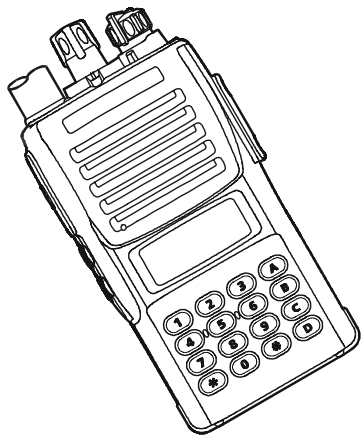


Vertex Standard

VX-420A(LTR)IS SERIES

OPERATING MANUAL





Vertex Standard LMR, Inc.

SAFETY TRAINING INFORMATION

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.

 **WARNING:** This radio generates RF electromagnetic energy during transmit mode. This radio is designed for and classified as **Occupational Use Only**, meaning it must be used only during the course of employment by individuals aware of the hazards, and the ways to minimize such hazards. This radio is not intended for use by the **General Population** in an uncontrolled environment.

 **CAUTION:** To ensure that your exposure to RF electromagnetic energy is within the FCC allowable limits for occupational use, always adhere to the following guidelines:

- **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.**

SAFETY TRAINING INFORMATION

- **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.**
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.**

The information listed above provides the user with the information needed to make him or her aware of RF exposure, and what to do to assure that this radio operates with the FCC RF exposure limits of this radio.

Electromagnetic Interference/Compatibility

During transmissions, this radio generates RF energy that can possibly cause interference with other devices or systems. To avoid such interference, turn off the radio in areas where signs are posted to do so.

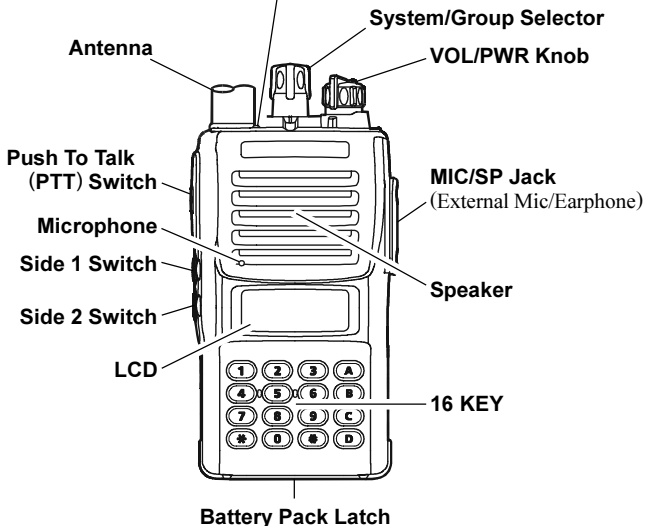
Do not operate the transmitter in areas that are sensitive to electromagnetic radiation such as hospitals, health care facilities, aircraft, and blasting sites.

FCC LICENSE INFORMATION

This radio operates on communications frequencies which are subject to FCC (Federal Communications Commission) Rules and Regulations. FCC Rules require that all operators using Private Land Mobile radio frequencies obtain a radio license before operating their equipment.

CONTROLS & CONNECTORS (16 KEY)

LED INDICATOR	LTR	CONVENTIONAL
Glow Green	System Busy	Monitor on
Blinking Green	—	Busy Channel (or SQL off)
Glow Red	Transmitting	Transmitting
Blinking Red	Battery Voltage is low	Battery Voltage is low
Yellow	Receiving a Selective Call	Receiving a Selective Call

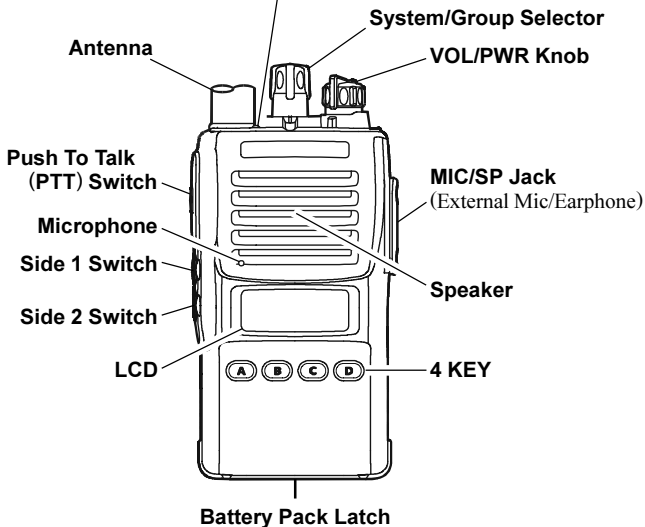


Notice !

