

 **STANDARD HORIZON**

HX470S

Submersible Tri-Band Marine Portable

Owner's Manual



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Congratulations on your purchase of the **HX470S**! Whether this is your first portable marine VHF transceiver, or if you have other STANDARD HORIZON equipment, the STANDARD HORIZON organization is committed to ensuring your enjoyment of this high performance transceiver, which should provide you with many years of satisfying communications even in the harshest of environments. STANDARD HORIZON technical support personnel stands behind every product sold, and we invite you to contact us should you require technical advice or assistance.

We appreciate your purchase of the **HX470S**, and encourage you to read this manual thoroughly, so as to learn and fully understand the capabilities of the **HX470S**.

WARNING

This radio is capable of transmitting on VHF Marine, FRS and MURS.

The FCC allows the use of VHF Marine band on water areas only. However the FCC does not allow the use of the VHF Marine band when on land. If persons use the VHF Marine Band on land and interfere with others communicating, the FCC will be notified and search for the interference. Responsible parties found to be transmitting on the VHF Marine Band on land could be fined up to \$10,000 for the first offense.

FRS and MURS Bands may be used on the land and water. The FCC does however prohibit the use in aircraft.

RF EXPOSURE SAFETY STATEMENT

SAFETY INFORMATION

Your wireless handheld portable transceiver contains a low power transmitter. When the Push-to-Talk (PTT) button is pushed, the transceiver sends out radio frequency (RF) signals. In August 1996, the Federal Communications Commission adopted RF exposure guidelines with safety levels for hand-held wireless devices.

This device is authorized to operate at a duty factor not to exceed 50% (this corresponds to 50% transmission time and 50% reception time).

WARNING: To maintain compliance with the FCC's RF exposure guidelines, this transmitter and its antenna must maintain a separation distance of at least 1 inch (2.5 centimeters) from your face. Speak in a normal voice, with the antenna pointed up and away from the face at the required separation distance.

If you use a headset accessory for this radio, with the radio worn on your body, use only the Vertex Standard belt clip for this transceiver, and ensure that the antenna is at least 1 inch (2.5 centimeters) from your body when transmitting.

Use only the supplied antenna. Unauthorized antennas, modifications, or attachments could damage the transmitter, and may violate FCC regulations.

FCC RADIO LICENSE INFORMATION

Standard Horizon radios comply with the Federal Communication Commission (FCC) and Industry-Canada requirements that regulate the Maritime Radio Service.

MARITIME STATION LICENSE

An FCC ship station license is no longer required for any vessel traveling in U.S. waters which uses a VHF marine radio, RADAR or EPIRB, and which is not required to carry radio equipment. However, any vessel required to carry a marine radio on an international voyage, carrying a HF single side band radiotelephone or marine satellite terminal. FCC license forms, including applications for ship (506) and land station licenses can be downloaded via the Internet at www.fcc.gov/forms. To obtain a form from the FCC, call (888) 225-5322.

MARINE RADIO CALL SIGN

Currently the FCC does not require recreational boaters to have a Ship Radio Station License. The USCG recommends the boats registration number and the state to be used.

CANADIAN SHIP STATION LICENSING

You may need a license when traveling in Canada. If you do need a license contact their nearest field office or regional office or write:

**Industry Canada
Radio Regulatory Branch
Attn: DOSP
300 Slater Street
Ottawa, Ontario
Canada, KIA 0C8**

FCC/INDUSTRY CANADA INFORMATION

The following data pertaining to the transceiver is necessary to fill out the license application.

FCC Type Accepted: Part 80
Output Power with FNB-80LI: 1 W (Low), 2.5 W (Mid), and 5 W (High)
Emission: 16K0F3E
Frequency Range: 156.025 to 163.275MHz
FCC Type Number: K66HX470S
Industry Canada Type Approval: Approval Pending

FRS AND MURS LICENSING

No FCC license is required to use the FRS or MURS Frequencies. You are allowed to operate the **HX470S** on the FRS and MURS channels if you are not a representative of a foreign government, and if you cooperate in the selection and use of channels in order to reduce interference to others. There is no need to identify your transmissions with a call sign; however you must monitor the channel before transmitting to reduce interference with other stations.

FCC NOTICE

Unauthorized changes or modifications to this equipment may void compliance with FCC Rules. Any change or modification must be approved in writing by STANDARD HORIZON, a Marine Division of VERTEX STANDARD.

NOTICE

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced marine electronics technician for help.

1. GENERAL INFORMATION

1.1 INTRODUCTION

The **HX470S** is a SUBMERSIBLE miniature 5-Watt portable two way Tri-Band marine transceiver. The transceiver has all allocated USA, International, or Canadian channels. It has an emergency channel 16 which can be immediately selected from any channel by pressing the [16/9] key. NOAA Weather channels can also be accessed immediately by pressing the [WX] key. In addition to these functions the **HX470S** can transmit a Digital Selective Distress Call with Latitude/Longitude when a GPS is connected to the **CD-25** Cradle Charger.

Besides VHF marine transceiver operation, the **HX470S** provides FRS (Family Radio Service) 460 MHz (0.5 Watts) and MURS (Multi-Use Radio Service) 152 MHz (2 Watts) transceiver operation, receive ONLY coverage of AM, FM broadcast bands and AM aircraft bands.

The **HX470S** includes the following features: Memory Scanning, Priority Scanning, NOAA Weather Alert, Battery Saver, easy-to-read large LCD display, EEPROM memory back-up, Battery Life displayed on LCD, and a transmit Time-Out Timer (TOT).

In the marine band, the transmitter provides a maximum of 5 Watts output, and has the selection of 2.5 Watts and 1 Watt to assist the user in ensuring maximum battery life.

The optional **SU-1** Barometric Pressure Sensor Unit can be installed to provide readout of the current barometric pressure.

Or (not simultaneously)

The optional **FVP-31** Voice Scrambler can be installed to permit secure voice communications with other Standard Horizon radios with the FVP-31 or CVS2500 scramblers installed.

2. ACCESSORIES

2.1 PACKING LIST

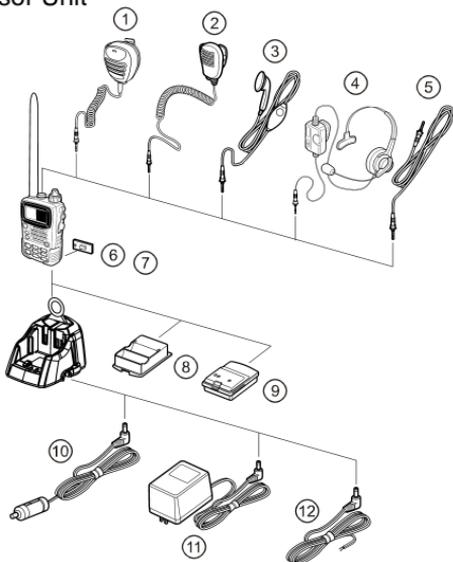
When the package containing the transceiver is first opened, please check it for the following contents:

- HX470S** Transceiver
- FNB-80LI** 1300 mAh Lithium Ion Battery Pack
- CD-25** Charger Cradle for **HX470S**
- NC-72B** 120VAC Wall Charger for **CD-25**
- E-DC-19** DC Cable with 12 V Cigarette Lighter Plug for **CD-25**
- CLIP-14** Belt Clip with screw
- Lanyard
- Owner's Manual

2.2 OPTIONS

- ① **CMP460** Noise-canceling Waterproof Speaker/Microphone
- ② **MH-57A4B** Mini Speaker/Microphone
- ③ **VC-27** Earpiece/Microphone
- ④ **VC-25** VOX Headset
- ⑤ **CT-32** Clone Cable
- ⑥ **SU-1** Barometric Pressure Sensor Unit
- ⑦ **FVP-31** Voice Scrambler
- ⑧ **FBA-23** Alkaline Battery Case
- ⑨ **FNB-80LI** 1300mAh Lithium Ion Battery Pack
- ⑩ **E-DC-19** DC Cable with 12 V Cigarette Lighter Plug
- ⑪ **NC-72C** 230-240 VAC Wall Charger for the **FNB-80LI**
- ⑫ **E-DC-6** DC Cable; plug and wire only

Note: Before operating the **HX470S** for the first time, it is recommended that the battery be charged. Please see section **10.3** "USING THE **CD-25** BATTERY CRADLE" for details.



3. ABOUT THIS RADIO

3.1 VHF MARINE BAND

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” Actual transmission range depends much more on antenna type, gain and height than on the power output of the transmitter. On a fixed mount 25W radio transmission expected distances can be greater than 15 miles, for a portable 5W radio transmission the expected distance can be greater than 5 miles in “line of sight”.



3.2 FRS (FAMILY RADIO SERVICE)

FRS is a private, two-way, very short-distance voice communications service for facilitating family and group activities



Areas of Operation

You may operate your FRS radio in the United States and certain locations specified by the FCC [95.192].

If you want to use FRS aboard a vessel or aircraft owned or operated by a U.S. citizen or company, you will need permission from the captain of the vessel.

You must share the channel with other users [95.191(b)]. There is no meaningful way to share the channel with others unless you listen before transmitting and wait until the channel is available before you transmit. To listen to the channel, you must disable any tone squelch.

Also, you must at all times and on all FRS channels, give priority to emergency messages [95.193(d)].

3.3 ABOUT MURS (MULTIPLE-USE RADIO SERVICE)

MURS is a private, two-way, short distance voice communication service for personal or business activities of the general public in the United States.



Areas of Operation

You may operate your MURS radio anywhere the FCC Rules permit CB operation. If you want to use MURS aboard a vessel owned or operated by a U.S. citizen or company, you will need permission from the captain of the vessel.

You must *not* operate your MURS radio aboard any aircraft in flight.

There are additional requirements with which you must comply if you wish to operate a MURS radio in Puerto Rico or certain other Caribbean Islands, in order to avoid interference to the Arecibo Observatory.

Transmission range:

At the 150 MHz frequencies of MURS, communications range is dependent on antenna height and on the surrounding environment. Range between two handheld MURS radios will vary, but should be between **a half mile to perhaps several miles** (in open terrain with no obstacles). If you are using the radios inside a vehicle, the range will be somewhat less.

MURS Comparison with FRS

Compared with **FRS** (Family Radio Service) at 460 MHz:

- MURS (at 150 MHz) permits four times more power (2 Watts TPO instead the 0.500 Watts ERP limit for FRS).
- At MURS frequencies, signals bend over hills better, but FRS signals are better at bouncing off of surfaces and penetrating into/escaping out of buildings.

