ALIGNMENT

EXCITER

Refer to Figure 3 for component locations. Refer to Figure 6 for equipment needed and setup diagram. Select “EXCITER” from the “TEST” menu in the repeater software.

Pretest

1. Set TCXO modulation adjust RV101 fully counterclockwise.

2. Connect the power meter to J402.

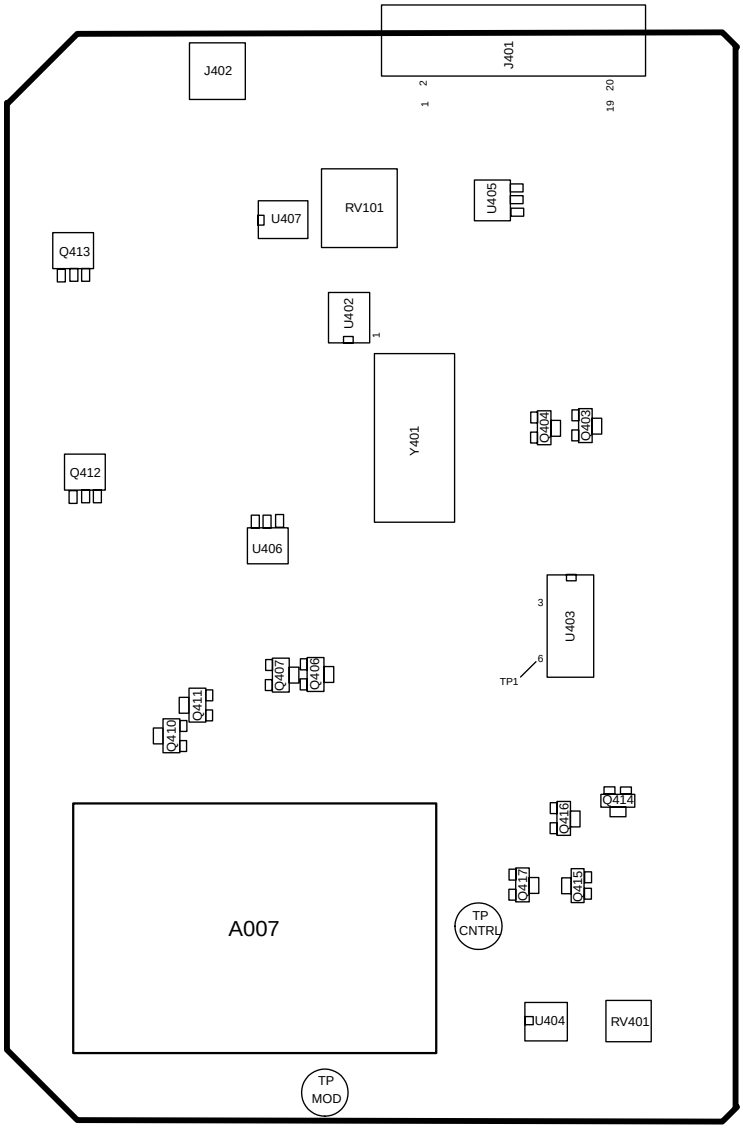

Figure 3 EXCITER ALIGNMENT POINTS DIAGRAM

Voltage Measurements

Apply power to the Exciter by plugging the 20-pin cable from the RF Interface Board into J401.

Measure the voltages at the following pins.

U406, pin 1 +12V DC 0.4V
U405, pin 1 +5V DC 0.3V
U402, pin 1 +3.5V DC 0.1V
U404, pin 7 +3.5V DC 0.1V

PROGRAM TUNE-UP CHANNEL

1. For Exciters operating between: 138-144 MHz or 154-172 MHz.

   a. Using the PC and software, program the Synthesizer for the Transmit frequency.

   b. Press the space bar to key the Exciter.

   c. Tune the VCO capacitor L102 for +4.5V DC 0.05V at TP1 (U403, pin 6).
   Increase the transmit frequency by 3 MHz. The voltage on TP1 shall be less than 7.5V.
   Decrease the transmit frequency by 3 MHz. The voltage on TP1 shall be greater than 2V.

   d. Measure the Power Output of the Exciter at J402. Reading should be > +18 dBm.

   e. Press the space bar to unkey the Exciter.

