



VX – 2500

# Operating Manual

2001. 10. 25

Ver 1.0

## **Congratulations!**

You now have at your fingertips a valuable communications tool—a VERTEX STANDARD two-way radio! Rugged, reliable and easy to use, your VERTEX STANDARD radio will keep you in constant touch with your colleagues for years to come, with negligible maintenance downtime. Please take a few minutes to read this manual carefully. The information presented here will allow you to derive maximum performance from your radio, in case questions arise later on. We're glad you joined the VERTEX STANDARD team. Call on us anytime, because communications is our business. Let us help you get your message across.

## **Notice !**

There are no owner-serviceable parts inside the transceiver. All service jobs must be referred to an authorized

VERTEX STANDARD Service Representative. Consult your Authorized VERTEX STANDARD Dealer for installation of optional accessories.

## **Safety / Warning Information**

**WARNING - DO NOT** operate the VX-2500 radio when someone (bystanders) outside the vehicle is within following range.

Safety Training information:

Antennas used for this transmitter must not exceed an antenna gain of 0 dBd. The radio must be used in vehicle-mount configurations with a maximum operating duty factor not exceeding 50%, in typical Push-to-Talk configurations.

This radio is restricted to occupational use, work related operations only where the radio operator must have the knowledge to control the exposure conditions of its passengers and bystanders by maintaining the minimum separation distance of following range.

Failure to observe these restrictions will result in exceeding the FCC RF exposure limits.

Antenna Installation:

For rear deck trunk installation, the antenna must be located at least following range away from rear seat passengers in order to comply with the FCC RF exposure requirements.

For roof top installation, the antenna must be placed in the center of the roof.

## **Radiated frequency and Distance**

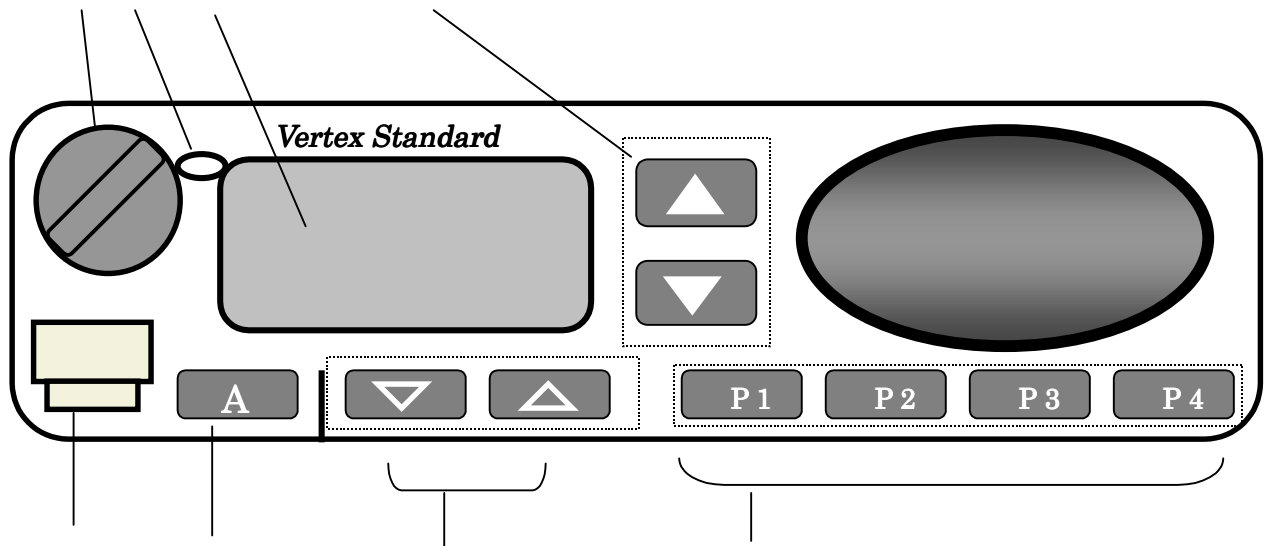
VX-2500U (D)

