†	First peak T-2 and T-4 then starting with T-4, use alternate loading, connect A 47000 ohm. resistor across the primary to load the plate winding while the grid winding of the same transformer is being peaked. Then load the grid winding with the 47000 ohm. resistor while the plate winding is being peaked.								
AM - RF Alignment	2	Ant. Ter.	Gnd	200 uuf	1620 K.C.	A.M.	'HI' End	Osc.	C1-2 Trimmer	Max. Out
	3	Same	Same	Same	1400 K.C.	Same	1400 K.C.	R.F.	C1-4 Trimmer	Same
	4	Same	Same	Same	Same	Same	Same	Ant.	C1-5 Trimmer	Same
	5	Same	Same	Same	600 K.C.	Same	600 K.C.	Osc.	L-5	Same
	‡	With a 10,000 ohm. resistor shunted across C1-4, peak the oscillator core L-5, simultaneously "Rocking" the gang condenser for maximum output. Then remove the 10,000 ohm. shunt resistor and peak L-7 for maximum output.								
	6	Ant. Ter.	Gnd	200 uuf	600 K.C.	A.M.	600 K.C.	R.F.	L-7	Max. Out
	7	Repeat steps 2 to 6								
FM-Ratio Det. Alignment	8	Connect the D-C probe of a voltohmyst to the negative lead of the 2 mfd. capacitor C40 and the Common lead to chassis. Adjust sig. gen. output to provide approx. - 3v indication during alignment.								
	9	Pin #1 6AU6	GND	.01 ufd	10.7 MC AM Mod.	F.M.		Top Driver Trans.	T-5	Max. D.C. Voltage
	10	Same	Same	Same	Same	Same		†Bottom Driver Trans.	T-5	Min. Audio. Output
	†	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.								
	11	Repeat steps 9 & 10								
F.M. I.F. Alignment	12	C1-3 Stator	Close to V-2 Cathode	470 ohms.	10.7 M.C.	F.M.	88 MC	I.F.	*T-3	Max. Out
	13	Same	Same	Same	Same	Same	Same	Same	*T-1	Same
	*	Use a 680 ohm resistor to load the plate winding while the grid winding of the same trans. vs being peaked. Then the grid winding is loaded with the 680 ohm resistor while the plate winding is being peaked. When windings are loaded, it is necessary to increase the 10.7 MC input to maintain the - 3 volts indication.								
FM RF Alignment	14	F.M. Ant. Ter.	F.M. Ant. Ter.	120 phms. in each line	90 M.C.	F.M.	90 M.C.	Osc.	L-8	Max. Out
	15	Same	Same	Same	106 M.C.	Same	106 M.C.	Ant.	C1-6 Trimmer	Same
	16	Same	Same	Same	Same	Same	Same	R.F.	C1-3 Trimmer	Same
	17	Same	Same	Same	90 M.C.	Same	90 M.C.	Ant.	L-1	Same
	18	Same	Same	Same	Same	Same	Same	R.F.	L-2	Same
	19	Repeat steps 14 to 18								
NOTE		Connect a sweep generator to the antenna terminals thru 120 ohms. in each side of line. Connect an oscilloscope to junction of R44 and C41 to check response and linearity of FM Band. Peak to peak separation should not be less than 180 K.C.								

L-8, L-1 and L-2 are adjustable by increasing or decreasing the spacing between turns. Oscillator signal tracks above signal frequency.

