

This Manual is provided by
CBTricks.com

Someone who wanted to help you repair your equipment
scanned this manual.

If you would like to help us put more manuals online support us.

Supporters of CBTricks.com paid for the hosting so you would have this file.

CBTricks.com is a non-commercial personal website was created to help promote the exchange of service, modification, technically oriented information, and historical information aimed at the Citizens Band, GMRS (CB "A" Band), MURS, Amateur Radios and RF Amps.

CBTricks.com is not sponsored by or connected to any Retailer, Radio, Antenna Manufacturer or Amp Manufacturer, or affiliated with any site links shown in the links database. The use of product or company names on my web site is not endorsement of that product or company.

If your company would like to provide technical information to be featured on this site I will put up on the site as long as I can do it in a non-commercial way.

The site is supported with donation from users, friends and selling of the Galaxy Service Manual CD to cover some of the costs of having this website on the Internet instead of relying on banner ads, pop-up ads, commercial links, etc. to pay my costs. Thus I do not accept advertising banners or pop-up/pop-under advertising or other marketing/sales links or gimmicks on my website.

ALL the money from donations is used for CBTricks.com I didn't do all the work to make money (I have a day job). This work was not done for someone else to make money also, for example the ebay CD sellers.

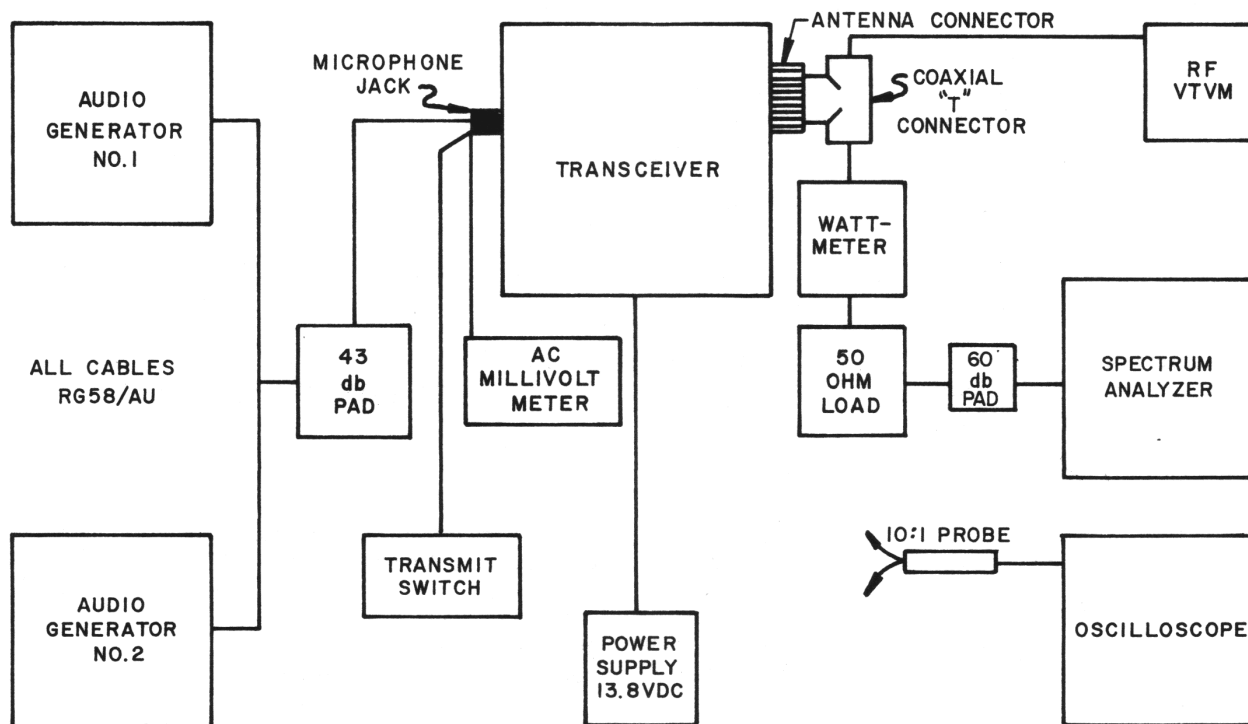
All Trademarks, Logos, and Brand Names are the property of their respective owners.
This information is not provided by, or affiliated in any way with any radio or antenna Manufacturers.
Thank you for any support you can give.

