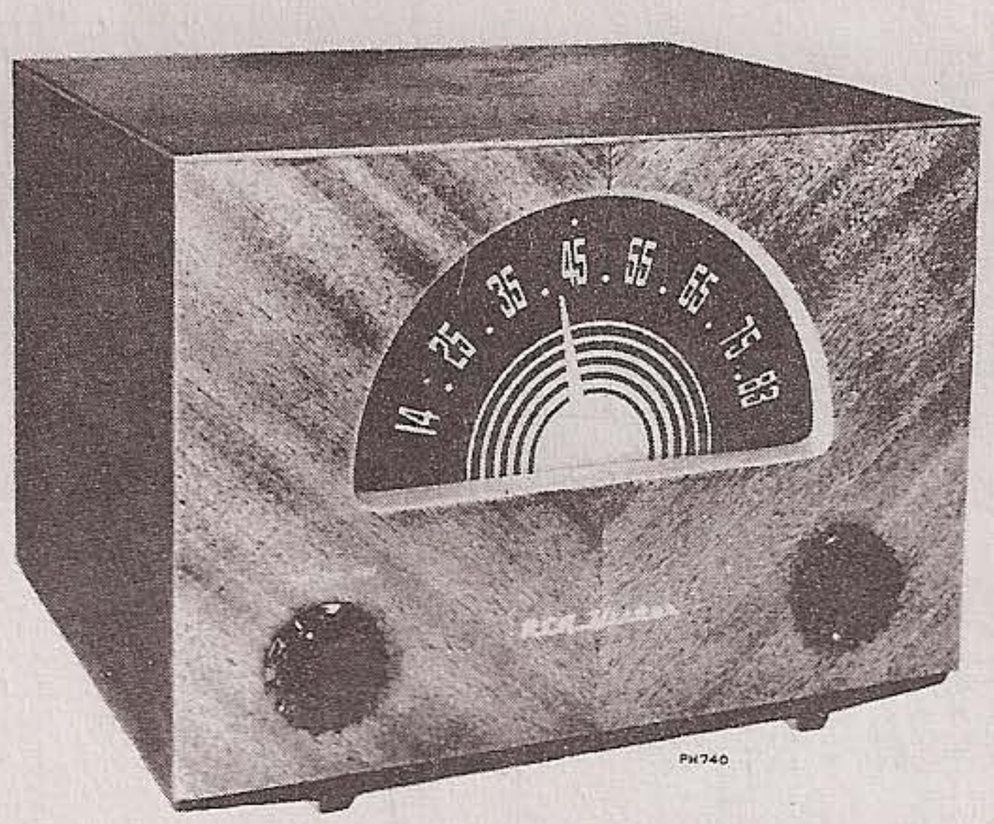

UHF Selector
Model U70

GENERAL DESCRIPTION

UHF Selector Model U70 permits the reception of any UHF television station within receiving range when employed with a VHF television receiver. The unit employs three tubes plus rectifier and a crystal mixer.

ELECTRICAL SPECIFICATIONS

TELEVISION R-F FREQUENCY RANGE

All 70 UHF television channels.....470 mc. to 890 mc.
I-F Output Frequency.....Channel 5 or 6

POWER SUPPLY RATING.....115 volts, 60 cycles, 40 watts

WEIGHT AND DIMENSIONS

Net Weight	Shipping Weight	Width Inches	Height Inches	Depth Inches
10 lbs.	12 lbs.	11⅛	8¼	9 21/32

ANTENNA INPUT IMPEDANCE

UHF — Choice: 300 ohms balanced or 72 ohms unbalanced.
VHF — 300 ohms balanced.

TUBE COMPLEMENT

Tube Used	Function
6AF4	R-F Oscillator
1N82	Crystal Mixer
6CB6	1st I-F Amplifier
6CB6	2nd I-F Amplifier
5Y3GT	Rectifier

INSTALLATION INSTRUCTIONS

The UHF Selector has been designed to operate from either of three types of antenna installations.

In all cases, the VHF antenna transmission line must be disconnected from the VHF receiver and reconnected to the selector VHF antenna terminals. A short length of 300 ohm line must then be connected between the VHF receiver antenna terminals and the selector terminals marked "Receiver."

If the UHF signals from the VHF antenna are strong and free from reflections, the above connections are all that are required. See Figure 1.

If a separate UHF antenna with 300 ohm transmission line is employed, connect the line to the selector terminal board marked UHF. Then, disconnect the 300 ohm line which runs over the fiber back and into the selector. Tape the ends of these leads so that they will not short other terminals on the back and cause trouble. See Figure 2.

If a separate UHF antenna with 72 ohm co-ax transmission line is employed, remove the balun, attach a male co-ax fitting to the antenna transmission line and plug it into the selector co-ax input at the lower left hand corner on the selector rear apron. Dress or tape the co-ax line so that it cannot be pulled out if the customer moves the selector. See Figure 3.

Plug the television receiver power cord into the a-c receptacle on the back of the selector and plug the selector power cord into the nearest 110 volt a-c outlet. With this connection, if the VHF receiver "on-off" switch is left in the "on" position, both the receiver and the selector will be controlled by the selector function switch.

