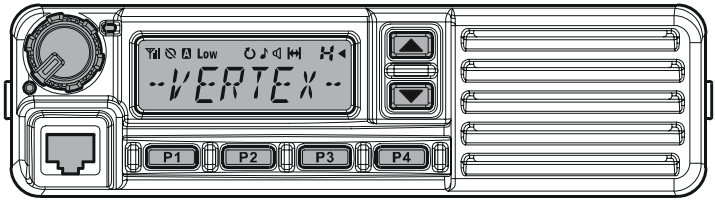
Vertex Standard

VX-2200(LTR) SERIES

OPERATING MANUAL



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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-2200 (LTR) radio when any person(s) (bystanders) outside the vehicle are within the distances shown in the chart at the bottom of this section.

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 shown below.

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

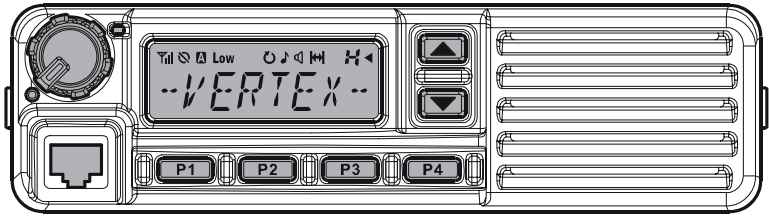
Antenna Installation:
For rear deck trunk installation, the antenna must be located at least the following distance away from rear-seat passengers in order to comply with the FCC RF exposure requirements.

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

Unsafe Radiation Distance

VHF Model	UHF Model
1.64 Feet (0.50 m)	1.35 Feet (0.41 m)

INTRODUCTION



The **VX-2200(LTR)** Series are full-featured FM transceivers designed for flexible mobile and base station business communications in the VHF or UHF Land Mobile bands. These transceiver are designed for reliable business communications in a wide variety of applications with a wide range of operating capability provided by their leading-edge design.

The 250-group memories can each be programmed with a 8-character group name.

Important channel frequency data is stored in EEPROM and flash memory on the CPU, and is easily programmable by dealers using a personal computer and the VERTEX STANDARD Programming Cable and **CE94** Software.

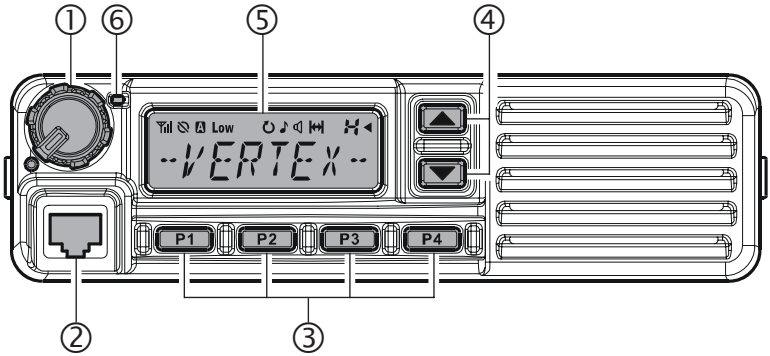
The pages which follow will detail the many advanced features provided on the **VX-2200(LTR)** Series transceiver. After reading this manual, you may wish to consult with your Network Administrator regarding precise details of the configuration of this equipment for use in your application.

For North American Users Regarding 406 MHz Guard Band

The U.S. Coast Guard and National Oceanographic and Atmospheric Administration have requested the cooperation of the U.S. Federal Communications Commission in preserving the integrity of the protected frequency range 406.0 to 406.1 MHz, which is reserved for use by distress beacons. Do not attempt to program this apparatus, under any circumstances, for operation in the frequency range 406.0 - 406.1 MHz if the apparatus is to be used in or near North America.

Front Panel

Important! - All buttons located on the Front Panel are Programmable Function (PF) Buttons, configured according to your network requirements and programmed by your VERTEX STANDARD dealer. The instructions below describe a typically-configured radio.



