Model 702X

RCA VICTOR

"HIS MASTER'S VOICE"

AM-FM, AC-DC RADIO RECEIVER

MODEL 702X

SERVICE DATA

— 1949 NO. 8 —

GENERAL SERVICE DIVISION
RCA VICTOR COMPANY LIMITED
MONTREAL, QUE.

Electrical and Mechanical Specifications

TUNING RANGES

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 19J6 ---------- Mixer and Oscillator
(2) RCA 6BJ6 ---------- I. F. Amplifier
(3) RCA 12AU6 ---------- Driver
(4) RCA 12AL5 ---------- Ratio Detector
(5) RCA 6AQ6 ---------- AM Det.—A. F. Amp.
(6) RCA 35C5 ---------- Output
(7) RCA 35W4 ---------- Rectifier

DIAL LAMP ---------- Type No. 47, 6-8 volts, 0.15 amp.

POWER SUPPLY:

This instrument will operate on 115 volts d.c. or 25 to 60 cycles a.c.

If the receiver does not operate on d.c., reverse the power cord. On a.c., reversal of the cord may reduce hum or improve FM reception.

ANTENNAS:

These receivers have built-in antennas for standard broadcast (AM) and frequency modulation (FM) reception.

Under average conditions these antennas will provide satisfactory reception—however provision is made for the use of an external antenna for FM reception if desired.

To use external FM antenna:

1. Remove the wire from under the No. 2 terminal screw of the antenna terminal board. The bare end of this wire should be taped to prevent contact with the antenna terminal screws.
2. Connect the transmission line from an external FM dipole antenna to the No. 1 and No. 2 terminals of the antenna terminal board.

To use built-in FM antenna:

1. The wire extending thru the back of the cabinet must be connected to No. 2 terminal of the antenna terminal board.
2. The power cord should be fully extended and must not be coiled or hanked up.
3. Reversal of the line cord plug may improve reception. DO NOT USE EXTERNAL GROUND.

LOUDSPEAKER

Type ---------- 5 inch P.M.
Voice coil impedance ---------- 3.2 ohms at 400 cycles

TUNING DRIVE RATIO ---------- 11½:1 (5¾ turns of knob)

POWER SUPPLY RATING

115 volts d.c. or 25 to 60 cycles a.c. ---------- 30 watts

POWER OUTPUT

Maximum ---------- 1.65 watts
Undistorted ---------- 1.0 watt

CABINET DIMENSIONS

Height---8⅝ in. Width---12⅞ in. Depth---7-5/16 in.

CAUTION:

THE CHASSIS IS CONNECTED TO ONE SIDE OF THE POWER SUPPLY. Use caution to prevent contact with pipes, radiators, etc. when servicing with chassis removed from cabinet.

CONTROL KNOBS

DO NOT ATTEMPT TO REMOVE THE CONTROL KNOBS FROM THE CABINET. The knobs have spring retainers on the inside of the cabinet to prevent their removal. The retainers are accessible only after the chassis has been removed from the cabinet.

REMOVAL OF CHASSIS:

1. Remove the four screws at the corners of the back cover—pull back cover off carefully—the power cord plug and socket at the bottom right-hand corner will pull apart but the antenna leads remain connected.
2. Unhook the dial cord from the pointer.
3. Remove the four screws which hold the chassis to the cabinet (two at sides of chassis base and two on dial cord pulley brackets above the chassis base).
4. Pull the chassis to the rear—the knobs will be retained with the cabinet.

If removal of the chassis is not necessary when servicing, the back cover may be placed on the supports molded into the upper part of the cabinet.

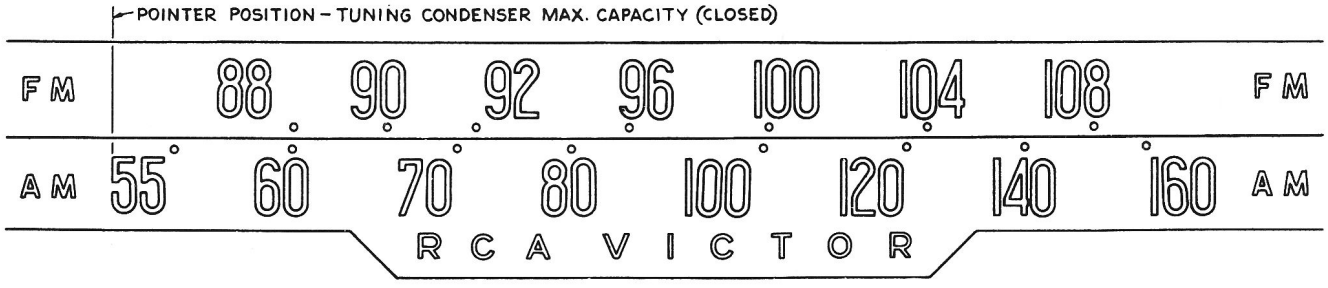


Fig. 1 Dial Scale

The dial scale drawing shown is a full size reproduction. It can be used as a reference in alignment procedure

