VX-410/420 Series Operating Manual

Important Notice!
FCC RF Exposure Compliance Requirements for Occupational Use Only: This Radio has been tested and complies with the Federal Communications Commission (FCC) RF exposure limits for Occupational Use/Controlled exposure environment. In addition, it complies with the following Standards and Guidelines: FCC 96-326, Guidelines for Evaluating the Environmental Effects of Radio-Frequency Radiation. FCC OET Bulletin 65 Edition 97-01 (1997) Supplement C, Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields. ANSI/IEEE C95.1-1992, IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300 GHz. ANSI/IEEE C95.3-1992, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields-RF and Microwave. **This radio is NOT approved for use by the general population in an uncontrolled environment. This radio is restricted to occupational use, work related operations only where the radio operator must have the knowledge to control its RF exposure conditions.** **When transmitting, hold the radio in a vertical position with its microphone 1 to 2 inches (2.5 to 5 cm) away from your mouth and keep the antenna at least 1 inch (2.5cm) away from your head and body.** **The radio must be used with a maximum operating duty cycle not exceeding 50 %, in typical Push-to-Talk (PTT) configurations.** **DO NOT transmit for more than 50 % of total radio use time (50 % duty cycle). Transmitting more than 50 % of the time can cause FCC RF exposure compliance requirements to be exceeded.** **The radio is transmitting when the red LED on the top of the radio is illuminated. You can cause the radio to transmit by pressing the PTT button.** **DO NOT transmit when the radio is used in Body Worn configuration with the following accessory: belt-clip (Parts # CP7064001).** **It must be used ONLY for (1) there is a 4 cm distance from the body during transmitting, (2) monitoring purposes, using the speaker only and (3) for carrying purposes.** **Always use Vertex Standard authorized accessories.**

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Controls & Connectors

- LED Indicator
  Glows Green: Monitor on
  Blinks Green: Busy Channel (or SQL off)
  Glows Red: Transmit
  Blinks Red: Battery Voltage is low
  Blinks Yellow: Receiving a Selective Call
- Antenna Jack
- PTT(Push To Talk)Switch
- Side1 key(Case side)
- Side2 key(Case side)
- CH(Channel) Selector
- VOL/PWR knob
- LCD (VX-427 only)
- A Key (VX-427 only) with 16 keys
- B Key (VX-427 only) with 16 keys
- C Key (VX-427 only) with 16 keys
- D Key (VX-427 only) with 16 keys
- MIC/SP Jack (External Mic/Earphone)
- Speaker
- Internal Microphone
- Battery Pack Latch

Before You Begin

Battery Pack Installation and Removal

- To install the battery, hold the transceiver with your left hand, so your palm is over the speaker and your thumb is on the top of the belt clip. Insert the battery pack into the battery compartment on the back of the radio while titling the Belt Clip outward, then close the Battery Pack Latch until it locks in place with a "Click".
- To remove the battery, turn the radio off and remove protective cases. Open the Battery Pack Latch on the bottom of the radio, and then slide the battery downward and out from the radio while unfolding the Belt Clip.

Caution!: *Do not attempt to open any of the rechargeable Ni-Cd packs, as they could explode if accidentally short-circuited.*

Low Battery Indication

- As the battery discharges during use, the voltage gradually becomes lower. When the battery voltage reaches 6.3 Volts, substitute a freshly charged battery and recharge the depleted pack. The TX/BUSY indicator on the top of the radio will blink ***red*** when the battery voltage is low.
- Avoid recharging Ni-Cd batteries often with little use between charges, as this can degrade the charge capacity. We recommend that you carry an extra, fully-charged pack with you so the operational battery may be used until depletion (this "deep cycling" technique promotes better long-term battery capacity)

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Operation

Preliminary Steps
・ Install a charged battery pack onto the transceiver, as described previously.
・ Screw the supplied antenna onto the Antenna jack. Never attempt to operate this transceiver without an antenna connected.
・ If you have a Speaker/Microphone, we recommend that it not be connected until you are familiar with the basic operation of the VX-417/427.

