

X520



RCA VICTOR



AC-DC RADIO RECEIVER

MODEL X520

SERVICE DATA

—1955 No. 13—

GENERAL SERVICE DEPARTMENT
RCA VICTOR COMPANY, LTD
MONTREAL, CANADA

ELECTRICAL AND MECHANICAL SPECIFICATIONS

FREQUENCY RANGES

Standard Broadcast ("A" Band) 540-1,600 kc.
INTERMEDIATE FREQUENCY 455 kc.

TUBE COMPLEMENT

- (1) RCA-12BE6 1st Detector-Oscillator.
- (2) RCA-12BA6 IF Amplifier
- (3) RCA-12AV6 2nd Detector, A.V.C. and A-F Amplifier
- (4) RCA-50C5 Output
- (5) RCA-35W4 Rectifier

POWER SUPPLY POLARITY—For operation on d-c, the power plug must be inserted in the outlet for correct polarity.

POWER SUPPLY RATINGS

105-125 volts 30 watts

POWER OUTPUT RATING

Undistorted 1.0 watt
Maximum 1.5 watts

LOUDSPEAKER

Type 4-inch Permanent-Magnet Dynamic
Voice Coil Impedance 3.2 ohms at 400 cycles
Tuning Drive Ratio Direct Drive

If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

GENERAL INFORMATION

The printed circuit technique provides many practical advantages over conventional point to point wiring methods. Since it permits absolute uniformity, consistent high quality is inherent. Further circuit arrangements are now possible which with conventional wiring methods, were formally impossible. A reduction in the number of required components and simplification of servicing and alignment procedures, are additional features made possible by the use of printed circuits.

TOOLS REQUIRED FOR SERVICING

1. Pencil type soldering iron with a small tip (35 watts or less)
2. Long-nose pliers.
3. Wire cutter.
4. Small stiff wire brush (for solder removal).
5. 60-40 low temperature rosin core solder.
6. Tinned jumper wires.
7. Metal pick (soldering aid).

WARNING:—Application of excessive heat when replacing components may damage the "printed" circuit.

SERVICING THE PRINTED CIRCUIT

The individual components that make up the printed circuit board should be replaced independently, when necessary. When removing and replacing components, every

possible precaution should be taken to prevent damage to the connecting strips. In some cases, a magnifying glass will assist in locating very small breaks in the wiring. Soldering should also be made with care to prevent excess solder from causing shorts. When taking voltages, resistance, and continuity measurements of coils, from the wiring side of the board, a needle point probe should be used since the varnish coating must be "broken through" to make contact.

The tube pin numbers must be counted in a counter-clockwise direction since the sockets on the board are mounted upright on the wiring side of the board. The clockwise direction is the usual practice when the socket is viewed from the bottom.

The absence of a lug hole in the board at the key position, when viewing the wiring side indicates the location of the socket key when the socket is mounted on the component side of the board.

AVOID DAMAGE TO COPPER FOIL

If one of the connecting copper strips on the printed circuit board is cracked or broken it may be repaired easily. A short length of tinned copper wire should be placed across the break. The joint is then soldered by flowing solder over the break and the length of wire. Care should be taken to prevent solder from shorting one connecting strip to another and the use of excessive heat

GENERAL INFORMATION (CONT'D)

in making the solder connections. Excessive solder may cause a short or an intermittent trouble to occur later, which may be difficult to locate.

AVOID DAMAGE TO PRINTED CIRCUIT BOARD

Excessive pressure to the printed circuit board or components applied during the removal or installation may cause the board to crack or break. The printed circuit board itself is sturdy in construction as well as mounting but without the proper care; it may be damaged.

AVOID OVERHEATING

Excessive heat that is applied through the use of a solder iron for longer periods than is necessary or by using a higher wattage iron than is recommended, may cause the bond between the board and the copper foil to separate. This will necessitate the replacement or repair of the foil connection. A soldering iron of 35 watts or less should be used to avoid overheating.

REPLACEMENT OF I-F TRANSFORMERS

In order to remove an I-F transformer, apply only enough heat to the terminals and can supports to melt the solder so that the terminals may be pushed away from the connecting strip.