① VOL/PWR Knob

Turn this control clockwise to turn the radio on and to increase the volume. Turn it counterclockwise into the click-stop to turn the radio off.

② Microphone Jack

Connect the microphone plug to this jack.

③ [P1] - [P4] Buttons (Programmable Function Buttons)

These buttons 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.

④ [▼]/[▲] Buttons (Programmable Function Buttons)

In the factory default, pressing either button changes the current group (and displayed group number or name). Holding in either button for more than 1.5 second causes the radio to begin stepping (repeatedly) upward or downward through the groups.

⑤ LCD (Liquid Crystal Display)

The display includes a 8-character alpha-numeric section showing group name tags/identity information and error messages, and an upper icon row displaying feature status (see below).

⑥ TX/BUSY Indicator

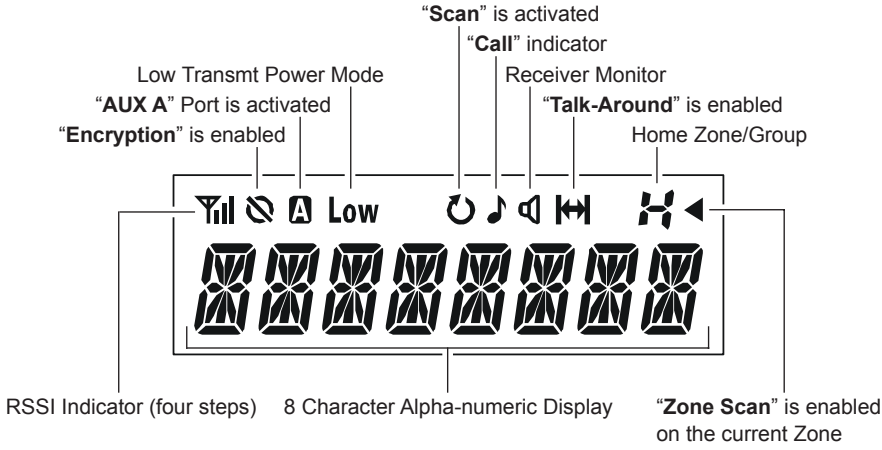
Indicates Transceiver's Transmit/Receive Status

CONVENTIONAL ZONE

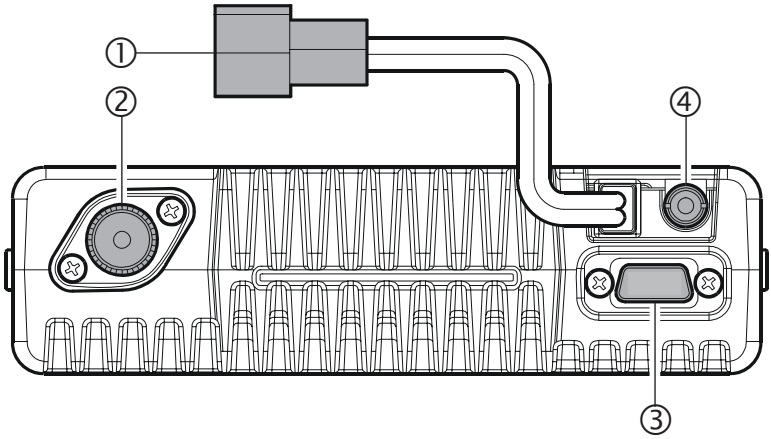
Steady Red: Transmitting in progress
Steady Green: Signaling Off
Blinking Green: Busy Channel/Squelch Off

LTR TRANKING ZONE

Steady Red: Transmission in progress
Steady Green: Zone Busy



Rear Panel



① 13.6V 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.

② Antenna Socket

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

③ D-Sub 15-Pin Accessory Connector

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

④ External Speaker Jack

An external loudspeaker may be connected to this 2-contact, 3.5-mm mini-phone jack.

Caution: Do not connect either wire of this line to ground, and be certain that the speaker has adequate capability to handle the audio output (12 W) from the radio.

