

4. Check all channel frequencies again and you should find they are now lower in frequency than they were on the initial check. All channels should now be within  $\pm 800$  cps of zero frequency. If the initial frequency check indicated all channels were on the low side, reverse the procedure described above in steps 2, 3 and 4.
5. If the initial frequency check indicated that all channels 1 thru 12 were out of tolerance on the high side and channels 13 thru 23 were on frequency this would indicate the LO channel 10.000mc heterodyning crystal Y-16 needs to be trimmed to frequency with capacitor C107.
6. The procedure here is the same as that outlined in steps 2, 3 and 4. The only difference being that trimmer C107 is adjusted to bring crystal Y-16 on frequency.
7. If channels 13 thru 23 were out of tolerance and channels 1 thru 12 were on frequency, this would indicate the HI channel 10.150mc heterodyning crystal Y-15 needs to be trimmed to frequency with capacitor C108. The procedure will be the same as outlined in paragraph 6 above.

After it has been determined that the transmitter is on frequency, set the CHANNEL selector dial on channel 1 and the HI-LO switch in the LO position. Using a VTVM measure the grid drive to the final amplifier at the green PA test jack on top of the power supply chassis. The voltage should not be less than a -25VDC. Rotate CHANNEL selector to channel 2 and check voltage at test jack. Repeat this procedure for each successive channel thru channel 12.

Next place HI-LO switch in HI position and CHANNEL selector on channel 13 and check voltage at PA test jack. Repeat this procedure for each successive channel thru channel 23. The voltage should not be less than -25VDC on any channel from channel 1 thru channel 23. The grid drive may vary about 10 volts from channel 1 thru channel 23.

If the voltage at the PA test jack falls within the limits described above, no adjustment of the RMO coils L17 and L19 or coils L10 and L12 in the trunk unit will be necessary. The transmitter RF power output should be fairly constant over the entire range from channel 1 thru 23. This should be a minimum of 2.5 watts on all channels.

If the transmitter does not perform satisfactorily, it may be re-aligned as follows:

1. Set CHANNEL selector on channel 23 and adjust RMO coils L17 & L19 for maximum grid drive at the grid of the 6BH6 V-10 pin 1, use the RF probe of the VTVM.  
CAUTION: It is possible to tune coil L19 to the second harmonic of the 17mc crystals. If this is done it is possible to completely tune up the transmitter in the 24mc region as follows: L19 is tuned to 34mc coil L17 will not resonate at 44mc but will tune to the difference frequency of 34mc and the 10mc crystals Y-15 or Y-16. One of the symptoms of this misalignment is low grid drive and consequently low power output. In view of this it is always best to check the output frequency of L19 with a frequency selective voltmeter. Always check each channel frequency with a C-12B frequency meter after the unit has been realigned.

2. Set CHANNEL selector on channel 13 and adjust transmitter PA grid coil L12 for maximum grid drive at test jack.
3. Set CHANNEL selector on channel 9 and adjust transmitter buffer plate coil L9 for maximum frid drive at test jack.
4. Tune transmitter plate and loading capacitors C89 and C90 for maximum output on channel 9.
5. Remove excitation from the buffer and final amplifier by disconnecting the B+ lead from power pin #59 on the RMO printed circuit board. Now rotate transmitter tuning capacitor C89 and check neutralization of the final amplifier for RF output as indicated by wattmeter.

If wattmeter indicates RF power output as capacitor C89 is rotated from minimum to maximum adjust neutralizing loop L13 and rotate capacitor C89. Repeat process until no output is indicated by the wattmeter.

When the final amplifier is completely neutralized, replace the lead to power pin #59. Now tune transmitter tuning and loading capacitor C89 and C90 for maximum output on channel 9 as indicated by the wattmeter.

## MICROPHONE GAIN AND SPEECH CLIPPER LEVEL CONTROLS

The microphone gain control R43 is mounted on the audio board. Access to this control is thru a hole in the top of the transceiver case. This control varies the output level from audio amplifier V7A.

The clipper level control R51 is mounted on the clipper printed circuit board. Access to this control is thru a hole in the front panel of the trunk unit. This control varies the output level from microphone pre-amplifier V8 to the clipper circuit.

Connect unit under test to test equipment as shown in FIG. 1.

Set Executive controls as follows:

1. Microphone gain and clipper level controls fully clockwise.
2. RMO CHANNEL selector dial to channel 9.
3. RMO HI-LO switch to LO position.
4. Place the power switch in RMO in ON position.

Set test equipment controls as follows:

1. Set audio generator frequency at 1000 cps and output to zero.
2. Set scope up as follows:
  - (a) Horizontal Frequency Selector from 100 to 1000 cps.
  - (b) Sync. Selector to + internal.
3. Set vertical input attenuator and vertical gain to mid-range.

Proceed with Executive adjustment as follows:

1. Place LOCAL-REMOTE switch in LOCAL position.
2. Adjust transmitter PA tuning and loading capacitors C89 and C90 for maximum output as indicated by vertical deflection on oscilloscope.
3. Adjust oscilloscope vertical gain control until carrier occupies five scale divisions above and below base line.
4. Adjust audio oscillator output level to .1 VAC.
5. Adjust Horizontal Freq. Vernier until sync. is obtained.
6. Adjust scope Horizontal Gain for a display similar to that of FIG. 2C.
7. Adjust Executive microphone gain control for a display similar to FIG.2B.

2. Set CHANNEL selector on channel 13 and adjust transmitter PA grid coil L12 for maximum grid drive at test jack.
3. Set CHANNEL selector on channel 9 and adjust transmitter buffer plate coil L9 for maximum frid drive at test jack.
4. Tune transmitter plate and loading capacitors C89 and C90 for maximum output on channel 9.
5. Remove excitation from the buffer and final amplifier by disconnecting the B+ lead from power pin #59 on the RMO printed circuit board. Now rotate transmitter tuning capacitor C89 and check neutralization of the final amplifier for RF output as indicated by wattmeter.

If wattmeter indicates RF power output as capacitor C89 is rotated from minimum to maximum adjust neutralizing loop L13 and rotate capacitor C89. Repeat process until no output is indicated by the wattmeter.

When the final amplifier is completely neutralized, replace the lead to power pin #59. Now tune transmitter tuning and loading capacitor C89 and C90 for maximum output on channel 9 as indicated by the wattmeter.

8. Reduce audio generator output to .05 VAC.
9. Adjust Executive CLIPPER LEVEL control for a display similar to FIG. 2D.
10. The above adjustment procedure pre-sets modulation percentage level for 100% modulation on negative peaks when talking close to the microphone.
11. When using the converter method for observing the modulation percentage it is always best to base the adjustments with reference to negative peaks since some compression may occur in the converter. In view of this the resulting waveform display may not be truly representative with respect to the positive peaks.

### RECEIVER ALIGNMENT

Prior to alignment, the Executive transceiver should be allowed to reach normal operating temperature. This will require approximately 15 minutes when operating from 115 VAC.

Alignment of the Executive receiver is performed by adjustment of the various stages as follows:

1. The following test equipment will be required for proper alignment of the Executive Model 750-H or 750-HB receiver.
  - (a) RF Signal Generator such as the H.P. 606-A, Clough-Brengle 550 or equivalent. It is important if accurate sensitivity measurements are to be made that the signal generator have good attenuator and very little signal leakage. A generator such as the Heath LG-1 may be used providing an external attenuator having an attenuation of approximately 60 DB is used between the generator and the transceiver. The generator is then operated on its higher output ranges.
  - (b) Crystal controlled frequency standard such as the International C-12B Frequency Meter.
  - (c) Audio output meter such as the H.P. 400-D, Heath AV-3 or equivalent.
  - (d) Vacuum tube voltmeter such as the H.P. 410-B, RCA WV-98B or equivalent.
  - (e) Combination attenuator 6 DB +50 DB International #150-224.
2. Set transceiver controls as follows:
  - (a) VOLUME control on RMO ON and fully clockwise.
  - (b) SQUELCH control on RMO fully counterclockwise until it clicks off.
  - (c) CHANNEL selector dial to channel 9.
  - (d) HI-LO switch to LO position.