3.4 ABOUT RECEIVE ONLY CHANNELS and FREQUENCIES

AM/FM Broadcast Bands

The AM/FM bands contained within the **HX470S** are the same channels you use every day to listen to music, news and commentary with your car or home stereo.

The AM broadcast band currently extends from 530 to 1700 kHz. Channels are spaced in even 10 kHz increments; i.e.: 530, 540, 550, ... , 1600 kHz in the United States and Canada. Elsewhere, channels are spaced in 9 kHz increments, i.e.: 531, 540, 549, etc.



The FM broadcast band in the United States extends from 88 to 108 MHz. Channels are assigned at 200 kHz increments; i.e.: 88.1, 88.3, 88.5, ... , 107.9. The channels from 88.1 to 91.9 are reserved for non-commercial educational stations. Outside the United States and Canada, the boundaries and channel spacing vary. In Japan, the band starts at 76 MHz. In Western Europe, the band generally runs from 88-108 MHz, but channels can be irregularly spaced, i.e.: 101.25 MHz.



AIR (Aircraft) Bands

The AM VHF aeronautical communications band lies between 108.000 MHz and 136.975 MHz. This frequency spectrum can be divided into a lower and upper range. The lower range between 108.000 MHz and 118.000 MHz is primarily used for navigational aids such as the ILS - Instrument Landing Systems, DME - Distance Measuring Equipment, and VOR's - Very High Frequency Omni Range. The lower range offers very little in the way of voice communications, it does however provide someone with a working knowledge of Morse code the opportunity to identify various beacons. The upper range of the aeronautical band 118.000 MHz to 136.975 MHz is where the majority of voice communications can be monitored. Communications in the VHF band are transmitted in AM mode and most if not all compatible receivers automatically default to this mode. Frequencies within the aeronautical range are spaced in increments of 25 kHz, as such you will find transmissions at 118.000, 118.025, 118.050 MHz etc.



The frequency(s) you monitor will determine the nature of traffic you will hear. As previously mentioned frequencies in the lower range of the aero-

nautical band are mostly occupied by navigational equipment and transmit non voice signals in Morse code. If you select a frequency in the upper range the air is suddenly filled with conversations between pilots and air traffic controllers, pilots and their company dispatchers, flight service stations, and ATIS broadcasts. Frequencies within the aeronautical band are designated according to their usage

4. GETTING STARTED

If the radio has never been used, or its charge is depleted, it may be charged by connecting the **CD-25** Charger Cradle with the **NC-72** battery charger, as shown in the illustration. If 12V DC power is available, the optional **E-DC-19** DC Cable with 12 V Cigarette Lighter Plug or the optional **E-DC-6** DC Cable may be used for charging the battery. The **NC-72**, **E-DC-19** and **E-DC-6** will charge a completely discharged **FNB-80LI** battery pack in about 3 hours.

4.1 BATTERIES AND CHARGERS

The **FNB-80LI** is a high performance Lithium-Ion battery providing high capacity in a very compact package.

CAUTION

To avoid risk of explosion and injury, **FNB-80LI** battery pack should only be removed, charged or recharged in non-hazardous environments.

4.1.1 BATTERY SAFETY

Battery packs for your transceiver contain Lithium-Ion batteries. This type of battery stores a charge powerful enough to be dangerous if misused or abused, especially when removed from the transceiver. Please observe the following precautions:

DO NOT SHORT BATTERY PACK TERMINALS: Shorting the terminals that power the transceiver can cause sparks, severe overheating, burns, and battery cell damage. If the short is of sufficient duration, it is possible to melt battery components. Do not place a loose battery pack on or near metal surfaces or objects such as paper clips, keys, tools, etc. When the battery pack is installed on the transceiver, the terminals that transfer current to the transceiver are not exposed. The terminals that are exposed on the battery pack when it is mounted on the transceiver are charging terminals only and do not constitute a hazard.

DO NOT INCINERATE: Do not dispose of any battery in a fire or incinerator. The heat of fire may cause battery cells to explode and/or release dangerous gases.

Battery Maintenance

For safe and proper battery use, please observe the following:

- Battery packs should be charged only in non-hazardous environments;
- Use only STANDARD HORIZON-approved batteries;
- Use only a STANDARD HORIZON, (a Marine Division of VERTEX STANDARD) approved charger. The use of any other charger may cause permanent damage to the battery.
- Follow charging instructions provided with the chargers.
- Keep the battery contacts clean.

Battery Storage

Store batteries in a cool place to maximize storage life. Since batteries are subject to self-discharge, avoid high storage temperatures that cause large self-discharge rates. After extended storage, a full recharge is recommended.

Battery Recycling

**DO NOT PLACE USED BATTERIES IN YOUR REGULAR TRASH!
LITHIUM-ION BATTERIES MUST BE COLLECTED, RECYCLED OR DIS-
POSED OF IN AN ENVIRONMENTALLY SOUND MANNER.**

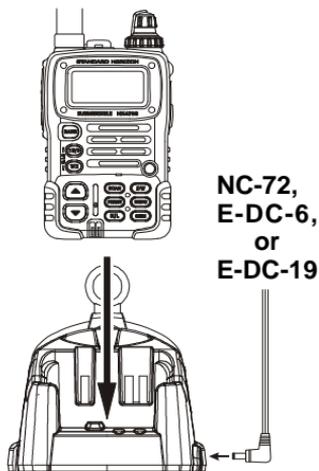
The incineration, land filling or mixing of nickel-cadmium batteries with the municipal solid waste stream is PROHIBITED BY LAW in most areas.

Return batteries to an approved lithium-ion battery recycler. This may be where you purchased the battery.

Contact your local waste management officials for other information regarding the environmentally sound collection, recycling and disposal of lithium-ion batteries.

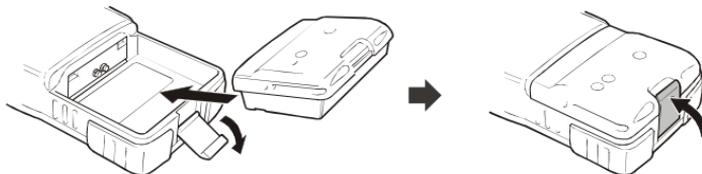
4.1.2 BATTERY CHARGING

If the radio has never been used, or its charge is depleted, it may be charged by connecting the **CD-25** Charger Cradle with the **NC-72** battery charger, as shown in the illustration. If 12V DC power is available, the optional **E-DC-19** DC Cable with 12 V Cigarette Lighter Plug or the optional **E-DC-6** DC Cable may be used for charging the battery. The **NC-72**, **E-DC-19** and **E-DC-6** will charge a completely discharged **FNB-80LI** battery pack in about 3 hours.



4.1.3 BATTERY INSTALLATION/REMOVAL

1. Turn the transceiver off.
2. To install, insert the battery pack into the battery compartment on the back of the transceiver, then close the Battery Pack Latch until it locks in place with a “click.”



3. To remove, open the Battery Pack Latch on the bottom of the transceiver, then slide the battery downward and out from the transceiver.

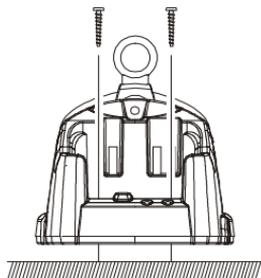
4.1.4 USING THE CD-25 CHARGER CRADLE

1. Turn the transceiver off.
2. Insert the DC plug from the **NC-72** into the DC jack on the **CD-25** rear panel, then plug the **NC-72** into the AC line outlet.
3. Insert the **HX470S** (with the battery pack) into the **CD-25**; the antenna should be at the left side when viewing the charger from the front.
4. If the **HX470S** is inserted correctly, the Red “**CHARGING**” indicator will glow. A fully-discharged pack will be charged completely in approximately 3 hours.
5. The Red “**CHARGING**” indicator will blink when charging is nearing completion.
6. When charging is completed, the Red “**CHARGING**” indicator will disappear, and the Green “**FULL**” indicator will glow. Disconnect the pack from the **CD-25**, and unplug the **NC-72** from the AC line outlet.

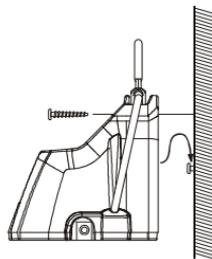
4.1.5 MOUNTING THE CD-25 ON THE VESSEL

The **CD-25** is designed to be surface or wall mounted on a vessel which can be connected to the charger and a GPS that supplies NMEA data for DSC Distress transmissions.

If mounting on a vessel the **CD-25** must be mounted in a location on the vessel that is directly shielded from rain or splashes of water. After the location is found mount the **CD-25** using the supplied mounting screws.

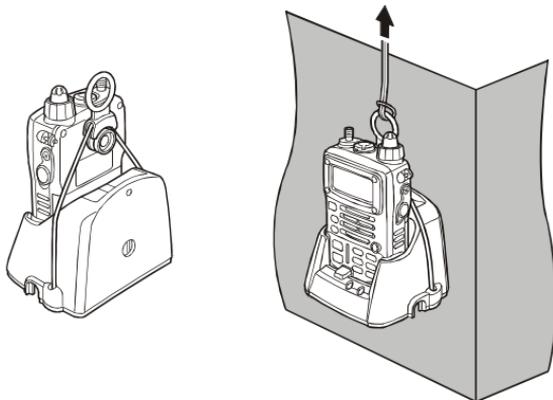


CD-25 Desktop Mount



CD-25 Wall Mount

When using the **HX470S/CD-25** on the vessel, be sure to secure the mounting band on the **CD-25** so that it secures the **HX470S** so it will not fall out due to rough seas. See the illustration below.



4.2 CONNECTING A GPS TO THE CD-25

The **CD-25** is supplied with a cable that is designed to be connected to any GPS that has an NMEA Output with the GLL, RMB or RMC sentences. Check with the owner's manual of the GPS to confirm this information. The NMEA input cable on the **CD-25** contains two wires, uses are shown below.