Operation Quick Start
・ To turn the top panel's [VOL/PWR] knob clockwise to turn on the radio on.
・ Turn the top panel's [CH] selector knob to choose the desired operating channel.
・ Rotate the [VOL/PWR] knob to set the volume level. If no signal is present, press and hold the [MONOTOR] (need select by the key config on program) key more than 1 seconds; background noise will now be heard, and you may use this to set the [VOL/PWR] knob for the desired audio level.
・ Press and hold the [MONITOR] key more than 1 seconds (or press the [MONITOR] key twice) to quiet the noise and resume normal (quiet) monitoring.
・ To transmit, press and hold the [PTT] switch. Speak into the microphone area of the front panel grill (lower left-hand corner) in a normal voice level. To return to the Receive mode, release the [PTT] switch.
・ If a Speaker/Microphone is available, remove the plastic cap and its two mounting screws from the right side of the transceiver, than insert the plug from the Speaker/Microphone into the [MIC/SP] jack; secure the plug using the screw supplied with the Speaker/Microphone. Hold the speaker grille up next to your ear while receiving. To transmit, press the [PTT] switch on the Speaker/Microphone, just as you would on the main transceiver's body.
Note: Save the original plastic cap and its mounting screws. They should be re-installed when not using the Speaker/Microphone.

Key Functions
The VX-427 has [side1] key, [side2] key, [A], [B], [C] and [D] function keys. These Soft key 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 Soft key programming features is illustrated below, and their functions are explained next chapter. For further details, contact your VERTEX STANDARD dealer.
For future reference, check the box next to each function that has been assigned to the Soft key on your particular radio, and keep it handy.

Functions	Soft (keys Press / Press and hold)					
	[Side 1]	[Side 2]	[A]	[B]	[C]	[D]
Monitor	/	/	/	/	/	/
Squelch Off	/	/	/	/	/	/
Low Power	/	/	/	/	/	/
Lock	/	/	/	/	/	/
Lamp	/	/	/	/	/	/
Channel Up	/	/	/	/	/	/
Channel Down	/	/	/	/	/	/
Scan	/	/	/	/	/	/
Follow-Me Scan	/	/	/	/	/	/
Dual Watch	/	/	/	/	/	/
Talkaround	/	/	/	/	/	/
Add/Del	/	/	/	/	/	/
Reset	/	/	/	/	/	/
Speed Dial	/	/	/	/	/	/
Tx Save Off	/	/	/	/	/	/
Call 1	/	/	/	/	/	/
Call 2	/	/	/	/	/	/
Call 3	/	/	/	/	/	/
Code Select	/	/	/	/	/	/
Code Up	/	/	/	/	/	/
Code Down	/	/	/	/	/	/
Emergency	X /	X /	X /	X /	X /	X /
ACC 1	/	/	/	/	/	/
ACC 2	/	/	/	/	/	/

Description of Operating Functions
Monitor
  Press (or press and hold) the assigned Soft key momentarily to disable the Tone squelch.

 Squelch Off
  Press (or press and hold) the assigned Soft key to disable the Noise and Tone squelch.
  Repeatedly press (or press and hold) the assigned Soft key to resume the Noise.
Scan
  The scanning feature is used to monitor multiple channels programmed into the transceiver. While scanning, the transceiver will check each channel for the presence of a signal, and will stop on a channel signal is present.
・ To activate scanning:
  Press (or press and hold) the assigned Soft key.
  The scanner will search the channels, looking for active ones; it will pause each time it finds a channel on which someone is speaking.
・ To stop scanning:
  Press (or press and hold) the assigned Soft key.
  Operation will revert to the channel to which the [CH] knob is set.

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Dual watch

The Dual Watch feature is similar to the Scan feature, except that only two channels are monitored: The current operating channel; and the "Priority" channel.

- ・ To activate Dual Watch:
  Press (or press and hold) the assigned Soft key.
  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 (or press and hold) the assigned Soft key.
  Operation will revert to the channel to which the [CH] knob is set.

Talk Around

Press (or press and hold) the assigned Soft key 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 in 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 key may be used for one of the other Pre-Programmed Functions.

Follow-Me Scan

"Follow-Me" Scan feature checks a User-assigned Priority Channel regularly as you scan the other channels. Thus, if only Channels 1, 3, and 5 (of the 8 available channels) are designated for "Scanning," the user may nonetheless assign Channel as the "User-assigned" Priority Channel via the "Follow-Me" feature.