2. For Transmitters operating within 6 MHz of the top of the transmit band (144-150 or 172-178 MHz).

   a. Program the Synthesizer for the *Highest* transmit frequency (i.e. 150 or 178 MHz).

   b. Press the space bar to key the Exciter.

   c. Set the control line voltage for 7.5V at TP1. Check 6 MHz *below* the programmed frequency (i.e. 144 or 172 MHz) to verify that the control voltage at TP1 is *greater than* 2V.
   The repeater Exciter can now be programmed for the desired operating frequency.

   d. Press the space bar to unkey the Exciter.

5. For Transmitters operating within 6 MHz of the bottom of the transmit band (132-138 or 150-156 MHz).

   a. Program the Synthesizer for the *Lowest* transmit frequency (i.e. 132 or 150 MHz).

   b. Set the control line voltage for 2V at TP1.
   Check 6 MHz *above* the programmed frequency (i.e. 138 or 156 MHz) to verify that the control voltage at TP1 is *less than* 7.5V.
   The repeater Exciter can now be programmed for the desired operating frequency.

VCO TEST

1. The software programs the synthesizer for 3 MHz above the Tune-Up frequency.
   Press the space bar to key the Exciter.
   The voltage on U403, pin 6 should be < 7V. Power output should be > +18 dBm.
   Press the space bar to unkey the Exciter.

2. The software programs the synthesizer for 3 MHz below the Tune-Up frequency.
   Press the space bar to key the Exciter.
   The voltage on U403, pin 6 should be > 2.5V. Power output should be > +18 dBm.
   Press the space bar to unkey the Exciter.

3. The software programs the synthesizer for the Transmit Channel.

TCXO FREQUENCY ADJUST

1. Connect a 10 dB pad and frequency counter to J402.

2. Press the space bar to key the Exciter.

3. Tune TCXO Y401 for the Transmit Channel Frequency, 50 Hz.

4. Press the space bar to unkey the Exciter.

TRANSMIT MODULATION ADJUST

1. Connect a 10 dB pad and modulation analyzer to J402.

2. Press the “FM” and “3 kHz LPF” switches of the modulation analyzer.

3. Inject a 1 kHz sine wave at 400 mV RMS into P100, pin 32 on the Main Audio Card (MAC).

4. Using the software adjust U207 with “Up/Dn” and "PgUp/PgDn" keys for 707 mV RMS on P100, pin 29.
   This waveform should be a “clean” sine wave.

5. Press the space bar to key the Exciter.

6. Set RV401 for 3 kHz deviation (25 kHz channels) or ±1.5 kHz deviation (12.5 kHz channels).

7. Press the space bar to unkey the Exciter.

8. Adjust R237 for a 2V P-P square wave on P100, pin 29.

9. Press the space bar to key the Exciter.

10. Set RV101 for “best” square wave as observed on the modulation analyzer output to the oscilloscope.

NOTE: Ensure that the oscilloscope is “DC” coupled and the Modulation Analyzer has the 3 kHz LPF switch set but NOT the 300 Hz HPF or 50 Hz HPF switches set.

11. Press the space bar to unkey the Exciter.

125W POWER AMPLIFIER ALIGNMENT

Refer to Figures 4 and 5 for component locations. Refer to Figure 7 for equipment needed and setup diagram. Select "PA" from the "TEST" menu in the Repeater Software.

DRIVER TUNING AND LIMIT ADJUSTMENTS

1. Connect an antenna or dummy load to the RF port (50 ohm impedance).

2. Connect the:
   Power supply ground lead to P105
   +15V DC lead to P103
   +26.5V DC lead to P101
   36-pin cable to J101 on the RFIB

3. Set the signal generator to +19 dBm ±0.1 dB. Connect the signal generator to WO513.

4. Press the space bar to key the PA.

5. Monitor the voltage on R45 on the RFIB and set R76 for 1.3V DC (see Figure 5).

POWER AMPLIFIER TUNING

Connect an antenna or dummy load to the RF port (50 ohm impedance). Use the carrier frequency needed.

1. Set RV501 on the PA fully counterclockwise.
   Set RV502 on the PA fully clockwise, see Figure 4.

2. Set Forward Power Adjust R611and Reflected Power Adjust R661 on the power detector board fully counter-clockwise (see Figure 4).