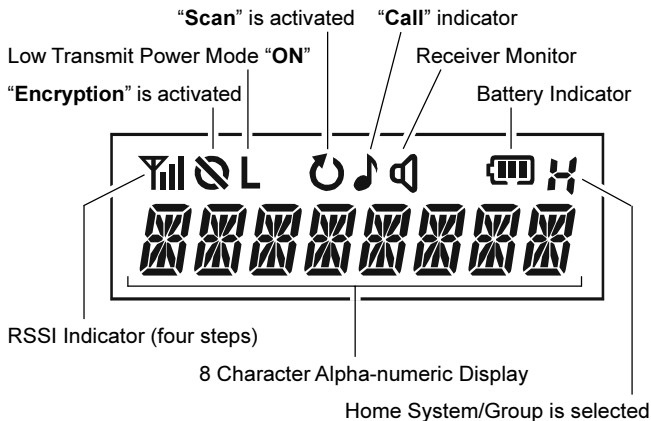
There are no owner-serviceable parts inside the transceiver. All service jobs must be referred to an authorized Vertex Standard Service Representative. Consult your Authorized Vertex Standard Dealer for installation of optional accessories.

CONTROLS & CONNECTORS (4 KEY)

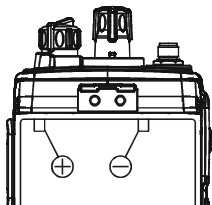
LED INDICATOR	LTR	CONVENTIONAL
Glows Green	System Busy	Monitor on
Blinking Green	—	Busy Channel (or SQL off)
Glows Red	Transmitting	Transmitting
Blinking Red	Battery Voltage is low	Battery Voltage is low
Yellow	Receiving a Selective Call	Receiving a Selective Call



DISPLAY ICONS & INDICATORS



BATTERY TERMINALS



VHF Model

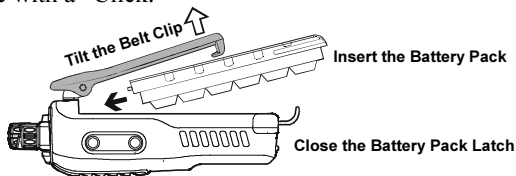
Maximum Input Voltage:	9 V DC
Maximum Input Current:	2.5 A
Maximum Input Power:	22.5 W
Maximum Internal Capacitance:	31.81 μ F
Maximum Internal Inductance:	3.46 μ H

UHF Model

Maximum Input Voltage:	9 V DC
Maximum Input Current:	2.5 A
Maximum Input Power:	22.5 W
Maximum Internal Capacitance:	31.81 μ F
Maximum Internal Inductance:	0.89 μ H

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 tilting 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 any protective cases. Open the Battery Pack latch on the bottom of the radio, then slide the battery downward and out from the radio while holding the Belt Clip.

Caution!

Do not attempt to open any of the rechargeable battery packs, as they could explode if accidentally short-circuited.

WARNING

- The **VX-420A(LTR)IS** series is only intrinsically safe with the use of the **FNB-V57AIS** battery pack.
- Do not reverse-connect the battery terminals.
- Do not parallel-connect the battery terminals.
- Do not change batteries in hazardous locations.
- To reduce the risk of explosion, recharge the batteries outside of hazardous locations.

Operation

- ❑ Insert the DC plug from the **PA-43** AC Adapter into the DC jack on the rear panel of the **CD-47** Desktop Rapid Charger, then plug the **PA-43** AC Adapter into the AC line outlet.
- ❑ Insert the battery pack into the **CD-47** Desktop Rapid Charger while aligning the slots of the battery pack with the guides in the nest of the **CD-47**; refer to the illustration below for details on proper positioning of the pack. If charging with the transceiver attached, turn the transceiver off, and the antenna jack should be at the left side when viewing the charger from the front.
- ❑ If the battery pack is inserted correctly, the RED indicator will glow. A fully-discharged pack will be charged completely 2.0 hours (**FNB-V57AIS**).
- ❑ When charging is completed, disconnect the pack from the **CD-47** Desktop Rapid Charger, and unplug the **PA-43** AC Adapter from the AC line outlet.

