

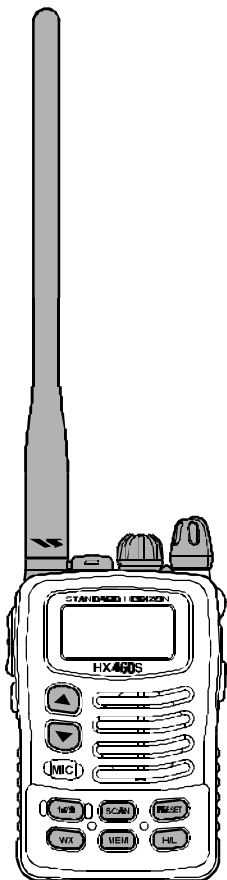


STANDARD HORIZON

HX460S

**VHF/FM Marine
Handheld Transceiver**

Owner's Manual



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Congratulations on your purchase of the **HX460S**! 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 stand behind every product we sell, and we invite you to contact us should you require technical advice or assistance.

We appreciate your purchase of the **HX460S**, and encourage you to read this manual thoroughly, so as to learn and understand the capabilities of the **HX460S** fully.

FCC NOTICE 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 division of YAESU USA.

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 **HX460S** is a miniature 5-Watt portable two-way VHF marine transceiver. The transceiver has 173 channels: 163 marine and 10 weather. The 163 marine channels are switchable to comply with USA, International, or Canadian regulations. It has an emergency channel 16 which can be immediately selected from any channel by pressing the **16/9** key. Weather channels can also be accessed immediately by pressing the **WX** key.

The transceiver includes 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).

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.

1.2 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 CNB460 1 W (Low), 2.5 W (Mid), and 5 W (High)
Emission 16K0F3E
Frequency Range 156.025 to 163.275 MHz
FCC Type Number K66HX460S
Industry Canada Type Approval <<??>>

Additional FCC and Industry Canada data, including licensing requirements, are contained in the companion document titled OWNER'S MANUAL SUPPLEMENT. The document also contains charts for VHF channel assignments, transceiver operating procedures, maintenance, factory service information, and warranty data.

2. ACCESSORIES

2.1 PACKING LIST

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

- **HX460S** Transceiver
- **CNB460** 1100 mAh Lithium Ion Battery Pack
- **NC-72B** 120VAC Wall Charger for **CNB460**
- **CAT460** Antenna
- **E-DC-19** DC Cable with 12 V Cigarette Lighter Plug for the **CNB460**
- *Quick Draw* Belt Clip
- Carrying Strap
- Owner's Manual (P/N EC010N100)
- Owner's Manual Supplement (P/N E00005004)

2.2 OPTIONS

CNB460 1100mAh Lithium Ion Battery Pack

NC-72C 230-240 VAC Wall Charger for the **CNB460**

NC-72U 230VAC Wall Charger for **FNB-58LI**

FBA-23 Alkaline Battery Case

SU-1 Barometric Pressure Sensor Unit

CMP460 Noise-canceling Waterproof Speaker/Microphone

VC-24 VOX Headset

E-DC-19 DC Cable with 12 V Cigarette Lighter Plug

E-DC-6 DC Cable; plug and wire only

MCC460 Soft Case

CAW230 SMA - SO239 Adapter

Note: Before operating the **HX460S** for the first time, it is recommended that the battery be charged. Please see section **5.3 OPERATING BATTERY CHARGER** for details.

3. CONTROLS AND INDICATORS

NOTE

This section defines each control of the transceiver. For detailed operating instructions, refer to section 4 of this manual. Refer to Figure 1 for the location of the following controls, indicators, and connections.

3.1 CONTROLS 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

Accepts the optional **CMP460** Speaker/Microphone or **VC-24** VOX Headset. When this jack is used, the internal speaker is disabled.

④ Antenna Connector

Connect the supplied **CAT460** flexible antenna here.

