

Preliminary



STANDARD HORIZON

FCC ID: K66VX-5100-1
2.1033 (c)(3) MANUAL (PRELIM)

***VHF/UHF Hand-Held Portable
Marine Transceiver***

OPERATING MANUAL

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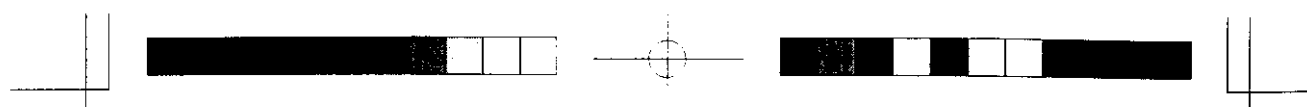
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Congratulations!

You now have at your fingertips a valuable communications tool - a **STANDARD HORIZON** two-way radio! Rugged, reliable and easy to use, your **STANDARD HORIZON** radio will keep you in constant touch with your colleagues for years to come, with negligible maintenance down time.

Please take a few minutes to read this manual carefully. The information presented here will allow you to derive maximum performance from your radio. After reading it, keep the manual handy for quick reference, in case questions arise later on.

We're glad you joined the **STANDARD HORIZON** team. Call on us any time, because our business is communications. Let us help you get your message across.



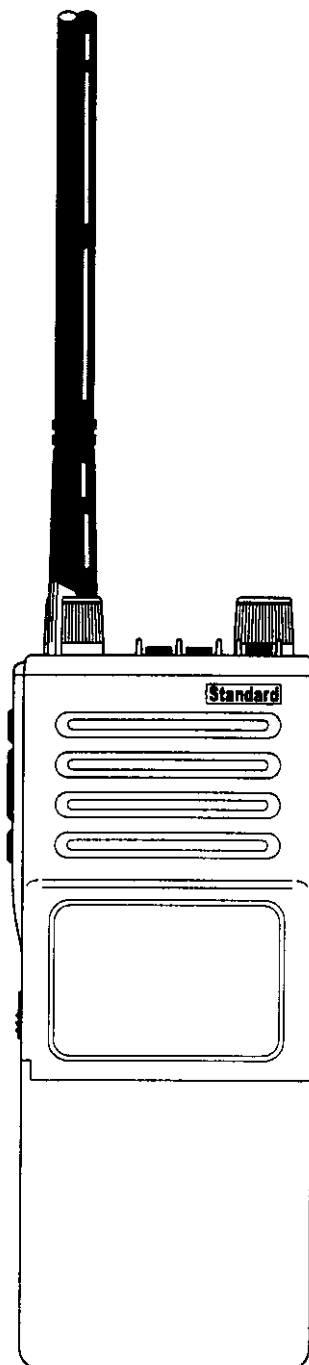
NOTICE

There are no user-serviceable points inside this transceiver. All service jobs must be referred to your Authorized Service Center or Network Administrator.

HX511 OPERATING MANUAL

HX511 Series

VHF/UHF Hand-Held Portable Marine Transceiver



The **HX511** is a frequency-synthesized, microprocessor-controlled FM hand-held portable transceiver providing up to five watts (VHF) or four watts (UHF) of power output on up to 16 channels in the VHF or UHF Marine Bands. Designed specifically for commercial and professional applications, the **HX511** is housed in high-strength die-cast aluminum alloy, sealed to MIL-810 C, D & E intrinsically safe (I/S) and weather-tight specifications*.

User selectable features include a four-mode display with channel name or number, upright or inverted for easy viewing when on your belt; selective channel scanning, adjustable-pause priority scanning, and variable transmitter power output.

Other user-selectable features include push-button display illumination, 2-tone decoder enable/disable (with optional F2D-5 Unit installed), and manual squelch override. The **HX511** is easily programmed by your dealer using a Yaesu Service Kit with an IBM PC-compatible computer.

Please read this manual carefully to become familiar with the features of the **HX511**.