Caution !!

When charging a battery pack alone (not attached to the transceiver), do not allow any metal object to short the terminals on the top of the pack.

Important Note !

- ❑ The **CD-47** Desktop Rapid Charger and **PA-43** AC Adapter are not designed to power the transceiver for operation (reception or transmission).
- ❑ Do not leave the charger connected to the transceiver for continuous periods in excess of 24 hours. Long term overcharging can degrade the rechargeable battery pack and significantly shorten its useful life.
- ❑ For optimum battery life, recharge the battery only after it has been discharged to the point where the transceiver indicates recharging is needed. Many recharges after only short periods of use may shorten battery life. Keep an extra, fully-

BEFORE YOU BEGIN

charged pack on hand if you need to avoid going without communications capability.

- ❑ Avoid recharging 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).

Low Battery Indication

- ❑ As the battery discharges during use, the voltage gradually becomes lower. When the battery voltage becomes too low, 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.

Intrinsic Safety (IS) Information

The **VX-420A(LTR)IS** series, equipped with any of the following optional units, meets the requirements of ANSI/UL 913 6th Edition for Class I, Division 1, Groups A-D; Class II, Groups E-G; and Class III for hazardous locations.

Battery Packs:

FNB-V57AIS

Speaker Microphone:

MH-45B4B

Encryption/DTMF Unit:

FVP-25

Voice Storage Unit:

DVS-5

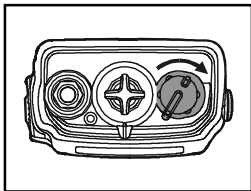
- Substitution of components may impair intrinsic safety.

Preliminary Steps

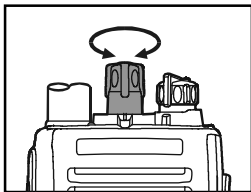
- ❑ Install a charged battery pack onto the transceiver, as described previously.
- ❑ Screw the supplied antenna onto the Antenna jack. Never attempt to operate this transceiver without an antenna connected.
- ❑ If you have a Speaker/Microphone, we recommend that it not be connected until you are familiar with the basic operation of the **VX-420A(LTR)IS** transceiver.

Operation Quick Start

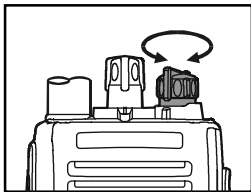
- ❑ Turn the top panel's **VOL/PWR** knob clockwise to turn on the radio on.



- ❑ Turn the top panel's **CH** selector knob to choose the desired operating channel.

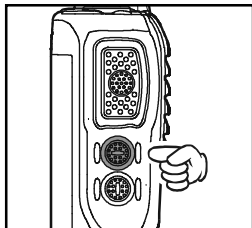


- ❑ Rotate the **VOL/PWR** knob to set the volume level. If no signal is present, press and hold in the **Soft** key assigned to "**MONITOR**" for more than one second; background noise will now be heard, and you may use this to set the **VOL/PWR** knob for the desired audio level.



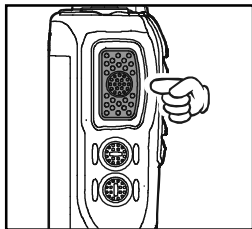
OPERATION

- ❑ Press and hold in the **Soft** key assigned to “**MONITOR**” for more than one second (or press the **MONITOR** key twice) to quiet the noise and resume normal (quiet) monitoring.

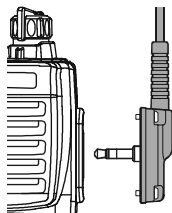


- ❑ To transmit, monitor the channel and make sure it is clear.
THIS IS AN FCC REQUIREMENT!

- ❑ To transmit, press and hold in the **PTT** switch. Speak into the microphone area of the front panel grille (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, then insert the plug from the Speaker/Microphone into the **MIC/SP** jack; secure the plug using the screws 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.



Do not remove/install the Speaker/Microphone in a hazardous location.

Note: Save the original plastic cap and its mounting screws. They should be re-installed when not using the Speaker/Microphone.

Trunking System

- ❑ Press the **PTT** switch.
- ❑ When a channel is available, the **TX/BUSY** indicator will glow red. The radio is now transmitting. While holding the **PTT** switch, speak into the microphone area of the front panel grille (lower left-hand corner) in a normal voice level.
- ❑ If all channels are busy, a continuous tone will be heard from the speaker, 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 speaker.