⑤ PUSH-TO-TALK (**PTT**) SWITCH

Activates transmission.

⑥ LAMP KEY

Turns the lamp (for LCD and Keypad back-lighting) on and off.

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

⑦ UP (**▲**) KEY

Selects the desired channel. Each press increases the channel number. When held down, the channels increase continuously.

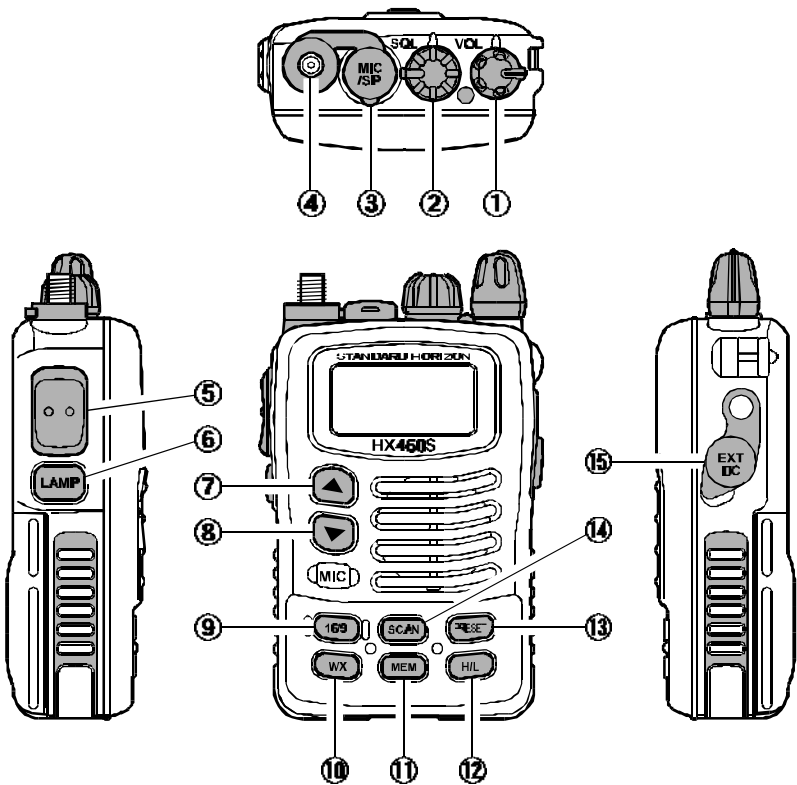


Figure 1
Controls and Connectors

⑧ DOWN (▼) KEY

Selects the desired channel. Each press decreases the channel number. When held down, the channels decrease continuously.

⑨ 16/9 KEY

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

⑩ 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 modes between the USA, International, and Canadian channel sets.

⑪ MEM KEY

Memorizes the selected channel for scanning. Holding this key will delete a memorized channel. ("**MEM**" appears on the LCD display during memory operation).

⑫ H/L KEY

Toggles the transmitter power level between High (5 Watts), Medium (2.5 Watts), and Low (1 Watt) of output. To change from Low power to Medium or High power, hold down this key on Canadian channel 13, USA channel 13 or 67. <<This can't be right>>

⑬ PRESET KEY

Immediately recalls one of up to five user preset memories for operation (shown as A-E on the LCD). Pressing this key repeatedly scrolls through the preset memory channels.

⑭ 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).

⑮ EXT DC JACK

This DC jack allows connection to an external DC power source (6-16V DC).

3.2 INDICATORS

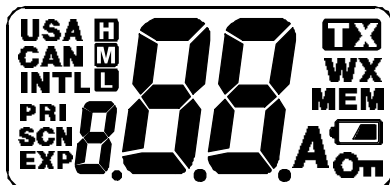


Figure 2
Indicators

Channel Display

The operating channel is shown on the LCD in both the transmission and reception modes. When the optional SU-1 Barometric Pressure Sensor Unit is installed, the LCD may be configured to indicate the current Barometric Pressure.