1.89 Feet

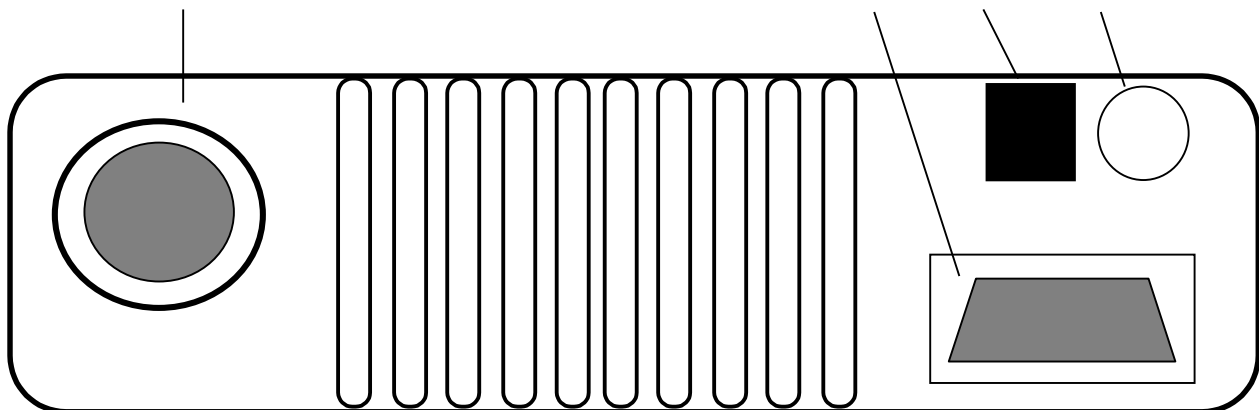
(0.576 m)

### Controls & Connectors

#### FRONT



#### REAR



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**Important!** – All buttons located on the Front Panel are **Programmable Function Button (PF button)** determined by your network requirements and programmed by your VERTEX STANDARD dealer. Following instruction is along with nominal button programming.

### **VOL. / PWR Knob**

Rotate the knob to turn the transceiver ON and OFF and set the volume of the receiver.

### **Busy / TX Indicator**

#### **[Conventional]**

This lamp glows red when the radio is transmitting and glows green when the channel is busy.

Steady Green	: Busy Channel
Blinking Green	: Tone Squelch in defeated condition
Steady Red	: Transmission in Progress

#### **[LTR Trunking]**

This lamp glows red when the radio is transmitting and glows green when the System is busy (Indicating all channels of the System are busy.)

Steady Green	: System Busy
Steady Red	: Transmission in Progress

### **LCD (Liquid Crystal Display)**

The display include an 8-character alpha-numeric section showing System and Group names, status and identity information, and error messages. Additional indicators on the display show priority channel assignments and scan include / exclude selection.

- **Button [Programmable Function Button ]**

Pressing these buttons changes the current Group (and displayed group number or name). Holding this button for more than 1/2 second causes the function to repeat.

### **Microphone Jack**

Connect the microphone plug to this jack.

#### **A Button [Programmable Function Button ]**

This button can be set up for special applications, such as high/low power selection, monitor, Talk-around, etc, as determined by your network requirements and programmed by your VERTEX STANDARD dealer.

- **Button [Programmable Function Button ]**

Pressing these buttons changes the current System (and displayed group number or name). Holding this button for more than 1/2 second causes the function to repeat.

#### **P1 to P4 [Programmable Function Button ]**

This button can be set up for special applications, such as High/Low power selection,

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Monitor, Talk-around, etc, as determined by your network requirements and programmed by your VERTEX STANDARD dealer.

**Antenna Socket**

The 50-ohm coaxial feedline to the antenna must be connected here, using a type-M (PL-259) plug.

**D-Sub 9Pin Accessory Connector**

External TX audio line input, PTT (Push To Talk), Squelch, and external RX audio line output signal may be obtained from this connector for use with accessories such as data transmission/reception modems, etc.