Press the assigned Soft key to activate "Follow-Me" scanning, then turn the CH selector knob to the channel which you want to designate as the "User-Assigned Priority Channel" When the scanner stops on an "Active" channel, the User-assigned Priority Channel will automatically be checked every few seconds.

Channel Up

Press (or press and hold) the assigned Soft key to increase operating channel.

Channel Down

Press (or press and hold) the assigned Soft key to decrease operating channel.

Call 1-3/Reset

When the 2-Tone or 5-Tone selective calling system is enabled, press (or press and hold) the assigned Soft key to silence the receiver and reset for another call, when a communication is finished.

Lamp

Press (or press and hold) the assigned Soft key to illuminate the LCD for five seconds.

Speed Dial

Your Dealer may have pre-programmed Auto-Dial telephone number memories into your radio. To dial a number, just press (or press and hold) the Dealer-assigned Soft key for Speed Dialing. The DTMF tones sent during the dialing sequence will be heard in the speaker.

TX Save Off

Press (or press and hold) the assigned Soft key to disable the Transmit Battery Saver, if you are operating in a location where high power is almost always needed.
The Transmit Battery Saver helps extend battery life by reducing transmit power when a very strong signal from an apparently nearly station is being received. Under some circumstances, though, your hand-held radio may not be heard well at the other end of the communication path, and high power may be necessary at all times.

Low Power

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

Lock

Press (or press and hold) the assigned Soft key to lock the Soft key, [CH] knob, and [PTT] switch (except **Lock** key); this can be enabled to prevent radio settings from being disturbed.

Add/Del

Add/Del feature can be arranged Scan list by the User.
Press (or press and hold) the assigned Soft keys to delete/restore the current channel to/from you're scanning list. When you delete a current channel, "-SKIP-" will appear on the LCD for one second after pressing the Soft key. When you restore a current channel, "-STOP-" will appear on the LCD for one second after pressing the Soft Key.

Speed Dial

Your Dealer may have pre-programmed Auto-Dial telephone number memories into your Radio. To dial a number, just press (or press and hold) the Dealer-assigned Soft key for Speed Dialing. The DTMF tones sent during the dialing sequence will be heard in the speaker.

Code Select

Press (or Press and hold) the assigned Soft key to enable the changing the 5-Tone Paging code which is recalled by the [Call1] key.

Code Up & Down

Press (or Press and hold) the assigned Soft key to switch to a higher paging code number for the 5-Tone Paging System.

Emergency

The VX-417/427 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.

ACC 1 and 2

When the optional unit is installed, these functions are various uses.

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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 55 seconds in an attempt to shake hands with the other station.

If you have out of range for more than two minutes, your radio senses that no signal has been receives, a ringing beeper will sound, and "IN RANGE" will appear on the LCD. If you subsequently move back into range, as soon as the other station transmits, your beeper will sound and "OUT RANGE" will appear on the LCD.

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 "short-wave" 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 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 is 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 frequency useful, as they can allow for communications between two stations over a highly obstructed path.

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Accessories & Options

FNB-V57	7.2V 1100mAh Ni-Cd Battery Pack
FNB-V57IS	7.2V 1100mAh Ni-Cd Intrinsically safe (IS) Battery
FNB-V64	7.2V 700mAh Ni-Cd Battery Pack
FBA-25	Alkaline Battery Case (6 x AA size)
NC-77B	120 VAC Wall Charger
NC-77C	230-240 VAC Wall Charger
VAC-6800	6-Unit Multi Charger
VAC-800B	120 VAC Desktop Rapid Charger
VAC-800C	230-240 VAC Desktop Rapid Charger
VCM-1	Mobile Mounting Bracket for VAC-800
MH-45**B4B**	Speaker/Microphone
MH-37**A4B**	Speaker/Microphone
VC-25	VOX Headset
VTP-50	VX-Trunk Unit
FVP-25	DTMF Pager Unit
DVS-5	Digital Voice Memory
CT-42	PC Programming Cable (CT-28 + CT-29)
CT-27	Clone Cable (Set-to-Set Cloneing)
CE-64	Programming Software

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.

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

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.

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