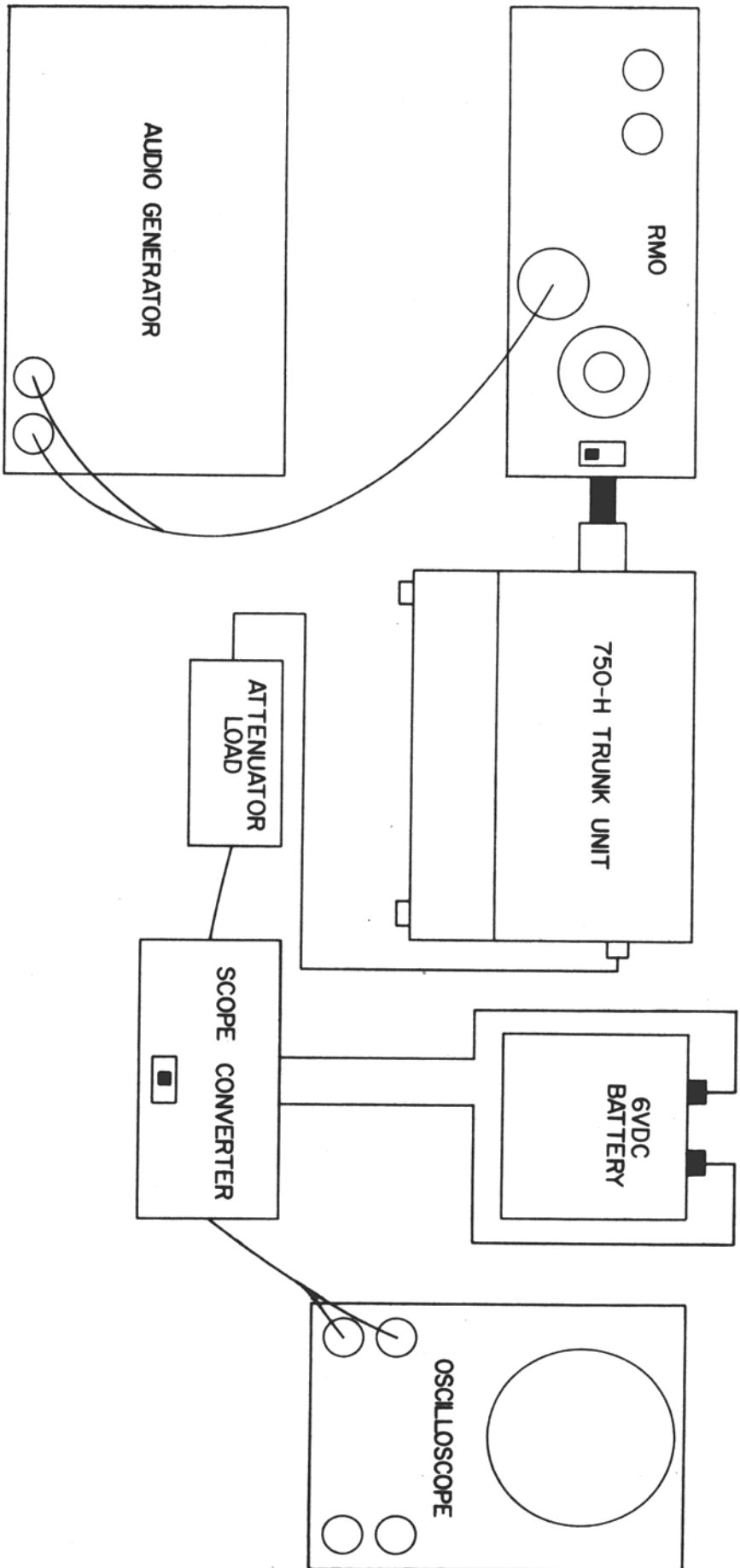


FIG. 1

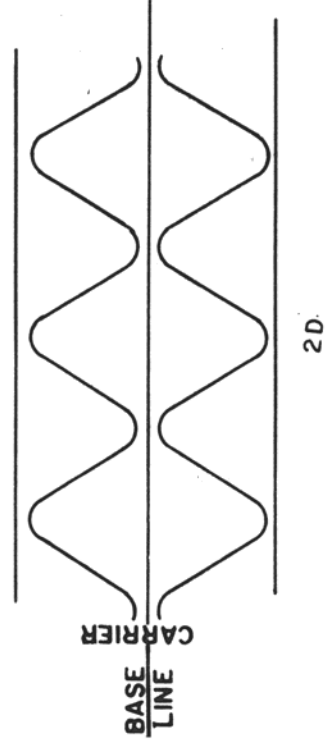
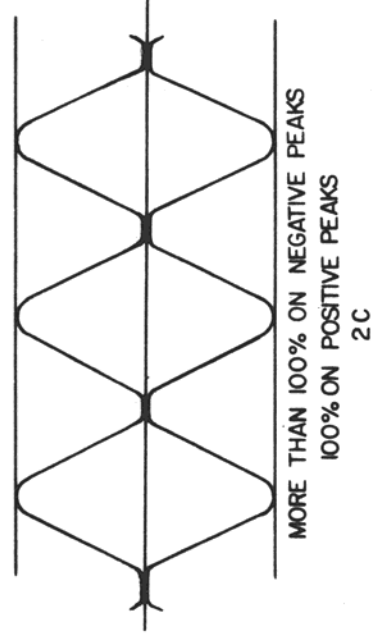
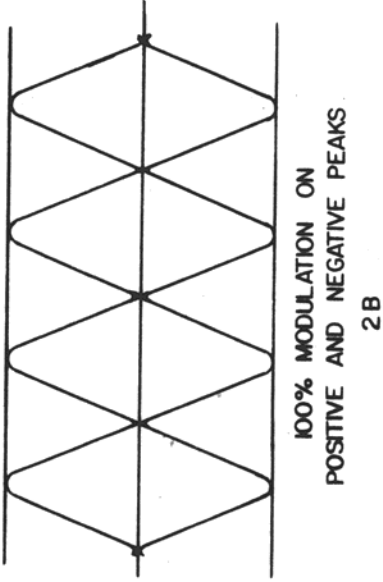
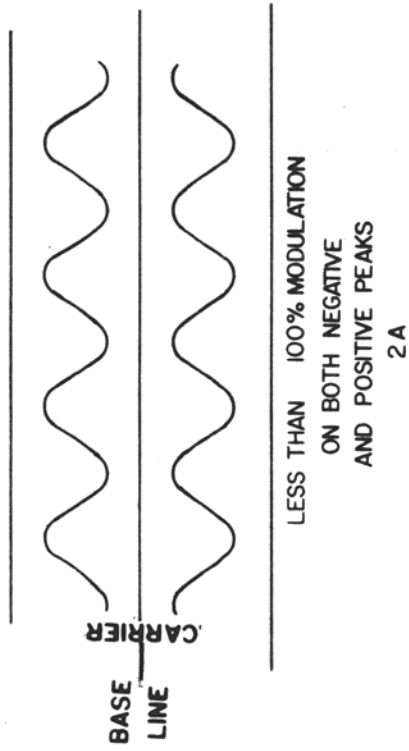


FIG. 2

- (b) Crystal controlled frequency standard such as the International C-12B Frequency Meter
- (c) Audio output meter such as the H. P. 400-D, Heath AV-3 or equivalent.
- (d) Vacuum tube voltmeter such as the H. P. 410-B, RCA WV-98B or equivalent.
- (e) Combination attenuator 6 DB / 50 DB International #150-224.

2. Set transceiver controls as follows:

- (a) VOLUME control on RMO ON and fully clockwise.
- (b) SQUELCH control on RMO fully counterclockwise until it clicks off.
- (c) CHANNEL selector dial to channel 9.
- (d) HI-LO switch to LO position.
- (e) Mark position of AUDIO LEVEL control on trunk unit front panel and then turn fully clockwise.

3. Connect test equipment to transceiver as shown in Fig. 3.

4. Set attenuator switch to the IN position.

5. Set C-12B CHANNEL selector switch to channel 9 and FUNCTION switch to the RF position.

6. Connect VTVM probe to AVC power pin (#21) on 1st I. F. board. Connect VTVM ground lead to transceiver chassis.

7. Press C-12B PWR switch to ON position and adjust RF level control for a -1 volt DC reading on the VTVM.

8. Carefully adjust both top and bottom slugs in I. F. transformers T-1 thru T-5 for maximum reading on VTVM. If necessary reduce RF LEVEL from C-12B to maintain an approximate reading of -1 volt on the VTVM.

9. Reduce RF LEVEL from C-12B until AVC voltage is approximately -.5 VDC. Set VTVM range switch to low range (1 volt on H. P. 410B or 1.5 volt on RCA WV-98B) and repeat above process being careful to get each tuning slug set for maximum reading on VTVM.



- (e) Mark position of AUDIO LEVEL control on trunk unit front panel and then turn fully clockwise.
3. Connect test equipment to transceiver as shown in FIG.3.
  4. Set attenuator switch to the IN position.
  5. Set C-12B CHANNEL selector switch to channel 9 and FUNCTION switch to the RF position.
  6. Connect VTVM probe to AVC power pin (#21) on 1st IF board. Connect VTVM ground lead to transceiver chassis.
  7. Press C-12B PWR switch to ON position and adjust RF level control for a -1 volt DC reading on the VTVM.
  8. Carefully adjust both top and bottom slugs in IF transformers T-1 thru T-5 for maximum reading on VTVM. If necessary reduce RF LEVEL from C-12B to maintain an approximate reading of -1 volt on the VTVM.
  9. Reduce RF LEVEL from C-12B until AVC voltage is approximately -.5 VDC. Set VTVM range switch to lo range (1 volt on H.P. 410B or 1.5 volt on RCA WV-98B) and repeat above process being careful to get each tuning slug set for maximum reading on VTVM.
  10. Adjust coil L8 on receiver OSC-MIXER board for maximum reading on VTVM.
  11. Adjust coil L2 on CONV. board for maximum reading on VTVM.
  12. Switch CHANNEL selector on C-12B and RMO to channel #1 and adjust coil L4 on CONV. board for maximum reading on VTVM.
  13. Switch CHANNEL selector on C-12B and RMO to channel #23. Set RMO HI-LO switch to the HI position and adjust coils L1, L3 and L6 for maximum reading on VTVM. Adjust slug in coil L6 at top of coil. Slug will be 1/4 to 1/2 its length out of the coil. Secure in place with RTV compound.
  14. Switch CHANNEL selector on C-12B and RMO to channel #9. Set RMO HI-LO switch to LO position. Set VTVM range switch to a range that will handle about 5 volts at midscale or a little less. Adjust C-12B RF level for a reading of -3 to -5 volts on the VTVM. Note reading.
  15. Release C-12B PWR switch and set C-12B CHANNEL selector to channel #8. Set attenuator switch to the OUT position and press C-12B PWR switch ON. Reading on VTVM should be less than the reading previously obtained on channel #9 in step #14. Release PWR switch and set C-12B CHANNEL selector on channel #10. Press C-12B PWR switch ON and again note reading on VTVM. Reading again should be less than the reading previously obtained on channel #9 in step #14. Reading should also be within .2 of a volt of that obtained for channel #8.