Blue – NMEA Input (Connects to NMEA Out of GPS)

Green – NMEA Negative (Connects to NMEA Negative or battery Ground of GPS)

If you have further inquires, please feel free to contact us at:

Phone: (800) 767-2450

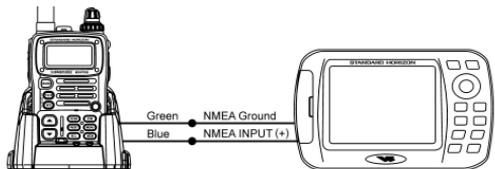
Fax: (714) 527-9031

Web site: standardhorizon.com

Email: marinetech@vxstdusa.com

Manufacturer/Model	Wires	HX470S (CD-25)	Manufacturer/Model	Wires	HX470S (CD-25)
STANDARD HORIZON CP150, CP160 and CP-170C	Green	Green	Lowrance Portable	Orange	Blue
	Brown	Blue		Black (GND)	Green
Furuno GP30, 36	White	Blue	Magellan Fixed Mount	Gray	Blue
	Blue	Green		Black (GND)	Green
Furuno GP1650, 1850	White	Blue	Magellan Portable	Orange	Blue
	Black	Green		Black (GND)	Green
Garmin Fixed Mounts	Blue	Blue	Northstar	Yellow	Blue
	Black (GND)	Green		Black (GND)	Green
Garmin Portables	Brown	Blue	Raytheon 420	Yellow	Blue
	Black (GND)	Green		Brown	Green
JRC GPS500	Yellow	Blue	Raytheon 520 / 620	Blue	Blue
	Green	Green		Brown	Green
JRC 100 SERIES	Green	Blue	Raytheon RL SERIES	White	Blue
	Black	Green		Brown	Green
JRC 200 SERIES	White	Blue	Simrad	White	Blue
	Black	Green		Brown	Green
Lowrance Fixed Mount	White	Blue	Sitex Neptune, Nautilus	Gray	Blue
	Black (GND)	Green		Brown	Green

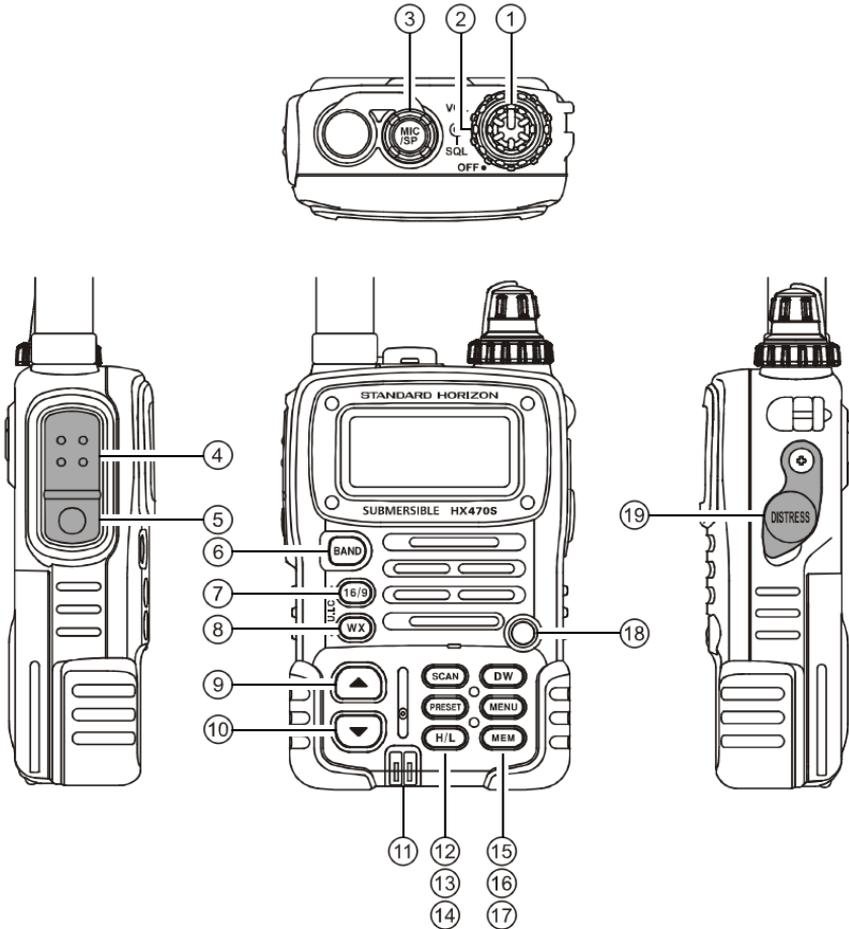
To connect to a GPS receiver, please use the above chart that will help you connect the wires between the **CD-25** and the GPS. Insure that the wires are properly shielded from water. See the figure at the right for example of connection to STANDARD HORIZON GPS CHART PLOTTER.



5. CONTROLS AND SWITCHES

NOTE

This section defines each control of the transceiver. For detailed operating instructions, refer to section 6 "BASIC OPERATION." Refer to illustrations for the location of the following controls, switches, and connections.



① **POWER SWITCH/VOLUME CONTROL**

Turns the transceiver on and off, and adjusts the volume.

② **SQUELCH (SQL) CONTROL**

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 the reception of wanted transmissions.

③ **MIC/SP JACK**

The jack accepts the optional **CMP460** Speaker/Microphone, **MH-57A4B** Mini Speaker/Microphone, **VC-25** VOX Headset or **VC-27** Earpiece/Microphone. When this jack is used, the internal speaker is disabled.

④ **PUSH-TO-TALK (PTT) SWITCH**

When pushed activates the transmitter of the selected band.

⑤ **LAMP (KEY LOCK) KEY**

Press to turn the LCD and keypad backlighting on or off.

Hold down this key to lock the keypad (except the **PTT**, **LAMP**, and **[H/L]** keys) so that they are not accidentally changed. The key lock symbol will appear on the LCD, to indicate that the functions are locked. Hold down until the key lock symbol disappears to unlock the radio.

⑥ **[BAND] KEY**

Press to select the VHF Marine, FRS , MURS , FM Broadcast, AM Broadcast, and AIR (aircraft) bands.

⑦ **[16/9] KEY**

Immediately recalls channel 16 from any marine channel or band location. Holding down this key recalls channel 9.

⑧ **[WX] KEY**

Immediately recalls the last-used NOAA Weather Channel from any channel location. Recalls the previously- selected working channel when the **[WX]** key is pressed again.

Secondary use:

When the **[16/9]** key is held *and* the **[WX]** key is pressed, the radio will change the marine channel between the USA, International, and Canadian channels.

⑨ **[▲(UP)] KEY**

Press to select a desired channel. Each press increases the channel number. When held down, the channels increase continuously.

⑩ **[▼(DOWN)] KEY**

Press to select a desired channel. Each press decreases the channel number. When held down, the channels decrease continuously.

⑪ **NMEA TERMINAL**

Connect to GPS receiver that outputs NMEA sentences GLL, GGA, GNS, and RMC via the **CD-25** Charger Cradle. Keep these terminals clean.

⑫ **[SCAN] KEY**

Starts scanning and priority scanning of programmed channels. When scanning, press and hold this key to turn on and off priority scan (P is shown on the left side of the display during Priority scanning).

⑬ **[PRESET] KEY**

Immediately recalls one of up to 10 user preset memories for each band (shown as P0-P9 on the LCD). Pressing this key repeatedly scrolls through the preset memory channels.

⑭ **[H/L] KEY**

On the Marine Band, changes the transmitter output power between High (5 Watts), Medium (2.5 Watts), and Low (1 Watt). Does not operate on “Low power only”, Marine “transmission inhibit,” or FRS/MURS channels.

⑮ **[DW] KEY**

Automatically scans between the priority channel and another selected channel (including FRS or a MURS channel). When receiving a signal on the selected channel the radio will dual watch to the priority channel.

⑯ **[MENU] KEY**

Select the Marine Band then press to select the Setup mode. This mode allows features and functions to be changed.

Refer to section 13. MENU (“SET”) MODE for additional information.

⑰ [MEM] KEY

Press this key to memorize the selected channel for scanning. When pressed a “MEM” icon will be shown on the LCD display indicating the channel has been saved to scan memory. The scan memory is only used with the Marine and WX channels.

To delete the channel from scan memory, select the channel and press this key until “MEM” is removed from the display.

⑱ BUSY/TX INDICATOR

This indicator illuminates different colors depending on the band that is selected. The chart to the right shows the colors illuminated with the Squelch control fully counter clockwise or a signal is received. This indicator glows red during transmit.

BAND	COLOR
MARINE	Blue
FRS	Green
MURS	Yellow
AM/FM/AIR	Marine Blue

⑲ [DISTRESS] KEY

When radio is programmed with a MMSI and this key is pressed once and pressed and held again for 3 seconds the radio will transmit a DSC Distress Call. To send the distress call, see section **6.8.2 “SENDING A DISTRESS CALL.”**

6. BASIC OPERATION

6.1 INITIAL SETUP

1. Install the belt clip on the transceiver according to the description in the box below, if desired.
2. Install the nylon carrying strap on the belt clip, if desired.
3. Install the battery pack on the transceiver (see section 4.1.3 “BATTERY INSTALLATION/REMOVAL”).

NOTE: Water resistance of the transceiver is assured only when the battery pack is attached to the transceiver and **MIC/SP** rubber cap is installed in the **MIC/SP** jack.

How to use the Quick Draw Belt Clip

1. Connect the hanger to the rear of the **HX470S**, with the notch pointing directly up, using the supplied screw (Figure 1).
Use only the screw included with the clip to mount the clip to the back of the transceiver!
2. Clip the Quick Draw Belt Clip to your belt (Figure 2).
3. To install the **HX470S** into the Quick Draw Belt Clip, align the hanger with the Quick Draw Belt Clip and slide the **HX470S** into its slot until a click is heard.
4. To remove the **HX470S** from the Quick Draw Belt Clip, rotate the **HX470S** 180 degrees, then slide the transceiver out from the Quick Draw Belt Clip (Figure 3).

