VX5 Reference Guide

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Chapter 1 Introduction

Overview

The VX5 Vehicle Mount Computer (VMC) is a rugged, vehicle mounted, PC (Personal Computer) running a Microsoft® Windows® operating system and capable of wireless data communications from a fork-lift truck or any properly configured vehicle. The VX5 provides the power and functionality of a desktop computer in a vehicle mounted unit, with a wide range of options:

CPU	933MHz PIII
Memory	256 or 512MB SDRAM
Display	Indoor or Outdoor 12.1" display, integrated Touchscreen, adjustable brightness
Network connectivity	2.4 Wireless LAN radio (single or dual antenna) Ethernet port
Audio	Speakers in front bezel, audio jack for headset with microphone
Storage media	Removable rotating Compact Flash PCMCIA
Operating system	Microsoft Windows 2000 or XP Professional No operating system
Other options	Extended temperature version (512MB RAM only)

For information on installing Microsoft Windows on a VX5 ordered with no operating system, please refer to Chapter 4, "System Configuration", section titled "VX5 Delivered with No OS".

Microsoft Windows License Agreement (First Boot)

If your VX5 is shipped with a Microsoft Windows operating system pre-installed, it is necessary to complete the Windows licensing/registration screens when starting the VX5 for the first time. To complete this information, you need the Microsoft Windows software/product key that was included with the VX5.

Please refer to Chapter 4 "System Configuration", section titled "Microsoft Windows License Agreement (First Boot)" for instruction.

The "VX5 User's Guide" is directed toward the VX5 user. It is delivered on the LXE Documentation CD. It contains safety warnings, descriptions of the controls and connectors, instruction on installing antennas, and day to day operation.

When to Use this Guide

As the reference for LXE's VX5 equipped with a Microsoft Windows operating system, this guide provides detailed information on its features and functionality. Use this guide as you would any other source book -- reading portions to learn about the VX5, and then referring to it when you need more information about a particular subject.

This chapter, **"Introduction",** briefly describes this reference guide structure, contains setup and installation instruction, briefly describes data entry processes, and explains how to get help.

Chapter 2 "Physical Description and Layout" describes the function and layout of the controls and connectors on the VX5.

Chapter 3 "Power Supply" describes AC power and DC power connections.

Chapter 4 "System Configuration" takes you through the BIOS Setup, hardware configuration, VX5 file structure, system files and Microsoft Windows configuration.

Chapter 5 "RF Network Configuration" presents information and instruction for using and managing radio cards in the VX5.

Chapter 6 "Troubleshooting" is split into several areas. The solution may be found in one area or it may be a combination of the solutions in several areas. It contains a listing of Power On Self Test (POST) messages and run time messages.

Appendix A "Key Maps" describes the keypress sequences for the LXE VMC keyboard.

Appendix B "Technical Specifications" lists technical specifications including physical, environmental, display and the radios.

Document Conventions

This reference guide uses the following document conventions:

ALL CAPS	All caps are used to represent disk directories, file names, and application names.
Menu|Choice	Rather than use the phrase "choose the **Save** command from the **File** menu", this guide uses the convention "choose **File|Save**".
"Quotes"	Indicates the title of a book, chapter or a section within a chapter (for example, "Document Conventions").
< >	Indicates a key on the keyboard (for example, <Enter>).
📖	Indicates a reference to other documentation.
✳	Differences in operation or commands due to radio type.
💾	Differences in operation or commands due to operating system.
ATTENTION	Keyword that indicates vital or pivotal information to follow.
⚠	Attention symbol that indicates vital or pivotal information to follow. Also, when marked on product, means to refer to the manual or user's guide.
⏚	International fuse replacement symbol. When marked on the product, the label includes fuse ratings in volts (v) and amperes (a) for the product.
Note:	Keyword that indicates immediately relevant information.
Caution ⚠	Keyword that indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury.
WARNING ⚠	Keyword that indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.
DANGER ⚠	Keyword that indicates an imminent hazardous situation, which, if not avoided, will result in death or serious injury.

Quick Start

This section's instructions are based on the assumption that your new system is pre-configured and requires only accessory installation (e.g. antenna, external keyboard and/or barcode scanner) and a power source.

In general, the sequence of events is:

1. Install Vehicle Mounting Bracket (and keyboard mounting bracket) on vehicle.

2. Secure VX5 in Mounting Bracket Assembly.

3. Connect power cable to the VX5. The power cable can also be connected to a UPS battery pack, which is then connected to the VX5.

4. Connect power cable to the VX5.

5. Connect accessories to VX5, e.g. scanner, antenna, keyboard.

6. Secure all cables to the VX5 with the Strain Relief Cable Clamps.

7. Turn the VX5 on.

The VX5 and its keyboard should be mounted in an area in the vehicle where it:

- Does not obstruct the vehicle driver's vision or safe vehicle operation.

- Can be easily accessed by anyone seated in the driver's seat.

Components

1. Access Panel Cover (See Following Illustrations for Detail)

2. Antenna Connectors or Hole Plugs

3. Speakers

4. Control Panel (See Following Illustrations for Detail)

5. COM1/Scanner Connector [1]

6. COM2 Connector [1]

7. Keyboard/Mouse Connector

8. Ethernet/USB Cable Connector

9. Fuse

10. Audio Connector

11. Power Cable Connector

12. Cable Strain Relief Bracket and Clips
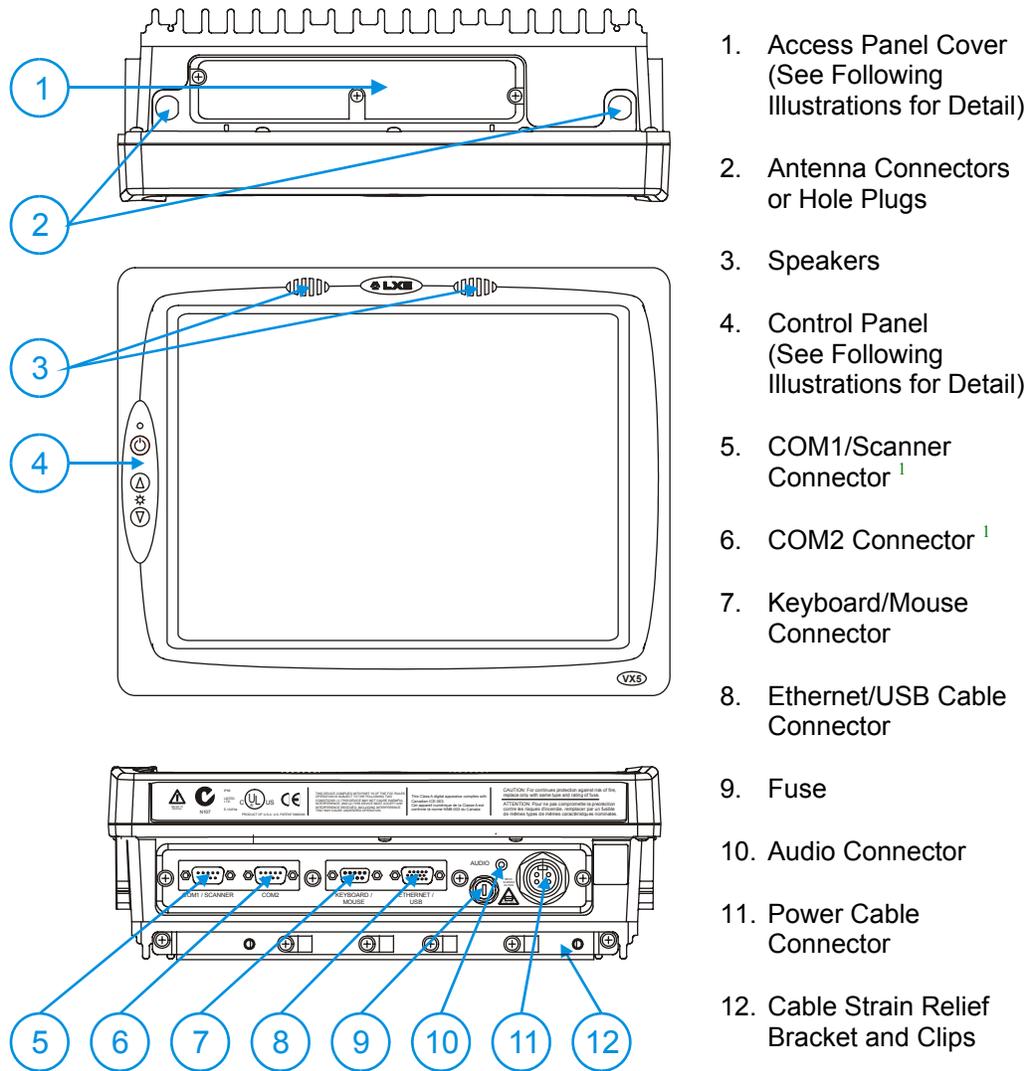
Figure 1-1 VX5 Components

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[1] COM1 is configured with Pin 9 +5V. COM2 is configured with Pin 9 RI. Refer to Chapter 4, "System Configuration" for more information.

1. Power LED

2. Power Switch

3. Brightness Increase

4. Brightness Decrease
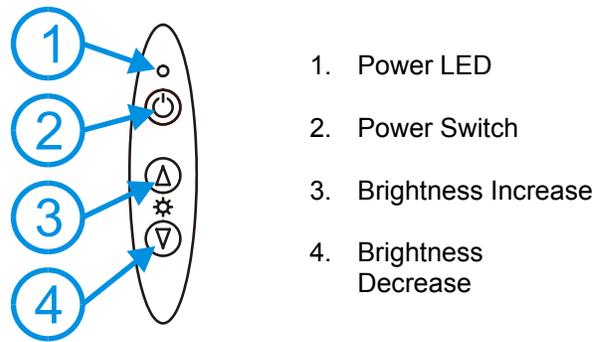
Figure 1-2 VX5 Control Panel

1. COM Port DIP Switches

2. USB Connector

3. ATA Slot (PCMCIA/Compact Flash)

4. CardBus (PCMCIA) Slots

5. IDE Drive
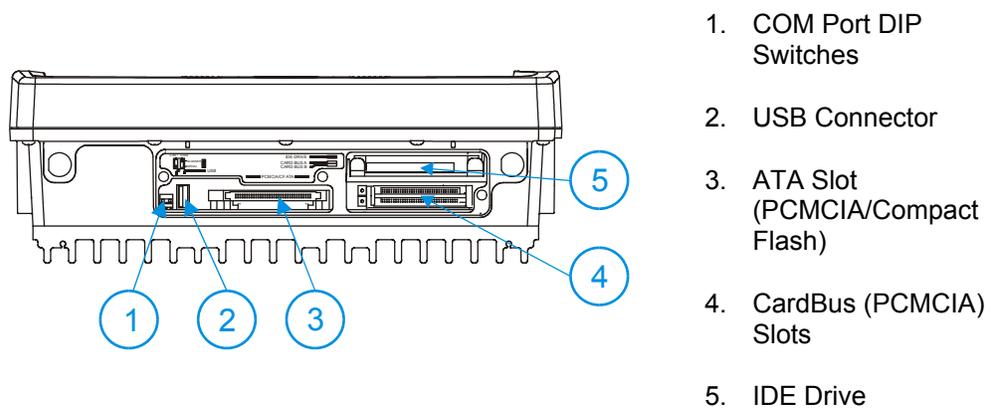
Figure 1-3 VX5 Access Panel

Note: The tethered access panel cover is not shown in the illustration above.

Data Entry

You can enter data into the VX5 through several different methods. A tethered scanner connected to the COM1 serial port provides barcode data entry, the serial ports are used to input/output data, keyboards provide manual entry and the touchscreen also provides manual entry (simulating a desktop PC's mouse).

Keyboard Data Entry

Refer to "Appendix A - Key Maps" for 101-key keyboard equivalent keypresses.

The keyboard is used to manually input data that is not collected otherwise. Almost any function that a full sized computer keyboard can provide is duplicated on the LXE VMT keyboard but it may take a few more keystrokes to accomplish a keyed task.

When using the LXE 60-key keyboard. almost every key has two or three different functions. The primary alpha or numeric character is printed on the key.

For example, when the <2nd> key is selected pressing the desired second-function key produces the <2nd> character i.e. <2nd> + <F1> toggles the CAPS Lock function. The specific <2nd> character is printed above the corresponding key.

Please refer to "Appendix A - Key Maps" for instruction on the specific keypresses to access all PC-compatible keyboard functions.

Barcode Data Entry

The VX5 supports an accessory barcode label reading device. Keyboard data entries can be mixed with barcode data entries. Any scanner that decodes the barcode internally and outputs an RS-232 data stream may be used. COM port 1 is designed to be used with a hand held tethered barcode scanner.

> COM1 is set to +5V on pin 9 up to accept input from a barcode scanner by default. COM2 pin 9 is set to RI. To change the default settings for pin 9 on either port, refer to Chapter 4: "System Configuration" section titled "Serial Port Pin 9" for details.

RS-232 Data Entry

The VX5 accepts input from an RS-232 device connected to either RS-232 port, COM1 or COM2. The data is entered at the cursor position, and the data is subject to all of the barcode/RS-232 input menu parameters, such as truncate.

Touchscreen Entry

Note: The touch screen should be calibrated before initial use.   See "Touchscreen Calibration" in Chapter 4, "System Configuration".

Note: Always use the point of the stylus for tapping or making strokes on the display. Never use an actual pen, pencil or sharp object to write on the touch screen.

The touchscreen input performs the same function as the mouse that is used to point to and click elements on a desk top computer. A stylus is used in the same manner as a mouse – single tap or double tap to select menu options, drag the stylus across text to select, hold the stylus down to activate slider bars, etcetera. Right click is accomplished via the <Ctrl> key, either as pressing of the <Ctrl> key followed by a screen touch or holding the <Ctrl> key down flowed by a screen touch. Please refer to "Configuring Right Click on the Touchscreen" in Chapter 4, "System Configuration" for more details.

Note: For the 60-key keyboard, the right click MUST BE configured as holding the <Crtl> key followed by a screen touch.

Hold the stylus as if it were a pen or pencil. Touch an element on the screen with the tip of the stylus then remove the stylus from the screen. The touch screen responds to an actuation force (touch) of up to 4 oz. of pressure.

The touch screen can be used in conjunction with the keyboard and scanner and an input/output device connected to one of the VX5's serial ports.

- Touch the stylus to the field of the data entry form to receive the next data feed.

- The cursor begins to flash in the field.

- The unit is ready to accept data from either the keyboard, integrated scanner or a device connected to a serial port.

Note: The touchscreen may be disabled.   Please refer to "Disabling the Touchscreen" in Chapter 4, "System Configuration" for details.

Virtual Keyboard

The optional My-T-Soft software provides a virtual keyboard on the touchscreen. To start the virtual keyboard, click on the My-T-Soft icon on the desktop or select **Start|Programs|My-T-Soft|My-T-Soft.**

The virtual keyboard provides several configuration options, including:

- Keyboard size

- QWERTY vs. ABCD

- Standard 101 key format vs. Windows 104 key format

For more information on configuring the virtual keyboard, click on **Start|Programs|My-T-Soft|My-T-Soft Setup.**

Figure 1-4 Virtual Keyboard, Typical Configuration

Virtual keyboards display the actual character the keypress outputs. For example, pressing the <Shift> key on the virtual keyboard toggles the characters displayed on the keys between upper and lower case.

Note: When the virtual keyboard is displayed, the physical keyboard is still active, if attached. Therefore it is possible to input data from both keyboards.

Getting Help

All LXE manuals are now available on one CD and they can also be viewed/downloaded from the LXE website. Contact your LXE representative to obtain the LXE Manuals CD.

You can also get help from LXE by calling the telephone numbers listed on the LXE Manuals CD, in the file titled "Contacting LXE". This information is also available on the LXE website www.lxe.com.

Explanations of terms and acronyms used in this guide are located in the file titled "Glossary" on the LXE Manuals CD.

Manuals and Accessories

Manuals

The following manuals are available on the LXE Manuals CD:

- VX5 User's Guide
- RFTerm™ Reference Guide
- ORiNOCO IEEE User's Guide
- Contacting LXE
- LXE Technical Glossary

Accessories

VX5 Brackets

Bracket, U Style, VX5	VX5A001UBRACKET
Bracket, U Style w/ Integrated Keyboard Mount, VX5	VX5A001UBRKTWKBDMNT
Kit, VXX U-Bracket to VX5 Adapter	VX5A002BRKTADPTKIT
Kit, VXX U-Bracket to VX5 Adapter w/ Keyboard Mount	VX5A002BRKTADPKBDMNT
Bracket, RAM Mount VX5	VX5A003BRKTRAMMOUNT
Bracket, Combo RAM VMT Mount w/ Keyboard Mount, VX5	VX5A003BRKTRAMWKBMNT

Keyboard Brackets

Bracket, Keyboard, Integrated U Style, VX5	VX5A004BRKTKBDUMOUNT
Bracket, Keyboard, RAM Mount, VX5 VX7	9000A017BRKTKBDRAM
Bracket, Remote, Keyboard, LXE	9000A012BRKTRMTLXE
Bracket, Remote, Mouse Keyboard	9000A018BRKTMKBDRMT

Keyboards

Keyboard, LXE Standard, D9, ANSI/PC Overlay, QWERTY	9000A157KBDSTDD9ANSI
Keyboard, LXE Standard, D9, 5250 Overlay, QWERTY	9000A158KBDSTDD95250
Keyboard, LXE Standard, D9, 3270 Overlay, QWERTY	9000A159KBDSTDD93270
Keyboard, Rugged PC Style w/Mouse, PS2 D9	9000A160MOUSEKBDD9

Data Cables

Cable Assembly, 6FT Remote, Antenna Mount, Non-Cond.	9000A278ANTREMOTE6
Cable Assembly, 8FT Remote, Antenna Mount, Non-Cond.	9000A279ANTREMOTE8
Cable, Combo D15 to USB and Ethernet Adapter 1 Ft	9000A071CBLD15USBETH
Cable, Keyboard/Mouse Dual PS2 Adapter 1 Ft	9000A072CBLD9DUALPS2
Cable, Printer/PC, D9 to D25	9000A053CBL6D9D25
Cable, PC, D9 to D9	9000A054CBL6D9D9
Cable, Zebra QL420 Printer	9000A062CBLD9COMTEC

Power Cables

Cable, Input Power, 12 FT, VX5 VX6 VX7	9000A073CBLPWR12FT

Power Supplies

Power Supply, External, AC, W/US Power Cord VX5 VX6 VX7	9000A317PSACUS
Power Supply, External, AC, No Power Cord VX5 VX6 VX7	9000A318PSACWW

UPS Battery and Cables

Battery, UPS Lead Acid, VX5 VX6 VX7	9000A378UPSBATTPACK
Cable, UPS Battery, Remote Mount Extender, 6 Ft	9000A074CBLUPSEXTNDR

Miscellaneous

Stylus, with Tethers and Sleeves, 5 Pack	9000A510STYLUS
Media BC-WEDGE DOS/Windows Taltech Floppy	9000A485BCWEDGEMEDIA
On-Screen Software Keyboard Windows 95 Through XP	11201 MY-T-SOFT
Protective Film, 12 in Display, 10 Pack, VX5 VX7	9000A511PROTFILM12IN
PCMCIA Compact Flash adapter	9000A106PCCCFADAPTR
Software, Drivers, VX5	VX5A477DRIVERS

Printers

Zebra, PA400, 240VAC, EC	PA400-050-12100
Zebra, PA400, 120VAC, US	PA400-050-11100
Zebra, PA400, 20-80VDC	PA400-050-99100
Zebra, PT400, 240VAC, EC	PT400-050-12100
Zebra, PT400, 120VAC, US	PT400-050-11100
Zebra, PT400, 20-80VDC	PT400-050-99100

Scanners	
Scanner, LS3203, Ext. Range, 8' Cbl, US	8011LS3203ERC08DUS
Scanner, LS3203, Ext. Range, 8' Cbl, EC	8011LS3203ERC08DEC
Scanner, LS3203, Ext. Range, 20' Cbl, US	8011LS3203ERC20DUS
Scanner, LS3203, Ext. Range, 20' Cbl, PS/2, US	8011LS3203ERC08PUS
Scanner, LS3203, Ext. Range, 8' Cbl, PS/2 EC	8011LS3203ERC08PEC
Scanner, 530092IP, 7' Cbl, WW	8110IP530092C07DWW
Scanner, 530092IP, 15' Cbl, US	8110IP530092C15DUS
Scanner, Phase 302 Fuzzy Logic, 8' Cbl, WW	8200A326SCNRP3028DA9F
Scanner, Phase 302 Fuzzy Logic, 20' Cbl, US	8200A327SCNRP30220DA9F
Scanner, Phase 302 Fuzzy Logic, 8' Cbl, PS/2, WW	8200A331SCNRP3028PS2
Scanner, P304PRO, 8' Cbl, WW	8210A326SCNRP3048DA9F
Scanner, P304PRO, 20' Cbl, US	8210A327PRO20D9F
Scanner, P304PRO, 20' Cbl, US	8210A327SCNRP30420DA9F
Scanner, Powerscan, SR, 8' Cbl, WW	8300A326SCNRPWRSR8DA9F
Scanner, Powerscan, SR, 12' Cbl, US	8300A327SCNRPWRSR12DA9F
Scanner, Powerscan SR, 11' Cbl, PS/2, US	8300A330SCNRPWRSR11PS2
Scanner, Powerscan, LR, 8' Cbl, WW	8310A326SCNRPWRLR8DA9F
Scanner, Powerscan LR 12' Cbl, US	8310A327SCNRPWRLR12DA9F
Scanner, Powerscan, LR, 12' Cbl, PS/2, US	8310A330SCNRPWRLR11PS2
Scanner, Powerscan, XLR, 8' Cbl, WW	8320A326SCNRPWRXLR8DA9F
Scanner, Powerscan XLR, 12' Cbl, US	8320A327SCNRPWRXLR12DA9F
Scanner, Powerscan XLR, 12' Cbl, PS/2, US	8320A330SCNRPWRXLR11PS2

Chapter 2 Physical Description and Layout

Hardware Configuration

System Hardware

The VX5 hardware configuration is shown in the following figure.
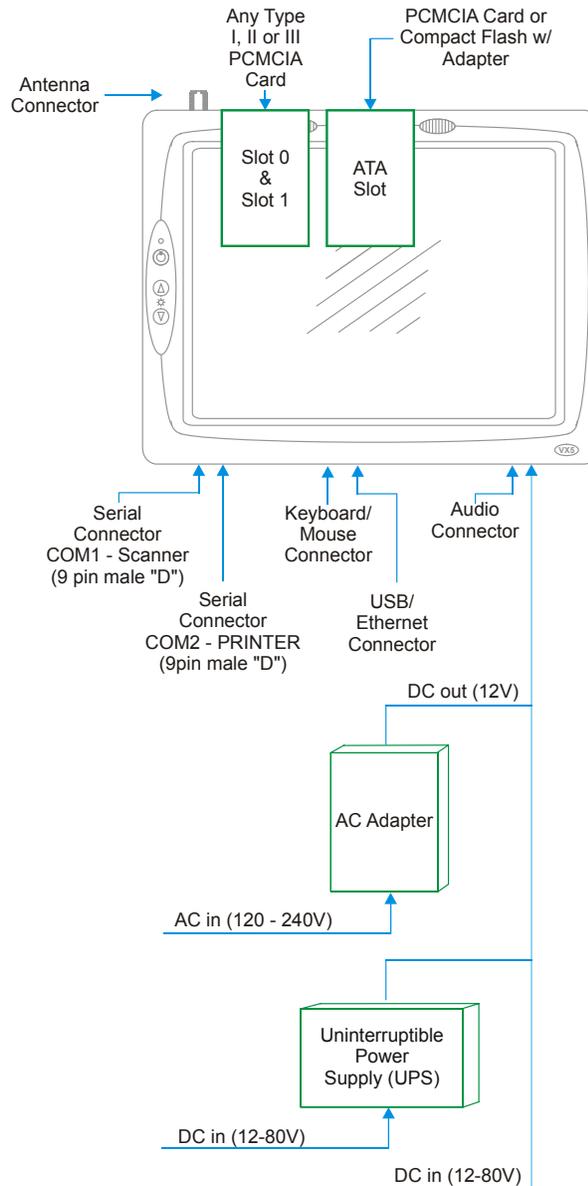
Figure 2-1 VX5 Hardware Configuration

Central Processing Unit

The LXE VX5 contains an Intel Pentium III 933 MHz CPU.

