

## 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).

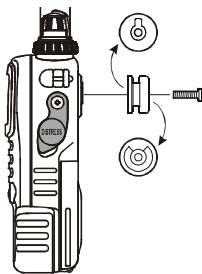


Figure 1



Figure 2

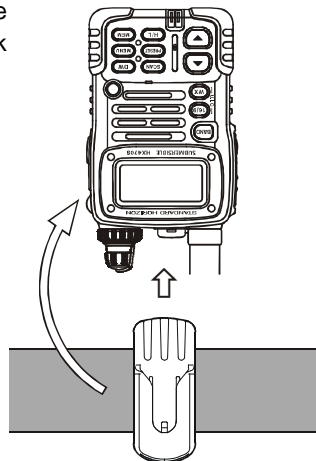


Figure 3

## 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 channel the scanning. Refer to section 7.2 for programming channels into scan memory.
9. Please refer to section 16 for VHF Marine and section 3 for FRS and MURS channel assignments.
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 band, the transmit power is fixed (0.5 Watt).

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.

For an overview of VHF Marine and FRS band operating procedures refer to section 3.

### **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 16 “VHF MARINE 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**] .....

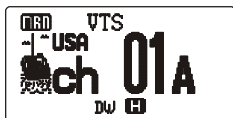
- Even when the transceiver stops and listens to the signal of a programmed channel, the transceiver will shift to a “dual watch” mode between this channel and the priority channel. Therefore, your priority watching of the designated channel is not compromised when the scanner has paused on an active 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).

**NOTE:** An MMSI must be programmed into the **HX470S** before the DSC Distress function will operate. If you have a fixed mounted DSC VHF and already have a MMSI, this MMSI should be programmed into the **HX470S**.

##### **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.

### 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. The **HX470S** will remember the position input from the GPS until the radio is turned off.

### 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 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 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 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 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 | CODE | FREQUENCY | CODE | FREQUENCY | CODE | FREQUENCY | CODE | FREQUENCY | CODE | FREQUENCY | 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 band (you may only access this Menu Item while operating on the FRS band).

## DISPLAY MODE

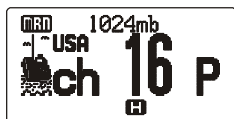
**Function:** Selects the information to be displayed on the LCD

**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 REPLACEMENT PARTS

Occasionally an owner needs a replacement parts. These can be ordered from our Parts Department by writing or calling:

**Marine Division of Vertex Standard**

US Headquarters


10900 Walker Street, Cypress, CA 90630, U.S.A.

Telephone (714) 827-7600

Commonly requested parts, and their part numbers are listed below.

- **VOLUME Knob:** RA0474200
- **SQL Knob:** RA0474100
- **CD-25 Charger Cradle:** Q7000462
- **MIC/SP Cover:** RA0399700
- **DISTRESS Cover:** RA0474800

### 14.3 TROUBLESHOOTING CHART

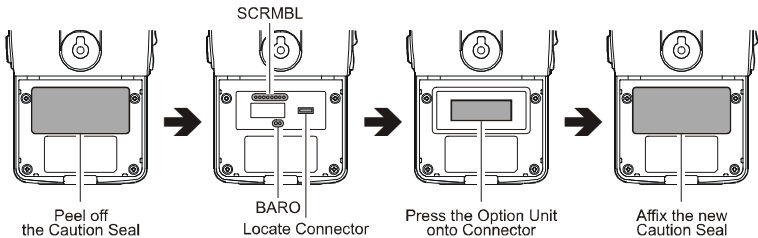
| TROUBLESHOOTING CHART   |                                     |  |
|---|-------------------------------------|--|
| SYMPTON   | PROBABLE CAUSE                      | REMEDY   |
| The [SCAN] key does not start the scan.                                       | No channels memorized.              | Use the <b>MEM</b> 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 <b>16/9</b> key and press the <b>WX</b> key.   |
| Rotating the <b>SQUELCH CONTROL</b> 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 <b>LAMP</b> key for 1 second.  |
| Indicator does not light when charging a battery.                             | Defective battery <b>FNB-80LI</b> . | 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.