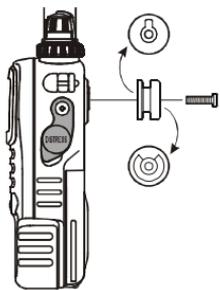


Figure 1



Figure 2

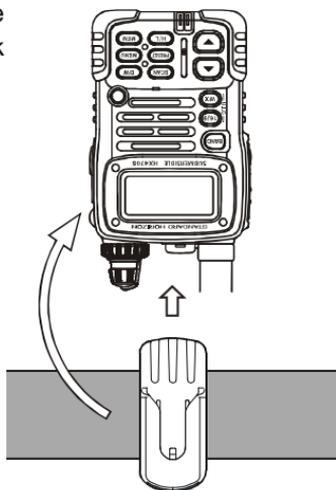


Figure 3

6.2 RECEPTION

1. Turn the **POWER/VOLUME CONTROL** knob clockwise to turn the transceiver on.
2. Turn the **SQUELCH CONTROL** knob fully counterclockwise. This state is known as “Squelch Off.”
3. Turn up the **POWER/VOLUME CONTROL** knob until the noise or audio from the speaker is at a comfortable level.
4. Select the desired operating band among the VHF Marine band, FRS band, MURS band, FM band, AM band, and AIR band by pressing the **[BAND]** key repetitively to switch between the bands.
5. Turn the squelch control fully to the left so audio is heard.
6. Press the **[▲]** or **[▼]** key to select a channel or frequency that has no signal being received (no one is transmitting on the channel)
7. Slowly turn the **SQUELCH CONTROL** knob clockwise and stop immediately after the noise disappears. This condition is known as the “Squelch Threshold.” If the knob is turned clockwise past this point, weak signals may not be received. No noise or no signal is heard until a signal is received that exceeds the squelch threshold. Sometimes, a slight adjustment of the squelch threshold is needed, as some channels have a higher noise level than others.
8. Press the **[SCAN]** key momentarily; the **HX470S** will begin scanning toward a higher channel or frequency and will stop when it receives a signal strong enough to break through the squelch threshold. Press the **[SCAN]** key momentarily to cancel the scanning.
9. Please refer to the section 7 “**ADVANCED OPERATION ON THE MARINE BAND**” for a complete listing of all USA, International and Canadian VHF Marine channels and their uses.
10. If necessary, press the **LAMP** key to turn on the display illumination. The lamp automatically turns off in about 5 seconds.
11. To “lock” the channel so that it is not accidentally changed, hold down the **LAMP** key for about three seconds. This locks the **[▲]** and **[▼]** keys and all the front panel controls except the **[H/L]**, **PTT** and **LAMP** keys. The “**🔒**” symbol will appear on the display to indicate that the keypad is locked. Hold down the **LAMP** key for about one second to unlock the keys. The “**🔒**” symbol will disappear from the display.



6.3 TRANSMISSION

1. Perform steps 1 through 7 of the RECEPTION discussion above.
2. Before transmitting, monitor the channel and make sure it is clear.

THIS IS AN FCC REQUIREMENT!

3. For communications over short distances on the Marine band, press the [H/L] key until “L” is displayed on the LCD. This indicates Low power (approximately 1 watt).

Note

Transmitting on 1 watt prolongs battery life. Low power (1 watt) should be selected whenever possible. On the FRS and MURS bands, the transmit power is fixed (0.5 Watt: FRS band, 2 Watts: MURS band).

4. If using Low power is not effective, select Medium power (2.5 watts) or High power (5 watts) by pressing the [H/L] key until “M” (Medium power) or “H” (High power) is displayed.
5. When receiving a signal, wait until the incoming signal stops before transmitting. The transceiver cannot transmit and receive simultaneously.
6. Press the **PTT** (Push-To-Talk) switch to transmit. The “**TX**” indicator is displayed during transmission.
7. Speak slowly and clearly into the microphone. Hold the microphone about 1/2 to 1 inch away from your mouth.
8. When the transmission is finished, release the **PTT** switch.

Refer to section 14 “**CHANNEL ASSIGNMENTS**” for an overview of VHF marine, FRS and MURS band operating procedures.

6.3.1 TRANSMIT TIME - OUT TIMER (TOT)

While the **PTT** switch is held down, transmission time is limited to 5 minutes. This prevents prolonged (unintentional) transmissions. About 10 seconds before automatic transmitter shutdown, a warning beep sounds from the speaker. The transceiver automatically switches to the receiving mode, even if the **PTT** switch is held down. Before transmitting again, the **PTT** switch must first be released, and then pressed again. This **Time-Out-Timer (TOT)** prevents a continuous transmission that would result from an accidentally stuck **PTT** switch.

6.4 NOAA WEATHER CHANNELS

1. To receive a NOAA weather broadcast, press the **[WX]** key. The transceiver changes to the weather channel mode. This mode consists of a special preset memory bank containing the NOAA weather channels.
2. The transceiver will be set to the last used NOAA weather channel. Press the **[▲]** or **[▼]** key to change to other weather channels.
3. To exit from the weather channel mode, press the **[WX]** key. The transceiver will revert to the channel you were using prior to switching to the weather channel mode.



6.4.1 NOAA WEATHER ALERT

In the event of extreme weather disturbances such as storms and hurricanes, NOAA (National Oceanic and Atmospheric Administration) sends a “weather alert” consisting of a 1050 Hz tone, followed by weather reports on the weather channels. The transceiver is capable of receiving this alert if the following is performed:

1. Program your area’s weather channels into the transceiver’s scan memory. Follow the same procedure as for regular channels.
2. Press the **[SCAN]** key to start the scan.
3. The memorized weather channels are scanned along with the regular memorized channels. Scanning will not stop on the (continuous) weather broadcast channels unless the weather alert tone is received.
4. When an alert is received on a weather channel, scanning stops and the transceiver emits a beeping tone that will stay on for 5 minutes.
5. Press the **[WX]** key to listen to the Weather Alert.

6.5 PRESET CHANNELS (P0 ~ P9): INSTANT ACCESS

Ten user assigned channels can be programmed for instant access. Pressing the [PRESET] key activates the user assigned channel bank. If the [PRESET] key is pressed and *no* channels have been assigned, an alert beep will be emitted twice from the speaker.

The **HX470S** provides the ten Preset channel for each individual operating band (VHF Marine, FRS, MURS, AM Broadcast, FM Broadcast and Air Band).

Programming

1. Select the desired band by pressing the [BAND] key.
2. Hold down the [PRESET] key, and press the [▲] or [▼] key (repeatedly, if necessary) until the desired channel number or frequency is displayed.
3. With the desired number displayed, release the [PRESET] key.
4. Repeat steps 2 and 3 to program the desired channels into Preset Channels "P1" ~ "P9."
5. To delete a Preset Channel, hold down the [PRESET] key and press the [▲] or [▼] key until the Preset Channel number to be deleted is displayed, then release the [PRESET] key.

You may add an alpha-numeric name "Tag" to any desired Preset Channel; refer to CH NAME SET item on the section **13 "MENU ("SET") MODE."**

Operation

Pressing the [PRESET] key will toggle between Preset Channels "P0" - "P9" and the last selected "regular" channel. Preset Channel "P0" is represented by "P0" to the left of the channel number on the LCD, and preset channel "P1" is represented by "P1" and so forth.



Press the [SCAN] key while on any of the Preset Channels, the **HX470S** will begin scanning the Preset Channels of the selected band.

6.6 ENABLING S.O.S STROBE OPERATION

The S.O.S. STROBE feature utilizes the high-intensity strobe LED on the front of the **HX470S** as a visual distress beacon. When enabled, the LED blinks the internationally-recognized Morse Code "S.O.S." message (•••— —•••) at a rate of 5 words per minute. This can be very useful in summoning help from rescuers who may not be able to communicate with you via radio.

1. Hold down the **[MEM]** key while turning the radio on to activate the emergency S.O.S. Strobe. Once the radio comes on, the **BUSY/TX** LED will flash the Morse Code S.O.S. message repeatedly.
2. The S.O.S. strobe function is interrupted when a signal is received or if the squelch control is turned so audio is heard from the speaker. and during transmission.
3. To disable the S.O.S. strobe function, turn the radio off and back on again.

7. ADVANCED OPERATION ON THE MARINE BAND

7.1 USA, CANADIAN, AND INTERNATIONAL CHANNELS

1. To change from US to Canadian or International Marine Channels, hold down the [16/9] key and press the [WX] key. The band will change from USA, to International, and to Canadian with each press.
2. “USA” appears on the LCD for the USA band, “CAN” appears for the Canadian band, and “INTL” appears for the International band.
3. Refer to the marine channel charts in section 14 “CHANNEL ASSIGNMENTS” for allocated channels.



7.2 MEMORY SCAN

The **HX470S** can be programmed to scan channels from a minimum of 2 channels up to all channels in the marine band. If an incoming signal is detected on one of the channels during scan, the radio will pause on that channel, allowing you to listen to the incoming transmission.

Select the desired band (VHF Marine, FRS, MURS, AM Broadcast, FM Broadcast or Air Band) on which you wish to select channels to be scanned.

1. Select the desired channel to be included in the scan memory using the [▲] or [▼] key.
2. Press the [MEM] key to store the channel into the transceiver's scan memory. “MEM” will be displayed on the LCD.
3. Repeat steps 1 and 2 for all the channels to be scanned.
4. To delete a channel from the transceiver's scan memory, select the memorized channel. Press the [MEM] key until “MEM” is removed from the display.
5. All channels programmed remain in the transceiver's scan memory even if the power is turned off. See section 11 “RESETTING THE TRANSCEIVER'S MICROPROCESSOR” to clear all channels from the transceiver's scan memory.
6. Adjust the **SQUELCH CONTROL** knob until background noise is eliminated.



- To start scanning, press the **[SCAN]** key. The scan proceeds from the lowest to the highest programmed channel and stops scanning when a transmission is received. Scanning will resume when the incoming signal disappears at the end of the transmission. A small “SCAN” icon is shown on the center bottom of the display during scanning.
- To stop the scan, press the **[SCAN]** key.

7.3 PRIORITY SCAN

The priority scanning feature allows the radio to scan while also keeping watch on a particularly important “priority channel.” The following channels can be set as the priority channel: 16, 09, and MARINE Preset Channel.

- To set the priority channel, hold down the **[16/9]** key and press the **[MEM]** key. The channel will change from 16 to 09 to Preset Channels P0 through P9 with each press of the **[MEM]** key. When the **[16/9]** key is released the displayed channel will be set as the priority channel (the large “P” icon will appear at the right side of the channel number).



- For priority scanning, hold down the **[SCAN]** key during normal scanning. Scanning will proceed between the memorized channels and the priority channel. The priority channel will be scanned after each programmed channel. A small “PSCN” is shown on the center bottom of the display during priority scanning.
- As an example of priority scanning, let us say that marine channels 06, 07, and 08 are memorized in the transceiver’s scan memory. Priority scanning will proceed in the following sequence:

**[CH06] → [Priority Channel] → [CH07] → [Priority Channel] →
[CH08] → [Priority Channel] → [CH06] → [Priority Channel]**

- Even when the transceiver stops and listens to the signal of a programmed channel, the transceiver will shift to a “dual watch” mode between this channel and the priority channel. Therefore, your priority watching of the designated channel is not compromised when the scanner has paused on an active channel.
- Hold down the **[SCAN]** key to change the priority scanning to normal scanning, and then press the **[SCAN]** key to stop the scan and return to normal operation.

7.4 DUAL WATCH

The Dual Watch feature allows the radio to watch for a transmission on the priority channel and another selected Marine, FRS or MURS channel until a signal is received. The priority channel is determined per the discussion in section 7.3 “**PRIORITY SCAN**” as described previously.