NOTE

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.

Switching Power ON/OFF

- ❒ Turn 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 an operating group from a different zone, press the **PF** (Programmable Function) button which is programmed to the Zone Up/Down feature to select the zone you want before selecting the operating group. See page 8 for more information on the Programmable Function keys.

Setting the Volume

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

Transmitting

CONVENTIONAL ZONE

- ❒ To transmit, monitor the channel and make sure it is clear.
  THIS IS AN FCC REQUIREMENT!
- ❒ Press the **PF** button which is programmed to the Monitor feature to listen for channel activity.
- ❒ When receiving a call, transmit only after the incoming call ends. The radio cannot receive a call and transmit simultaneously.
- ❒ Press the **PTT** switch.
- ❒ If the channel is clear, the **TX/BUSY** indicator will glow red. The radio is now transmitting. While holding in the **PTT** switch, speak across the face of the microphone in a clear and normal voice. For best transmission, hold the microphone about 1-1/2 to 2 inches away from your mouth. Release the **PTT** switch to receive.
- ❒ If the Busy Lockout feature has been programmed on a group, the radio will not transmit when a carrier is present. Instead, the radio will generate a short beep three times and indicate "**ERROR**" on the display. Release the **PTT** switch and wait for the channel to be clear of activity.
- ❒ If CTCSS or Digital Coded Squelch (DCS) Lockout has been programmed on a group, 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.

LTR ZONE

- ❒ Press the **PTT** switch.
- ❒ When a group is available, the **TX/BUSY** indicator will glow red. The radio is now transmitting. While holding in the **PTT** switch, speak across the face of the microphone in a clear and normal voice. For best transmission, hold the microphone about 1-1/2 to 2 inches away from your mouth. Release the **PTT** switch to receive.
- ❒ If all groups are busy, a continuous tone will be heard from the radio, and the "**BUSY**" notation will appear on the display when the **PTT** switch is pressed. Release the **PTT** switch.
- ❒ If the radio is out of range during the transmitting attempt, slow beeps will be heard followed by a continuous tone from the radio.

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 10 seconds before time-out. Another beep will sound just before the deadline; the red "**TX**" indicator will disappear and transmission will cease soon thereafter. To resume transmitting, you must release the **PTT** switch and wait for the "penalty timer" to expire (if you press the **PTT** switch before this timer expires, the timer restarts, and you will have to wait another "penalty" period)

Programmable Function (PF) Buttons

The **VX-2200(LTR)** Series includes six Programmable Function (**PF**) Buttons. The PF button functions can be customized, via programming by your VERTEX STANDARD dealer, to meet your communications/network requirements. Some features may require the purchase and installation of optional internal accessories. The possible **PF** button programming features are illustrated below, and these functions are explained on the pages to follow. For further details, contact your VERTEX STANDARD dealer. For future reference, check the box next to the function that has been assigned to each **PF** button on your particular radio, and keep it handy.

Function	PF Button (Press Key/Press and Hold Key)					
	P1	P2	P3	P4	▲	▼
MONI	/	/	/	/	/	/
NSQ	/	/	/	/	/	/
Lighting	/	/	/	/	/	/
Group Up	/	/	/	/	/	/
Group Down	/	/	/	/	/	/
Continuous Group Up	–/	–/	–/	–/	–/	–/
Continuous Group Down	–/	–/	–/	–/	–/	–/
Zone Up	/	/	/	/	/	/
Zone Down	/	/	/	/	/	/
Continuous Zone Up	–/	–/	–/	–/	–/	–/
Continuous Zone Down	–/	–/	–/	–/	–/	–/
SCAN	/	/	/	/	/	/
SCAN A/D	/	/	/	/	/	/
LOW	/	/	/	/	/	/
TA (Talk Around)	/	/	/	/	/	/
Emergency	/	/	/	/	/	/
CALL 1	/	/	/	/	/	/
CALL 2	/	/	/	/	/	/
Code Up	/	/	/	/	/	/
Code Down	/	/	/	/	/	/
Call/Reset	/	/	/	/	/	/
Phone	/	/	/	/	/	/
Public Address	/	/	/	/	/	/
EXT. ACC1	/	/	/	/	/	/
EXT. ACC2	/	/	/	/	/	/
Short Cut to GP1	/	/	/	/	/	/
Short Cut to GP2	/	/	/	/	/	/
Short Cut to GP3	/	/	/	/	/	/
Short Cut to GP4	/	/	/	/	/	/
AF Min Vr	/	/	/	/	/	/
HORN	/	/	/	/	/	/
Key Lock	/	/	/	/	/	/
Option SW※	/	/	/	/	/	/
Encryption	/	/	/	/	/	/

