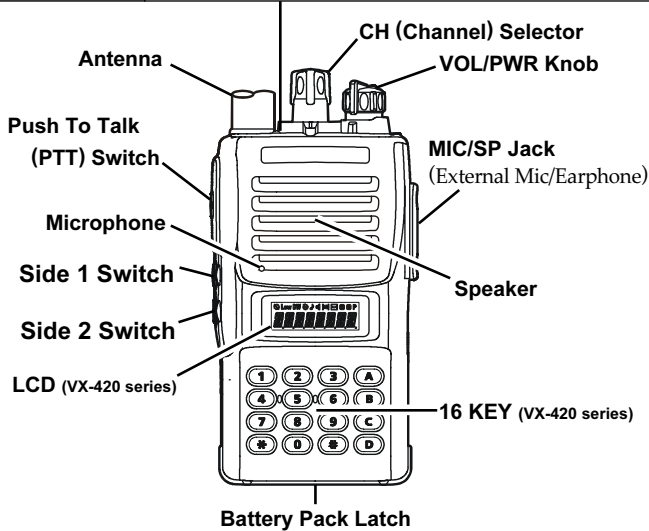


Operating Manual Reprint

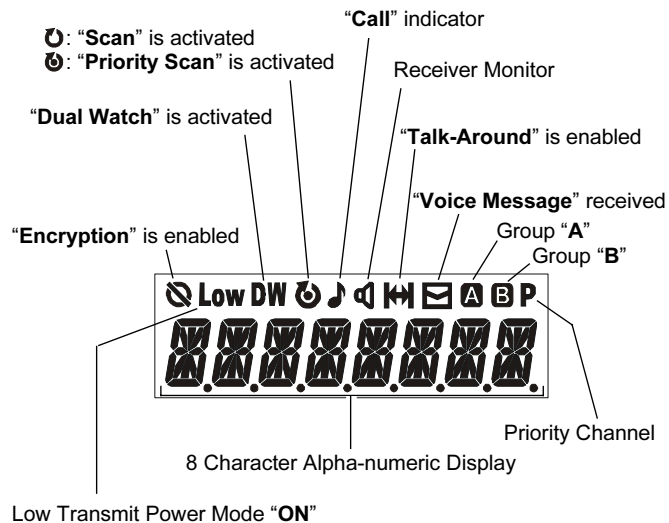
Controls & Connectors

LED Indicator

Glows Green	Monitor on (or Side 1, 2 switch is activated : VX-410 series only)
Blinking Green	Busy Channel (or SQL off)
Glows Red	Transmitting
Blinking Red	Battery Voltage is low
Yellow	Receiving a Selective Call



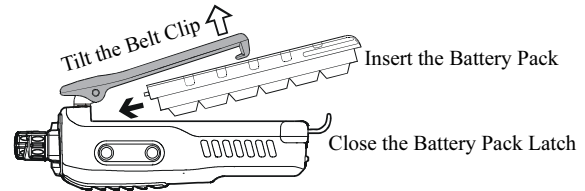
Display Icons & Indicators (VX-420 Only)



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 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 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 becomes to 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.
- 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).

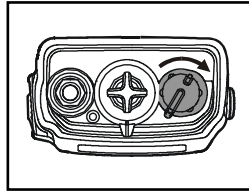
Operation

Preliminary Steps

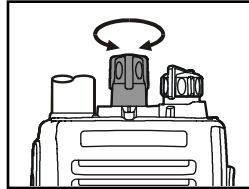
- Install a charged battery pack onto the transceiver, as described previously.
- Screw the supplied antenna onto the Antenna jack. Never attempt to operate this transceiver without an antenna connected.
- If you have a Speaker/Microphone, we recommend that it not be connected until you are familiar with the basic operation of the **VX-410/-420**.

Operation Quick Start

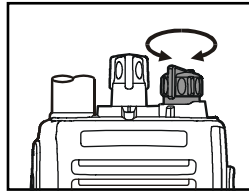
- Turn the top panel's **VOL/PWR** knob clockwise to turn on the radio on.