- D. Adjust the transceiver VOLUME control to obtain 3.0 volts (10 db) on the AC VTVM.
 - E. Decrease the signal generator output to obtain 1.0 volt (0 db) on the AC VTVM. The signal generator output voltage should be approximately 3.0 microvolts (16 db).
8. AM AUDIO OUTPUT
- A. Adjust the signal generator output to 1000 microvolts (66 db) and the transceiver VOLUME control to maximum (CW). The audio output should be 6.8 volts or more.
9. AM S-METER
- A. Set the transceiver Meter switch to S/RF position. Adjust the signal generator voltage output to obtain a reading on the S-Meter of S-9.
 - B. The generator output should be 150 to 325 microvolts (50 +6/-0 db).

TRANSMITTER SECTION ADJUSTMENTS

WARNING

PERSONNEL POSSESSING A FIRST OR SECOND CLASS RADIO TELEPHONE OPERATOR'S LICENSE ONLY ARE ALLOWED TO PERFORM ADJUSTMENTS IN THE TRANSMITTING SECTION OF THIS TRANSCEIVER.



TEST EQUIPMENT SETUP

1. RF SECTION ALIGNMENT

A. Turn the transceiver POWER switch to the OFF position. Remove the TOP cover of the transceiver ONLY for the following tests. Connect the transceiver to the test equipment as shown in the diagram above.

B. Set the transceiver front panel controls as follows:

CLARIFIER	to	Center position
PA/CB	to	CB
CHANNEL	to	13
POWER	to	ON
MODE	to	AM

C. Adjust the oscilloscope vertical gain to 0.5 volts/cm and the horizontal sweep to 0.2 microseconds/cm. Turn both audio signal generator outputs to Zero (assure that the carrier is not being modulated). Turn the TEST TRANSMIT switch ON.

D. Adjust T18, T19, T20, T21, L12, L14 and CT20 for maximum power output as observed on the RF wattmeter. Repeat this adjustment several times to obtain the absolute maximum power output.

E. The UNMODULATED POWER OUTPUT should be 3 to 4 watts. Turn the POWER OFF. If the output is greater than 4 watts, adjust VR17 to obtain 4 watts MAXIMUM.

2. SSB MODE ADJUSTMENT

A. Set the MODE switch to the LSB position. Turn the transmit switch ON.

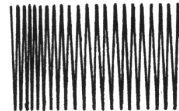
B. Adjust the frequency of audio generator No. 1 to 900 Hz and generator No. 2 to 1900 Hz. Set the output of both generators to Zero.

C. Connect the oscilloscope probe to the center conductor of the antenna connector (from inside the chassis). Adjust the vertical gain to 0.5 volts/cm, and the horizontal sweep to 0.2 milliseconds/cm.

D. Observe the oscilloscope wave pattern shown below and if necessary, adjust VR13 and CT19 alternately, to improve carrier suppression.



CORRECT ADJUSTMENT



INCORRECT ADJUSTMENT

E. Adjust the output voltage of audio generator No. 1 (900 Hz) to produce the carrier wave pattern on the oscilloscope. Increase the output until the full amplitude is reached without limiting (780 mV at the input of the 43 db pad).

F. Adjust the output of audio generator No. 2 (1900 Hz) to obtain 100% modulation of the carrier (780 mV at the input of the 43 db pad).

NOTE: Adjust the outputs of both generators alternately very carefully to obtain the 100% modulated pattern shown below:



(LESS THAN 100% MODULATION)



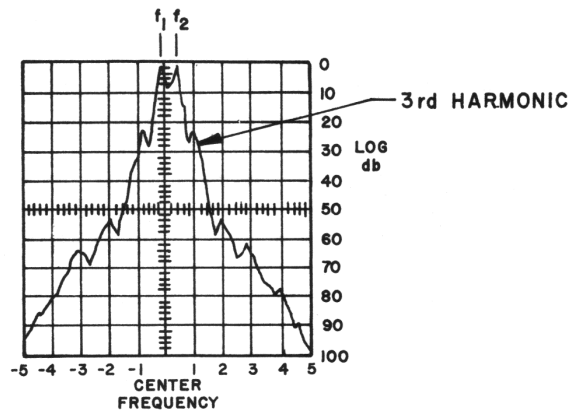
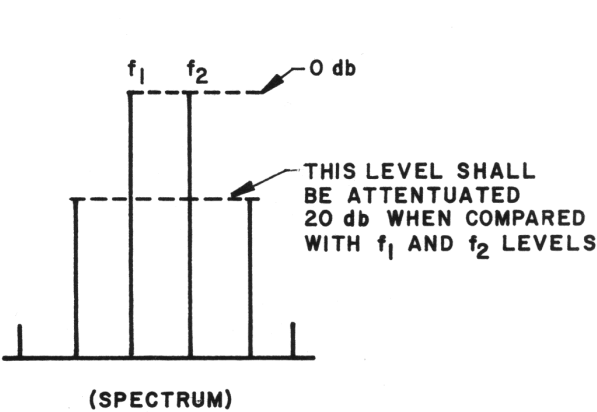
(100% MODULATION)



(MORE THAN 100% MODULATION)

G. To obtain the maximum amplitude of a symmetrical wave pattern as above, it may be necessary to adjust L15. Observe the reading on the RF voltmeter, which should be approximately 23 volts RMS. If this voltage is not achieved, readjustment of T18, T19, T20, T21 and L12 may be necessary. If these readjustments are required, recheck the AM power output as in step 1.E.

