GX1500S Alignment

The **GX1500S** has been carefully aligned at the factory for the specified performance across the marine 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, a division of VERTEX STANDARD, 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

- ❒ RF Signal Generator with calibrated output level at 200 MHz
- ❒ Deviation Meter (linear detector)
- ❒ AF Millivoltmeter
- ❒ SINAD Meter
- ❒ Inline Wattmeter with 5% accuracy at 200 MHz
- ❒ Regulated DC Power Supply: 13.8 VDC, 10A
- ❒ 50-ohm Non-reactive Dummy Load: 30W at 200 MHz
- ❒ Frequency Counter: >0.1 ppm accuracy at 200 MHz
- ❒ AF Signal Generator
- ❒ DC Voltmeter: high impedance
- ❒ VHF Sampling Coupler
- ❒ AF Dummy Load: 4 Ohms, 10 W
- ❒ Oscilloscope
- ❒ Spectrum Analyzer
- ❒ GX3500S Marine Transceiver

Alignment Preparation & Precautions

A dummy load and inline wattmeter must be connected to the main antenna jack in all procedures that call for transmission. Correct alignment is not possible with an antenna.

After completing one step, read the following step to determine whether the same test equipment will be 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°C and 30°C (68°F and 86°F). When the transceiver is brought into the shop from hot or cold air it should be allowed some time for thermal equalization with the environment before alignment. If 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.

Note: Signal levels in dB referred to in this procedure are based on 0 dBμ = 0.5 μV (closed circuit).

Overview of Test Mode

The test mode has been build in the microprocessor in order to adjust and confirm the performance of transceiver.

The purpose is to adjust transceiver simply and to confirm the performance of transceiver smoothly.

(A) In CH70, every time you are in transmit mode, (every time you press PTT), the following test tone can be outputted:

1st transmission: 1300 Hz
2nd transmission: 2100 Hz
3rd transmission: No modulation
4th transmission: Synthetic tone of 1300 Hz and 2100 Hz
5th transmission: Return to 1st transmission

(B) Scan the channels between WX10 and EXP04 in the SCAN mode.

Starting Test Mode

Confirm that **PWR/VOL** switch is off, and short the TEST points(JP1001). Turn on the **PWR/VOL** switch while press and holding the **DIST** and **DW** keys.

Adjustment of VCO

- ❒ Connect the DC voltmeter to the test point (LOCK TP).
- ❒ Use the **16/9** key to set the channel to **CH16**, adjust TC1002 so that voltage on the TP1010 is 1.5 V ±0.1 V in the receive and transmit mode.
- ❒ Use the **16/9** key to set the channel to **CH16**, adjust TC1001 so that voltage on the TP1007 is below 3.0 V ±0.1 V in the transmit mode.

Adjustment of Transmit Power

Adjust power at high and low in the transmit mode, and confirm power in the specified bandwidth.

- ❒ Connect the wattmeter and 50-ohm dummy load to the antenna jack.
- ❒ Use the **H/L** key to set transceiver to ***high power*** and set the channel to **CH16**. With the **PTT** switch pressed, adjust **VR1001** so that RF power is 25 W.
- ❒ Use the **H/L** key to set transceiver to ***low power*** and set the channel to **CH16**. With the **PTT** switch pressed, adjust **VR1002** so that RF power is 0.8 W.

Adjustment of PLL Frequency

Adjust the frequency in the transmit mode and local frequency in the receive mode.

- ❒ Setup the test equipment as shown below.
- ❒ Set the channel to **CH16**. With the **PTT** switch pressed, adjust **TC1003** so that RF frequency is 156.80000 MHz ± 100 Hz.

Adjustment of Deviation

Adjust deviation in the transmit mode.