AT Compatible Core Logic

The LXE VX5 utilizes AT-compatible core logic. The VX5 supports the following I/O components:

- Two 9-pin RS-232 serial ports configured as:

    o COM 1 - 03F8h; IRQ4 (SCANNER port),

    o COM 2 - 02F8h; IRQ3 (PRINTER/PC port)

- Two CardBus slots (supporting Type I, II or III PCMCIA cards), accepts two (2) Type II cards or one (1) Type III card.

- One slot for ATA memory cards supporting PCMCIA or compact flash format, configured as secondary IDE.

- Primary IDE, usually an internal hard drive.

- LXE VMT or standard PS/2 keyboard (via a watertight connector).

- Two USB ports, conforming to USB 1.0 specifications

    o One external USB port via dongle cable

    o One internal USB port accessible by removing access panel cover.

- One audio jack providing monaural audio output.

- Ethernet port via dongle cable.

Note: *Using switches inside the user access panel, Pin 9 of COM1 and COM2 may be configured to provide 5 volts DC to power a barcode scanner or RI for serial transfer.*

System Memory

Main system memory is 256 or 512MB SDRAM.

Upper Memory Block

The upper memory area, or Upper Memory Block (UMB), consists of memory between 640KB and 1 MB. It occupies the address range A0000H – FFFFFH and includes the areas used to shadow various system software components.

Flash BIOS

256KB of flash BIOS memory is included.

Video Subsystem

The LXE VX5 video subsystem consists of a color TFT display. The video subsystem complies with the VESA VL bus standard. The resolution of this display is 800 by 600 pixels. This resolution complies with the SVGA graphics industry standard.

The AGP video controller uses a portion of the system memory. As installed in the VX5, the video controller uses about 2MB of system memory.

Power Supply

Vehicle power input for the VX5 is 12V to 80V DC nominal and is accepted without the need to perform any manual operation within the VX5.

If 12V to 60V DC power is not available – for example, in an office environment – an optional external Universal Input Power Supply can be used to convert AC wall power to an appropriate DC level. See Chapter 3 "Power Supply", sub-section titled "External Power Supply."

Power input is fused for protection and the fuse is externally accessible.

Uninterruptible Power Supply

A DC uninterruptible power supply (UPS) battery is available to maintain power to the VX5 for a minimum of 15 minutes when vehicle power is not available (such as when a vehicle battery is being swapped).

Backup Battery

The LXE VX5 has a permanent lithium battery installed to maintain time, date and BIOS setup information. The backup battery is not user serviceable and should last five years with normal use before it requires replacement.

Note: This battery should only be changed by authorized service personnel.

PCMCIA Slots

Microsoft Windows Plug and Play operating system controls the CardBus/PCMCIA cards. These cards are hot swappable per the CardBus/PCMCIA specifications.

The ATA slot is not hot swappable. The VX5 must be powered down to insert or remove an ATA card.

Power Management

The VX5 uses Microsoft Windows Power Management. The VX5 has two operating modes: Normal and Standby.

In Normal operating mode all systems are powered up and the video display is on. The RS-232 ports, any installed PCMCIA cards are active. However, Microsoft Windows also allows the display and hard disks to be shut down in normal mode to conserve energy.

The Standby mode shuts down many devices such as the display and hard drives. For complete details on the standby mode, please refer to the Microsoft Windows help screens.

Physical Controls

On/Off Switch

The power (on/off) switch is a toggle switch located on the front control panel of the VX5. The switch is a momentary switch. If the VX5 is Off, pressing the power switch turns the VX5 On. If the VX5 is On, Windows determines the results of a power button press. For example, the VX5 may be configured to:

- Shut down
- Hibernate
- Ignore the power button press
- Ask user to choose.

Pressing and holding the power button for several seconds forces a reboot.

The Status LED, located on the keyboard of the VX5, is lit when the power is on:

- **Green** – VX5 is operating from vehicle power or AC power.
- **Solid Yellow** – VX5 is operating from the UPS, UPS battery is good.
- **Flashing Yellow** – VX5 is operating from the UPS, UPS battery is critically low.

Note: Always turn the computer off prior to removing power cables.
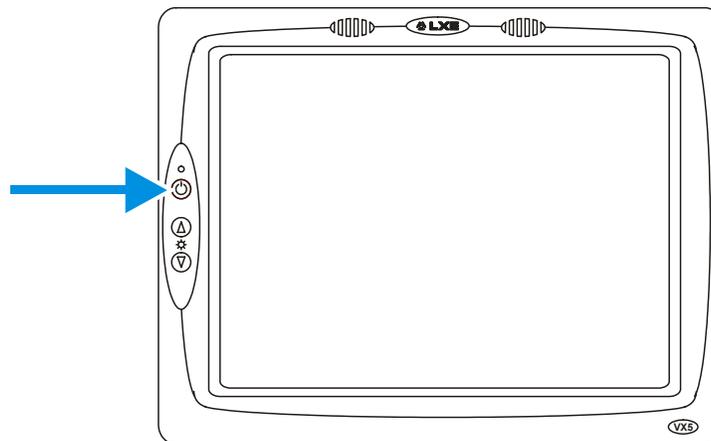
Figure 2-2 The Power (On/Off) Switch

The VX5 is designed for a controlled shutdown when using the power switch. A controlled shutdown first closes any open programs, and then shuts down the Windows operating system. DO NOT remove power from the VX5 without shutting down the VX5.

The VX5 shutdown may be initiated in any of the following ways:

- Selecting the "Shut Down" option from the Windows Start Menu.

- Selecting the "Shut Down" option from the Windows Task Manager. The Windows Task Manager is displayed by pressing Ctrl-Alt-Del.

- Mometarily pressing and releasing the power button. The VX5 behavior when the power button is pressed can be configured in the Windows Control Panel.

- Pressing and holding the power button for approximately five seconds. Any open programs and the Windows operating system are shut down before power off. Note that this option must be used to shut down when the operating system is not responding.

For more information on the Windows shutdown process, please refer to the Windows help function or commercially available Windows help guides.

External Connectors

Most external connectors for the VX5 are located on the bottom of the unit.

- The Keyboard/Mouse connector accepts an LXE VMT keyboard or a dongle cable for a PS/2 keyboard and mouse.

- COM 1 connects to a serial barcode scanner cable [2].

- COM 2 connects to a serial printer or PC with the appropriate cables .[2]

- The USB/Ethernet connector accepts a dongle cable providing a USB port and Ethernet port.

- Audio connects to a mono telephone headset/microphone.

Other external connectors are located as follows:

- Antenna connectors are located on the top of the VX5. VX5's can be configured for a single antenna or dual antennas.

- A USB port is available inside the access panel.

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[2] Pin 9 of the COM port can be switched between +5V and RI to change between a barcode scanner and a serial port printer or PC cable. See Chapter 4: "System Configuration" section titled "Serial Port Pin 9".

Scanner Serial Connector (COM1)

The serial connector, with a SCANNER label, (configured as COM1) is industry-standard RS-232. The connector includes a PC/AT standard 9–pin "D" male connector. Jumpers on the system board control the function of pin 9. Pin 9 is capable of supplying +5 VDC at 0.4A (max) for an external bar code scanner. Refer to Chapter 4: "System Configuration" section titled "Serial Port Pin 9" for more information on configuring pin 9.

```
  1   2   3   4   5
 ○   ○   ○   ○   ○
   ○   ○   ○   ○
   6   7   8   9
```
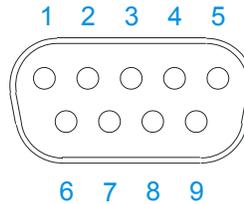
Figure 2-3 Scanner Serial Connector (COM1)

Pinout

Pin	Signal	Description
1	DCD	Data Carrier Detect – Input
2	RXD	Receive Data – Input
3	TXD	Transmit Data – Output
4	DTR	Data Terminal Ready – Output
5	GND	Signal/Power Ground
6	DSR	Data Set Ready – Input
7	RTS	Request to Send – Output
8	CTS	Clear to Send – Input
9	+5VDC or RI	Barcode Scanner Power – 400mA max (Default) or Ring Indicator – Input [3]
Shell	CGND	Chassis Ground

[3] Pin 9 of the COM port can be switched between +5V and RI. See Chapter 4: "System Configuration" section titled "Serial Port Pin 9".

Printer/PC Serial Connector (COM2)

The serial connector, with a COM2 label, is an industry-standard RS-232 9-pin "D" connector. The connector and its pin assignments are shown below.
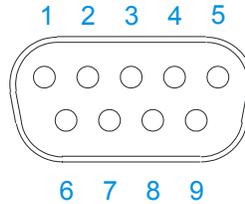
Figure 2-4 The Printer/PC Serial Connector (COM2)

Pinout

Pin	Signal	Description
1	DCD	Data Carrier Detect – Input
2	RXD	Receive Data – Input
3	TXD	Transmit Data – Output
4	DTR	Data Terminal Ready – Output
5	GND	Signal/Power Ground
6	DSR	Data Set Ready – Input
7	RTS	Request to Send – Output
8	CTS	Clear to Send – Input
9	RI or +5VDC	Ring Indicator – Input (default) or Bar Code Scanner Power – 400mA max [4]
Shell	CGND	Chassis Ground

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[4] Pin 9 of the COM port can be switched between +5V and RI. See Chapter 4: "System Configuration" section titled "Serial Port Pin 9" for instruction.

Keyboard/Mouse Connector

The VX5 external keyboard connector accepts:

- An LXE VMT keyboard with integrated pointing device
- An LXE VMT keyboard without integrated pointing device
- A dongle cable providing PS/2 connections for a standard PS/2 keyboard and mouse.
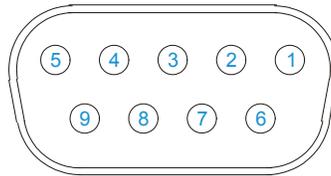
Figure 2-5 VX5 Keyboard Connector and External Keyboard Cable Connector

The +5V supply available from the connector is current limited at 400mA.

Pinout

Pin	Signal	Description
1	KBDAT_A	Keyboard Data
2	MSDAT_A	Mouse Data
3	–	Not Connected
4	MSCLK_A	Mouse Clock
5	DGND	System Ground
6	–	Not Connected
7	KBCLK_A	Keyboard Clock
8	/BL_ENABLE	Keyboard Backlight Enable
9	KDB_PWR	Keyboard Power, 5V
Shell	CGND	Chassis Ground

PS/2 Keyboard/Mouse Dongle Cable

The PS/2 keyboard/mouse dongle cable allows a standard PS/2 keyboard and/or mouse to be attached to the VX5. The PS/2 connectors on the dongle cable are labeled for keyboard and mouse.

1   D9 Connector

2   PS/2 Keyboard Connector

3   PS/2 Mouse Connector
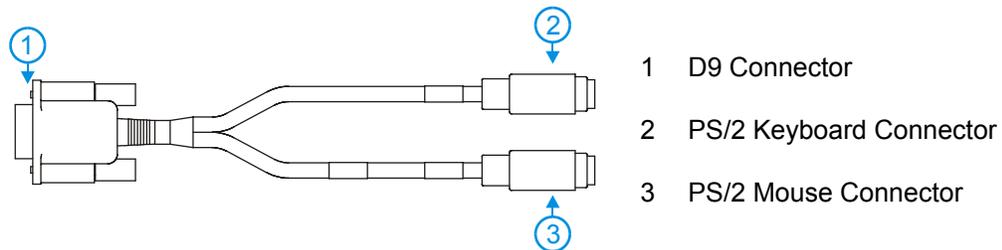
Figure 2-6 VX5 PS/2 Keyboard/Mouse Dongle Cable

D9 Male Connector
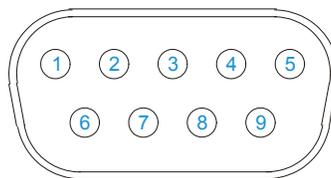
Figure 2-7 D9 Male Connector

Pinout

Pin	Signal	Description
1	KBDAT_A	Keyboard Data
2	MSDAT_A	Mouse Data
3	–	Not Connected
4	MSCLK_A	Mouse Clock
5	DGND	System Ground
6	–	Not Connected
7	KBCLK_A	Keyboard Clock
8	/BL_ENABLE	Keyboard Backlight Enable
9	KB_PWR	Keyboard Power, 5V
Shell	CGND	Chassis Ground

PS/2 Keyboard Connector
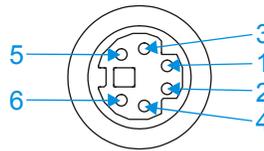
Figure 2-8 PS/2 Keyboard Connector

Pinout

Pin	Signal	Description
1	KBDAT_A	Keyboard Data
2	–	Not Connected
3	DGND	System Ground
4	KBD_PWR	Keyboard Power, 5V
5	KBCLK_A	Keyboard Clock
6	–	Not Connected
Shell	CGND	Chassis Ground

PS/2 Mouse
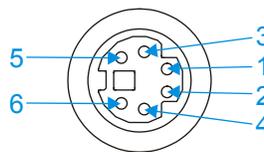
Figure 2-9 PS/2 Mouse Connector

Pinout

Pin	Signal	Description
1	MSDAT_A	Mouse Data
2	–	Not Connected
3	DGND	System Ground
4	KBD_PWR	Keyboard Power, 5V
5	MSCLK_A	Mouse Clock
6	–	Not Connected
Shell	CGND	Chassis Ground

Ethernet/USB Connector

The VX5 Ethernet/USB connector accepts a dongle cable that provides a USB port and an Ethernet port. The connector is shown below.
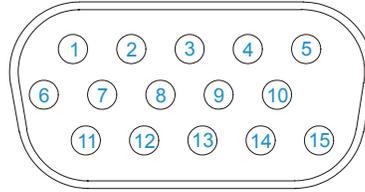
Figure 2-10 VX5 USB Connector and External USB Adapter Cable Connector

Pinout

Pin	Signal	Description
1	USB2N_A	USB D –
2	–	Not Connected
3	–	Not Connected
4	RXP	Receive +
5	RXN	Receive –
6	USB2P_A	USB D +
7	DGND	USB Power Return
8	–	Not Connected
9	RJ45_45	RJ45, Pins 4 and 5 Connections
10	RJ45_78	RJ45, Pins 7 and 8 Connections
11	5V_USB_23	USB Power, Current Limited
12	–	Not Connected
13	–	Not Connected
14	TXN	Transmit –
15	TXP	Transmit +
Shell	CGND	Chassis Ground

Ethernet/USB Dongle Cable

Figure 2-11 VX5 Ethernet/USB Dongle Cable

D15 Female Connector
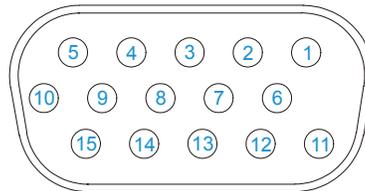
Figure 2-12 D15 Female Connector

Pinout

Pin	Signal	Description
1	USB2N_A	USB D –
2	–	Not Connected
3	–	Not Connected
4	RXP	Receive +
5	RXN	Receive –
6	USB2P_A	USB D +
7	DGND	USB Power Return
8	–	Not Connected
9	RJ45_45	RJ45, Pins 4 and 5 Connections
10	RJ45_78	RJ45, Pins 7 and 8 Connections
11	5V_USB_23	USB Power, Current Limited
12	–	Not Connected
13	–	Not Connected
14	TXN	Transmit –
15	TXP	Transmit +
Shell	CGND	Chassis Ground

USB Connector
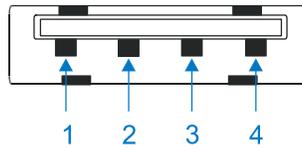
Figure 2-13 Dongle Cable USB Port

Pinout

Pin	Signal	Description
1	5V_USB_23	USB Power, Current Limited
2	USB2N_A	USD D –
3	USB2P_A	USB D +
4	DGND	USB Power Return
Shell	CGND	Chassis Ground

RJ45 Connector
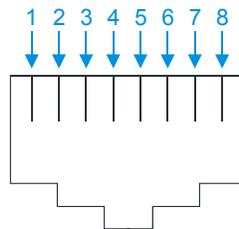
Figure 2-14 Dongle Cable Ethernet Port

Pinout

Pin	Signal	Description
1	TXP	Transmit +
2	TXN	Transmit –
3	RXP	Receive +
4	–	Not Connected
5	–	Not Connected
6	RXN	Receive –
7	–	Not Connected
8	–	Not Connected

Audio Connector

The VX5 audio connector accepts a headset with a 2.5mm plug, such as a mono telephone headset with microphone.
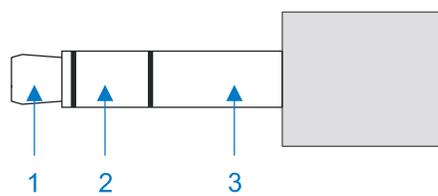
Figure 2-15 VX5 Audio Jack for External Speaker or Headphones

Note: The VX5 is not configured for standard PC speakers.

Pinout

Pin	Description
1	Microphone (Not connected in VX5)
2	Speaker
3	Ground

Power Supply Connector

Power is supplied to the VX5 through the power connector. Additionally this assembly provides a connection point for the vehicle's chassis ground to be connected internally to the conductive chassis of the computer.

The VX5 internal power supply can accept DC input voltages in the range of 12 to 80 Volts.
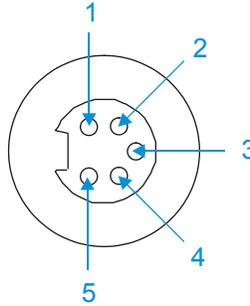
Figure 2-16 The Power Connector

Pinout

Pin	Signal
1	DC Positive (+)
2	UPS Battery Positive (+)
3	Chassis Ground
4	UPS Battery Negative (–)
5	DC Negative (–)

UPS Battery Pack Connectors

Input
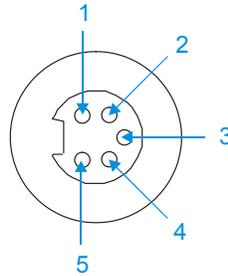
Figure 2-17 The UPS Battery Pack Input Connector

Pinout

Pin	Signal
1	DC Positive (+)
2	Not used
3	Chassis Ground
4	Not used
5	DC Negative (−)

Output
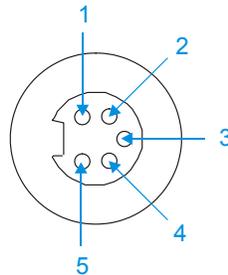
Figure 2-18 The UPS Battery Pack Output Connector

Pinout

Pin	Signal
1	DC Positive (+)
2	UPS Battery Positive (+)
3	Chassis Ground
4	UPS Battery Negative (−)
5	DC Negative (−)

UPS Battery Extension Cable Connectors

Input
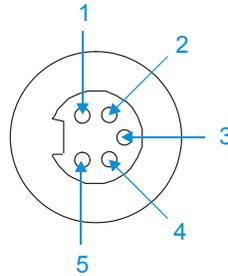
Figure 2-19 The UPS Battery Extension Cable Input Connector

Pinout

Pin	Signal
1	DC Positive (+)
2	UPS Battery Positive (+)
3	Chassis Ground
4	UPS Battery Negative (−)
5	DC Negative (−)

Output
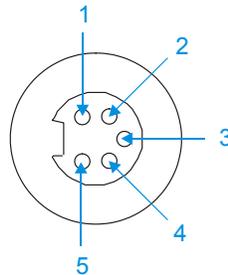
Figure 2-20 The UPS Battery Extension Cable Output Connector

Pinout

Pin	Signal
1	DC Positive (+)
2	UPS Battery Positive (+)
3	Chassis Ground
4	UPS Battery Negative (−)
5	DC Negative (−)

Antenna Connector

> *Note:* *VX5's equipped with a radio require an external antenna. A VX5 without a radio does not use an antenna. Some VX5's may be equipped with a dual antenna option. For these VX5's, an external antenna must be connected to each antenna connector.*

1. Antenna

2. Antenna Connector
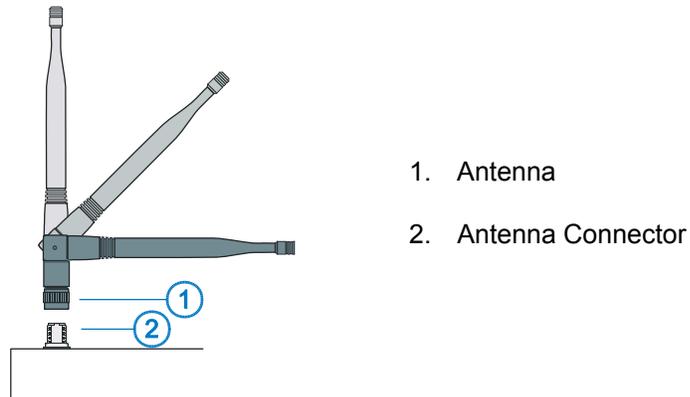
Figure 2-21 2.4GHz Antennas

Spread Spectrum RF Antenna Connector Pin
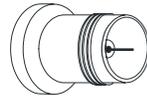
Figure 2-22 RF Antenna SS Connector

Vehicle Remote Antenna Mount

The external antenna (or antennas) can be remotely mounted on the vehicle. Please refer to the "Vehicle Remote Mount Antenna Installation Sheet" for details.

Internal USB Port

An internal USB port can be accessed by removing the access panel cover. This port conforms to USB 1.0 specifications.
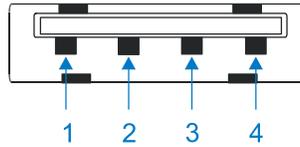
Figure 2-23 Dongle Cable USB Port

Pinout

Pin	Signal	Description
1	5V_USB_23	USB Power, Current Limited
2	USB2N_A	USD D –
3	USB2P_A	USB D +
4	DGND	USB Power Return
Shell	CGND	Chassis Ground

The Keyboards

The following keyboard options are available for the VX5:

The LXE VMT keyboards are customized rugged keyboards, connected to the VX5 via a watertight connector. The keyboards are available in the following configurations:

- LXE VMT 95-key QWERTY keyboard with integrated pointing device – a customized rugged keyboard connected to the VX5 via a watertight connector.

- LXE VMT 60-key QWERTY keyboard – a customized rugged keyboard connected to the VX5 via a watertight connector

- A standard PS/2 keyboard via an adapter cable attached to the "Keyboard/MOUSE" port on the VX5. The adapter cable also provides a connector for a PS/2 mouse.

- A software keyboard, or virtual keyboard, can be displayed on the touch screen. The virtual keyboard can be used in place of, or in addition to, a physical keyboard.