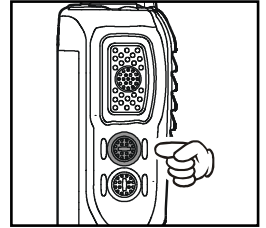
- Turn the top panel's **CH** selector knob to choose the desired operating channel.



- 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 1 seconds; background noise will now be heard, and you may use this to set the **VOL/PWR** knob for the desired audio level.

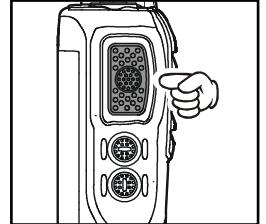


- Press and hold in the **Soft** key assigned to "**MONITOR**" for more than 1 seconds (or press the **MONITOR** key twice) to quiet the noise and resume normal (quiet) monitoring.



- 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.

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

Accessories & Options

FNB-64	7.2 V 700 mAh Ni-Cd Battery
FNB-V57	7.2 V 1100 mAh Ni-Cd Battery
FNB-V57IS	Intrinsically-Safe 7.2 V 1100 mAh Ni-Cd Battery
FNB-V67LI	7.4 V 1600 mAh Lithium-Ion Battery
FBA-25	Alkaline Battery Case
NC-77C	220-240 VAC Overnight Desktop Charger
NC-77U	230 VAC Overnight Desktop Charger
VAC-800	Desktop Rapid Charger (for FNB-64/-V57/-V57IS)
VAC-810	Desktop Rapid Charger (for FNB-V67LI)
VAC-6800	6-unit Multi Charger
MH-45_{B4B}	Speaker/Microphone
MH-37_{A4B}	Earpiece Microphone
VC-25	VOX Headset
VCM-1	Mobile Mounting Bracket (for VAC-800/-810)
CT-42	PC Programming Cable
CT-27	Radio to Radio Programming Cable
CE64	Programming Software
VTP-50	VX-Trunk Unit
FVP-25	Encryption/DTMF pager Unit
FVP-35	Encryption Unit (Rolling code voice scrambler)
DVS-5	Voice Storage Unit
MDC1200	Digital ANI encoder Unit

Operating Manual Reprint

Key Function

The **VX-420 series** provides programmable [A], [B], [C], and [D] function keys, and both the **VX-410 series** and **VX-420 series** provide programmable **Side 1** and **2** switches. These “**Soft**” 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 **Soft** 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 **Soft** key on your particular radio, and keep it handy.

Function	Soft Key (Press / Press and Hold)					
	[A]	[B]	[C]	[D]	Side 1	Side 2
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	-/	-/	-/	-/	-/	-/
Group	/	/	/	/	/	/
ACC 1	/	/	/	/	/	/
ACC 2	/	/	/	/	/	/
Play	/	/	/	/	/	/
Record	/	/	/	/	/	/
Encryption	/	/	/	/	/	/

* VX-420 series only

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. Again press (or Press and hold) the assigned **Soft** key to resume normal (quiet) Noise and Tone squelch action.

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.

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

Lock

Press (or Press and hold) the assigned **Soft** key to lock the **Soft** keys (except *Lock* key); thus, the [A], [B], [C], and [D] keys can be disabled to prevent radio settings from being disturbed.

Lamp

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

Channel Up

Press (or Press and hold) the assigned **Soft** key to switch to a higher operating channel number.

Channel Down

Press (or Press and hold) the assigned **Soft** key to switch to a lower operating channel number.

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 **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.

Description of Operating 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.

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 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 “” icon will be indicated 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.

Add/Del

The Add/Del feature allows the user to arrange a custom Scan.

Press (or Press and hold) the assigned **Soft** key to delete/restore the current channel to/from your 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.

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 nearby 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.

Call 1, 2, 3/Reset

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

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 “**Call 1**” key.

Code Up, Down

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

Operating Manual Reprint

Description of Operating Functions

Emergency

The VX-410/-420 series 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.