When installing the I-F transformer can, the terminals and can support should be positioned to contact the connecting strips, then solder at these points.

REPAIR AND/OR REPLACEMENT OF TUBE SOCKETS

Intermittent conditions of the tube socket pin contacts can usually be repaired by bending the contacts so they grasp the tube pin better. This can be accomplished through the use of a small metal pick or pointed tool that may be inserted between the socket hole and the socket contact.

The tube socket may be of a miniature type with an additional grounding lug extending to the tubular center

shield (center connection) at the bottom of the socket.

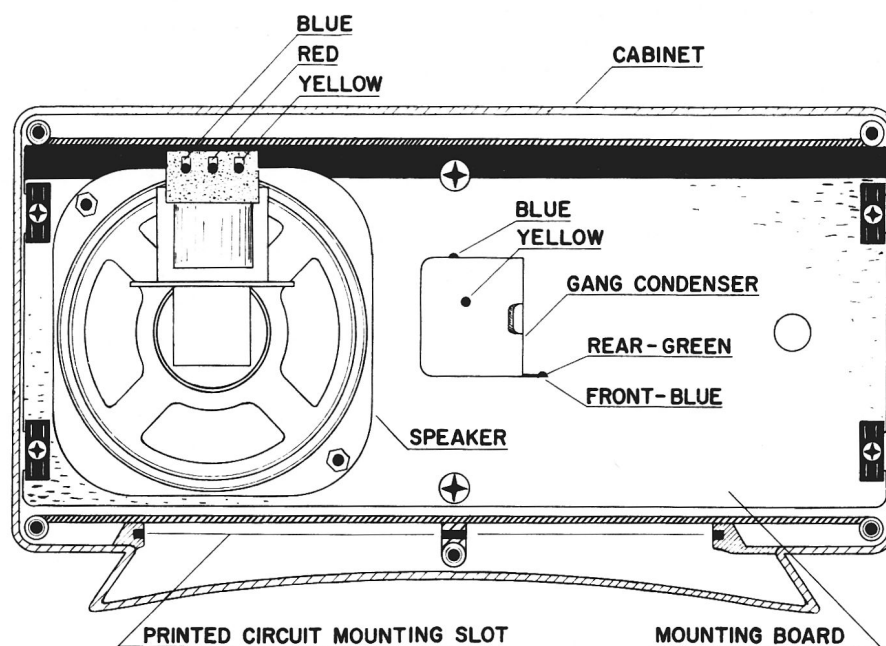
In order to remove the tube socket, apply heat to the socket terminals and, using a pointed tool or knife blade, pry the terminal up from the connecting strip. At this point, unsolder and pry up the center pin ground connection. (DO NOT REMOVE THE TUBE SHIELD GROUNDING STRIP).

A new tube socket may present difficulties in inserting the tube lugs through the holes in the board due to the very close tolerance. Do not attempt to apply too much pressure to the socket terminals while forcing them through the holes in the board or the board will break. Enlarge the holes slightly, if necessary, with a pen knife to the point that the socket terminals can be inserted without any excessive pressure.

To install a new socket, bend the socket terminal and center pin ground and position the socket so that the terminals and ground contact the proper connection strip, and then solder in place.

REPLACING COMPONENTS

These parts can be removed by applying heat to the point on the connecting strip where the leads come through the board and lifting out the part. If the leads of the component are bent over, the component may be removed by applying the soldering iron to the soldered joints and "wiggle" the component up until the leads clear the hole. If the heat is removed just before the lead clears the hole in the board, the hole will be free from solder, facilitating replacement. The new part can then be inserted into the holes in the connecting strip. Keep the leads as short as possible, bend the leads over $\frac{1}{8}$ " and solder in place . . . If a thin film of solder remains over the hole through the board after removing the component, pierce the film with the lead from the replacement component after heating the solder film with the soldering iron.



