

HX500S Alignment

The HX500S has been carefully aligned at the factory for the specified performance across the land mobile band.

Realignment should therefore not be necessary except in the event of a component failure.

All component replacement and service should be performed only by an authorized STANDARD HORIZON representative, or the warranty policy may be voided.

The following procedures cover the sometimes critical and tedious adjustments that are not normally required once the transceiver has left the factory. However, if damage occurs and some parts 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 STANDARD HORIZON service technicians who are experienced with the circuitry and fully equipped for repair and alignment. Therefore, if a fault is suspected, contact the dealer from whom the transceiver was purchased for instructions regarding repair. Authorized STANDARD HORIZON service technicians realign all circuits and make complete performance checks to ensure compliance with factory specifications after replacing any faulty components. Those who do undertake any of the following alignments are cautioned to proceed at their own risk.

Problems caused by unauthorized attempts at realignment are not covered by the warranty policy. Also, STANDARD HORIZON must reserve the right to change circuits and alignment procedures in the interest of improved performance, without notifying owners. 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 the need for realignment determined to be absolutely necessary. The following test equipment (and thorough familiarity with its correct use) is necessary for complete realignment. Correction of problems caused by misalignment resulting from use of improper test equipment is not covered under the warranty policy. 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 single 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.

Required Test Equipment

- o Radio Tester with calibrated output level at 200 MHz
- o In-line Wattmeter with 5% accuracy at 200 MHz
- o 50 Ω , 10 W RF Dummy Load
- o Regulated DC Power Supply adjustable from 3 to 15 VDC, 2A
- o Frequency Counter: ± 0.2 ppm accuracy at 200 MHz
- o AF Signal Generator
- o AC Voltmeter
- o DC Voltmeter: high impedance
- o 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 dB μ = 0.5 μ V (closed circuit).

PLL Section

PLL Reference Frequency

- Connect the wattmeter, dummy load, and frequency counter to the antenna jack.
- Set the transceiver to CH16 (156.800 MHz) then turn the transceiver off.
- Press and hold in the **PTT** key, **MONI** key, [**▲**] and [**▼**] key while turn the transceiver on to enter the alignment mode.
- Press the [**▼**] or [**▲**] key to select the display to [REF xx].
- Press the [**MEM**] key to enable adjustment of the PLL Reference Frequency.
- Press the **PTT** key to transmit the transceiver, if necessary, press the [**▼**] or [**▲**] key to adjust the frequency so the counter frequency is 156.800 MHz (\pm 100 Hz).
- Press the [**MEM**] key to exit this Alignment Mode.
- Press and hold the [**PWR**] key for 2 seconds to exit to the normal operation.

Receiver Section

Squelch Hysteresis Adjustment

- Connect the Radio Tester to the antenna jack.
- Set the transceiver to CH16 (156.800 MHz) then turn the transceiver off.
- Press and hold in the **PTT** key, **MONI** key, [**▲**] and [**▼**] key while turn the transceiver on to enter the alignment mode.
- Press the [**▼**] or [**▲**] key to select the display to [FM HS xx].
- Press the [**MEM**] key to enable adjustment of this Alignment Mode.
- Press the [**▼**] or [**▲**] key to adjust the hysteresis level.
- Press the [**MEM**] key to exit this Alignment Mode.

Squelch Threshold Adjustment

- Adjust the Radio Tester output level -13 dB μ (with a standard FM modulation: \pm 3.0 kHz deviation @ 1 kHz) at 156.800 MHz.
- Press the [**▼**] or [**▲**] key to select the display to [FM TH xx].
- Press the [**MEM**] key to read the Squelch Threshold data.
- Press the [**MEM**] key again to save the new setting.

Squelch Tight Adjustment

- Adjust the Radio Tester output level +5 dB μ (with a standard FM modulation: \pm 3.0 kHz deviation @ 1 kHz) at 156.800 MHz.
- Press the [**▼**] or [**▲**] key to select the display to [FM TI xxx].
- Press the [**MEM**] key to read the Squelch Tight data.
- Press the [**MEM**] key again to save the new setting.
- Press and hold the [**PWR**] key for 2 seconds to exit to the normal operation.

Transmitter Section

TX Power Adjustment (Hi Power)

- Connect the wattmeter and dummy load to the antenna jack.

- Set the transceiver to CH16 (156.800 MHz) with “high” power mode, and then turn the transceiver off.
- Press and hold in the **PTT** key, **MONI** key, [**▲**] and [**▼**] key while turn the transceiver on to enter the alignment mode.
- Press the [**▼**] or [**▲**] key to select the display to [HPOW xx].
- Press the [**MEM**] key to enable adjustment of this Alignment Mode.
- Press the **PTT** key to transmit the transceiver, if necessary, press the [**▼**] or [**▲**] key to adjust the output power to 5.0 W (± 0.3 W).
- Press the [**MEM**] key to exit this Alignment Mode.
- Press and hold the [**PWR**] key for 2 seconds to exit to the normal operation.

TX Power Adjustment (Medium Power)

- Connect the wattmeter and dummy load to the antenna jack.
- Set the transceiver to CH16 (156.800 MHz) with “Medium” power mode, and then turn the transceiver off.
- Press and hold in the **PTT** key, **MONI** key, [**▲**] and [**▼**] key while turn the transceiver on to enter the alignment mode.
- Press the [**▼**] or [**▲**] key to select the display to [MPOW xx]
- Press the [**MEM**] key to enable adjustment of this Alignment Mode.
- Press the **PTT** key to transmit the transceiver, if necessary, press the [**▼**] or [**▲**] key to adjust the output power to 2.5 W (± 0.2 W).
- Press the [**MEM**] key to exit this Alignment Mode.
- Press and hold the [**PWR**] key for 2 seconds to exit to the normal operation.

TX Power Adjustment (Low Power)

- Connect the wattmeter and dummy load to the antenna jack.
- Set the transceiver to CH16 (156.800 MHz) with “Low” power mode, and then turn the transceiver off.
- Press and hold in the **PTT** key, **MONI** key, [**▲**] and [**▼**] key while turn the transceiver on to enter the alignment mode.
- Press the [**▼**] or [**▲**] key to select the display to [LPOW xx]
- Press the [**MEM**] key to enable adjustment of this Alignment Mode.
- Press the **PTT** key to transmit the transceiver, if necessary, press the [**▼**] or [**▲**] key to adjust the output power to 1.0 W (± 0.1 W).
- Press the [**MEM**] key to exit this Alignment Mode.

Tx Deviation Adjustment

- Connect the Radio Tester to the antenna jack, and then adjust the Audio generator output to 100 mV at 1 kHz.
- Press the [**▼**] or [**▲**] key to select the display to [MOD xx].
- Press the [**MEM**] key to enable adjustment of this Alignment Mode.
- Press the **PTT** key to transmit the transceiver, if necessary, press the [**▼**] or [**▲**] key to adjust the deviation to 4.2 kHz (± 0.2 kHz).
- Press the [**MEM**] key to exit this Alignment Mode.

- Press and hold the [**PWR**] key for 2 seconds to exit to the normal operation.