A Indicator

Signifies ship-to-ship channels in USA or Canadian mode (whose counterpart in the International mode is a public correspondence (marine operator) channel).

USA/CAN/INTL Indicator

Denotes the “band” of operation for the particular channel. “**USA**” indicates the USA band; “**CAN**” indicates the Canadian band; and “**INTL**” indicates the International band. Refer to the Owner’s Manual Supplement for a list of channels.

H/M/L Indicator

“**H**” indicates high power; “**M**” indicates medium power; and “**L**” is for low power. “Blank” in this location indicates a reception-only channel.

PRI Indicator

Priority Scan is activated.

SCN Indicator

Scan is activated.

TX Indicator

Appears during transmission.

WX Indicator

NOAA weather channel.

MEM Indicator

The channel is in the transceiver's "Scan Memory."

Battery Indicator

This indicator appears when the battery capacity is approximately 60%. When the battery capacity is approximately 10%, this indicator will blink.

NOTE: The battery life indicator is accessed immediately by pressing the **PTT** switch. The battery indicator should be used only as a guide in charging the **CNB460** battery.

KEY Lock Indicator

When the symbol is shown on the LCD, all keys are disabled except for the **H/L**, **PTT** and **LAMP** keys.

4. OPERATION

4.1 INITIAL SETUP

NOTE

Never key the transceiver without an antenna connected, as this may cause damage to the transceiver. Do not operate the transceiver while charging its battery.

1. Install the belt clip on the transceiver, if desired.
2. Install the nylon carrying strap on the the transceiver, if desired.
3. Install the battery pack on the transceiver (see figure 6 and section 5.2).
4. Install the antenna onto the transceiver.

NOTE

Water resistance of the transceiver is assured only when the battery pack and antenna are attached to the transceiver.

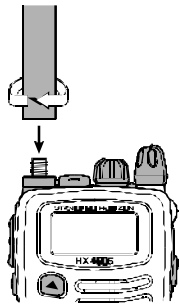


Figure 3
Antenna Installation

How to use the Quick Draw Belt Clip

1. Connect the hanger to the rear of the **HX460S**, using the supplied screw (**Figure 4-a**).

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 4-b**).
3. To install the **HX460S** into the Quick Draw Belt Clip, align the hanger with the Quick Draw Belt Clip and slide the **HX460S** into its slot until a click is heard.
4. To remove the **HX460S** from the Quick Draw Belt Clip, Rotate the **HX460S** 180 degrees, then slide the transceiver out from the Quick Draw Belt Clip (**Figure 4-c**).

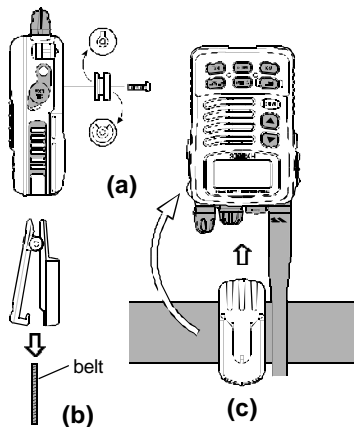


Figure 4

4.2 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 a channel that has no signal being received (no one is transmitting on the channel) and where only noise is heard.
5. 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.
6. To change channels, press the [▲] or [▼] key. Sometimes, a slight adjustment of the squelch threshold is needed, as some channels have a higher noise level than others.
7. Please refer to the Owner’s Manual Supplement for a complete listing of all USA, International and Canadian VHF Marine channels and their uses.
8. If necessary, press the **LAMP** key to turn on the display illumination. The lamp automatically turns off in about 5 seconds. To turn off the lamp sooner, press the **LAMP** key again.
9. To “lock” the channel so that it is not accidentally changed, hold down the **LAMP** key for about one second. This locks the [▲] and [▼] buttons and all the front panel controls except the **HL**, **PTT** and **LAMP** keys. The “**On**” 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 “**On**” symbol will disappear from the display.