With the selector function switch in the VHF position, the receiver is turned "on," the selector is "on" but in stand-by condition and the VHF antenna is connected through to the receiver.

With the selector function switch in the UHF position, the selector is operating, the VHF antenna is disconnected from the receiver, the selector output is connected to the receiver and the antenna employed for UHF operation is connected to the selector input.

To receive a UHF station, switch the selector function switch to UHF and the television receiver to channel 5 or 6, whichever is vacant in the receiving area. Tune in the UHF station by adjusting the selector tuning knob. The selector dial is calibrated in channel numbers as an aid in locating the channel. Tune the selector for best sound and picture. In some instances interference may result if the receiver fine tuning control is not properly adjusted. If this should occur, adjust fine tuning until the interference is eliminated and retune the selector for the best sound and picture.

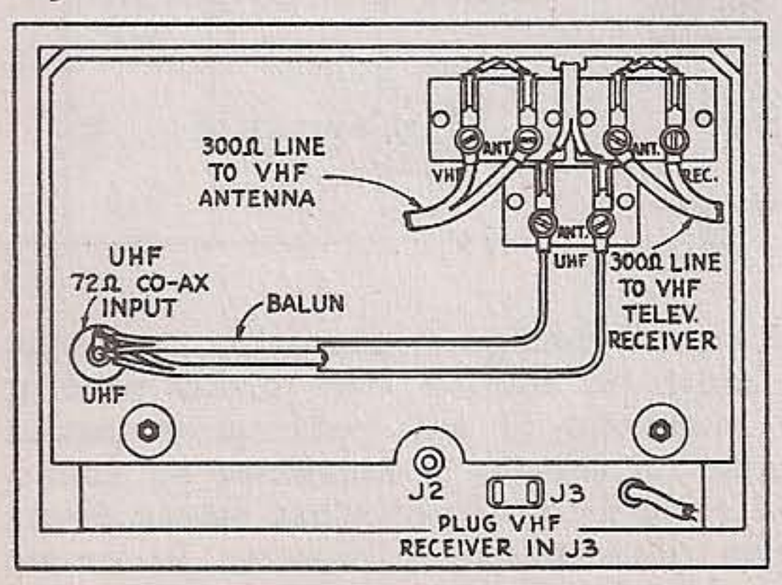

Figure 1—Selector Connections When VHF Antenna Is Employed For UHF Reception.

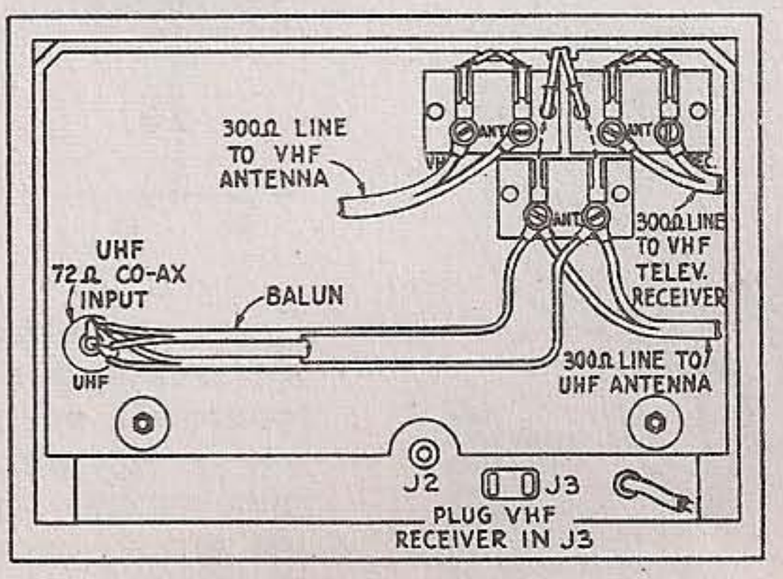

Figure 2—Selector Connections For Use of Separate UHF Antenna With 300 Ohm Lead-In.

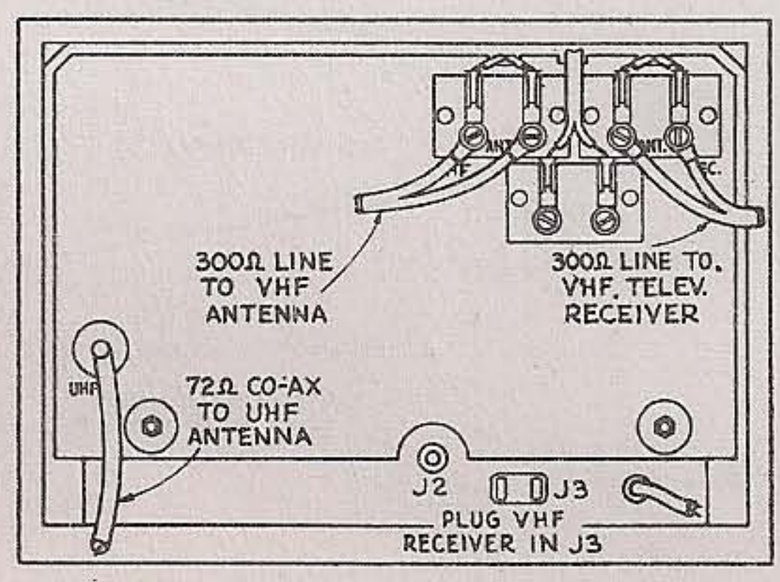

Figure 3—Selector Connections For Use of Separate UHF Antenna With 72 Ohm Co-Ax.