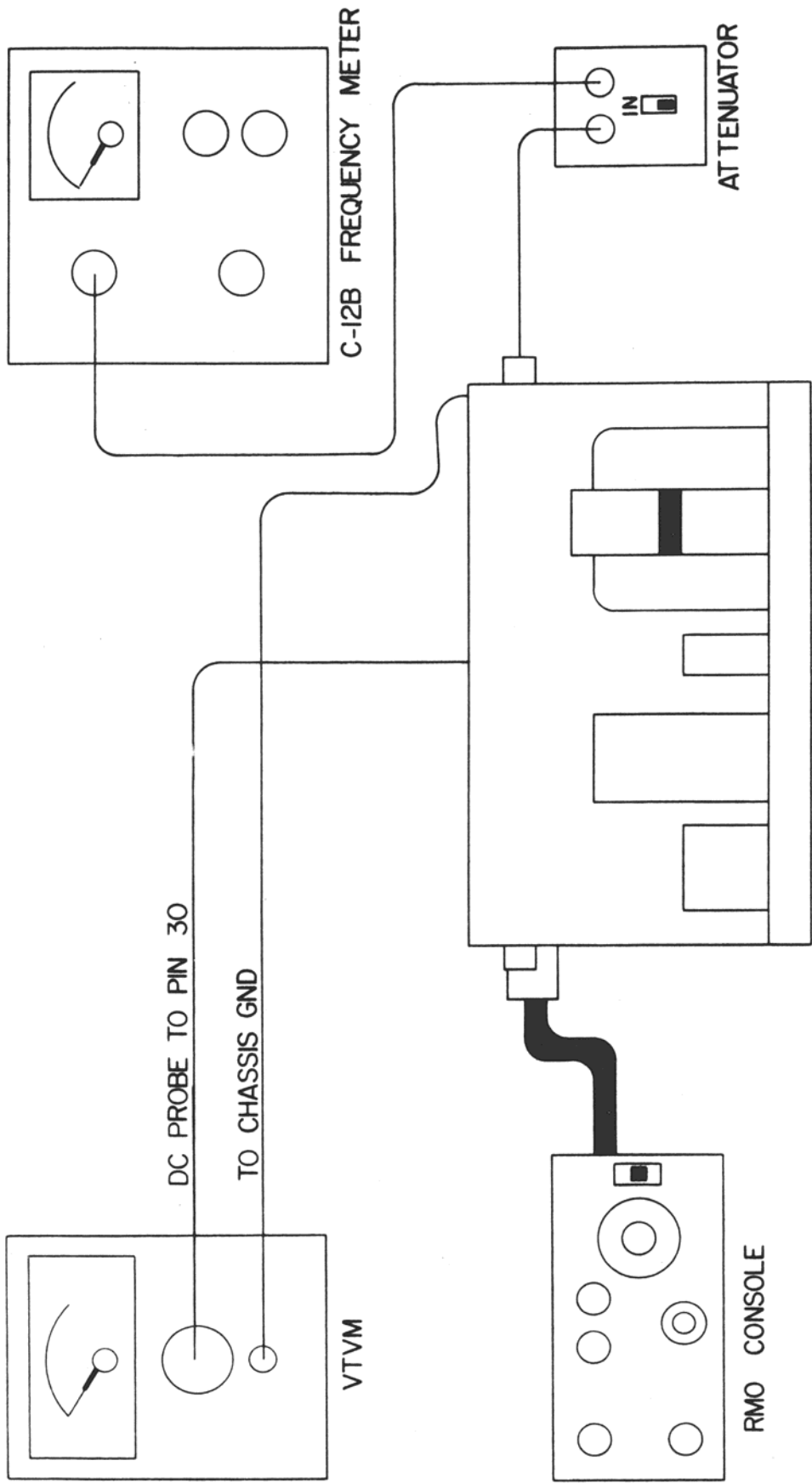
16. If the adjacent channel VTVM readings are not within .2 of a volt of each other a slight adjustment of trimmer capacitor C-28 will be necessary. For example, let us suppose that the VTVM reading for channel #8 was -1 volt and the reading for channel #10 was -2 volts. Set C-12B CHANNEL selector to channel #10 and press PWR switch ON. Now adjust trimmer capacitor C-28 on receiver OSC-MIXER board until VTVM reads -1.5 volts. Release PWR switch and set C-12B CHANNEL selector on channel #8. Press C-12B PWR switch ON and note VTVM reading. Reading on VTVM should now be very close to -1.5 volts DC. Repeat the above procedure on channels 20, 21 and 22 using channel #21 to set RF level as with channel #9 before.
17. Disconnect attenuator from transceiver ANT. connector and connect signal generator to ANT connector. Set RMO CHANNEL selector to channel #9 and HI-LO switch to LO position. Connect audio voltmeter across transformer T-6 speaker windings. These are the two black wires on the terminal strip mounted adjacent to the transformer.

Set signal generator output to 1 uv and adjust generator frequency for maximum AVC voltage as indicated on VTVM. Turn generator modulation on and set for 30% modulation. Recovered audio as indicated by the audio voltmeter should be a minimum of 1.75 VAC. Place generator in standby position or tune frequency control off 100KC frequency and noise level should be no greater than .5 VAC. This of course to some extent will depend upon the noise atmosphere of the location. Fluorescent lighting and neon signs in the immediate vicinity can raise the rf noise atmosphere considerably and if encountered should be taken into consideration.

Repeat the tests for channels 1 and 23. The receiver sensitivity should produce 1.75 VAC recovered audio for a 30% modulated 1 uv rf signal.

When the receiver is properly adjusted the no signal noise level will be from .2 to .3 VAC on channels 1 and 23 and peak up slightly in the middle of the band and recovered audio will vary in the same manner.

18. After alignment has been completed, re-set AUDIO LEVEL control to the panel marking established in step 2 e.



TRUNK UNIT

FIG 3

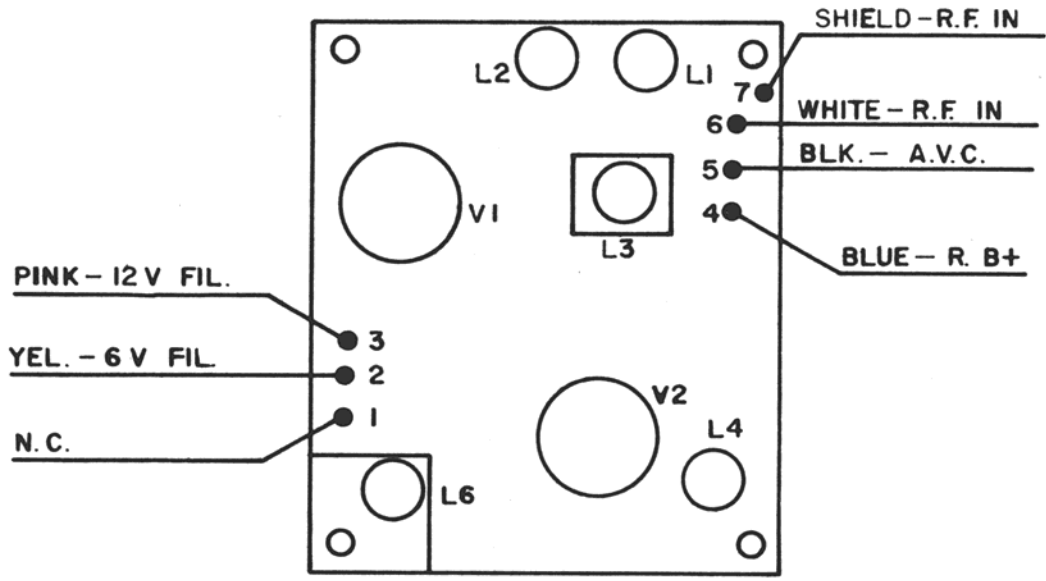
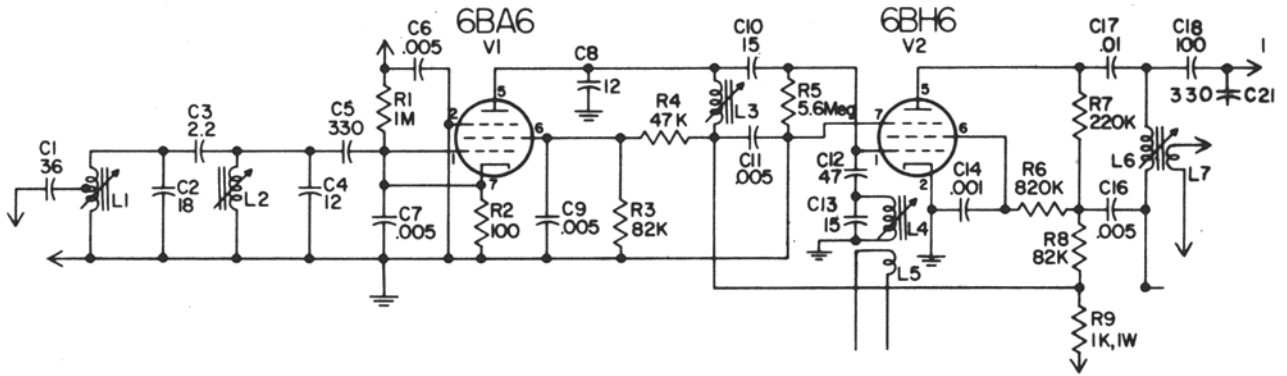
VOLTAGE MEASUREMENT CHART

TUBE TYPE	V NO.	CATHODE			SCREEN			PLATE			CONTROL GRID		
		Pin No.	N/S	W/S									
6BA6	V1	7	+ .8	+ .7	6	+ 64	+ 74						
6BH6	V2				6	+ 38	+38.5						
6CL8A	V3A				7	+11.0	+11.1				9	-1.6	-1.6
6CL8A	V3B							2	90	90	1	-4.3	-4.35
6BA6	V4	7	+2.5	+2.4	6	+ 87	+ 94						
6BA6	V5	7	+3.0	+2.95	6	+107	+115						
6AL5	V6A	1	+ .02	+ .14									
6AL5	V6B	5	+ .3	+ .5									
12AX7	V7A							6	+58 <sup>T</sup>				
12AX7	V7B	3	SQ/ff +2.6	SQ/on +3.4									
6DS4	V8							2	+55 <sup>T</sup>				
6AQ5	V9	2	+15.5 <sup>R</sup>										
6AQ5	V9	2	+17.5 <sup>T</sup>										
6BH6	V10				6	+215 <sup>T</sup>					1	-2.8 <sup>T</sup>	
6CL6	V11				3	+220 <sup>T</sup>			+280 <sup>T</sup>		2	-36.5	
6CL8A	V12A										1	-2.3	
6CL8A	V12B	8	+11 <sup>R</sup>	+46 <sup>T</sup>	7	+135					9	-13 <sup>R</sup>	0 <sup>T</sup>
6BH6	V13				6	+215 <sup>R</sup>	+240 <sup>T</sup>				1	7VAC <sup>R</sup>	7VAC <sup>T</sup>

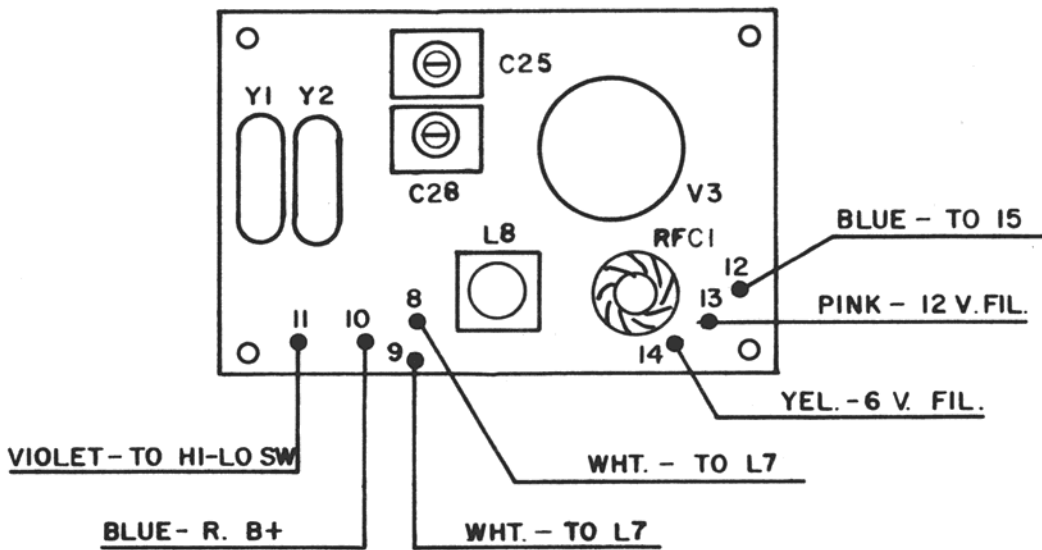
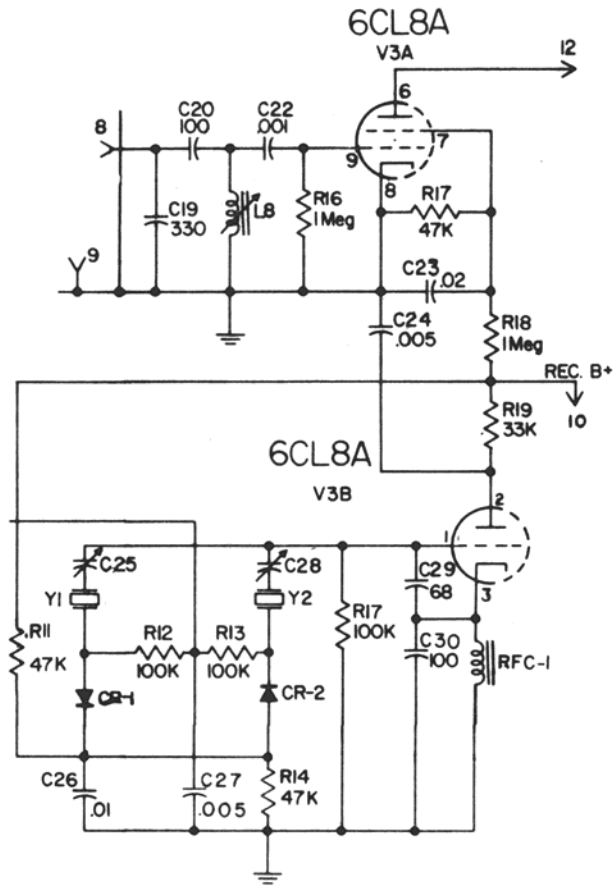
NOTE: All voltages measured with WV-98B VTVM. Transceiver operating from 115VAC.

