

QUANTUM AIS GX6000

**25 Watt VHF/FM
Marine Transceiver**

Owner's Manual

- Capable of connecting two optional wired RAM4 or one wired RAM4 and up to four Wireless RAM4W remote access microphones using SCU-31 wireless access point
- Integrated NMEA2000 interface supporting all PGNs for Navigation, GPS, AIS and DSC functions
- Integrated Dual Channel AIS (Automatic Identification System) receiver
- GPS Compass, Waypoint and GPS status pages
- Dual Zone 25W PA / Loud Hailer with preprogrammed horn, siren, fog signals and listen back
- Submersible IPX8 (5 feet or 1.5 meters for 30 minutes)
- Integrated 32 Code Voice Scrambler and 4 Code Voice Scrambler
- AIS / AIS SART target display: MMSI, Call Sign, Ship Name, BRG, DST, SOG and COG
- Front panel microphone can be connected to rear panel and extended 20 feet using MEK-4 mic extension kit
- Programmable CPA or TCPA collision avoidance alarms
- Advanced 80 dB commercial Grade Receiver with Local / Distance Attenuator
- Intercom feature allows you to communicate between the radio, RAM4 and Wireless RAM4W microphones
- Integrated Voice Recorder to play back up to two minutes of RX receive audio



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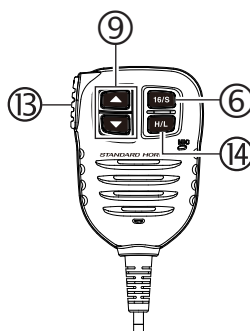
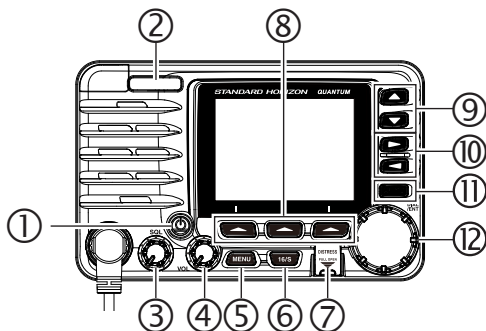
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QUICK REFERENCE GUIDE

The **GX6000** is equipped with the E2O (Easy-To-Operate) menu system. Basic operation may be accomplished by following the procedure below:

- ① Press and hold the **⏻** key to turn on or off the radio.
- ② The **MODE/STATUS** indicator indicates the status of the transceiver.
- ③ Rotate the **SQL** knob clockwise to squelch or counterclockwise to un-squelch the radio.
- ④ Rotate the **VOL** knob to adjust the speaker audio volume.
- ⑤ Press the **MENU** key to access MENU.
- ⑥ Press the **16/S** key on the radio or the microphone to select channel 16. Press and hold the **16/S** key on the radio or the microphone to select sub channel. Press again to revert to the last selected channel.
- ⑦ Activates a DSC distress call. Lift the red cover, press the **DISTRESS** once, then press and hold until the radio alarms.
- ⑧ These three programmable soft keys can be customized through the setup menu to quickly access advanced functions of the radio. Press the **▶/◀** key to switch the function of these keys, display the key functions at the bottom of the display.
- ⑨ Press the **▲/▼** key (or press the microphone's **▲/▼** keys) to select the operating channel. While the MENU screen is displayed, press the key to slide the on-screen menu upward/downward.
- ⑩ Press the **▶/◀** key to switch the function menu. While the MENU screen is displayed, press the key to slide the on-screen menu to the right/left side.
- ⑪ Press the **CLEAR** key to cancel a function or menu selection.
- ⑫ While the normal screen is displayed, rotate the **DIAL/ENT** knob to select your desired channel. While the MENU screen is displayed, rotate the knob to select your desired menu item.
- ⑬ To transmit: place your mouth about 1/2 inch away from Mic hole and speak in a normal voice level while pressing the **PTT** switch.
- ⑭ Press the **H/L** key to toggle the transmit power between High (25W) and Low (1W).



1 GENERAL INFORMATION

The STANDARD HORIZON **GX6000** Marine VHF/FM Marine transceiver is designed to be used in USA, International, and Canadian Marine bands. The **GX6000** can be operated from 11 to 16 VDC and has a switchable RF output power of 1 watt or 25 watts.

The **GX6000** integrates a dual channel AIS (Automatic Identification System) receiver to display class A and B AIS vessel information (MMSI, Call Sign, Ship Name, BRG, DST, SOG and COG) directly on the LCD display. The **GX6000** has a separate AIS antenna connection to ensure that you will be able to receive AIS signals while transmitting VHF communications. The **GX6000** is also capable of entering and saving up to 250 waypoints, which may be selected and navigated to by using a unique navigation compass display. The **GX6000** allows you to contact an AIS ship directly using DSC, show your vessels position in relation to AIS targets and alert you when an AIS ship may be approaching too close to your location via the Closest Point of Approach (CPA) Alarm or Time to Closest Point of Approach (TCPA) Alarm.

The **GX6000** is capable of DSC (Digital Selective Calling) ITU-R M.493 Class D operation. Class D operation allows continuous receiving of Digital Selective Calling functions on channel 70 even if the radio is receiving a call. The **GX6000** operates on all currently-allocated marine channels which are switchable for use with USA, International, or Canadian regulations. Emergency channel 16 can be immediately selected from any channel by pressing the red **16/S** key. NOAA weather channel can also be accessed immediately by pressing the **[WX]** soft key.

Other features of the **GX6000** includes: Noise canceling function for transmit and receive audio, NMEA 2000 compatibility, high expandability, integrated voice recorder to play back up to two minutes of RX receive audio, speaker microphone, dual zone 25 W PA/Loud hailer with preprogrammed fog signals and listen back, capable of being connected to two optional wired **RAM4** or one wired **RAM4** and four Wireless **RAM4W**^{*1} remote access microphones, allowing full control of all VHF, DSC and hailer functions remotely including an intercom feature allowing you to communicate between the radio, **RAM4** and Wireless **RAM4W** microphones, scanning, priority scanning, submersible speaker microphone, high and low voltage warning, and GPS repeatability. (*1 requires SCU-30 Wireless Access Port)

2 PACKING LIST

When the package containing the transceiver is first opened, please check it for the following contents:

- Transceiver **GX6000**
- Speaker Microphone
- DC Power Cord
- Mounting Bracket and Hardware
- Owner's Manual
- DSC Warning Sticker
- USB Cable (Type USB "A" plug to Type USB micro "B" plug) **T9101606**

3 OPTIONAL ACCESSORIES

Flush-Mount Bracket	MMB-84
Remote-Access Microphone (RAM4 Mic)	SSM-70H
RAM4W Wireless Remote Access Microphone	SSM-71H
Wireless Access Point	SCU-30
23 Feet Extension Cable for SSM-70H (RAM4) Microphone	CT-100
20 Feet Microphone Extension Kit (for connection to rear panel) ...	MEK-4
External Loud Speaker	MLS-300
5" Round 30 Watt Hail/PA Horn	220SW
5" × 8" Rectangular 40 Watt Hail/PA Horn	240SW
External GPS Antenna with 49 Feet of Cable	SCU-31

4 ONLINE WARRANTY REGISTRATION (in USA or Canada only)

Please visit www.standardhorizon.com to register the **GX6000** Marine VHF. It should be noted that visiting the website from time to time may be beneficial to you, as new products are released they will appear on the STANDARD HORIZON website.

PRODUCT SUPPORT INQUIRIES

If you have any questions or comments regarding the use of the **GX6000**, you can visit the STANDARD HORIZON website to send an E-Mail or contact the Product Support team at (800) 767-2450 M-F 8:00-5:00 PST.

5 GETTING STARTED

5.1 PROHIBITED COMMUNICATIONS

The FCC prohibits the following communications:

- False distress or emergency messages;
- Messages to “any boat” except in emergencies and radio tests;
- Messages to or from a vessel on land;
- Transmission while on land;
- Obscene, indecent, or profane language (potential fine of \$10,000).