For more details on each keyboard type, please refer to the appropriate section later in this chapter.
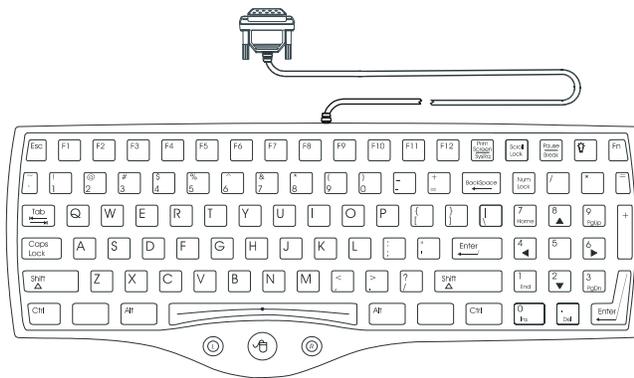
95 key with Integrated Pointing Device
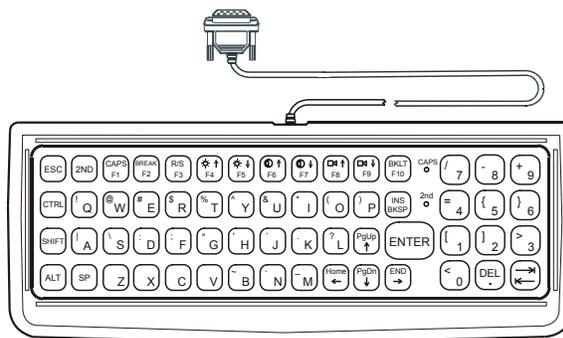
60 key

Figure 2-24 The LXE VMT Keyboards with Cable

The 95-key QWERTY Keyboard with Pointing Device

Designed for ease of use with Windows operating systems, the 95-key keyboard with pointing device connects via a cable to the keyboard port on the VX5. Additional Windows keys (the Windows log key and the Application key) and an integrated pointing device are provided for ease of use with Windows operating systems.
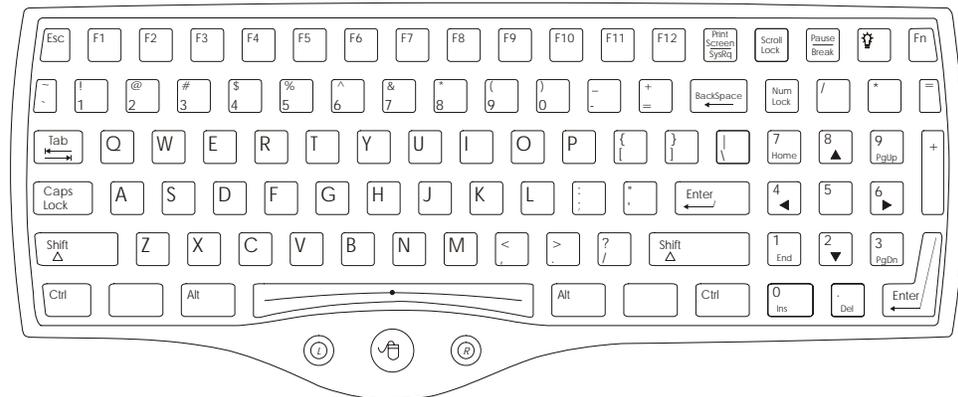
Figure 2-25 The 95-key QWERTY Keyboard

Key Maps

The 95-key keyboard supports all 104 keyboard functions (101 keyboard standard plus Windows keys) and includes an integrated pointing device and left and right mouse buttons. However, because the keyboard only has 95 keys, all functions are not visible (or printed on the keyboard). Therefore the VX5 keyboard supports what is called hidden keys -- keys that are accessible but not visible on the keyboard.

As with a standard keyboard, many keys are found in the Alphanumeric section as well as on the Numeric keypad (i.e. the 1 key is found on the numeric keypad and above the alpha characters on standard keyboards). However these keys send distinctly different scan codes when the keys are pressed. The hidden keys supported by the VX5 are listed in Appendix A, "Key Maps".

Note: The 95-key keyboard does not have a 2nd key function.

NumLock and the VX5

For the 95-key keyboard, the NumLock key and the numeric keys are backlit **green** when NumLock is off. When NumLock is on, the backlight for the NumLock key and the numeric keys are **amber**.

CapsLock, Scroll Lock and the VX5

For the 95-key keyboard, the CapsLock key is backlit **green** when CapsLock is off. When CapsLock is on, the backlight for the CapsLock key is **amber**.

The Scroll Lock key is backlit **green** when Scroll Lock is off. When Scroll Lock is on, the backlight for the Scroll Lock key is **amber**.

The default values for CapsLock and Scroll Lock are Off.

Keyboard Backlight

The 95-key keyboard backlights each key with an LED. The keyboard backlight is manually controlled using the "backlight" key in the upper right hand corner of the keyboard. Pressing the backlight key cycles the keyboard backlight through the levels of backlight intensity:

- Off

- Maximum intensity

- Medium intensity

- Low intensity.

The 60-key QWERTY Keyboard

The 60-key keyboard has 101 keyboard functions, including a numeric keyboard pad. Please refer to Appendix A, "Key Maps", for keypress combinations.
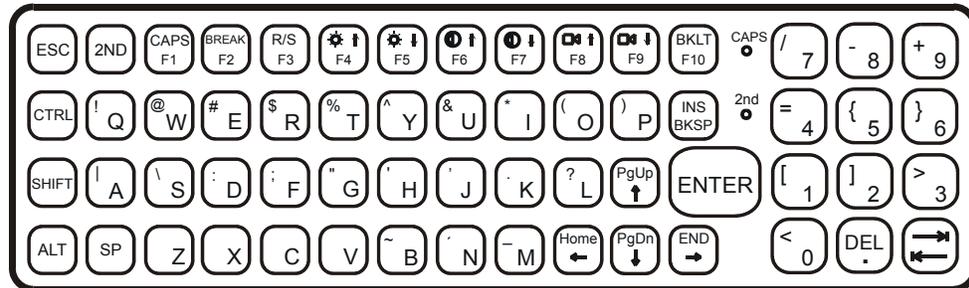
Figure 2-26 The 60-key QWERTY Keyboard

Note: *When the 60-key keyboard is used, the touchscreen MUST BE configured to recognize holding the <Ctrl> key then touching the screen as a right click. Please refer to "Configuring Right Click on the Touchscreen" in Chapter 4, "Configuration" for more details.*

Key Maps

The 60-key keyboard supports all 101 keyboard functions. However, because the keyboard only has 60 keys, all functions are not visible (or printed on the keyboard). Therefore the VX5 keyboard supports what is called hidden keys -- keys that are accessible but not visible on the keyboard.

On standard keyboards many keys are found in the Alphanumeric section as well as on the Numeric keypad (i.e. the 1 key is found on the numeric keypad and above the alpha characters on standard keyboards). However these keys send distinctly different scan codes when the keys are pressed. The default codes for the VX5 number keys correspond to the numeric keypad on standard keyboards. In order to duplicate the codes sent when the alphanumeric key is pressed, the hidden keystroke must be used.

The hidden keys supported by the VX5 are listed in Appendix A, "Key Maps".

Unused Key Functions

There are several key functions on the 60-key keyboard that are not used on the VX5. These include:

- <2nd> <F3> – The Resume/Suspend function is not used as Microsoft Windows controls all power management modes.

- <2nd> <F4> and <2nd> <F5> – The Display Brightness functions are not used as the display brightness is adjusted by the buttons on the VX5 control panel.

- <2nd> <F6> and <2nd> <F7> – The Contrast functions are not used as the contrast is not adjustable on the TFT display on the VX5.

- <2nd> <F8> and <2nd> <F9> – The Volume control keys are not used as volume is adjusted via the Microsoft Windows Volume icon in the System Tray.

- <2nd> <F10> – Please see "Keyboard Backlight" later in this section for details on toggling the keyboard backlight.

NumLock and the VX5

The 60-key keyboard does not have a NumLock indicator or key. NumLock can be toggled On or Off using the <2nd> <SHIFT> <F10> keypress sequence.

Keyboard Backlight

The LXE keyboard keys are backlit with LEDs. The backlight is manually controlled using the <2nd> + <CTRL> + <F10> keypress sequence.

Keyboard LEDs

The VX5 keyboard has three (2) LED indicators.
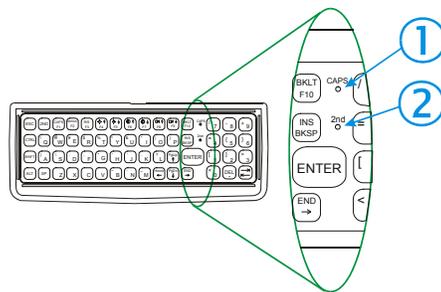
1. CapsLock Mode LED Indicator

2. Secondary Mode LED Indicator

Figure 2-27 Keyboard LEDs

CAPS LED

This LED indicates the state of the keyboard CapsLock mode. If CapsLock is enabled this LED is illuminated green. When CapsLock is off, the LED is dark.
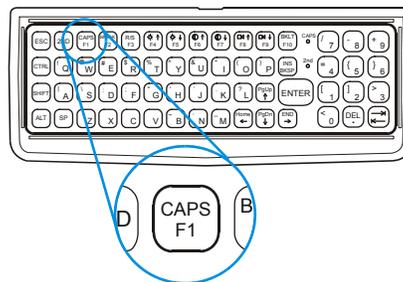
Figure 2-28 The CapsLock Key

Press <2nd> then <F1> to toggle CapsLock On and Off.

The default value of CapsLock is "Off".

Secondary Keys LED

The VMT keyboard is equipped with several secondary keys. These keys are identified by the superscripted text found on the keyboard keys. The secondary keys are accessible by using two (2) keystrokes: the <2nd> key followed by the superscripted key.
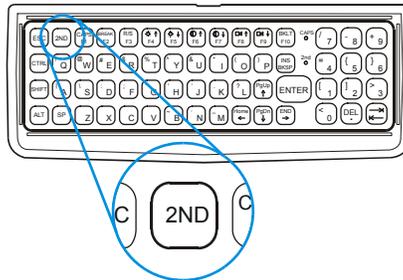
Figure 2-29 The Secondary Key

Once the <2nd> state is enabled (by pressing the <2nd> key) the Secondary Mode LED is illuminated and the <2nd> state is enabled until another key is pressed. The <2nd> key is toggled on with a <2nd> keypress and then immediately off with another <2nd> keypress.

For example:

Press <2nd> and <F1> to turn CapsLock on and off.

Press <2nd> and <↑> to initiate the PgUp command.

Press <2nd> and <Q> to type the "!" key.

Press <2nd> and <BkSp> to enter the Insert (Ins) mode.

Control Keys

The VMT keyboard has several control keys. Because of the construction of the VX5 and the Microsoft Windows operating system, many of the Control Keys are not used on the VX5.

Note: *The 2nd functions of the <F4> and <F5>keys are not used as the display brightness is adjusted via the buttons on the control panel.*

    The 2nd functions of the <F6>, and <F7> keys are not used as the VX5 has TFT LCD screen with no provision for contrast adjustments.

    The 2nd functions of the <F8> and <F9> keys are not used as the sound volume on the VX5 is controlled with the Sound icon in the Microsoft Windows System Tray.

The <F10> key is used to toggle the backlight as part of the keypress sequence <2nd> + <CTRL> + <F10>. This key sequence immediately toggles the status of the keyboard backlight. Pressing <2nd> + <F10> has no effect on the keyboard backlight.

1. Display Brightness Control Keys (Not used)

2. Display Contrast Control Keys (Not used)

3. Speaker Volume Control Keys (Not used)

4. Backlight Control Key (See above)
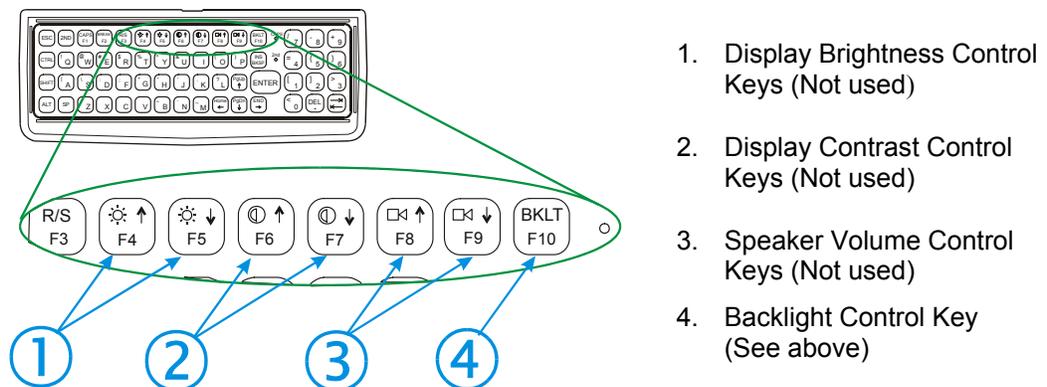
Figure 2-30 The VMT Keyboard Display Controls

General Windows Keyboard Shortcuts

Use the keyboard shortcuts in the chart below to navigate with any VX5 keyboard. These are standard keyboard shortcuts for Windows applications.

Press these keys …	To …
CTRL + C	Copy
CTRL + X	Cut
CTRL + V	Paste
CTRL + Z	Undo
DELETE	Delete
SHIFT with any of the arrow keys	Select more than one item in a window or on the desktop, or select text within a document.
CTRL+A	Select all.
ALT+ESC	Cycle through items in the order they were opened.
CTRL+ESC	Display the Start menu.
ALT+Underlined letter in a menu name	Display the corresponding menu.
Underlined letter in a command name on an open menu	Carry out the corresponding command.
ESC	Cancel the current task.

PS/2 Keyboard/Mouse

A standard PS/2 keyboard and mouse can be attached to the VX5 using the appropriate dongle cable. The dongle cable attaches to the VX5 and provides two PS/2 connectors, one labeled "Keyboard" and one labeled "Mouse". Please refer to documentation provided with the PS/2 keyboard and mouse for more information on their operation.

Virtual Keyboard

The optional My-T-Soft software provides a virtual keyboard on the touchscreen. To start the virtual keyboard, click on the My-T-Soft icon on the desktop or select **Start|Programs|My-T-Soft|My-T-Soft.**

The virtual keyboard provides several configuration options, including:

- Keyboard size

- QWERTY vs. ABCD

- Standard 101 key format vs. Windows 104 key format

For more information on configuring the virtual keyboard, click on **Start|Programs|My-T-Soft|My-T-Soft Setup**.

Figure 2-31 Virtual Keyboard, Typical Configuration

Virtual keyboards display the actual character the keypress outputs. For example, pressing the <Shift> key on the virtual keyboard toggles the characters displayed on the keys between upper and lower case.

Note: When the virtual keyboard is displayed, the physical keyboard is still active, if attached. Therefore it is possible to input data from both keyboards.

The Display

The VX5 Display is a thin-film transistor display capable of supporting SVGA graphics modes. Display size is 800 x 600 pixels. The display covering is designed to resist stains. The touch screen allows signature capture and touch input.

Cleaning the Display

Keep fingers and rough or sharp objects away from the display. If the glass becomes soiled or smudged, clean only with a standard household cleaner such as Windex® without vinegar or use Isopropyl Alcohol. Do not use paper towels or harsh-chemical-based cleaning fluids since they may result in damage to the glass surface. Use a clean, damp, lint-free cloth. Do not scrub optical surfaces. If possible, clean only those areas which are soiled. Lint/particulates can be removed with clean, filtered canned air.

Touchscreen

The touch screen is a Resistive Panel with a scratch resistant finish that can detect touches by a stylus, and translate them into computer commands. In effect, it simulates a computer mouse. Only Delrin or plastic styluses should be used.

Note: Always use the point of the stylus for tapping or making strokes on the display. Never use an actual pen, pencil or sharp object to write on the touch screen.

An extra or replacement stylus may be ordered from LXE. See the "Accessories" section for the stylus part number.

Please refer to Chapter 4, "System Configuration" for more information on:

- Calibrating the touchscreen
- Disabling the touchscreen.

LXE offers a replaceable touchscreen protective film to protect the touchscreen when the VX5 is used in an abrasive environment. For information on installing or removing the protective film, please refer to the "VX5 User's Guide".

Factory Default Settings

Boot Sequence (devices searched in this order)	Removable Devices (i.e. USB floppy drive), Hard Drive, CD-ROM Drive, Network Boot (i.e. PXE)
Legacy Floppy (A and B)	Disabled
Primary and Secondary Master and Slave drives	Auto
Display POST Messages	Disabled
Show Summary Screen	Disabled
Power Supply	ATX
Power Savings	Disabled
Onboard LAN RPL BIOS	Disabled

For more information on the default settings, please refer to Chapter 4, "System Configuration".

PCMCIA/CardBus and ATA Slots

The VX5 has two PCMCIA/CardBus slots and one ATA slot. The PCMCIA slots are stacked on top of each other and located on the right hand side of the opening. The ATA is located on the left hand side of the opening.

The PCMCIA slots support the Personal Computer Memory Card International Association (PCMCIA) 2.1 standards. The upper slot is designated as Slot 0 and the lower slot is designated as Slot 1.

Slot 0 accepts Type I or II PCMCIA cards. If a radio card is used, it must be installed in Slot 0 to prevent damage to the internal radio cables. LXE supports only Type II 2.4GHz Spread Spectrum radios.

Slot 1 accepts Type I, II or III PCMCIA cards. A Type III card can be used only when no card is installed in Slot 0.

The left slot is used for ATA memory cards, either PCMCIA or Compact Flash (CF) format via a PCMCIA adapter. The left slot is connected to the secondary IDE interface.

1. ATA PCMCIA Slot (Left)

2. Slot 1 (Lower Right)

3. Slot 0 (Upper Right)
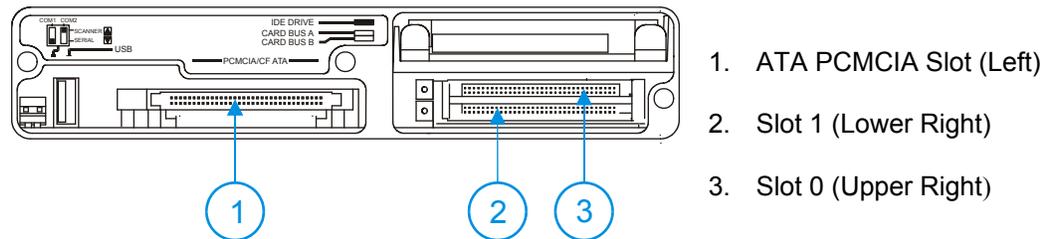
Figure 2-32 The PCMCIA and ATA Slots

PCMCIA Slots

Slot 0 and 1 PCMCIA Card Management is handled by Microsoft Windows. The PCMCIA cards are Plug and Play devices and can be "hot swapped". For more details, refer to the Windows help screens or refer to the documentation delivered with the PCMCIA card.

PCMCIA Pinout

Pin	Signal	Pin	Signal
1	GND	35	12V_RF_POWER
2	D3	36	-CDI
3	D4	37	D11
4	D5	38	D12
5	D6	39	D13
6	D7	40	D14
7	-CE1	41	D15
8	A10	42	-CE2
9	-OE	43	n.c. or VS1#
10	A11	44	-IORD
11	A9	45	-IOWR
12	A8	46	A17
13	A13	47	A18
14	A14	48	A19
15	-WE	49	A20
16	RDY/-IREQ	50	A21
17	SLOT_VCC	51	SLOT_VCC
18	SLOT-VPP	52	SLOT_VPP
19	A16	53	A22
20	A15	54	A23
21	A12	55	A24
22	A7	56	A25
23	A6	57	n.c. or VS2#
24	A5	58	RESET
25	A4	59	-WAIT
26	A3	60	-INPACK
27	A2	61	-REG
28	A1	62	BVD2/-SPKR
29	A0	63	BDV1/-STSCHG
30	D0	64	D8
31	D1	65	D9
32	D2	66	D10
33	WP/A_-IOIS16	67	-CD2
34	GND	68	GND

Install PCMCIA Cards

Equipment Needed: Phillips No. 1 screwdriver and a Torque wrench capable of measuring to 9±1 inch pounds (1.016±.11 N/m).

Note: The example below details installing a 2.4GHz radio card. Installation of other PCMCIA cards is similar, except there is no antenna.

Install the 2.4GHz Type II PCMCIA Radio

Caution ⚠️	*The LXE Model VX5 Vehicle Mount Computer is specifically for use with LXE Model Numbers 480628-4096, 480824-3300 and LXE 6526 2.4GHz Type II PCMCIA radios. Substitution of other PCMCIA radios will void the FCC, Industry Canada and other international radio certifications for the Model VX5 Vehicle Mount Computer and is strictly prohibited.*

1.   Turn the VX5 off and detach the power cable.

2.   Loosen the three (3) Phillips head screws securing the access panel cover so the cover can be removed. The screws are a captive part of the cover and cannot be removed.

Partially insert the 2.4GHz Type II PCMCIA Radio into Slot 0 (the upper right slot).

Caution ⚠️ Slot 0 MUST BE used for the radio card. Installing a radio card in Slot 1 can result in pinching or other damage to the internal antenna cable.

Radio Card
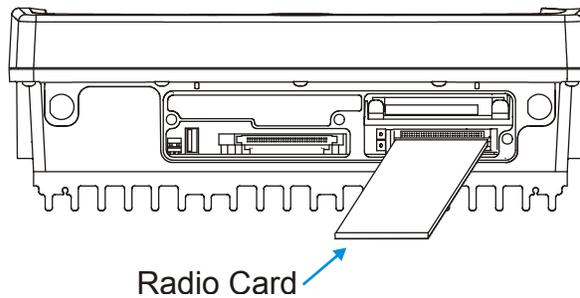
Figure 2-33 Inserting the 2.4GHz Type II PCMCIA Radio

Note: The tethered access panel cover is not shown in the illustration above.

3.   Before completely inserting the 2.4GHz Radio, connect the Antenna Cable to the 2.4GHz Radio, using the port(s) indicated below:

Cisco Radio Card

- Cisco radio with single antenna – Connect antenna cable to right port, as shown below.
- Cisco radio with dual antennas – Connect antenna cables to both ports.
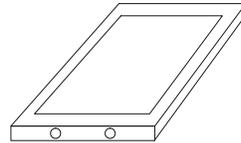
Figure 2-34 Cisco Antenna Cable Connections

Symbol 11Mb Radio Card

- Symbol 11Mb radio with single antenna – Connect antenna cable to left port, as shown below.
- Symbol 11Mb radio with dual antennas – Connect antenna cables to both ports.
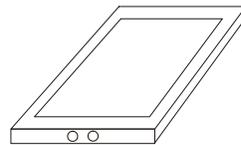
Figure 2-35 Symbol 11Mb Antenna Cable Connections

4.   Now complete the insertion of the 2.4GHz Type II PCMCIA Radio into Slot 0 or Slot 1.

Note: When this process is complete, reattach the access cover screws using a torque wrench capable of measuring to 9±1 inch pounds (1.016±.11 N/m). The screws must be fastened to 9 inch pounds each. The screws require a Phillips size 1 driver head.

5.   Re-connect the power cord/cable and turn the VX5 on.

ATA Slot

The ATA slot is connected to the secondary IDE controller. The slot accepts a PCMCIA card or a compact flash card via a PCMCIA adapter. The VX5 must be powered down before inserting or removing an ATA card.

Only ATA memory cards may be used in these slots. No other types of PCMCIA or compact flash cards may be used in the ATA slots. The ATA slots do not provide for "hot swapping" of cards.

Install an ATA Card

1. Turn the VX5 off and detach the power cable.

2. Loosen the three (3) Phillips head screws securing the access panel cover so the cover can be removed. The screws are a captive part of the cover and cannot be removed.

3. Insert the card into the ATA slot. This slot accepts an ATA PCMCIA card or a compact flash ATA card in a PCMCIA adapter.
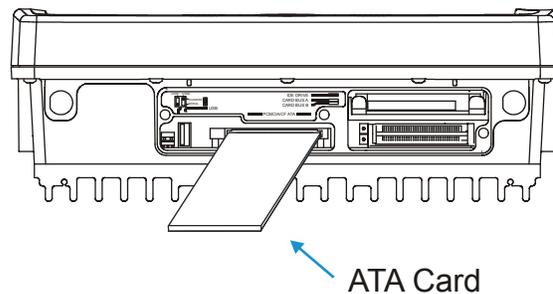
ATA Card

Figure 2-36 Inserting the ATA Card

Note: The tethered access panel cover is not shown in the illustration above.

Note: When this process is complete, reattach the access cover screws using a torque wrench capable of measuring to 9±1 inch pounds (1.016±.11 N/m). The screws must be fastened to 9 inch pounds each. The screws require a Phillips size 1 driver head.

4. Re-connect the power cord/cable and turn the VX5 on.

5. Review the BIOS settings to ensure the ATA card is recognized as the secondary drive.

Chapter 3 Power Supply

Introduction

AC to DC power input for the VX5 is delivered via an optional external power supply. See "External Power Supply".

Vehicle power input for the VX5 is 12V to 80V DC nominal and is accepted without the need to perform any manual operation within the VX5. See "Vehicle 12-80VDC Direct Connection." An optional uninterruptible power supply (UPS) battery can be used with the vehicle DC power supply.

Power input is fused for protection and the fuse is externally accessible on the VX5.