N/S Measurement made with no signal into receiver

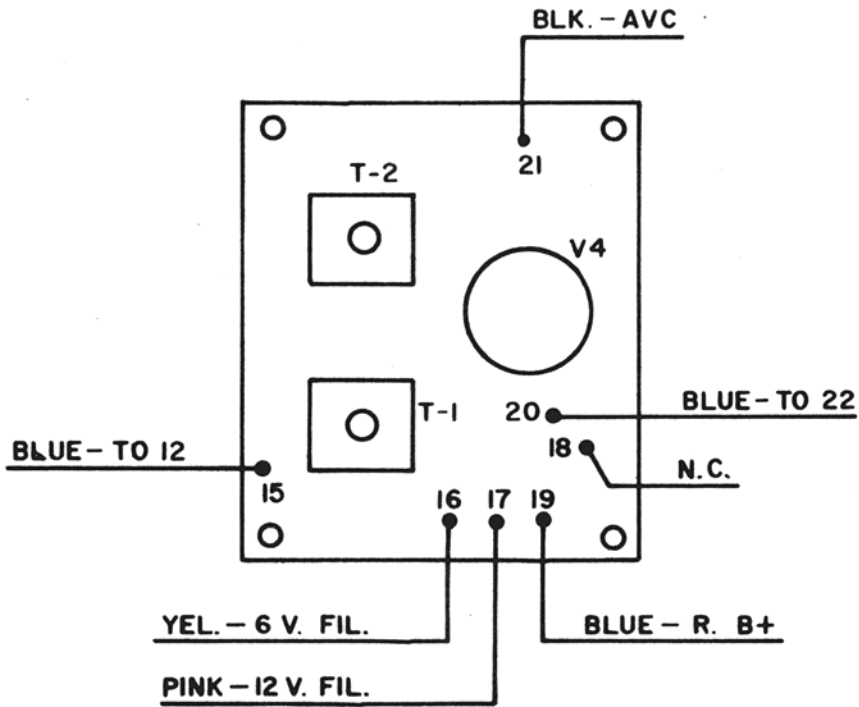
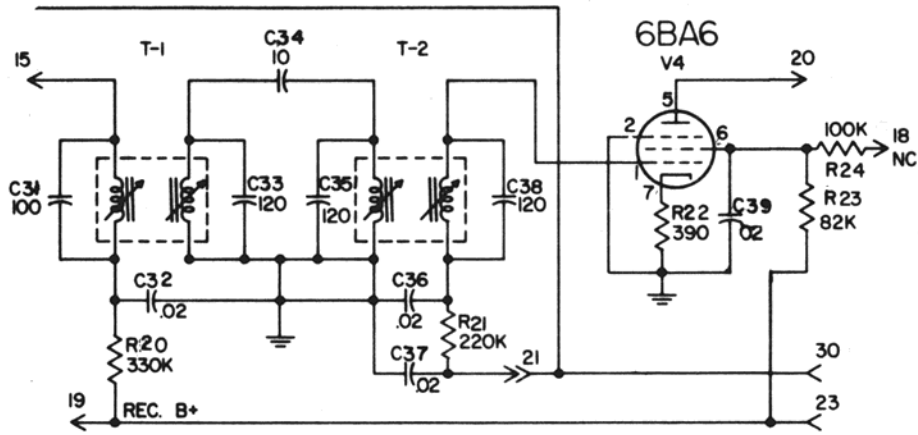
W/S Measurement made with a channel 9 1uv 30% modulated signal fed into receiver ANT terminal



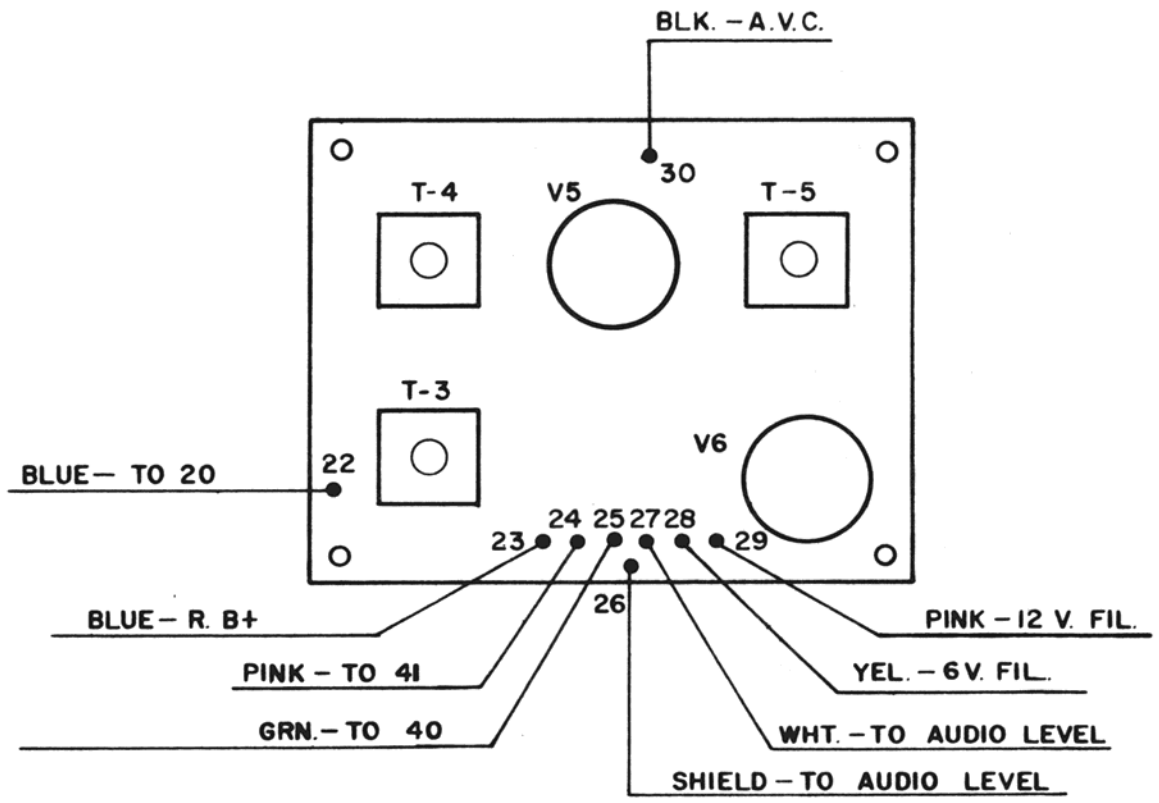
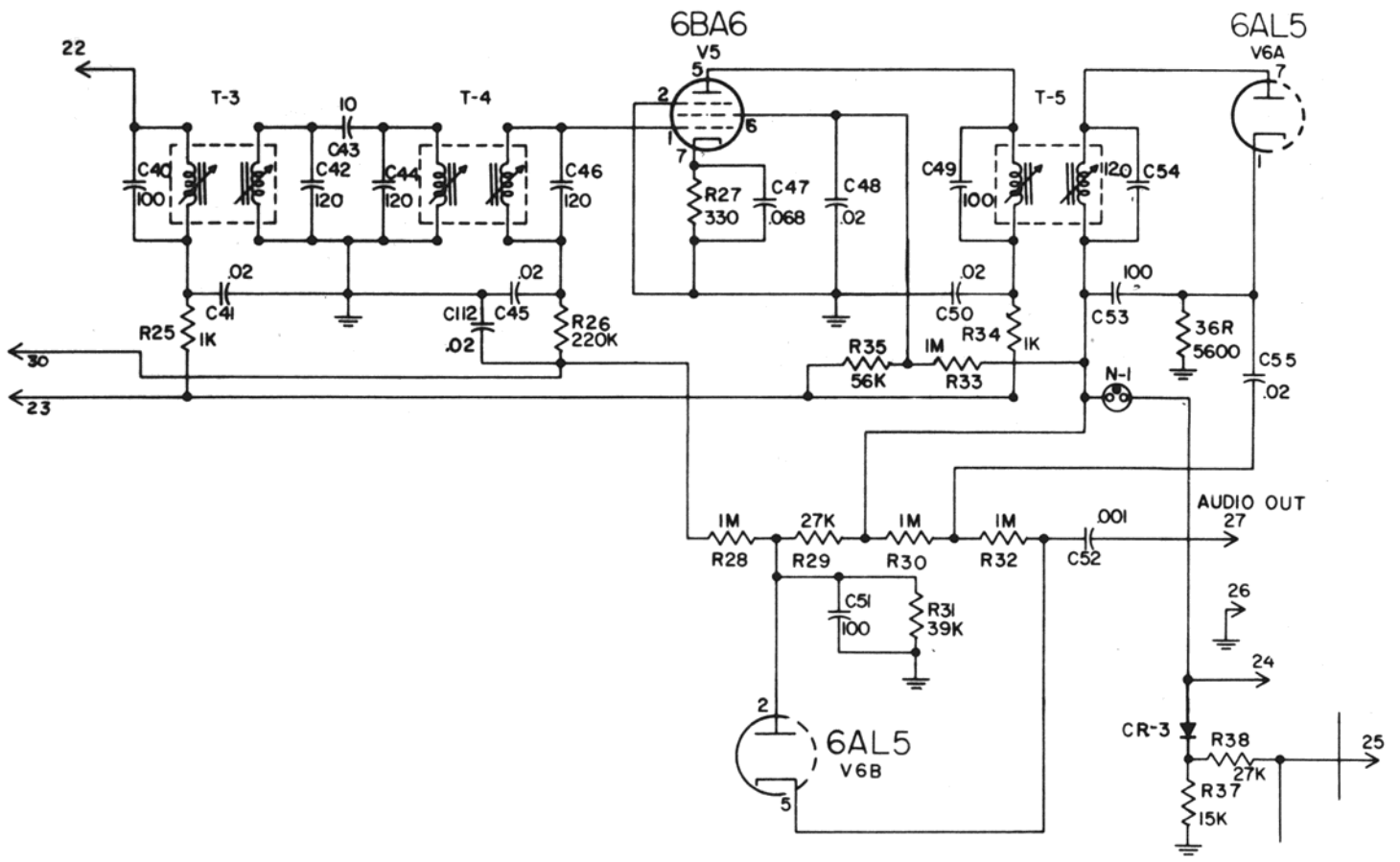
CONVERTER