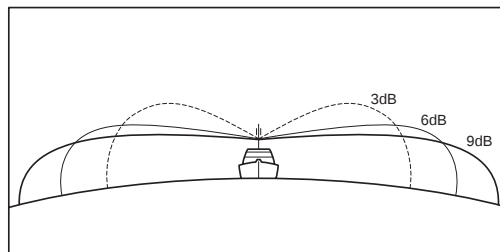
5.2 ABOUT VHF RADIO

The radio frequencies used in the VHF marine band lie between 156 and 158 MHz with some shore stations available between 161 and 163 MHz. The marine VHF band provides communications over distances that are essentially “line of sight” (VHF signals do not travel well through objects such as buildings, hills or trees). Actual transmission range depends much more on antenna type, gain and height than on the power output of the transmitter. On a fixed mount 25 W radio transmission expected distances can be greater than 15 miles, for a portable 5 W radio transmission the expected distance can be greater than 5 miles in “line of sight”.

5.3 SELECTING AN ANTENNA

Marine antennas are made to radiate signals equally in all horizontal directions, but not straight up. The objective of a marine antenna is to enhance the signal toward the horizon. The degree to which this is accomplished is called the antenna’s gain. It is measured in decibels (dB) and is one of the major factors in choosing an antenna. In terms of effective radiated power (ERP), antennas are rated on the basis of how much gain they have over a theoretical antenna with zero gain. A 3-foot, 3 dB gain antenna represents twice as much gain over the imaginary antenna.

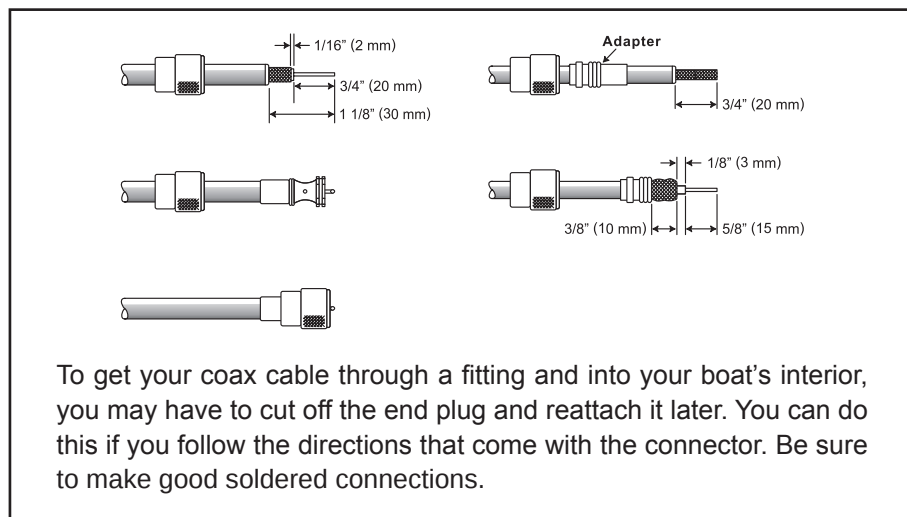
Typically, a 3-foot 3 dB gain stainless steel whip is used on a sailboat mast. The longer 8-foot 6 dB fiberglass whip is primarily used on power boats that require the additional gain.



5.4 COAXIAL CABLE

VHF antennas are connected to the transceiver by means of a coaxial cable – a shielded transmission line. Coaxial cable is specified by its diameter and construction.

For runs less than 20 feet, RG-58/U, about 1/4 inch in diameter is a good choice. For runs over 20 feet but less than 50 feet, the larger RG-8X or RG-213/U should be used for cable runs over 50 feet RG-8X should be used. For installation of the connector onto the coaxial cable refer to the figure below.



5.5 DISTRESS AND HAILING (CHANNEL 16)

Channel 16 is known as the Hail and Distress Channel. An emergency may be defined as a threat to life or property. In such instances, be sure the transceiver is on and set to CHANNEL 16. Then use the following procedure:

1. Press the microphone push-to-talk switch and say "**Mayday, Mayday, Mayday**. This is _____, _____, _____" (your vessel's name).
2. Then repeat once: "**Mayday, _____**" (your vessel's name).
3. Now report your position in latitude/longitude, or by giving a true or magnetic bearing (state which) to a well-known landmark such as a navigation aid or geographic feature such as an island or harbor entry.
4. Explain the nature of your distress (sinking, collision, aground, fire, heart attack, life-threatening injury, etc.).
5. State the kind of assistance your desire (pumps, medical aid, etc.).
6. Report the number of persons aboard and condition of any injured.
7. Estimate the present seaworthiness and condition of your vessel.

8. Give your vessel's description: length, design (power or sail), color and other distinguishing marks. The total transmission should not exceed 1 minute.
9. End the message by saying "**OVER**". Release the microphone switch and listen.
10. If there is no answer, repeat the above procedure. If there is still no response, try another channel.

NOTE

The **GX6000** has the DSC Distress calling, that can transmit a distress call digitally to all ships with compatible DSC radios. Refer to section "**10 DIGITAL SELECTIVE CALLING (DSC)**".

5.6 CALLING ANOTHER VESSEL (CHANNEL 16 OR 9)

Channel 16 may be used for initial contact (hailing) with another vessel. However, its most important use is for emergency messages. This channel must be monitored at all times except when actually using another channel.

It is monitored by the U.S. and Canadian Coast Guards and by other vessels.

Use of channel 16 for hailing must be limited to initial contact only. Calling should not exceed 30 seconds, but may be repeated 3 times at 2-minute intervals. In areas of heavy radio traffic, congestion on channel 16 resulting from its use as a hailing channel can be reduced significantly in U.S. waters by using **channel 9** as the initial contact (hailing) channel for non-emergency communications. Here, also, calling time should not exceed 30 seconds but may be repeated 3 times at 2-minute intervals.

Prior to making contact with another vessel, refer to the channel charts in this manual, and select an appropriate channel for communications after initial contact. For example, Channels 68 and 69 of the U.S. VHF Charts are some of the channels available to non-commercial (recreational) boaters. Monitor your desired channel in advance to make sure you will not be interrupting other traffic, and then go back to either channel 16 or 9 for your initial contact.

When the hailing channel (16 or 9) is clear, press the **PTT** switch on the mic and state the name of the other vessel you wish to call and then "this is" followed by the name of your vessel and your Station License (Call Sign) then release the **PTT** switch on the mic. When the other vessel returns your call, immediately request another channel by pressing the **PTT** switch on the mic and saying "**go to**," the number of the other channel, say "**over**" and release the **PTT** switch on the mic. Then switch to the new channel. When the new channel is not busy, call the other vessel.

After a transmission, say “**over**,” and release the microphone’s push-to-talk (PTT) switch. When all communication with the other vessel is completed, end the last transmission by stating your Call Sign and the word “**out**.” Note that it is not necessary to state your Call Sign with each transmission, only at the beginning and end of the contact.

Remember to return to Channel 16 when not using another channel. Some radios automatically monitor Channel 16 even when set to other channels or when scanning.

5.7 MAKING TELEPHONE CALLS

To make a radiotelephone call, use a channel designated for this purpose. The fastest way to learn which channels are used for radiotelephone traffic is to ask at a local marina. Channels available for such traffic are designated **Public Correspondence** channels on the channel charts in this manual. Some examples for USA use are Channels 24, 25, 26, 27, 28, 84, 85, 86, and 87. Call the marine operator and identify yourself by your vessel’s name. The marine operator will then ask you how you will pay for the call (telephone credit card, collect, etc.) and then link your radio transmission to the telephone lines.

The marine telephone company managing the VHF channel you are using may charge a link-up fee in addition to the cost of the call.

5.8 BRIDGE CHANNELS 13 AND 67

Channel 13 is used at docks, bridges and by vessels maneuvering in port. Messages on this channel must concern navigation only, such as meeting and passing in restricted waters.

Channel 67 is used for navigational traffic between vessels.

By regulation, power is normally limited to 1 Watt on these channels. Your radio is programmed to automatically reduce power to this limit on these channels. However, in certain situations it may be necessary to temporarily use a higher power. See Page 33 for means to temporarily override the low-power limit on these two channels.

5.9 AUTOMATED RADIO CHECK SERVICE

In areas across the country, Sea Tow offers boaters a way to conduct radio checks. To use Sea Tow’s free Automated Radio Check service, simply tune your VHF radio to the appropriate channel for your location and conduct a radio check as you typically would. Upon releasing your radio’s microphone, the system will play an automated message and relay your transmission back to you, thereby letting you know how your signal will sound to other boaters.