1. To start the Dual Watch feature, select a channel to be dual watched with the priority channel and press the [DW] key. The radio checks the priority channel for voice traffic every one second. A small “DW” icon is shown on the center bottom of the display during scanning.
2. To cancel the Dual Watch feature, press the [DW] key.



7.5 EMERGENCY CHANNEL 16

1. To select the emergency channel, press the [16/9] key from any channel.
2. If you cannot contact anyone on channel 16, switch to another channel.
3. See section 10.1 “**EMERGENCY (CHANNEL 16 USE)**” for additional emergency operating practices.
4. To recall the previously-used channel when you are finished on channel 16, press the [16/9] key again.

7.6 CHANNEL 9

Channel 9 is used as a hailing channel for initial, non-emergency contacts with other vessels. Hold down the [16/9] key for 1 second to select channel 9. You should change to a working channel, after contact is established (so as to keep the hailing channel clear for other users).

7.7 OPERATING ON USA OR CANADIAN 13, OR USA CHANNEL 67

USA and Canadian Channel 13, USA 67 are used at docks, bridges and for maneuvering in port. Messages on this channel must concern navigation only, such as meeting and passing in restricted waters. In emergencies and when approaching blind river bends, high power is allowed. Holding down the [H/L] key will change the power output from 1 Watt (L) to 5 Watts (H); if pressed and held again 2.5 Watts (M) will be selected. When the PTT switch is released, the transceiver will revert to low power. Press and hold in the [H/L] key again if you need High power on a subsequent transmission.

7.8 OPERATING ON USA CHANNEL 67

USA Channel 67 is used for navigational bridge-to-bridge traffic between ships. This channel has been allocated for temporary high power transmission if communication is not able to be established on one watt.

Select Channel 67, then press the [H/L] key to set the transmitter output to either High or Medium power. When the **PTT** switch is released, the transceiver will revert to low power.

7.9 DIGITAL SELECTIVE CALLING

7.9.1 GENERAL

7.9.1.1 Digital Selective Calling (DSC)

Digital Selective Calling is a semi-automated method of establishing a radio call; it has been designated by the International Maritime Organization (IMO) as an international standard for establishing VHF, MF and HF radio calls. It had also been designated as part of the Global Maritime Distress and Safety System (GMDSS). It is planned that DSC will eventually replace aural watches on distress frequencies and will be used to announce routine and urgent maritime safety information broadcasts.

The **HX470S** has a DSC Distress feature that allows mariners to instantly transmit a VHF Marine distress call with GPS position (when connected to the transceiver) to the US Coast Guard and other vessels within range of the transmission.

7.9.1.2 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). This number is used by the **HX470S** when a Marine DSC Distress call is transmitted. This number is registered with the USCG. Refer to section **13 “MENU (“SET”) MODE”(MMSI REG)**.

How can I obtain a MMSI assignment?

Currently there are two companies that offer MMSI numbers:

- Boat US at (800) 563-1539 or visit the web site <http://www.boatus.com/mmsi/>.
- Seatow at (631) 765-3660 or visit the web site <http://www.seatow.com/mmsiinfo.htm>

WARNING: This radio is designed to generate a digital maritime distress and safety call to facilitate search and rescue. To be effective as a safety

device, this equipment must be used only within communication range of a shore-based VHF marine channel 70 distress and safety watch system.

NOTE: An MMSI must be programmed into the HX470S before the DCS Distress function will operate.

7.9.2 SENDING A DISTRESS CALL

The distress call automatically includes the vessel's DSC MMSI and Lat/Lon position. The vessel's position will only be transmitted if the transceiver is properly connected to an operating GPS receiver with NMEA output.

1. Lift the red DISTRESS rubber cover on the right side of the transceiver and press the **[DISTRESS]** key. "DSC DISTRESS" will appear on the top of the LCD.
2. Press and hold in the **[DISTRESS]** key for 3 seconds. The LCD will count down (3s, 2s, 1s), and afterwards the **HX470S** will transmit the DSC Distress Call on channel 70.
3. When the distress signal is being sent, "TX" icon will appear on the LCD. After the message has been sent, the Distress Alarm will sound.
4. The transceiver "shadow-watches" for a transmission between CH16 and CH70 until an acknowledgment signal is received.
5. If no acknowledgment is received, the distress call is repeated in three minute intervals until an acknowledgment is received.
6. To cancel the distress call alarm, press the **[16/9]** key.
7. To send the CANCEL call:
Press the **[DISTRESS]** key, then press the **[▲]** or **[▼]** key until "CANCEL" is shown on the LCD. Press the **[DISTRESS]** key.

NOTE: When a GPS receiver with NMEA output is connected via the **CD-25** Charger Cradle, the vessel's position is automatically transmitted with the distress call.

7.10 SIMPLEX/DUPLEX CHANNEL USE

All Marine channels are factory-programmed in accordance with FCC (USA), Industry Canada and International regulations. The mode of operation cannot be altered from simplex to duplex or vice-versa. Simplex (ship to ship) or duplex (marine operator) mode is automatically activated, depending on the channel and whether the USA, International or Canadian operating band is selected.

8. CTCSS OPERATION ON THE FRS AND MURS BANDS

8.1 CTCSS CODE OPERATION

CTCSS stands for **C**ontinuous **T**one **C**oded **S**quelch **S**ystem; it is a sub-audible tone system with 39 selections, labeled CODE01 through CODE39.

CTCSS tones are used on FRS and MURS channels where there are several stations transmitting on the same frequencies within close proximity to one another. When this occurs, you may hear multiple communications at the same time to the point where it is impossible to clearly receive and understand the transmission of the person calling you.

The **HX470S** allows you to program CTCSS codes for each FRS or MURS channel. If multiple signals are transmitted on the channel you selected, you will only hear the transmission of other stations with the same CTCSS tone that was programmed in the **HX470S**. If the radio does not receive the correct tone on the selected channel, then you will not hear the transmission.

1. Select the FRS or MURS channel on which you wish to utilize CTCSS control of the squelch.
2. Press the **[MENU]** key to enter the Menu Mode.
3. Press the **[▲]** or **[▼]** key to select Menu item (CTCSS).
4. Press the **[MENU]** key to enable adjustment of this Menu item ("CTCSS" icon will blink).
5. Press the **[▲]** or **[▼]** key to select the desired CTCSS code number (CODE01 - CODE39).
6. Press the **[MENU]** key to save the new setting.
7. Press the **PTT** key to exit from the Menu mode, and activate the CTCSS feature.

When CTCSS is programmed the CTCSS code number will appear to the right of the operating channel number.



To disable CTCSS operation, select "OFF" in step 5 above.

CODE	FREQUENCY												
01	67.0 Hz	07	85.4 Hz	13	103.5 Hz	19	127.3 Hz	25	156.7 Hz	31	192.8 Hz	37	241.8 Hz
02	71.9 Hz	08	88.5 Hz	14	107.2 Hz	20	131.8 Hz	26	162.2 Hz	32	203.5 Hz	38	250.3 Hz
03	74.4 Hz	09	91.5 Hz	15	110.9 Hz	21	136.5 Hz	27	167.9 Hz	33	210.7 Hz	39	69.3 Hz
04	77.0 Hz	10	94.8 Hz	16	114.8 Hz	22	141.3 Hz	28	173.8 Hz	34	218.1 Hz	--	--
05	79.7 Hz	11	97.4 Hz	17	118.8 Hz	23	146.2 Hz	29	179.9 Hz	35	225.7 Hz	--	--
06	82.5 Hz	12	100.0 Hz	18	123.0 Hz	24	151.4 Hz	30	186.2 Hz	36	233.6 Hz	--	--

9. BAROMETER AND SCRAMBLER OPERATION

9.1 BAROMETRIC PRESSURE METER

The optional Barometric Pressure unit (**SU-1**) brings to the **HX470S** the unique capability of providing readout of the current barometric pressure and display the relative changes in the pressure (Upward (▲) or Downward (▼), Count: every 1/2 hour). The **SU-1** unit requires calibration of the “offset” parameters, so that the pressure reading will be correct. To do this you must have a barometer to use as a reference as you adjust the **SU-1** to match its reading; see section 13 “MENU (“SET”) MODE”(BARO OFFSET).



To display the current barometric pressure:

1. Press the [**MENU**] key to enter the Menu Mode.
2. Press the [**▲**] or [**▼**] key to select the Menu item (DISPLAY MODE).
3. Press the [**MENU**] key to enable adjustment of this Menu item.
4. Press the [**▲**] or [**▼**] key to set this Menu item to “BARO.”
5. When you have completed your selection, press the [**MENU**] key to save the new setting, and then press the **PTT** key to exit to normal operation.
6. To disable the barometric pressure display, select “None” in step 4 above.

9.2 VOICE SCRAMBLER UNIT

The optional **FVP-31** Voice Scrambler Unit permits secure voice communications with stations within your network, which prevents others from listening using normal communication equipment.



To activate the Voice Scrambler:

1. Select the channel on which you wish to activate the Voice Scrambler.
2. Press the [**MENU**] key to enter the Menu Mode.
3. Press the [**▲**] or [**▼**] key to select the Menu item (SCRAMBLER).
4. Press the [**MENU**] key to enable adjustment of this Menu item.
5. Press the [**▲**] or [**▼**] key to set this Menu item to “ON.”
6. When you have completed your selection, press the [**MENU**] key to save the new setting, and then press the **PTT** key to exit to normal operation.
7. To disable the Voice Scrambler, select “OFF” in step 5 above.

Note: Voice Scrambler may not be activated on Marine Channels 16 and 70.

10. OPERATING PRACTICES

10.1 EMERGENCY (CHANNEL 16 USE)

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 button and listen.
10. If there is no answer, repeat the above procedure. If there is still no response, try another channel.

10.2 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, 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). When the other vessel returns your call, immediately request another channel by saying “**go to**,” the number of the other channel, and “over.” 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; see your Owner’s Manual.

10.3 OPERATING ON CHANNELS 13 AND 67

Channel 13 is used at docks and 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 20 ([H/L] key) for means to temporarily override the low-power limit on these two channels.

10.4 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).

10.5 NOAA WEATHER ALERT TESTING

In the event of a major storm or other appreciable weather condition requiring vessels at sea (or other bodies of water) to be notified, the NOAA (National Oceanographic and Atmospheric Administration) broadcasts a 1050 Hz tone that some VHF radios, including your **HX470S**, can detect for “Weather Alarm” purposes (refer to section **6.4.1 “NOAA WEATHER ALERT”** for a discussion of how to use this feature). The 1050 Hz tone, when detected, will produce a loud beep in the speaker of the **HX470S**, to signal that a Weather Alert Broadcast is being received.