**OSC. MIXER**

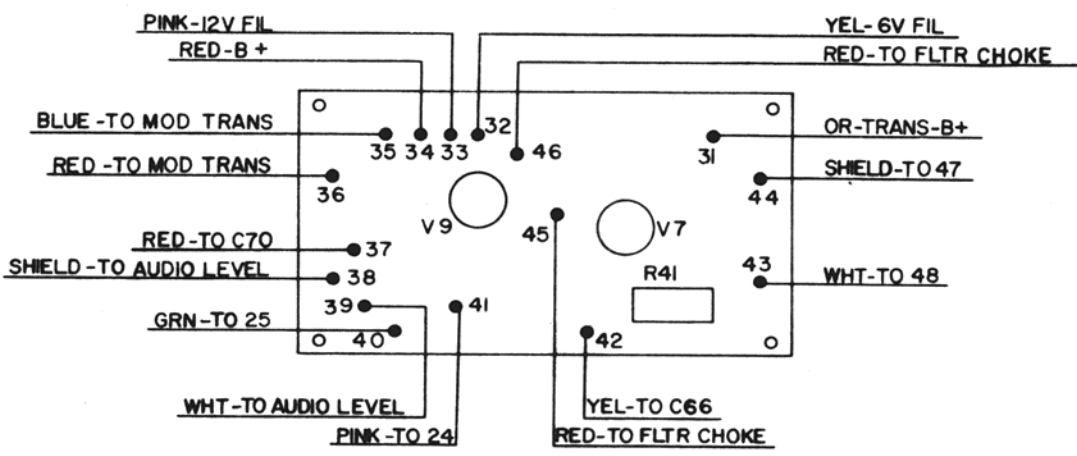
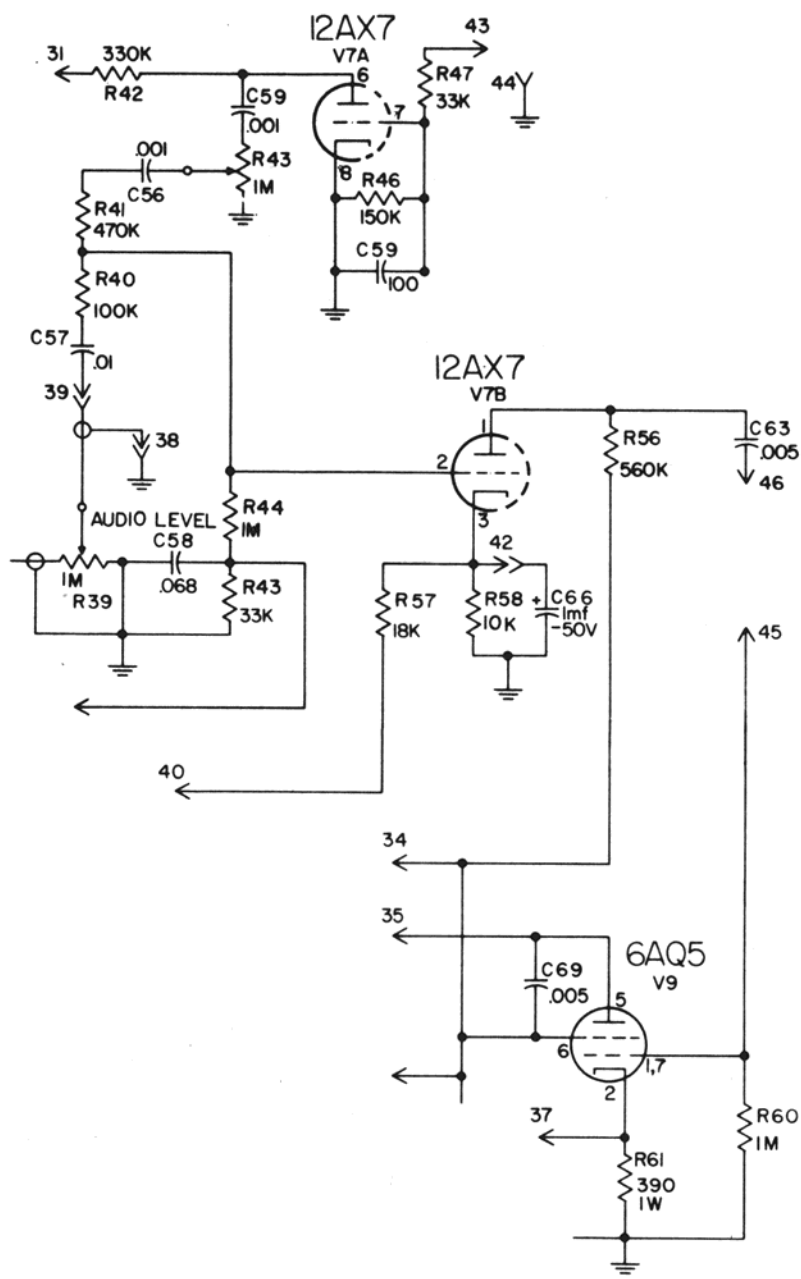


IST. IF AMP.