The Automated Radio Check Service is currently available in the areas listed below.

West Coast	Sea Tow Newport/LA - Ch. 27 Sea Tow San Diego - Ch. 27
Northeast	Sea Tow Portland-Midcoast (Maine) - Ch. 27 Sea Tow Boston - Ch. 27 Sea Tow South Shore (Mass.) - Ch. 28 Sea Tow Rhode Island - Ch. 24 Sea Tow Eastern Long Island - Ch. 27 Sea Tow Huntington (N.Y.) - Ch. 27 Sea Tow Manasquan (N.J.) - Ch. 28
Mid-Atlantic	Sea Tow Northern Chesapeake (Md.) - Ch. 28 Sea Tow Central Chesapeake (Md.) - Ch. 27 Sea Tow Hampton Roads (Va.) - Ch. 28
North Carolina	Sea Tow Wrightsville Beach - Ch. 28 Sea Tow Ocean Isle Beach - Ch. 28
Florida	Sea Tow Sebastian - Ch. 28 Sea Tow Fort Lauderdale - Ch. 27 Sea Tow Charlotte Harbor - Ch. 24 Sea Tow Tampa Bay - Ch. 27 Sea Tow Horseshoe Beach - Ch. 27 Sea Tow Carrabelle/St. Marks - Ch. 27 Sea Tow Pensacola/Orange Beach (Ala.) - Ch. 27

5.10 WHAT IS THE RANGE FOR AIS RECEIVERS?

Since AIS uses similar frequencies as a marine VHF radio, it has similar radio reception capabilities - which are basically line of sight. This means that the higher the VHF antenna is mounted, the greater the reception area will be. Reception from Class A vessels that are 20 or even 30 miles away on open water is not uncommon as their antennas are mounted high off the water. Class B transponders use lower power for transmissions; therefore, you can expect Class B vessels to be acquired when they are 5 to 10 miles away.

NOTE

The GX6000 require two separate marine VHF antennas; one antenna for VHF and a second antenna for AIS.

For additional information on AIS visit the USCG website:
<<http://www.navcen.uscg.gov/marcomms/ais.htm>>

5.11 Accuracy of COG*

The error in the COG (the path of the antenna position over ground) due to the actual ship's speed over ground shall not exceed the following values:

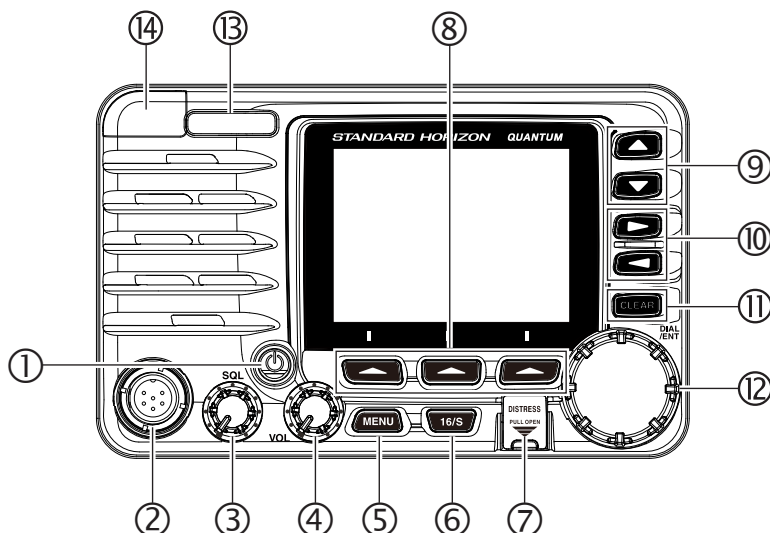
Speed range (knots)	Accuracy of COG output to user
0 to ≤1 knot	Unreliable or not available
>1 to ≤17 knots	±3°
>17 knots	±1°

* Only when the SCU-31 external GPS antenna connected.

6 CONTROLS AND INDICATORS

This section defines each control of the transceiver. See illustration below for location of controls. For detailed operating instructions refer to chapter 8 of this manual.

6.1 FRONT PANEL



① (Power) key

Press and hold to toggle the radio on or off. When the power is turned on, the transceiver is set to the last selected channel.

② MIC Connector

Connects the supplied speaker microphone.

③ **SQL** knob (Squelch control)

Adjusting this control clockwise, sets the point at which random noise on the channel does not activate the audio circuits but a received signal does. This point is called the squelch threshold. Further adjustment of the squelch control will degrade reception of wanted transmissions.

④ **VOL** knob (Volume control)

Adjusts the audio volume level.

Clockwise rotation of this knob increases the internal and speaker microphone volume.

SECONDARY USE

When in the PA or Fog mode, controls the listen-back volume.

⑤ **MENU** key

Press to access MENU. For details, refer to section “**8.4 BASIC OPERATION OF THE MENU MODE**”.

⑥ **16/S** key

Pressing this key immediately recalls channel 16 from any channel location. Holding down this key selects the SUB channel (The default setting is channel 9). Pressing this key again reverts to the previous selected working channel.

⑦ **DISTRESS** key

Used to send a DSC Distress Call. To send the distress call, refer to section “**10.2.1 Transmitting a DSC Distress Alert**”.

⑧ Soft keys

The 3 programmable soft keys can be customized by the Setup Menu mode described in section “**15.8 SOFT KEYS**”.

⑨ **▲/▼** key

These keys are used to change the operating channel. The Up/Down keys on the microphone can also be used to change the operating channel. Press the key momentarily, the channel increases/decreases one step. Holding the key, the channel increases/decreases continuously.

SECONDARY USE

- While the MENU screen is displayed, press the key to slide the on-screen menu upward/downward.

⑩ **►/◄** key

Press these keys to switch the function of soft keys.

SECONDARY USE

While the MENU screen is displayed, press the key to slide the on-screen menu to the right/left side.

⑪ **CLEAR** key

Press this key to cancel a menu selection.

⑫ **DIAL/ENT** knob

While the normal screen is displayed, rotate the **DIAL/ENT** knob to select your desired channel. While the MENU screen is displayed, rotate the knob to select your desired menu item.

SECONDARY USE

- Press this knob to enter a selection in the MENU.

⑬ MODE/STATUS indicator

Indicates the radio status with the four colors on the three positions of the mode/status indicator.

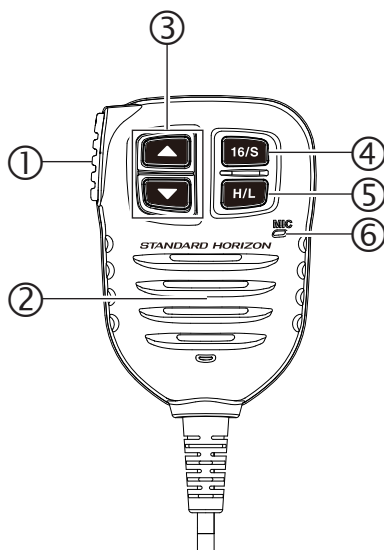
Position	Color	Description
Left	Blue	AIS-Board Working
	Purple	Receiving MSG23
	Red	AIS-Board Failed
Right	Green	AIS Receiving (registered MMSI)
	Orange	AIS Receiving (unregistered MMSI)
	Red	Receive Error

⑭ DATA jack

Use the USB micro type B jack to configure the transceiver settings and download the GPS logger data.

Note: When the DATA jack is securely covered with rubber cap, the **GX6000** meets the waterproofing performance.

6.2 MICROPHONE



① PTT (Push-To-Talk) switch

When in radio mode and the **PTT** switch is pressed, the transmitter is enabled for voice communications to another vessel.

When PA mode is selected, pressing the **PTT** switch allows your voice to be amplified and supplied to a connected PA horn.

When an optional **RAM4** and **RAM4W** mic is connected and intercom mode is selected, pressing the **PTT** switch enables voice communications from the **GX6000** to the **RAM4** and **RAM4W** second station microphone.

② Microphone speaker

Audio heard through internal radio speaker is heard through the speaker microphone.

③ ▲/▼ key

These keys on the microphone are used to select channels and to choose menu items.

