VXA-220 Alignment

Introduction

The VXA-220 is carefully aligned at the factory for the specified performance across the Aircraft and Weather bands. Realignment should therefore not be necessary except in the event of a component failure.

The following procedures cover the adjustments that are not normally required once the transceiver has left the factory. However, if damage occurs and some parts subsequently are replaced, realignment may be required. If a sudden problem occurs during normal operation, it is likely due to component failure; realignment should not be done until after the faulty component has been replaced.

We recommend that servicing be performed only by authorized Vertex Standard service technicians who are experienced with the circuitry and fully equipped for repair and alignment. If a fault is suspected, contact the dealer from whom the transceiver was purchased for instructions regarding repair. Under no circumstances should any alignment be attempted unless the normal function and operation of the transceiver are clearly understood, the cause of the malfunction has been clearly pinpointed and any faulty components replaced, and realignment determined to be absolutely necessary. Problems caused by unauthorized attempts at realignment are not covered by the warranty policy

Vertex Standard reserves the right to change circuits and alignment procedures, in the interest of improved performance, without notifying owners.

The following test equipment (and familiarity with its use) is necessary for complete realignment. While most steps do not require all of the equipment listed, the interactions of some adjustments may require that more complex adjustments be performed afterwards. Do not attempt to perform only a signal step unless it is clearly isolated electrically from all other steps. Have all test equipment ready before beginning, and follow all of the steps in a section in the order presented.

Correction of problems caused by misalignment resulting from use of improper test equipment is not covered under the warranty policy.

Required Test Equipment

- Radio Tester with calibrated output level at 200 MHz
- In-line Wattmeter with 5 % accuracy at 200 MHz
- 50 Ω, 10 W RF Dummy Load
- Regulated DC Power Supply adjustable from 3 to 15 VDC, 2 A
- Frequency Counter: ±0.2 ppm accuracy at 200 MHz
- AF Signal Generator
- AC Voltmeter
- DC Voltmeter: high impedance
- VHF Sampling Coupler

Alignment Preparation & Precautions

A 50 Ω RF load and in-line wattmeter must be connected to the main antenna jack in all procedures that call for transmission, except where specified otherwise. Correct alignment is not possible with an antenna. After completing one step, read the next step to see if the same test equipment is required. If not, remove the test equipment (except dummy load and wattmeter, if connected) before proceeding.

Correct alignment requires that the ambient temperature be the same as that of the transceiver and test equipment, and that this temperature be held constant between 20 - 30 °C (68 - 86 °F). When the transceiver is brought into the shop from hot or cold air, it should be allowed some time to come to room temperature before alignment. Whenever possible, alignments should be made with oscillator shields and circuit boards firmly affixed

in place. Also, the test equipment must be thoroughly warmed up before beginning.
Set up the test equipment as shown below for transceiver alignment, apply 7.2 VDC power to the transceiver.
Notes: signal levels in dB referred to in alignment are based on 0 dBμ = 0.5 μV (closed circuit).

PLL Section

PLL Reference Frequency

- ❒ Connect the wattmeter, dummy load and frequency counter connected to the antenna jack, then set the transceiver to 128.000 MHz and turn the transceiver off.
- ❒ Press and hold in the PTT switch, Monitor switch, and ENT key while turn the transceiver on to enter the alignment mode.
- ❒ Rotate the DIAL selector knob to select the “REF xxx.”
- ❒ Press the PTT switch, confirm the counter reading is 128.000 MHz.
- ❒ If not,
  1. press the ENT key momentarily,
  2. rotate the DIAL selector knob clockwise (frequency up) or counter-clockwise (frequency down),
  3. press the ENT key again,
  4. confirm the counter reading.
- ❒ Repeat above steps 1 - 4, so that the counter reading is 128.000 MHz (±100 Hz).
- ❒ Turn the transceiver off.

Transmitter Section

AM TX Power Adjustment

- ❒ Connect the wattmeter and dummy load to the antenna jack, then set the transceiver to 128.000 MHz and turn the transceiver off.
- ❒ Press and hold in the PTT switch, Monitor switch, and ENT key while turn the transceiver on to enter the alignment mode.
- ❒ Rotate the DIAL selector knob to select the “TX PO xxx.”
- ❒ Press the PTT switch with no microphone input, confirm the RF output power is 1.5 Watts.
- ❒ If not,
  1. press the ENT key momentarily,
  2. rotate the DIAL selector knob clockwise (increase the power) or counter-clockwise (decrease the power),
  3. press the ENT key again,
  4. confirm the RF output power.
- ❒ Repeat above steps 1 - 4, so that the RF output power is 1.5 Watts.
- ❒ Turn the transceiver off.