REPLACEMENT PARTS FOR MODEL V-310

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

STOCK NO.	DESCRIPTION
	CHASSIS ASSEMBLY
*75567	Condenser-Gang Tuning (C1-1,C1-2,C1-3,C1-4, C1-5,C1-6)
*74733	Capacitor-Ceramic-3 mmf. +-10% 500 v.(C10)
*75613	" Ceramic-5 mmf. +-10% 1 mmf, 500v. (C13)
31353	Capacitor-Ceramic-15 mmf. +-10% 500 v.(C12)
*75609	" -Ceramic-47 mmf. 500v. (C45)
*S-5545	" -Ceramic-68 mmf. +-10% 500v.(C9,C11)
*45233	" -Ceramic-100 mmf. +-10% 500v. (C4)
*75437	" -Ceramic-100 mmf. +-20% 500v. (C31)
*75614	" -Ceramic-150 mmf. +-20% 500v. (C14, C30,C43,C54)
*75611	" -Ceramic 220 mmf. +-20%,500v. (C3)
39640	" -Mica 330 mmf. +-10% 500v. (C37,C38)
*72571	" -Mica 470 mmf. +-20% 300v. (C7)
*75610	" -Ceramic 1500 mmf. +-20% 500v. (C19)
	" -Ceramic 1800 mmf. +-10% 500v. (C17)
*73473	" -Ceramic 5000 mmf. 500v. (C2,C5,C6, C15,C24,C25,C27,C28,C29,C33,C34,C36)
	" -Paper .001 mfd. +-10% 200v. (C8)
	" -Paper .001 mfd. +-10% 1000v.(C42,44)
	" -Paper .005 mfd. +-10% 200v. (C39)
	" -Paper .005 mfd. +-20% 200v. (C26,C41)
*S-5643	" -Paper .01 mfd. +-20% 400v. (C32)
	" -Paper .015 mfd. +-10% 200v. (C22)
*58476	" -Paper Oil .018 mfd. +-10% 200v.(C21)
	" -Paper .02 mfd. +-10% 100v.(C20)
	" -Paper .02 mfd. +-20% 400v.(C35)
	" -Paper .05 mfd. +-20% 200v.(C16)
*73747	" Electrolytic-2 mfd. 50 v. (C40)
*72052	" " 30 mfd. 350 v.(C23B)
	" " 30 mfd. 450 v.(C23A)
	" " 40 mfd. 25 v.(C23C)
*75570	Coil-A.M. RF. (L6,L7)
*75569	" AM Oscillator (L3,L4,L5)
*75615	" FM Antenna (L1)
*74815	" FM RF (L2)
*74817	" FM Oscillator (L8)
*71942	" Filament Choke (L9)
*75537	Control-Vol. & Power switch (R22)
*75561	" -Tone, L.F. (R19)
*75562	" " H.F. (R34)
S-4313	Cord-Drive Cord-
	Lamp-Dial lamp (2) Mazda (51)
*75536	Pointer-Stn. Selector
	Resistors-68 ohms +-10%, 1/2 watt (R1,26)
	" -100 ohms +-10%,1/2 watt (R15,38,43)
	" -120 ohms +-10%,1/2 watt (R27)
	" -270 ohms +- 5%, 2 watts (R42)
	" -390 ohms +-10% 1/2 watts(R9)
	" -680 ohms +-10% 1/2 watts(R4)
	" -680 ohms +-20% 1/2 watt (R30,31)
	" -1000 ohms +-10% 1/2 watt (R6)
	" -1200 ohms +-5% 1/2 watt (R46)
	" -3300 ohms +-5% 1/2 watt (R40,R45)
	" -8200 ohms +-10% 1 watt (R3)
	" -15,000 ohms +-10% 1/2 watt (R44)
	" -18,000 ohms +-10% 1/2 watt (R7,R20)

STOCK NO.	DESCRIPTION
	CHASSIS ASSEMBLY (Cont'd.)
	Resistors-22,000 ohms +-10% 1/2 watt(R28,29)
	" -27,000 ohms +-10% 1/2 watt(R18,R21)
	" -33,000 ohms +-10% 1/2 watt(R2,R8, 101-102)
	" -39,000 ohms +-5% 1/2 watt (R47)
	" -39,000 ohms +-10% 1 watt (R16)
	" -56,000 ohms +-10% 1/2 watt (R32)
	" -68,000 ohms +-10% 1/2 watt (R39)
	" -82,000 ohms +-10% 1/2 watt (R36)
	" -120,000 ohms+-10% 1/2 watt (R8,R16)
	" -150,000 ohms+-10% 1/2 watt(R12,R14)
	" -220,000 ohms+-20% 1/2 watt (R11)
	" -270,000 ohms+-10% 1/2 watt (R35)
	" -470,000 ohms+-10% 1/2 watt (R37, R41,R48)
	" -1.5 Megohm +-10% 1/2 watt(R17,R51)
	" -2.2 Megohm +-20% 1/2 watt(R5,10,13)
	" -10 Megohm +-20% 1/2 watt (R23)
	" -22 Megohm +-20% 1/2 watt (R33)
	" -W.W.3-Ohms +-10% 1/2 watt (R25)
S-5908	" -W.W.2200 ohms +-10% 5 watt(R24)
*75565	Shaft-Exten.shaft for function switch
*74038	Spring-Drive cord spring
*75602	Switch-Function switch (S1-1,S1-2,S1-3)
*75557	Transformer-Output transf. (T7)
*733743	" -Ratio Det.Transf. (T5)
*75558	" -1st I.F. Transf. (AM) (T2)
*73037	" -2nd I.F. " " (T4)
*75559	" -1st I.F. " (FM) (T1)
*75560	" -2nd I.F. " " (T3)
*S-9151	" -Power Transf.25/60 cy.(T6)
S-4379	" " " 60 cy.
	SPEAKER ASSEMBLY
S-4288	Speaker 12" P.M.
S-4299	Cone & Voice Coil
	MISCELLANEOUS ASSEMBLY
*75705	Antenna Loop
S-5533	Bracket-Stop bracket
*74882	Connector-Male,2 contacts for Ant.loop
*74752	" -Male 2 contacts for FM. Term. Board Cable
*75709	" -8 contacts for main cable (P4)
30868	" -Female connector for 33-1/3 and 78 RPM Record Changers
*75474	" -Speaker plug
S-5935	Decal
S-5565	Decal
75572	Dial Scale
S-5988	Hinge-R.H. hinge
S-5989	Hinge-L.H. hinge
*75712	Knob-Control (4)
*75714	Knob-Function switch
	Lamp-Pilot Lamp - Mazda (51)

N O T E:

(*) Indicates New Stock Items.

N O T E:

(*) Indicates New Stock Items.

All parts subject to change or withdrawal without notice.

Only items listed under Stock Numbers are available as Replacement Parts.