4.3 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, 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.

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 ½ to 1 inch away from your mouth.
8. When the transmission is finished, release the **PTT** switch.
9. Refer to the **OWNER’S MANUAL SUPPLEMENT** for an overview of common transceiver operating procedures.

4.4 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, then pressed again. This **Time-Out Timer (TOT)** prevents a continuous transmission that would result from an accidentally stuck **PTT** switch.

4.5 USA, CANADIAN, AND INTERNATIONAL BANDS

1. To change the operating band (channel set) of the transceiver, 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 the OWNER’S MANUAL SUPPLEMENT for allocated channels in each band.

4.6 NOAA WEATHER CHANNELS

1. To receive a NOAA weather channel, press the **WX** key. The transceiver changes to the weather channel mode. This mode consists of a special pre-set memory bank containing the standard 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.

4.7 SCAN

This transceiver provides a special “Scanning Memory Bank” which allows you to designate certain channels for inclusion in a “loop” which will be scanned at high speed. If an incoming signal is detected on one of the channels in the scanning loop, the radio will pause on that channel, allowing you to listen to the incoming transmission.

1. Select the desired channel to be included in the scanning loop using the [**▲**] or [**▼**] key.
2. Press the **MEM** key to store the channel into the transceiver’s scanning 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, press the **MEM** key again while the memorized channel is displayed. “**MEM**” will disappear from the display.
5. All channels programmed remain in the transceiver’s scan memory even if the power is turned off. See section 4.17: “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.
7. To start scanning, press the **SCAN** key. The scan proceeds from the lowest to the highest programmed channel number and stops on channels when a transmission is received. Scanning will resume when the squelch closes after the incoming signal disappears at the end of the transmission.
8. To stop the scan, press the **SCAN** key.

4.8 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 Preset Channels A through E (Preset Channels are described in section 4.14).

1. 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 A to Preset B to Preset C to Preset D to Preset E with each press of the **MEM** key. The displayed channel will be set as the priority channel.
2. 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 "P" is shown on the left side of the channel number during priority scanning.
3. As an example of priority scanning, let us say that 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]
4. 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.

4.9 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 under Section 4.7.
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, however, 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 or until the user presses the **WX** key to listen to the Weather Alert.

4.10 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 the **OWNER’S MANUAL SUPPLEMENT** 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.

4.11 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 shift to a different channel, by mutual agreement with the other vessel’s operator, after contact is established (so as to keep the hailing channel clear for other users).

4.12 OPERATING ON CHANNEL 13

Channel 13 is 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.

4.13 OPERATING ON CHANNEL 67

When channel 67 is used for navigational bridge-to-bridge traffic between ships, High or Medium power may be used temporarily (in the USA band) by pressing the **H/L** key. When the **PTT** switch released, the transceiver will revert to low power.

4.14 PRESET CHANNELS (A ~ E): INSTANT ACCESS

Five user-assigned channels can be programmed for instant access. Pressing the **PRESET** key provides 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.

4.14.1 Programming

Hold down the **PRESET** key, and press the [**▲**] or [**▼**] key (repeatedly, if necessary) until the desired channel number (from among the regular operating channels) is displayed.

With the desired channel number displayed, release the **PRESET** key. The “**A**” notation will appear on the LCD display, indicating that the displayed channel is now saved in the Preset Channel A position.

Repeat steps 1 and 2 to program the desired channels into Preset Channels b ~ E.

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.

4.14.2 Operation

Pressing the **PRESET** key toggles between Preset Channel A, b, C, d, E, and the last selected “regular” channel. Preset Channel A is represented by “A” to the left of the channel number on the LCD, and channel B is represented by “b,” and so forth. The letter “A” should not be confused with the “A” that sometimes is displayed to the *right* of the channel number (described in the section 3.2 of this Owner’s Manual).