④ **16/S** key

Pressing this key immediately selects channel 16 from any channel location. Holding down this key selects the SUB channel (The default setting is channel 9). Pressing this key again reverts to the previous selected working channel.

⑤ **H/L** key

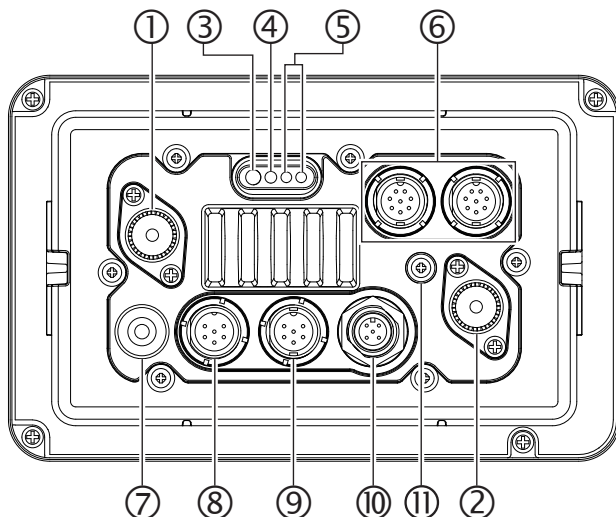
Press this key to toggle between 25 W (High) and 1 W (Low) power. When the TX output power is set to “Low” while the transceiver is on channel 13 or 67, the output power will temporarily switch from “Low” to “High” power until the **PTT** switch of the microphone is released. This key is not available on transmit inhibited and low power only channels.

⑥ Microphone

The internal microphone transmits your voice reducing background noise using Clear Voice Noise Reduction Technology.

Note: Position your mouth about 1/2” (1.5 cm) away from the microphone hole and speak in a normal voice.

6.3 REAR PANEL



① VHF **ANT** jack (VHF antenna jack)

Connects an antenna to the transceiver. Use a marine VHF antenna with an impedance of 50 ohms.

Note: This **ANT** jack is used to marine voice channel.

② AIS **ANT** jack (AIS antenna jack)

Connects an antenna to the AIS receiver. Use a marine VHF antenna with an impedance of 50 ohms.

③ PA Speaker Connection Cable (Orange, Yellow, Green & Blue)

Connects the **GX6000** to PA speakers. See section “**3 OPTIONAL ACCESSORIES**” for a list of optional STANDARD HORIZON Speakers.

Green: PA1 Speaker (+)

Blue: PA1 Speaker (-)

Orange: PA2 Speaker (+)

Yellow: PA2 Speaker (-)

④ EXTERNAL Speaker Connection Cable (Red & White)

Connects the **GX6000** to an optional external speaker. Refer to section “**3 OPTIONAL ACCESSORIES**” for a list of optional STANDARD HORIZON Speakers.

Red: External Speaker (+)

White: External Speaker (-)

⑤ DC Input Cable

Connects the radio to a DC power supply capable of delivering 11 to 16 VDC.

⑥ **RAM-1/RAM-2 Remote Access Microphone Connectors**

Connects the **GX6000** to the **SSM-70H (RAM4)** Remote Station Microphone or SCU-30 Wireless Access Point for use with up to four SSM-71H (RAM4W) wireless microphones. Refer to section “**19 SSM-70H (RAM4) REMOTE MIC OPERATION**” for details.

⑦ **NMEA0183 In/Out & NMEA0183-HS OUT Connection Cable (Blue, Green, Gray, Brown, Yellow & White)**

Connects the **GX6000** to a GPS chart plotter. Refer to section “**7.5 CONNECTION OF EXTERNAL DEVICES TO THE RADIO**”.

⑧ **Rear MIC Connector**

Connects the supplied hand microphone if desired. This connector provides the same function as that on the front panel and allows remote use of the microphone by using the optional **MEK-4** (microphone extension kit).

⑨ **GPS ANT Connector (White)**

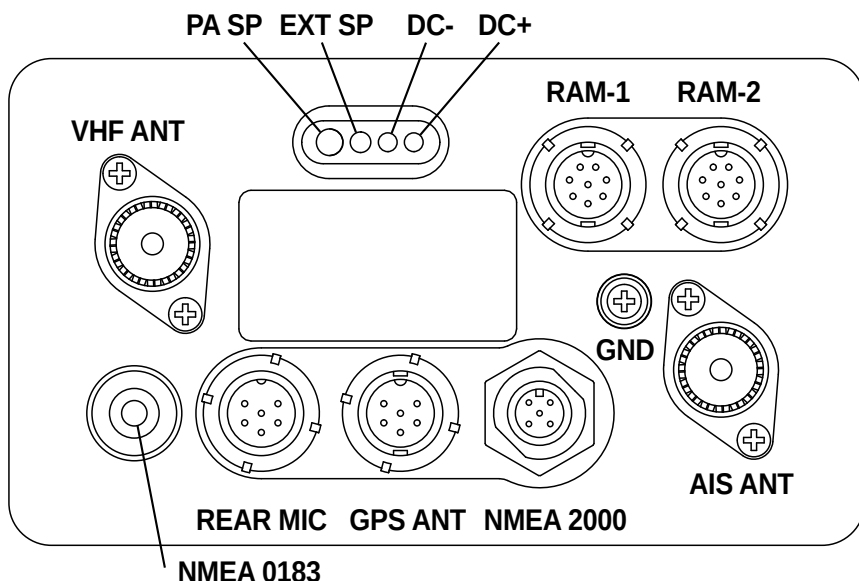
Connects the optional **SCU-31** external GPS antenna.

⑩ **NMEA 2000 Connector (Black)**

Connects to the NMEA 2000 network.

⑪ **GND Terminal (Ground Terminal)**

Connects the **GX6000** to ships ground, for safe and optimum performance. Use the screw supplied with the **GX6000** only.



7 INSTALLATION

7.1 SAFETY / WARNING INFORMATION

This radio is restricted to occupational use, work related operations only where the radio operator must have the knowledge to control the exposure conditions of its passengers and bystanders by maintaining the minimum separation distance of 3 feet (1 m). Failure to observe these restrictions will result in exceeding the FCC RF exposure limits.

Antenna Installation:

The antenna must be located at least 3 feet (1 m) away from passengers in order to comply with the FCC RF exposure requirements.

7.2 LOCATION

The radio can be mounted at any angle. Choose a mounting location that:

- complies with the compass safe distances shown in the table below to prevent interference to a magnetic compass

Transceiver Unit	1.0 m
Handset	0.5 m

- provides accessibility to the front panel controls
- allows connection to a power source and antennas
- has nearby space for installation of a microphone hanger
- is at least 3 feet (1 m) away from the radio's antenna
- the signal from the GPS satellite can receive sufficiently

Note: To insure the radio does not affect the compass or radios performance is not affected by the antenna location, temporarily connect the radio in the desired location and:

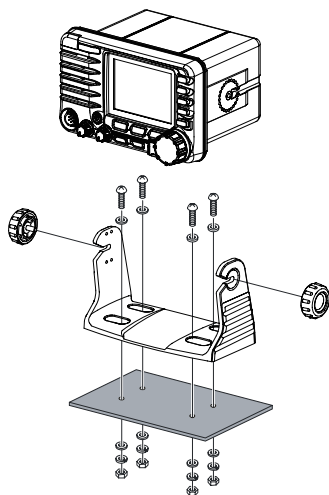
- a. Examine the compass to see if the radio causes any deviation
- b. Connect the antenna and key the radio. Check to ensure the radio is operating correctly by requesting a radio check.

7.3 MOUNTING THE RADIO

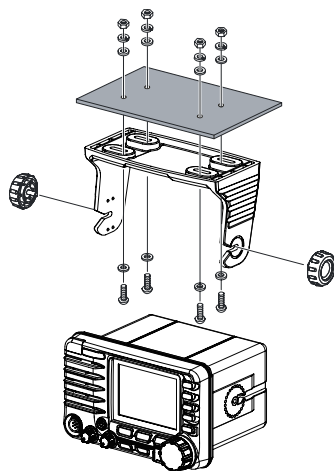
7.3.1 Supplied Mounting Bracket

The supplied mounting bracket allows overhead or desktop mounting.