※: Requires **FVP-35** Optional Unit

Description of Operating Functions

MONI (MONITOR)

Press (or press and hold) the assigned programmable key to cancel CTCSS- and DCS-controlled squelch; the **TX/BUSY** indicator will glow green

NSQ

Press (or press and hold) the assigned programmable key to open the SQL to hear background noise (unmute the audio); the **TX/BUSY** indicator will blink green.

LIGHTING

Press (or press and hold) the assigned programmable key to select the brightness level of the display. Available selections are four levels.

GROUP UP/DOWN

Press (or press and hold) the assigned programmable key (generally the [▼]/[▲] button) to select a different group within the current zone.

CONTINUOUS GROUP UP/DOWN

Press and holding in the assigned programmable key causes the radio to begin stepping (repeatedly) upward or downward through the groups.

ZONE UP/DOWN

Press (or press and hold) the assigned programmable key to select a different zone of groups.

CONTINUOUS ZONE UP/DOWN

Press and holding in the assigned programmable key causes the radio to begin stepping (repeatedly) upward or downward through the zones.

SCAN

The Scanning feature is used to monitor multiple channels programmed into the transceiver. While scanning, the transceiver will check each group which is programmed with scan memory "Enabled" for the presence of a signal, and will stop on a channel if a signal is present.

To activate scanning:

- ❒ Press (or press and hold) the assigned programmable key to activate scanning.
- ❒ The scanning radio will search the programmed groups, looking for active ones; it will pause each time it finds a group on which someone is speaking.
- ❒ Press (or press and hold) the assigned programmable key again to disable scanning. Operation will revert to the Scan Start Group.

SCAN A/D

Press (or press and hold) the assigned programmable key to delete the Current Memory Group from the Scanning. When you delete a group, "**- SKIP -**" will appear on the display for one second after pressing the assigned programmable key. To restore a particular group to your scanning list, press (or press and hold) the assigned programmable key again; "**- STOP -**" will appear on the display for one second after pressing the assigned programmable key.

LOW (LOW POWER)

Press (or press and hold) the assigned programmable key to set the radio's transmitter to the "Low Power" mode. Press (or press and hold) the key again to return to "High Power" operation when in difficult terrain.

When the radio's transmitter is set to "Low Power" mode, the "**Low**" icon will be indicated on the display.

TA (TALK AROUND)

Press (or press and hold) the assigned programmable key to activate the Talk Around feature when you are operating on a duplex group (separate receive and transmit frequencies, utilizing a "repeater" station) which is programmed with "Talk Around (by user)" Enabled. The Talk Around feature allows you to bypass the repeater station and talk directly to a station or a radio that is nearby. This feature has no effect when you are operating on "simplex" groups, where the receive and transmit frequencies are already the same.

When the "TA" function is activated, the "|↔|" icon will be indicated on the display.

EMERGENCY

The **VX-2200(LTR)** series include an "Emergency" feature which may be useful if you have someone monitoring on the same frequency as your transceiver's channel.

Press (or press and hold) the assigned programmable key to initiate an emergency call. For further details contact your VERTEX STANDARD dealer.

CALL 1/2

Press (or press and hold) the assigned programmable key to send a 5-Tone sequential burst which is pre-defined.