*approval pending

HX511 OPERATING MANUAL

SPECIFICATIONS

General

Frequency range (MHz):
Channels:

VHF

146 – 174 MHz
Up to 16
(simplex or semi-duplex)
Pre-programmed with
CH 06: 156.300 MHz
CH 09: 156.450 MHz
CH 16: 156.800 MHz

UHF

450 – 488 MHz
Up to 16
(simplex or semi-duplex)
Pre-programmed with
CH 01: 457.525 MHz
CH 02: 457.550 MHz
CH 03: 457.575 MHz
CH 04: 457.600 MHz

Maximum Channel Spread:
Minimum Channel Spacing:
Programming Channel Step:
Emission Type:
Supply Voltage:
Current Consumption:

28 MHz
12.5/25 kHz
5/6.25 kHz
11K0F3E/16K0F3E
7.2 V DC 10%
50 mA (stby, saver off)
19 mA (stby, saver on)
200 mA (receive)
2000 mA (transmit)

20 MHz
12.5/25 kHz
10/12.5 kHz
11K0F3E/16K0F3E
7.2 V DC 10%
50 mA (stby, saver off)
19 mA (stby, saver on)
200 mA (receive)
2000 mA (transmit)

Case Size (WxHxD):
Weight (approx.):

59x149x39mm
570 grams

59x149x39mm
570 grams

Receiver

Receiver Circuit Type:

Double-conversion
Superheterodyne

Double-conversion
Superheterodyne

Intermediate Frequencies:
12-dB SINAD Sensitivity:
20-dB Noise Quieting:
Squelch Threshold:
Adjacent Channel Selectivity:
Image Rejection:
Intermodulation Response:
Hum & Noise:
Audio Response:
AF output (for 5% THD):

21.6 MHz & 455 kHz
better than 0.25 μ V
better than 0.35 μ V
better than 0.20 μ V
65/75 dB
75 dB
72 dB
44/50 dB
+3/-8 dB from the 6 dB/oct.
De-emphasis curve
0.5 watts @16 Ω

47.9 MHz & 455 kHz
better than 0.25 μ V
better than 0.35 μ V
better than 0.20 μ V
65/75 dB
75 dB
72 dB
40/45 dB
+3/-8 dB from the 6 dB/oct.
De-emphasis curve
0.5 watts @16 Ω

Transmitter

Power Output:
Frequency Stability:
Modulation System:
Maximum Deviation:
Audio Response:
FM Hum and Noise:
Spurious Emissions:
AF Distortion (@ 1 kHz):
Microphone Type:

5W/1W
 $\pm$ 2.5 ppm
variable reactance
 $\pm$ 2.5/ $\pm$ 5 kHz
TIA/EIA-603 3.2.6
better than -45/50 dB
60 dB below carrier
< 5% @60 % modulation
2-k Ω condenser

4W/1W
 $\pm$ 2.5 ppm
variable reactance
 $\pm$ 2.5/ $\pm$ 5 kHz
TIA/EIA-603 3.2.6
better than -45/50 dB
60 dB below carrier
< 5% @60 % modulation
2-k Ω condenser

Specifications may be subject to change without notice or obligation.

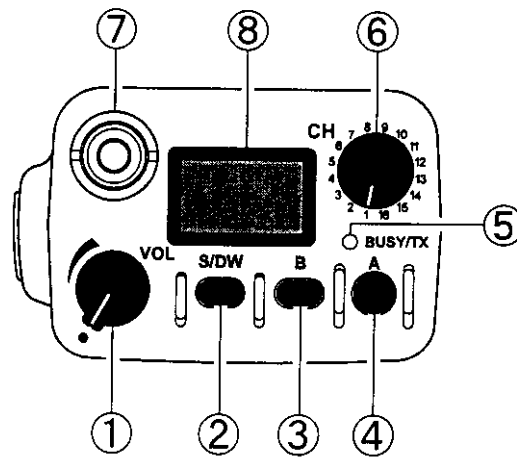
HX511 OPERATING MANUAL

ACCESSORIES & OPTIONS

MH- 30_{A2B}	Speaker/Microphone
FNB-29A	7.2 V/1700 mAh Ni-Cd Battery Pack
CD-8	Desktop Battery Rapid-Charger (used w/ PA-14B/C)
PA-14B	120 V AC Mains Adapter
PA-14C	230 – 240 V AC Mains Adapter
CS-500	Overnight Desktop Charger
ATV-3D	VHF Helical Flex Antenna
ATU-5D	UHF Helical Flex Antenna
FVP-22	Encryption Unit
F2D-5A/B	Two-Tone Sequential Decoder
FTT-7	DTMF Keypad Tone Generator (16 keys)
FTT-7D	DTMF Keypad Tone Generator w/Decoder
CE-21	Programming Software
VPL-1	Programming Cable
CLIP-4	Belt Clip
SBC-1	Swivel Belt Adaptor (Requires LCS-2)

CONTROLS & CONNECTORS

Top panel



(1) VOL Control

This control adjusts the volume of the receiver, and turns the radio off when rotated fully counterclockwise to the click-stop

(2) S/DW Button (Scan/Dual Watch)

Momentarily (< 1sec.) pressing this button turns the channel scanner on and off. Pressing and holding (> 1 sec.) this button activates the Dual Watch feature (explained later).

