

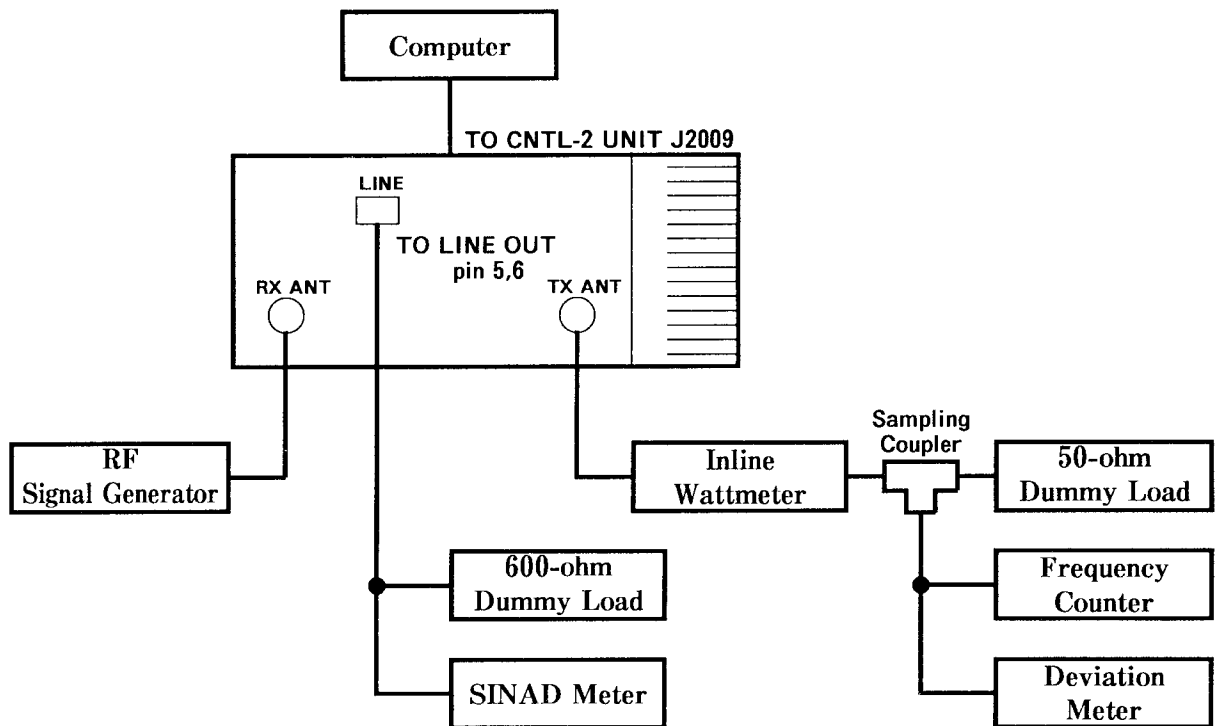
## Alignment

The VXR-5000 has been factory aligned for the specified performance across the entire operating frequency range. Realignment should not be necessary except in the event of a component failure. All components replacement and service should only be performed by an authorized Yaesu service representative, or the warranty policy may be voided.

### Required Test Equipment

- IBM PC/compatible computer
- Yaesu CE-8 Channel Programming Diskette and VPL-1 connection cable.
- RF Signal Generator with calibrated output level at 1000 MHz.
- Deviation Meter (linear detector)
- Oscilloscope
- AF millivoltmeter
- SINAD Meter
- In-line Wattmeter with 5% accuracy at 1000 MHz.
- Regulated DC Power Supply adjustable from 10 to 17-V DC, 15 A.
- 50-Ohm, non-reactive Dummy Load: 100 W @ 1000 MHz.
- Frequency Counter  $\pm 0.2$  ppm accuracy at 1000 MHz
- AF Signal Generator
- DC Voltmeter: high input impedance
- Spectrum Analyzer
- UHF Sampling Coupler

Before alignment, connect the VPL-1 connection cable to the repeater and PC as described in the *EEPROM Programming Software Instructions* chapter, and download the



Alignment Setup

EEPROM data from the transceiver to the computer. Then store this data in a file so that it can be uploaded when alignment is finished.

Next, using the CE-8 Channel Editor and referring to the table below, program band-edge channels 1, 2 and 3 according to version. Ensure REPEATER operation is enabled via software, then set these three channels to duplex, and turn off any tone settings for these channels. Download this data to the repeater.