ALIGNMENT PROCEDURE

TEST EQUIPMENT The following test equipment is required for alignment of the U70 UHF Selector:

A UHF sweep generator with a range of 470 mc. to 890 mc.
A VHF sweep generator with a range of 70 mc. to 90 mc.
A UHF marker generator for locating 480, 630 and 840 mc.
A VHF marker generator capable of supplying 72.5 mc., 76.5 mc., 82.5 mc., 88.5 mc. and 92.5 mc. signals.
An oscilloscope with a high gain vertical amplifier.
A milliammeter with a 0-5 ma. range.
A resistive pad for terminating the sweep generator cable.
A 300 ohm balanced detector.
A small protractor.

I-F ALIGNMENT

Second I-F Stage — Construct a 300 ohm balanced detector as shown in Figure 4 and connect it to terminal board TB3.

Connect a high gain oscilloscope to the balanced detector and set the gain to maximum.

Connect a jumper across terminals A and B of T1.

Connect a 72 ohm attenuator pad of the type shown in Figure 5 to the output cable of the sweep and connect the output of the pad to the grid, pin 1 of V2 and to ground.

Set the sweep generator to sweep from 72 mc. to 90 mc. As an alternate, an RCA WR59 sweep generator may be employed and switched to channel 5 to see the low frequency side of the response curve and to channel 6 to see the high frequency side of the response curve.

Insert markers from the VHF marker generator by loosely coupling the generator output cable to the grid of V2.

Adjust the T2 pri. and sec. cores and the bandwidth trimmer C22 to obtain response as shown in Figure 9A.

The bandwidth capacitors C22 (and C21 in T1) consist of a short piece of wire soldered to terminal A and the free end inserted into a ceramic tube capacitor. Adjustment is made by pushing the wire in further or pulling it out.

First I-F Stage — Remove the jumper from terminals A and B of T1 and reconnect it across terminals A and B of T2.

Connect the balanced detector across T2 terminals C and D.

Connect the output cable of the sweep generator with the 72 ohm pad through a 1,500 mmf. capacitor to pin 2 of V1.

Connect the VHF marker generator loosely to pin 2 of V1.

Adjust the T1 pri. and sec. cores and the bandwidth trimmer C21 to obtain the response shown in Figure 9B.

Overall I-F Response — Leave the sweep generator connected to the cathode of V1.

Remove the jumper across terminals A and B of T2.

Connect the balanced detector across terminal board TB3.

The overall i-f response should appear as shown in Figure 9C. The oscilloscope gain should be kept at maximum and the input kept low to prevent overloading the selector.

If excessive tilt of the curve is present, retouch the T1 and T2 pri. and sec. cores until the curve is reasonably flat.

R-F ALIGNMENT

If the selector needs only touch-up adjustments, no presetting of the tuning cores is required. However, if the selector is completely out of alignment, the tuning cores should be preset as follows. With the dial drive mechanism 1¼ turns from the low frequency stop (channel 14 end of the dial), set the C18 oscillator tuning core as shown in the Figure 6A. The cores of the r-f tuning capacitors C1 and C2 should be set as shown in Figure 6B. The tapered end of the L9 core should be set about ¾ of an inch from the closest end of the L9 coil as shown in Figure 6C.

Turn the dial drive mechanism until it comes up against the stop at the low frequency (channel 14) end of the dial. Turn the dial pointer on its shaft until the pointer coincides with the end marker on the dial back plate.

Turn the dial drive mechanism until the pointer is 17 degrees to the left of center of the dial when the selector is sitting in an upright position. This position should be located with a protractor to insure accuracy. Make a small mark on the dial back plate so that the dial can be returned to this position quickly and accurately throughout the remainder of the alignment procedure. This is the 630 mc. calibration point.

Connect the 300 ohm balanced detector across terminals A and B of T1 and shunt a 1,000 ohm resistor across terminals C and D of T1.

Connect the UHF sweep generator through a 6 db pad to the 72 ohm co-ax input to the selector at J1. It is necessary to use the pad so that impedances will be matched. Otherwise standing waves on the sweep cable may become objectionable.

Connect the UHF marker gen. loosely to the selector input.

Connect a VHF marker generator loosely to the cathode of V1. Insert an 82.5 mc. marker into the selector.

630 Mc. Adjustments — Turn the dial drive mechanism until the dial pointer points to the 630 mc. calibration mark scribed on the dial back plate at 17 degrees left of center.

Insert a 630 mc. marker from the UHF marker generator.

Set the UHF sweep generator to sweep from 615 mc. to 645 mc. and observe the output on the oscilloscope. If the sweep generator is not sweeping the correct frequency range, it may be necessary to readjust the sweep in order to center the 630 mc. marker on the response curve.