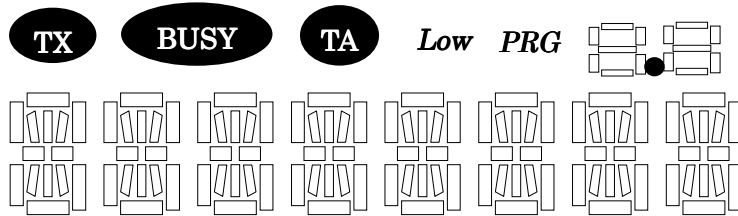
**13.8V DC Cable Pigtail with Connector**

The supplied DC power cable must be connected to this 2-pin connector. Use only the supplied fused cable, extended if necessary, for power connection.

**External Speaker Jack**

An external loudspeaker may be connected to this 2-contact, 3.5-mm mini-phone jack. Caution: Do not connect this line to ground, and be certain that the speaker has adequate capability to handle the audio output from the Radio.

### LCD Icons & Indicators



Transmission in Progress as same as Red lamp.



Busy condition as same as Green lamp.



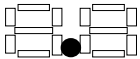
Talk-Around Mode

*Low*

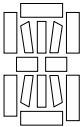
Low Transmit Power Mode On

*PRG*

Current Group on "Scan" List



Status of current System /Group , such as Home , Priority .



8 Character Alpha-numeric Display of memorized System /Group Tagging

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## Basic Operation of the Transceiver

**Important!** - Before turning on the radio the first time, confirm that the power connections have been made correctly and that a proper antenna is connected to the antenna jack.

**Overview** - Your Authorized VERTEX STANDARD Dealer can program your Radio for Trunking or Conventional format.

### Switching Power ON/OFF

Rotate the **VOL. / PWR Knob** turn on the radio. The display will become illuminated. Press the

- **Button** to choose the desired operating Group. A Group name will appear on the display.

If you want to select the operating Group from a different System, press the • **Button** to select the System you want before selecting the operating Group.

### Setting the Volume

Turn the **VOL. / PWR Knob** clockwise to increase the volume, and counterclockwise to decrease it.

#### *[Conventional System]*

If no signal is present, press and hold in the MON button more than 1/2 seconds; background noise will now be heard, and you may use this to set the **VOL. / PWR Knob** for the desired audio level. Press the MON button again to quiet the noise and resume normal (quiet) monitoring.

#### *[Trunking System]*

If no signal is present, press the MON button, the bass sound will be heard. And you may use this to set the **VOL. / PWR Knob** for the desired audio level.

### Transmitting

#### *[Conventional System]*

1. In conventional mode, IT IS A FCC REQUIRMENT TO MONITOR A CHANNEL BEFORE TRANSMITTING. Press the button programmed for monitoring. Listen for channel activity.
2. When receiving a call, Transmit only after the incoming call ends. The radio cannot receive a call and transmit simultaneously.
3. Press the PTT key. When a channel is available, the TXLED will glow red. The radio is now transmitting and a voice message can be delivered. For best transmission, speak into the microphone from a distance of 1- 1/2 to 2 inches. Release the PTT key after each transmission.
4. If Busy Channel Lockout has been programmed for a channel, the radio will not transmit

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when a carrier is present. Instead, the radio will give a Continuous low-pitched tone while the PTT key is pressed. Release the PTT key and wait for channel activity to stop.

5. If CTCSS or Digital-Coded Squelch (DCS) Lockout has been programmed for a channel, the radio can transmit only when there is no carrier being received or when the carrier being received includes the correct CTCSS tone or DCS code.

### ***[Trunking System]***

1. Press the PTT key. When a channel is available, the TX LED will glow red steadily. The radio is now transmitting and a voice message can be delivered.
2. If all channels are busy, a continuous tone will be heard and **BUSY** will appear on the LCD when the PTT key is pressed. Release the PTT key. When a channel becomes available, **BUSY** will disappear from the LCD, and a beep will be heard from the radio. Immediately press the PTT key to hold the channel. If the TX LED glows red, deliver the voice message. If **BUSY** is displayed, repeat this step until a channel becomes available.
3. If the radio is out of range during the transmitting attempt, slow beeps will be heard followed by a continuous tone. The in-range symbol will not be displayed on the LCD.