VERSION	LOW BAND-EDGE CHANNEL (1)	BAND CENTER CHANNEL (2)	HIGH BAND-EDGE CHANNEL (3)
A	400	410	420
C	430	440	450
D	450	460	470
E	470	480	490
F	490	510	512

*Note: When finished with alignment, be sure to reload the original channel data from disk, and upload it back to the repeater.*

Before beginning the alignment, preset the controls and switches as follows:

- VR2001 - VR2005: centered, 12 o'clock position
- L4002, L4003, L4005, L4011, L4013, L4015 T4001, T4002: flush with the top of the coil form

- VR7071: centered
- VR4001: fully clockwise
- S2001: OFF
- S2002: INT
- S2003 & S2004: LOW
- pin 10 of ACC connector to GND

**Power Supply Voltage**

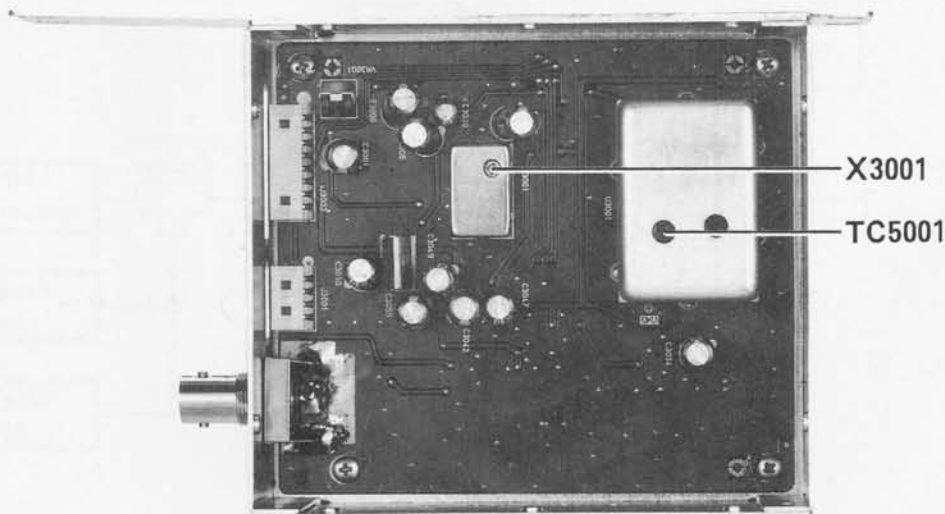
- Connect the positive (+) lead of the DC voltmeter to P7001 on the REG Unit, and negative (-) to P7002, then adjust VR7001 for 13.8 ± 0.1-V DC.

**Transmitter**

- Set up the test equipment as shown below for TX alignment. Adjust the supply voltage to 13.8-V DC (as above) for all steps.

**VCV Adjustment**

- Select the high band-edge channel, connect the DC voltmeter between VCV land and GND on the TX Unit. Then key the transmitter and adjust TC5001 on the TX VCO Unit for 7.5-V DC.
- Connect a frequency counter to the **TX ANT** jack via a sampling coupler (attenuator pad), key the transmitter and adjust X3001, so that the TX frequency is within ±100 Hz of the programmed TX frequency.



**TX Unit Alignment Points**

## RX Unit

Refer to the bottom of the page for receiver alignment points.

### VCV Adjustment

- Set the channel to the high band-edge, then connect a DC voltmeter between VCV land and GND on the RX Unit. Adjust TC5501 on the RX VCO Unit for 7.5-V DC.

### Sensitivity Adjust

- Inject a 0 dB $\mu$  signal modulated with a 1 kHz tone at 20 mVrms and deviation according to the chart below.

Channel Separation	Deviation ( $\pm$ )
25 kHz	3.0 kHz
20 kHz	2.4 kHz
12.5 kHz	1.5 kHz

- Adjust L4003 & L4009 for maximum SINAD indication.
- Repeat the above step several times.
- Increase the SG output level +40 dB $\mu$ , then adjust T4001 and T4002 for minimum distortion level on the SINAD meter.

## TX Output Power

- Connect a dummy load wattmeter to the TX ANT jack.