Use a 13/64" (5.2 mm) bit to drill the holes to a surface which is more 0.4" (10 mm) thick and can support more than 3.3 lbs (1.5 kg) and secure the bracket with the supplied screws, spring washers, flat washers, and nuts.



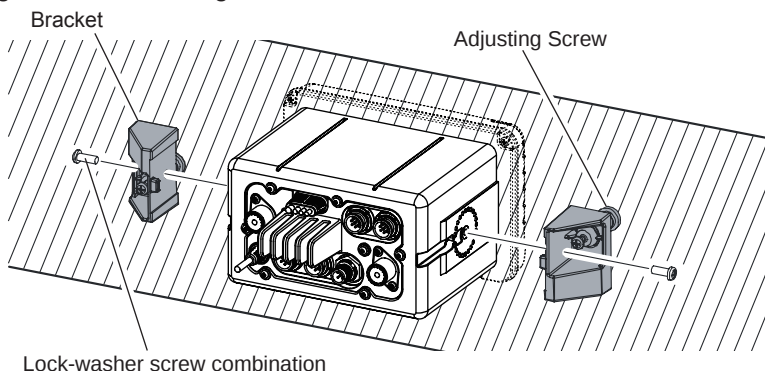
Desktop Mounting



Overhead Mounting

7.3.2 Optional MMB-84 Flush Mount Bracket

1. Use the template (page 153) to mark the location where the rectangular hole is to be cut. Confirm the space behind the dash or panel is deep enough to accommodate the transceiver (at least 6.7" (17 cm) deep). There should be at least 1/2" (1.3 cm) between the transceivers heatsink and any wiring, cables or structures.
2. Cut out the rectangular hole and insert the transceiver.
3. Fasten the brackets to the sides of the transceiver with the lock washer screw combination; so that the mounting screw base faces the mounting surface (see illustration below).
4. Turn the adjusting screw to adjust the tension so that the transceiver is tight against the mounting surface.



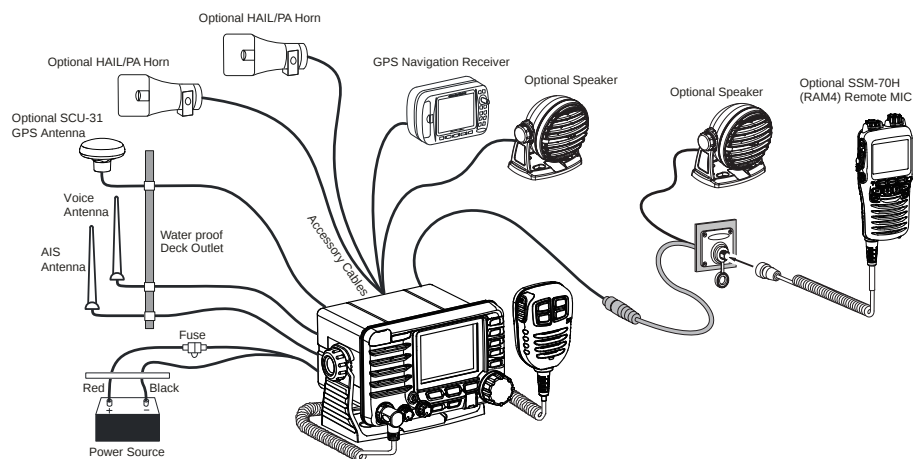
7.4 ELECTRICAL CONNECTIONS

CAUTION

Reverse polarity battery connections will damage the radio!

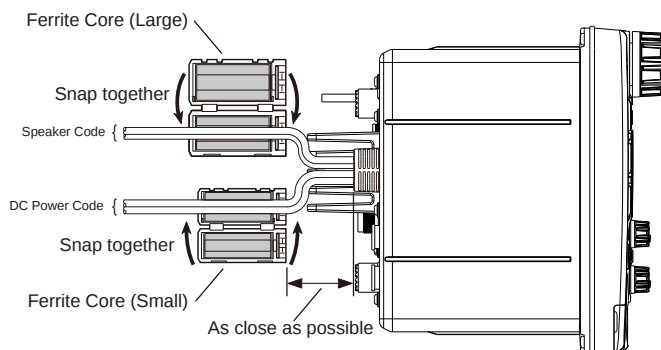
Connect the power cord and antenna to the radio. Antenna and Power Supply connections are as follows:

1. Mount the antenna at least 3 feet (1 m) away from the radio. At the rear of the radio, connect the antenna cable. The antenna cable must have a PL259 connector attached. RG-8/U coaxial cable must be used if the antenna is 25 feet (7.6 m) or more from the radio. RG58 cable can be used for distances less than 25 feet (7.6 m).
2. Connect the red power wire to a 13.8 VDC $\pm 20\%$ power source. Connect the black power wire to a negative ground.
3. If an optional remote extension speaker is to be used, refer to section 6.5 for connections.
4. It is advisable to have a Certified Marine Technician check the power output and the standing wave ratio of the antenna after installation.



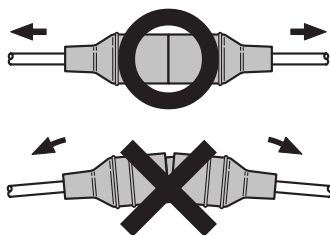
Ferrite Cores

To suppress RF interference that can cause abnormal operation of the transceiver, attach the supplied two ferrite cores as shown in the next page: bigger one to the accessory connection cable and the DC input cable together, and smaller one to the PA speaker connection cable and the external speaker connection cable together. Then snap the two halves of each ferrite core together. Attach each ferrite core as close as possible to the transceiver body. Finally, wind some plastic tape around each ferrite core, to prevent vibration from causing the two halves to split apart.



Fuse Replacement

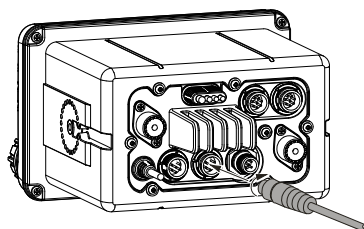
To take out the fuse from the fuse holder, hold both ends of the fuse holder and pull the fuse holder apart without bending the fuse holder. When you replace the fuse, please confirm that the fuse is tightly fixed on the metal contact located inside the fuse holder. If the metal contact holding the fuse is loose, the fuse holder may heat up.



7.5 CONNECTION OF EXTERNAL DEVICES TO THE RADIO

7.5.1 Connecting the SCU-31 External GPS Antenna to the Radio

Connect the **SCU-31** cable to the GPS ANT (six pin) connector (White) on the rear panel, then tighten the cable nut (see illustration at the right).



7.5.2 Connecting the NMEA 0183/NMEA 0183-HS to the Radio

External GPS Connections (NMEA 0183 4800 baud or NMEA 0183-HS 38400 baud)

The **GX6000** can select the NMEA baud rate between “4800 bps” and “38400 bps”. Refer to section “**18.9 NMEA 0183 IN/OUT**” for selection.

NMEA Input (GPS Information)

- **GX6000** can read NMEA 0183 version 2.0 or higher, and NMEA 0183-HS version 1.01 or higher.
- The NMEA 0183 input sentences are GLL, GGA, RMC, GNS, GSA, and GSV (RMC sentence is recommended).

- If 4800 baud (default) is selected:
The Blue and Green wires of input are at 4800 baud.
- If 38400 baud is selected:
The Blue and Green wires of input are at 38400 baud.

NMEA Output (DSC and GPS information)

- The NMEA 0183 output sentences are DSC and DSE.
- If 4800 baud (default) is selected:
 - a. The Gray and Brown wires output DSC and DSE sentences.
 - b. The Yellow and White wires of output AIS VDM sentence at 38400 baud.
- If 38400 baud is selected:
 - a. The Gray and Brown wires of output are at 38400 baud and includes both DSC (DSC, DSE) and AIS (VDM) sentences.
 - b. The Yellow and White wires always output AIS sentences at 38400 baud.
- GSA, GSV, GLL, GGA, and RMC sentences can be output in the **GX6000** by setting through the GPS setup menu (refer to section “**18.9 NMEA 0183 IN/OUT**”).

For further information on interfacing/setting up your GPS, please contact the manufacturer of the GPS receiver externally connected.