Group

Press (or Press and hold) the assigned **Soft** key to select a “**A**” or “**B**” group of channels.

Once the desired Group is reached, rotate the **CH** knob to select the desired channel within the selected Group.

ACC 1, 2

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

For further details, contact your **VERTEX STANDARD** dealer.

REC/PLAY (Voice Storage: Option)

This function, which requires the optional Voice Storage Unit, Allows you to record and play back incoming receiver audio.

Recording:

Press (or Press and hold) the assigned **Soft** key to toggle the recording feature “on” and “off.” If the incoming signal is being heard through the speaker when the recording feature is set to “on,” the received audio will be recorded. The last 2 minutes of incoming audio will be stored on a first-in, first-out basis.

Playback:

Press (or Press and hold) the assigned **Soft** key to start playback. During playback, pressing then “#” key lets you jump forward 8 seconds, while pressing the “*” key lets you go back 8 seconds. To stop playback before the stored message is complete, press (or Press and hold) the assigned **Soft** key.

Encryption

When the Voice Scrambler feature is enabled, pressing the assigned **Soft** key of the “Encryption” toggles the Scrambler “on” and “off.”

ARTS (Auto Rande Transpond System : VX-420 only)

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 received, 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.

DTMF Paging System (VX-420 only)

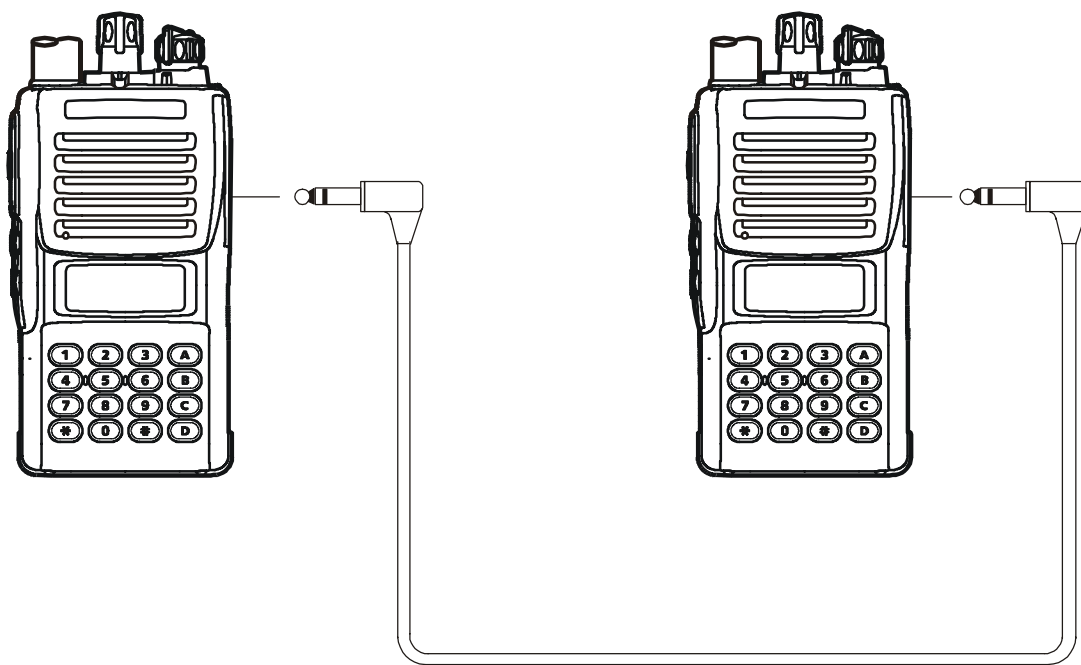
This system allows paging and selective calling, using DTMF tone sequences.

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.

Cloning

The **VX-410/-420** series includes a convenient “Cloning” feature, which allows the programming data from one transceiver to be transferred to another **VX-410/-420** series. Here is the procedure for Cloning one radio's data to another.