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 or 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 received, a ringing beeper will sound, and “**GROU OUT**” will appear on the LCD. If you subsequently move back into range, as soon as the other station transmits, your beeper will sound and “**GROU IN**” will appear on the LCD.

DTMF PAGING SYSTEM (REQUIRES FVP-25 OPTIONAL BOARD)

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 LCD.

KEY FUNCTIONS

The **VX-420A(LTR)IS** provides programmable [A], [B], [C], [D] function keys and programmable [Side 1] and [Side 2] switches. These “**Programmable**” keys functions can be customized (set to other functions), 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 **Programmable** key programming features are illustrated below, and their functions are explained in the 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 **Programmable** key on your particular radio, and keep it handy.

KEY FUNCTIONS

Function	PROGRAMMABLE KEY (PRESS/PRESS AND HOLD)					
	[A]	[B]	[C]	[D]	[Side 1]	[Side 2]
System Up	/	/	/	/	/	/
System Down	/	/	/	/	/	/
Group Up	/	/	/	/	/	/
Group Down	/	/	/	/	/	/
Monitor	/	/	/	/	/	/
NSQ	-/	-/	-/	-/	-/	-/
TX Low Power	/	/	/	/	/	/
Key Lock	/	/	/	/	/	/
Lighting	/	/	/	/	/	/
Scan	/	/	/	/	/	/
Talkaround	/	/	/	/	/	/
Scan A/D	/	/	/	/	/	/
Phone	/	/	/	/	/	/
Call/Reset	/	/	/	/	/	/
Call 1	/	/	/	/	/	/
Call 2	/	/	/	/	/	/
Code Up	/	/	/	/	/	/
Code Down	/	/	/	/	/	/
Code Set	/	/	/	/	/	/
Emergency	-/	-/	-/	-/	-/	-/
Home	/	/	/	/	/	/
Home Set	/	/	/	/	/	/
Short-cut to GP 1	/	/	/	/	/	/
Short-cut to GP 2	/	/	/	/	/	/
Short-cut to GP 3	/	/	/	/	/	/
Short-cut to GP 4	/	/	/	/	/	/
Continuous System Up	-/	-/	-/	-/	-/	-/
Continuous System Down	-/	-/	-/	-/	-/	-/
Continuous Group Up	-/	-/	-/	-/	-/	-/
Continuous Group Down	-/	-/	-/	-/	-/	-/

System Up, Down

Press (or Press and hold) the assigned **Programmable** key to switch to a higher (or lower) System.


Once the desired System is reached, rotate the **System/Group** knob to select the desired System/Group within the selected System.

Group Up, Down

Press (or Press and hold) the assigned **Programmable** key to switch to a higher (or lower) operating Group number.


Monitor

Press (or Press and hold) the assigned **Programmable** key to disable the Signaling Squelch (CTCSS, DCS, 5-Tone Signaling, or DTMF Pager). Again press (or Press and hold) the assigned **Programmable** key to resume normal (quiet) the Signaling Squelch action.

When the Signaling Squelch is disabled, the “” icon will be indicated on the display.

NSQ

Press and hold the assigned **Programmable** key to disable both the Noise and Signaling Squelch (CTCSS, DCS, 5-Tone Signaling, or DTMF Pager) systems. Again press and hold the assigned **Programmable** key to resume normal (quiet) operation of the Noise and Signaling Squelch system.

When the Signaling Squelch is disabled, the “” icon will be indicated on the display.

TX Low Power

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

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

Key Lock

Press (or Press and hold) the assigned **Programmable** key to lock the **Programmable** keys (except *Lock*, *Emergency*, *Monitor*, *Lighting*, and *NSQ* keys); thus, the [A], [B], [C], and [D] keys can be disabled to prevent radio settings from being disturbed. In the Lock mode, the display will show "LOCK" when you rotate the **System/Group** selector knob or touch a **Programmable** key.

Lighting

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

Scan

The Scanning feature is used to monitor multiple channels programmed into the transceiver. While scanning, the radio will check each channel 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. 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 **Programmable** key. Operation will revert to the channel to which the **System/Group** knob is set.



Talk Around

Press (or Press and hold) the assigned **Programmable** 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 is nearby. This feature has no effect when you are operating on “Simplex” channels, where the receive and transmit frequencies are already the same.