BACK VIEW

Fig. 1

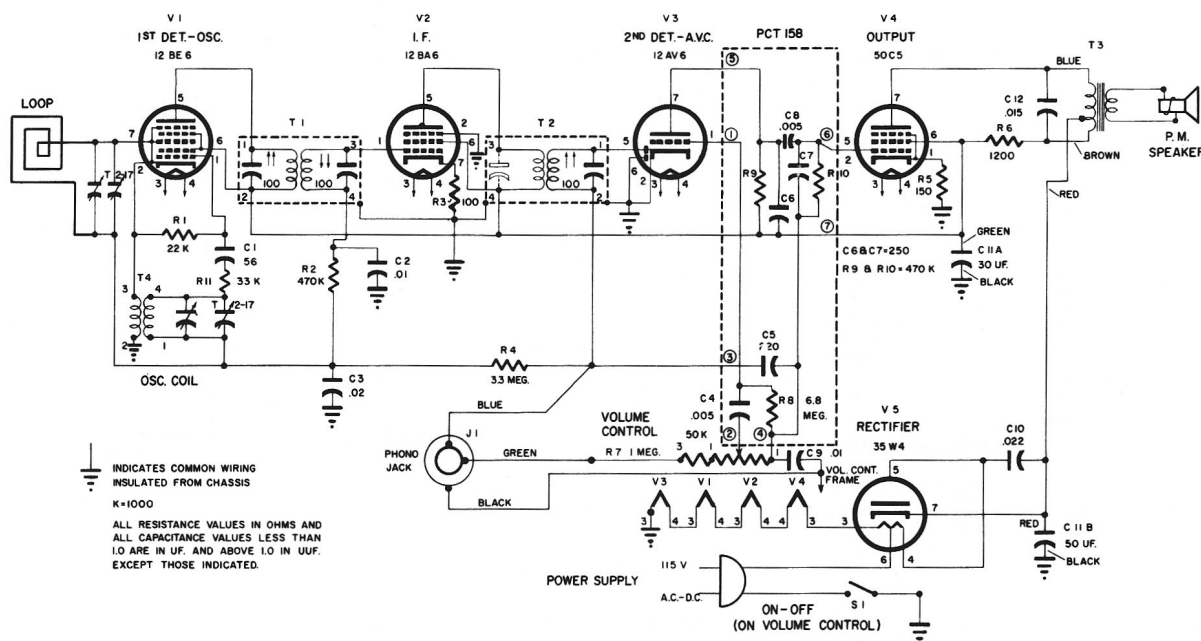


Fig. 4—Chassis Layout (Bottom View)

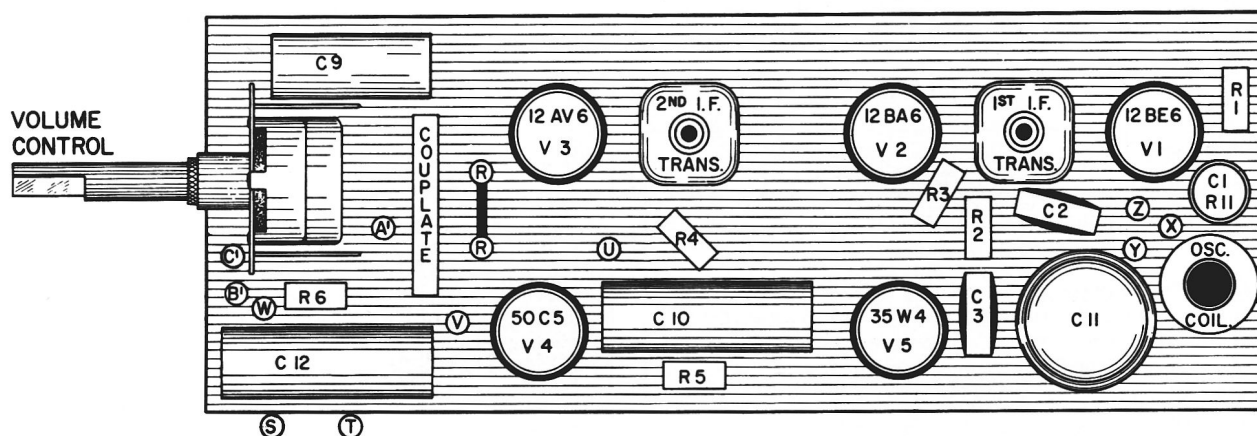


Fig. 3—Chassis Layout (Top View)

ALIGNMENT PROCEDURE

Before aligning the receiver, set the gang condenser for maximum capacity and then set the dial knob opposite 56 on left hand end of the dial.