1. Turn both transceivers off.
2. Remove the plastic cap and its two mounting screws from the **MIC/SP** jack on the right side of the transceiver. Do this for both transceivers.
3. Connect the optional **CT-27** cloning cable between the **MIC/SP** jacks of the two transceivers.
4. Press and hold in the **PTT** and **Soft** key assigned to “*MONITOR*” while turning the transceiver on. Do this for both transceivers (the order of the switch-on does not matter). “*CLONE*” will appear on the displays (for the **VX-420** series) of both transceivers when Clone mode is successfully activated in this step; in the case of the **VX-410** series, no change will be observed at this point.
5. On the Destination transceiver, press the **Soft** key assigned to “*MONITOR*”. “*LOADING*” will appear on the LCD (for **VX-420** series; for **VX-410** series, the **TX/BUSY** indicator on the top of the radio will glow Green).
6. Press the **PTT** switch on the source transceiver; “*SENDING*” will appear on the Source transceiver (for **VX-420** series; for **VX-410** series, the **TX/BUSY** indicator on the top of the radio will glow Red), and the data will be transferred.
7. If there is a problem during the cloning process, “*ERROR*” will appear on the LCD (for **VX-420** series; for **VX-410** series, the **TX/BUSY** indicator on the top of the radio will blink Red); check your cable connections and battery voltage, and try again.
8. If the data transfer is successful, the display will return to “*CLONE*” (for **VX-420** series; for **VX-410** series, the **TX/BUSY** indicator on the top of the radio will turn off). Turn both transceivers off and disconnect the **CT-27** cable. You can then turn the transceivers back on, and begin normal operation.
9. Replace the plastic cap and its two mounting screws.



Optional Cloning Cable **CT-27**

Specifications

GENERAL Specifications

Frequency Range:	450 - 490 MHz (D)
Number of Channels:	32 channels
Channel Spacing:	12.5 / 25 kHz
PLL Steps	5 / 6.25 kHz
Power Supply voltage:	7.5 VDC \pm 10%
Operating Temperature Range:	-22°F to +140°F (-30°C to +60°C)
Frequency Stability:	\pm 2.5 ppm
Dimensions (WHD):	2.3" (W) x 4.3" (H) x 1.2" (D) (58 x 108 x 29 mm)
Weight (approx.):	0.78 lb. (350 g) w/FNB-V57, Antenna and Belt clip

RECEIVER Specifications (Measurements made per EIA standard TIA/EIA-603)