H. Observe the spectrum analyzer for harmonic distortion. The third harmonic should be -20 db from the carrier as shown in the diagram below:

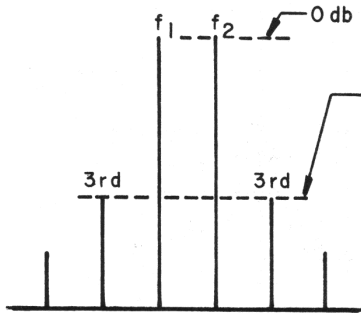


I. Set the MODE switch to the USB position. Adjust the output of each audio generator to 2.5 mV to obtain 5 mV on the millivolt meter at the microphone jack.

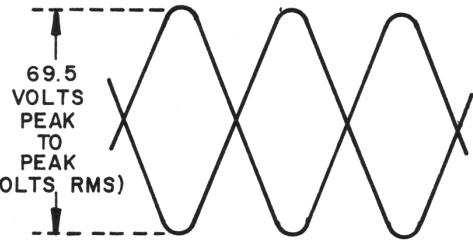
J. Adjust VR15 (MIC GAIN ADJUST) to obtain 24.5 volts RMS on the RF voltmeter.

K. Observe the following wave forms and patterns on the oscilloscope and the spectrum analyzer for correct adjustment of VR15, VR¹4, VR13 and CT19.

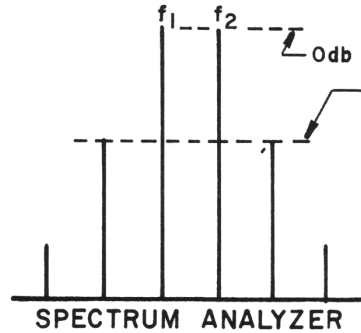
L. Adjust VR18 to obtain a symmetrical wave pattern as shown below.



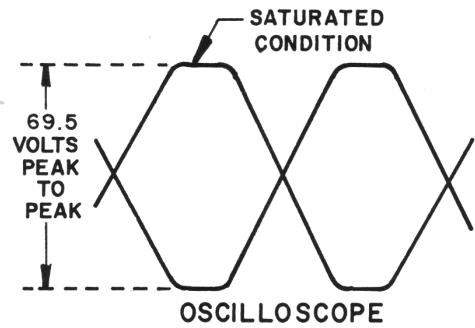
THIS LEVEL SHALL BE ATTENUATED BY 20 db OR MORE WHEN COMPARED WITH f_1 AND f_2 LEVELS.



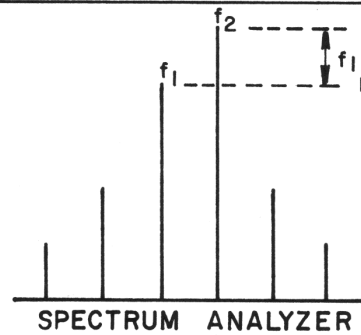
NORMAL SPECTRUM ANALYZER AND OSCILLOSCOPE WAVE PATTERNS



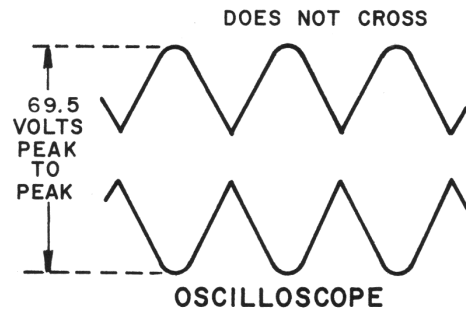
THIS LEVEL HAS NOT BEEN ATTENUATED BY 20 db WHEN COMPARED WITH f_1 AND f_2 LEVELS.