(3) B Button

Pressing and holding this button more than 2 seconds (but less than 4 seconds) activates the voice encryption unit for privacy during communications, if optional FVP-24 Encryption Unit installed. Pressing and holding this button more than 4 seconds inverts the LCD display to either frontward or backward facing readout (the backward display is convenient for viewing when wearing the transceiver on your belt).

CONTROLS & CONNECTORS

(4) A Button

Pressing and holding this button more than 2 seconds (but less than 4 seconds) selects High or Low power transmit. Pressing and holding this button more than 4 seconds causes the selected channel to be assigned as the Priority Channel for use with Priority Scanning and Dual Watch functions (explained later).

(5) BUSY/TX Indicator

This lamp blinks green when a signal is being received (or the squelch is opened by pressing the **MON RES** button) and red when transmitting. To avoid interference, do not transmit if the lamp is glowing green. When the battery almost depleted, this lamp blinks red, indicating that the battery needs recharging or replacement very soon.

(6) CH Rotary Selector

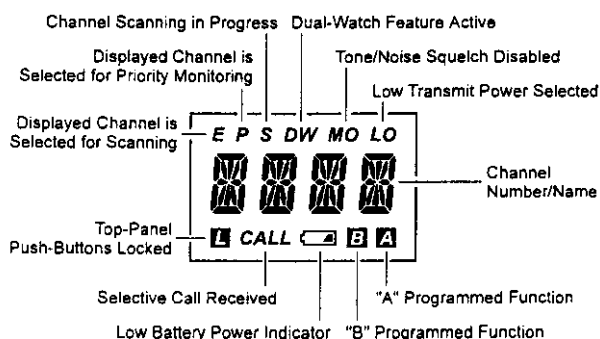
This rotary switch selects the operating channel. If a channel is selected that is not available for operation, " -- -- -- " is displayed, accompanied by a rapid warning beeper (2 beeps/sec.).

(7) Antenna Jack

This threaded-type jack accepts the supplied flexible antenna. Any other antenna types used here must be designed for the programmed operating frequencies.

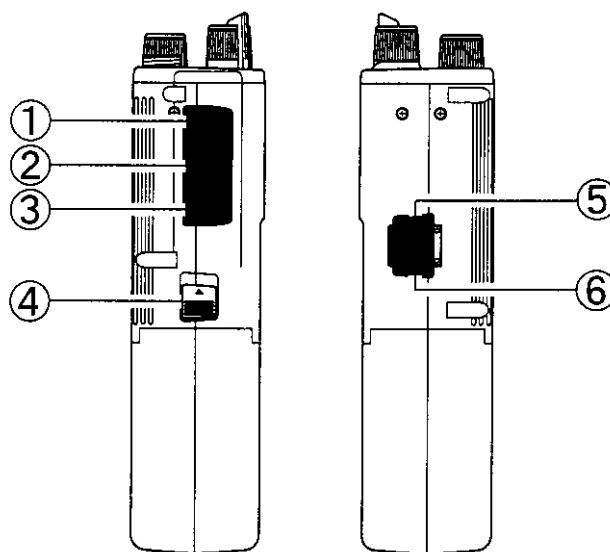
(8) Liquid Crystal Display

In addition the channel number name, the display includes some operating status symbols, indicated in the diagram below.



CONTROLS & CONNECTORS

Side Panel Buttons



(1) MON RES (Monitor/Reset) Button

Pressing and holding this button more than 2 seconds (but less than 4 seconds) disables the tone squelch, and permits monitoring of stations transmitting on the selected channel while still keeping your receiver quiet from noise (“**MO**” will appear at the top right of the LCD). Press it again to only hear calls within your network.

Pressing and holding this button more than 4 seconds toggles the tone and noise squelch override, allowing all stations (and noise) on the channel to be heard. This may be used to hear weak stations whose signals would not normally open the squelch. Do this to pre-adjust the VOLUME control before receiving calls.

(With Selective Calling Option)

When the two-tone sequential decoder unit (F2D-5) is installed, and a selective call has been received (“**CALL**” indicator on), pressing and holding this button more than 2 seconds (but less than 4 seconds) will reset the call function on the current channel and silence the receiver, otherwise pressing and holding this button more than 4 seconds resets the call function on ALL channels.