Tx AM Modulation Adjustment

- ❒ Connect the Radio Tester to the antenna jack, then adjust the AF generator output level for injection of 200 mV rms @ 1 kHz to the MIC jack.
- ❒ Set the transceiver to 127.500 MHz and turn the transceiver off.
- ❒ Press and hold in the PTT switch, Monitor switch, and ENT key while turn the transceiver on to enter the alignment mode.
- ❒ Rotate the DIAL selector knob to select the “ MDLV xxx.”
- ❒ Press the PTT switch, confirm the modulation level is 85 % modulation (±5 %).
- ❒ If not,
  1. press the ENT key momentarily,
  2. rotate the DIAL selector knob clockwise (increase the MIC gain) or counter-clockwise (decrease the MIC gain),
  3. press the ENT key again,

4. confirm the modulation level.

❒ Repeat above steps 1 - 4, so that the modulation level is 85 % modulation (±5 %).
❒ Turn the transceiver off.

Receiver Section

AM Squelch Hysteresis Adjustment

❒ Press and hold in the PTT switch, Monitor switch, and ENT key while turn the transceiver on to enter the alignment mode.
❒ Rotate the DIAL selector knob to select the “AMHS xxx.”
❒ Press the ENT key momentarily, then adjust the hysteresis level using the DIAL selector knob.
❒ Turn the transceiver off.

FM Squelch Hysteresis Adjustment

❒ Press and hold in the PTT switch, Monitor switch, and ENT key while turn the transceiver on to enter the alignment mode.
❒ Rotate the DIAL selector knob to select the “FMHS xx.”
❒ Press the ENT key momentarily, then adjust the hysteresis level using the DIAL selector knob.
❒ Turn the transceiver off.

AM Squelch Threshold Adjustment

❒ Connect the Radio Tester to the antenna jack, then adjust the output level –9 dBµ (with a standard AM modulation: 30 % AM modulation @ 1 kHz) at 128.000 MHz.
❒ Set the transceiver to 128.000 MHz and turn the transceiver off.
❒ Press and hold in the PTT switch, Monitor switch, and ENT key while turn the transceiver on to enter the alignment mode.
❒ Rotate the DIAL selector knob to select the “AMTH xx.”
❒ Press the ENT key (emit the long beep), then press and hold the ENT key (emit the short beep).
❒ Turn the transceiver off.

FM Squelch Threshold Adjustment

❒ Connect the Radio Tester to the antenna jack, then adjust the output level –11 dBµ (with a standard FM modulation: ±3kHz deviation @ 1 kHz) at 163.275 MHz.
❒ Set the transceiver to 163.275 MHz and turn the transceiver off.
❒ Press and hold in the PTT switch, Monitor switch, and ENT key while turn the transceiver on to enter the alignment mode.
❒ Rotate the DIAL selector knob to select the “FMTH xx.”
❒ Press the ENT key (emit the long beep), then press and hold the ENT key (emit the short beep).
❒ Turn the transceiver off.

AM Squelch Tight Adjustment

❒ Connect the Radio Tester to the antenna jack, then adjust the output level +10 dBµ (with a standard AM modulation: 30 % AM modulation @ 1 kHz) at 128.000 MHz.
❒ Set the transceiver to 128.000 MHz and turn the transceiver off.
❒ Press and hold in the PTT switch, Monitor switch, and ENT key while turn the transceiver on to enter the alignment mode.
❒ Rotate the DIAL selector knob to select the “AMTI xxx.”
❒ Press the ENT key (emit the long beep), then press and hold the ENT key (emit the short beep).
❒ Turn the transceiver off.

FM Squelch Tight Adjustment

- ❒ Connect the Radio Tester to the antenna jack, then adjust the output level +10 dBµ (with a standard FM modulation: ±3kHz deviation @ 1 kHz) at 163.275 MHz.
- ❒ Set the transceiver to 163.275 MHz and turn the transceiver off.
- ❒ Press and hold in the PTT switch, Monitor switch, and ENT key while turn the transceiver on to enter the alignment mode.
- ❒ Rotate the DIAL selector knob to select the “FMTI xxx.”
- ❒ Press the ENT key (emit the long beep), then press and hold the ENT key (emit the short beep).
- ❒ Turn the transceiver off.

Resetting the CPU

If you are unable to gain control of the transceiver (or if you want to clear all memories and settings to their factory defaults), press and holding the MONITOR button and ENT key while turning the transceiver on.