External Power Supply

1. AC Input Cable (US only)

2. DC Output Cable
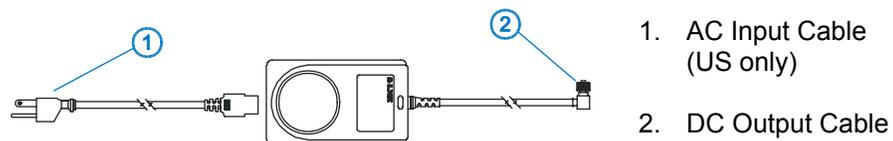
Figure 3-1 Optional Power Supply Cable

In North America, this unit is intended for use with a UL Listed ITE power supply with output rated 12 – 80 VDC, minimum 75 W. Outside North America, this unit is intended for use with an IEC certified ITE power supply with output rated 12 – 80 VDC, minimum 75 W.

The external power supply may be connected to either a 120V, 60Hz supply or, outside North America, to a 230V, 50Hz supply, using the appropriate detachable cordset. In all cases, connect the external AC supply to a properly grounded source of supply provided with maximum 15 Amp overcurrent protection (10 Amp for 230V circuits).

Note: Instructions for using this configuration are contained in "VX5 User's Guide" section titled "Installation".

Specifications

Feature	Specification
Dimensions	3.40" x 5.87" x 2.00"
Weight	<3.0 pounds
Input Power Switch	None
Power "ON" Indicator	None
Input Fusing	None
Input Voltage	90VAC min - 264VAC max
Input Frequency	47 - 63 Hz
Input Surge Current	50 Amps max @ 264VAC input
Input Connector	Standard IEC input power cord (included with US units only)
Output Connector	3 pin female connector
Output Voltage	+24VDC
Output Voltage Tolerance	+/- 8%, measured at the end of the output power cable
Output Current	0 Amps min, 1.87 Amps max
Safety and Emissions Compliance	FCC, Part 15, Radio Frequency Devices, Class B. EN 55022 UL1950 and IEC 950

Environmental Specifications

The AC to DC adapter will withstand the following environmental characteristics:

Feature	Specification
Operating Temperature	see VX5 Environmental Specifications
Storage Temperature	see VX5 Environmental Specifications
Humidity	Operates in a relative humidity of: 5 – 95% (non-condensing)
ESD Immunity	Per IEC 801-1

CMOS Battery

The LXE VX5 has a permanent 190 mAh Lithium battery installed to maintain time, date and CMOS setup information. The lithium battery is not user serviceable and should last five years with normal use before it requires replacement.

Note: This battery should only be changed by authorized service personnel.

Vehicle 12-80VDC Direct Connection

Note: *Instructions for using this configuration are contained in "VX5 User's Guide" section titled "Installation".*

1. To Vehicle Battery
2. To Vehicle Mounted Device or UPS Battery Pack
3. Green (GND)
4. Red / White (DC+)
5. Red / Black (DC-)
6. 12 – 80 VDC
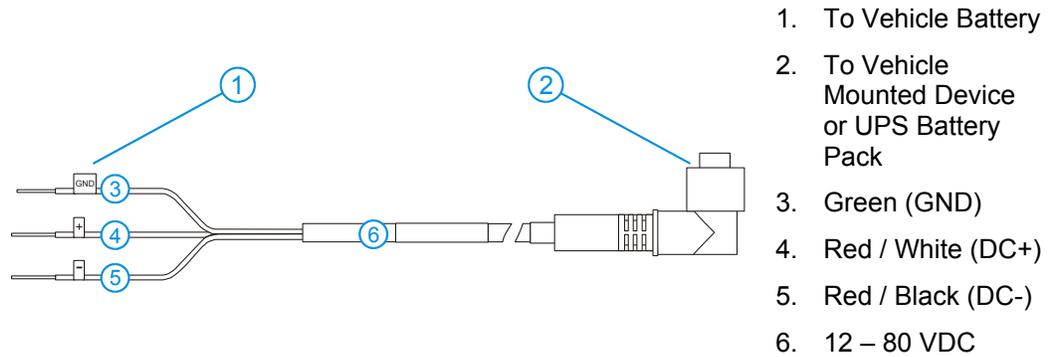
Figure 3-2 Direct Vehicle Power Connection Cable (12 Ft.)

1. Vehicle Electrical System
2. 5 Amp Slow Blow Fuse
3. DC +
4. DC -
5. Vehicle Chassis
6. Red / White
7. Red /Black
8. Green
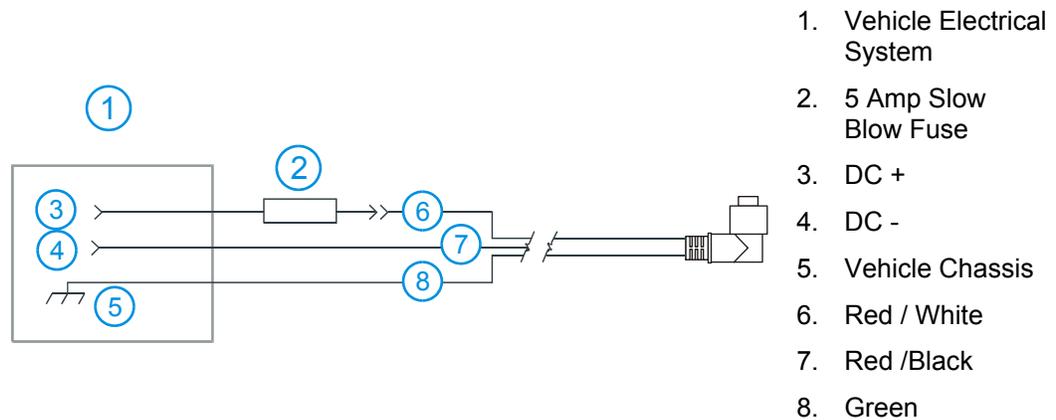
Figure 3-3 Connecting the Power Cable to the Vehicle

Note: *Correct electrical polarity is required for safe and proper installation. Connecting the cable to the VX5 with the polarity reversed will cause the VX5's fuse to be blown. See the following table for wire color-coding specifics.*

Wiring color codes for LXE supplied DC input power cabling:

Vehicle Supply		Wire Color
+12 - 80VDC	(DC +)	Red with White Stripe
Return	(DC -)	Red with Black Stripe
Vehicle Chassis	(GND)	Green

Figure 3-4 Vehicle Connection Wiring Color Codes

VX5 Input Power Specifications

Feature	Specification
DC Input Voltage	12 - 80 VDC
Input Current	3.5 Amps
Input Fuse	5A Time Delay
Input Power Switch	SPST 6 Amp 125VDC

Fuse

The VX5 uses a 100V, 10A time delay (slow blow), high current interrupting rating fuse that is externally accessible and user replaceable. Should it need replacement, replace with same size, rating and type of fuse – Littlefuse 0234010 or Optifuse MSC-10A (5x20mm).

1. Fuse

2. Twist in this direction to remove

3. Twist in this direction to insert
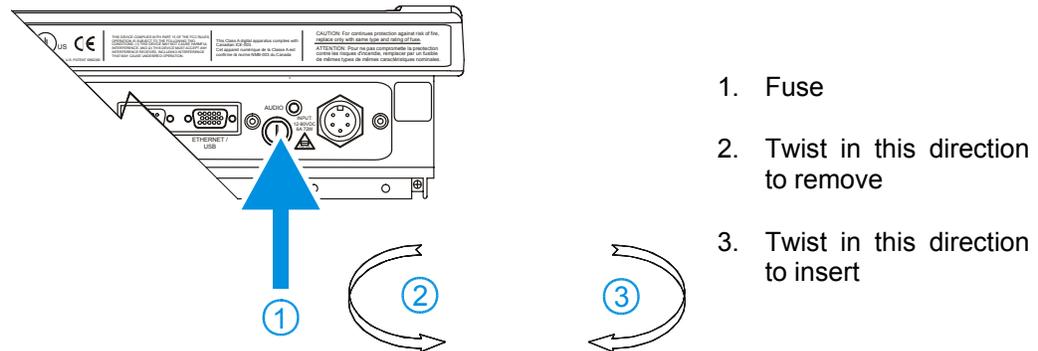
Figure 3-5 Fuse Replacement

Caution: **Fuse has voltage on it even when power is off. Always disconnect input power before changing fuse.**

Chapter 4 System Configuration

Introduction

Like any personal computer, there are many aspects to the setup and configuration of the VX5. Much of the setup and configuration of the VX5 is dependent upon the optional features (both hardware and software) installed on the computer. Since the VX5 uses the Microsoft Windows Plug and Play operating system, much of the hardware setup is automatic. The examples found in this chapter are to be used as samples only; the configuration of your specific computer may vary. The following sections provide a general reference for the configuration of the VX5 and its optional features.

> Please refer to commercially available Microsoft Windows user guides or to Windows on-line Help application for more information on Windows' options for system configuration.

BIOS Setup

LXE installs Microsoft Windows on the VX5 before shipping. The default BIOS parameters are configured at that time. In most cases, it is unnecessary to modify the BIOS parameters.

Generally, it is only necessary to enter the BIOS setup to change the boot order of the drives.

Note: Some BIOS parameters described in this section may not be available on all VX5's.

Caution: ⚠	*Be very careful when using this utility to modify BIOS Setup parameters. The VX5 may generate unexpected results when incorrect or conflicting parameter values are entered. Selecting incorrect or invalid options may require the VX5 to be returned to LXE for repairs.* *The parameters should only be modified by Information Services personnel or the system administrator.*

*Note: Make sure there is an uninterrupted power supply connected to the VX5 **before** accessing BIOS Setup.*

Windows Management Instrumentation

VX5 BIOS includes support for Windows Management Instrumentation (WMI). The information displayed by selecting **Programs|Accessories|System Tools|System Information** from the Windows Start Menu identifies the System Manufacturer as "LXE Inc." and the System Model as "VX5".

Windows Management Instrumentation (WMI) is a component of the Microsoft Windows operating system and is the Microsoft implementation of Web-Based Enterprise Management (WBEM). WBEM is an industry initiative to develop a standard technology for accessing management information in an enterprise environment. WMI uses the Common Information Model (CIM) industry standard to represent systems, applications, networks, devices, and other managed components. You can use WMI to automate administrative tasks in an enterprise environment.

Windows Management Instrumentation (WMI) is a component of the Microsoft Windows operating system that provides management information and control in an enterprise environment. By using industry standards, managers can use WMI to query and set information on desktop systems, applications, networks, and other enterprise components. Developers can use WMI to create event monitoring applications that alert users when important incidents occur.

In order to get specific system attributes to return valid data is very simple. The values are pulled from the SMBIOS data structure. The following attributes are populated with LXE specific information:

Within the **Win32_ComputerSystemProduct** class
> **Caption = "Computer System Product"**
> **Description = "Computer System Product"**
> **IdentifyingNumber =** *this field is populated by the Kontron Serial number, if available. If not available, this field contains a 'serial number not available message'.*
> **Name = "VX5" [This is equivalent to the Model Number]**
> **Vendor = LXE Inc [This is equivalent to the Make Number]**

Within the **Win32_SystemEnclosure**
> **ChassisTypes = 8 (Note that some applications may display "portable", which is equivalent to the value 8)**
> **Manufacturer = LXE Inc**

Accessing the BIOS Setup

When you turn the VX5 on, the unit starts to boot. Watch the bootup sequence and when the following is displayed:

    Press F2 to Enter Setup

Press the [F2] key.

Note: The "Press F2 to Enter Setup" message may be disabled in the BIOS. The F2 key still has the same function when the display of the message is disabled.

BIOS Setup has six menus: Main, Advanced, Security, Power, Boot and Exit.

Using the Keypad

The set of keypad commands used to select menu items and parameters, as well as modify parameter values is as follows:

Action	Keypress
Exit a menu	Esc
Activate Help Screen	F1
Modify parameter value	Space key or alpha-numeric key
Move to next parameter	Enter or Arrow Key
Move from menu to menu	Arrow key

Note: Refer to Appendix A "Key Maps" for other key press sequences.

BIOS Setup Default Values by Option

Menu Option	Menu / Section	Default Value
Boot	Boot Device Priority	Removable Devices (i.e. USB floppy drive), Hard Drive, CD-ROM drive, Network boot (i.e. PXE) in this order
Onboard LAN RPL ROM	Boot	Disabled
Power Savings	Power	Disabled [5]
Power Supply	Power	ATX
Rpt Delay	Advanced / Keyboard	1/2 sec [5]
Rpt Rate	Advanced / Keyboard	30 /sec [5]
Dark Boot	Boot	Disabled (displays diagnostic screen during boot)
Summary	Boot	Disabled

Settings are saved temporarily as each parameter activity screen is closed. Changes are saved to CMOS RAM when Exit With Save is selected and the BIOS setup program closes.

Changed parameter values take effect when the VX5 reboots upon exiting BIOS Setup. If the VX5 does not automatically reboot upon exit, please reboot the VX5.

---

[5]   Refer to commercially available Windows guides or Windows help files as these items may be configured via Microsoft Windows Control Panel.

Main Menu Options

To edit parameters, use the up and down arrow key to move from parameter to parameter.

Use the space key or an alpha-numeric key to modify a parameter value.

Press F1 to activate the help screen. Then use the panning function to move around the help screen. Press ESC to close the help screen.

Use the left and right arrow keys to move from menu to menu.

Press the ESC key or key sequence to go directly to the Exit Menu.

When changes have been made, press an arrow key to go to another parameter or menu or press ESC to go to the Exit Menu.

Menu Option	Default Value
System Time	
System Date	
Legacy Diskette (A: and B:)	Disabled
Primary Master	Auto
Primary Slave	Auto
Secondary Master	Auto [6]
Secondary Slave	Auto [6]
Memory Shadow	---
Memory Cache	---
System Memory	640KB
Extended Memory	252928KB

Settings are saved temporarily as each parameter activity screen is closed. Changes are saved to CMOS RAM when "Save and Exit" is selected and the BIOS Setup program closes.

Changed and saved parameter values take effect after the VX5 is rebooted.

Legacy Diskette (A and B)

This option is used to indicate if a floppy disk drive is attached to the VX5. The VX5 does not have a provision for a standard floppy drive; however, a USB floppy may be attached to the USB interface cable.

```
Values:
Disabled          No floppy drive present.

360KB 5¼"         The option chosen will depend
1.2MB 5¼"         on the drive attached.  Most
720KB 3½"         common are 1.44MB 3½" drives.
1.44/125MB 3½"
2.88MB 3½"

Default:          Disabled
```

---

[6] The secondary drive is either an ATA Compact Flash or ATA PCMCIA card. Please refer to "ATA Secondary Drive" later in this chapter for more information.

Primary and Secondary Master and Slave Drives

Use this option to indicate the type of disk drive installed in the VX5.

```
Values:
Auto              Auto-detects the hard drive installed, if any.
User              User  enters  parameters  of  the  installed  hard
                  drive.
1-39              Select hard drive from pre-determined types.
CD-ROM            A CD-ROM is installed here.
ATAPI Removable   A removable disk drive is installed.
Default:          Auto
```

Note: *The secondary drive is the enabled ATA slot on the side of the VX5. This drive may be either a PCMCIA or Compact Flash (via PCMCIA adapter) ATA drive. Please see "ATA Secondary Drive" later in this chapter for more details.*

Advanced Menu Options

The Advanced Menu contains several sections – Advanced Chipset Control, PCI Configuration, Keyboard Features, and I/O Device Configuration.

To edit parameters, use the up and down arrow key to move from parameter to parameter.

Use the space key or an alpha-numeric key to modify a parameter value.

Press F1 to activate the help screen then use the arrow keys to scroll through the help screen. Press ESC to close the help screen.

Use the left and right arrow keys to move from menu to menu.

Press the ESC key or key sequence to go directly to the Exit Menu.

Menu Option	Default Value
Advanced Chipset Control	---
PNP OS Installed	No
Reset Configuration Data	No
Secured Setup Configuration	Yes
PCI Configuration	---
PS/2 Mouse	Auto Detect
Keyboard Features	---
I/O Device Configuration	---
Hardware Monitor	---
Large Disk Access Mode	DOS

Settings are saved temporarily as each parameter activity screen is closed. Changes are saved to CMOS RAM when "Save and Exit" is selected and the BIOS Setup program closes.

Changed and saved parameter values take effect after the VX5 is rebooted.

Advanced Chipset Control

Parameters in this menu have been selected for best performance from your VX5. Changes are not recommended.

PCI Configuration

Parameters in this menu have been selected for best performance from your VX5. Changes are not recommended.

Keyboard Features

NumLock

> *Note: Some VX5 keyboards do not have a NumLock indicator or key. For these keyboards,*
> *NumLock may be toggled using the <2nd> <SHIFT> <F10> keypress sequence.*

Use this option to set NumLock at boot time. When NumLock is On, the keypad is locked in numeric mode. When NumLock is Off the numeric keys are inoperable.

Whether NumLock at Boot is Off or On, no LED is illuminated on the VX5.

```
Values:          Auto, On, Off
Default:         Auto
```

Keyclick

Enables the click on a keypress.

```
Values:          Enabled, Disabled
Default:         Disabled
```

I/O Device Configuration

Serial Port (A and B)

These parameters determine if the integrated serial port is active.

```
Values:
    Disabled    Port is not active.
    Enabled     User must define port by specifying base
                I/O address and interrupt.
    Auto        BIOS or OS configured.
    OS Cntrl    Controlled by OS
Default:        Auto
```

Note: *To switch pin-9 of the port between RI and +5v, it is necessary to change jumpers on the system board. See "Serial Port Pin 9" later in this chapter.*

Onboard LPT

These parameters determine if the integrated parallel port is active.

```
Values:
    Disabled    Port is not active.
    Enabled     User must define port by specifying base
                I/O address and interrupt.
    Auto        BIOS or OS configured.
    OS Cntrl    Controlled by OS
Default:        Disabled
```

Note: *There is no parallel port (LPT1) on a VX5. Disabling the LPT1 port allows IRQ7 to be used by other devices.*

USB Port / USB Host Controller

These parameters determine if the USB port is active.

```
Values:         Enabled, Disabled
Default:        Enabled
```

Note: *The USB adapter cable must be attached to the VX5 to use the USB port.*

USB BIOS Legacy Support

Enables support for USB keyboard and mice.

```
Values:         Enabled, Disabled
Default:        Enabled
```

Note: *To boot from a USB floppy, USB BIOS Legacy Support must be enabled.*

Security

This menu can be used to set security features as desired.

Power

BIOS power management is disabled in the VX5. Microsoft Windows handles all power management.

Boot

Floppy Check

This parameter determines if the floppy drive is verified on boot. Disabling provides a faster boot.

```
Values:         Enabled, Disabled
Default:        Disabled
```

Summary Screen

This parameter determines if the summary screen should be displayed on bootup. Disabling provides a faster boot.

```
Values:         Enabled, Disabled
Default:        Disabled
```

Quickboot Mode

This parameter determines if certain tests should be skipped during boot. Enabling provides a faster boot.

```
Values:         Enabled, Disabled
Default:        Enabled
```

Dark Boot

This parameter prevents diagnostic output to the screen during boot.

```
Values:         Enabled, Disabled
Default:        Enabled
```

Boot Device Priority

The bootable devices are listed in the order they are searched.

```
    Removable Devices
+   Hard Drive
    ATAPI CD-ROM Drive
    Network Boot
```

Any item listed with a "+" contains an expandable list of devices. Highlight the item and press the <Enter> key to expand the list.

```
    Removable Devices
-   Hard Drive
        Secondary Master 7
        Bootable Add-In Cards
        Primary Master 7
    ATAPI CD-ROM Drive
    Network Boot
```

This is the default boot order delivered with your VX5. Valid functions are:

- Highlight a device and press <+> to move it up the list of devices.
- Highlight a device and press <-> to move it down the list of devices.
- <Enter> expands an item with a "+" and contracts an item with a "-".
- <2nd>+<Shift>+<1> disables or enables a device. Any disabled device is displayed with an "!".

Onboard LAN RPL ROM

Enables remote boot BIOS extensions for the onboard LAN controller (Ethernet port). RPL stands for Remote Program Load.

```
Values:         Enabled, Disabled
Default:        Disable
```

---

[7] Hard drives may be identified by the manufacturer name. In those cases, the (PM) or (SM) listed after the drive name identifies the drive as Primary Master or Secondary Master.

Exit Menu Options

To edit parameters, use the up and down arrow key to move from parameter to parameter.

Press F1 to activate the help screen then use the panning function to move around the help screen. Press ESC to close the help screen.

Use the left and right arrow keys to move from menu to menu.

Press the ESC key or key sequence to go directly to the Exit Menu.

As changes are made to Setup values, the values can be saved or discarded. The next time the VX5 is turned on or rebooted, the saved values take effect.

Exit Saving Changes

Use this option to immediately save current Setup settings to CMOS RAM and into the Flash Boot Device (FBD).

When "Save and Exit" is highlighted, press <Enter> to save. When the saving process is complete, the VX5 reboots with the current values.

Exit Discarding Changes

Use this option when any current changes made to Setup parameters are to be ignored. The parameters revert to their state when Setup was entered.

When this option is highlighted, press <Enter> and the boot process continues. The system reboots with unchanged values.

Load Setup Defaults

This option is used to reset the Setup values to the original, default values that were set at the factory, before suppliers or end users made changes.

The next time the VX5 is turned on or rebooted, those saved values are in effect. Save this change by selecting "Save and Exit."

Discard Changes

Use this option to immediately restore CMOS RAM and update the current Setup settings from the Flash Boot Device.

Save this change by selecting "Save and Exit."

Save Changes

Used to save BIOS Setup changes without rebooting. The changed parameters are in effect the next time the VX5 is powered on or rebooted.

Reboot by selecting either "Exit w/o Save" or "Save and Exit."

Serial Port Pin 9

Pin 9 of the serial ports may be configured to provide RI or +5V using DISP switches accessible by removing the access cover:

- Pin 9 must be set to +5V if an external serial scanner is to be attached. This is the default setting for COM1 and provides 400mA maximum.

- Pin 9 must be set to RI if a serial printer or PC cable is to be used with the port. This is the default setting for COM2.

Equipment Needed: Phillips No. 1 screwdriver, a Torque wrench capable of measuring to 9±1 inch pounds (1.016 ±.11 N/m).

Note: Torquing tool is not supplied by LXE.

1.   Turn the VX5 off and remove the power supply before opening the access cover located on the top of the VX5.

2.   Loosen the three (3) Phillips screws securing the access cover so the cover can be removed. The screws are a captive part of the cover and cannot be removed.

3.   Remove the access cover. The cover is tethered to the VX5 to prevent loss.
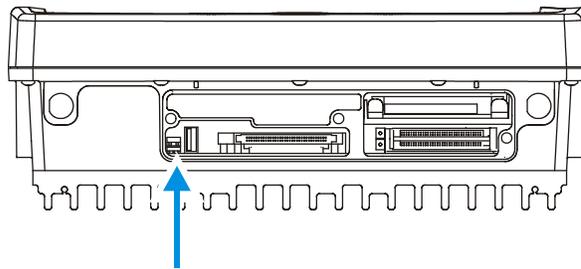
Figure 4-1 DIP Switch Location

Note: The tethered access panel cover is not shown in the illustration above.

4.   Refer to the legend above the DIP switches. There are two DIP switches, one for COM1 and one for COM2. When a DIP switch is in the Up position, the COM port pin 9 is configured for a scanner (+5V). When a DIP switch is in the Down position, the COM port pin 9 is configured for RI.

5.   After setting the dip switches to the desired position, reattach the access cover screws using a torque wrench capable of measuring 9±1 inch pounds (1.016±.11 N/m). The three screws must be fastened to 9 inch pounds each. The screws require a Phillips size 1 driver head.

VMT Keyboard Backlighting

95-key Keyboard

This LXE keyboard has keys that are backlit with LEDs. The backlight is manually controlled using the "backlight" key in the upper right hand corner of the keyboard. Pressing the backlight key cycles the backlight through the levels of backlight intensity:

- Off
- Maximum intensity
- Medium intensity
- Low intensity.

60-key Keyboard

This LXE keyboard has LEDs that illuminate the individual keys. The keyboard backlight may be toggled manually by pressing <2nd> + <CTRL> + <F10>. This key sequence immediately changes the state of the keyboard backlight as follows:

- Turns the backlight Off if it is currently On.
- Turns the backlight On if it is currently Off.

Microsoft Windows Setup and Configuration

Options for the VX5 include Windows 2000 Professional and Windows XP Professional preinstalled. If your VX5 was ordered with no Operating System, please see "VX5 Delivered with No OS" later in this chapter.