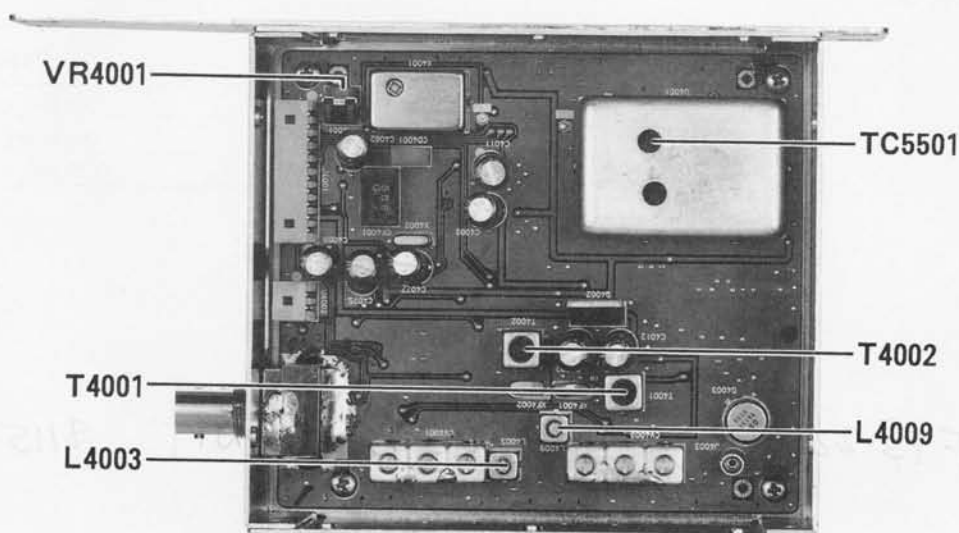
### Full Power Set

- Connect the VPL-1 connection cable to J2009 on CNTL Unit 2, then load the CE-8 programming software. Recall the alignment adjustment file, and press the return key. Key the repeater and press the function key indicated in the program for an indication of 25 watts ( $\pm 0.5$  watt) on the wattmeter.

### Low Power Set

- Repeat the above procedure for an indication of 12.5 Watts ( $\pm 0.5$  watts) on the wattmeter.
- Press the F10 key to exit the adjustment mode, then press F4 to save the settings to memory. Disconnect the VPL-1 cable.

*Note: do not adjust the low power setting below 10 watts.*



RX Unit Alignment Points

### Repeater Mode

#### Squelch Adjust

- First ensure DUPLEX mode of operation is enabled via CE-8 programming.
- Next inject a standard deviation 0 dBμ signal into the **RX ANT** jack. Adjust VR4001 on the RX Unit to the point where the TX is activated.

#### Deviation Adjustment

- Inject a 40-dBμ 1-kHz tone with deviation according to the chart below, and adjust VR2004 for the listed TX deviation.

Channel Separation	Signal Gen. Deviation	TX Deviation
25 kHz	5.0 kHz	4.5 kHz
20 kHz	4.0 kHz	3.6 kHz
12.5 kHz	2.5 kHz	2.3 kHz

- Change SG deviation according to the chart below, then adjust VR2005 for the TX deviation listed in the far right column.

Channel Separation	Signal Gen. Deviation	TX Deviation
25 kHz	3.0 kHz	3.0 kHz
20 kHz	2.4 kHz	2.4 kHz
12.5 kHz	1.5 kHz	1.5 kHz

### Base Mode

Note: When making Base Mode adjustments, connect pin 13 of the **ACC** jack to **GND**.

#### Audio Level Adjust

- Connect the SG to the **RX ANT** jack and adjust the SG output level to 40 dBμ and standard deviation. Adjust VR2003 for -10 dBm ± 0.1 dBm line out audio level.

#### Line Audio Deviation Adjustment

- Connect an audio signal generator to the **LINE IN** jack, then adjust generator output level to +10 dBm @ 1 kHz. Adjust VR2002 for the deviation listed to the chart below.

Channel Separation	VR2002	VR2001
25 kHz	4.6 kHz	3.0 kHz(± 0.1 kHz)
20 kHz	3.7 kHz	2.4 kHz(± 0.1 kHz)
12.5 kHz	2.3 kHz	1.5 kHz(± 0.1 kHz)

- Reduce audio generator output level to -10 dBm @ 1 kHz, then adjust VR2001 according to the chart above.

#### CTCSS (FTS-22) Deviation Adjustment

- Ensure the FTS-22 option has been installed and adjust VR2006 on CNTL-2 Unit for the deviation shown in the chart below.

Channel Separation	Deviation
25 kHz	0.7 kHz (± 0.1 kHz)
20 kHz	0.5 kHz (± 0.1 kHz)
12.5 kHz	0.35 kHz (± 0.05 kHz)

FTS-22 CTCSS DUAL DECODE UNIT \$115