4.15 SIMPLEX/DUPLEX CHANNEL USE

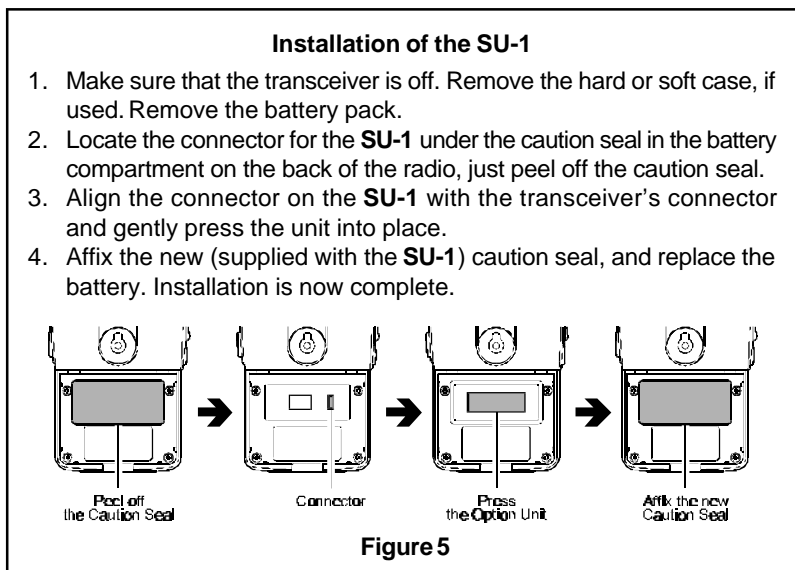
All channels are factory-programmed in accordance with FCC (USA), Industry Canada and International regulations. The mode of operation cannot be altered from simplex to duplex or vice-versa. Simplex or duplex mode is automatically activated, depending on the channel and whether the USA, International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

4.16 BAROMETRIC PRESSURE METER

The optional Barometric Pressure unit (**SU-1**) brings to the **HX460S** the unique capability of providing readout of the current barometric pressure. 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 4.17.6 *boF (Barometric Pressure Offset)*. The **SU-1** Barometric Pressure Unit can be installed in the transceiver by referring to the following illustration:

SU-1 Operation

1. Set the **SQUELCH CONTROL** knob to the "Squelch Threshold" point.
2. Hold down the **H/L** key for at least 1 second; this initiates measurement of the current Barometric Pressure.
3. After few seconds, the current Barometric Pressure (in mm of Hg) will appear on the display.
4. To return to normal operation, again hold down the **H/L** key until the **HX460** shows the last selected working channel; alternatively, turn the squelch counter-clockwise until noise is heard. The display will revert to the last channel selected. Return the squelch control to the "threshold" position to resume normal operation.



4.17 SETUP MODE

The **HX460S**'s Setup Mode allows a number of the **HX460S** operating parameters to be custom-configured for your operating requirements.

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

1. Turn the radio off.
2. Hold down the **LAMP** key, then turn on the transceiver while still holding down the **LAMP** key.
3. "**SET**" will appear on the display, indicating that the Setup Mode has been activated.
4. Press the **LAMP** key to select the Menu item to be adjusted.
5. Press the [**▲**] or [**▼**] key select the status or value of the Menu item.
6. After completing your adjustment, press the **16/9** key to save the new setting and exit to normal operation.

4.17.1 beP (KEY BEEP)

Function: Enable/Disable the Keypad beeper.

Available Values: ON/OFF

Default: ON

4.17.2 LP (LAMP MODE)

Function: Select the LCD/Keypad Lamp mode.

Available Values: KEY/TGL (Toggle)/5 (5 second)

Default: KEY

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

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

5 (5 second): Pressing the **LAMP** key illuminates the LCD/Keypad for 5 seconds.

4.17.3 SCL (SCAN LAMP)

Function: Enable/Disable the Scan lamp while scanning is paused.