Note: *The VX5 System Tools CD-ROM (LXE Part No. VX5A477DRIVERS) contains files that may be used during Microsoft Windows setup and Configuration. Please refer to the section detailing the contents of this CD later in this chapter.*

Microsoft Windows License Agreement (First Boot)

If your VX5 is shipped with a Microsoft Windows operating system pre-installed, it is necessary to complete the Windows licensing/registration screens when starting the VX5 for the first time. To complete this information, you need the Microsoft Windows software/product key that was included with the VX5.

Note: If you are installing a Microsoft Windows operating system on a VX5 delivered with no OS, you may be prompted for the Windows software or product key and registration information either during installation or upon first boot.

Microsoft Windows 2000

The Microsoft Windows software key is a 25 digit key included with the VX5.

The first screen prompts for the name (individual or corporation) to which Microsoft Windows is registered. After the information is entered, press or click on the "Next" button.

The second screen displays Microsoft's licensing agreement. Review the agreement and indicate if you wish to accept the agreement.

Note: If you do not accept the agreement, Microsoft Windows does not continue to load.

The next screen asks for the software key. Enter the key exactly as it is displayed on the decal.

Note: If you ordered multiple VX5's, a separate key code decal is included for each VX5. Each key code is to be used on only one VX5. Be sure to store the key codes in a safe place.

Pressing "Next" finishes the licensing/registration process.

As Microsoft Windows starts for the first time, you are asked to verify the time and time zone. Make any necessary changes and Windows finishes its setup and starts for the first time.

Microsoft Windows XP

When Microsoft Windows XP is started by the user for the first time (known as the "out of the box experience"), a series of questions is presented. The product key (printed on a decal attached to the VX5) must be entered. The series of prompts and responses allow the user to configure Microsoft Windows XP on the VX5 according to the user's needs.

During this process it is normal for the "New Hardware Wizard" window to appear. When the wizard appears and asks for the Ethernet device driver, select "OEMxxx.INF" (where xxx is a series of numbers, such as OEM123.INF) from the list of available drivers and click Next. When prompted, click Finish to complete the installation of the Ethernet device.

If you are installing a Symbol radio, the wizard window may appear for the radio driver. Click Next and then Finish when prompted.

Proceed with the remainder of the boot process.

Drive C Directory Structure

The drive C: directory structure is the same for all media types. Microsoft Windows is installed in the \Windows or \WINNT directory. The default directory depends on the version installed. In addition, Microsoft Windows creates other directories and several subdirectories. For more information on the directories Microsoft Windows uses, please refer to commercially available Windows reference guides.

Depending on the option ordered, drive C: may be:

- a 40GB rotating drive
- a 2GB flash drive
- a 2GB PCMCIA card
- a user installed drive (a VX5 with the "no hard drive" option)

Please refer to the invoice or packing list if there are any questions about the configuration of your VX5.

> **ATTENTION: On a VX5 with a flash drive, powering off the VX5 before a write (to disk) function has completed, may result in the corruption of the flash drive.**

Software Loaded on Drive C

The software loaded on the VX5 computer consists of:

- BIOS
- Microsoft Windows 2000 Professional or Windows XP Professional
- device drivers
- radio software
- touchscreen software
- RFTerm™ software.

Note: If your VX5 was ordered with the no OS option, please refer to "VX5 with No OS", later in this chapter.

The software installed on the VX5 is summarized below.

Note: Due to the complex directory structure and System Registry under Microsoft Windows, software should not be removed manually. Instead use the Add/Remove Programs icon in the Windows Control Panel.

Microsoft Windows

Microsoft Windows is installed in the \Windows (or \WINNT) subdirectory, which is the Windows default. In addition, Windows places files in other directories and subdirectories during installation. For more information, please refer to commercially available Windows user guides.

Device Drivers

Device drivers are included for all installed hardware options, such as the display, touchscreen, radios, Ethernet port, etc. For more information on Microsoft Windows device drivers, please refer to commercially available Windows guides.

Radio Software

If a radio is ordered with a VX5, the VX5 is delivered with the radio software installed. Because the VX5 is uses a Microsoft Windows operating system, the radio installation includes Windows device drivers.

Touchscreen Software

Fujitsu Touch Panel software is installed for calibrating the VX5's touchscreen. Please see "Touch Screen Calibration" later in this chapter for more information.

RFTerm™ Software

RFTerm allows users to connect to applications running on IBM 3270, AS/400 and VT hosts from an LXE Microsoft Windows based mobile computer over a wireless TCP/IP data network.

Microsoft Windows Configuration

After the system files are processed, Microsoft Windows begins to load. Windows maintains a System Registry and INI files. Standard Windows configuration options apply to the VX5. Configuration options are located in either the System Tray or the Control Panel:

- The System Tray contains icons for adjusting the time, date or volume level.

- The Control Panel contains icons for many other configuration options, such as Power Management, PC Cards, etc.

- The Control Panel icons are also used to add, delete or modify hardware installed on the VX5.

Please refer to Microsoft Windows help screens or commercially available Windows guides for more information on configuration options in Windows.

Touchscreen

Calibrating the Touchscreen

Although the touch screen is installed and calibrated at the factory, users may make adjustments to it by using the Fujitsu Touch Panel on the Microsoft Windows Programs menu. To calibrate the touchscreen, select **Start|Programs|Fujitsu Touch Panel (USB)|Touch Screen Calibration Utility**.
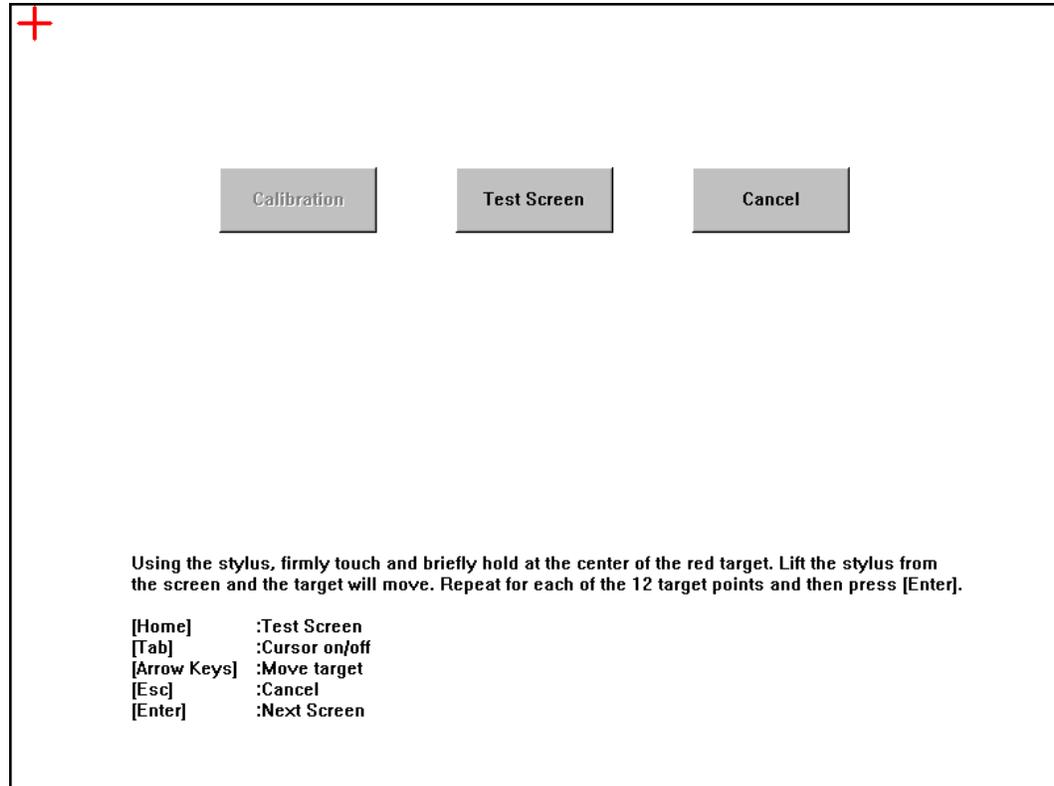
Figure 4-2 Touchscreen Calibration

The calibration utility displays a red cross on the screen. Touch the center of the cross with the stylus and hold for a few seconds. Release and repeat with the next cross. After all twelve locations have been touched, either press <Enter> or click the Calibration button.

Use the stylus to check touch screen calibration in this test area. Press [Enter] to save settings and exit or [Home] to return to Calibration Screen.

[Home]   :Calibration Screen
[Tab]   :Cursor on/off
[Space Bar]   :Clear Screen
[Esc]   :Cancel & Exit
[Enter]   :Save & Exit
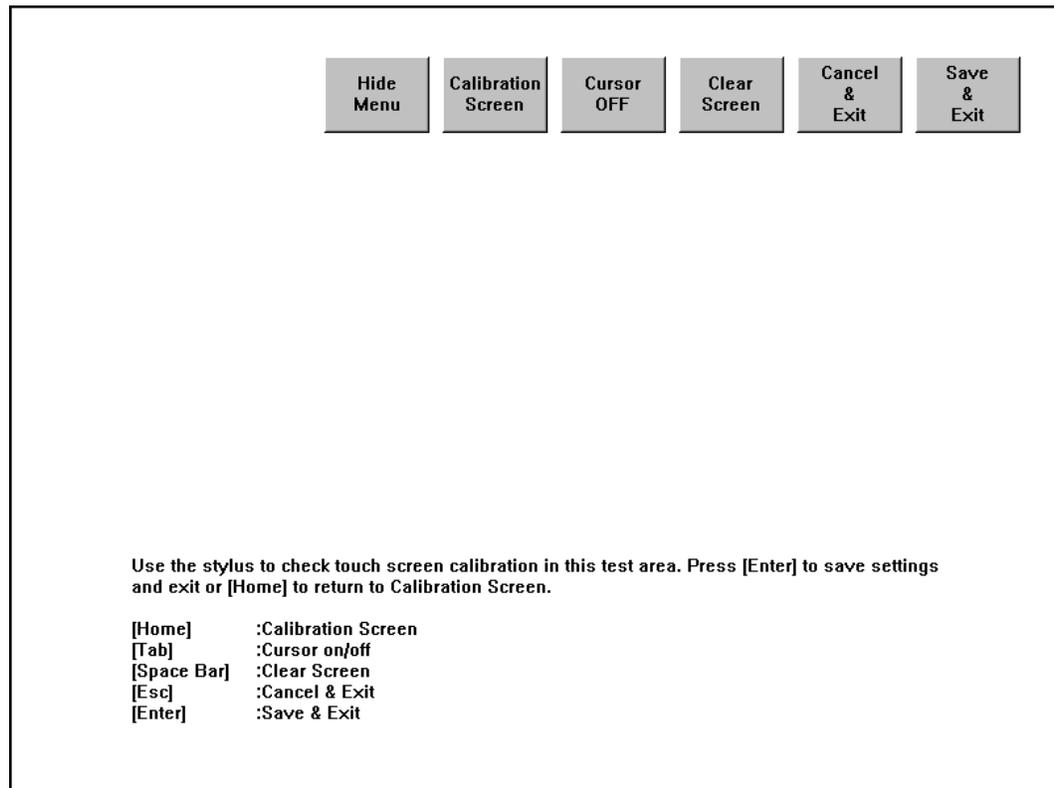
Figure 4-3 Touchscreen Calibration

To save the new calibration settings, click on the Save & Exit button or press <Enter>.

To discard the new calibration settings, click Cancel & Exit or press <Esc>.

Configuring Right Click on the Touchscreen

The Fujitsu Touch Panel configuration is accessed from the Programs section of the Microsoft Windows Start menu. Use this utility to configure the "right click" behavior of the touch screen.
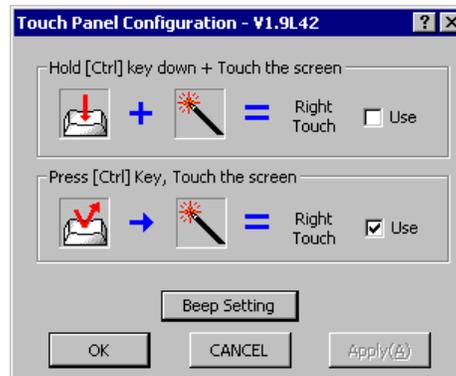
Figure 4-4 Touch Panel Configuration

The touch screen right click behavior can be configured as followed:

- Holding the <Ctrl> key and then touching the screen if the first option is selected

- A screen touch after the <Ctrl> key is pressed if the second option is selected.

Note: Because the <Ctrl> key is a "sticky key" on the 60-key keyboard, the first option must be used with this keyboard. Once the <Ctrl> key is pressed on the 60-key keyboard, the <Ctrl> key stays active (and every screen touch is treated as a right click) until another key is pressed on the keyboard.

Disabling the Touch Screen

If desired, the touchscreen can be disabled in the Windows control panel. Once disabled, the touchscreen remains disabled until it is enabled again.

To disable the touchscreen, access the Windows control panel and click on **System|Hardware|Device Manager|Human Interface Devices**. Under the Human Interface Devices there is a listing for Fujitsu Touch Panel (USB). Right click on this listing and select Disable from the menu.

To enable the touchscreen, follow the same process, selecting Enable from the right click menu.

Network Configuration

There are two networking options available for the VX5:

- 2.4GHz wireless radios
- Ethernet (RJ-45) connector.

2.4 GHz Wireless Radios

Please refer to Chapter 5, "RF Network Configuration" for details on configuring the 2.4 GHz wireless radio cards.

Ethernet Connector

When the VX5 is networked using the Ethernet connector, the VX5's networking options are set via the Microsoft Windows Control Panel. The same networking configuration options are available as in a standard PC.

For more information on configuring the Microsoft Windows network settings, please refer to the Windows Help feature or commercially available Windows networking literature.

VX5 Delivered with No Hard Drive

How To Install 2.5" IDE Hard Drive

1. Turn the VX5 off and remove the power supply before opening the access cover located on the top of the VX5.

2. Loosen the three (3) Phillips head screws securing the access cover so the cover can be removed. The screws are a captive part of the cover and cannot be removed.

3. Slide the Hard Drive Sled (or bracket) out of the VX5.
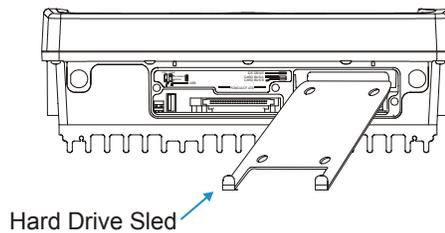
Hard Drive Sled

Figure 4-5 Hard Drive Sled

Note: The tethered access panel cover is not shown in the illustration above.

4. Attach the hard drive to the hard drive sled, using 4 M3x4 flat head screws inserted through the holes in the bottom of the hard drive sled. Torque to 8.0±1 in/lb (0.9±.11 N/m). The VX5 accepts 2.5" IDE flash or rotating hard drives.

5. Insert the hard drive into the VX5. Slide the assembly into the opening from which the empty bracket was removed. Do not slide it all the way in.

6. Connect the hard drive cable to the connector pins on the back of the hard drive. Make sure the cable is centered correctly on the connector pins. Do not attempt to place the hard drive cable over the jumper pins.

Hard Drive Cable
Connector Pins

Hard Drive
Jumper Pins
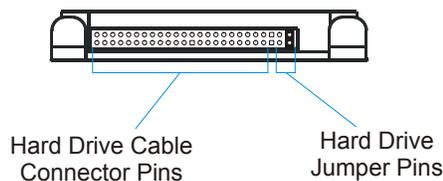
Figure 4-6 Hard Drive Connector Pins

7. Insert the hard drive assembly the rest of the way into the VX5.

8. Reinstall the access panel cover, torquing the screws to 9±1 inch pounds (1.016±.11 N/m). The screws require a Phillips size 1 driver head.

9. If the VX5 displays a message such as "operating system not found" during the first boot with the new hard drive, it may be necessary to reboot. The error may be eliminated with a reboot. If the error persists, please review the BIOS settings for the primary hard drive. Also check the hard drive documentation for the proper jumper settings.

VX5 Delivered with No OS

Note: This section applies only to a VX5 ordered with no OS installed.

If the 'no Operating System (OS)' option was chosen when ordering the VX5, two possible options for installing the OS are detailed in this section:

- Install the OS using Norton Ghost[TM].
- Install the OS over the network.

Additionally, a Microsoft Windows image can be created on a hard drive before it is installed in the VX5. See "VX5 Delivered with No Hard Drive" earlier in this chapter for information on installing a hard drive in the VX5.

Note: It is assumed that the OS to be installed is Microsoft Windows.

It is necessary to make changes to the BIOS when using either of these options to install an OS. Please refer to "BIOS Setup" earlier in this chapter for more details.

The VX5 System Tools CD (LXE Part No. VX5A477DRIVERS) contains device drivers that are necessary when installing Microsoft Windows on a VX5 delivered with no OS. The device drivers contained on this CD need to be available during the Windows installation/configuration. For example, the drivers can be copied to a location where they can be accessed via network or USB floppy. Please see the section detailing the contents of this CD-ROM later in this chapter.

After installing Microsoft Windows, please refer to "Microsoft Windows Setup and Configuration" earlier in this chapter.

Installing Microsoft Windows with Norton Ghost

The requirements and process for using Norton Ghost depend on the version of Microsoft Windows to be installed on the VX5.

Microsoft Windows 2000

To use the Norton Ghost utility to install an OS, there must be a blank drive connected to the Primary IDE and a Compact Flash or ATA drive with a ghost image connected to the Secondary IDE.

Note: This procedure can also be used with Microsoft Windows NT. For NT versions of Windows, the image must be created on the same type of computer as the destination computer where the OS is to be used. Differences in hardware may keep NT from booting after it is loaded on the destination computer.

Hardware Required

- A PC where the original image will be produced.
- A Micro drive, PCMCIA ATA flash drive or Compact Flash drive that is at least 10MB larger than the ghost image.

Software Required

- Norton Ghost 2002 or newer
- Microsoft Windows image

How To Install Microsoft Windows 2000

---

1. With the primary hard drive installed in the VX5, insert a bootable Compact Flash or PCMCIA ATA drive into the secondary IDE slot. This drive should contain the ghost image and the Norton Ghost utility 2002 or newer.

2. Boot the VX5 and enter the BIOS by pressing F2.

    Note: Refer to "BIOS Setup" earlier in this chapter for more information on the BIOS changes made during this process.

3. Select **Advanced|I/O Device Configuration** and ensure that the Local Bus Adapter is set to "Both".

4. Press <Esc> to return to the main menu.

5. Select **Boot|Boot Device Priority** and make sure the Secondary IDE device is first in the boot order.

    - Press <Enter> while "Hard Drive" is highlighted to expand the listing

    - Highlight the Secondary IDE device in the listing and press <2nd> <+> until it is listed before the Primary hard drive.

6. Save any changes made and allow the VX5 to boot.

7. Follow the instructions for the version of Ghost you are using to copy the ghost image from the Secondary IDE to the Primary IDE drive.

8. Once the image has been copied, power the VX5 down and remove the secondary drive.

9. Restart the VX5 and edit the BIOS to return the Primary IDE to the top of the boot order.

10. Save the change and reboot the VX5.

11. After the VX5 boots, verify that the image has been transferred and the unit is operating correctly.

Note: You may wish to review the "Microsoft Windows Setup and Configuration" section, earlier in this chapter, to set up Windows as desired.

Microsoft Windows XP

To use the Norton Ghost utility to install an OS, there must be a blank drive connected to the Primary IDE and a Compact Flash or ATA drive with a ghost image connected to the Secondary IDE.

Note: This procedure can also be used with Microsoft Windows NT.

Hardware Required

- A PC where the original image will be produced.

- A Micro drive, PCMCIA ATA flash drive or Compact Flash drive that is at least 10MB larger than the ghost image.

- TEAC USB floppy drive or equivalent bootable USB floppy drive.

  Note: Not all USB floppy drives are bootable devices.

Software Required

- Norton Ghost 2002 or equivalent

- Microsoft Windows image

How To Install Microsoft Windows XP

To install Microsoft Windows XP using Ghost 2002 or newer, a Ghost boot floppy is required. You will also need the Ghost license number from the Ghost program that made the Windows XP image. To make the Ghost floppy:

1. From Microsoft Windows, start the Ghost 2002 Boot Wizard.

2. Choose "Boot Disk with CD/R"

3. Connect the USB floppy drive to the VX5.

4. Boot the VX5 and enter the BIOS by pressing F2.

    Note: Refer to "BIOS Setup" earlier in this chapter for more information on the BIOS changes made during this process.

5. Select Advanced|I/O Device Configuration and ensure that the USB Controller and USB Legacy Support are enabled.

6. Press <Esc> to return to the main menu.

7. Select Boot|Boot Device Priority and make sure that "Removable Devices" is listed first in the boot order.

8. Save any changes and exit the BIOS setup.

9. Insert the Ghost floppy in USB floppy drive and allow the VX5 to boot from the floppy.

10. Follow the directions to transfer the Microsoft Windows XP image to the VX5 hard drive.

    Note: Do not restart the VX5 with Microsoft Windows running until you are ready to perform the "Out of box experience" process detailed earlier in this chapter. Please refer to "Microsoft Windows License Agreement" for more details.

11. Restart the VX5 and edit the BIOS to return the Primary IDE to the top of the list (to boot into Microsoft Windows).

12. Save the change and reboot the VX5.

13. After the VX5 boots, verify that the image has been transferred and the unit is operating correctly.

Note: You may wish to review the "Microsoft Windows Setup and Configuration" section, earlier in this chapter, to set up Windows as desired.

Installing Microsoft Windows Over a Network

Using a PCMCIA Network Card

This section details installing the operating system over the network. This procedure assumes the VX5 has a formatted blank hard drive installed as the Primary IDE drive. You will also need software to enable the PCMCIA slot in which the Ethernet card will reside. For this example, that software will be Enabler that is delivered with the Socket LP-E Ethernet card.

Hardware Required

- Socket LP-E network card or equivalent.

  Note: Bus cards will not fit into the PCMCIA slots.

- TEAC USB floppy drive or equivalent bootable USB floppy drive.

  Note   Not all USB floppy drives are bootable devices.

- USB adapter cable for VX5.

Software Required

- Bootable Microsoft Windows diskette.

- Software to enable PCMCIA slot.

  Note: Enable is included with the Socket LP-E Ethernet card.

- Software needed to connect to your network (ie: ETHDRV.EXE, TCP.EXE, LSL.COM, odipkt.COM)

How To Install Microsoft Windows 2000 or XP

1. Create a bootable diskette.

2. Copy the utility to enable the PCMCIA slot and any files needed to connect to your network to the bootable diskette. A sample list of files to be included on the bootable diskette is included later in this section.

3. Edit all required files to allow the Ethernet card to become active. A list of sample files used in this process is provided later in this section.

   Note: Different cards and different utilities may require different settings.

4. Connect the hardware listed above to the VX5.

5. Boot the VX5 and enter the BIOS by pressing F2.

   Note: Refer to "BIOS Setup" earlier in this chapter for more information on the BIOS changes made during this process.

6. Select **Advanced|I/O Device Configuration** and ensure that the USB Controller and USB Legacy Support are enabled.

7. Press <Esc> to return to the main menu.

8. Select **Boot|Boot Device Priority** and make sure that "Removable Devices" is listed first in the boot order.

9. Save any changes made and exit the BIOS.

10. Insert the floppy drive and allow the VX5 to boot.

11. After connecting to the network, perform all necessary installations.

12. Restart the VX5 and edit the BIOS to return the primary IDE to the top of the boot order.

13. Save the change and reboot the VX5.

14. After the VX5 boots, verify that all software is installed and the unit is operating correctly.

Note: You may wish to review the "Microsoft Windows Setup and Configuration" section, earlier in this chapter, to set up Windows as desired.

Files on Bootable Diskette

Note: The files included on the boot disk shown below are examples only. The files contained on your bootable diskette and the directory structure may vary depending on the network card and software used.