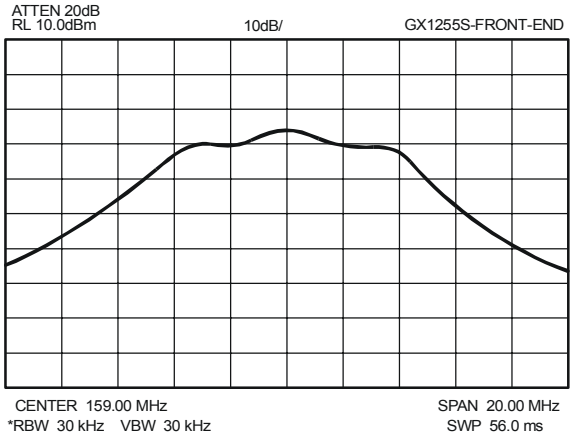
- ❒ Setup the test equipment as shown below.
- ❒ Set the channel to **CH16**.
- ❒ Set the output of the audio generator (AG) to 1 kHz and 100 mV.

- ❒ With the **PTT** switch pressed, adjust **VR1003** so that the maximum deviation is ±4.4 kHz.
- ❒ Set the output of the audio generator (AG) to 100 Hz and 1 V.
- ❒ With the **PTT** switch pressed, adjust **VR1004** so that the maximum deviation is ±4.4 kHz.

Adjustment of Receiver Front-end

Adjust the receiver front-end coil.

- ❒ Setup the test equipment as shown below.
- ❒ Set the center frequency of the spectrum analyzer to 159.00 MHz, set SPAN to 20.00 MHz, set RBW and VBW to 30 KHz, and set SWP to 56 ms.
- ❒ Adjust L**1010**, **L1013**, **L1027**, **L1028**, and **L1031** until the wave form shown in below is obtained.



Note: Adjust the output of the tracking generator so that RF AMP and spectrum analyzer will not saturate.

Figure shows the reference wave form. The wave form varies with measuring instruments. It is impotent to take the lowest possible value at the stop band near 150 MHz and the highest possible value at the band near 156 MHz.

Each coil shall be adjusted at the range between the initial condition and right and left revolving.

Confirmation of Weather Alert Tone

In the weather channel mode, when transceiver receives the specific emergency tone (1050 Hz), weather alert tone will be output (Weather Alert Operation). The Weather Alert mode will be active when a NOAA weather channel is in memory and radio is in memory scan or P-scan mode.

- ❒ Connect the standard signal generator (SSG) to the antenna jack.
- ❒ Squelch position set to tight.
- ❒ Press the **SCAN** key and start to Memory Scan mode.
- ❒ Set the SSG to 163.275 MHz (WX10) and output level of the SSG to 20 dBμV, ±3.0 kHz deviation with 1050 Hz tone modulation.
- ❒ Set the output of the SSG to ON.
- ❒ Confirm that the channel of transceiver stops at WX10 and the transceiver outputs the weather alert tone (1050 Hz).

Confirmation of receiver NMEA data

Input NMEA format data output from GPS receiver to NMEA terminal A of transceiver and display it to the LCD of the transceiver.

NMEA format data output from GPS receiver is applied to NMEA terminal of transceiver's option connector and LCD of transceiver will show data.

- ❒ Setup the test equipment as shown below.
- ❒ Press and hold the **H/L** key, confirm that the position data is displayed on the LCD of transceiver.

Confirmation of DSC Operation

- ❒ Prepare the confirmation transceiver (GX3500S).
- ❒ Input below data to the confirmation transceiver in advance.
  - Input "TEST" to NAME of INDIVIDUAL DIRECTORY
  - Input "123456789" to MMSI of INDIVIDUAL DIRECTORY
  - Input "123456780" to local MMSI
  - Channel 13 in U.S.A. mode
- ❒ Setup the test transceiver as follows:
  - Channel 21 in U.S.A.
- ❒ In 3 seconds, send the INDIVIDUAL CALL from the confirmation transceiver.
- ❒ Confirm that the test transceiver receives the INDIVIDUAL CALL from the confirmation transceiver and outputs the beep.
  Press the **CALL/SET** key of the test transceiver and turn off the beep.
  Simultaneously, confirm that "123456780" of confirmation transceiver's MMSI is displayed in the LCD of the test transceiver.
- ❒ Confirm that the confirmation transceiver receives the response from the test transceiver and outputs beep.
  Press the **CALL/SET** key of the confirmation transceiver and turn off the beep.
  Simultaneously, confirm that "TEST" of test transceiver's MMSI is displayed in the LCD of the confirmation transceiver.