The shields must be in place over the top and bottom of the r-f section when making any adjustments.

Adjust the C18 oscillator core until the markers for 630 mc. and 82.5 mc. coincide on the sweep pattern.

Adjust the cores of the r-f tuning capacitors C1 and C2 to obtain a maximum amplitude, symmetrical response curve centered about the 82.5 mc. marker.

Set the bandwidth adjustment L2 until the response bandwidth is 20 mc. at 70% response.

Tune L5 for max. response at the center of the bandpass.

Repeat the adjustments of C1, C2, L2 and L5 if necessary.

Plug the 0-5 milliammeter into the crystal current jack J2. The current should be between 0.8 ma. and 5 ma. If this current is not obtained, either the crystal is defective or the oscillator is not functioning properly. The bottom cover should be in place when measuring crystal current.

Turn off the sweep and marker generators. If the crystal current decreases by more than 10%, it indicates that excessive input signals are being employed. Proper alignment cannot be obtained under such conditions.

490 Mc. Adjustments — Set the UHF marker gen. to 490 mc.

Set the UHF sweep gen. to sweep 475 mc. to 505 mc.

Turn off the 82.5 mc. marker generator.

Turn the UHF selector toward the low frequency end of the band. Tune the selector and the sweep generator until the 490 mc. marker is centered in the bandpass.

Turn the 82.5 mc. marker back on.

Adjust C18 until the markers coincide. Then, overshoot the adjustment by an amount slightly less than the amount of adjustment required to get the markers to coincide. Then close or spread the turns on the L9 coil until the markers again coincide.

Repeat the adjustments in the section above labeled "630 Mc. Adjustments." C1, C2, L2 and L5 probably will not require retouching. Then repeat the adjustments in the section above labeled "490 Mc. Adjustments." Continue the repetition of the 630 mc. and 490 mc. adjustments until no further adjustments are required. Make the final adjustment at 630 mc. before proceeding with the next section.

840 Mc. Adjustment — Set the UHF marker gen. to 840 mc.

Turn off the 82.5 mc. marker generator.

Adjust the UHF sweep gen. to sweep 825 mc. to 855 mc.

Turn the UHF selector dial drive and the sweep generator until the 840 mc. marker is centered in the bandpass of the response curve on the oscilloscope.

Turn the 82.5 mc. marker back on.

Adjust the L9 core until the two markers coincide.

Check of Tracking — Turn off the UHF marker generator.

Tune the sweep generator across the band in small steps.

Tune in the sweep generator with the selector.

The response on the oscilloscope should fall below 70% response between the 76.5 mc. and 88.5 mc. markers obtained from the VHF marker generator.

The crystal current should be between 0.8 and 5 ma. at all points between 470 mc. and 890 mc. when measured with the bottom shield in place and with no signal input.

Overall Response Check — Leave the sweep and signal generators connected as for r-f alignment. Remove the 1,000 ohm resistor from terminals C and D of T1. Connect the 300 ohm balanced detector across the output terminal board TB3 and observe the overall response which should be similar to that shown in Figure 5. If excessive tilt appears, it may cause the picture to be overpeaked or smeared depending on the direction of the tilt. The maximum tilt or sag of the curve should not exceed 30%.

ALIGNMENT DATA

Air Check — As a final test, the selector should be tested on the air by receiving a known weak signal. If the picture obtained seems excessively snowy for a particular selector unit, it may be necessary to replace the mixer crystal CR1. If the crystal is changed, the r-f alignment should be retouched. A good crystal may perform no better than a defective one unless the r-f section is aligned for the good crystal.