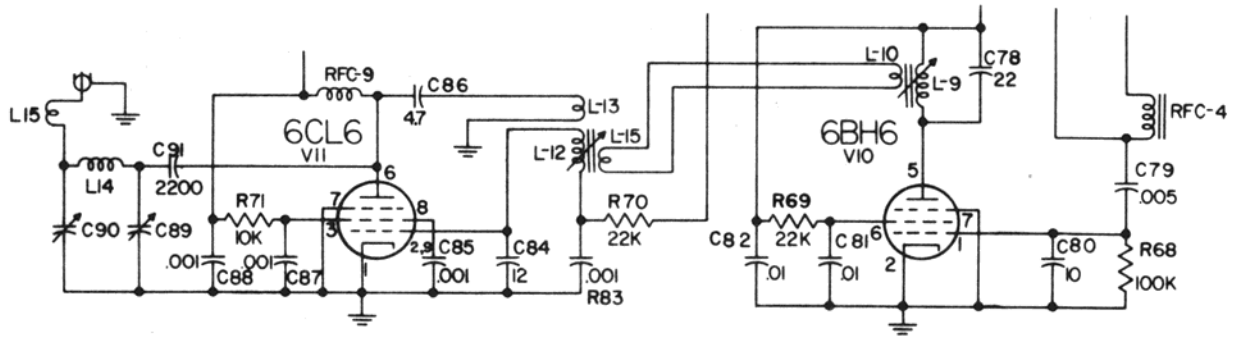
**2ND IF DET NOISE LIMITER**



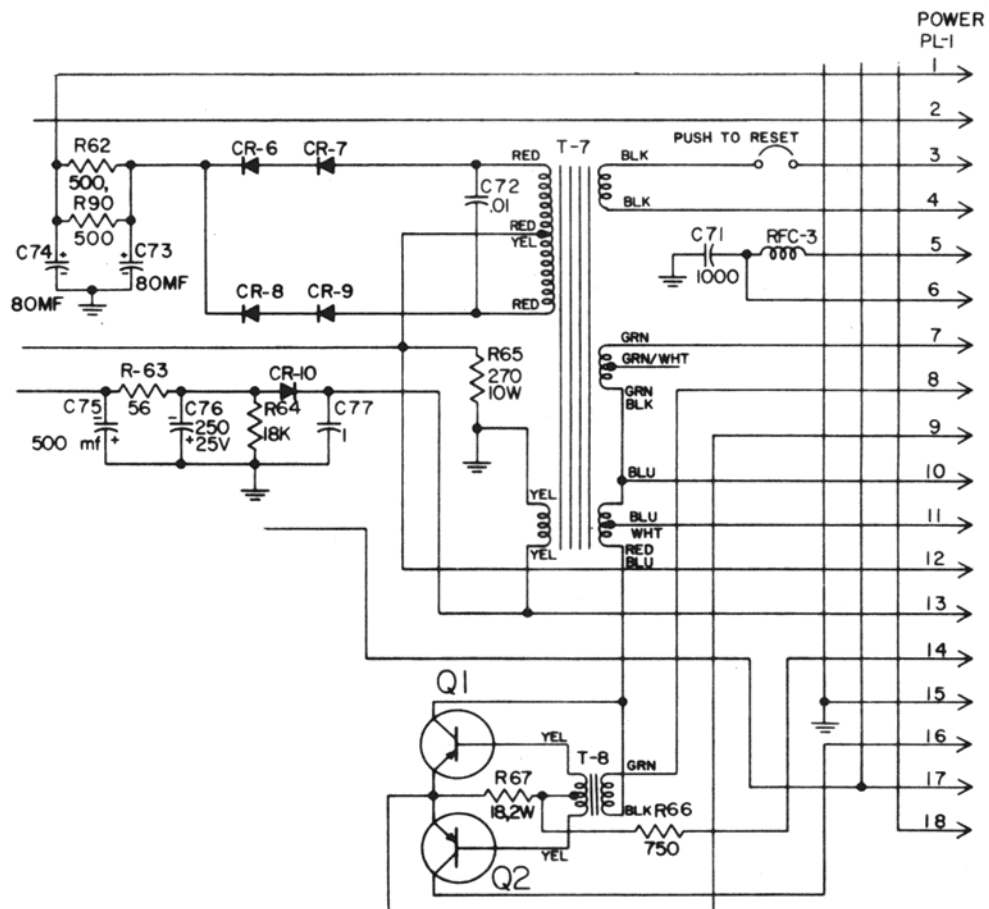


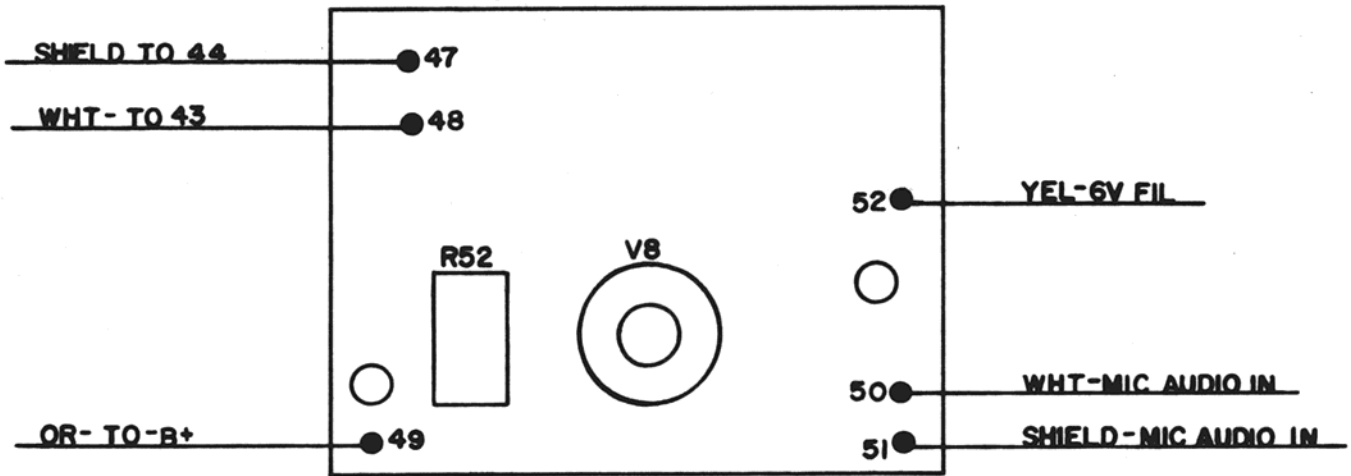
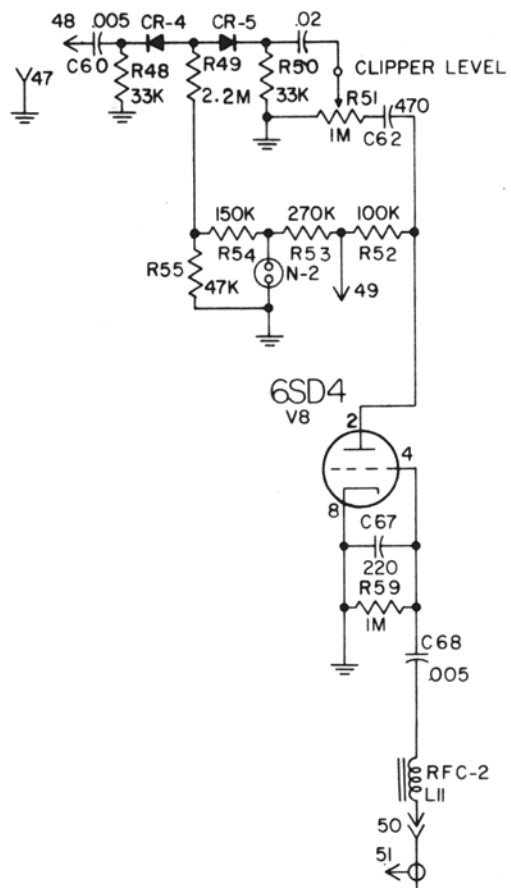
AUDIO UNIT

# TRANSMITTER SECTION

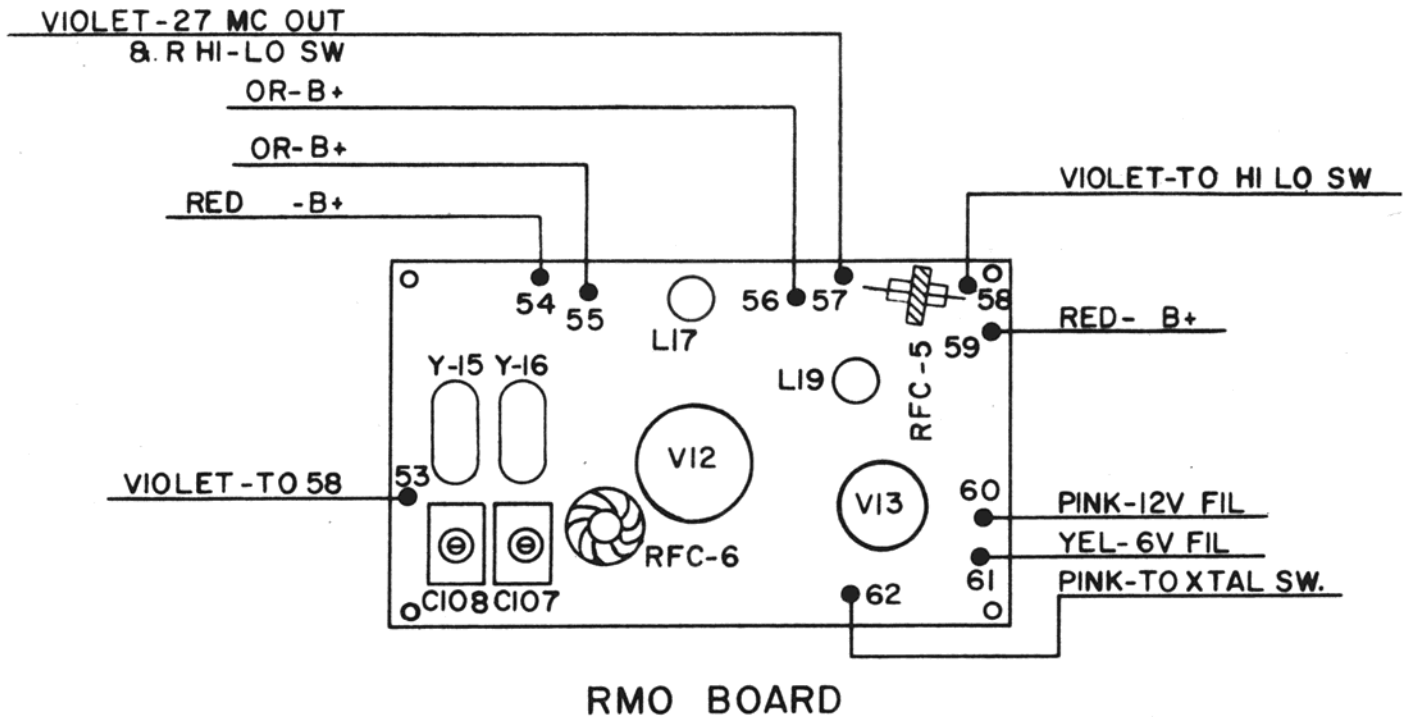
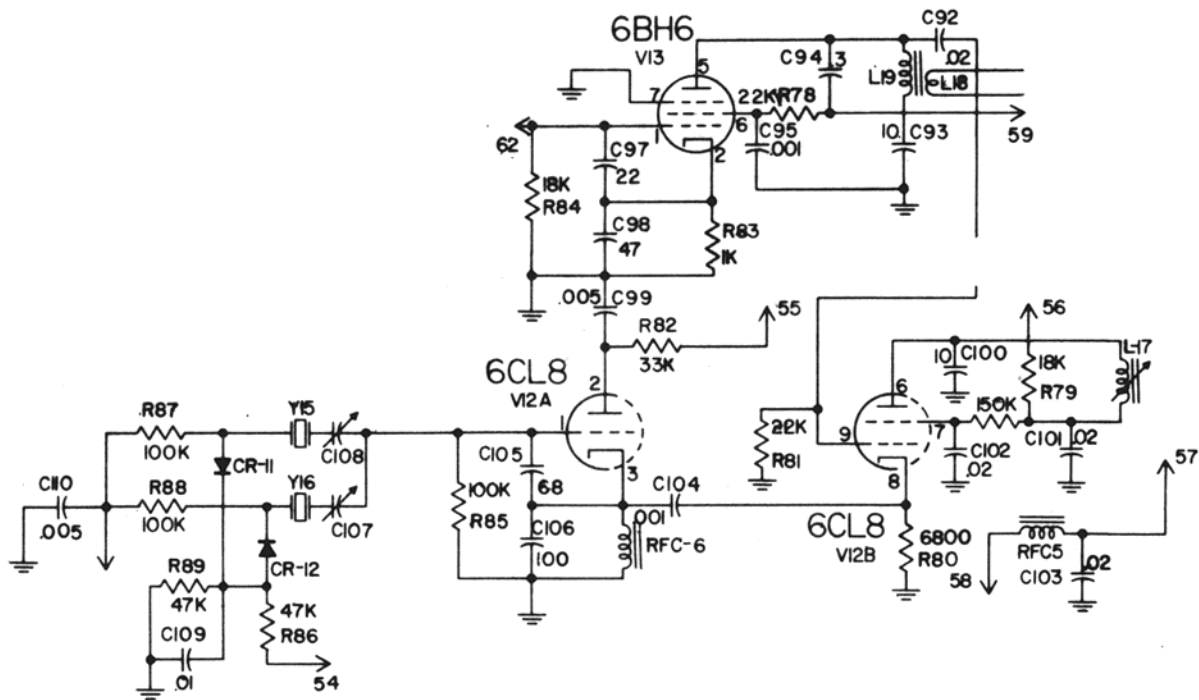