If you have further questions, please feel free to contact Product Support at:

Phone: (800) 767-2450

Email: marinetech@yaesu.com

7.5.3 Accessory Cables and NMEA 0183 Cables

The image and table below show the wires of the **GX6000** and the connections to optional devices such as an external GPS antenna, GPS chart plotter and an AIS receiver.

CAUTION

Care must be taken not to touch any of the NMEA wires to positive 12 VDC or the radio may be damaged.

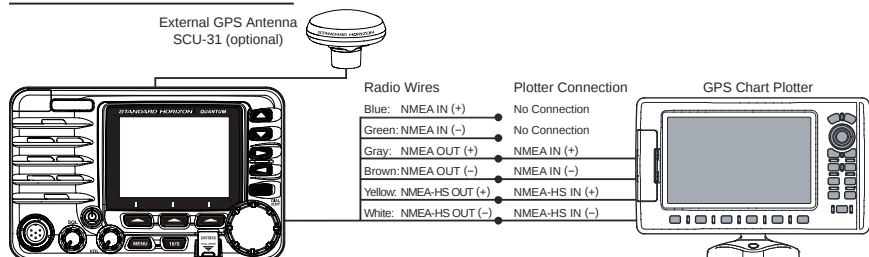
When connecting the GPS navigation receiver, strip off about 1 inch (2.5 cm) of the specified wire's insulation, then splice the ends together.

The **GX6000** uses NMEA 0183/HS protocol to share coordinates, DSC and AIS information to and from a GPS chart plotter. The **GX6000** transfers AIS information to a GPS chart plotter at 38400 baud (sometimes called HS or High Speed). GPS and DSC information is transferred between a GPS chart plotter with multiple ports (minimum 2) at 4800 baud (default setting).

To connect to a GPS chart plotter which has one NMEA port, the **GX6000** may be setup to receive GPS coordinates, send DSC and AIS signals at 38400 baud. Refer to section “**18.9 NMEA 0183 IN/OUT**” for details.

7.5.4 NMEA 0813/NMEA 0183-HS to Chart Plotter

4800 Baud Connections

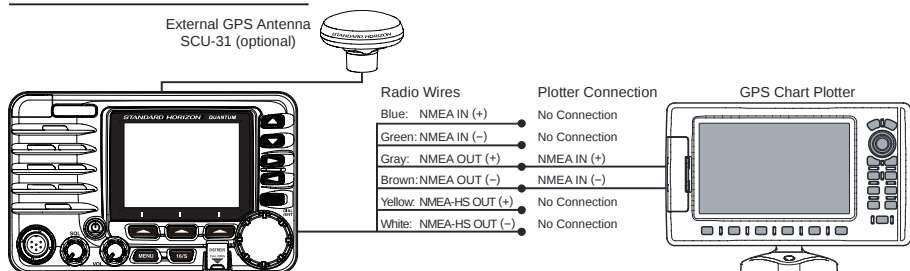


Wire Color/Description	Connection Examples
BLUE - NMEA GPS Input (+)	No connection
GREEN - NMEA GPS Input (-)	No connection
GRAY - NMEA DSC Output (+)	NMEA (+) input of GPS*1
BROWN - NMEA DSC Output (-)	NMEA (-) input of GPS*1
YELLOW - AIS Data Output (+)	NMEA-HS (+) input of AIS receiver*2
WHITE - AIS Data Output (-)	NMEA-HS (-) input of AIS receiver*2

*1: 4800 baud *2: 38400 baud

Note: Some GPS chart plotters have a single wire for NMEA signal ground. In such a case connect the NMEA input (-) to the GPS chart plotter's single NMEA signal ground wire, and leave the NMEA output (-) open. In case the assignment of power supply and ground of a GPS chart plotter to be used is different from that of the radio, connect the signal ground wire of the GPS chart plotter to the ground terminal (GND) on the rear panel of the radio.

38400 Baud Connections



Wire Color/Description	Connection Examples
BLUE - NMEA GPS Input (+)	No connection
GREEN - NMEA GPS Input (-)	No connection
GRAY - NMEA DSC Output (+)	NMEA (+) input of GPS*1
BROWN - NMEA DSC Output (-)	NMEA (-) input of GPS*1
YELLOW - AIS Data Output (+)	No connection*2
WHITE - AIS Data Output (-)	No connection*2

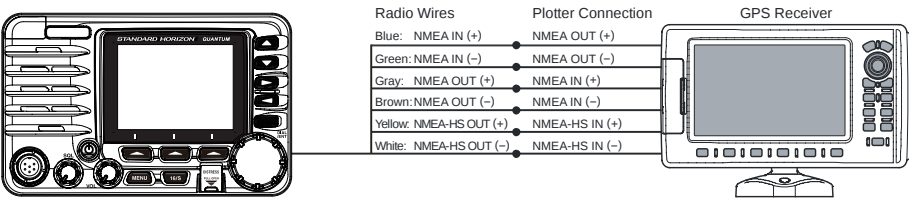
*1: The GPS chart plotter Com Port must be setup to 38400 baud (HS) to receive DSC and AIS sentences from the **GX6000** (Gray and Brown wires).

*2: The **GX6000** always outputs NMEA 0183-HS VDM sentence at 38400.

Note: Some GPS chart plotters have a single wire for NMEA signal ground. In such a case connect the NMEA input (-) to the GPS chart plotter's single NMEA signal ground wire, and leave the NMEA output (-) open. In case the assignment of power supply and ground of a GPS chart plotter to be used is different from that of the radio, connect the signal ground wire of the GPS chart plotter to the ground terminal (GND) on the rear panel of the radio.

7.5.5 Connection to External GPS or Chart Plotter

4800 Baud Connections

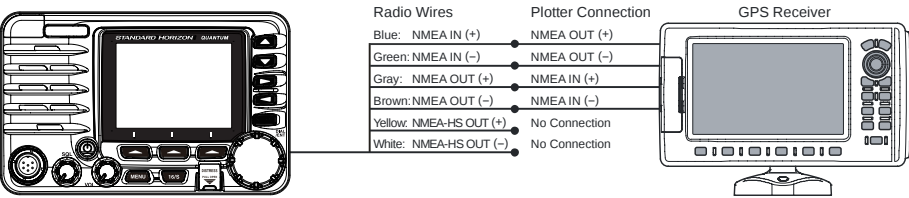


Wire Color/Description	Connection Examples
BLUE - NMEA GPS Input (+)	NMEA (+) output of GPS* ¹
GREEN - NMEA GPS Input (-)	NMEA (-) output or common ground of GPS* ¹
GRAY - NMEA DSC Output (+)	NMEA (+) input of GPS* ¹
BROWN - NMEA DSC Output (-)	NMEA (-) input of GPS* ¹
YELLOW - AIS Data Output (+)	NMEA-HS (+) input of AIS receiver* ²
WHITE - AIS Data Output (-)	NMEA-HS (-) input of AIS receiver* ²

*1: 4800 baud *2: 38400 baud

Note: Some GPS chart plotters have a single wire for NMEA signal ground. In such a case connect the NMEA input (-) to the GPS chart plotter's single NMEA signal ground wire, and leave the NMEA output (-) open. In case the assignment of power supply and ground of a GPS chart plotter to be used is different from that of the radio, connect the signal ground wire of the GPS chart plotter to the ground terminal (GND) on the rear panel of the radio.

38400 Baud Connections



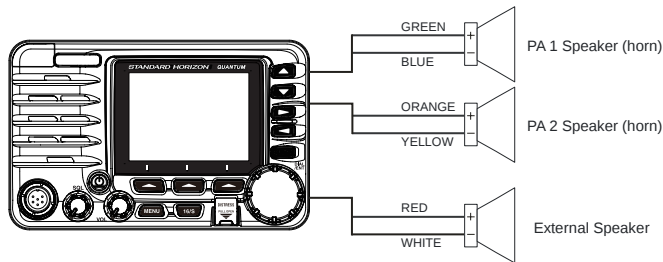
Wire Color/Description	Connection Examples
BLUE - NMEA GPS Input (+)	NMEA (+) output of GPS* ¹
GREEN - NMEA GPS Input (-)	NMEA (-) output or common ground of GPS* ¹
GRAY - NMEA DSC Output (+)	NMEA (+) input of GPS* ¹
BROWN - NMEA DSC Output (-)	NMEA (-) input of GPS* ¹
YELLOW - AIS Data Output (+)	No connection* ²
WHITE - AIS Data Output (-)	No connection* ²

*1: The GPS chart plotter ComPort must be setup to 38400 baud (HS) to send GPS coordinates to the **GX6000** (Blue and Green wires) and to receive DSC and AIS sentences from the **GX6000** (Gray and Brown wires).