In order to test this system, NOAA broadcasts the 1050 Hz tone every Wednesday sometime between 11 AM and 1 PM local time. You may use this opportunity to test your **HX470S** periodically to confirm that the Weather Alert feature is working, or for training crew members on how to configure the **HX470S** to receive the NOAA Weather Alerts.

11. RESETTING THE TRANSCEIVER'S MICROPROCESSOR

Resetting the microprocessor restores the initial, factory-supplied conditions in the transceiver. These are called the "default" conditions.

To reset the microprocessor, first turn the transceiver off. Then, while pressing and holding in the [WX] and [SCAN] keys, turn the transceiver on.

The default conditions are:

- No channel numbers are in scan memory.
- Channel 16 is the priority channel.
- Channel 16 will be selected when the transceiver is turned on.
- WX channel 01 will be recalled when the [WX] key is pressed.
- Preset Channels are unassigned.

Note: The above procedure also resets the microprocessor. Perform this procedure if an operational problem occurs which cannot be solved by normal operating procedures.

12. CLONING

The **HX470S** includes a convenient “Clone” feature, which allows the memory and configuration data from one transceiver to be transferred to another **HX470S**.

Turn both radios off.

1. Connect the (optional) **CT-32** Clone Cable between the **MIC/SP** jacks of the two transceivers.
2. Hold down the [**PRESET**] key and then turn on the transceiver. Do this for both transceivers (the order of switching the radios on does not matter); “CLONE” will appear on the display on both transceivers.
3. On the **Destination** transceiver, press the [**MEM**] key (“CLONE RX” will appear on the LCD).
4. Press the [**16/9**] key on the **Source** transceiver; “CLONE TX” will appear on the Source radio, and the data will now be transferred.
5. If there is a problem during the cloning process, “CLONE ERR” is displayed. Check your cable connections and battery voltage, and try again.
6. If the data transfer is successful, the Destination transceiver will return to normal operation; Turn both transceivers off and disconnect the Clone cable. You can then turn the transceivers back on, and begin normal operation.

13. MENU (“SET”) MODE

The **HX470S**'s Menu Mode allows a number of the **HX470S** operating parameters to be custom-configured for your operating requirements.

The Menu Mode is easy to activate and set, using the following procedure:

1. Press the [**MENU**] key to enter the Menu Mode.
2. Press the [**▲**] or [**▼**] key to select the Menu item to be adjusted.
3. Press the [**MENU**] key to enable adjustment of the selected Menu item.
The menu item will blink
4. Press the [**▲**] or [**▼**] key to select the status or value of the Menu item.
5. After completing your adjustment, press the **PTT** key to save the new setting and exit to normal operation.

BEEP

Function: Enable/Disable the Keypad beeper.

Available Values: ON / OFF

Default: ON

BARO OFFSET (Requires optional SU-1)

Function: Calibrating the Barometric Pressure meter.

Press the [**▲**] or [**▼**] key to set the **HX470S**'s Barometric Pressure display to match a *Calibrated Barometer's* displayed pressure.

Available Values: -127 to +127

Default: 000

BARO UNIT (Requires optional SU-1)

Function: Selects the Units Of Measure of the Barometric display.

Available Values: mb / HPA / mm Hg / Inches

Default: mb

CH NAME SET

Function: Changes the channel name shown on the display.

1. Select the channel on which you wish to change the name *before* recalling this Menu item.
2. Press the [**MENU**] key to enter the Menu Mode.
3. Press the [**▲**] or [**▼**] key to select this Menu item (CH NAME SET).
4. Press the [**MENU**] key to enable adjustment of this Menu item.
5. Press the [**▲**] or [**▼**] key to select the first character (letter, number, or symbol) in the name you wish to change, then press the [**MEM**] key to move to the next character.

- If you make a mistake, press the **[H/L]** key to move back, and then reselect the correct letter, number, or symbol.
- Repeat step 5 as many times as necessary to complete the name tag (up to 10 characters).
- After completing your adjustment, press the **[MENU]** key to save the new setting.
- Press the **PTT** key to exit to normal operation.

CTCSS

Function: Enables/Disables CTCSS operation and allows code selection

Available Values: ON (with 39 standard CTCSS Tones) / OFF

Default: OFF

Note: This Menu Item is only selectable on the FRS and MURS bands (you may only access this Menu Item while operating on the FRS or MURS band).

DISPLAY MODE

Function: Selects the information to be displayed on the LCD

Available Values: BARO*1 / GPS NAV info*2 / CH name / Time*2 / None

Default: CH name

※1: Requires optional **SU-1**

※2: Requires GPS receiver.



BARO



GPS NAV Info



CH name



Time



None

DISTRESS RING

Function: Selects how long the DSC Distress alarm will ring

Available Values: 3 min / 5 times / 10 times / 15 times

Default: 3 min

DW DISPLAY

Function: Selects the Dual Watch scanning display mode.

Available Values: Normal / Special

Default: Special

When "Special" is selected the channel shown on the display is the last channel the **HX470S** received a call on. This is a handy feature if you cannot look at the radio the moment a transmission was received

BAND ICON

Function: Enable/Disable the BAND Icon display

Available Values: ON / OFF

Default: ON



BAND ICON "ON"



BAND ICON "OFF"

LAMP MODE

Function: Selects the Lamp illumination method for the LCD/Keypad.

Available Values: Key / Toggle / 5 sec

Default: Key

Key: Illuminates the LCD/Keypad for 5 seconds when any key is pressed.

Toggle: Pressing the **LAMP** key toggles the LCD/Keypad lamp On/Off.

5 sec: Pressing the **LAMP** key illuminates the LCD/Keypad for 5 seconds.

MMSI REG

Function: Stores MMSI ID code.

Note: The MMSI can only be inputted twice. If entered more than twice, the **HX470S** will have to be sent to STANDARD HORIZON factory service to reset the MMSI.

MUTE

Function: Enable/Disable the Audio Muting on the FM Broadcast Band.

Available Values: ON / OFF

Default: ON

SCAN DISPLAY

Function: Selects the Scanning display mode

Available Values: Normal / Special

Default: Normal

When this menu is set to "Normal," the channel numbers during scan will be shown as scrolling on the display. When Special is selected the channel numbers on the display do not change unless a call was received. The channel shown is the last channel that was received.

SCAN LAMP

Function: Enable/Disable the automatic illumination of the lamp when a signal is received on a channel during Scanning

Available Values: ON / OFF

Default: OFF

SCRAMBLER (Requires optional FVP-31)

Function: Enable/Disable the Voice scrambler.

Available Values: ON / OFF

Default: OFF

Note: This Menu Item is ignored when using Marine Channels 16 and 70.

STEP

Function: Selects the AM Band frequency step size

Available Values: 10kHz or 9kHz (for Europe)

Default: 10kHz

STROBE

Function: Selects the DSC Distress Call STROBE illumination

Available Values: OFF / Flashing / Continue / SOS

Default: OFF

TIME OFFSET

Function: Allows entering a "Time Offset" for your location so the time will be shown correctly on the display when connected to a GPS receiver via the CD-25 Charger Cradle.

Available Values: -12 to +12

Default: 00

WX ALERT

Function: Enable/Disable the Weather Alert feature.

Available Values: ON / OFF

Default: ON

14. MAINTENANCE

14.1 GENERAL

The inherent quality of the solid-state components in STANDARD HORIZON radios will provide many years of continuous use. Take the following precautions to prevent damage to the radio.

- Keep the microphone connected or the jack covered at all times to prevent corrosion of electrical contacts;
- Never key the transmitter unless an antenna or suitable dummy load is connected to the antenna receptacle.
- Ensure that the input voltage does not exceed the value specified in your Owner's Manual.
- Use only STANDARD HORIZON-approved accessories and replacement parts.

14.2 TROUBLESHOOTING CHART

TROUBLESHOOTING CHART		
SYMPTON	PROBABLE CAUSE	REMEDY
The [SCAN] key does not start the scan.	No channels memorized.	Use the MEM key to enter desired channels into the transceiver's memory.
	Squelch is not adjusted.	Adjust the squelch to threshold or to the point where noise just disappears. Further adjustment of the squelch control may eliminate incoming signals.
The USA/INTL/CAN modes do not function.	Proper operation not followed.	HOLD down the 16/9 key and press the WX key.
Rotating the SQUELCH CONTROL knob does not eliminate background noise.	Low battery.	Charge battery. Refer to section 5 of this manual.
Cannot change any function.	Key Lock is on.	Turn Key Lock off. Refer to section 5, LAMP key.
Key Lock does not function.	Proper operation not followed.	Hold down the LAMP key for 1 second.
Indicator does not light when charging a battery.	Defective battery FNB-80LI .	Contact your Standard Horizon dealer.

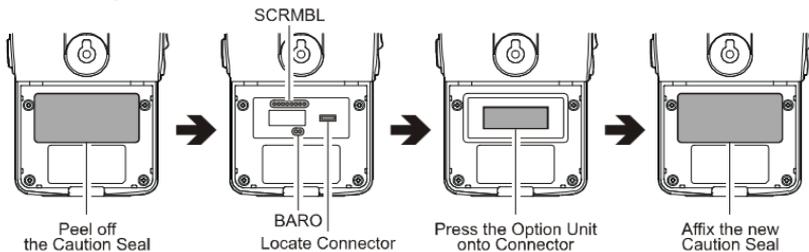
15. INSTALLATIONS OF OPTION

15.1 SU-1 BAROMETRIC PRESSURE UNIT OR FVP-31 VOICE SCRAMBLER UNIT

1. Make sure that the transceiver is off. Remove the hard or soft case, if used. Remove the battery pack.
2. Locate the connector for the optional unit under the caution seal in the battery compartment on the back of the radio; just peel off the caution seal.
3. When installing the Barometric Pressure Unit SU-1, connect the jumper pads labeled "BARO" (2 pair) by soldering them together. When installing the Voice Scrambler Unit FVP-31, connect the jumper pads labeled "SCRMBL" (8 pair) using the soldering jumper.

Note: It is not possible to install both optional units into the same radio.

4. Align the connector on the optional unit with the transceiver's connector and gently press the unit into place.
5. Affix the new caution seal (supplied with the optional unit), and replace the battery. Installation is now complete.