Directory of A:

```
COMMAND.COM
NET.CFG             (See example file below)
AUTOEXEC.BAT        (See example file below)
CONFIG.SYS          (See example file below)
HIMEM.SYS
DIR.TXT
EDIT.EXE
ATTRIB.EXE
FDISK.EXE
XCOPY.EXE
FORMAT.COM
QBASIC.EXE
SOCKETLP            <DIR>
```

Directory of A:\SOCKETLP

```
CIRRFIX.EXE
DRIVER.LST
ENABLELP.EXE
ETHDRV.EXE
FTP.EXE
IPSTAT.EXE
LSL.COM
NE2000.COM
NE2000.INS
NET.CFG
ODIPKT.COM
PCTCP.INI
PING.EXE
SKTID.EXE
TCP.EXE
TFTP.EXE
```

Sample Files for Installation Procedure

*Note: The example files shown below are examples only. Your files may differ depending on
the Ethernet card used.*

NET.CONFIG

```
Link Driver NE2000
    Port 340
    Int 7

; Remove the semi-colon in front of the frame type you will use.
; This frame type must match what the NetWare server is using.
; FRAME Ethernet_802.2
; FRAME Ethernet_802.3
; FRAME Ethernet_SNAP
FRAME Ethernet_II

NetWare DOS Requester
    FIRST NETWORK DRIVE = F

; If you know the name of your preferred server, remove the
; semi-colon below and enter the preferred server name after
; the equal sign.
;preferred server =
```

CONFIG.SYS

```
DEVICE=HIMEM.SYS /testmem:off
FILES=30
BUFFERS=20

DEVICE=a:\socketlp\enablelp.exe   membase=0xE8000   messages=enabled
socket=1

LASTDRIVE=Z
```

AUTOEXEC.BAT

```
@echo off

cd\socketlp
LSL
ne2000
odipkt
SET PCTCP=a:\socketlp\pctpc.ini
ethdrv.exe
```

Using the Ethernet Port

This section provides only a general overview of the PXE boot and RIS service. For complete details, the user should consult Microsoft's documentation for PXE and RIS. This information is available on Microsoft's web site, www.microsoft.com.

Microsoft Remote Installation Services (RIS) can be used to install a Microsoft Windows operating system on a VX5 delivered with no OS. RIS uses DHCP based boot technology known as Preboot eXecution Environment (PXE).

Requirements

- A PC with Microsoft Windows 2000 Server with the following services:
  - Remote Installation Services (RIS)
  - Domain Name Systems (DNS)
  - Dynamic Host Configuration Protocol (DHCP) server
  - Active Directory.
- A Microsoft Windows 2000 or XP image to download to VX5 computers.
- A VX5 configured for PXE boot located on the same physical network as the server PC.

How To Install Microsoft Windows 2000 or XP

1. Connect the VX5 to the network by inserting a network cable in the Ethernet port.

2. Boot the VX5 and enter the BIOS by pressing F2.

   Note: Refer to "BIOS Setup" earlier in this chapter for more information on the BIOS changes made during this process.

3. Select **Boot** and change "Onboard LAN RPL ROM" to enabled.

4. Press <Esc> to return to the main menu.

5. Select **Boot**|**Boot Device Priority** and make sure that "Network boot" is listed first in the boot order.

6. Save any changes made and exit the BIOS.

7. Allow the VX5 to boot.

8. When the message is displayed, press F12 to connect to the RIS server.

9. When the file transfer is complete, reboot the VX5 and enter the BIOS by pressing F2.

10. Set "Onboard LAN RPL ROM" to disabled. Return primary IDE to the top of the boot order list.

11. Save any changes made and exit the BIOS.

12. After the VX5 boots, verify that the image has been transferred and the unit is operating correctly.

Installing Microsoft Windows From a CD

This section details installing the Microsoft Windows XP operating system from a CD-ROM. This procedure assumes the VX5 has a formatted blank hard drive installed as the Primary IDE drive.

Hardware Required

- VX5 computer with at least 10GB of free space on the hard drive
- Ethernet/USB dongle cable
- External USB CD–ROM drive

    Note: *The following drives have been tested to work with the VX5:*
    - IOMEGA CD-RW 52x24x52x USB 2.0 external drive, model number CDRW55292EXT
    - TDK veloCD 5201ue 52x24x48x USB 2.0 external drive, model number UE-5201B
    - HP DVDwriter model number dvd300e

Software Required

- Microsoft Windows XP Professional installation CD
- LXE VX5 Driver CD, part no. VX5A477DRIVERS.

How To Install Microsoft Windows XP

1. Plug the CD drive into the USB connector on the end of the Ethernet/USB dongle cable.

2. Turn the VX5 on and press the F2 key when prompted to enter setup.

    Note: *Refer to "BIOS Setup" earlier in this chapter for more information on the BIOS changes made during this process.*

3. Select **Boot|Boot Device Priority** and change the boot sequence to the following order: CD ROM, Hard Drive, Floppy Drive in that order.

4. Before exiting BIOS, insert the Windows XP Professional CD into the CD drive.

5. Exit and save BIOS changes.

6. During the reboot, watch for the message "Press any key to boot from the CD" and press any key.

    Note: *This message appears for a short time only. If no key is pressed before the message disappears, the VX5 must be rebooted.*

7. This starts the Windows XP setup routine.   Complete the installation answering the questions appropriately.

8. Install LXE drivers using the LXE VX5 Drivers CD.

The VX5 Drivers CD-ROM

The VX5 Drivers CD-ROM (LXE Part No. VX5A477DRIVERS) contains files that may be necessary for configuration of the VX5 computer. It is recommended that the device drivers listed below (as appropriate for your VX5 display panel type and operating system) be available during Microsoft Windows installation and configuration. Since the VX5 does not have a CD-ROM drive, the device drivers can be copied to a floppy and accessed via a USB floppy drive. The device drivers can also be copied to a location on the network if a network connection is used to install the Windows OS.

After Microsoft Windows is installed, device drivers contained on the CD can be used to update default Windows device drivers, if necessary.

> For more information on installing or updating Microsoft Windows device drivers, please refer to the Windows Help feature or commercially available Windows documentation.

The files on the CD are organized as follows:

\Radio_drvs\Cisco

Note: *Do not install the radio card before the drivers are installed. The driver installation prompts for the radio card to be inserted at the applicable time.*

\Win2K – This directory contains the radio driver and radio firmware for the VX5 with a Cisco radio and Microsoft Windows 2000 operating system. Click on the IWSetup.exe icon and follow the on screen direction for the driver.

\WinXP – This directory contains the radio driver and radio firmware for the VX5 with a Cisco radio and Microsoft Windows XP operating system. Click on the IWSetup.exe icon and follow the on screen direction for the driver.

\Radio_drvr\Symbol

Note: *Do not install the radio card before the drivers are installed. The driver installation prompts for the radio card to be inserted at the applicable time.*

\Win2K – This directory contains the radio driver and radio firmware for the VX5 with a Symbol radio and Microsoft Windows 2000 operating system. Click on the Setup.exe icon and follow the on screen direction for the driver.

\WinXP – This directory contains the radio driver and radio firmware for the VX5 with a Symbol radio and Microsoft Windows XP operating system. Click on the Setup.exe icon and follow the on screen direction for the driver.

\Win_2K

Contains drivers for use with the Microsoft Windows 2000 operating system:

\TouchScreen – Provides the touchscreen driver used on the VX5. The drivers are loaded by running FTSETUP.EXE.

\Display – This file provides an update to the display driver.

\Cardbus – Provides a driver for the Cardbus controller under Windows 2000.

\Audio – Provides an update to the audio driver for use with the sound card.

\Ethernet – Provides drivers to support the on-board Ethernet port.

\Wav_files – Contains .WAV files designed for the VX5's speaker frequency range.

\Win_XP

Contains drivers for use with the Microsoft Windows XP operating system:

\TouchScreen – Provides the touchscreen driver used on the VX5. The drivers are loaded by running FTSETUP.EXE.

\Display – This file provides an update to the display driver.

\Audio – Provides an update to the audio driver for use with the sound card.

\Ethernet – Provides drivers to support the on-board Ethernet port.

\Wav_files – Contains .WAV files designed for the VX5's speaker frequency range.

Chapter 5 RF Network Configuration

Introduction

> *Note:*   *This chapter is only applicable to wireless RF network configuration. If an Ethernet cable provides the network connection, please refer to "Network Configuration" in Chapter 4, "System Configuration".*

The VX5 radios rely on Microsoft Windows network configuration via the Windows Control Panel and configuration software that depends on the type of radio installed in the VX5. The VX5 has all necessary radio software and drivers installed before it is shipped. The radio software includes a configuration utility and a status monitor or diagnosis utility.

For information on network configuration under Microsoft Windows, please refer to commercially available Windows networking guides, Windows on-line help screens or Windows network troubleshooter.

Cisco Radio

Configuration

> *Note:*   *For more information on configuring the Cisco radio, select the "Help" item from the menu bar or click on the "Help" icon. For details on ACU features not described in this section, please refer to the online help.*

To access the configuration utility, select **Programs|Cisco Aironet|Aironet Client Utility (ACU)** from the Microsoft Windows Start menu.
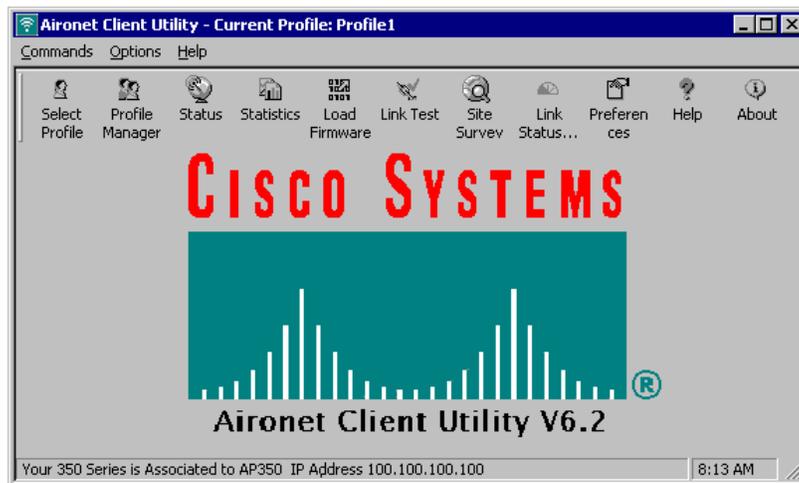
Figure 5-1 Cisco Aironet Client Utility

If profiles have already been created, a profile can be selected by clicking on the Select Profile icon.
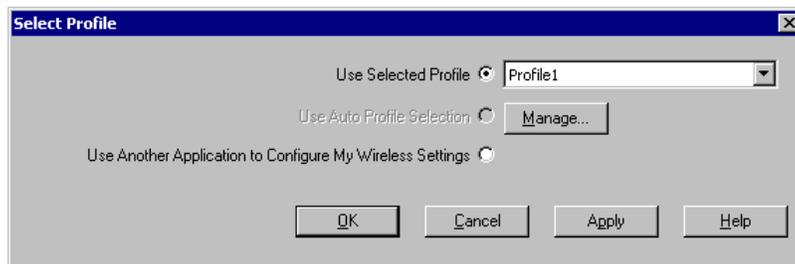
Figure 5-2 Cisco Profile Selection Screen

There are two ways to select an active profile:

- Select "Use Selected Profile" and specify the profile name to use.

- Select "Use Auto Profile Selection". A profile is selected from the profiles set up to be included in auto selection. The name of the selected profile is displayed in the text box. If the network adapter loses association for more than 10 seconds (default), then another profile marked for auto selection is chosen. As long as the adapter remains associated or reassociates within 10 seconds (default), the selected profile does not change. To change profiles, you must use the "Use Selected Profile" option.

If using automatic profile selection, click on the Manage button to access the profile selection management screen. Highlight an available profile name and click **<<Add** to add it to the auto selection list. To remove a profile from automatic selection, highlight the profile name and click **Remove>>**.
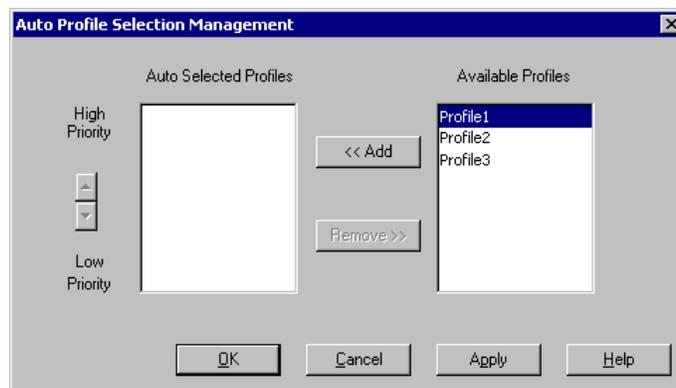
Figure 5-3 Cisco Profile Selection Management Screen

More details on the Profile Manager are available in Cisco's online help.

To create a new profile, access the Profile Manager screens by selecting **Commands|Profile Manager** or clicking on the "Profile Manager" icon.
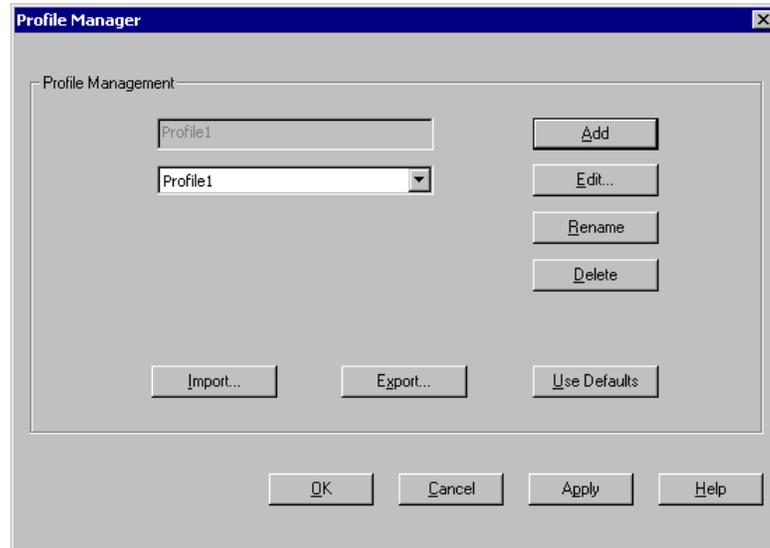
Figure 5-4 Cisco Profile Manager Screen

To add a new profile:

- Click the "Add" button

- Enter the profile name and press enter

- Complete the Properties screens for the profile (later in this section)

- Click "OK" or "Apply" to save your profile.

Note: If the profile is configured to use LEAP, it must have a saved username and password to be included in auto profile selection.

You can also edit, rename or apply default values to a profile by selecting the profile name and clicking the appropriate button.

You can use the Import/Export buttons to backup profiles or transfer profiles between computers:

- Import a profile from a selected drive/directory, such as a floppy.

- Export a profile to a selected drive/directory, such as a floppy.

Profile Properties Screens

The Properties screen shows the name of the profile in parenthesis. Each Properties screen contains a specific group of parameters:

- **System Parameters** – Parameters to configure the adapter for the network.

- **RF Network** – Parameters controlling the transmission and receiving of RF data.

- **Advanced (Infrastructure)** – Parameters controlling operation in an infrastructure network.

- **Advance (Ad Hoc)** – Parameters controlling operation in an Ad Hoc (peer-to-peer) network.

- **Network Security** – Parameters controlling association, authentication and encryption.
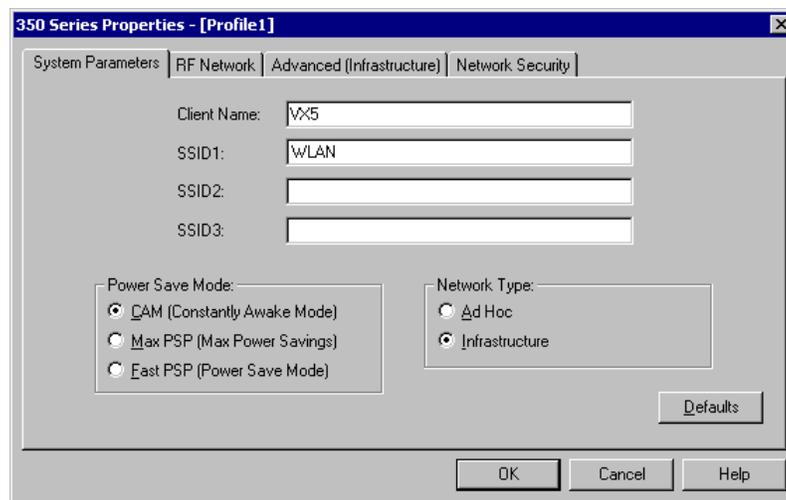
Figure 5-5 Cisco Properties - System Parameters

The System Parameters tab allows you to set:

- **Client Name** – The assigned station name in the table of connected devices. Used for easier identification than the MAC address. Default is "".

- **SSID 1-3** – The Service Set Identifier, which must match the SSID of any Access Points that you wish to communicate with. Up to three SSIDs may be specified. The SSID is case sensitive. The default is "" which enables the station to connect to any available network.

- **Power Save Mode –** The default is CAM (Constant Awake Mode), which provides the fastest response, but uses the most power. Max PSP provides for maximum power savings, but may cause delays in transmission. Fast PSP provides a compromise between the other settings.

- **Network type –** The default is Infrastructure. Infrastructure mode is used to connect to a wired network, such as an Ethernet, via access points. Ad hoc mode is used to connect two or more computers in a small temporary network.
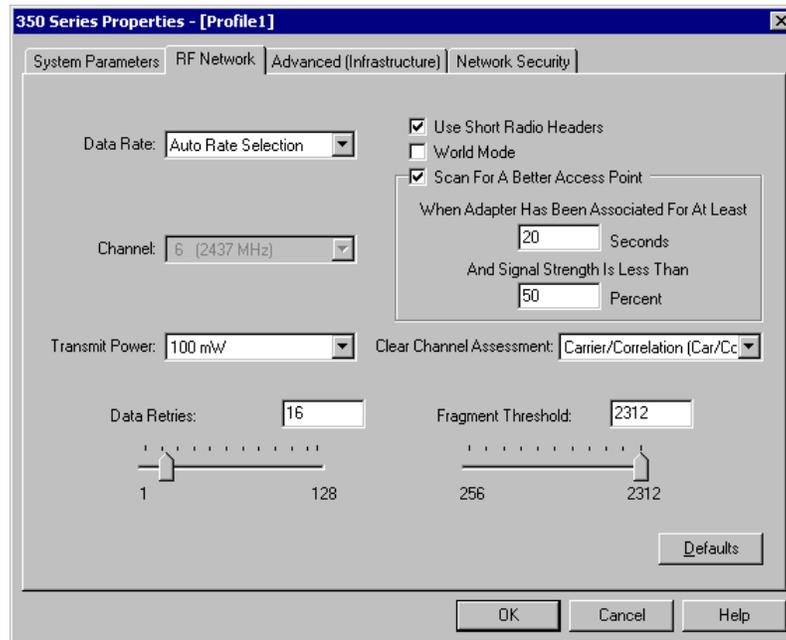
Figure 5-6 Cisco Properties - RF Network

The RF Network Tab allows you to set:

- **Data Rate** – The higher the transmit rate, the greater the throughput, but the range is decreased. Auto Rate Selection uses the highest transmit rate whenever possible, but uses the slower rates as necessary. Auto Rate Select is the default.

- **Use Short Radio Headers** – Selecting this checkbox allows the adapter to use short radio headers. If any clients associated with an access point are using long headers, then all clients must use long headers even when this box is checked. Short radio headers improve throughput performance. Long radio headers ensure compatibility with clients and access points that do not support short headers. The default is to use short radio headers.

- **World Mode** – Selecting this checkbox enables the adapter to adopt the maximum power level and frequency range of the access point to which it is associated (provided the Access Point is configured for World Mode). This parameter is available only in Infrastructure mode. The default is disabled.

- **Scan For A Better Access Point** – When selected, if the associated Access Point's signal becomes low, this option allows the adapter to search for a better Access Point and switch to that Access Point. The default is selected. The time period of association before scanning and the signal strength can be configured. LXE recommends 10 seconds for the association time before scanning and 40% for the signal strength.

- **Channel** – The default is 6. The channel selected must match the Access Point (Infrastructure mode) or the other computers (Ad Hoc mode).

- **Transmit Power** – The default is 100 mW. Higher transmit power drains batteries faster.

- **Data Retries** – The number of times a packet is to be resent if the transmission is not successful. The default is 16.

- **Fragment Threshold** – The threshold above which a packet is split up. Only the affected part of a fragmented message must be resent if a problem occurs. However, smaller fragment size slows transmission. The default is 2312.
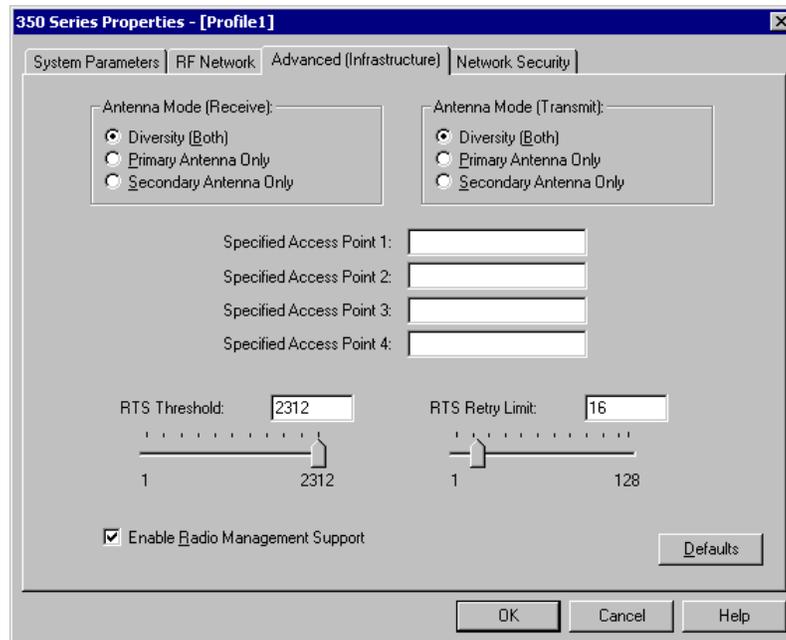
Figure 5-7 Cisco Properties - Advanced (Infrastructure)

Advanced (infrastructure) Tab allows you to set:

- **Antenna Mode (Receive and Transmit)** – The default is Diversity (Both). When this mode is selected, the radio uses the stronger signal from the two antenna ports. If only one antenna port is used, select the appropriate option.

- **Specified Access Point (1-4)** – When an Access Point is specified (by MAC address) the radio attempts to connect with it first. If the specified Access Point is not found, the radio then attempts to connect to any other Access Point. The default is "".

- **RTS Threshold** – The size of data packet for which the low-level RF protocol issues an RTS packet. Smaller packets use more bandwidth, but allow for faster recovery from interference or data collisions. The default is 2312.

- **RTS Retries** – The number of times the radio re-sends the RTS packet if a CTS is not received.   The default is 16.
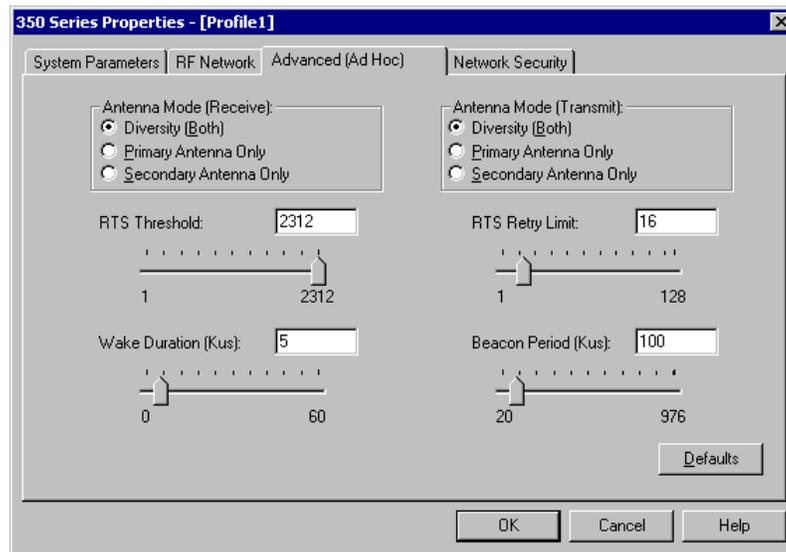
Figure 5-8 Cisco Properties - Advanced (Ad Hoc)

Advanced (Ad Hoc) Tab allows you to set:

- Please see the figure titled "Cisco Properties - Advanced (Infrastructure)" for descriptions of parameters not mentioned below.