*2: The **GX6000** always outputs NMEA 0183-HS VDM sentence at 38400.

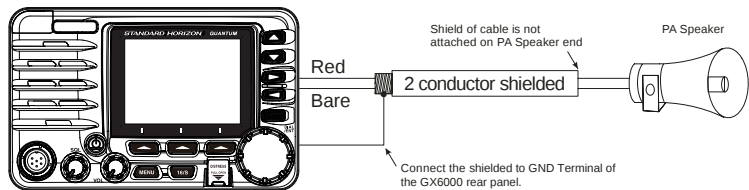
Note: Some GPS chart plotters have a single wire for NMEA signal ground. In such a case connect the NMEA input (-) to the GPS chart plotter's single NMEA signal ground wire, and leave the NMEA output (-) open. In case the assignment of power supply and ground of a GPS chart plotter to be used is different from that of the radio, connect the signal ground wire of the GPS chart plotter to the ground terminal (GND) on the rear panel of the radio.

7.5.6 Connection to External PA/HAIL Speaker



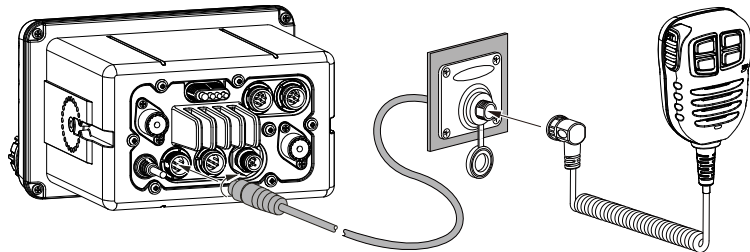
Wire Color/Description	Connection Examples
RED - External Speaker (+)	Positive wire of external 4 Ohm External speaker
WHITE - External Speaker (-)	Negative wire of external 4 Ohm External speaker
GREEN - PA1 Speaker (+)	Positive wire of external 4 Ohm audio speaker (horn)
BLUE - PA1 Speaker (-)	Negative wire of external 4 Ohm audio speaker (horn)
ORANGE - PA2 Speaker (+)	Positive wire of external 4 Ohm audio speaker (horn)
YELLOW - PA2 Speaker (-)	Negative wire of external 4 Ohm audio speaker (horn)

In some areas powerful AM broadcast stations may be heard when in listen-back mode. In this case change the speaker wire to 2-conductor shielded audio cable. See the illustration below for connections.



7.5.7 Rear Microphone Installation

The GX6000 has an additional microphone connector on the rear panel that provides the same function as that on the front panel. Connect the optional MEK-4 (microphone extension kit) to the Rear MIC (six pin) connector on the rear panel, then tighten the cable nut (see illustration at the below).



In addition, the GX6000 is capable of connecting hand microphone to the connector on either the front or rear panels.

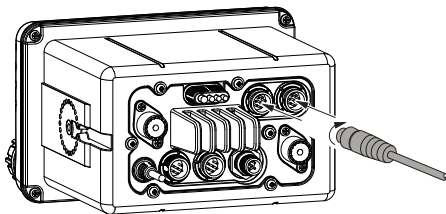
Optional SSM-70H (RAM4) Installation

The **GX6000** is capable of using two **SSM-70H (RAM4)** Remote Station Microphones to remotely control the Radio, AIS, DSC and PA/Fog functions. In addition the **GX6000** can operate as a full function intercom system between the **SSM-70H (RAM4)** and the **GX6000**.

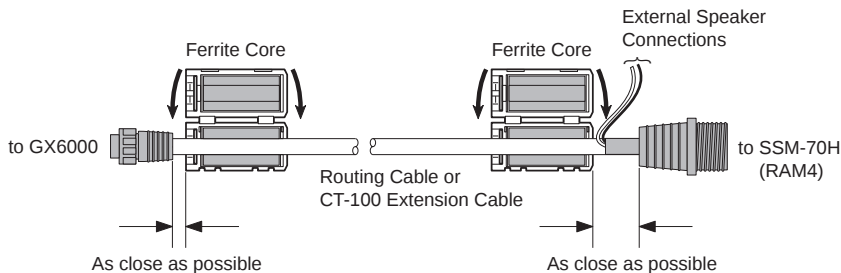
WARNING

Do not connect or remove the SSM-70H (RAM4) microphone while the radio is powered on. This may result in equipment failure.

1. Connect the Routing Cable (supplied with the **SSM-70H**) to the RAM-1 or RAM-2 (eight pin) connectors on the rear panel, then tighten the cable nut (see illustration at the below).



2. Install the two ferrite core (supplied with the **SSM-70H** Remote Station Microphone) to the routing cable or the **CT-100** extension cable, then snap its two halves together. These require to install near the connector by the each side of a transceiver and a microphone of the cable.
3. Attach the ferrite cores as close as possible to the plugs, as shown below.



NOTE

Caution!: Before cutting the cable, it must be disconnected from the rear panel of the transceiver.

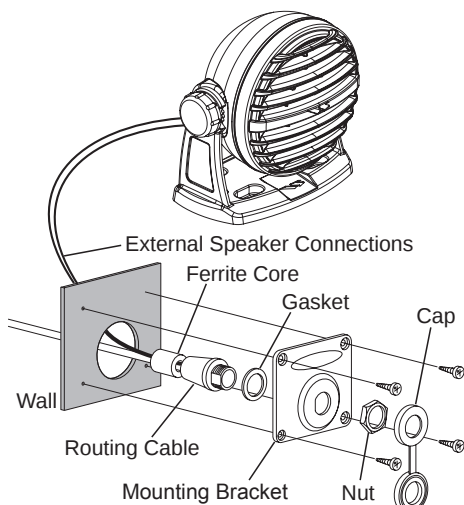
The routing cable can be cut and spliced, however care needs to be taken when reconnecting the wires to ensure water integrity.

After cutting you will notice there are the following wires:

Yellow, White, Brown, Gray, Blue, Green, Red/White*, Shield*

* The red/white and shield wires are wrapped in foil. Remove the foil, and separate the red/white and shield wires.

4. Finally, wind some plastic tape around each ferrite core, to prevent vibration from causing the two halves to split apart.
5. Referring to illustration right, make a 1.2" (30 mm) hole in the wall, then insert the extension cable into this hole. Connect the gasket and mount base to the extension cable connector using the nut.
6. Drill the four screw holes (approx. 2 mm) on the wall, then install the mounting base to the wall using four screws.
7. Put the rubber cap on to the nut. The installation is now complete.



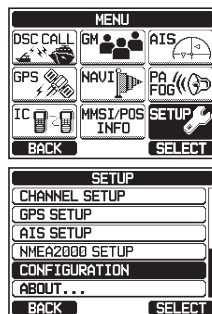
WARNING

It is not recommended to plug or unplug the **SSM-70H (RAM4)** Remote Station Microphone into the routing cable while the radio is powered on.

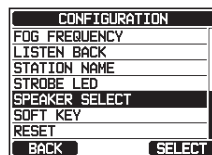
Connecting an External Speaker to the RAM4 Mic Cable

In noisy locations and **MLS-300/MLS-310** optional external speaker may be connected to the white speaker wires on the **RAM4** routing cable. The **RAM4** can drive the internal speaker or the external speaker one at a time. When connecting an external speaker, follow the procedure below to turn off the **RAM4** audio and enable the external speaker wires on the **RAM4** routing cable.

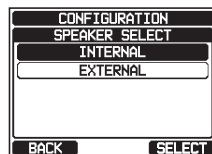
1. On the **RAM4** mic, press the **MENU** key to display "MENU".
2. Rotate the **DIAL/ENT** knob to select "SETUP", then press the **[SELECT]** soft key.
3. Rotate the **DIAL/ENT** knob to select "CONFIGURATION", then press the **[SELECT]** soft key.