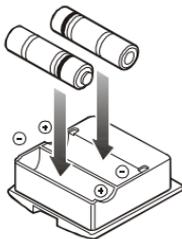


15.2 FBA-23 BATTERY CASE

FBA-23 is a battery case that holds two alkaline batteries and is used with the **HX470S** transceiver. Alkaline batteries can be used for transmission in an emergency, but power output is reduced to one watt, and battery life will be short.

1. Slide the batteries into the **FBA-23** with the Negative [-] side of the batteries touching the *spring* connections inside the **FBA-23**.
2. Insert the **FBA-23** into the battery compartment on the back of the transceiver, then close the Battery Pack Latch until it locks in place with a "click."

Note: The battery indicator on the transceiver is only applicable to the **FNB-80LI** rechargeable battery. Disregard this indication when using alkaline batteries.



16. CHANNEL ASSIGNMENTS

Tables on the following pages list the VHF Marine Channel assignments for U.S.A. and International use. Below are listed some data about the charts.

1. VTS. Where indicated, these channels are part of the U.S. Coast Guard's **Vessel Traffic System**.
2. Alpha channel numbers, that is, channel numbers followed by the letter A (such as Channel 07A) are **simplex** channels on the U.S.A. or Canadian channel assignments whose counterparts in the International assignments are **duplex** channels. International channels do not use "alpha" numbers. If you call the Coast Guard on Channel 16, they will sometimes ask you to "**go to channel 22 Alpha**." This is a channel assigned to U.S.A. and Canadian Coast Guards for handling distress and other calls. If your radio is set for **International** operation you will go to Channel 22 instead of 22A, and will not be able to communicate with the Coast Guard. To use Channel 22A, your radio must be set for **USA** or **Canada** operation, using the USA/CAN/INTL channel selection procedure described on page 28 of this manual. Channel 22 (without an "A") is an **International** duplex channel for port operations. The **HX470S** displays an "A" adjacent to the channel number on all "Alpha" channels, unlike some other models that may not indicate the "A" even though they may be set to the correct frequency.
3. Bridge-to-Bridge channels (for example, Channel 13) are for use by bridge operators on inter-coastal waterways and rivers. It is also used by marine vessels in the vicinity of these bridges for navigation and for communicating with the bridge operators. Note that a limit of 1 Watt is specified for these channels.
4. The **S/D** column on the chart indicates either S (simplex) or D (duplex). **Simplex** means transmitting and receiving on the same frequency. Only one party at a time can talk, unlike a telephone. Be sure to say "**over**" and release your microphone push-to-talk switch at the end of each transmission. **Duplex** operation involves the use of one frequency for transmitting and a separate frequency for receiving. On channels specified as duplex on the charts, correct mode of operation is established automatically by your radio when you select a channel; you cannot change the mode. And you still must release the push-to-talk switch after each transmission in order to listen to the radio.
5. Channels normally used by recreational boaters are those that include



the term “non-commercial” in the **Channel Use** column of the chart. Some of these are shared with other users and some are used only in certain geographic regions.

6. Marine vessels equipped with VHF radios are required to monitor Channel 16.

VHF Marine Channel

VHF MARINE CHANNEL CHART							
CH	U	C	I	S/D	TX	RX	CHANNEL USE
01		X	X	D	156.050	160.650	Public Correspondence (Marine Operator)
01A	X			S	156.050		Port Operation and Commercial. VTS in selected areas
02		X	X	D	156.100	160.700	Public Correspondence (Marine Operator)
03		X	X	D	156.150	160.750	Public Correspondence (Marine Operator)
03A	X			S	156.150		US Government only, Coast Guard
04			X	D	156.200	160.800	Public Correspondence (Marine Operator), Port operation, ship movement
04A		X		S	156.200		Pacific coast: Coast Guard, East Coast: Commercial fishing
05			X	D	156.250	160.850	Public Correspondence (Marine Operator), Port operation, ship movement
05A	X	X		S	156.250		Port operation. VTS in Seattle
06	X	X	X	S	156.300		Inter-ship Safety
07			X	D	156.350	160.950	Public Correspondence (Marine Operator), Port operation, ship movement
07A	X	X		S	156.350		Commercial
08	X	X	X	S	156.400		Commercial (Inter-ship only)
09	X	X	X	S	156.450		Boater Calling channel, Commercial & Non-commercial (Recreational)
10	X	X	X	S	156.500		Commercial
11	X	X	X	S	156.550		Commercial. VTS in selected areas.
12	X	X	X	S	156.600		Port operation. VTS in selected areas.
13	X	X	X	S	156.650		Inter-ship Navigation Safety (Bridge-to-bridge)
14	X	X	X	S	156.700		Port operation. VTS in selected areas.
15	X			S	---	156.750	Environmental (Receive only)
15		X	X	S	156.750		Commercial, non-commercial, ship movement (1 W)
16	X	X	X	S	156.800		International Distress, Safety and Calling
17	X	X	X	S	156.850		State Controlled (1 W)
18			X	D	156.900	161.500	Port operation, ship movement
18A	X	X		S	156.900		Commercial
19			X	D	156.950	161.550	Port operation, ship movement
19A	X			S	156.950		US: Commercial
19A		X		S	156.950		Coast Guard
20	X	X	X	D	157.000	161.600	Canadian Coast Guard Only, International: port operations and shipment
20A	X			S	157.000		Port operation
21			X	D	157.050	161.650	Port operation, ship movement
21A	X	X		S	157.050		U.S. Government Only, Canadian Coast Guard
22			X	D	157.100	161.700	Port operation, ship movement
22A	X	X		S	157.100		US and Canadian Coast Guard Liaison and Maritime Safety Information Broadcasts announced on channel 16

VHF MARINE CHANNEL CHART							
CH	U	C	I	S/D	TX	RX	CHANNEL USE
23		X	X	D	157.150	161.750	Public Correspondence (Marine Operator)
23A	X			S	157.150		U.S. Government Only
24	X	X	X	D	157.200	161.800	Public Correspondence (Marine Operator)
25	X	X	X	D	157.250	161.850	Public Correspondence (Marine Operator)
26	X	X	X	D	157.300	161.900	Public Correspondence (Marine Operator)
27	X	X	X	D	157.350	161.950	Public Correspondence (Marine Operator)
28	X	X	X	D	157.400	162.000	Public Correspondence (Marine Operator)
60	X	X	X	D	156.025	160.625	Public Correspondence (Marine Operator)
61			X	D	156.075	160.675	Public Correspondence (Marine Operator), Port operation, ship movement
61A	X	X		S	156.075		U.S. Government Only, Canadian Coast Guard-Pacific Coast, Commercial Fishing-East Coast
62			X	D	156.125	160.725	Public Correspondence (Marine Operator), Port operation, ship movement
62A		X		S	156.125		Public Coast: Coast Guard; East Coast: commercial fishing only
63			X	D	156.175	160.775	Public Correspondence (Marine Operator), Port operation, ship movement
63A	X			S	156.175		Port Operation and Commercial. VTS in selected areas.
64		X	X	D	156.225	160.825	Public Correspondence (Marine Operator), Port operation, ship movement
64A	X	X		S	156.225		U.S. Government Only, Canadian Commercial Fishing
65			X	D	156.275	160.875	Public Correspondence (Marine Operator), Port operation, ship movement
65A	X	X		S	156.275		Port Operations
66			X	D	156.325	160.925	Public Correspondence (Marine Operator), Port operation, ship movement
66A	X	X		S	156.325		Port Operations
67	X	X	X	S	156.375		US: Commercial. Used for Bridge-to-bridge communications in lower Mississippi River. Inter-ship only, Canada: Commercial fishing, S&R
68	X	X	X	S	156.425		Non-commercial (Recreational)
69	X	X	X	S	156.475		US: Non-commercial (Recreational), Canada: Commercial fishing only, International: Inter-ship, Port operations and Ship movement
70	X	X	X	S	156.525		Digital selective calling (voice communications not allowed)
71	X	X	X	S	156.575		US, Canada: Non-commercial (Recreational), International: Port operations and Ship movement
72	X	X	X	S	156.625		Non-commercial (Inter-ship only)
73	X	X	X	S	156.675		US: Port Operations, Canada: Commercial fishing only, International: Inter-ship, Port operations and Ship movement
74	X	X	X	S	156.725		US: Port Operations, Canada: Commercial fishing only, International: Inter-ship, Port operations and Ship movement
75	X			S	156.775		Port Operations (Inter-ship only) (1W)
76	X			S	156.825		Port Operations (Inter-ship only) (1W)
77	X	X		S	156.875		Port Operations (Inter-ship only) (1W)
77			X	S	156.875		Port Operations (Inter-ship only)
78			X	D	156.925	161.525	Public Correspondence (Marine Operator), Port operation, ship-movement
78A	X	X		S	156.925		Non-commercial (Recreational)

VHF MARINE CHANNEL CHART							
CH	U	C	I	S/D	TX	RX	CHANNEL USE
79			X	D	156.975	161.575	Port operation and Ship movement
79A	X	X		S	156.975		Commercial
80			X	D	157.025	161.625	Port operation, ship movement
80A	X	X		S	157.025		Commercial
81			X	D	157.075	161.675	Port operation, ship movement
81A	X	X		S	157.075		U.S. Government Only - Environmental protection operations.
82			X	D	157.125	161.725	Public Correspondence (Marine Operator), Port operation, ship movement
82A	X	X		S	157.125		U.S. Government Only, Canadian Coast Guard Only
83		X	X	D	157.175	161.775	Canadian Coast Guard Only
83A	X	X		S	157.175		U.S. Government Only, Canadian Coast Guard Only
83		X	X	D	157.175	161.775	Public Correspondence (Marine Operator)
84	X	X	X	D	157.225	161.825	Public Correspondence (Marine Operator)
85	X	X	X	D	157.275	161.875	Public Correspondence (Marine Operator)
86	X	X	X	D	157.325	161.925	Public Correspondence (Marine Operator)
87	X	X	X	D	157.375	161.975	Public Correspondence (Marine Operator)
88	X	X	X	D	157.425	162.025	Public Correspondence (ship-to-coast)
88A	X			S	157.425		Commercial, Inter-ship Only
WX01	X	X	X	D	---	162.550	Weather (receive only)
WX02	X	X	X	D	---	162.400	Weather (receive only)
WX03	X	X	X	D	---	162.475	Weather (receive only)
WX04	X	X	X	D	---	162.425	Weather (receive only)
WX05	X	X	X	D	---	162.450	Weather (receive only)
WX06	X	X	X	D	---	162.500	Weather (receive only)
WX07	X	X	X	D	---	162.525	Weather (receive only)
WX08	X	X	X	D	---	161.650	Weather (receive only)
WX09	X	X	X	D	---	161.775	Weather (receive only)
WX10	X	X	X	D	---	163.275	Weather (receive only)

The above **BOLD** channels are not for use of the general public in U.S. waters, unless proper authorization is given.