Available Values: ON/OFF

Default: OFF

4.17.4 SCn (SCAN DISPLAY)

Function: Select the display mode while scanning.

Available Values: nor (Normal)/SPL (Special)

Default: nor (Normal)

nor (Normal): Changes the channel number accordance with scanning

SPL (Special): The channel number does not change during scanning. However, the channel number changes, when the scanner is stopped, to indicate the channel number on which the radio has stopped.

4.17.5 bro (BAROMETRIC PRESSURE) [Requires optional **SU-1**]

Function: Select the unit of the Barometric Pressure display.

Available Values: HG (mm Hg)/HPA

Default: HG (mm Hg)

4.17.6 boF (BAROMETRIC PRESSURE OFFSET) [Requires optional **SU-1**]

Function: Calibrating the Barometric Pressure meter.

Press the [▲] or [▼] key to set the **HX460S**'s Barometric Pressure display to match a *Calibrated Barometer's* displayed pressure. See page <<??>> for a Barometric Pressure Conversion Chart.

4.18 CLONING

The **HX460S** includes a convenient “Clone” feature, which allows the memory and configuration data from one transceiver to be transferred to another **HX460S**. Here is the procedure for Cloning one radio’s data to another:

1. Turn both radios off.
2. Connect the (optional) **CT-32** Clone Cable between the **MIC/SP** jacks of the two transceivers.
3. 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); “cLn” will appear on the display on both transceivers.
4. On the **Destination** transceiver, press the **MEM** key (“cr” will appear on the LCD).
5. Press the **16/9** key on the **Source** transceiver; “cS” will appear on the Source radio, and the data will now be transferred.
6. If there is a problem during the cloning process, “cE” will displayed. Check your cable connections and battery voltage, and try again.
7. 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.

4.19 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.

5. BATTERY

The **CNB460** is a high performance Lithium-Ion battery providing high capacity in a very compact package.

CAUTION

To avoid risk of explosion and injury, **CNB460** battery pack should only be removed, charged or recharged in non-hazardous environments.

5.1 BATTERY CHARGING

If the radio has never been used, or its charge is depleted, it may be charged by connecting the **NC-72** battery charger, as shown in the illustration. If 12V DC power is available, the optional **E-DC-6** or the **E-DC-19** DC adapter with cigarette plug may be used for charging the battery. The **NC-72**, **E-DC-6** and **E-DC-19** will charge a completely discharged **CNB460** battery pack in about 3 hours.

5.2 BATTERY REMOVAL/INSTALLATION

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

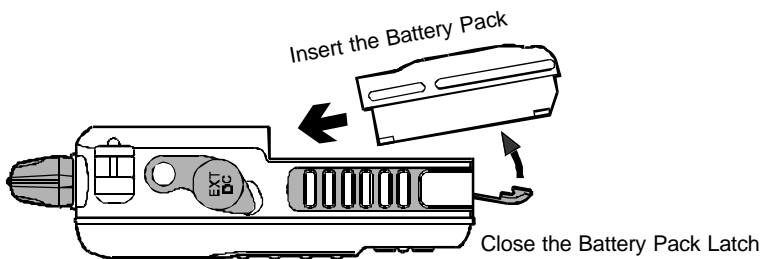


Figure 6

5.3 USING THE NC-72 BATTERY CHARGER

1. Turn the transceiver off.
2. Insert the miniature plug on the end of the **NC-72** Battery Charger cable into the **EXT DC** jack of the transceiver.
3. Plug the **NC-72** into a 120 VAC wall outlet.
4. The indicator will glow red, indicating that charging has begun.
5. When charging is completed, the red indicator will change to green. Remove the plug from the **EXT DC** jack when charging has been accomplished.
6. Replace the rubber gasket in its place to protect the inside of the transceiver from the water.

We do not keep the water-proof while opening the gasket.