### **Automatic Time-Out Timer**

If the selected channel has been programmed for automatic time-out, you must limit the length of each transmission. While transmitting, a beep will sound five seconds before time-out. Another beep will sound just before the deadline; the “TX” indicator will disappear and transmission will cease soon thereafter. To resume transmitting, you must release the PTT and wait for the “penalty timer” to expire (if you press the PTT before this timer expires, the timer restarts, and you will have to wait another “penalty” period)





## Advanced Operation

### Description of Operating Functions

#### Group Scan

The Scanning feature is used to monitor multiple Groups (channels) programmed into the transceiver. While scanning, the transceiver will check each Group (channel) for the presence of a signal on Conventional System or ID on the Trunking System, and will stop on a Group(channel) if a signal or correct ID is present.

#### **To activate scanning:**

- Press the assigned PF button of the **Scan** momentarily to activate scanning.
- The scanner will search the Groups (channels) of the each System, looking for active ones; it will pause each time it finds a Group (channel) on which someone is speaking.

#### **To stop scanning:**

- Press the assigned PF button of the **Scan**.
- Operation will revert to the programmed **Revert group**.

*Note:* Your dealer may have programmed your radio to stay on one of the following channels if you press the **PTT** switch during scanning pause:

- Current Group (“Talk Back”)
- “Last Busy” Group
- “Priority” Group
- “Home” Group
- “Scan Start” Group

#### Dual Watch [only available on Conventional System]

The Dual Watch feature is similar to the **Scan** feature, except that only two channels are monitored:

- The current operating channel; and
- The “Priority” Group(channel.)

#### **To activate Dual Watch:**

- Press the assigned **PF** button of the **Dual Watch**.
- The scanner will search the two channels; it will pause each time it finds a channel on which someone is speaking.

#### **To stop Dual Watch:**

- Press the assigned **PF** button of the **Dual Watch**.
- Operation will revert to the revert Group which is programmed.

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### Low Power

Press the assigned **PF** button of the **Low Power** to set the radio's transmitter to the "Low Power" mode. Press this button again to the other Position to return to "High Power" operation when in difficult terrain.

### Talk Around

Press the assigned **PF** button of the **Talk Around** to the assigned position to activate the Talk Around feature when you are operating on duplex channel systems (separate receive and transmit frequencies, utilizing a "repeater" station). The Talk Around feature allows you to bypass the repeater station and talk directly to a station that is nearby. This feature has no effect when you are operating on "Simplex" channels, where the receive and transmit frequencies are already the same.

Note that your dealer may have made provision for "Talk Around" channels by programming "repeater" and "Talk Around" frequencies on two adjacent channels. If so, the button may be used for one of the other Pre-Programmed Functions.

### Lock

Press and hold the assigned **PF** button of the **Key lock** for 2sec. to lock the Front Panel buttons; this can be enabled to prevent radio settings from being disturbed.

### System Selection

The **VX-2500** is capable of separating its 250 memory Groups into any of 32 Systems. There is no limit as to the number of Groups which may be assigned to each System. The Dealer will have made the System assignment at the time of Group programming.

To change System, press the assigned PF button of the SYSTEM UP/DOWN (Normally **•** **button**) to change the System. Once the desired System is reached, press the assigned PF button of the GROUP UP/DOWN (Normally **•** **Button**) to select the desired Group within the selected System.

You may wish to have the Scanner (described previously) pass through more than one Group during the scanning process (normally, scanning is performed within the current group only). To include the current Group in the scanning loop, press and hold in the assigned PF button for one second.

Multi-System Scanning is only possible if you are using the "User Scan" list.

The **VX-2500** has two scanning "lists:" the "Dealer Scan" list and the "User Scan" list. The "Dealer Scan" list is a fixed group of stations which will be included when scanning is activated. The "User Scan" list is a different list, initially arranged by the Dealer, which may be modified by the User (if, for example, you want to delete one or more of these channels from the

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scanning list).