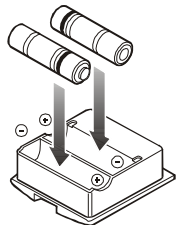


### 15.2 FBA-23 BATTERY CASE

**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. VHF MARINE 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 07**A**) 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 22**A**, and will not be able to communicate with the Coast Guard. To use Channel 22**A**, 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        | X | D        | 156.150        | 160.750 | Public Correspondence (Marine Operator)   |
| <b>03A</b>               | <b>X</b> |          |   | <b>S</b> | <b>156.150</b> |         | <b>US Government only, Coast Guard</b>  |
| 04                       |          |          | X | D        | 156.200        | 160.800 | Public Correspondence (Marine Operator),<br>Port operation, ship movement                                 |
| 04A                      |          | X        |   | S        | 156.200        |         | Pacific coast: Coast Guard, East Coast:<br>Commercial fishing   |
| 05                       |          |          | X | D        | 156.250        | 160.850 | Public Correspondence (Marine Operator),<br>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),<br>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<br>(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,<br>International: port operations and shipment                                 |
| 20A                      | X        |          |   | S        | 157.000        |         | Port operation  |
| 21                       |          |          | X | D        | 157.050        | 161.650 | Port operation, ship movement   |
| <b>21A</b>               | <b>X</b> | <b>X</b> |   | <b>S</b> | <b>157.050</b> |         | <b>U.S. Government Only, Canadian Coast Guard</b>   |
| 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<br>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)  |
| <b>23A</b>               | <b>X</b> |          |   | <b>S</b> | <b>157.150</b> |         | <b>U.S. Government Only</b>  |
| 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 | D        | 156.025        | 160.625 | Public Correspondence (Marine Operator)  |
| 61                       |          |          | X | D        | 156.075        | 160.675 | Public Correspondence (Marine Operator),<br>Port operation, ship movement  |
| <b>61A</b>               | <b>X</b> | <b>X</b> |   | <b>S</b> | <b>156.075</b> |         | <b>U.S. Government Only, Canadian Coast Guard-Pacific Coast, Commercial Fishing-East Coast</b>   |
| 62                       |          |          | X | D        | 156.125        | 160.725 | Public Correspondence (Marine Operator),<br>Port operation, ship movement  |
| 62A                      |          | X        |   | S        | 156.125        |         | Public Coast: Coast Guard;<br>East Coast: commercial fishing only  |
| 63                       |          |          | X | D        | 156.175        | 160.775 | Public Correspondence (Marine Operator),<br>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),<br>Port operation, ship movement  |
| <b>64A</b>               | <b>X</b> | <b>X</b> |   | <b>S</b> | <b>156.225</b> |         | <b>U.S. Government Only, Canadian Commercial Fishing</b>   |
| 65                       |          |          | X | D        | 156.275        | 160.875 | Public Correspondence (Marine Operator),<br>Port operation, ship movement  |
| 65A                      | X        | X        |   | S        | 156.275        |         | Port Operations  |
| 66                       |          |          | X | D        | 156.325        | 160.925 | Public Correspondence (Marine Operator),<br>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,<br>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),<br>Canada: Commercial fishing only,<br>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),<br>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,<br>International: Inter-ship, Port operations and Ship movement                    |
| 74                       | X        | X        | X | S        | 156.725        |         | US: Port Operations, Canada: Commercial fishing only,<br>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),<br>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  |
| <b>81A</b>               | <b>X</b> | <b>X</b> |   | <b>S</b> | <b>157.075</b> |         | <b>U.S. Government Only - Environmental protection operations.</b>     |
| 82                       |          |          | X | D        | 157.125        | 161.725 | Public Correspondence (Marine Operator), Port operation, ship movement |
| <b>82A</b>               | <b>X</b> | <b>X</b> |   | <b>S</b> | <b>157.125</b> |         | <b>U.S. Government Only, Canadian Coast Guard Only</b>                 |
| 83                       |          | X        | X | D        | 157.175        | 161.775 | Canadian Coast Guard Only  |
| <b>83A</b>               | <b>X</b> | <b>X</b> |   | <b>S</b> | <b>157.175</b> |         | <b>U.S. Government Only, Canadian Coast Guard Only</b>                 |
| 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.