CONTROLS & CONNECTORS

(2) PTT (Push-To-Talk) button

Hold this button to transmit (the “BUSY/TX” indicator glows red).

(3) LAMP/LOCK button

Press this button momentarily (<1 sec.) to illuminate the display for five seconds. Pressing and holding (>1 sec.) this button locks top-panel push-buttons (**S/DW**, **B**, **A**, and the optional DTMF keypad); this can be enabled to prevent radio settings from being disturbed.

(4) Battery Release button

Slide this button in the direction of the arrow (upward) for battery removal.

(5) EAR Jack

This provides audio output for an earphone or the optional MH-30A2B External Speaker/Microphone here. The internal speaker is disabled when a plug is inserted into this jack.

(6) MIC Jack

Connect the optional MH-30A2B Speaker/Microphone here, the internal microphone is disabled when this jack is used.

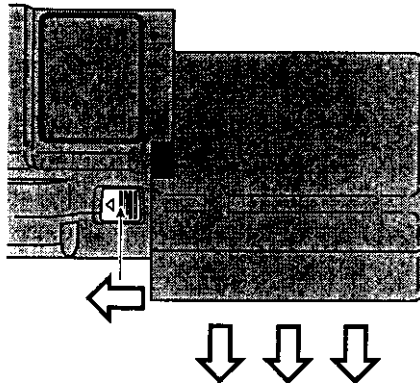
HX511 OPERATING MANUAL

OPERATION

Preliminaries

If the transceiver has not been used since leaving the factory, fully charge the battery using CD-8 unit (with PA-14B or C) before using it.

Mount the battery on the transceiver as described and shown in the photo below. Also, install the antenna on the jack on top of the transceiver by screwing the connector into the jack until it is finger-tight.



Battery Removal & Replacement

- Make sure that the **VOL** control is set into the off click-stop, and remove the protective soft or hard case, if used.
- Grasp the transceiver with your left hand, so your palm is over the speaker and your thumb is on the Battery Release Button.
- Move the button in the direction indicated by the arrowhead, while using your right hand to slide the battery pack toward the side with the button. The battery pack should slide smoothly out of its track.
- To replace the Ni-Cd pack, repeat the second and third steps above, simply sliding the battery case in the other direction after aligning the shorter side of the battery pack with the track below the Battery Release Button.

OPERATION

Preliminary Steps

Before operating the transceiver for the first time:

- Charge the battery pack and connect the supplied helical rubber flex antenna to the antenna jack on the top of the transceiver. *Never operate the transceiver without an antenna connected.*
- If you have a Speaker/Mic, we suggest you do not connect it until you are familiar with basic operation.
- Before proceeding, please review the "*Top & Side Panel Controls*" outline, if you have not already, to familiarize yourself with the functions of the controls.

Basic Operation

- Switch on the transceiver by rotating the **VOL** control clockwise out of the click-stop (a momentary beep will sound). For now, adjust the control to about mid-position (12-o'clock), later you can adjust the level to suit the operating environment.
- Rotate the **CH** knob to select a channel for operation, the LCD will show the currently selected channel. If " " is displayed, along with a rapid (2 beeps/sec.) beeping tone, the selected channel position is not available for operation.
- To transmit, wait until the channel is clear ("**BUSY/TX**" LED off), then press in the **PTT** switch on the side of the transceiver while speaking across the face of the radio. A clear normal voice will provide the best quality transmission. For maximum battery life, select low power output (covered later) whenever possible. During transmission the "**BUSY/TX**" indicator glows red. Release the **PTT** switch to receive.
- To receive weak stations better, try positioning the radio as high and far away from your body as possible, or disable the squelch momentarily by holding the **MON RES** button on the side of the radio for > 4 sec. (until the second low/high beep sounds). With the squelch disabled, the "**BUSY/TX**" indicator will blink green and channel noise and weak stations can be heard. To quiet the radio again, press the **MON RES** button again momentarily.
- When you are done operating, be certain to turn the **VOL** control to the off position to conserve battery life.

OPERATION

Scanning

Scanning allows you to sequentially check for calls on all or only those channels you select. To start scanning, press the **S/DW** button momentarily. A beep then sounds and the display will clear and show "SCAN". Scanning will pause when a signal is received, at which time the channel number (or alphanumeric tag) will be displayed. A small "S" will be displayed above the channel, indicating the scanner is still active, but paused.