To edit the User Scan list, press and hold the button (assigned to the Group Up/Down function) to delete the current Memory Group from the Scanning. Alternatively, press and hold the assigned of the **Scan A/D** for one second to delete the Current Memory channel from the Scanning.

When you delete a Group or channel, “**PRG**” icon on the LCD will disappear on the LCD for one second after pressing the assigned button. To restore a particular channel to your scanning list, press and hold in the button again for one second; “**PRG**” icon will appear on the LCD for one second after pressing the button.

*Call/Reset* [only available on Conventional system]

This feature, if enabled, allows the user to change the 3-digit Page Call code, used to call other similarly-equipped stations. Press the Dealer-assigned button, followed by the three digits representing the Page Call code of the station you wish to call. Three tones will be heard after the last button is pressed (the new code will now be transmitted).

The receiver squelch of the other station will be opened, and you can begin communication.

*Speed Dial*

Your Dealer may have pre-programmed Auto-Dial telephone number memories into your radio.

*Emergency* [only available on Conventional system]

The **VX-2500** Radio includes an “Emergency” feature which may be useful if you have someone monitoring on the same frequency as your transceiver’s channel. For further details contact your VERTEX STANDARD dealer.

### **ARTS (Auto Range Transpond System)**

This system is designed to inform you when you and another ARTS-equipped station are within communication range.

During ARTS operation, your radio automatically transmits for about 1 second every 25 seconds (the interval is programmed by the Dealer) in an attempt to shake hands with the other station.

If you move out of range for more than two minutes, your radio senses that no signal has been received, a ringing beeper will sound, and “OUT OF SERVICE” will scroll on the LCD. If you subsequently move back into range, as soon as the other station transmits, your beeper will sound, and “IN SERVICE” will scroll on the LCD.

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**DTMF Paging System** [only available on conventional system]

This system allows paging and selective calling, using DTMF tone sequences.

When your radio is paged by a station bearing a tone sequence which matches yours, your radio's squelch will open and the alert ringer will sound.

The three-digit code of the station which paged you will be displayed on your radio's LCD.

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### **Understanding Radio Waves**

Radio waves travel from one point to another by several different means. The general term for these methods of wave travel is “propagation.” You may know that “shortwave” signals can be propagated over distances of several thousand miles by reflection off of the upper regions of the atmosphere.

Your hand-held transceiver, on the other hand, operates on the so-called UHF (Ultra-High Frequency) band. On this band, radio waves usually do not reflect off of the atmosphere. Instead, the radio waves behave almost as light: they travel in a straight line, and when they meet a building or obstruction, they go no further in that direction.

Therefore, it is important that you be as high and free from obstructions as possible to cover the greatest distance when using your radio. If you operate from inside a car or building, any metal around you can absorb much of the signal, both transmitted and received. Coverage may therefore be very poor under those conditions. However, if you must operate from indoors, moving next to a window will improve communications.

In view of the factors just discussed, you can easily see the potential benefit of holding the radio up high near your mouth while transmitting. In this way the antenna is high and clear, and coverage is best.

On final note regarding propagation is useful in improving coverage. Because radio waves at UHF are similar to light waves, they do reflect, to varying degrees, off of hills, buildings, and the like. In a crowded urban area, with many close buildings close together, many reflections may occur, and interfere with one another, causing variations in signal strength at different locations.

Therefore, if a signal is weak and you walk a few feet in any direction, reception may suddenly become clear, because a particular reflection path may become dominant. Reflections are frequently useful, as they can allow for communications between two stations over a highly obstructed path.

## Accessories & Options

<b>FVP-25</b>	Encryption/DTMF Pager Unit
<b>FP-712</b>	External 12A Power Supply
<b>MLS-100</b>	Mobile Loud speaker (12 W Peak Power)
<b>LF-1</b>	Line Filter
<b>MH-700D</b>	DTMF Back-lit Microphone
<b>MH-25 A8J</b>	Microphone

Availability of accessories may vary; some accessories are supplied standard per local requirements, others may be unavailable in some regions.

Check with your VERTEX STANDARD Dealer for changes to the this list.