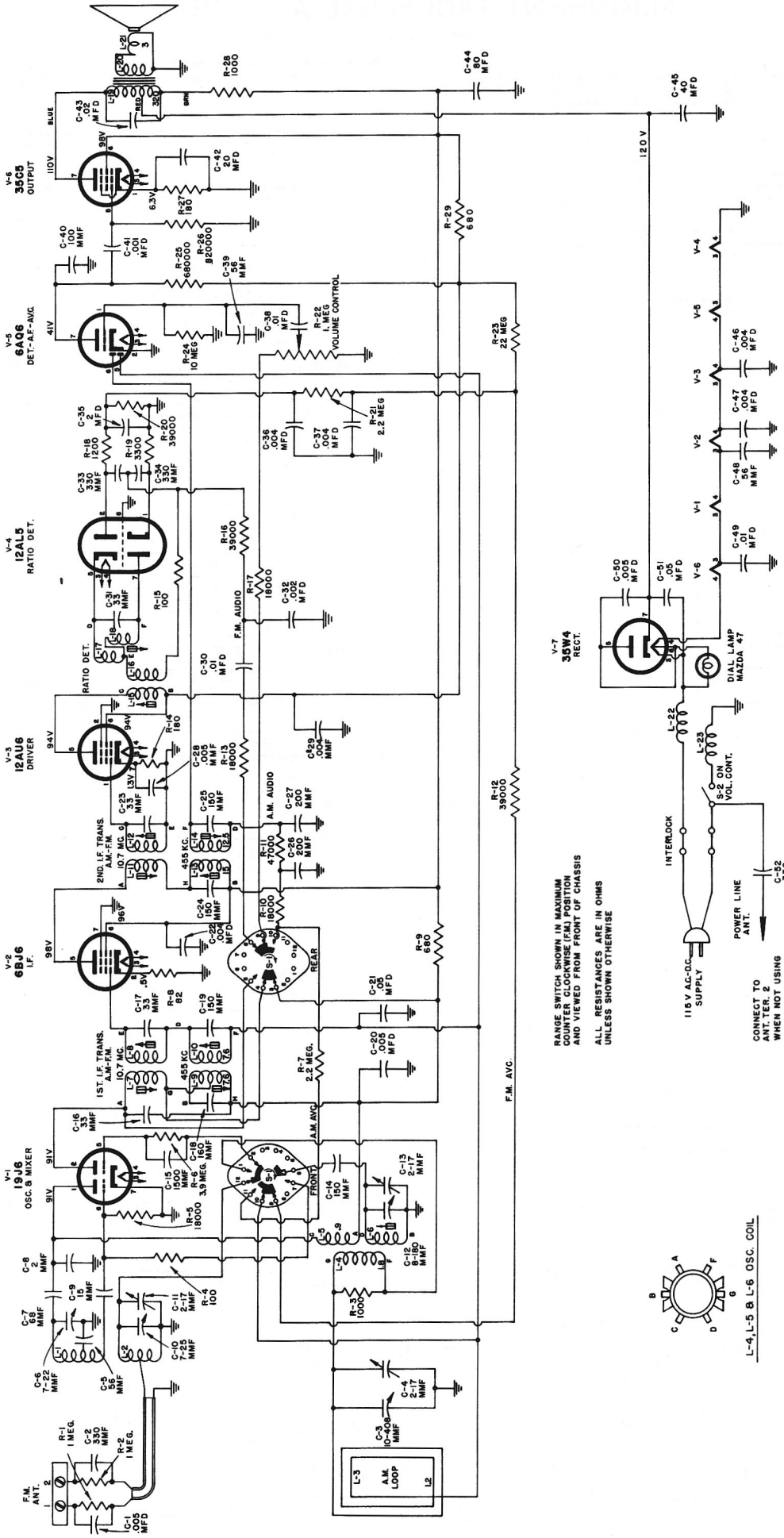


Fig. 2—Schematic Diagram

ALIGNMENT PROCEDURE AND CHART

Correct Alignment of the FM Band requires that the AM. Band be aligned first.

CAUTION:

The chassis is connected to one side of the power supply. On a.c. operation it is recommended that an isolation transformer (115 v./115 v.) be used for the receiver when servicing.