# POWER SUPPLY SECTION

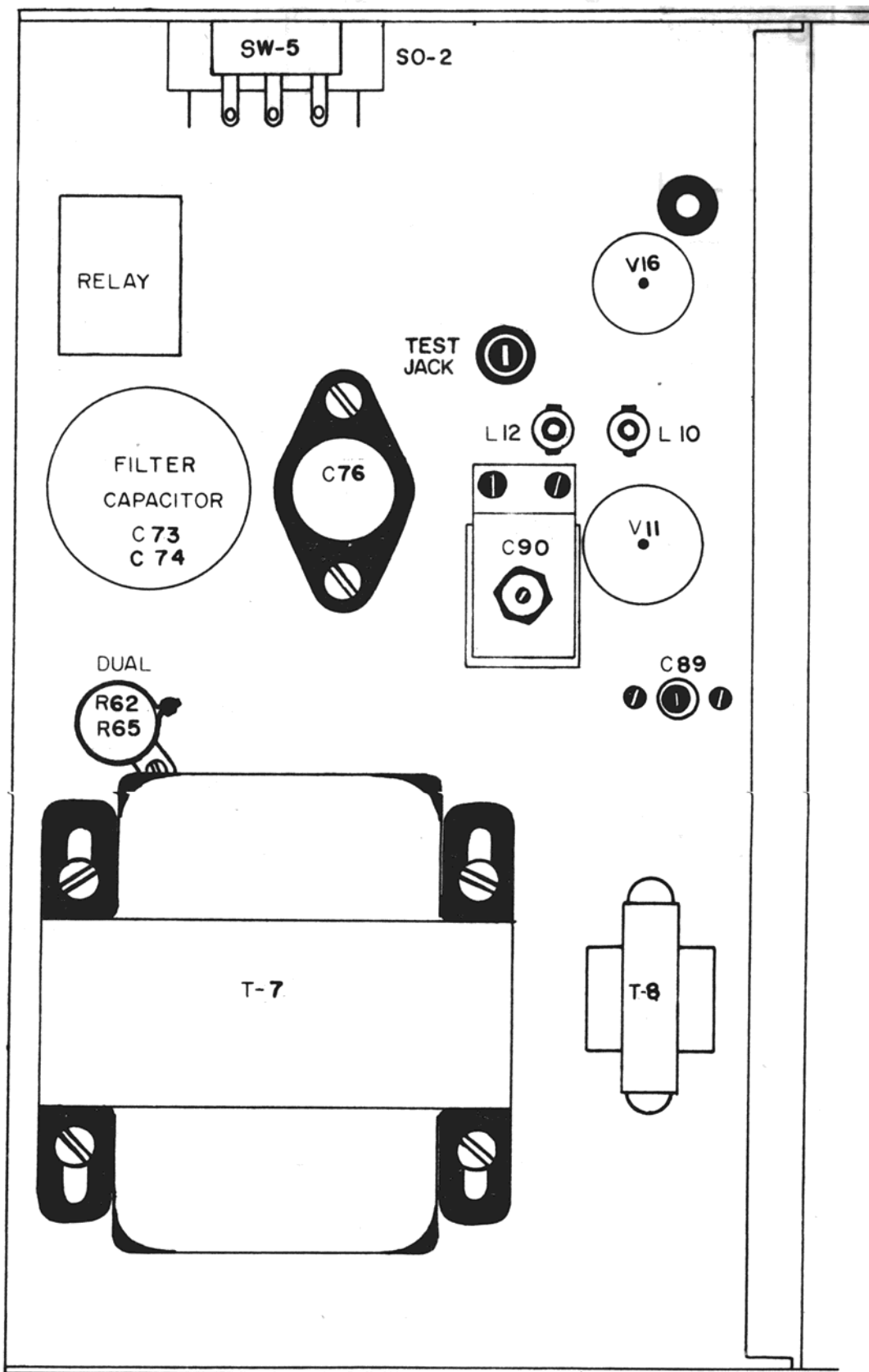




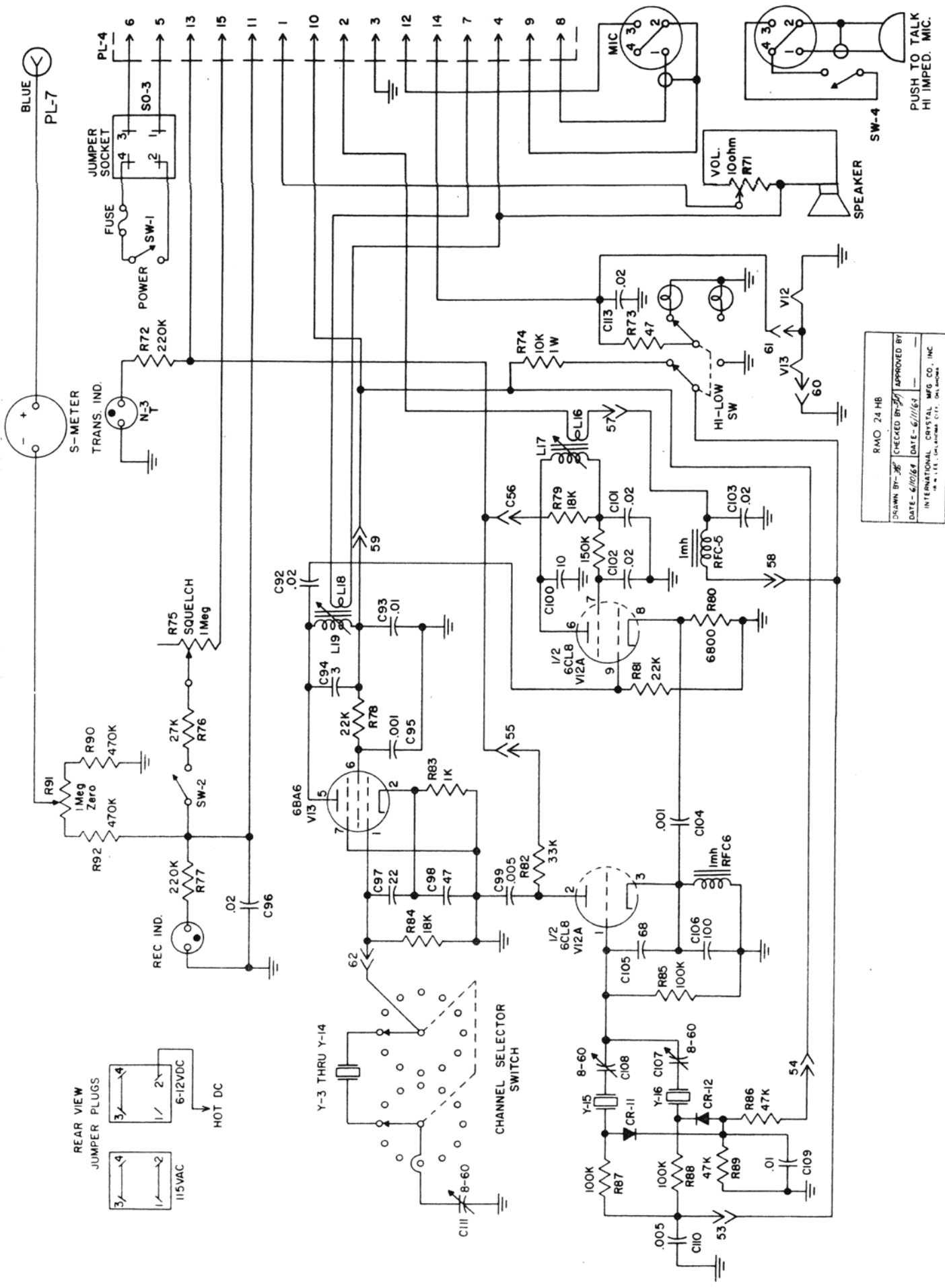
CLIPPER UNIT



FRONT PANEL



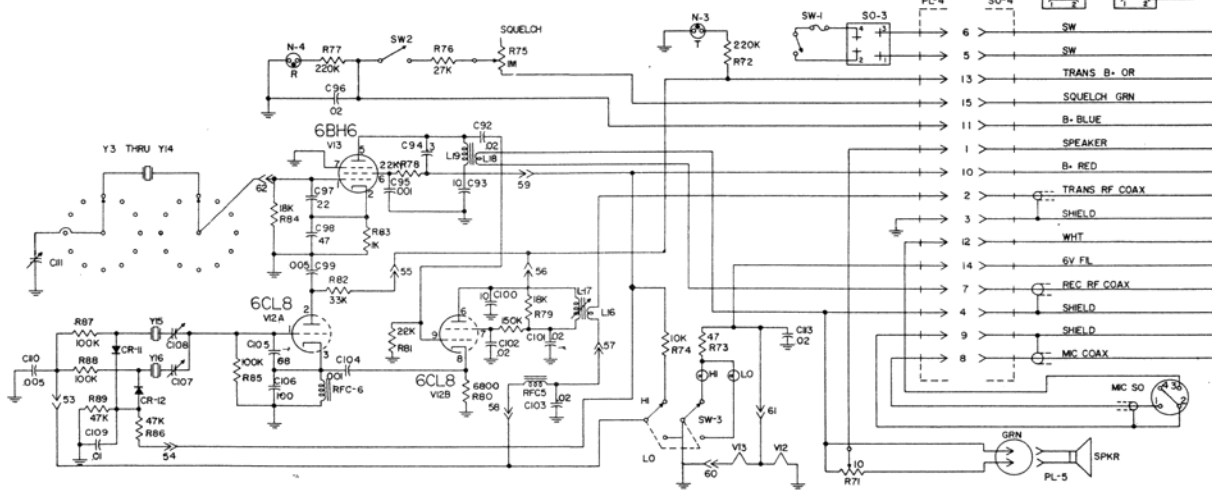
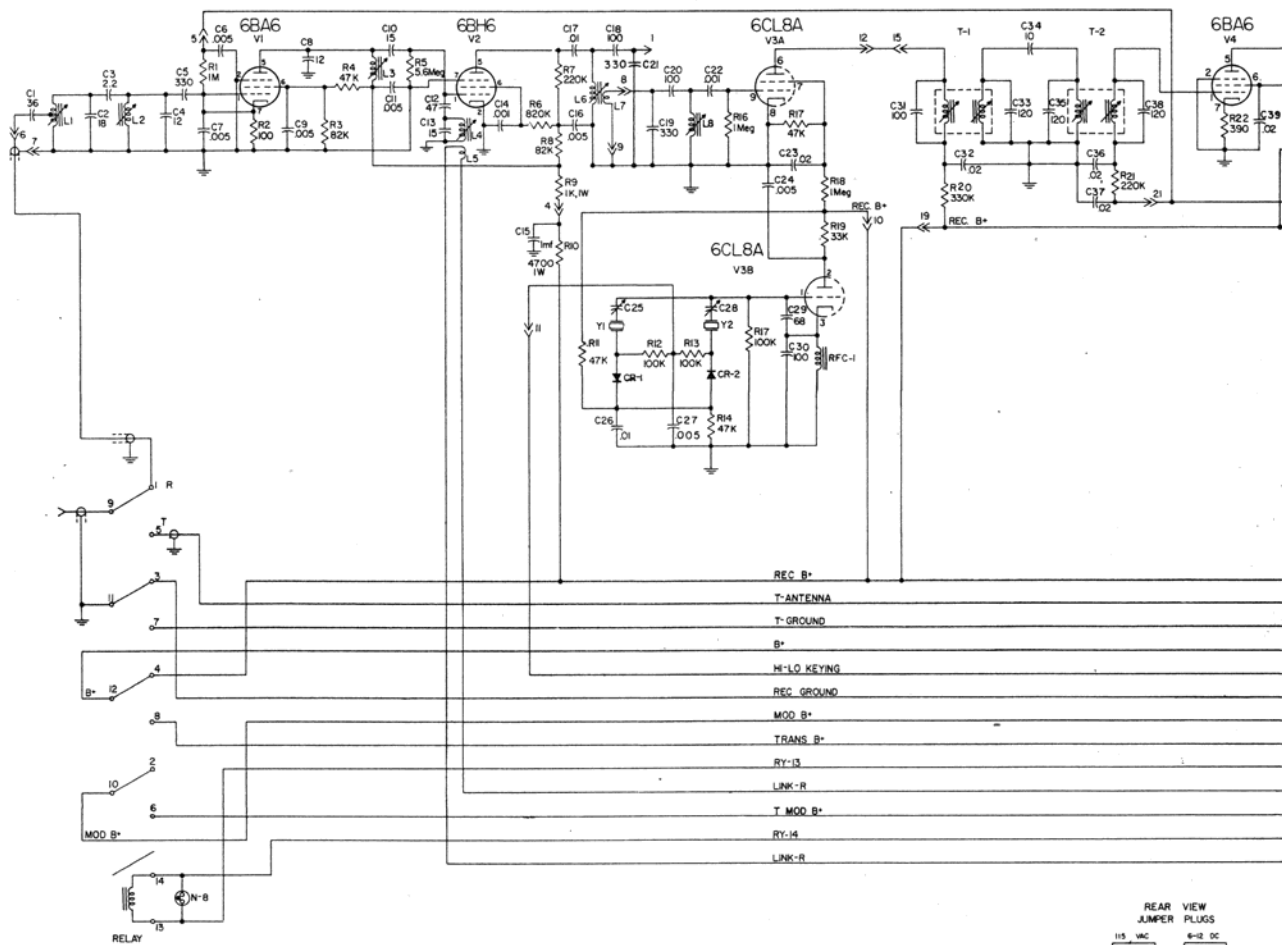
TOP VIEW

