

**VX-510 Series**  
**VHF/UHF Hand-Held Portable Land Mobile Transceiver**  
**Operating Manual**

The VX-510 is a frequency-synthesized, microprocessor-controlled FM hand portable transceiver providing up to five watts of power output on up to 32 channels in the VHF or UHF Land Mobile Bands. Designed specifically for commercial and professional applications, the VX-510 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 transmitter power output.

Other user-selectable features include push-button display illumination, 2-tone decoder enable/disable (when optional F2D-5 Unit installed) and manual squelch override. The VX-510 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 VX-510.

\*approval pending

**Accessories & Options**

<b>F2D-5</b>	Two-Tone Sequential Decoder
<b>FTT-7</b>	DTMF Keypad Tone Generator (16 keys)
<b>FTT-7D</b>	DTMF Keypad Tone Generator w/Decoder
<b>FTE-17</b>	Tone Burst Generator
<b>MH- 30A2B</b>	Speaker/Microphone
<b>CD-1</b>	Desktop Battery Rapid-Charger
<b>PA-14 B</b>	100 - 120 V AC Mains Adapter (used w/CD-1)
<b>PA-14 C</b>	200 - 234 V AC Mains Adapter (used w/CD-1)
Herical Flex Antenna (supplied option)	
<b>FVP-22</b>	Encryption Unit
<b>CE-21</b>	Channel Editor Programming Software
<b>FRB-2</b>	Programming Interface Connection Box
<b>SBC-1</b>	Swivel Belt Clip
<b>FNB-29A</b>	7.2 V/1700 mAh Ni-Cd Battery Pack

**Controls & Connectors**

***Top panel***

**(1) VOL (OFF) 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.) button activates the Dual Watch feature (explained later).

**(3) A Button**

Pressing and holding this more than 2 seconds (but less than 4 seconds) activates functions as programmed by your dealer and determined by your system requirements (See "*Pre-Programmed Functions*"). Pressing and holding this 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).

(4) **B** Button

Pressing and holding this more than 2 seconds (but less than 4 seconds) also activates an assigned function (programmed by your dealer). Pressing and holding this 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).

(5) **BUSY/TX** Indicator

This lamp blinks green when a signal is being received (or the squelch is opened by pressing the **MON RES** switch) and glows red when transmitting. To avoid interference, do not transmit if this is green.

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

*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 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 to be heard. 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), momentarily pressing this button will reset the call function on the current channel and silence the receiver, otherwise press and hold to reset the call function on ALL channels.

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

Hold this button in while transmitting (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.) the button locks top-panel push-buttons (**S/DW**, **B**, **A**, and the DTMF keypad (optional), this can be enabled to prevent radio settings from

being disturbed.

(4) **Battery Release**

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.

## Operation

### *Preliminaries*

If the transceiver has not been used since leaving the factory, fully charge the battery using CD-1 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.

### *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.

### *An important note about your radio !*

Some of the radio/button functions discussed next will only operate in your radio if so programmed by your dealer, or after the installation of certain internal optional units. In this way, the radio’s operation can be simplified and customized specifically for the user according to network requirements. If pressing a button on your radio does not result in the same function described in this manual, or if you are uncertain of the functions your particular radio is configured with, contact your dealer. See “*Pre-Programmed Functions*” .

### *Low Battery Power Indication*

When the rechargeable Ni-Cd battery pack voltage reaches a low level, the “Battery” 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.

### *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** button 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** button, 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.

Turn the radio OFF, then depress the **S/DW** button while turning the radio back ON again. “**PROG**” will momentarily appear on the display, after which it will revert to the currently selected channel (this indicates you are in the programming mode). If user-access is disabled “**INH**” will appear briefly.

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.

### *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** button 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.

### *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 lets 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** button, 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** button. 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).