| Channel designator                                 | Carrier frequency (MHz) |                | Points of communication (Intership and between coast and ship unless otherwise indicated) |  |
|--|-------------------------|----------------|---|--|
|  | Ship transmit           | Coast transmit |   |  |
| <b>Port Operations</b>                             |                         |                |   |  |
| 01A <sup>1</sup>                                   | 156.050                 | 156.050        | Intership only.<br>Intership only.  |  |
| 63A <sup>1</sup>                                   | 156.175                 | 156.175        |   |  |
| 05 <sup>2</sup>                                    | 156.250                 | 156.250        |   |  |
| 65A  | 156.275                 | 156.275        |   |  |
| 66A  | 156.325                 | 156.325        |   |  |
| 12 <sup>3</sup>                                    | 156.600                 | 156.600        |   |  |
| 73   | 156.675                 | 156.675        |   |  |
| 14 <sup>3</sup>                                    | 156.700                 | 156.700        |   |  |
| 74   | 156.725                 | 156.725        |   |  |
| 77 <sup>4</sup>                                    | 156.875                 |                |   |  |
| 20A <sup>12</sup>                                  | 157.000                 |                |   |  |
| <b>Navigational (Bridge-to-Bridge)<sup>5</sup></b> |                         |                |   |  |
| 13 <sup>6</sup>                                    | 156.650                 | 156.650        |   |  |
| 67 <sup>7</sup>                                    | 156.375                 | 156.375        |   |  |
| <b>Commercial</b>                                  |                         |                |   |  |
| 01A <sup>1</sup>                                   | 156.050                 | 156.050        | Intership only.<br>Do.  |  |
| 63A <sup>1</sup>                                   | 156.175                 | 156.175        |   |  |
| 07A  | 156.350                 | 156.350        |   |  |
| 67 <sup>7</sup>                                    | 156.375                 |                |   |  |
| 08   | 156.400                 | .....          |   |  |
| 09   | 156.450                 | 156.450        |   |  |
| 10   | 156.500                 | 156.500        |   |  |
| 11 <sup>3</sup>                                    | 156.550                 | 156.550        |   |  |
| 18A  | 156.900                 | 156.900        |   |  |
| 19A  | 156.950                 | 156.950        |   |  |
| 79A  | 156.975                 | 156.975        |   |  |
| 80A  | 157.025                 | 157.025        |   |  |
| 88A <sup>8</sup>                                   | 157.425                 | .....          |   |  |
| 72 <sup>14</sup>                                   | 156.625                 | .....          |   |  |
| <b>Digital Selective Calling</b>                   |                         |                |   |  |
| 70 <sup>15</sup>                                   | 156.525                 | 156.525        |   |  |

| Channel designator                  | Carrier frequency (MHz) |                | Points of communication (Intership and between coast and ship unless otherwise indicated)   |  |
|-------------------------------------|-------------------------|----------------|---|--|
|                                     | Ship transmit           | Coast transmit |   |  |
| <b>Noncommercial</b>                |                         |                |   |  |
| 68 <sup>17</sup>                    | 156.425                 | 156.425        | Intership only.<br><br>Great Lakes only.<br>Do.<br>Intership only.  |  |
| 09 <sup>16</sup>                    | 156.450                 | 156.450        |   |  |
| 69                                  | 156.475                 | 156.475        |   |  |
| 71                                  | 156.575                 | 156.575        |   |  |
| 72                                  | 156.625                 | .....          |   |  |
| 78A                                 | 156.925                 | 156.925        |   |  |
| 79A                                 | 156.975                 | 156.975        |   |  |
| 80A                                 | 157.025                 | 157.025        |   |  |
| 67 <sup>14</sup>                    | 156.375                 | .....          |   |  |
| <b>Distress, Safety and Calling</b> |                         |                |   |  |
| 16                                  | 156.800                 | 156.800        |   | EPRIB  |
| <b>Intership Safety</b>             |                         |                |   |  |
| 06                                  | 156.300                 | .....          |   | a. Intership, or b. For SAR: Ship and aircraft for the U.S. Coast Guard. |
| <b>Environmental</b>                |                         |                |   |  |
| 15 <sup>13</sup>                    | .....                   | 156.750        | Coast to ship only.   |  |
| <b>Maritime Control</b>             |                         |                |   |  |
| 17 <sup>9,10</sup>                  | 156.850                 | 156.850        |   |  |
| <b>Liaison, U.S. Coast Guard</b>    |                         |                |   |  |
| 22A <sup>11</sup>                   | 157.100                 | 157.100        | Ship, aircraft, and coast stations of the U.S. Coast Guard and at Lake Mead, Nev., ship and coast stations of the National Park Service, U.S. Department of the Interior. |  |