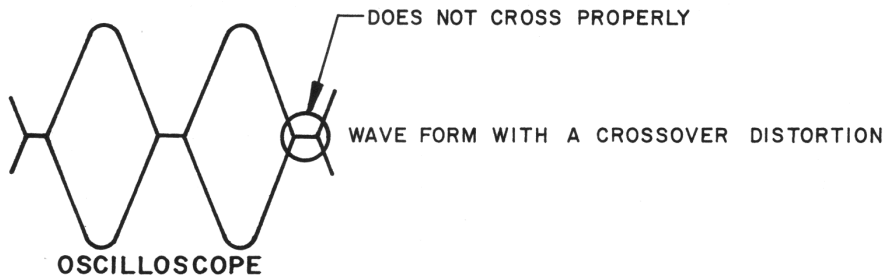
INCORRECT ADJUSTMENT OF VR15



f_1 AND f_2 LEVELS DIFFER



AUDIO GENERATOR OUTPUTS ARE NOT EQUAL



VR18 INCORRECTLY ADJUSTED

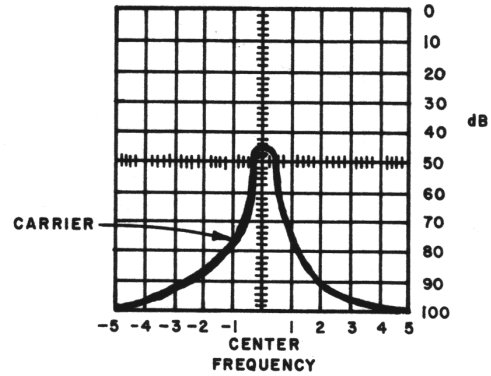
3. SSB POWER OUTPUT MEASUREMENTS

A. After the SSB Mode Adjustments have been made, the Peak Envelope Power (PEP) may be calculated from the following formula:

$$PEP = \frac{E^2}{Z} = \frac{(\text{RMS Voltmeter reading})^2}{\text{Antenna Output Impedance}} = \frac{24.5 \times 24.5}{50} = 12.00 \text{ watts}$$

4. SSB CARRIER SUPPRESSION MEASUREMENT

- A. Set the audio signal generator output to zero.
- B. Adjust VR13 and CT19 to obtain a CARRIER of -40 db as shown on the spectrum analyzer diagram.



5. AM MODE POWER OUTPUT MEASUREMENTS

- A. Turn both audio generator output voltages to zero. Set the channel switch to AM.
- B. Turn the transmit switch to ON and read the AM unmodulated power output on the RF wattmeter. Reading should be 3+ watts.
- C. Adjust audio generator No. 1 output to obtain a 100% modulated wave pattern, without limiting, on the oscilloscope, and read the power output on the RF wattmeter. Reading should be 3.5 to 4 watts.

6. METER ADJUSTMENTS

- A. While observing the AM power output in 5.C above, adjust VR20 to make the meter needle indicate the same power output as indicated on the RF wattmeter.
- B. Turn both audio generator outputs to zero. Set the mode switch to USB.
- C. Turn the transmit switch ON and adjust the output of audio generator No. 1 to obtain the full carrier wave pattern on the oscilloscope, without limiting or saturation.
- D. Read the RF power output on the wattmeter; it should be approximately 3 watts.
- E. Set the meter switch to S/RF position. Transceiver meter RF Power scale should read more than 5 watts.

7. TVI TRAP ADJUSTMENT (2nd harmonic suppression)

Measure the 2nd harmonic (54 MHz) suppression on the spectrum analyzer. Adjust the TVI Trap to obtain -50 db down or more, from the carrier frequency.

TRANSMITTER PERFORMANCE TESTS

After Service has been performed on the transmitter section of the transceiver, the following check-out procedure should be performed to assure the transmitter functions in compliance with the manufacturers specifications. The transceiver should be completely assembled (top and bottom covers attached) and connected to test equipment as indicated in the particular test.

1. FREQUENCY TOLERANCE MEASUREMENT

- A. Connect a regulated power supply to the transceiver and adjust to 13.8 VDC.
- B. Connect a coaxial T connector to the antenna connector. Connect the T connector to a 50 ohm non-inductive load and a frequency counter through a 60 db pad.
- C. Plug the microphone plug into the MIC jack and press the transmit switch; DO NOT talk into the microphone.
- D. Set the transceiver front panel controls as follows:

CHANNEL SELECTOR	to	1 through 23
MODE	to	AM
CLARIFIER	to	Center position
POWER	to	ON

- E. Measure the frequency transmitted by each of the following channels; frequency should be the assigned channel frequency ± 500 Hz.

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	26.965 MHz	13	27.115 MHz
5	27.015 "	17	27.165 "
9	27.065 "	21	27.215 "

F. Clarifier Frequency Range

- 1) Set the CLARIFIER to the center position and the channel selector to channel 13.
- 2) Press the transmit switch and record the frequency reading observed on the frequency counter. Should be 27.115 MHz ± 500 Hz.
- 3) Turn the CLARIFIER to the maximum (+) position. The frequency indicated on the counter should be 500 Hz ± 100 Hz higher than the frequency measured in step 2 above.
- 4) Turn the CLARIFIER to the minimum (-) position. The frequency indicated on the counter should be 500 Hz lower than the frequency measured in step 2 above.
- 5) The difference between the frequencies measured in steps 3 and 4 should be within 100 Hz.
- 6) Perform the above measurements on channels 1, 5, 9, 17 and 21.