4. Rotate the **DIAL/ENT** knob to select “**SPEAKER SELECT**”, then press the **[SELECT]** soft key.



5. Rotate the **DIAL/ENT** knob to select “**INTERNAL**” or “**EXTERNAL**”, then press the **[SELECT]** soft key.



6. Press the **CLEAR/On** key to return to radio operation.

7.6 INITIAL SETUP REQUIRED WHEN TURNING ON THE POWER FOR THE FIRST TIME

7.6.1 Maritime Mobile Service Identity (MMSI)

What is an MMSI?

An MMSI is a nine digit number used on marine transceivers capable of using Digital Selective Calling (DSC) and Automatic Identification System (AIS) signal transmission. This number is used like a telephone number to selectively call other vessels.

THIS NUMBER MUST BE PROGRAMMED INTO THE RADIO TO OPERATE DSC FUNCTIONS.

How can I obtain an MMSI assignment?

In the USA, visit the following websites to register:

<http://www.boatus.com/mmsi/>

<https://www.seatow.com/tools-and-education/mmsi>

http://wireless.fcc.gov/services/index.htm?job=licensing&id=ship_stations

In Canada, visit

<http://www.ic.gc.ca/epic/site/smt-gst.nsf/en/sf01032e.html>

WARNING

The MMSI can be inputted only once, please be careful not to input the incorrect MMSI number. If you need to change the MMSI number after it has been entered, the radio will have to be returned to Factory Service. Refer to the section “**21.2 FACTORY SERVICE**”.

Programming the MMSI

1. Press the **MENU** key to display “MENU”.
2. Rotate the **DIAL/ENT** knob to select “**MMSI/POS INFO**”, then press the **[SELECT]** soft key. (To cancel, press the **[BACK]** soft key.)

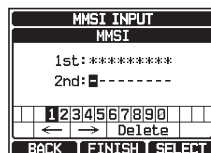
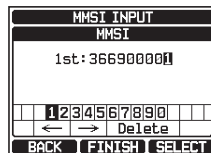
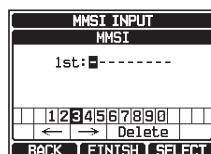
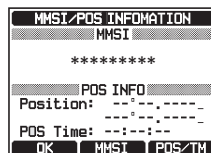
To view your MMSI to ensure it is correct, perform steps 1 to 2.

3. Press the **[MMSI]** soft key.

The **[MMSI]** soft key is displayed which has not yet set the MMSI.

In the case of the GX6000 which has completed the MMSI setting, you can only check the MMSI on this screen.

4. Rotate the **DIAL/ENT** knob to select the first number of your MMSI, then press the **[SELECT]** soft key to step to the next number.
5. Repeat step 4 to set your MMSI number (9 digits).
6. If a mistake was made entering in the MMSI number, rotate the **DIAL/ENT** knob to select “←” or “→”, press the **[SELECT]** soft key until the wrong character is selected, then perform step 4.
7. When finished programming the MMSI number, press the **[FINISH]** soft key. The radio will ask you to input the MMSI number again. Perform steps 4 through 6 above.
8. After the second number has been input, press the **[FINISH]** soft key to store the MMSI.
9. Press the **[OK]** soft key to return to radio operation.



NOTE

To view your MMSI after programming to ensure it is correct, perform steps 1 to 2. Look that the MMSI number shown on the display is correct.

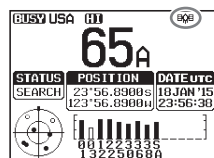
7.7 CHECKING GPS SIGNAL (GPS STATUS DISPLAY)

When the **GX6000** receives the GPS signal from the optional SCU-31, a small satellite icon “GPS” will appear on the display and your current location (latitude/longitude) is shown on the display. (*When the GPS signal receiving from the NMEA 2000 or NEMA-0183, a “2K” (NMEA 2000) icon or “I/O” (NMEA-0183) icon will appear on the display.)

NOTE

If there is a problem with the NMEA connection between the radio and the GPS, the GPS icon will blink continuously until the connection is corrected.

The **GX6000** has a GPS status display which shows the satellites currently being received, along with a graphical (bar-graph) representation of the relative signal strengths from the satellites.

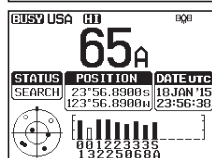
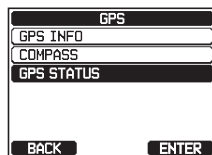


(GPS STATUS DISPLAY MODE)

NOTE

For the **GX6000** to properly show the GPS status page when an external GPS antenna or a chart plotter is connected it must be setup to output GSA and GSV NMEA 0183 sentences. When using the equipment of NMEA 2000, it must be able to output PGN No.129540 (GNSS Sats in View).

1. Press the **MENU** key to display “MENU”.
2. Rotate the **DIAL/ENT** knob to select “GPS”, then press the **[SELECT]** soft key.
3. Rotate the **DIAL/ENT** knob to select “GPS STATUS”, then press the **[ENTER]** soft key to display the GPS status currently being received.
4. Press the **CLEAR** key to return to radio operation.

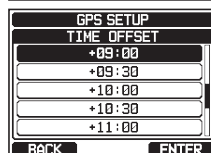
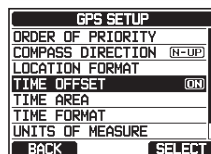
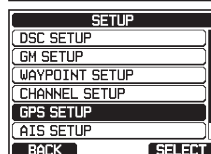


7.8 GPS CONFIGURATION

7.8.1 Changing the GPS Time

The **GX6000** shows GPS satellite time or UTC (Universal Time Coordinated) time in factory default. A time offset is needed to show the local time in your area. The time offset must be changed in order for the radio to display the current time in your area.

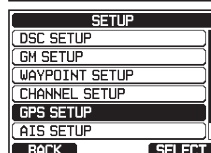
1. Press the **MENU** key to display “MENU”.
2. Rotate the **DIAL/ENT** knob to select “**SETUP**”, then press the **[SELECT]** soft key.
3. Rotate the **DIAL/ENT** knob to select “**GPS SETUP**”, then press the **[SELECT]** soft key.
4. Rotate the **DIAL/ENT** knob to select “**TIME OFFSET**”, then press the **[SELECT]** soft key.
5. Rotate the **DIAL/ENT** knob to select time offset of your location. See illustration above to find your offset time. If “00:00” is assigned, the time is the same as UTC or GPS satellite time.
6. Press the **[ENTER]** soft key to store the time offset.
7. Press the **CLEAR** key to return to radio operation.



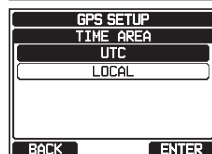
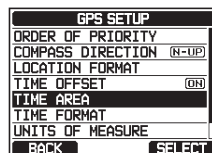
7.8.2 Changing the Time Area

This menu selection allows the radio to show UTC time or local time with offset.

1. Press the **MENU** key to display “MENU”.
2. Rotate the **DIAL/ENT** knob to select “**SETUP**”, then press the **[SELECT]** soft key.
3. Rotate the **DIAL/ENT** knob to select “**GPS SETUP**”, then press the **[SELECT]** soft key.



4. Rotate the **DIAL/ENT** knob to select “**TIME AREA**”, then press the **[SELECT]** soft key.
5. Rotate the **DIAL/ENT** knob to select “**UTC**” or “**LOCAL**”.
6. Press the **[ENTER]** soft key to store the selected setting.
7. Press the **CLEAR** key to return to radio operation.



7.8.3 Changing the Time Format

This menu selection allows the radio to setup to show time in 12-hour or 24-hour format.

1. Press the **MENU** key to display “**MENU**”.
2. Rotate the **DIAL/ENT** knob to select “**SETUP**”, then press the **[SELECT]** soft key.
3. Rotate the **DIAL/ENT** knob to select “**GPS SETUP**”, then press the **[SELECT]** soft key.
4. Rotate the **DIAL/ENT** knob to select “**TIME FORMAT**”, then press the **[SELECT]** soft key.
5. Rotate the **DIAL/ENT** knob to select “**24hour**” or “**12hour**”.
6. Press the **[ENTER]** soft key to store the selected setting.
7. Press the **CLEAR** key to return to radio operation.