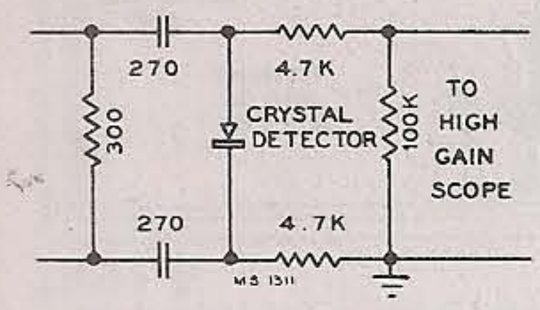

Figure 4 — 300 Ohm Balanced Detector

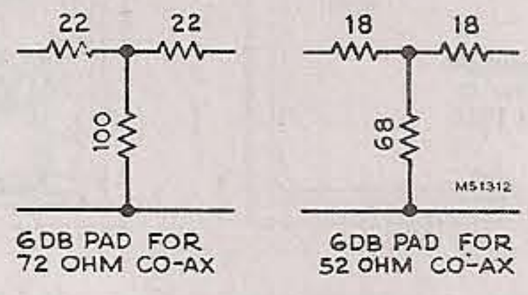

Figure 5 — Sweep Cable Attenuator

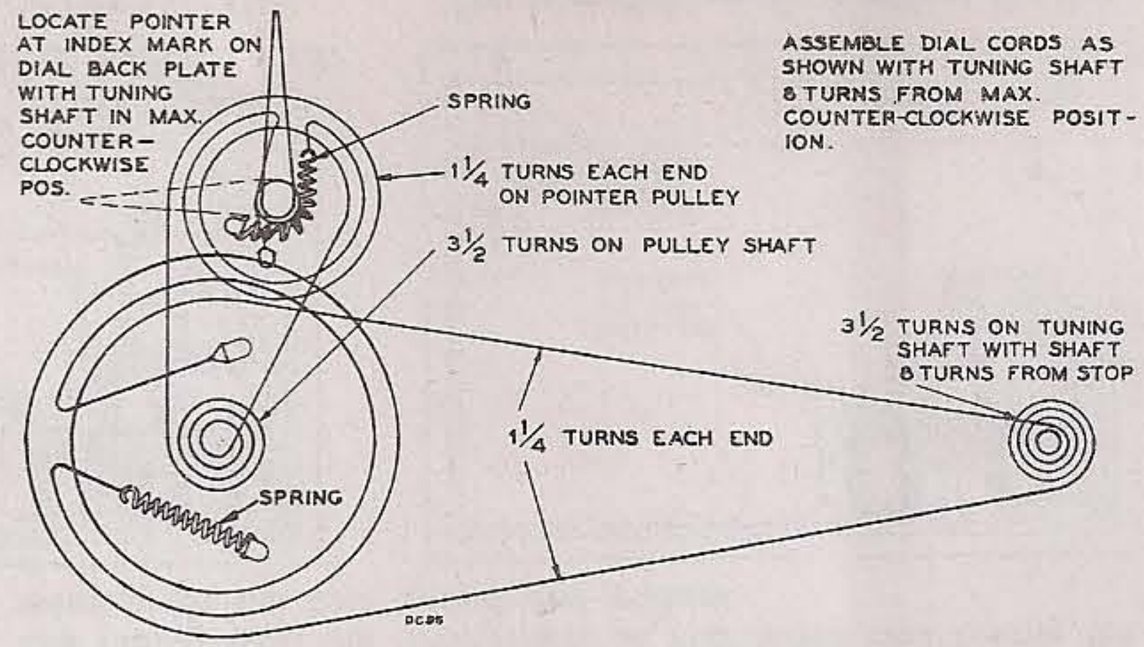

Figure 8 — Dial Cord and Drive

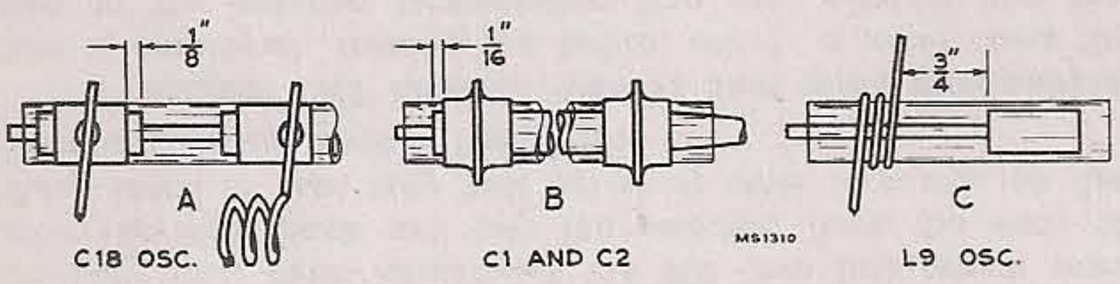

Figure 6 — Preset for R-F Adjustments

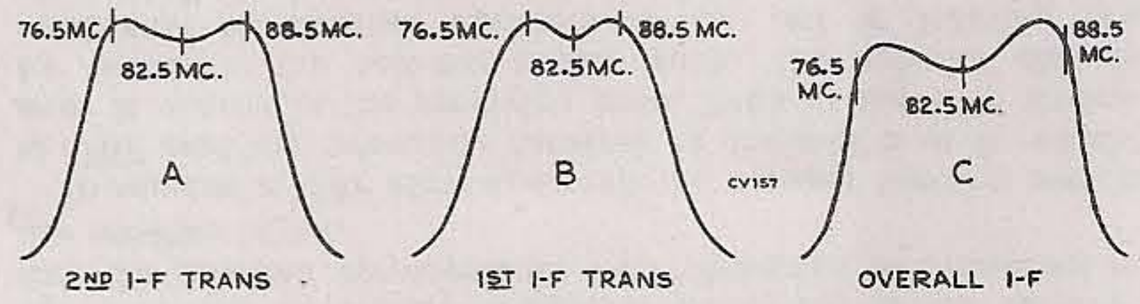

Figure 9 — Sweep Response Curves

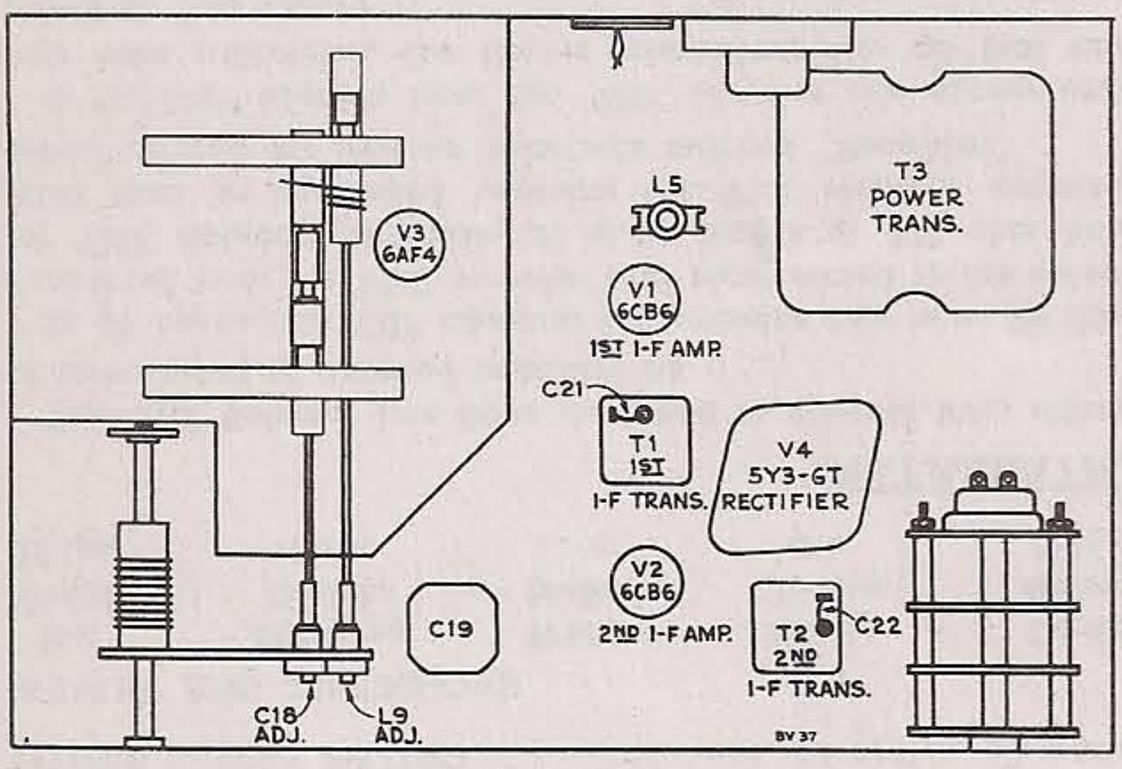

Figure 7 — Bottom Chassis Adjustments

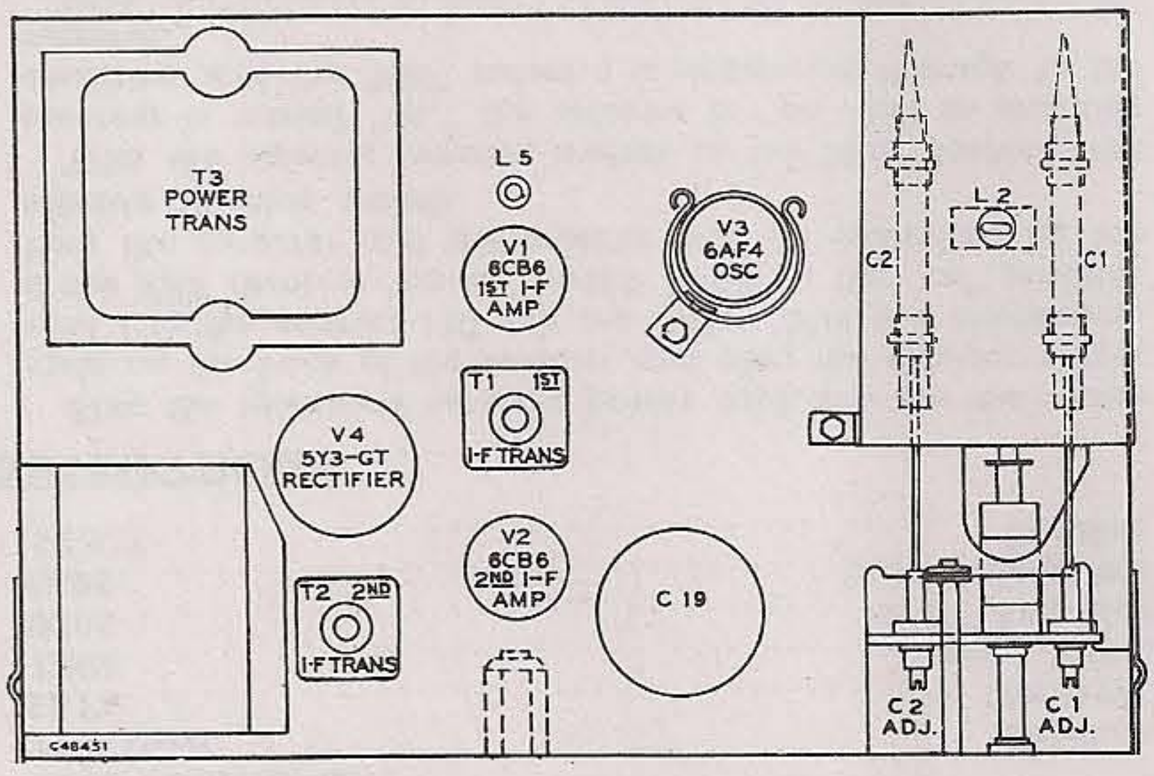

Figure 10 — Top Chassis Adjustments

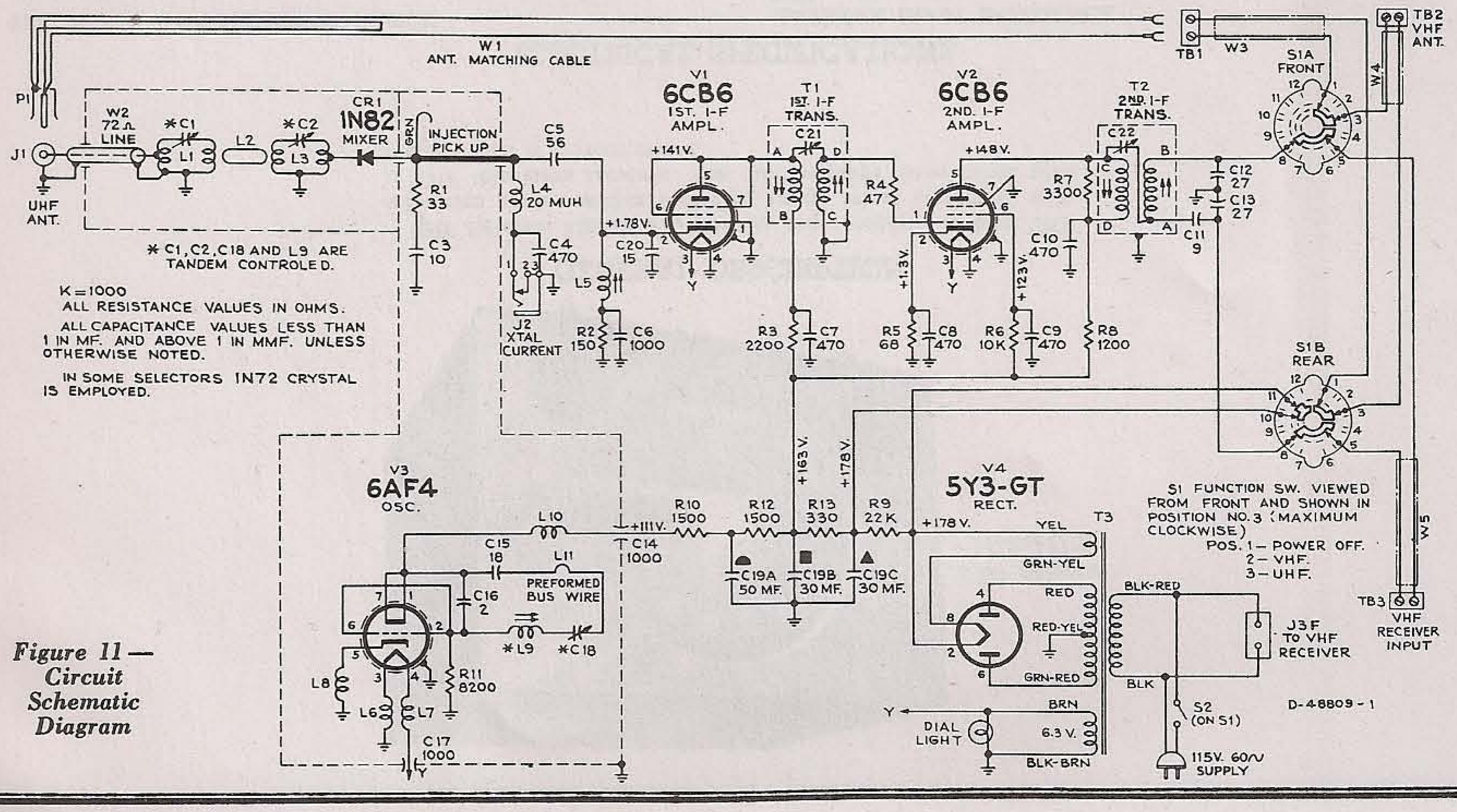

Figure 11 — Circuit Schematic Diagram

REPLACEMENT PARTS

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	KCS70
77097	Back—Back cover complete with three (3) terminal boards
76184	Board—Terminal board for back cover
77069	Bracket—Mounting bracket for r-f tuning assembly (includes L2 and part of L1, L3, C1, C2) less glass tubing
76522	Bracket—Vertical bracket for tube shield for 6AF4
77072	Bushing—Drive shaft bushing (in rear of coil spring)
77210	Capacitor—Ceramic, 2 mmf. (C16)
77108	Capacitor—Ceramic, 9 mmf. (C11)
77085	Capacitor—Ceramic, feed-thru, 10 mmf. (C3)
45465	Capacitor—Ceramic, 15 mmf. (C20)
77209	Capacitor—Ceramic, 18 mmf. (C15)
70935	Capacitor—Ceramic, 27 mmf. (C12, C13)
70599	Capacitor—Ceramic, 56 mmf. (C5)
75198	Capacitor—Ceramic, 470 mmf. (C4, C7, C8, C9, C10)