2. POWER OUTPUT MEASUREMENT (WITHOUT MODULATION)

- A. Connect a 50 ohm RF wattmeter to the antenna connector. Set the front panel controls as in 1.D.
- B. Press the transmit switch, DO NOT talk into the microphone and read the power output on the RF wattmeter. Should be approximately 3+ watts.
- C. Change the MODE switch to the USB position. Press the transmit switch; DO NOT talk into the microphone. The reading on the wattmeter should not be greater than 1 milliwatt (-40 db). (See page 29, item 4)
- D. Change the MODE switch to the LSB position. Press the transmit switch; DO NOT talk into the microphone. The reading on the wattmeter should not be greater than 1 milliwatt (-40 db).

3. POWER OUTPUT MEASUREMENT (WITH MODULATION)

- A. Connect an audio signal generator and a simulated transmit switch to the MIC jack. Connect a coaxial "T" connector to the antenna connector.
- B. Connect an oscilloscope through a 10:1 probe to the "T" connector and a 50 ohm RF wattmeter. Set the transceiver MODE switch to AM.
- C. Adjust the audio generator frequency to 1 KHz and the output to zero. Adjust the oscilloscope vertical gain to 0.5 volts/cm and the sweep to 0.2 mS/cm.
- D. Turn the transmit switch ON and observe on the oscilloscope the transmitted carrier wave pattern. Adjust the audio generator output to obtain 100% symmetrically modulated pattern on the oscilloscope. (See page 27)
- E. The power output wattage should be between 3.5 and 4 watts.

4. SSB POWER OUTPUT MEASUREMENT

- A. Connect the audio generator as in 3A above. Set the MODE switch to USB, and the signal generator frequency to 27.116 MHz.
- B. Turn the transmit switch ON and observe that there is NO RF pattern on the oscilloscope.
- C. Adjust the generator output to obtain the full amplitude of the RF carrier without limiting.
- D. The audio generator output voltage should be approximately 5 mV.
- E. Set the MODE switch to LSB and change the signal generator frequency to 27.114 MHz. Turn the audio generator output to zero and observe that there is NO RF wave pattern on the oscilloscope.
- F. Increase the audio generator output to obtain the full RF carrier amplitude on the oscilloscope, without limiting.
- G. The audio generator output voltage should be approximately 5 mV.