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

In order to obtain best results, it is advisable to align the 455 KC I.F.'s with the help of a cathode ray oscilloscope. The

scope should be connected across the volume control. If this equipment is not available, use the method outlined below in the alignment chart.

NOTE: If the test-oscillator is ac/dc operated it may be necessary to use an isolation transformer (117 v./117 v. for the receiver during alignment).

Alignment Chart

TEST OSCILLATOR						RECEIVER				
Order of Alignment		Connect "HI" Side To	Connect "LO" Side To	Dummy Antenna	Frequency Setting	Range Selector	Receiver Dial-Setting	Circuit To Adjust	Adjustment Symbols	Notes
I.F. ALIGNMENT	1	I2BA6 Pin #1	Gnd.	.1 Mfd	455 KC		"HI" End	2nd I.F. Trans.	Top cores	Max.Out.
	2	I2BE6 Pin #7	Same	Same	Same	Same	Same	1st I.F. Trans.	Top cores	Same,
S.B. ALIGNMENT	3	Radiate signal			1600 KC		1600 KC	Osc.	T2-17	Same
	4	Same			1500 KC		1500 KC	Osc.	T2-17	Same
	5	Repeat Steps 3 & 4.								

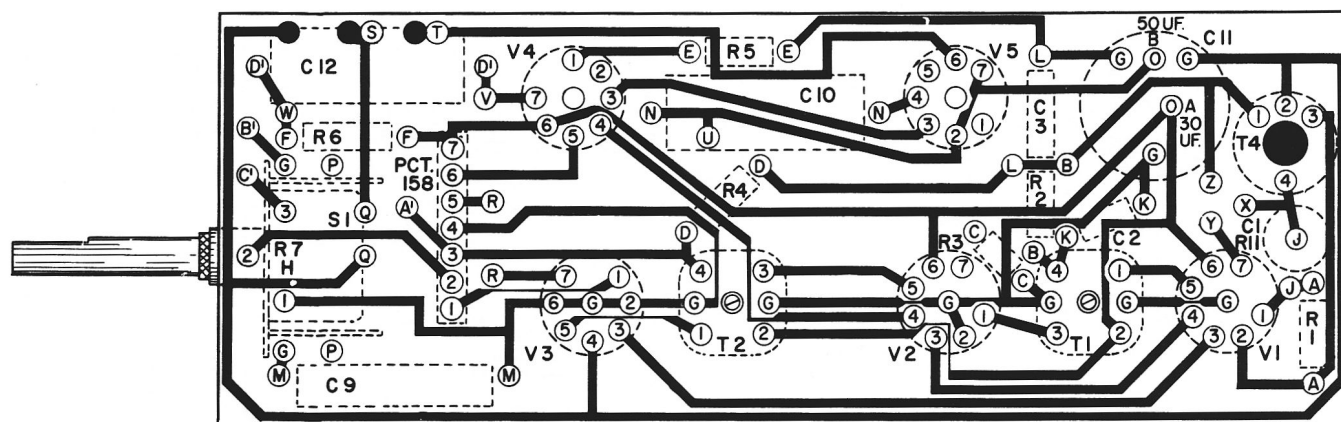


Fig. 4—Chassis Layout (Bottom View)

T4—Osc. Coil	V1—12BE6	C6—250 UUF.	FF—R6 — 1200	OO—C11 —
ST—Power Supply (AC)	V2—12BA6	C7—250 UUF.	G—Ground	A—30UF
XYZ—Gang Cond	V3—12AV6	C8—.005 UF.	H—R7 — 1 Meg.	B—50UF
X—Green	V4—50C5	T1—1st I.F. Trans.	JJ—C18 R11	P—Tie Points
Y—Yellow	V5—35W4	T2—2nd I.F. Trans.	C18 — 56 UUF	QQ—S1
Z—Blue	PCT 158—Couplate	AA—R1 — 22K	—R11 — 33K	RR—Jumper
E1—Blue	R8—6.8 Meg.	BB—R2 — 470K	KK—C2 — .01 UF	UVM—Sprkr. Trans
F1—Black	R9—470K	CC—R3 — 100	LL—C3 — .02 UF	U—Red
G1—Green	R10—470K	DD—R4 — 3.3 Meg.	MM—C9 — .01 UF	V—Blue
A, B, C,—Phono Socket	C4—.005 UF.	EE—R5 — 150	NN—C10 — .022 UF	W—Brown
D,D,—C-12	C5—220 UUF.			