AIR (Aircraft) BAND FREQUENCY CHART	
Frequency Range	Communications Usage
108.000 - 117.975 MHz	Navigational Aids
118.000 - 121.400 MHz	Control Towers
121.500 MHz	Int'l Distress Frequency
121.600 - 122.900 MHz	Ground & Apron Control
122.700 - 123.900 MHz	UNICOM Frequencies
123.450 MHz	Air to Air / Pilot chat
124.000 - 128.800 MHz	Arrivals & Departures
128.825 - 132.000 MHz	Company Operations
132.000 - 135.975 MHz	Area Control Centre (Enroute)
136.000 - 136.975 MHz	Shared ATC/Company Ops & DataLink

MURS CHANNEL CHART	
Channel	Frequency
1	151.820 MHz
2	151.880 MHz
3	151.940 MHz
4	154.570 MHz
5	154.600 MHz

FRS CHANNEL CHART							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	462.5625 MHz	5	462.6625 MHz	9	467.5875 MHz	13	467.6875 MHz
2	462.5875 MHz	6	462.6875 MHz	10	467.6125 MHz	14	467.7125 MHz
3	462.6125 MHz	7	462.7125 MHz	11	467.6375 MHz	-	---
4	462.6375 MHz	8	467.5625 MHz	12	467.6625 MHz	-	---

17. WARRANTY

Marine Products Limited Warranty

STANDARD HORIZON (a division of VERTEX STANDARD) warrants, to the original purchaser only, each new Marine Communications Product ("Product") manufactured and/or supplied by STANDARD HORIZON against defects in materials and workmanship under normal use and service for a period of time from the date of purchase as follows:

Fixed Mount and Portable Transceivers

1 year - if purchased before 01/01/91

3 years - if purchased between 01/01/91 and 01/01/94

3 years Waterproof - if purchased after 01/01/94

Loud hailers

1 year - if purchased before 01/01/91

3 years - if purchased after 01/01/91

Associated Chargers

1 year - if purchased before 01/01/91

3 years - if purchased after 01/01/91

Associated Batteries - 18 months. Note: Batteries will be deemed defective only if storage capacity drops below 80% of rated capacity or if leakage develops.

Associated Accessories - 1 year. Includes: Microphones/Handsets, External Speakers, Antennas, Carrying Accessories, Power Supplies, and Signaling Boards.

To receive warranty service, the purchaser must deliver the Product, transportation and insurance prepaid, to STANDARD HORIZON (a division of VERTEX STANDARD), 115 North Wright Brothers Dr, Salt Lake City, Utah 84116-2838. Include proof of purchase indicating model, serial number, and date of purchase. STANDARD HORIZON will return the Product to the purchaser freight prepaid. Products purchased prior to January 1, 1991 will bear the STANDARD HORIZON warranty terms in effect prior to that date.

In the event of a defect, malfunction or failure of the Product during the warranty period, STANDARD HORIZON's liability for any breach of contract or any breach of express or implied warranties in connection with the sale of Products shall be limited solely to repair or replacement, at its option, of the

Product or part(s) therein which, upon examination by STANDARD HORIZON, appear to be defective or not up to factory specifications. STANDARD HORIZON may, at its option, repair or replace parts or subassemblies with new or reconditioned parts and subassemblies. Parts thus repaired or replaced are warranted for the balance of the original applicable warranty.

STANDARD HORIZON will not warrant installation, maintenance or service of the Products. In all instances, STANDARD HORIZON's liability for damages shall not exceed the purchase price of the defective Product.

This warranty only extends to Products sold within the 50 States of the United States of America and the District of Columbia.

STANDARD HORIZON will pay all labor to repair the product and replacement parts charges incurred in providing the warranty service except where purchaser abuse or other qualifying exceptions exist. The purchaser must pay any transportation expenses incurred in returning the Product to STANDARD HORIZON for service.

This limited warranty does not extend to any Product which has been subjected to misuse, neglect, accident, incorrect wiring by anyone other than STANDARD HORIZON, improper installation, or subjected to use in violation of instructions furnished by STANDARD HORIZON, nor does this warranty extend to Products on which the serial number has been removed, defaced, or changed. STANDARD HORIZON cannot be responsible in any way for ancillary equipment not furnished by STANDARD HORIZON which is attached to or used in connection with STANDARD HORIZON's Products, or for the operation of the Product with any ancillary equipment, and all such equipment is expressly excluded from this warranty. STANDARD HORIZON disclaims liability for range, coverage, or operation of the Product and ancillary equipment as a whole under this warranty. STANDARD HORIZON reserves the right to make changes or improvements in Products, during subsequent production, without incurring the obligation to install such changes or improvements on previously manufactured Products.

The implied warranties which the law imposes on the sale of this Product are expressly LIMITED, in duration, to the time period specified above. STANDARD HORIZON shall not be liable under any circumstances for consequential damages resulting from the use and operation of this Product, or from the breach of this LIMITED WARRANTY, any implied warranties, or any contract with STANDARD HORIZON. IN CONNECTION WITH THE

SALE OF ITS PRODUCTS, STANDARD HORIZON MAKES NO WARRANTIES, EXPRESS OR IMPLIED AS TO THE MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE, EXCEPT AS EXPRESSLY SET FORTH HEREIN.

Some states do not allow the exclusion or limitation of incidental or consequential damages, or limitation on how long an implied warranty lasts, so the above limitations or exclusions may not apply. This warranty gives specific legal rights, and there may be other rights which may vary from state to state.

ONLY PRODUCTS SOLD ON OR AFTER JANUARY 1, 1991 ARE COVERED UNDER THE TERMS OF THIS LIMITED WARRANTY.



ON-LINE WARRANTY REGISTRATION

THANK YOU for buying STANDARD HORIZON (a division of Vertex Standard) products! We are confident your new radio will serve your needs for many years!

Please visit www.standardhorizon.com to register the **HX470S** Marine VHF. It should be noted that visiting the Web site from time to time may be beneficial to you, as new products are released they will appear on the STANDARD HORIZON Web site. Also a statement regarding product support should be added to the manual.

Product Support Inquiries

If you have any questions or comments regarding the use of the **HX470S**, you can visit the STANDARD HORIZON Web site to send an E-mail or contact the Product Support team at 562/404-2700 M-F 7:00-5:00PST.

In addition to the warranty, STANDARD HORIZON includes a lifetime "flat rate" program to provide service after the warranty period has expired. If you wish to obtain the flat rate price for out-of-warranty repair, you must include the information on the Owner's Record with the unit when you return it to your Dealer or to STANDARD HORIZON.

Lifetime Flat Rate Service Program: For the original Owner only, for the lifetime of the unit, STANDARD HORIZON will repair the unit to original specifications.

Note: The flat rate amount is payable by the Owner only if STANDARD HORIZON or the STANDARD HORIZON Dealer determines that a repair is needed. After the repair, a 90-day warranty will be in effect from the date of return of the unit to the Owner.

This service program is not available for equipment which has failed as a result of neglect, accident, breakage, misuse, improper installation or modification, or water damage (depending on the product).

18. SPECIFICATIONS

Performance specifications are nominal, unless otherwise indicated, and are subject to change without notice.

18.1 GENERAL

Frequency Ranges (MHz):	156 MHz - 163.275 MHz (Marine Band + WX Band) Channel Steps: 25 kHz 151.82 MHz - 154.60 MHz (MURS) Channel Steps: 5 kHz 462.5625 MHz - 467.7125 MHz (FRS Band) Channel Steps: 6.25 kHz 88 MHz - 108 MHz (FM Broadcast) Channel Steps: 100 kHz 500 kHz - 1800 kHz (AM Broadcast) Channel Steps: 10 / 9 kHz 108 MHz - 137 MHz (AIR Band) Channel Steps: 25 kHz
Frequency Stability:	±2.5 ppm (-22 °F to +140 °F [-30 °C to +60 °C])
Emission Type:	F3
Antenna Impedance:	50 Ohms
Supply Voltage:	Nominal: 7.4V DC, Negative Ground (Battery Terminal)
Current Consumption:	195 mA (Receive) 68 mA (Standby, Saver Off) 45 mA (Standby, Saver On) 1.7 A (Marine High Power) 1.2 A (Marine Mid Power & MURS) 0.8 A (Marine Low Power & FRS)
Operating Temperature:	-22 °F to +140 °F (-30 °C to +60 °C)
Case Size (W x H x D):	2.36" x 3.78" x 1.12" (60 x 96 x 29 mm) w/o knob & antenna
Weight (Approx.):	9.3 oz. (265 g) with FNB-80LI

18.2 TRANSMITTER

RF Power Output (@7.4 V):	5, 2.5 or 1 W (Marine Band) 2 W (MURS Band) 0.5W (FRS Band)
Modulation Type:	Variable Reactance
Maximum Deviation:	±5 kHz (Marine Band) ±5 kHz (MURS Band) ±2.5 kHz (FRS Band)
Spurious Emission:	At least 65 dB below
Microphone Impedance:	2 k-Ohm

18.3 RECEIVER

Circuit Type:	Double-Conversion Superheterodyne (NFM, AM) Triple-Conversion Superheterodyne (WFM)
Intermediate Frequencies:	NFM, AM WFM 1st: 47.25 MHz 45.8 MHz 2nd: 450 kHz 10.7 MHz 3rd: – 1 MHz
Sensitivity:	0.2 µV for 12 dB SINAD (Marine & MURS Band) 0.2 µV for 12 dB SINAD (FRS Band) 1 µV for 12 dB SINAD (FM Broadcast) 0.5 µV for 10 dB SN (AM Broadcast) 0.5 µV for 10 dB SN (AIR Band)
Adjacent Channel Selectivity:	65 dB Typical
Intermodulation:	65 dB Typical
Selectivity:	12 kHz / 25 kHz (–6 dB / –60 dB) NFM / AM 200 kHz / 300 kHz (–6 dB / –20 dB) WFM 6 kHz / 18 kHz (–6 dB / –60 dB) FRS Band
AF Output:	400 mW @ 8 Ohm for 10 % THD (@7.4 V)

This device complies with part 15 of the FCC rules. Operation is subject to the condition that this device does not cause harmful interference.

Part 15.21: Changes or modifications to this device not expressly approved by Vertex Standard could void the User's authorization to operate this device.



Marine Division of VERTEX STANDARD

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0302H-AK



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