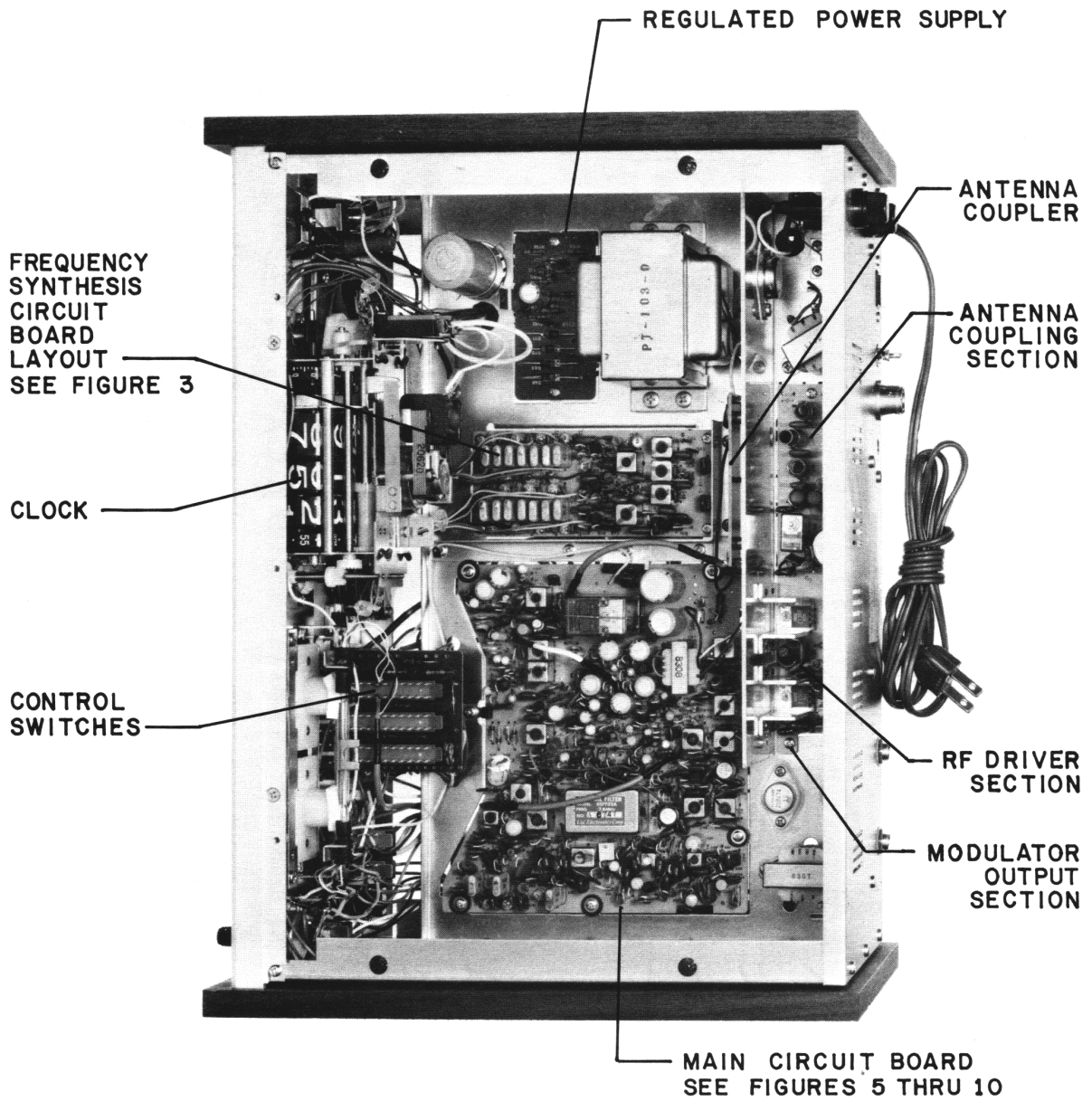


FIGURE 4, MAJOR COMPONENTS, TOP VIEW

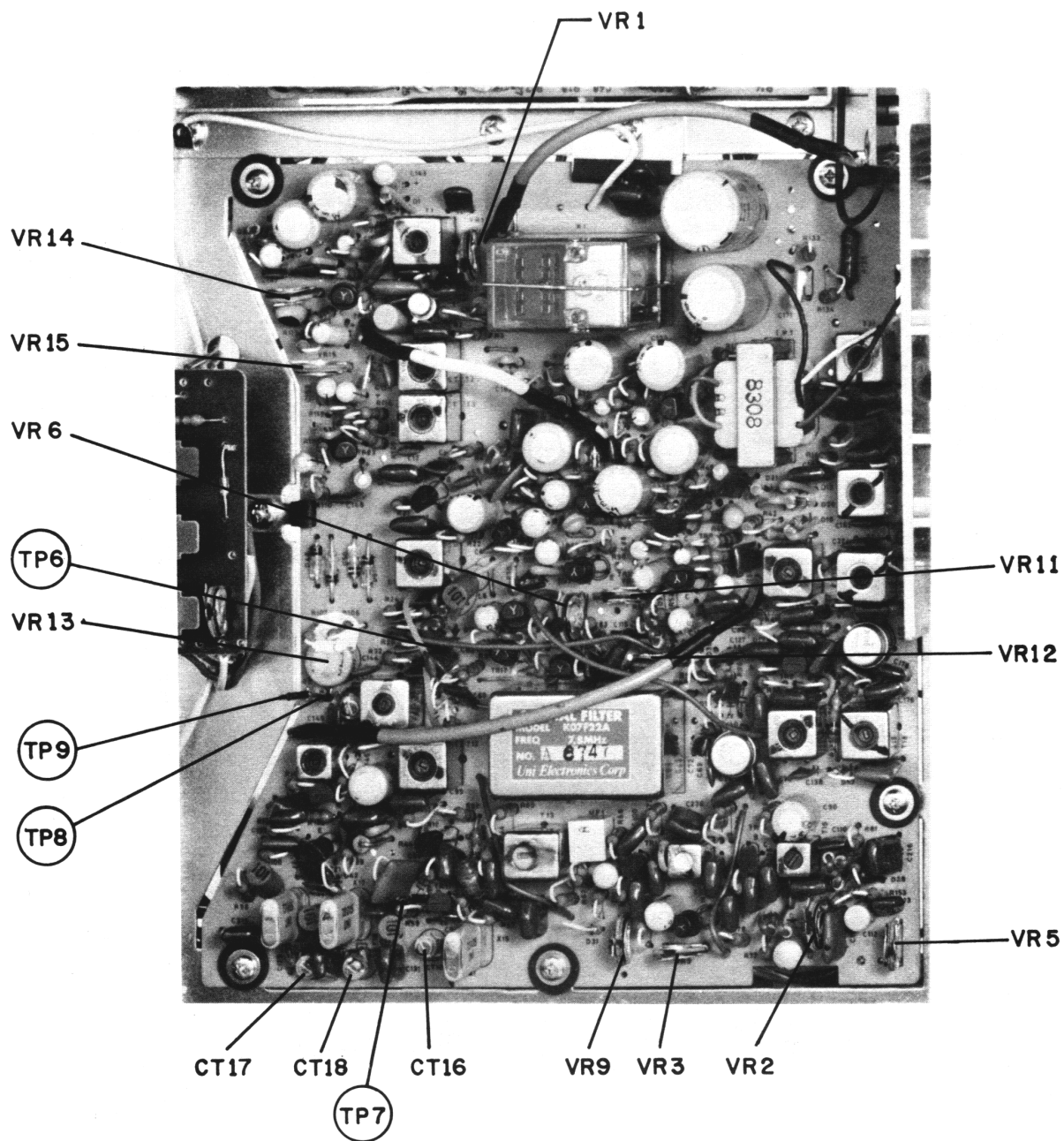