OSCILLOSCOPE ALIGNMENT:

The FM I. F. alignment may be checked using a sweep generator and an oscilloscope. Shunt terminals B and C of the Ratio Det. trans. with a 1,200 ohm resistor. Connect the high side of the oscilloscope to terminal C of R.D.T. in series with a diode probe. Apply the output of the sweep generator (10.7 mc with ±250 kc. sweep) to pin No. 1 of V2 (6BJ6) in series with .01 mf. Low side of the oscilloscope and sweep generator to chassis. This will show the response of the 2nd I.F. Trans.

To check the combined response of the first and second I.F.'s connect the sweep generator to the antenna terminal board—high side to No. 2 terminal in series with 300 ohms and low side to No. 1 terminal. Oscilloscope connections are previously connected.

To check the ratio detector response; connect the high side of the oscilloscope direct to terminal No. 8 of S1 rear, low side to chassis, apply the outout of the sweep generator to pin No. 1 of V3 (12AU6) in series with .01 mf. Driver plate circuit connected for normal operation (1200 ohm resistor removed). NOTE: It is difficult to observe marker signals in this step—center frequency and sweep width should be previously observed.

ALIGNMENT INDICATOR:

The dial and dial back plate are not attached to the chassis. During alignment a substitute frequency indication must be used. We suggest attaching a paper clip to the dial drive cord so that its movement may be measured—refer to the "Dial Scale" illustration on page 1.

CRITICAL LEAD DRESS

1. All connections in the mixer-oscillator circuit are extremely critical both in regard to lead length and lead dress. Do not disturb unless necessary—make careful notation before servicing if it becomes necessary to disturb this wiring.
2. The ground lead from pin No. 2 of V3 (12AU6 Driver) is critical in length and must be dressed down against chassis.
3. Dress audio coupling capacitor C38 away from output transformer.
4. Dress diode filter unit away from alignment hole in 2nd I.F.
5. Dress grid lead of V3 (pin No. 1 of 12AU6) against chassis apron.
6. Dress plate lead of V1 (pin No. 2 of 19J6) against chassis.
7. Dress loop antenna leads so as to prevent contact with external antenna terminal board.
8. All ground connections to chassis should be restored to the original places of connection if disturbed.
9. Dress capacitor C14 down close to range switch so as to clear the projection on the bottom of the cabinet.
10. The FM ant. and osc. coils must be cemented to the coil support to prevent microphonic howl on FM. Coil dope is recommended for this purpose.

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 SYMBOL	NOTES
A.M.	I.F. ALIGNMENT	1	C-3 Gang Cond.	Gnd.	.01 Mfd	455 Kc	AM	Low end	2nd. I.F. AM. Trans.	L-13 L-14 †	Max. Out.
		2	Same	Same	Same	Same	Same	Same	1st. I.F. AM. Trans.	L- 9 L-10 †	Max. Out.
	R.F. ALIGNMENT	3	Short Wire (Radiate)	Same	Same	1620 Kc	Same	Extreme High end	Osc.	C-13	Max. Out.
		4	Same	Same	Same	1400 Kc	Same	1400 Kc	Ant.	C- 4	Max. Out.
		5	Same	Same	Same	600 Kc	Same	600 Kc	Osc.	L-6 Rock Gang	Max. Out.
		6	Repeat Steps 3, 4 and 5.								
F.M.	I.F. ALIGNMENT	7	Connect the positive probe of the meter to the negative lead of the 2 Mfd. capacitor (C-35) and the common lead to chassis. Adjust signal generator output ot provide approx. - 3V indication during alignment.								
		8	Pin No 1 12AU6	Same	.01 Mfd	10.7 Mc 400 cycles 30% AM. Mod.	FM	Extreme Low end	Ratio Det.	L-15 L-18 *	Max. Out. Min. Audio Out.
		9	Remove (blue) ant. lead from No. 2 term. Connect "Hi" side in series with a 300 ohm resistor and the "Lo" side to ter. No. 1.								
		10	See Step 9	See Step 9	See Step 9	10.7 Mc 400 cycles 30% AM. Mod.	FM	Extreme Low end	2nd. I.F. FM. Trans.	L-11 †† L-12	Max. Out.
		11	Same	Same	Same	Same	Same	Same	1st. 8.F. FM. Trans.	L-7 †† L-8	Max. Out.
	R.F. ALIGNMENT	12	Same	Same	Same	106 Mc	Same	106 Mc	Osc. Ant.	L- 1 ** L-11	Max. Out.
		13	Same	Same	Same	90 Mc	Same	90 Mc	Ant.	L-5 (Rock Gang)	Max. Out.
		14	Repeat Steps 12 and 13 until further adjustment does not improve calibration.								

