

# VX-160U/180U Alignment

## VX-160U/180U Alignment

The VX-160U/180U has been carefully aligned at the factory for the specified performance across the frequency range specified for each version. Re-alignment should therefore not be necessary except in the event of component failure, or altering version type. All component replacement and service should only be performed by an authorized **VERTEX STANDARD** representative, or the warranty policy may be void.

### Required Test Equipment

- CT-42 Programming Cable with CE44 Channel Programming Diskette
- RF Signal Generator with calibrated output level at 1GHz
- Deviation Meter (Linear Detector)
- AC Voltmeter
- SINAD Meter
- In-Line wattmeter with 5 % accuracy at 500 MHz
- Regulated DC Power Supply adjustable from 4 to 10 V, 3 A
- $50\Omega$  Non-reactive Dummy Load: 10 W at 500 MHz
- Frequency Counter:  $\pm 0.2$  ppm accuracy at 500 MHz
- AF Signal Generator
- DC Voltmeter: high impedance

Before beginning alignment, connect the transceiver and PC using the CT-42 Programming Cable, and run the CE44 Channel Programming Diskette, then download the EEPROM data from the transceiver to the computer.

Then store this data in a disk file so that it can be uploaded when alignment is finished. You should find the corresponding data file on the computer disk for the transceiver version you are aligning, containing channel settings for the high edge, middle and low edge of the transceiver's frequency range in channels 1, 2 and 3, respectively. Up-load this file to the transceiver.

Low Band Edge (Channel 1): 400.000 MHz

Band Center (Channel 2): 415.000 MHz

High Band Edge (Channel 3): 430.000 MHz

**Note:** Signal levels in dB referred in the alignment procedure are based on  $0\text{dB}\mu = 0.5\text{ }\mu\text{V}$ .

### PLL & Transmitter

Set up the test equipment as shown for transmitter alignment. Adjust the supply voltage to 7.2 V for all steps where not specified otherwise.

#### PLL VCV (Varactor Control Voltage)

- Connect the DC voltmeter between **TP03** on the Main Unit and ground.
- Set the transceiver to CH 3 (high band edge), and adjust **L1004** on the Main Unit for  $4.1\text{ V} \pm 0.1\text{ V}$  on the DC voltmeter.
- Set the transceiver to CH 1 (low band edge), and confirm the low-end VCV is more than 1.1 V while transmitting, and also while receiving.

#### PLL Reference

- Set the transceiver to CH 2 (band center).
- Open the “**Adjust**” window on the CE44, then select “**Reference**” parameter.
- Press the **[ENTER]** key to enable programming of this parameter, use the **[UP]** or **[Down]** arrow keys so that the frequency counter displays band center frequency  $\pm 100\text{ Hz}$  (for the version being aligned).

#### Transmitter Output Power

- Set the transceiver to CH 2 (band center).
- Open the “**Adjust**” window on the CE44, then select “**TX Hi Power**” parameter.
- Press the **[ENTER]** key to enable programming of this parameter, use the **[UP]** or **[Down]** arrow keys so that the power meter reading is 5 W. Confirm that the current consumption is 2.0 A or below.
- Select “**TX Low Power**” parameter.
- Press the **[ENTER]** key to enable programming of this parameter, use the **[UP]** or **[Down]** arrow keys so that the power meter reading is 1 W. Confirm that the current consumption is 1.0 A or below.

#### Modulation Level

- Set the transceiver to CH 2 (band center).
- Inject a 1 kHz tone at 77 mVrms to the **MIC** jack.
- Open the “**Adjust**” window on the CE44, then select “**Modulation**” parameter.
- Press the **[ENTER]** key to enable programming of this parameter, use the **[UP]** or **[Down]** arrow keys so that the deviation meter reading is  $\pm 4.2\text{ kHz}$  (for 25 kHz steps) or  $\pm 2.1\text{ kHz}$  (for 12.5 kHz steps) deviation.

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### Receiver

Set up the test equipment as shown for receiver alignment.

#### Sensitivity

- Set the transceiver to CH 3 (high band edge)
- Tune the RF signal generator to the same frequency of the transceiver, then set the generator output level to 40  $\mu$ V with  $\pm 3.0$  kHz deviation @ 1 kHz tone modulation.
- Open the “Adjust” window on the CE44, then select “Sensitivity” parameter.
- Press the [**ENTER**] key to enable programming of this parameter, use the [**UP**] or [**Down**] arrow keys so that the RF signal generator output level should be  $-7$ dB or less for 12 dB SINAD.