FIGURE 5, INTERNAL POTENTIOMETERS AND TEST POINTS LOCATION DIAGRAM

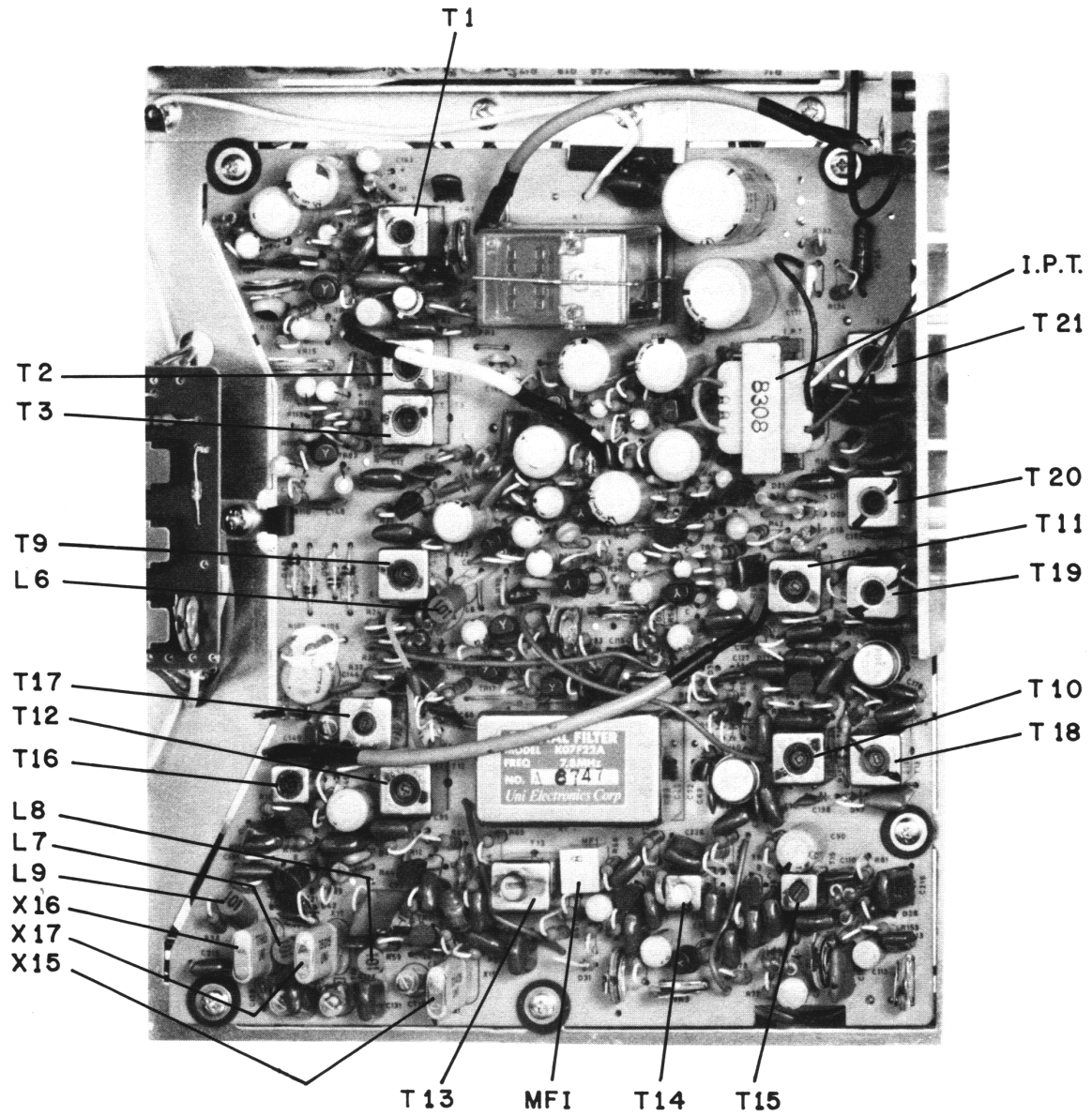