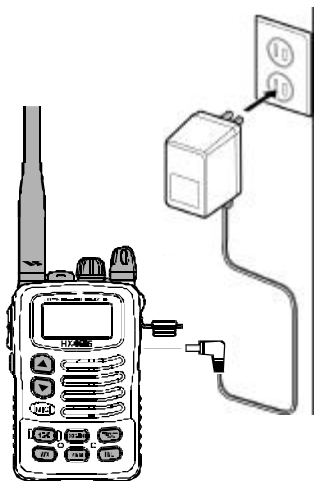


Figure 7

5.4 FBA-23 BATTERY CASE

FBA-23 is a battery case that holds two alkaline batteries and is used with the **HX460S** transceiver. Alkaline batteries can be used for transmission in an emergency, but power output will only be **0.9 W**, 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-V75LI** rechargeable battery. Disregard this indication when using alkaline batteries.

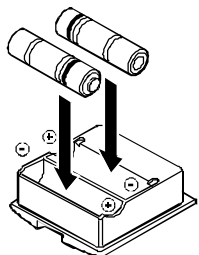


Figure 8

5.5 BATTERY SAFETY

Battery packs for your transceiver contain Nickel-cadmium (Ni-Cd) 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

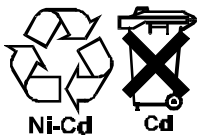
Shorting the terminals that power to the transceiver can cause sparks, severe overheating, burns, and battery cell damage. If the short is of sufficient duration, it is possible to melt battery components. Do not place a loose battery pack on or near metal surfaces or objects such as paper clips, keys, 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.

DISPOSE OF BATTERY PACKS PROPERLY

Batteries must be recycled or disposed of properly. For requirements in your area, check with the dealer from whom you purchased your transceiver. The symbol shown at the right is a reminder that the battery packs are recyclable.



6. MAINTENANCE

For preventive maintenance and instructions on obtaining factory service, please refer to the OWNER'S MANUAL SUPPLEMENT. For general troubleshooting, refer to this 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.
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-58LI .	Contact your Vertex Horizon dealer.

7. SPECIFICATIONS

7.1 General

Frequency range:	TX: 156.025 - 157.425 MHz RX: 156.050 - 163.275 MHz
Number of channels:	All US, Canadian & International channels 10 weather channels
Channel spacing:	25 kHz
Modulation type:	16K0G3E
Supply voltage:	7.2 VDC
Current consumption:	Standby: 45 mA Saver on: 20 mA RX: 190 mA TX: 1.6 A (H)/0.9 A (M)/0.6 A (L)
Temperature range:	-4 °F to +140 °F (-20 °C to +60 °C)
Battery life: (STBY:RX:TX = 18:1:1)	10 hours @ 5 W (HI) 15 hours @ 2.5W (MID) 19 hours @ 1 W (LOW)
Dimensions:	37.8 (H) x 23.6 (W) x 11.41 (D) in 96 (H) x 60 (W) x 29 (D) mm
Weight:	<<??>>

7.2 Transmitter

Frequency range:	156.025 - 157.425 MHz
RF output power:	5 W/2.5 W/1 W @ 7.2 V or 13.8 V
Spurious emissions:	At least 65 dB down
AF distortion:	<5 % @ 1 kHz
Max deviation:	±5 kHz
Frequency stability:	±5 ppm
FM noise:	>40 dB down
Microphone type:	Condenser
Microphone impedance:	2 kΩ

7.3 Receiver

Frequency range:	156.050 - 163.275MHz
Circuit type:	Double-conversion superheterodyne
IFs:	1st: 21.7 MHz 2nd: 450 kHz
Sensitivity:	0.2 μ V 12 dB SINAD
Adjacent channel selectivity:	70 dB
Intermodulation response:	70 dB
Spurious response rejection:	70 dB
Speaker impedance:	8 Ω
AF output:	0.4 W @ 8 Ω 10 % THD (7.2V) 0.5 W @ 8 Ω 10 % THD (13.8V)



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