*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 the fact that several incorrect peaks may be obtained when aligning the ratio detector, 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.

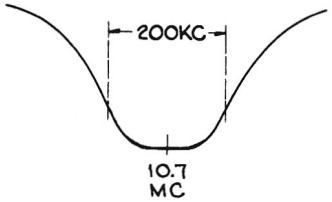
**L1 and L2 are adjustable by increasing or decreasing the spacing between turns.

†Use alternate loading.

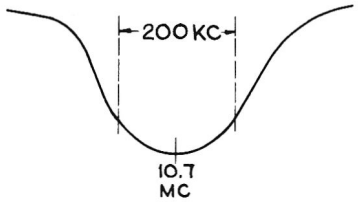
Alternate loading involves the use of a 10,000 ohm resistor to load the AM plate winding while the AM grid winding of the SAME TRANSFORMER is being peaked. Then the grid winding is loaded with the resistor while the plate winding is peaked. Only one winding is loaded at any one time. Remove the 10,000 ohm resistor after 2nd and 1st I.F.'s have been aligned.

Oscillator frequency is above signal frequency on both AM and FM.

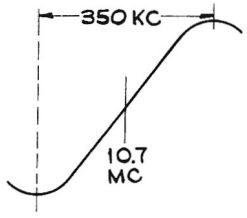
††Align 2nd and 1st I.F. trans. by means of alternate loading as explained under AM alignment. Use a 680 ohm resistor instead of a 10,000 ohm resistor and load the FM windings.