FIGURE 6, RF COILS, TRANSFORMER, AND CRYSTALS LOCATION DIAGRAM

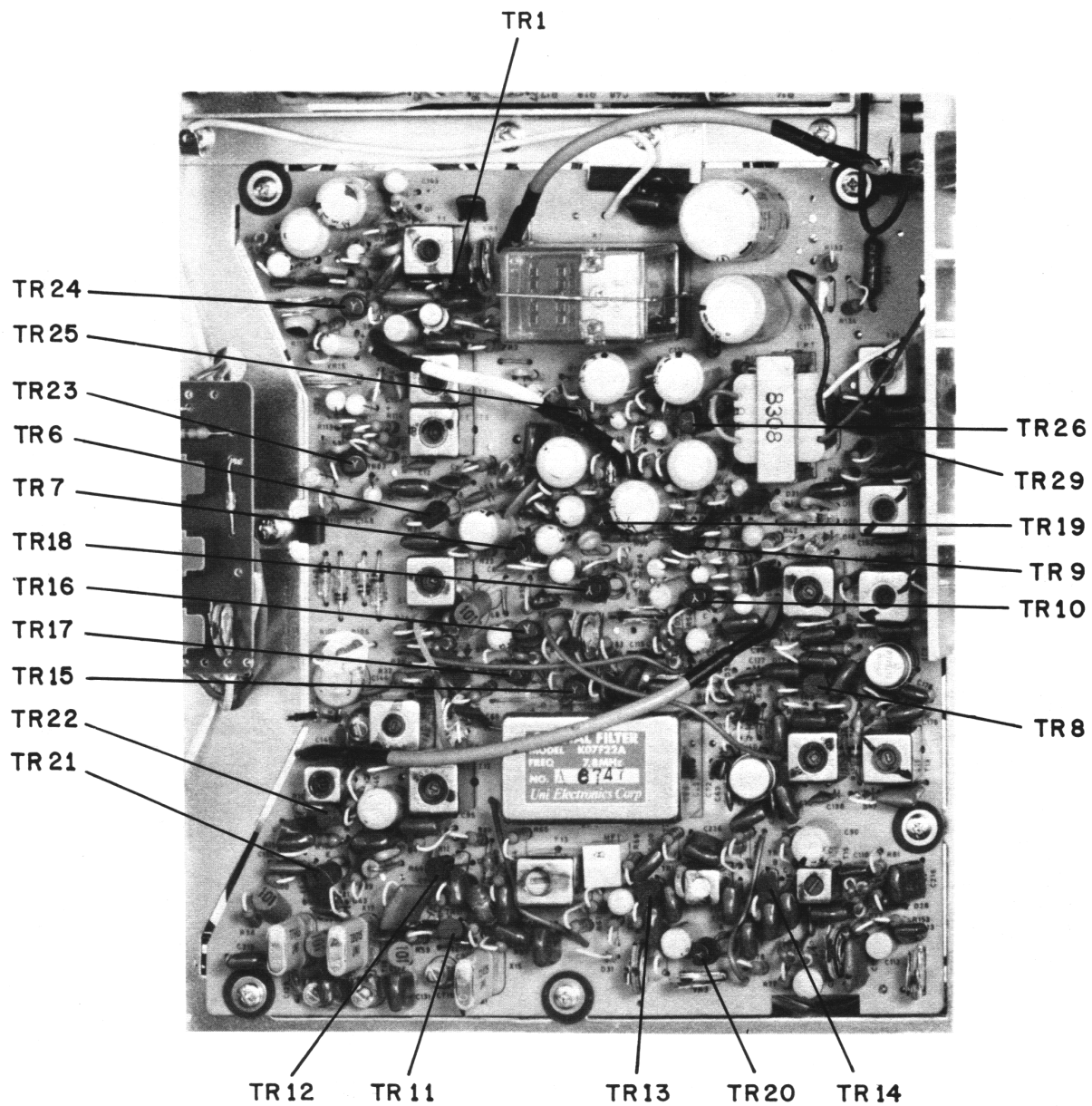


FIGURE 7, TRANSISTORS
LOCATION DIAGRAM