REPLACEMENT PARTS LIST FOR X-520

SYM. NO.	STOCK NO.	DESCRIPTION	SYM. NO.	STOCK NO.	DESCRIPTION
C-1	S-4523	Capristor - 56 mmf. /33 ohms.			MISCELLANEOUS ASSEMBLY
C-2		Capacitor - .01 mfd. 500 v			
C-3		Capacitor - .02 mfd. 200 v			
C-4		Capacitor - .005 mfd. - in couplate PCT158	*S-20650		Back Cover Assembly
C-5		Capacitor - 220 mfd. - in couplate PCT158	*S-20643		Blue Cabinet
C-6		Capacitor -	*S-20657		Black Cabinet
C-7		Capacitor -	*S-20647		Burgundy Cabinet
C-8		Capacitor - .005 mfd. - in PCT158	*S-20646		Green Cabinet
C-9	S-20391	Capacitor - .001 mfd. - 500 v	*S-20648		Ivory Cabinet
C-10	73562	Capacitor - .022 mfd. - 400 v	*S-20644		Red Cabinet
C-11A}	*S-20502	Capacitor - electrolytic - 50 - 30 mfd. - 150 v	*S-20649		White Cabinet
C-11B}		Capacitor - electrolytic - 50 - 30 mfd. - 150 v	*S-20645		Yellow Cabinet
C-12		Capacitor - .015 mfd. - 400 v	S-6858		Cord - Power Cord
	*S-20616	Capacitor - Variable Capacitor			
PCT158	S-20560	Couplate - PCT158	*S-20687		Dial - Dial Ring (all colours except white)
	*S-20606	Board - Printed Circuit Board	*S-20688		Dial - Dial Ring - (white only)
R-1		Resistor - 22,000 ohms $\frac{1}{2}$ w	*S-20621		Front - Cabinet front.
R-2		Resistor - 270,000 ohms $\frac{1}{2}$ w			
R-3		Resistor - 100 ohms $\frac{1}{2}$ w	*S-20717		Knob Assembly - Tuning (all cabinets except white)
R-4		Resistor - 3.3 mehoohms $\frac{1}{2}$ w			
R-5		Resistor - 150 ohms $\frac{1}{2}$ w	*S-20718		Knob Assembly - Tuning (white cabinet only)
R-6		Resistor - 1,200 ohms 1w	S-20493		Knob Assembly - Volume/Power - Blue
R-7	*S-20630	Control - Volume Control - 1 Megohm	S-20492		Knob Assembly - Volume/Power - Brown
R-8		Resistor - 6.8 megohms	S-20497		Knob Assembly - Volume/Power - Burgundy
R-9		Resistor - 470 ohms. in couplate PCT158	S-20496		Knob Assembly - Volume/Power - Green
R-10		Resistor - 470 K ohms in couplate PCT158	S-20498		Knob Assembly - Volume/Power - Ivory
R-11	S-4523	Capristor - 33 ohms - 56 mmf.	S-20494		Knob Assembly - Volume/Power - Red
T-1	S-20504	Transformer - 1st I. F. Transformer	S-20499		Knob Assembly - Volume/Power - White
T-2	S-20505	Transformer - 2nd I. F. Transformer	S-20495		Knob Assembly - Volume/Power - Yellow
T-3	S-20631	Transformer - Audio Output Transformer	S-5661		Monogram - RCA Victor
T-4	S-20506	Transformer - Oscillator Coil			
		SPEAKER ASSEMBLY	S-20519		Plate - Chassis Retainer Plate
			*S-20654		Pointer - Dial Pointer
	*S-20491	Speaker - 4" P.M. complete with cone and voice coil	S-20660		Socket - for 12AV6 tube
			S-20653		Socket - for 12BE6, 12BA6, 50C5 and 35W4

* Indicates New Stock Items.

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