77084	Capacitor—Ceramic, feed-thru, 1,000 mmf. (C14, C17)
77252	Capacitor—Ceramic, 1,000 mmf. (C6)
77086	Capacitor—Electrolytic comprising 1 section of 50 mfd., 200 volts and 2 sections of 30 mfd., 200 volts (C19A, C19B, C19C)
77102	Clamp—Polystyrene clamp for oscillator tuning capacitor and coil (2 required)
77109	Coil—Choke coil (L6, L7, L8, L10)
77083	Coil—Cathode peaking coil (L5)
77224	Coil—Oscillator tuning coil (L9)
72618	Coil—Peaking coil (20 muh) (L4)
77212	Connector—Single contact male connector for antenna matching assembly (P1)
75474	Connector—Single contact male connector for W3, W4, W5
77088	Connector—Single contact connector for 72 ohm antenna connection (J1)
52131	Connector—2 contact female connector (J3)
72953	Cord—Drive cord (approx. 23″ overall)
72953	Cord—Drive cord (approx. 38″ overall)
70392	Cord—Power cord and plug
77074	Core—Adjusting core assembly for r-f tuning assembly capacitors C1 and C2
77075	Core—Adjusting core assembly for oscillator tuning capacitor C18
77076	Core—Adjusting core assembly for oscillator tuning coil L9
77093	Cover—Bottom cover for oscillator tuning shield
	Crystal—See Rectifier
77103	Cushion—Rubber cushion for mounting oscillator tuning coil (2 required) or oscillator tuning capacitor (2 required)
74838	Grommet—Power cord strain relief (1 set)
77079	Holder—Holder for crystal rectifier
75482	Jack—Test jack (J2)