Sensitivity

EIA 12 dB SINAD : 0.25 μ V

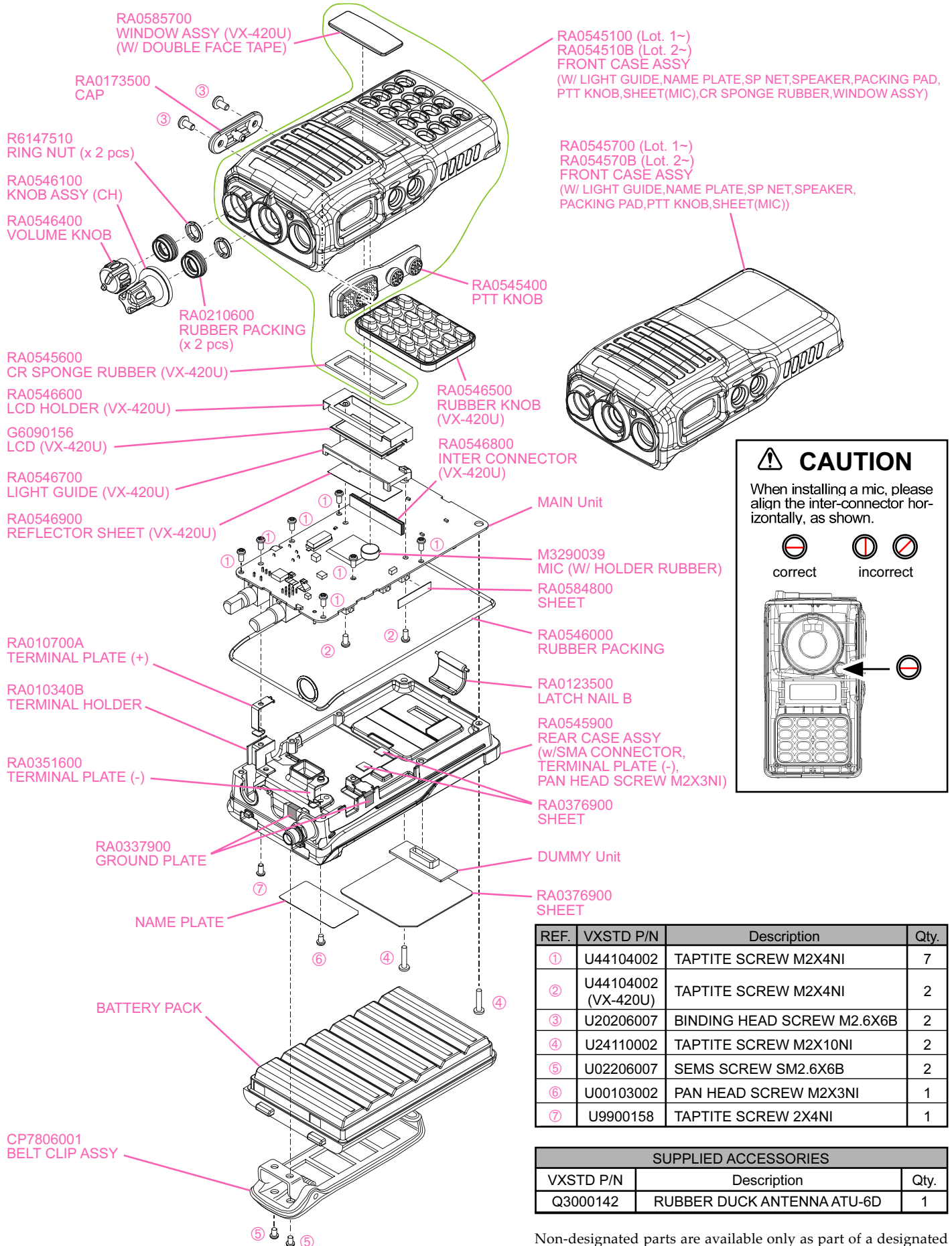
Adjacent channel selectivity:	70 dB (25 kHz) / 60 dB (12.5 kHz)
Intermodulation:	70 dB (25 kHz) / 65 dB (12.5 kHz)
Spurious and Image Rejection:	70 dB
Hum & Noise	45 dB
Audio output:	500 mW @4 Ohms, 10% THD

TRANSMITTER Specifications (Measurements made per EIA standard TIA/EIA-603)

Power output:	5.0 / 1.0 W
Modulation:	16K0F3E, 11K0F3E
Conducted Spurious Emissions:	70 dB Below Carrier
FM Hum & Noise:	45 dB (25 kHz) / 40 dB (12.5 kHz)
Audio distortion (@ 1 kHz):	< 5 %

Measurements per EIA standards unless noted above. Specifications subject to change without notice or obligation.

Exploded View & Miscellaneous Parts



REF.	VXSTD P/N	Description	Qty.
①	U44104002	TAPTITE SCREW M2X4NI	7
②	U44104002 (VX-420U)	TAPTITE SCREW M2X4NI	2
③	U20206007	BINDING HEAD SCREW M2.6X6B	2
④	U24110002	TAPTITE SCREW M2X10NI	2
⑤	U02206007	SEMS SCREW SM2.6X6B	2
⑥	U00103002	PAN HEAD SCREW M2X3NI	1
⑦	U9900158	TAPTITE SCREW 2X4NI	1

SUPPLIED ACCESSORIES		
VXSTD P/N	Description	Qty.
Q3000142	RUBBER DUCK ANTENNA ATU-6D	1

Non-designated parts are available only as part of a designated assembly.