- **Wake Duration** – Specifies the amount of time after a beacon that the adapter stays awake to receive a traffic indicator message, which is sent to keep the adapter awake until the next beacon.

- **Beacon Period** – Specifies the duration between beacons, which are used to help clients find each other in Ad Hoc mode.

Encryption
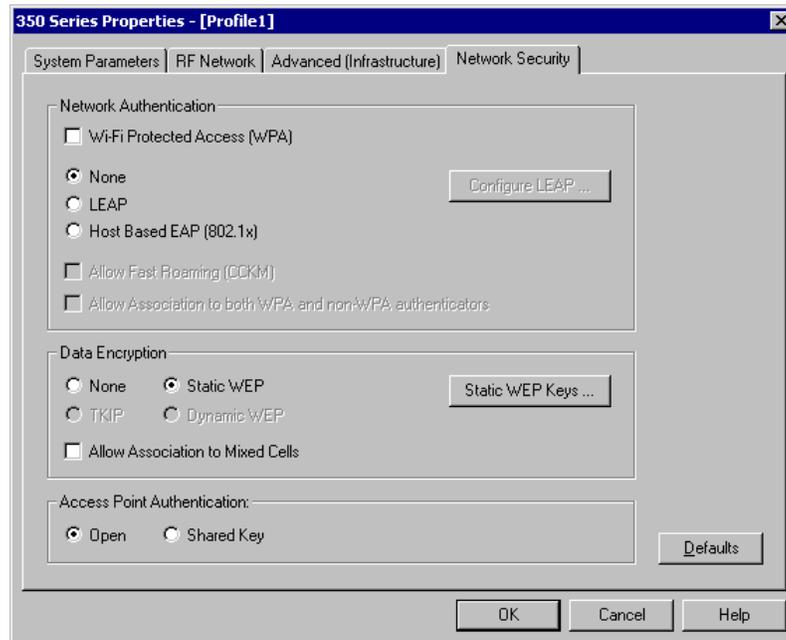
Figure 5-9 Cisco Properties – Network Security

The Network Security Tab allows you to set several security features. First, select the **Network Security Type.** Valid options include:

- Select "None" in the top two boxes for no security.

- Select "None" and check "Static WEP" to use static WEP. Click the **Static WEP Keys…** button to configure the keys.

- Select "LEAP" and click on **Configure LEAP…** to use LEAP.

Static WEP
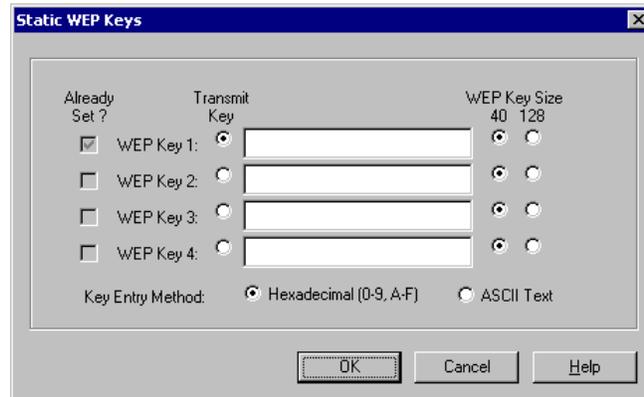
Figure 5-10 Cisco Properties – Static WEP

To enter a static WEP key:

- Select "Hexadecimal" or "ASCII Text".

    ○ Hexadecimal – the WEP key contains hexadecimal characters (0-9, A-F).

    ○ ACII Text – the WEP key contains ASCII text, including alpha characters, numbers and punctuation marks.

- Select 40 or 128 Key size.

    ○ 40 bit keys consist of 10 hexadecimal or 5 ASCII text characters.

    ○ 128 bit keys consist of 26 hexadecimal or 13 ASCII text characters.

- When setting more than one WEP key, the keys must be assigned in the same order on all devices.

- Click on "Transmit Key" to the left of the key used to transmit packets. Only one WEP key can be selected as the transmit key.

- When a WEP Key has been set, the Already Set box is checked and the WEP key is not displayed on screen.

LEAP

To enable LEAP, select LEAP from the Network Security Type Box. Then click the **Configure LEAP…** button. When LEAP is selected, Static WEP is disabled and Dynamic WEP is enabled automatically. The LEAP Settings screen is displayed.
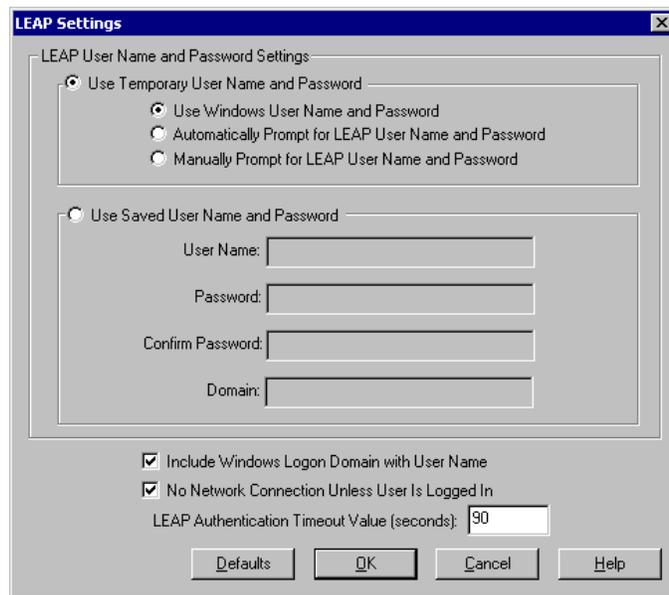
Figure 5-11 Cisco Properties – LEAP Settings

LEAP allows a Temporary or Saved User Name and Password. The Temporary User Name and Password can be set as follows:

- Use the Windows User Name and Password and start authentication automatically.
- Automatically prompt for the User Name and Password and start LEAP authentication automatically.
- Manually start the LEAP authentication process, which prompts for the User Name and Password.

The Saved User Name and Password is set as follows:

- Enter a user name and password.
- Re-enter the password
- Specify a domain name, if desired.

Additional options include:

- **Include Windows Logon Domain with user Name –** Used to pass the Windows login domain along with the user name in an environment with multiple domains.
- **No Network Connection Unless User is Logged In –** Forces the client adapter to disassociate after you log off so another user cannot access the network without entering a user name and password.
- **LEAP Authentication Timeout Value –** The amount of time (in seconds) before a LEAP Authentication is considered failed. An error message is then displayed. The range is 10 to 300 seconds. The default is 90.

Diagnostics

To access the configuration utility, select **Commands|Link Status Meter** or click on the "Link Status Meter" icon.
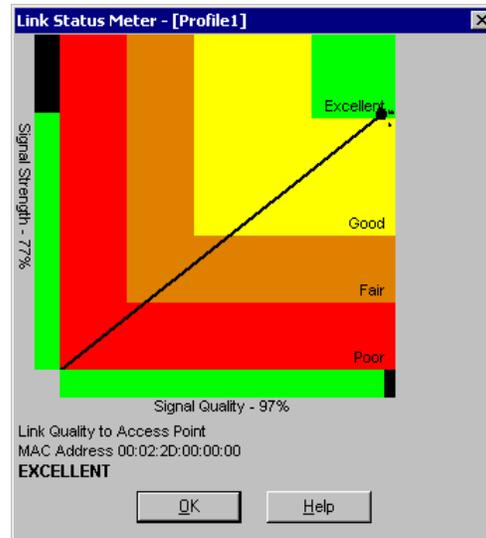
Figure 5-12 Cisco Link Status Meter

The Link Status Meter shows the name of the associated Access Point, if a name has been assigned. The MAC address of the Access Point is also shown.

Scales ranging from 0 to 100% rate both the received signal strength and quality. The meter shows. The Link Quality is based on the strength and quality of the signal:

- Over 75% - Excellent

- Over 40% - Good

- Over 20% - Fair

- Under 20% - Poor

If a problem is suspected, load the Aironet Client Utility as described in the previous section. The "Commands" menu contains several items that may be useful:

- Statistics – Both receive and transmit statistics are displayed

- Status – List values for radio parameters and displays information about the current Link Quality.

- Link Test – Tests the performance of the radio with an Access Point (specified by IP Address).

- Site Survey – Monitors the signal strength, beacons received, link speed and link quality.

Updating Firmware

Cisco firmware can be updated manually or automatically.

- To manually update the radio card's firmware, click on the Load Firmware icon on the main Cisco screen. Browse to the location of the desired firmware.

- To automatically load new firmware when a new radio driver is installed, click on the Preferences icon on the main Cisco screen. Make sure the checkbox for "Automatically load new firmware when NDIS driver is updated" is checked.
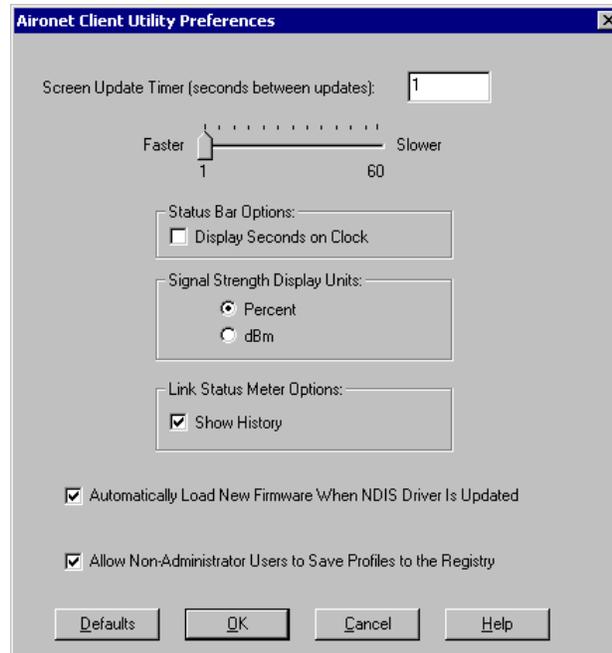

Figure 5-13 Cisco Preferences

Symbol Radio

Configuration

> *Note: For more information on configuring the Symbol radio, click the "?" button available on every Symbol screen.*

Symbol radio configuration screens can be accessed by right clicking (60-key keyboard : press <Ctrl> key then touch the screen or hold the <Ctrl> key down and touch the screen) on the Symbol icon in the Windows system tray.   Select WLAN profiles from the menu to configure the radio.
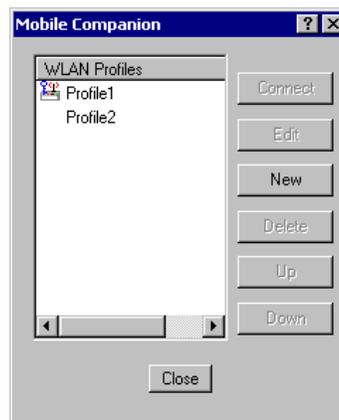
Figure 5-14 Symbol WLAN Profiles

The first screen of the Mobile Companion shows any existing profiles. Profiles can also be edited or deleted. The Up and Down buttons move the highlighted profile up or down in the list. The order of the profiles (as displayed in the list) corresponds to the order in which the profiles are searched if association with the current profile is lost.

Figure 5-15 Symbol Profile – Mode

The Mode screen provides for the entry of the following information:

- The name of the profile

- **ESS ID** – Enter a network card ESS ID in this field. This string can be a maximum of 32 characters and identifies the wireless local area network. The ESS ID of the card is required to match the Access Point ESS ID if the card is to communicate with the access point.

- **Operating Mode** – Select Infrastructure to allow the radio to communicate with an Access Point. Select AdHoc to allow the radio to communicate with other radios in a peer-to-peer network. The default is Infrastructure.

- Use the Country pulldown to select the country of operation. When this is selected, the radio uses the country code information compatible with the country code of the access point. Select worldwide if the radio is used with a non-Symbol (or pre AP-4131 model Symbol access point).
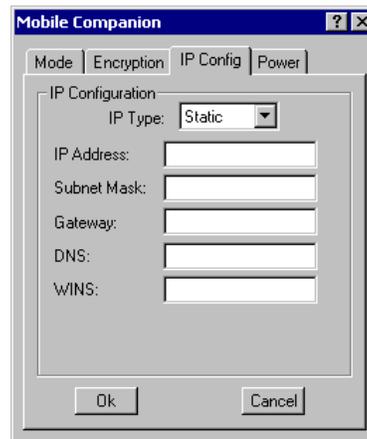
Figure 5-16 Symbol Profile – IP Configuration

Use this screen to select between a dynamically assigned IP address (DHCP) or a static address. If a static IP address is selected the following entries are also available on this screen:

- IP Address

- Subnet Mask

- Gateway

- DNS

- WINS
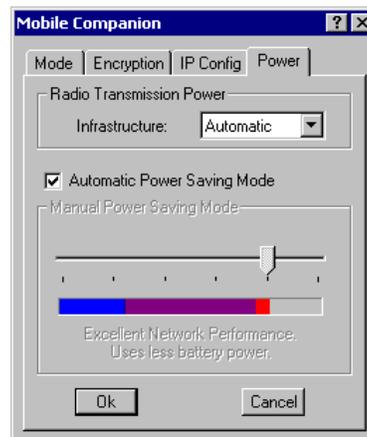
Figure 5-17 Symbol Profile – Power

Use this screen to set the power management properties of the radio card. If automatic power saving mode is not desired, uncheck the checkbox and adjust the sliding scale as desired. The leftmost position uses the least power, but at the expense of network performance. The rightmost position provides the best network performance, but consumes the most power.

Encryption

The Symbol profile contains several choices for data encryption.

Note: *The card and the Access Point are required to use the same encryption to associate and transmit data. If the Access Point is set to Open System and the card is set to 40-bit or 128-bit encryption, no association (and therefore no data transfer) can occur. Likewise no association occurs if the card is set to Open System and the Access Point is set to 40-bit or 128-bit encryption.*

If the Access Point is set to 40-bit and the card is set to 128-bit encryption, the Access Point and card associate, but do not transmit data.

On the Encryption screen, select the desired encryption type:

- **Open System** – Select Open System if no packet encryption is desired. Click the OK button to enable this option.

- **40-bit Shared Key algorithm** – Select 40-bit encryption, enter a 10 hex digit key in the boxes (there are two five-digit boxes per key) and click the OK button to enable 40-bit encryption. Use the Reset Keys button to clear any entered keys.

Figure 5-18 Symbol Profile – 40 bit Encryption

- **128-bit shared Key algorithm** – Select 128-bit encryption, enter a 26 hex digit key in the boxes and click the OK button to enable 128-bit encryption. Use the Reset Keys button to clear any entered keys. The 128-key encryption provides greater security over the 40-key encryption.

Figure 5-19 Symbol Profile – 128 bit Encryption

Up to four keys may be specified for each type of encryption. Selecting the "Adapter will use this key" checkbox for one key deselects all other keys.

The Reset Keys button resets the keys to factory default values.

Note: The hex digits are visible after the key is set. After the key values are set for the network, the digits are replaced with asterisks (*).

If the access point is using a passkey, then the active profile must use one too. The passkey is a plain text representation of the WEP keys, providing an easy way to enter WEP data without remembering the entire WEP key.

Diagnostics

The diagnostics can be accessed by either left clicking the Symbol icon in the Windows system tray or by right clicking and selecting Status from the menu.

Note: The menu also contains a Find WLAN option. This option displays available wireless LANs.
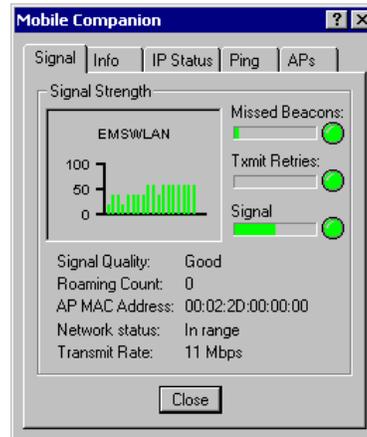
Figure 5-20 Symbol Status – Signal

This screen displays the following information:

- A real time graph of the signal strength

- The missed beacons graph displays the amount of beacons broadcast by the access point missed by the receiver. Missed beacons are represented by a green indicator. If the indicator is red, the association with the access point could be jeopardized by the amount of missed beacons. It may be better to associate with a different access point.

- The transmit retries graph represents the number of data packets retransmitted by the radio. Fewer retries indicate a better signal and this condition is represented by a green indicator.   If the indicator is red, associating with a different access point may reduce the number of retries and improve the signal.
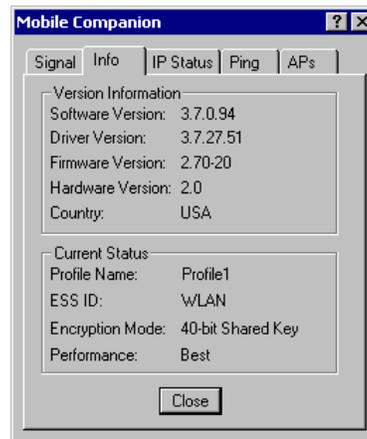
Figure 5-21 Symbol Status – Information

This screen displays information about the adapter. The version information section displays the country and version numbers of the symbol hardware, software and firmware.

The current status section displays information about the profile currently being used.
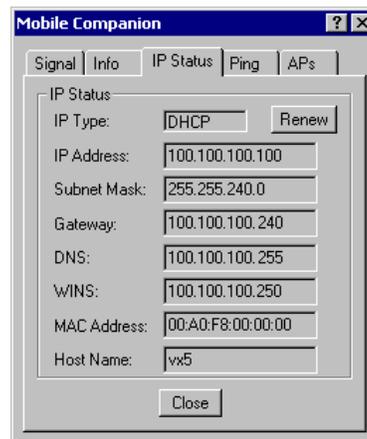
Figure 5-22 Symbol Status – IP Status

This screen displays the IP information for the radio.

Note: This screen is read only and cannot be changed by the user. To change IP settings, use the configuration screen covered earlier in this chapter.
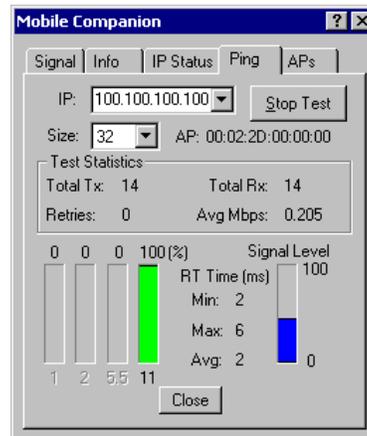
Figure 5-23 Symbol Status – Ping Test

The ping test can be used to test the radio's ability to send and receive packets to another device, such as an access point. To start the test, enter the IP address of the desired network device (or select it from the pull down list) and select the packet size.   Click the **Start Test** button. The statistics section displays the send and receive statistics. The lower part of the screen displays the signal level and the percentage of the data transmitted at the indicated rate (1, 2, 5.5 or 11Mb).

To stop the test, click the **Stop Test** button.
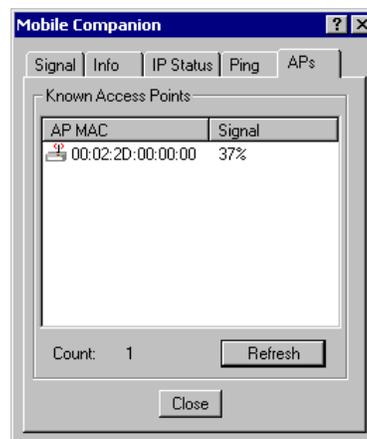
Figure 5-24 Symbol Status – AP's

This screen displays all AP's known to the radio card and their signal strength.

Roaming can be controlled by right clicking on the icon to the left of the MAC address of the AP. After right clicking on the icon, select "Set Mandatory" to prohibit the radio from associating with a different access point. When this option is selected, an M appears above the icon.

Selecting "Set Roaming" allows the radio to associate with any access point with a better signal.

Note: These setting are temporary. They are not saved to the registry.

The available WLAN networks can be displayed by right clicking on the Symbol icon in the Task Bar and selecting Available WLANs from the menu.
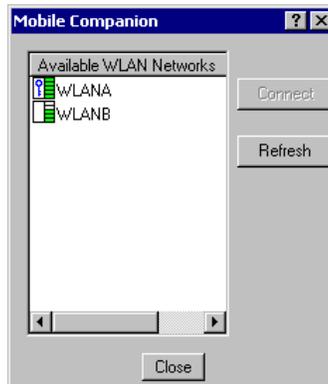
Figure 5-25 Symbol – Available WLANs

The signal strength of the WLAN is indicated from one bar (weakest) to five bars (strongest). Encrypted networks are indicated with a "key" icon.

Updating Firmware

Symbol radio firmware is automatically updated when the Dario driver is updated.
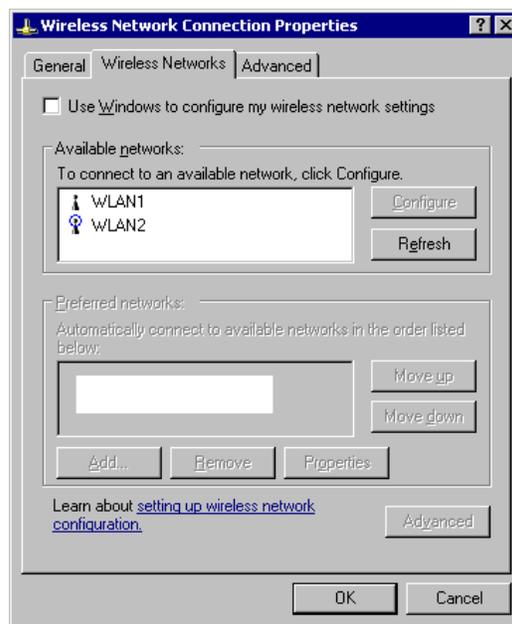
Troubleshooting

When troubleshooting a radio problem, keep in mind that the problem may originate in one or more of the following areas:

- Microsoft Windows network configuration
- Hardware setup and configuration
- Software configuration

Possible areas to check include:

- Review Microsoft Windows on-line help or commercially available reference guides for more information on Windows networking.
- Verify that radio settings match those of the desired Access Point (where appropriate).
- Review the settings in the radio software and use the diagnostics built into the radio software.

Make sure Windows is NOT used to configure wireless network settings. Select the Network Connection icon in the Windows Control panel. Right click on the wireless network icon and select Properties.

Figure 5-26 Windows Wireless Network Properties

Make sure the "Use Windows to configure my wireless network setting" checkbox IS NOT checked.

Chapter 6 Troubleshooting

Problem Determination Tips

Use the tips in this chapter as a guide. They include solutions to the simplest problems as well as things to observe when trying to diagnose more serious problems.

Consider the following:

- If a problem occurs while you're working, stop immediately. If you continue, you may lose data and destroy problem-related information.

- Observe what is happening. Write down what the computer and any optional devices are doing as well as what actions you took immediately before the problem occurred.

- Consider the simplest solution first. Ask yourself logical questions and consider alternatives.

- Is the computer plugged in? Are all the cables attached correctly?

- Which part of the system is operating erratically? Keyboard? Disk/Flash Drive? Barcode Scanner? Radio? Display? Each produces different symptoms.

- What program and/or optional devices are you using?

- What appears on the screen? Do you see any messages or random characters? Look up any messages in the documentation for your software, (e.g. Microsoft Windows, etc.)

- Are any LEDs illuminated? Which ones?

- Do you hear any beeps? How many? Are they long or short?

- Is the computer making any unusual noises?

- See if you can cause the problem to occur again. This may help you understand the source of the problem and will help you describe the problem if you must call for technical assistance.

- Make sure you are operating under the specified environmental conditions discussed in "Appendix C Technical Specifications" and "Chapter 3 Power Supply".

Use the troubleshooting procedures that follow these tips and, if necessary, perform any diagnostic procedures that may apply.

Based on the answers to the previous questions and suggestions, try to narrow the problem down to one of the following areas:

- Startup Problems
- Hardware Problems - (i.e. power source, keyboard, display, hard drive, PCMCIA cards, optional devices, etc.)
- Radio Problems
- Software Related problems
- Memory

The following sections provide more detailed troubleshooting information about each of these areas.