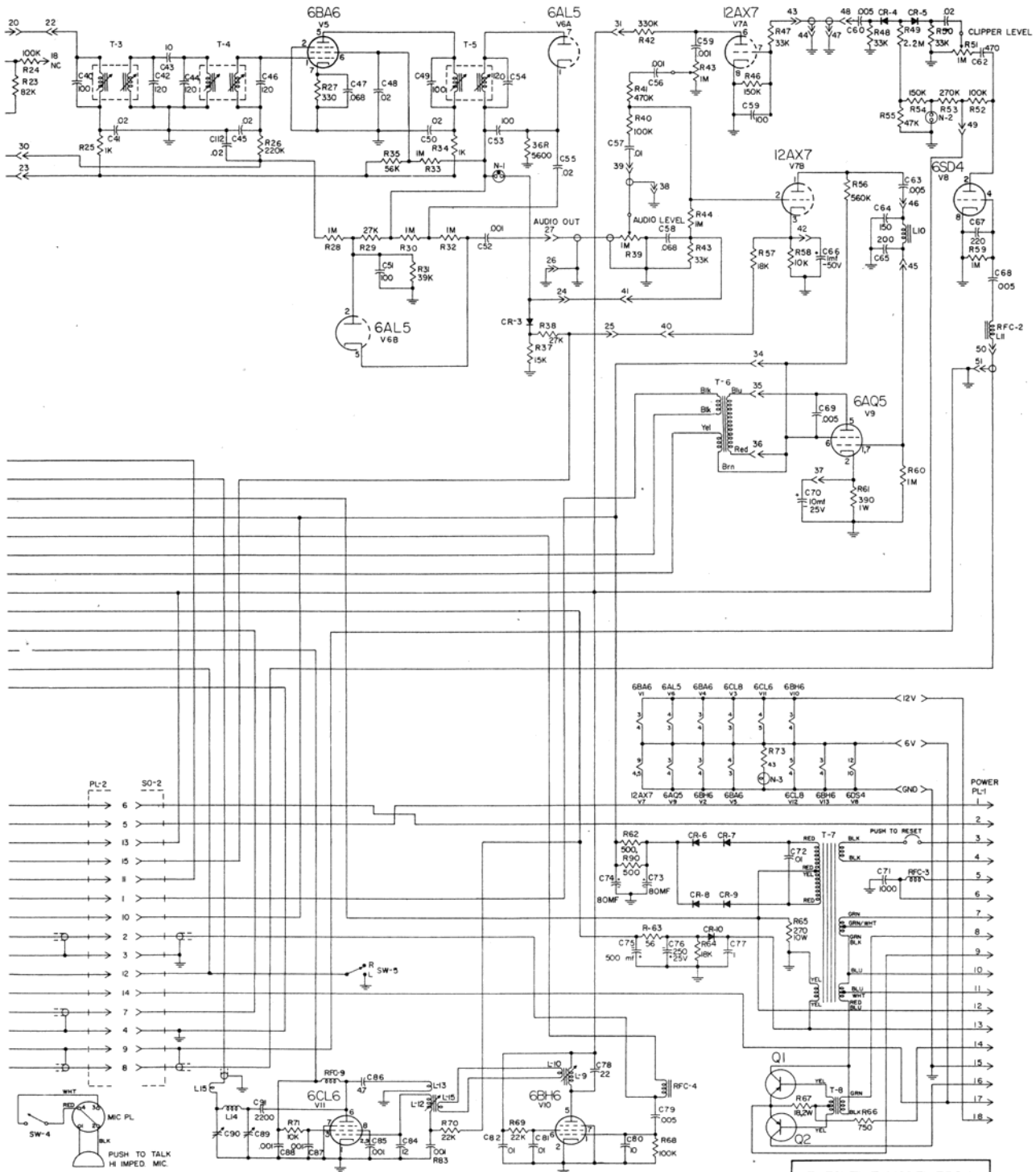


DRAWN BY: <i>JG</i>	CHECKED BY: <i>JG</i>	APPROVED BY:
DATE: 6/10/64	DATE: 6/11/64	
INTERNATIONAL CRYSTAL MFG. CO. INC.		
18 W. 115th St., Hicksville, N.Y., U.S.A.		

RMO 24 HB

PUSH TO TALK  
HI IMPED. MIC.





**EXECUTIVE MODEL 750-H**

DRAWN BY: <i>SP</i>	CHECKED BY: <i>de</i>
DATE: 10/50	DATE: 10/52
INTERNATIONAL CRYSTAL MFG. CO., INC.	
18 N. LEE, OKLAHOMA CITY, OKLAHOMA	



## WARRANTY

International Crystal Manufacturing Company warrants the parts and tubes in any International Citizen Transceiver to be free from defects in workmanship and material arising from normal usage. Its obligation under this warranty is limited to replacing any such parts or tubes of the receiver which, after regular installation and under normal usage and service, shall be returned within ninety (90) days from the date of original purchase of the set to the authorized dealer from whom the purchase was made and which shall be found to have been thus defective in accordance with the policies established by International Crystal Manufacturing Company.

The obligation of International Crystal Manufacturing Company is limited to making replacement parts available to the purchaser, and does not include either the making or the furnishing of any labor in connection with the installation of such replacement parts nor does it include responsibility for any transportation expense.

International Crystal Manufacturing Company assumes no liability and shall not be liable in any respect for failure to perform or delay in performing its obligations with respect to the above warranty if such failure or delay results, directly or indirectly, from any preference, priority or allocation order issued by the Government or because of any other act of the Government, or by war, conditions of war, inadequate transportation facilities, conditions of weather, acts of God, strikes, lockouts, Governmental controls, or International reasonable requirements for manufacturing purposes, or any cause beyond its control or occurring without its fault, whether the same kind or not.

## CONDITIONS AND EXCLUSIONS

This warranty is expressly in lieu of all other agreements and warranties expressed or implied, and International Crystal does not authorize any person to assume for it the obligations contained in this warranty and neither assumes nor authorized any representative or other person to assume for it any other liability in connection with such International units or parts or tubes thereof.

The warranty herein extends only to the original consumer purchaser and is not assignable or transferable and shall not apply to any transceiver or parts or tubes thereof which have been repaired or replaced by anyone else other than an authorized International dealer, service contractor or distributor, or which have been subject to alteration, misuse, negligence or accident, or to the parts or tubes of any receiver which have had the serial number or name altered, defaced or removed.

International Crystal Manufacturing Company is under no obligation to extend this warranty to any unit for which an International registration card has not been completed and mailed to the Company within fifteen (15) days after date of purchase.

UNAUTHORIZED PRACTICES IN BUSINESS AND CITIZENS RADIO SERVICES

An increasing number of reports have reached the Commission concerning the practice of some suppliers of Business and Citizens Radio Services equipment to advise their customers that such equipment may be operated by them prior to the issuance of a radio station license by the Commission. In some instances, sellers have "assigned" radio station call signs to purchasers in conjunction with the sale of radio apparatus and, in a few such cases, these call signs have been identical with those authorized to be used by the manufacturer or seller of the equipment.

A radio station license is required for the use or operation of a radio station in the Business and Citizens Radio Services by Section 301 of the Communications Act. With the exception of certain low power equipment described in Part 15 of the Commission's Rules, the operation of any radio transmission apparatus by a person other than the one to whom the Commission has issued a radio station license is illegal and may result in the imposition of severe criminal sanctions (one year in prison or \$10,000 fine, or both) or in the institution of other enforcement action by the Commission.

Under Section 310 (b) of the Communications Act, the prior consent of the Commission is required for the transfer or assignment of any radio station license or the rights granted thereunder. One who fails to observe this provision by the purported transfer of his operating authority subjects himself to possible license revocation and such other enforcement action as the Commission may consider warranted by the circumstances. The denomination of such unlawful activities as "equipment demonstrations" does not render them less illicit.

This matter is being brought to the attention of manufacturers, distributors and retail vendors of Business and Citizens Radio Service communication equipment in the belief that they share the Commission's conviction that the orderly development of these dynamic special radio services is hampered by the above-described practices and that one who engages in such practices, in addition to the possibility of having drastic enforcement action instituted against him, may be sacrificing for the benefit of an immediate sale the long range good will of a misadvised customer.

It is requested that the foregoing be brought to the attention of the personnel in all organizations concerned in any way with the sale, maintenance or use of Business or Citizens Radio Stations in order that a prompt cessation of unlicensed operation of radio stations in these services may be brought about.

## F.C.C. RULES & REGULATIONS

### PART 95.72 POSTING OF STATION LICENSE

- (b) The current authorization of each citizens radio station operated as a mobile station or operated at temporary locations may be retained in the permanent records of the station and need not be posted; However, an executed Transmitter Identification Card (FCC Form 452-C, Revised) shall be affixed to each transmitter which is operated as a mobile station or is operated at temporary locations, and to the control equipment of each such transmitter in every case where such transmitter is not in view from the location from which the station is controlled.
  
- (c) The following information shall be entered on each Transmitter Identification Card (FCC Form 452-C, Revised) which is used for transmitter or station identification in accordance with the foregoing:
  - (1) Name of the station licensee;
  - (2) Station call sign assigned by the Commission (see 95.62);
  - (3) Exact location or locations of the permanent station records;
  - (4) Frequency or frequencies upon which the associated transmitter is adjusted to operate; and
  - (5) Signature of the licensee.