During this pause, you can press the **PTT** switch and talk to the station. Otherwise, scanning will resume a few seconds after the signal is no longer present. While scanning, if you momentarily press the **PTT** switch, operation automatically shifts to a default channel. This default channel can be set to the priority channel (both "**P**" and "**S/DW**" are displayed), last-busy channel, or home channel, *depending on how your radio was programmed.*

To stop scanning, simply press **S/DW** momentarily again. Operation will return to the channel that was last selected when scanning was activated.

If enabled by dealer programming, you may select only the channels you want to scan, and have others skipped-over by performing the following routine.

Use the **CH** knob to select a channel, then press the **S/DW** button to enable the channel for scanning ("**E**" will appear in the upper left corner of the LCD). Repeat this process for each channel you want the scanner to check.

To remove a channel from those to be scanned, press **S/DW** again, so that "**E**" no longer appears in the display.

After you have enabled all the channels you want to scan, turn the radio off, then on again to return to normal operation.

OPERATION

Priority Scanning

Priority scanning allows you to scan and monitor channels while the receiver periodically checks for calls on a pre-selected ("priority") channel. You may want to use this feature if you want to scan different channels, but don't want to miss a call for you on a primary dispatch, emergency or tactical frequency. After a call has been received on the priority channel, operation returns to the programmed default channel scheme, as mentioned before. Only *one channel at a time* can be selected as the priority channel.

- To set the currently displayed channel as the priority channel, just press and hold the **A** button for 4 sec. A small "**P**" will now appear at the top left corner of the display whenever this channel is selected, along with an accompanying "beep".

When a priority channel has been selected, the scanner will check the priority channel regularly as you scan the other channels. If a signal appears on the priority channel, the scanner will pause and operation will jump to the priority channel. Otherwise, the scanner will pause on active non-priority signals as previously described.

If a call comes in on a non-priority channel that you need to respond to, just press the **PTT** switch while the scanner is paused on that channel. As long as no call comes in on the priority channel, you can send and receive on the other channel: scanning will resume when you finish and the channel clears.

OPERATION

Dual Watch

If you need to operate on a non-priority channel while still checking for calls on the priority channel, the Dual Watch feature let's you to do this without using the scanner. When enabled, operation on any selected non-priority remains normal as before, however, when a signal is received on the priority channel or when you press the **PTT** switch, operation immediately shifts to the priority channel. The rate at which the Dual Watch feature samples the priority channel can be set by the user.

- To begin Dual Watch operation, first assign a priority channel as described before, then select the non-priority channel you wish to operate on.
- Press and hold the **S/DW** button until the second beep sounds, "**DW**" (but not "**S**") will appear at the top of the display.
- To manually shift to the priority channel, press the **PTT** switch. At this time you make transmit, otherwise, if no signal is received within 2 seconds, operation will revert back to the other selected Dual Watch channel.
- To turn off the Dual Watch Feature, press and hold the **S/DW** button again ("**DW**" will disappear in the display).

Voice Encryption (Requires Optional FVP-22):

When optional FVP-22 Encryption Unit installed, pressing and holding the **B** button more than 2 seconds (but less than 4 seconds) will turn on the voice encryption unit for privacy during communications.

Low Battery Power Indication

When the rechargeable Ni-Cd battery pack voltage reaches a low level, the " " indicator appears at the lower right corner of the LCD, and the "**BUSY/TX**" indicator will blink red. *Immediately remove the Ni-Cd pack and install a freshly charged battery pack, or insert the radio into the charging stand for a complete recharge cycle.* If you plan to operate your radio for extended periods of time, you may want to keep a spare, fully-charged pack handy.

CUSTOM SETTINGS

Below is a table of radio features that can be customized by dealer programming. To change a feature as your requirements change, contact your Yaesu dealer. For future reference, check the box next to the option that has been programmed in your particular radio, and keep it handy.

Feature	Options	Explanation
Channel Scan	☐ Enabled ☐ Disabled	Channel scanning can be disabled completely for systems not requiring this feature.
Scan Stop Resume	☐ 5-seconds ☐ Carrier	In the 5-seconds mode, scanning pauses on a busy channel for 5 seconds, then resumes. In the Carrier mode, scanning pauses and remains on a busy channel until the station stops transmitting.
User Scan Program	☐ Enabled ☐ Disabled	If enabled, the user can program which channels are to be scanned; otherwise, dealer-programmable only.
Dual-Watch	☐ Enabled ☐ Disabled	Dual-Watch can be disabled completely for systems not requiring this feature.
Channel after PTT	☐ Priority Ch. ☐ Home Ch. ☐ Last-Busy	If the PTT is pressed during scanning, determines which default channel the radio returns to : the selected Priority Channel, a designated "Home" Channel, or the channel that was last-busy.
Monitor	☐ Enabled ☐ Disabled	Enable/Disable the side-panel MON RES button (See pages 6 & 9).