11765	Lamp—Dial lamp—Mazda 51
77106	Plate—Dial back plate and bushing less dial and pulley
77073	Plate—Plate complete with five (5) bushings for drive shaft and adjusting cores
77095	Pointer—Station selector pointer
77077	Post—Retainer post for plate and bushing assembly
77105	Pulley—Drive cord pulley (1⅜″ dia.) and shaft
77094	Pulley—Drive cord pulley (2¾″ dia.) and shaft assembly
77489	Rectifier—Crystal rectifier 1N82 (CR1)
30340	Retainer—Retainer ring for drive shaft
	Resistor—Fixed, composition:
503033	33 ohms, ±10%, ½ watt (R1)
503047	47 ohms, ±10%, ½ watt (R4)
503068	68 ohms, ±10%, ½ watt (R5)
503115	150 ohms, ±10%, ½ watt (R2)
523133	330 ohms, ±10%, 2 watt (R13)
503212	1,200 ohms, ±10%, ½ watt (R8)
523215	1,500 ohms, ±10%, 2 watt (R10, R12)
503222	2,200 ohms, ±10%, ½ watt (R3)
503233	3,300 ohms, ±10%, ½ watt (R7)
503282	8,200 ohms, ±10%, ½ watt (R11)
503310	10,000 ohms, ±10%, ½ watt (R6)
513322	22,000 ohms, ±10%, 1 watt (R9)
77078	Shaft—Drive shaft
77092	Shield—Shield assembly for oscillator tuning assembly
77091	Shield—Shield assembly for r-f tuning assembly
77090	Shield—Tube shield for 6AF4
76967	Shield—Tube shield for 6CB6
31251	Socket—Tube socket, octal, wafer
31364	Socket—Dial lamp socket
77087	Socket—Tube socket, 7 pin, miniature, moulded phenolic, saddle-mounted
77207	Socket—Tube socket, 7 pin, miniature, steatite, saddle-mounted
77071	Spring—Drive shaft spring