- 156.050 MHz and 156.175 MHz are available for port operations and commercial communications purposes when used only within the U.S. Coast Guard designated Vessel Traffic Services (VTS) area of New Orleans, on the lower Mississippi River from the various pass entrances in the Gulf of Mexico to Devil's Swamp Light at River Mile 242.4 above head of passes near Baton Rouge.
- 156.250 MHz is available for port operations communications use only within the U.S. Coast Guard designated VTS radio protection areas of New Orleans and Houston described in Sec. 80.383. 156.250 MHz is available for intership port operations communications used only within the area of Los Angeles and Long Beach harbors, within a 25- nautical mile radius of Point Fermin, California.
- 156.550 MHz, 156.600 MHz and 156.700 MHz are available in the U.S. Coast Guard designated port areas only for VTS communications and in the Great Lakes available primarily for communications relating to the movement of ships in sectors designated by the St. Lawrence Seaway Development Corporation or the U.S. Coast Guard. The use of these frequencies outside VTS and ship movement sector protected areas is permitted provided they cause no interference to VTS and ship movement communications in their respective designated sectors.

- 4: Use of 156.875 MHz is limited to communications with pilots regarding the movement and docking of ships. Normal output power must not exceed 1 watt.
- 5: 156.375 MHz and 156.650 MHz are available primarily for intership navigational communications. These frequencies are available between coast and ship on a secondary basis when used on or in the vicinity of locks or drawbridges. Normal output power must not exceed 1 watt. Maximum output power must not exceed 10 watts for coast stations or 25 watts for ship stations.
- 6: On the Great Lakes, in addition to bridge-to-bridge communications, 156.650 MHz is available for vessel control purposes in established vessel traffic systems. 156.650 MHz is not available for use in the Mississippi River from South Pass Lighted Whistle Buoy "2" and Southwest Pass entrance Midchannel Lighted Whistle Buoy to mile 242.4 above Head of Passes near Baton Rouge. Additionally it is not available for use in the Mississippi River-Gulf Outlet, the Mississippi River-Gulf Outlet Canal, and the Inner Harbor Navigational Canal, except to aid the transition from these areas.
- 7: Use of 156.375 MHz is available for navigational communications only in the Mississippi River from South Pass Lighted Whistle Buoy "2" and Southwest Pass entrance Mid-channel Lighted Whistle Buoy to mile 242.4 above head of Passes near Baton Rouge, and in addition over the full length of the Mississippi River-Gulf Outlet Canal from entrance to its junction with the Inner Harbor Navigation Canal, and over the full length of the Inner Harbor Navigation Canal from its junction with the Mississippi River to its entry to Lake Pontchartrain at the New Seabrook vehicular bridge.
- 8: Within 120 km (75 miles) of the United States/Canada border, in the area of the Puget Sound and the Strait of Juan de Fuca and its approaches, 157.425 MHz is half of the duplex pair designated as Channel 88. In this area, Channel 88 is available to ship stations for communications with public coast stations only. More than 120 km (75 miles) from the United States/Canada border in the area of the Puget Sound and the Strait of Juan de Fuca, its approaches, the Great Lakes, and the St. Lawrence Seaway, 157.425 MHz is available for intership and commercial communications. Outside Puget Sound area and its approaches and the Great Lakes, 157.425 MHz is also available for communications between commercial fishing vessels and associated aircraft while engaged in commercial fishing activities.
- 9: When the frequency 156.850 MHz is authorized, it may be used additionally for search and rescue training exercises conducted by state or local governments.
- 10: The frequency 156.850 MHz is additionally available to coast stations on the Great Lakes for transmission of scheduled Coded Marine Weather Forecasts (MAFOR), Great Lakes Weather Broadcast (LAWEB) and nscheduled Notices to Mariners or Bulletins. F3C and J3C emissions are permitted. Coast Stations on the Great Lakes must cease weather broadcasts which cause interference to stations operating on 156.800 MHz until the interference problem is resolved.
- 11: The frequency 157.100 MHz is authorized for search and rescue training exercises by state or local government in conjunction with U.S. Coast Guard stations. Prior U.S. Coast Guard approval is required. Use must cease immediately on U.S. Coast Guard request.
- 12: The duplex pair for channel 20 (157.000/161.600 MHz) may be used for ship to coast station communications.
- 13: Available for assignment to coast stations, the use of which is in accord with an agreed program, for the broadcast of information to ship stations concerning the environmental conditions in which vessels operate, i.e., weather; sea conditions; time signals; notices to mariners; and hazards to navigation.
- 14: Available only in the Puget Sound and the Strait of Juan de Fuca.
- 15: The frequency 156.525 MHz is to be used exclusively for distress, safety and calling using digital selective calling techniques. No other uses are permitted.
- 16: The frequency 156.450 MHz is available for intership, ship and coast general purpose calling by noncommercial vessels, such as recreational boats and private coast stations.
- 17: The frequency 156.425 MHz is assigned by rule to private coast stations in Alaska for facsimile transmissions as well as voice communications.