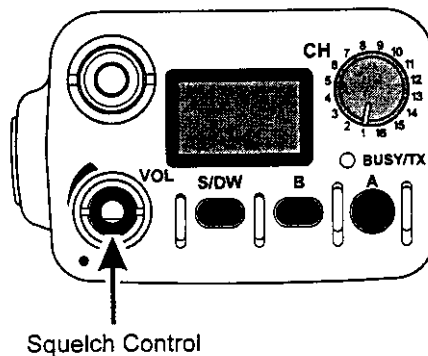
HX511 OPERATING MANUAL

RECEIVER SQUELCH SETTING

The squelch setting on your **HX511** is preset at the factory, and does not normally require re-adjustment. However, in the event that this should become necessary:

To adjust the squelch, use the Allen wrench to *loosen* the setscrew securing the **VOL** knob, then pull off the **VOL** knob. Rotate the small brass collar just above the base of the **VOL** control shaft, using a pair of tweezers, as shown below. Be careful not to loosen the larger mounting nut at the base of the control. When done, rotate the **VOL** control shaft fully to the counter-clockwise position (into the click-stop), and press the **VOL** control back on the shaft to align the indicator of the **VOL** control to the dot “●” on the top panel, then tighten the setscrew.

Adjustment of this control affects whether your radio can hear distant and nearby stations, or only nearby ones; therefore we recommend leaving the control as set, or having your Yaesu dealer perform the adjustment.

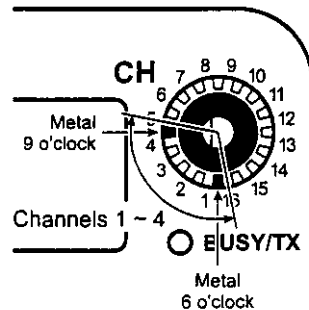


INSTALLING CHANNEL-STOPPS

To simplify operation and prevent selection of unprogrammed/unused channels or channel groups, tiny metal inserts or "stops" can be inserted into the top panel beneath the **CH** selector knob. A tiny tab protruding from beneath the skirt of the **CH** knob engages the stop(s) as it is turned, preventing further rotation.

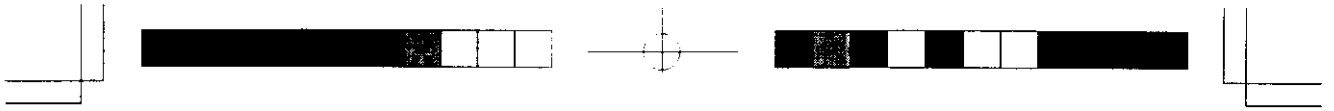
To insert a stop, rotate the **CH** knob to the channel "1" position and use the Allen wrench to *loosen* the setscrew locate the **CH** knob, then pull off the **CH** knob. Insert the stops firmly into the appropriate slot(s) for the desired channels, using a pair of tweezers or fine needle-nose pliers, according to the drawing below. For example, to limit **CH** selection to channels 1 - 4, insert one metal stop at the 9 o'clock position (slot), and the other at the 6 o'clock position. When done, press the **CH** selector knob back on the shaft, align the indicator of the **CH** knob to channel "1," then tighten the setscrew.

Note: The use of mechanical stops should not be used or relied upon as the sole means to prevent selection or transmission on an invalid or unauthorized channel. Channels should be locked-out or TX-inhibited via programming by your Yaesu dealer, and stops inserted as a operating convenience to you and your network users.



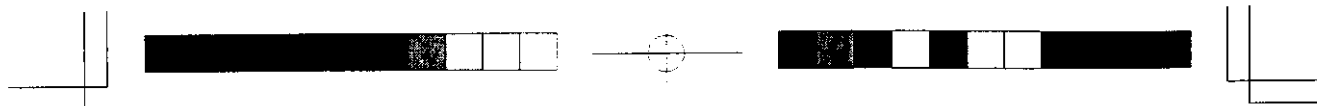
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NOTE



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





STANDARD HORIZON

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