77096	Spring—Drive cord spring
12007	Spring—Retaining spring for adjusting cores
75068	Spring—Retaining spring for tube shield for 6AF4
77208	Support—Oscillator tuning coil support (glass tube)
77099	Support—Polystyrene support only for oscillator tuning coil and capacitor
77089	Switch—Function and power switch (S1, S2)
76463	Terminal—Screw type grounding terminal
77080	Transformer—Power transformer, 117 volts, 60 cycles (T3)
77081	Transformer—First i-f transformer complete with adjustable cores (T1, C21)
77082	Transformer—Second i-f transformer complete with adjustable cores (T2, C22)
77100	Tubing—Capacitor tubing (glass) for oscillator tuning capacitor (Part of C18)
77070	Tubing—Capacitor tubing (glass) for r-f tuning assembly capacitors C1 and C2
2917	Washer—"C" washer for drive shaft and drive cord pulleys
33726	Washer—"C" washer for plate and bushing retainer post
77098	Washer—Spring washer for drive shaft
	MISCELLANEOUS
77111	Clamp—Dial clamp (2 required)
77110	Dial—Glass dial scale
77033	Emblem—"RCA Victor" emblem
77492	Foot—Rubber foot (4 required)
77251	Knob—Function and power switch knob—maroon
77140	Knob—Tuning control knob—maroon
77013	Nut—Speednut to fasten emblem to cabinet
74734	Spring—Spring clip for knobs

The system of employing an asterisk before the stock number of new items has been discontinued.

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