## 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](http://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 714/827-7600 ext 6300 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

|                                |   |
|--------------------------------|---|
| <b>Frequency Ranges (MHz):</b> | 156 MHz - 163.275 MHz (Marine Band + WX Band)<br>Channel Steps: 25 kHz<br>462.5625 MHz - 467.7125 MHz (FRS Band)<br>Channel Steps: 6.25 kHz<br>151.82 MHz - 154.60 MHz (MURS)<br>Channel Steps: 5 kHz<br>88 MHz - 108 MHz (FM Broadcast)<br>Channel Steps: 100 kHz<br>500 kHz - 1800 kHz (AM Broadcast)<br>Channel Steps: 10 / 9 kHz<br>108 MHz - 137 MHz (AIR Band)<br>Channel Steps: 25 kHz |
| <b>Frequency Stability:</b>    | ±2.5 ppm<br>(-22 °F to +140 °F [-30 °C to +60 °C])  |
| <b>Emission Type:</b>          | 16K0G3E, 11K0F3E, 16K0G2B   |
| <b>Antenna Impedance:</b>      | 50 Ohms   |
| <b>Supply Voltage:</b>         | Nominal: 7.4V DC, Negative Ground<br>(Battery Terminal)   |
| <b>Current Consumption:</b>    | 195 mA (Receive)<br>68 mA (Standby, Saver Off)<br>45 mA (Standby, Saver On)<br>1.7 A (Marine High Power)<br>1.2 A (Marine Mid Power)<br>0.8 A (Marine Low Power & FRS)  |
| <b>Operating Temperature:</b>  | -22 °F to +140 °F (-30 °C to +60 °C)  |
| <b>Case Size (W x H x D):</b>  | 2.36" x 3.78" x 1.12" (60 x 96 x 29 mm)<br>w/o knob & antenna   |
| <b>Weight (Approx.):</b>       | 9.3 oz. (265 g) with FNB-80LI   |

## 18.2 TRANSMITTER

|                                  |   |
|----------------------------------|---|
| <b>RF Power Output (@7.4 V):</b> | 5, 2.5 or 1 W (Marine Band)<br>0.5W (FRS Band)        |
| <b>Modulation Type:</b>          | Variable Reactance                                    |
| <b>Maximum Deviation:</b>        | $\pm 5$ kHz (Marine Band)<br>$\pm 2.5$ kHz (FRS Band) |
| <b>Spurious Emission:</b>        | At least 65 dB below                                  |
| <b>Microphone Impedance:</b>     | 2 k-Ohm   |

## 18.3 RECEIVER

|                                      |  |
|--------------------------------------|--|
| <b>Circuit Type:</b>                 | Double-Conversion Superheterodyne (NFM, AM)<br>Triple-Conversion Superheterodyne (WFM)   |
| <b>Intermediate Frequencies:</b>     | NFM, AM                      WFM   |
|                                      | 1st: 47.25 MHz              45.8 MHz   |
|                                      | 2nd: 450 kHz                10.7 MHz   |
|                                      | 3rd: –                         1 MHz   |
| <b>Sensitivity:</b>                  | 0.2 $\mu$ V for 12 dB SINAD (Marine & MURS Band)<br>0.2 $\mu$ V for 12 dB SINAD (FRS Band)<br>1 $\mu$ V for 12 dB SINAD (FM Broadcast)<br>0.5 $\mu$ V for 10 dB SN (AM Broadcast)<br>0.5 $\mu$ V for 10 dB SN (AIR Band) |
| <b>Adjacent Channel Selectivity:</b> | 65 dB Typical  |
| <b>Intermodulation:</b>              | 65 dB Typical  |
| <b>Selectivity:</b>                  | 12 kHz / 25 kHz (–6 dB / –60 dB) NFM / AM<br>200 kHz / 300 kHz (–6 dB / –20 dB) WFM<br>6 kHz / 18 kHz (–6 dB / –60 dB) FRS Band  |
| <b>AF Output:</b>                    | 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**

**US Headquarters**

10900 Walker Street, Cypress, CA 90630, U.S.A.

0305L-



E M O O 2 N 1 O 1

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