When the “TA” function is activated, the “**TA ON**” notation will be appeared on the display.

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.

Scan A/D

The Add/Del feature allows the user to arrange a custom Scan. Press (or Press and hold) the assigned **Programmable** key to delete/restore the current channel to/from your scanning list. When you delete a stored channel, the “” icon will, in turn disappear. When you restore a channel, the “” icon will now appear.

Phone

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 **Programmable** key for Speed Dialing. The DTMF tones sent during the dialing sequence will be heard in the speaker.

Call/Reset

Press (or Press and hold) the assigned **Programmable** key to silence the receiver and reset for another call (when your communication is finished).

Call 1/Call 2

Press (or Press and hold) the assigned **Programmable** key to send a 5-tone sequential tone group which is pre-defined.

Call Up/Call Down

Press (or Press and hold) the assigned **Programmable** key to select a 5-tone encode code from the pre-defined encode list.

Code Set

Press (or Press and hold) the assigned **Programmable** key to change the encode digits for 5-tone operation. To change a specific digit, select the desired digit using the [A] key, then change the number using the [B]/[C] keys, and store the number using the [D] key.

Emergency

The **VX-420A(IS)** 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.

Home

Press (or Press and hold) the assigned **Programmable** key to recall the pre-programmed Home system/group. When you recall the Home system/group, the “**H**” icon will appear on the display.

Press (or Press and hold) the assigned **Programmable** key again to return to previous system/group; the “**H**” icon will disappear on the display.

Home Set

Press (or Press and hold) the assigned **Programmable** key to store the current system/group to the Home register.

Short-cut GP-1, GP-2, GP-3, GP-4

Press (or Press and hold) the assigned **Programmable** key to recall the Dealer pre-programmed System/Group directly.

Continuous System Up, Down

Press and hold the assigned **Programmable** key causes the radio to begin stepping (repeatedly) upward or downward through the Systems.

Continuous Group Up, Down

Press and hold the assigned **Programmable** key causes the radio to begin stepping (repeatedly) upward or downward through the Groups.

ACCESSORIES & OPTIONS

IS APPROVES ACCESSORIES

FNB-V57AIS	Intrinsically-Safe 7.2 V 1250 mAh Ni-MH Battery Pack
MH-45^{B4B}	Speaker/Microphone (Noise Cancelling)
MH-37^{A4B}	Earpiece Microphone
MH-360S	Compact Speaker/Microphone
MH-450S	Speaker/Microphone
VH-115S	Lightweight Headset w/Boom
VH-215S	Lightweight Padded Headset, Single Speaker
VH-225S	Lightweight Padded Headset, Dual Speaker
VC-25	VOX Headset
FVP-25	DTMF pager Unit
DVS-5	Digital Voice Storage Unit
ATU-6D	Rubber Antenna 450-490 MHz
ATV-6XL	Rubber Antenna 134-174 MHz
ATV-8C	Rubber Antenna 161-174 MHz
CLIP-17C	Swivel Belt Clip

IS EXEMPT ACCESSORIES

FNB-V67LI	7.4 V 2000 mAh Lithium-Ion Battery Pack
FNB-83	7.2 V 1400 mAh Ni-MH Battery Pack
FBA-25A	Alkaline Battery Case
CD-47	Charger Cradle (for FNB-V57AIS/FNB-83)
PA-43	AC Adapter for CD-47
VAC-810	Desktop Rapid Charger (for FNB-V67LI)
VAC-6020	Rapid 6-Unit Multi Charger (for FNB-V57AIS/FNB-83)
VAC-6810	Rapid 6-Unit Multi Charger (for FNB-V67)
VCM-1	Vehicle Charger Mounting Adapter (for VAC-810)
CE47	Programming Software
FIF-12	USB Programming Interface
CT-42	PC Programming Cable
CT-27	Radio to Radio Cloning Cable
CT-106	Programming Cable (for FIF-12)

WARRANTY POLICY

Vertex Standard warrants, to the original purchaser only, its Vertex Standard manufactured communications products against defects in materials and workmanship under normal use and service for a given period of time from the date of purchase.

Limited Warranty Details:

- North America customers (USA and Canada):
<http://www.vertexstandard.com/lmr/warranty-terms.aspx>
- Customers outside of North America:
Contact the authorized dealer in your country.

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



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