2nd I.F. Response



1st and 2nd I.F. Response



Ratio Det. Response

Fig. 3—F.M. Response Curves

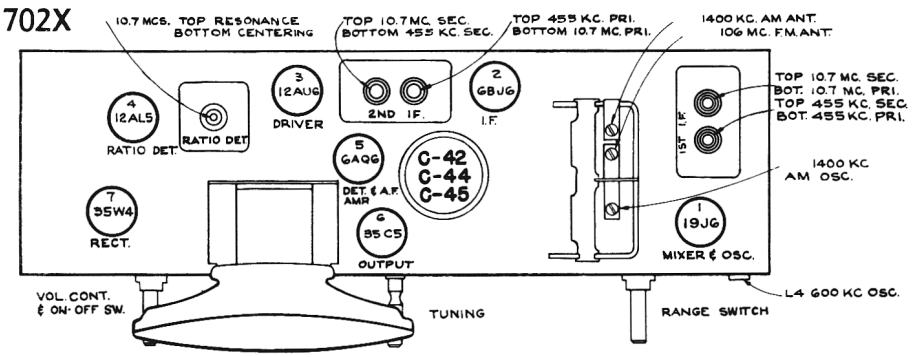


Fig. 4—Chassis Layout and Alignment Adjustment

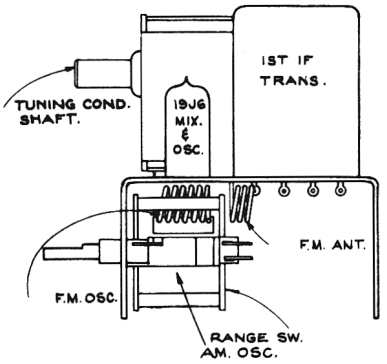


Fig. 5—Ant. and Osc. Coil Locations

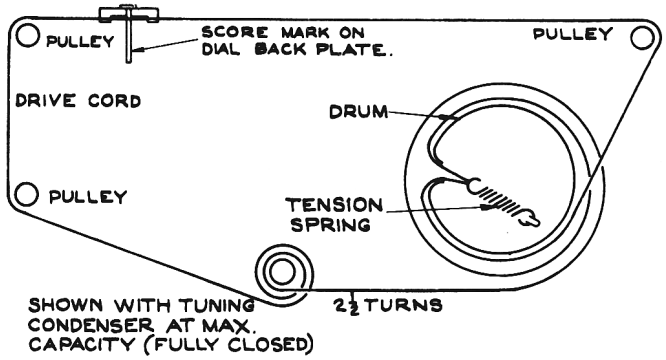


Fig. 6—Dial Cord Stringing

Fig. 7—Controls

REPLACEMENT PARTS FOR MODEL 702X

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

Stock No.	Description	List Price
	CHASSIS ASSEMBLY	
73866	Capacitor - 2 MMF. ceramic 12½% 500 V.(C8)	
31353	" - 15 " " 10 % 500 V.(C9)	
73867	" - 56 " " 2½% 500 V.(C5)	
73499	" - 56 " " 20 % 500 V. (C39-C48)	
33379	Capacitor - 68 " " 10 % 500 V.(C7)	
39628	" -100 " Mica 10 % 500 V. (C40)	
48125	Capacitor -150 " ceramic 10 % 500 V.(C40)	
12952	" -330 " Mica 10 % 500 V. (C2-C33-C34-C52)	
71501	Capacitor 1500 " ceramic 20% 350 V. (C15)	
74009	" .004 Mfd. ceramic (dual) 500 V. (C22-C29-C36-C37-C46-C47)	
73473	Capacitor .005 Mfd. ceramic (C1-C50-C20)	
73186	" .001 Mfd. Midget paper 10% 400 V. (C41)	
73750	Capacitor .002 Mfd. " " 10% 200V. (C32)	
71926	Capacitor .005 " " " 10% 100V. (C28)	
71923	Capacitor .01 " " " 10% 100V. (C30-C38-C49)	
74010	Capacitor .02 " " " 10% 400V. (C43)	
	Capacitor .05 " Paper 20% 400V. (C51-C21)	
73747	Capacitor Electrolytic Midget 2 Mfd. 50V. (C35)	
73975	Capacitor Electrolytic 80 Mfd. 150V.-40 Mfd.-150V. 20 Mfd.25V.(C42-C44-C45)	
73973	Condenser - Variable (C6-C10-C11-C3-C4-C12-C13)	
S-5050	Coil - Oscillator coil FM (L1)	
S-5049	" - " " AM (L4-L5-L6)	
S-5051	" - Ant. coil FM (L2)	
S-5052	" - Line choke coil (#18 solid wire 1/32" plastic insulation 10 turns close wind (L6-L7)	
74011	Filter - diode filter (200 MMF - 200 MMF - 47000 ohms) (C26-C27-R11)	
73991	Indicator - station selector pointer	
	Resistor 82 ohms ½ watt 10% (R8)	
	" 100 " " " 20% (R4)	
	" 100 " " " 5% (R15)	
	" 180 " " " 10% (R14-R27)	
	" 680 " " " 20% (R9-R29)	
	" 1000 " " " 10% (R3)	
	" 1000 " " " 20% (R28)	

Stock No.	Description	List Price
	CHASSIS ASSEMBLY - Cont'd	
	" 1200 " " " 5% (R18)	
	" 3300 " " " 5% (R19)	
	" 18000 " " " 10% (R5-R10-R13-R17	
	" 39000 " " " 10% (R12-R16)	
	" 39000 " " " 5% (R20)	
	" 680,000 " " " 10% (R25)	
	" 820,000 " " " 10% (R26)	
	" 1 Megohm " " 20% (R1-R2)	
	" - 2.2 Megohm ½ watt 20% (R7-R21)	
	" - 3.9 " " " 10% (R6)	
	" - 10 " " " 20% (R24)	
	" - 22 " " " 20% (C23)	
73978	Shaft - drive shaft	
73117	Socket - tube socket	
73977	Switch - range switch (S1)	
S-5043	Transformer 1st I.F. (dual)(L7-L8-C16-C17) (L9-L10-C18-C19)	
S-5044	" 2nd I.F. (dual)(L11-L12-C23-L13-L14-C24-C25)	
S-5045	" ratio detector (L15-L16-L17-C31)	
38406	Volume control - 1 Meg. (R22-S2)	
	SPEAKER ASSEMBLY	
35849	Dust cap (Pkg. 3)	
S-5047	Cone - cone & voice coil assy. (L21)	
S-5048	Output transformer (L19-L20)	
	MISCELLANEOUS ASSEMBLY	
73984	Back - cabinet back (Maroon) complete with loop	
73985	Back - cabinet back (Ivory) complete with loop	
73988	Bezel - dial bezel less dial	
S-5040	Cabinet - plastic (Maroon)	
S-5041	" - " (Ivory)	
S-4313	Cord - dial cord	
73990	Dial - plastic dial scale	
73982	Knob - control knob (brown)	
73983	" - " " (ivory)	
11891	Lamp - dial lamp (Mazda 47)	
73986	Loop - antenna loop (L3)	
72765	Nut - speed nut for bezel & dial scale (Pkg. 2)	
S-5042	Socket - cable & power input socket & cable assy. part of back cover assy.	
14270	Spring - retaining spring for knobs (Pkg. 2)	
S-5054	Transmission line FM.	

Items not shown in the Replacement Parts List are not supplied.
All parts and prices subject to change or withdrawal without notice.