CODE UP/DOWN

Press (or press and hold) the assigned programmable key to select a 5-Tone encode code from pre-defined encode list.

CALL/RESET

When this feature is programmed and a selective call has been received, press the assigned programmable key to reset the flashing indicator and mute the receiver; otherwise press the assigned programmable key to sent your radio's identification code (ANI) to the dispatcher.

PHONE

Press (or press and hold) the assigned programmable key to dial the Dealer preprogrammed Auto-Dial telephone number. The DTMF tones sent during the dialing sequence will be heard in the speaker.

PUBLIC ADDRESS

Press (or press and hold) the assigned programmable key to use the transceiver as a PA amplifier. When you enable this function, a tone sounds and "**PA**" notation will appear on the display. The public address can be used even while scanning and receiving a call.

EXT. ACC1

During pressing and holding the assigned programmable key, activates the optional device. It works as a momentarily action.

EXT. ACC2

Press (or press and hold) the assigned programmable key to toggle the optional device "on" and "off."

SHORT CUT TO GP1/GP2/GP3/GP4

Press (or press and hold) the assigned programmable key to recall the Dealer pre-programmed group directly.

AF MIN VR

Press (or press and hold) the assigned programmable key to reduce the audio output to the (lower) level programmed by your Dealer.

HORN

Press (or press and hold) the assigned programmable key to turn the Horn Alert function "ON" or "OFF." If you receive a call from the base station with 5-Tone, DTMF signaling, or Sub-Audible, horn alert will be activated and your vehicles horn will sound.

When you turn the Horn Alert "ON," a tone will sound.

KEY LOCK

Press (or press and hold) the assigned programmable key to lock the various aspects of the transceiver's keys. The precise lockout configuration must be programmed by your VERTEX STANDARD dealer.

OPTION SW

This function is usable only when a **FVP-35** Optional Unit is installed. It is used to toggle "on" or "off" the Rolling Encryption feature of the **FVP-35**.

ENCRYPTION

This function is usable on groups whose encryption feature is programmed to "Key On" or "Power On". It is used to toggle "on" or "off" the built-in Encryption feature.

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, when the radio receives an incoming ARTS signal, a short beep will sound, and "**IN SVC**" ("In Service") notation will be displayed on the display for 2 seconds. If you move out of range for more than two minutes, your radio senses that no signal has been received; a short triple-beep will sound, and "**OUT SVC**" ("Out of Service") notation will be displayed on the display for 2 seconds. If you subsequently move back into communication range, as soon as the other station transmits, a short beep will sound and "**IN SVC**" notation will be displayed again on the display for 2 seconds.

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

5-Tone System

This system is designed for 5-Tone SQL Controlling or STUN/KILL/REVIVE features.

When your radio receive the STUN/KILL code, your radio will get into STUN/KILL status. When the radio is in the STUN status, the radio is not usable till a radio receives a REVIVE code. When the radio is in the KILL status, the radio is not usable, please bring the radio to your Vertex Standard dealer.

OPTIONAL ACCESSORIES

MH-67A8J	Standard Microphone
MH-25A8J	Standard Microphone
MH-64A8J	16 Keypad Microphone
MD-11A8J	Desktop Microphone
MLS-100	External Speaker (12 W Peak Power)
MLS-200	External Speaker (15 W Peak Power)
FP-1023A	External Power Supply (13.8 VDC 23 A)
LF-1	Line Filter
FVP-35	High Level Encryption Unit
VME-100	ANI Encode Unit
VPL-1	Programming Kit (Computer to PC)
CE94	PC Programming Software
FIF-10A	USB Programming Interface (Required the Microsoft® Windows® 2000 or Windows® XP)
CT-104A	Connection Cable for FIF-10A
CT-4	Radio to Radio Cloning Cable

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 this list.

NOTE

NOTE

Part 15.21: Changes or modifications to this device not expressly approved by Vertex Standard could void the user's authorization to operate this device.