3. Monitor the voltage at R45 on the RFIB and set R76 for 1.3V DC (see Figure 5).
   This sets the current limit point for driver Q501 at hot temperatures.

4. Set each of the quiescent currents for Q502 and Q503 for 10 mA (DC) each.

5. Program the power output for the correct frequency range as follows:

   132-150 MHz 125W
   150-178 MHz 125W

6. Press the space bar to key the PA. Output power will be approximately 80W.

7. Monitor the output power and tune C601 and C602 for maximum output power, see Figure 4.

8. Set Forward Power Adjust RV601 for rated power (125W).

9. Press the space bar to unkey the PA.

10. Disconnect the antenna or dummy load from the RF port.

11. Press the space bar to key the PA. *NOTE: This will not harm the PA.*

12. Adjust Reverse Power Calibration Pot RV602 for equal voltages on W121 and W126 on the RFIB or for equal Forward and Reverse Power (see Figure 5).

13. Press the space bar to unkey the PA.

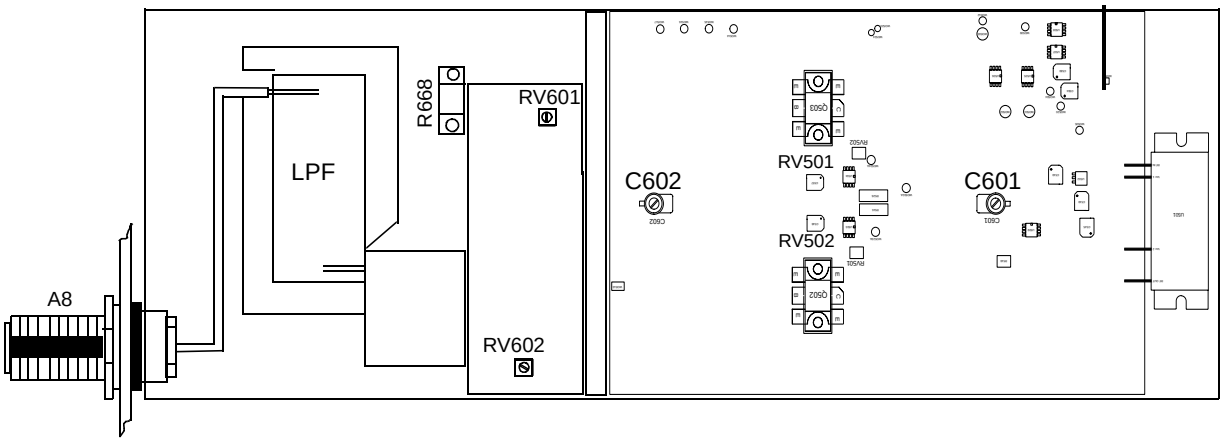

Figure 4 125W POWER AMPLIFIER ALIGNMENT POINTS

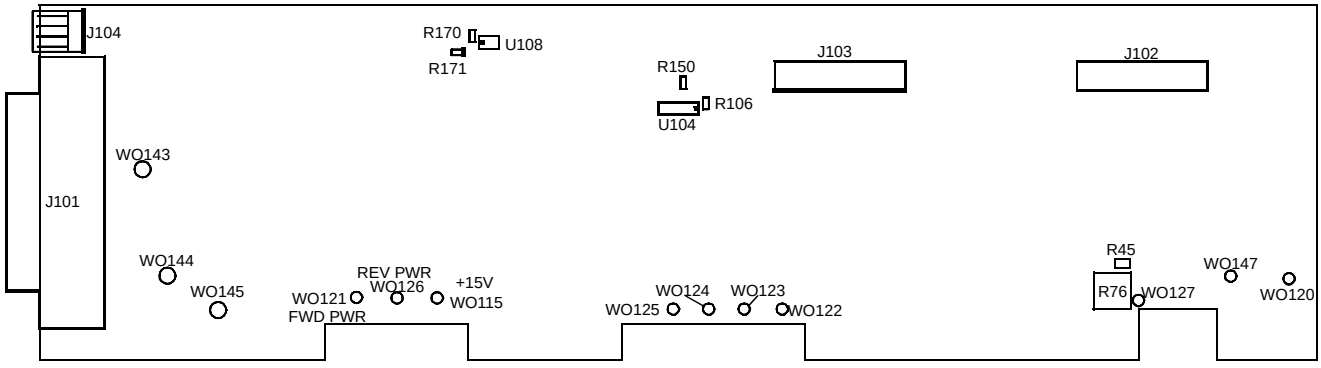

Figure 5 RF INTERFACE BOARD ALIGNMENT POINTS

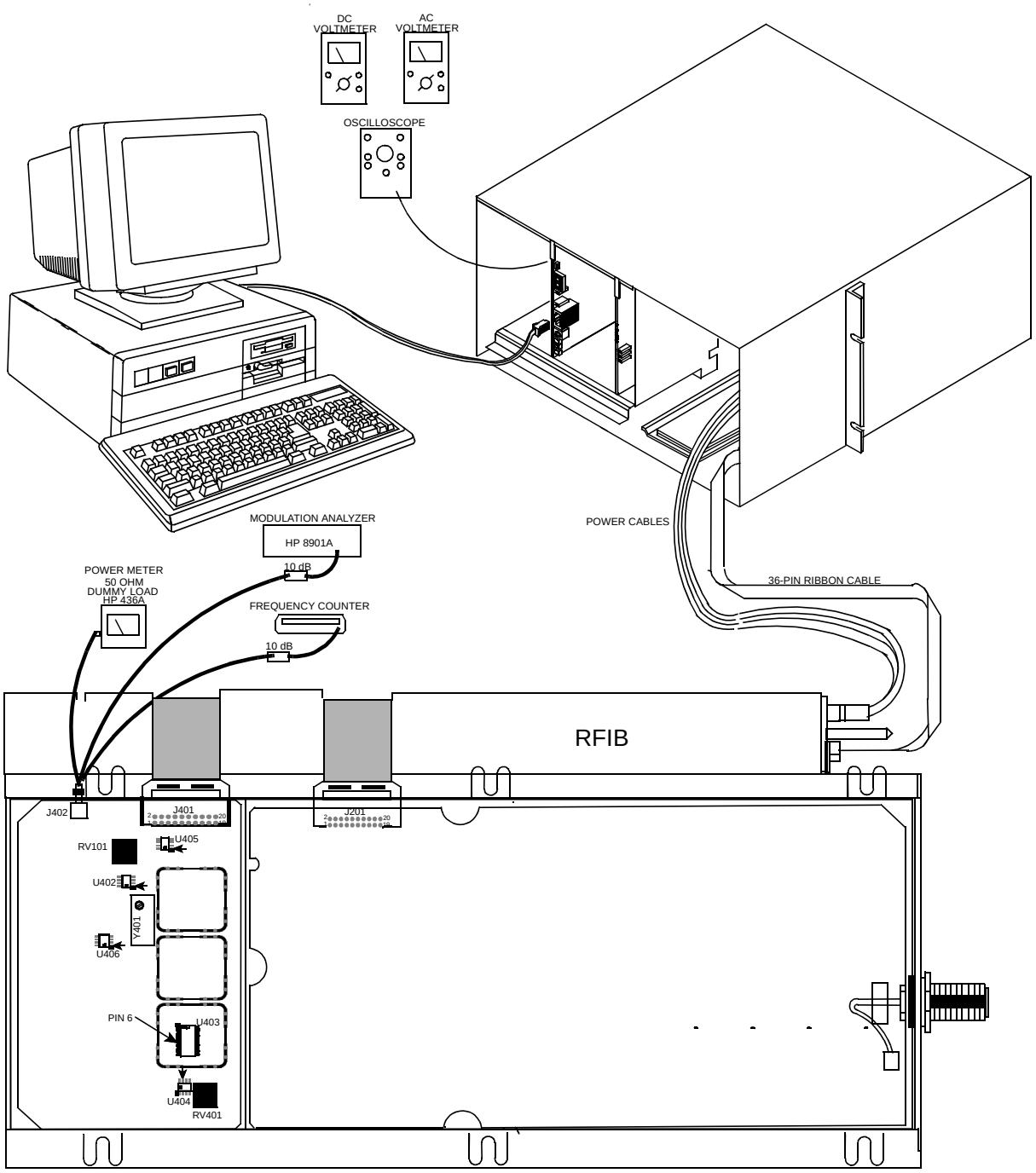

Figure 6 EXCITER TEST SETUP

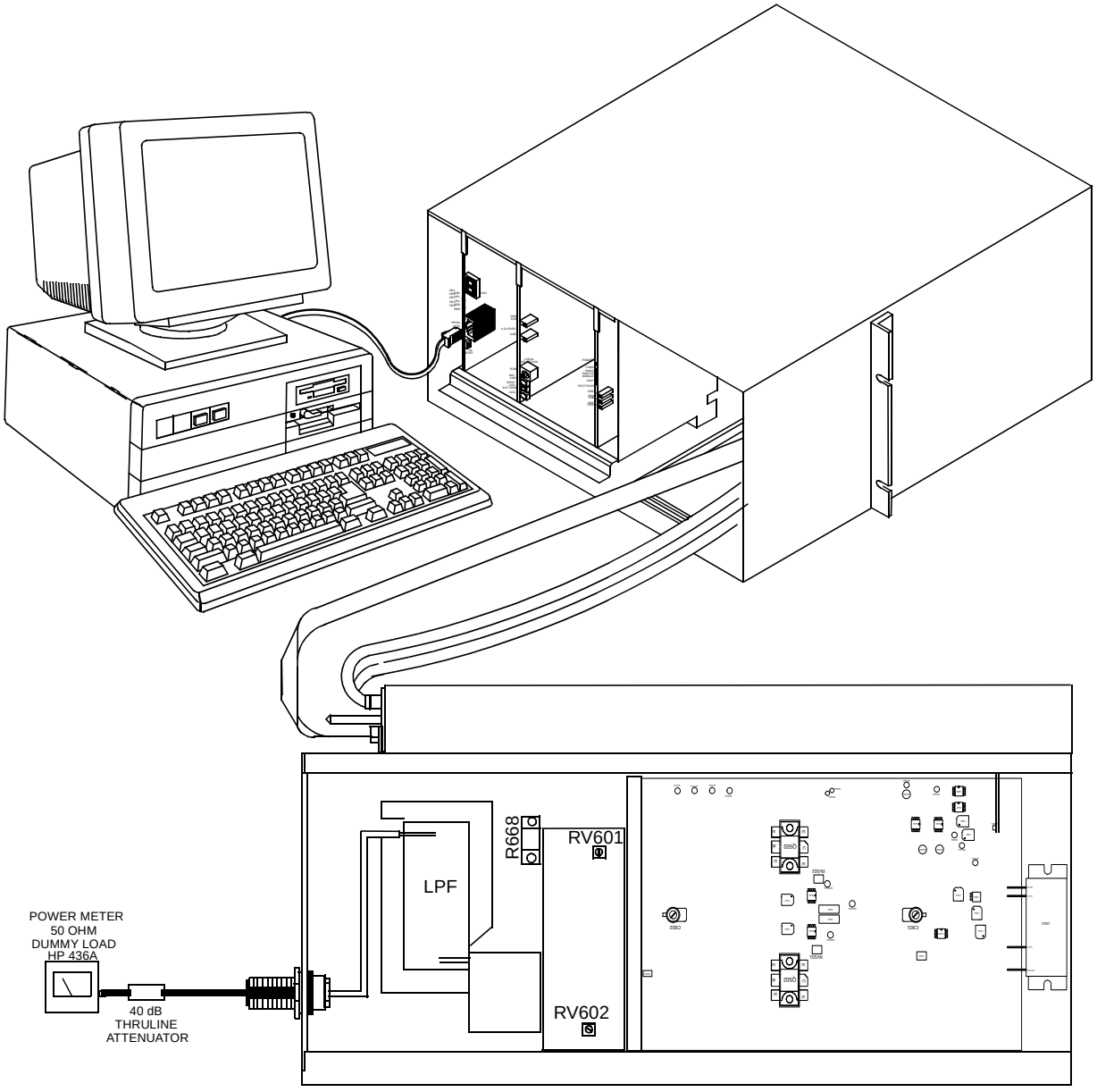

Figure 7 125W POWER AMPLIFIER TEST SETUP