Startup Problems

This section lists some of the configuration error messages that may appear at system startup and their possible solutions.

Note: If you press the power switch and the VX5 remains off, refer to the "Power Source" section of this chapter.

Problem	Solution
VX5 computer stops working and locks up each time you start it.	There may be a problem with a Microsoft Windows driver. To recover from this error, follow the steps in the "Bypassing Microsoft Windows Startup" section of this chapter.
The VX5 displays the "Non-System disk or disk error" message.	Make sure the VX5 is booting from the proper drive. To recover from this error, follow the steps in the "Verifying Boot Order" section of this chapter.
The VX5 displays either "CMOS time and date not set" or "Real time clock failure" messages.	There may be a problem with the CMOS battery. Follow the steps in the "Setting System Time and Date" section of this chapter.

Bypassing Microsoft Windows Startup

When using a Microsoft Windows operating system, you may want to bypass the configuration files or load Windows with a minimum number of drivers. The Windows Start Up Menu Allows several choices that aid in diagnosing a problem. To access the start-up menu:

1. Turn on the VX5.

2. Press and hold the <F5> key.

3. When the Windows Start Up Menu appears, select the desired choice:

    1. Normal
    2. Logged (\BOOTLOG.TXT)
    3. Safe mode
    4. Step-by-step confirmation
    5   Command prompt only
    6. Safe mode command prompt only

When you choose Safe Mode, you may notice differences in the way your system behaves. For instance, some device drivers are not loaded, the display resolution may be changed and system prompts and path have default values.

Step by step confirmation allows you to process or skip individual line items in your start up files.

Please refer to Microsoft Windows on line help or commercially available Windows guides for more information on operating Windows in safe mode and performing diagnostic and troubleshooting routines.

Verifying Boot Order

1. During bootup, the <F2> key may be pressed to enter BIOS Setup. Turn on the VX5. Press <F2> immediately.

2. The BIOS Setup Main Menu is displayed. Move the highlight to the Boot Menu.

3. Select "Boot Device Priority" by pressing the <Down Arrow> to highlight it.

4. Verify that the desired drive is listed first. In most cases this will be "Hard Drive".

5. If more than one drive is listed under "Hard Drive" verify the desired drive is listed first.

6. Any device listed with a "!" in front of the name will NOT be searched for a boot record.

7. Use the <+> key to move an item up in the boot order and the <-> key to move an item down the list. Press <SHIFT> + <2nd> + <1> to enable or disable a device on the search list.

If the error continues you may need to reformat the C: drive and restore the system from backup.

Setting System Time and Date

1. If the VX5 is not already powered up, turn it on.

2. During bootup the <F2> key may be pressed to enter BIOS Setup. Press <F2> immediately.

3. At the BIOS Setup Main Menu, move the highlight to the Time parameter.

4. Type the desired entry and then press the <Tab> key to move from hours to minutes to seconds. The colons are automatically added by the system.

5. Press the <Down Arrow> to move to the Date parameter.

6. Type the desired entry and then press the <Tab> key to move from month to day to year. The backslashes are automatically added by the system.

7. Press <Esc> until you reach the Exit menu.

8. Select "Save and Exit" to save the changes. Press <Enter>.

If the VX5 does not automatically reboot, turn the VX5 off and then on again.

Hardware Problems

This section lists possible solutions to some common problems with hardware.

Power Source

The VX5 receives power from either an AC-DC adapter or a vehicle battery. Power source problems are usually interrelated. For example, a malfunctioning AC-DC adapter or vehicle battery will not power the computer.

ATTENTION
Using the wrong AC adapter or DC converter could damage the VX5. LXE assumes no liability for damage to the VX5 or adapter/converter caused by using the wrong adapter/converter.

The following table provides solutions to common power source problems:

Problem	Solution
The computer won't start.	Make sure you've attached the power cord properly and that you have the power switch in the On position.
	Make sure the wall outlet (for AC-DC adapter) is working or the vehicle battery is charged.
	Check fuse and replace if blown.
	Make sure the vehicle battery is connected properly to the VX5 power cable.

If you cannot find the source of the problem, consult LXE. Please refer to "Contacting LXE."

Keyboard

The following table provides solution to common keyboard problems:

Problem	Solution
Get an unexpected character or function when pressing some keys.	Reboot the machine to return to its original setting. If the problem continues refer to the key map found in Appendix A "Key Maps" for correct key combinations.
The <2nd> key on the keyboard remains active and does not toggle on and off when another key is pressed.	Press the <SP> key or an arrow key to release the <2nd> state. If the problem continues, contact LXE Customer Support department. *Note: The 95-key keyboard does not have 2nd key functionality.*
The keyboard locked and you cannot use <Ctrl> + <Alt> + <Del> to reboot.	Flip the power switch off and then on to restart the computer.

Display

Problem	Solution
The display is unreadable.	Verify the Display setting in the Microsoft Windows Control panel. The display settings should be set to High Color (16 bit) and 800 by 600 pixel resolution. *Note: It may be necessary to reboot in Safe Mode to change the display settings if the screen is unreadable. See "Bypassing Microsoft Windows Startup" earlier in this chapter.*

Hard Disk Drive

If you have problems with the hard disk drive, run the Microsoft Windows scandisk utility. This utility analyzes the directories, files and File Allocation Tables (FAT).

Windows 2000/XP path: **My Computer | Local Disk | Properties | Tools | Error checking** then click the Check now button. If the scandisk utility does not report any errors and the hard disk still has problems, contact LXE Technical Support.

For information on running the scandisk utility, refer to the Windows help files.

PCMCIA Cards

Problem	Solution
You are having trouble accessing data on a PCMCIA card or some of the data appears to be missing.	Run the scandisk utility, which analyzes the directories, files and the File Allocation Table (FAT) on the card.
The scandisk utility reports no errors and you're still experiencing problems.	Can you access the PCMCIA card? Try to view the contents of the folders. If the folder doesn't display all the files stored in the folder, recovering data is unlikely.
Data files are damaged or corrupted.	Refer to your software documentation for file recovery procedures. Many software packages automatically create backup files or restore points.

Memory Conflicts

Microsoft Windows controls memory management. If you experience a problem with memory management, please refer to Windows help files or a commercially available Windows guide. If a particular program causes the memory error, refer to the documentation for that program.

IRQ Assignments

The VX5 has 16 IRQs, numbered 0 through 15, many of which are already assigned as follows:

IRQs	Device(s) Windows 2000	Device(s) Windows XP
IRQ0	Timer Output	Timer Output
IRQ1	Keyboard	Keyboard
IRQ2	Programmable Interrupt Controller	Programmable Interrupt Controller
IRQ3 [8]	Serial Port COM2	Serial Port COM2
IRQ4 [8]	Serial Port COM1	Serial Port COM1
IRQ5	Not Used	Not Used
IRQ6	Not Used	Not Used
IRQ7 [9]	Cisco Radio Card	Symbol Radio Card
IRQ8	Real Time Clock	Real Time Clock
IRQ9	PCI to USB Controller	PCI to USB Controller Cisco Radio Card
IRQ10	Reserved (default PC Card events)	Reserved (default PC Card events)
IRQ11	PCMCIA controller Symbol Radio Card	PCMCIA controller
IRQ12	Not Used	Not used
IRQ13	Numeric data processor	Numeric data processor
IRQ14	Primary IDE Controller	Primary IDE Controller
IRQ15	Not used	Secondary IDE Controller

Note: Please note that the IRQ assignments may change if additional hardware is added.

If additional hardware is added and no IRQs are available, it may be necessary to disable certain devices in the BIOS to free up IRQs for the new hardware.

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[8]   Device may be disabled in BIOS or Windows freeing up the IRQ for other devices.
[9]   When the parallel port is disabled, IRQ7 is available for the radio. The parallel port is disabled on the VX5 by default. However, some radios may use IRQ9 instead of IRQ7.

Optional Devices

This section provides information on solving problems related to optional devices.

Note: *Make sure the VX5 is powered on before you turn on any powered optional devices.*

To help determine which device is causing the problem:

- Check that all connecting cables are correctly and firmly attached. Loose cables can cause erroneous or intermittent signals. You may need to inspect connecting cables for loose wires, and check connectors for loose pins.

- Isolate the problem. Look in the Microsoft Windows Control panel System icon for devices displaying a "?" or an "!". Check the properties for these devices or delete these devices and reinstall them.

- Device Configuration. The smooth operation of the system depends on the interaction of all devices, programs and features. Is the device Plug and Play or is configuration necessary?

- Device driver. Make sure the correct driver is installed for the device, based on the version of Microsoft Windows operating system you are using. Check the documentation for the device or the device manufacturer's website for an updated driver.

For information adding or deleting devices or updating drivers, please refer to Windows Help screens or commercially available Windows guides.

The following table provides some solutions to common configuration problems:

Problem	Solution
You connected a device and the device isn't operating properly.	Verify Microsoft Windows recognizes the device by checking the System icon in the Control Panel. Check for a problem with the device driver or a hardware conflict.
You connected an external device and the computer isn't operating properly.	Check all cables and connectors. Try a different cable. If the VX5 was on when the device was attached, reboot the VX5.

Radio and Network Problems

2.4 GHz Wireless Network

Wireless radio and network problems may be divided into two general categories:

- Microsoft Windows networking problems
- Configuration of radio card/network

All VX5 radios include utilities to aid in diagnosing transmission problems. Please refer to Chapter 5, "RF Network Configuration" for details on using the diagnostic features.   Chapter 5 also includes a "Troubleshooting" section. Please review the information there if experiencing troubles with the 2.4 GHz network.

Note: Make sure Windows is NOT used to configure wireless network settings. Instructions can be found in the "Troubleshooting" section of Chapter 5, "RF Network Configuration".

If you are experiencing a Microsoft Windows networking problem, please refer to Windows on-line help or commercially available Windows networking guides for more information.

Ethernet Connection

Verify the network cable connections.   If problems persist, please refer to Microsoft Windows on-line help or commercially available Windows networking guides for more information.

Software Related Problems

Consider the following:

- If an error message appears while you are using a software package, check the software documentation first. It usually includes a troubleshooting section or summary of error messages. If you cannot find the error message in the software documentation, look for the message in the Microsoft Windows Help.

- Some software may be incompatible with other software already installed. If the problem continues, contact the manufacturer of the software program.

- Make sure the software is compatible with the Microsoft Windows version you are using.

- Be sure you have enough memory and hard disk space to meet the software requirements.

Determining Software Revision

The Gnumber of the LXE loaded Windows image on the VX5 can be read in the system registry Use the Microsoft Registry Editor (REGEDIT.EXE) and browse to the following key:

    HKEY_LOCAL_MACHINE\SOFTWARE\LXE\VX5

The value for VX5GNUM is the Gnumber of the LXE loaded Windows image.

Caution	Incorrectly editing the registry may severely damage your system. You should back up any valued data on the computer before making changes to the registry. LXE recommends only qualified personnel make registry changes.

System Testing

Power On Self Test (POST)

Each time the computer is turned on (or is rebooted using <Ctrl> + <Alt> + <Del>), a series of comprehensive hardware tests are performed. These tests are called the Power On Self Test, or POST. The POST exercises the following hardware components:

- CPU flags and registers
- DRAM
- Cache RAM
- DMA
- Timers
- Interrupts
- Extended/expanded memory
- Video memory and controller
- Keyboard controller

POST Error Messages

The following table lists the POST error messages for the VX5. If problems persist, contact LXE's Customer Support.

0200 Failure Fixed Disk

Possible Cause
The fixed disk is not properly identified in BIOS.

Action
Run Setup. Choose "Auto" or enter the correct user parameters for the disk drive.

0210 Stuck Key

Possible Cause
A key is stuck on the keyboard.

Action
Turn the power off, and then back on again. If the problem persists, try a different keyboard or contact LXE's Customer Support.

0211 Keyboard Error

Possible Cause
Keyboard is not working.

Action
Check keyboard connection. Test with another keyboard. Keyboard or cable may be faulty.

0212 Keyboard Controller Failed

Action
Contact LXE's Customer Support.

0213 Keyboard locked – Unlock key switch

Action
Contact LXE's Customer Support.

0220 Monitor type does not match CMOS

Action
Run Setup and verify monitor settings.

0230 Shadow RAM Failed at offset: nnnn

Action
Contact LXE's Customer Support.

0231 System RAM Failed at offset: nnnn

Action
Contact LXE's Customer Support.

0250 System battery is dead – Replace and run Setup

Action
Contact LXE's Customer Support for CMOS battery replacement.

0251 System CMOS checksum bad – Default Configuration Used

Action
CMOS has been corrupted. The VX5 is loading with default settings. Run Setup to modify values.

0260 System timer error

Action
Contact LXE's Customer Support.

0270 Real time clock error

Action
Contact LXE's Customer Support.

0280 Previous boot incomplete – Default configuration used

Action
The default BIOS values will be loaded. Run setup to change the values.

0281 Memory Size found by POST differed from CMOS

Action
Run BIOS Setup utility.

02B0/02B1 Diskette Drive A/B error

Possible Cause
Diskette drive is present but does not match BIOS setting.

Action
Check connections and run BIOS Setup.

02B2/02B3 Incorrect Drive A/B type – Run Setup

Action
Run the BIOS Setup utility.

02D0 System cache error – Cache disabled

Action
Contact LXE's Customer Support.

02F0 CPU ID:

Possible Cause
Contact LXE's Customer Support.

02F4 EISA CMOS not writeable

Possible Cause
Cannot write BIOS to CMOS.

Action
Contact LXE's Customer Support.

02F5 DMA Test Failed

Possible Cause
Cannot write to DMA (Direct Memory Access) registers..

Action
Contact LXE's Customer Support.

02F6 Software NMI failed

Possible Cause
Cannot generate software NMI (Non-Maskable Interrupt).

Action
Contact LXE's Customer Support.

02F7 Fail-Safe Timer NMI Failed

Possible Cause
Server BIOS2 test error: Fail-safe timer takes too long.

Action
Contact LXE's Customer Support.

POST Informational Messages

The following table lists the POST informational messages for the VX5.

Message	Meaning
nnn kB System RAM Passed	The amount of base memory that tested successfully.
nnn kB Extended RAM Passed	The amount of extended memory that tested successfully.
nnn kB Cache/Shadow RAM Passed	The amount of system cache or shadow RAM tested successfully.
UMB upper limit segment address: nnn	Displays the address of the limit of Upper Memory Blocks.
Video BIOS shadowed	The video BIOS has successfully been copied to shadow RAM.
System BIOS shadowed	The system BIOS has successfully been copied to shadow RAM.
Fixed Disk n	Fixed disk n (0 – 3) identified.
Press the <F1> key to continue	This message indicates that an error was found during POST. Pressing the <F1> key allows the system to attempt to boot.
Press <F2> to enter Setup	Optional prompt displayed during POST. If the message is suppressed, pressing <F2> still enters Setup.
Entering SETUP….	Starting the Setup program.

If You Need Further Assistance

If you have followed these recommendations and are still having problems, you may need additional technical assistance. This section contains the steps to take as you prepare to ask for help.

Before You Call

Since some problems you experience may be related to the operating system or software, it is important to investigate other sources of assistance first. Try the following before contacting LXE.

- Review the troubleshooting information in commercially available Microsoft Windows documentation.

- If the problem occurs while running software applications loaded after your purchase of the VX5, consult the software documentation for troubleshooting suggestions. Contact the software company's technical support department for assistance.

If you still need assistance refer to "Contacting LXE".

Appendix A Key Maps

95-key Keypad with Pointing Device
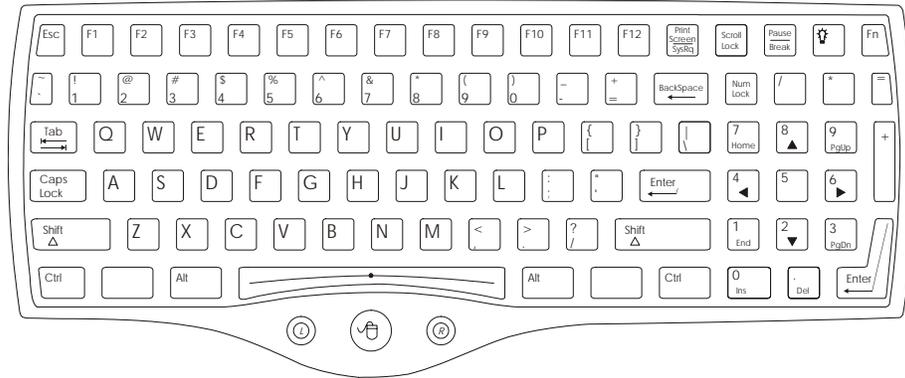
Figure A-1 95-Key VMT QWERTY Keyboard

The key map table that follows lists the commands used for the VX5. Note that since the VX5 uses a Microsoft Windows operating system, no DOS Terminal Emulation keypress sequences are provided.

Key Map 101-Key Equivalencies

There are ten hidden keys on the 95-key keyboard. Each of these hidden keys is accessed by pressing the <Fn> key plus another key.

To get this key	Press These Keys and Then
Insert	Fn + 0 on the number pad
Home	Fn + 7 on the number pad
Page Up	Fn + 9 on the number pad
Delete	Fn + . on the number pad
End	Fn + 1 on the number pad
Page Down	Fn + 3 on the number pad
Up Arrow	Fn + 8 on the number pad
Left Arrow	Fn + 4 on the number pad
Down Arrow	Fn + 2 on the number pad
Right Arrow	Fn + 6 on the number pad

Note: The 95-key keyboard does not have a 2nd key function.

60-key Standard Keypad
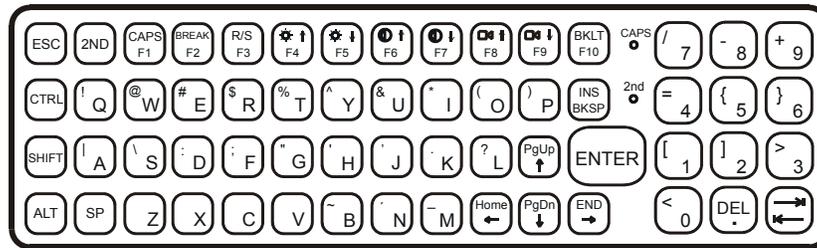
Figure A-2 60-Key VMT QWERTY Keyboard

The key map table that follows lists the commands used when running LXE's VX5.

The "VX5 User's Guide" contains connection and vehicle mounting instructions for the VMT keyboard.

Key Map 101-Key Equivalencies

When using a sequence of keys that includes the 2nd key, press the 2nd key first then the rest of the key sequence.

Note: *The VMT keyboard does not have a NumLock indicator. NumLock is enabled by default in BIOS. NumLock may be toggled On or Off using the <2nd> <SHIFT> <F10> keypress sequence. To change NumLock status at boot, it is necessary to access the BIOS. Please refer to "BIOS Setup" in Chapter 4, "System Configuration". When NumLock is off, only the numeric 0 through 9 and DOT keys are affected. All other keymaps are unchanged.*

When the computer boots with a VMT keyboard, the default condition of Caps (or CapsLock) is Off. The Caps (or CapsLock) condition can be set toggled with a <2nd>+<F1> key sequence. The CAPS LED on the VMT keyboard is illuminated when CapsLock is On.

To get this key	Press These Keys and Then					Press this key
	2nd	Shift	Ctrl	Alt	CapsLock	
Increase Brightness [10]	x					F4
Decrease Brightness [10]	x					F5
Increase Contrast [11]	x					F6
Decrease Contrast [11]	x					F7
Increase Volume [12]	x					F8
Decrease Volume [12]	x					F9
Keyboard Backlight [13]	x		x			F10
Suspend/Resume [14]	x					F3
2nd						2nd
Shift						Shift
Alt						Alt
Ctrl						Ctrl
Esc						Esc
Space						Sp
Enter						Enter
Enter (numeric)	x					Enter
CapsLock (Toggle)	x					F1
Back Space						Ins/BkSp
Tab						Tab

---

[10]   The Brightness Adjustment keys have no function. Brightness is adjusted via the buttons on the VX5 control panel.

[11]   The Contrast Adjustment keys have no function because the VX5 is equipped with a TFT display that has no provision for these adjustments.

[12]   The Volume Control keys have no function as the volume control is adjusted via the Windows System Tray Volume icon.

[13]   The Keyboard Backlight key is used in <2nd> + <CTRL> + <F10> key sequence. Refer to "VMT Keyboard Backlighting" in Chapter 4, "System Configuration".

[14]   The Suspend/Resume key has no function as Windows Power Management controls all power management modes on the VX5.

To get this key	Press These Keys and Then					Press this key
	2nd	Shift	Ctrl	Alt	CapsLock	
BackTab	x					Tab
Ctrl-Break [15]	x		x			F2
Pause	x					F2
Up Arrow						Up Arrow
Down Arrow						Down Arrow
Right Arrow						Right Arrow
Left Arrow						Left Arrow
Insert	x					Ins/BkSp
Delete (numeric)	x					DOT
Home	x					Left Arrow
End	x					Right Arrow
Page Up	x					Up Arrow
Page Down	x					Down Arrow
Right Shift	x	x				F7
Right Alt	x	x				F8
Right Ctrl	x	x				F9
ScrollLock	x	x				F4
NumLock	x	x				F10
F1						F1
F2						F2
F3						F3
F4						F4
F5						F5
F6						F6
F7						F7
F8						F8
F9						F9
F10						F10
F11	x	x				F1
F12	x	x				F2
a						A
b						B
c						C
d						D
e						E
F						F
g						G
h						H

---

[15] Press <Ctrl> then <2nd> then <F2> to produce Ctrl-Break.

To get this key	Press These Keys and Then					Press this key
	2nd	Shift	Ctrl	Alt	CapsLock	
i						I
j						J
k						K
l						L
m						M
n						N
o						O
p						P
q						Q
r						R
s						S
t						T
u						U
v						V
w						W
x						X
y						Y
z						Z
A					x	A
B					x	B
C					x	C
D					x	D
E					x	E
F					x	F
G					x	G
H					x	H
I					x	I
J					x	J
K					x	K
L					x	L
M					x	M
N					x	N
O					x	O
P					x	P
Q					x	Q
R					x	R
S					x	S
T					x	T
U					x	U
V					x	V

To get this key	Press These Keys and Then					Press this key
	2nd	Shift	Ctrl	Alt	CapsLock	
W					x	W
X					x	X
Y					x	Y
Z					x	Z
1 (alpha)	x	x				1
2 (alpha)	x	x				2
3 (alpha)	x	x				3
4 (alpha)	x	x				4
5 (alpha)	x	x				5
6 (alpha)	x	x				6
7 (alpha)	x	x				7
8 (alpha)	x	x				8
9 (alpha)	x	x				9
0 (alpha)	x	x				0
DOT (alpha)	x					K
1 (numeric)						1
2 (numeric)						2
3 (numeric)						3
4 (numeric)						4
5 (numeric)						5
6 (numeric)						6
7 (numeric)						7
8 (numeric)						8
9 (numeric)						9
0 (numeric)						0
DOT (numeric)						DOT
<	x					0
[	x					1
]	x					2
>	x					3
=	x					4
{	x					5
}	x					6
/ (numeric)	x		x			7
/ (alpha)	x					7
- (numeric)	x		x			8
- (alpha)	x					8
+ (numeric)	x		x			9
+ (alpha)	x					9
* (numeric)	x					I

To get this key	Press These Keys and Then					Press this key
	2nd	Shift	Ctrl	Alt	CapsLock	
* (alpha)	x		x			I
: (colon)	x					D
; (semicolon)	x					F
?	x					L
`	x					N
_ (underscore)	x					M
, (comma)	x					J
' (apostrophe)	x					H
~ (tilde)	x					B
\	x					S
|	x					A
"	x					G
!	x					Q
@	x					W
#	x					E
$	x					R
%	x					T
^	x					Y
&	x					U
(	x					O
)	x					P

Appendix B Technical Specifications

Physical Specifications

Features		Specification	Comments
CPU		933MHz PIII	
Memory	BIOS Flash	1 MB BIOS Flash	
	RAM	256 or 512MB SDRAM	
Display	Controller	SVGA compatible controller	
	Type	TFT	
Mass Storage	Rotating	40 GB	Drive C:
	Compact Flash	2 GB	
	PCMCIA	2 GB	
PCMCIA/CardBus Interface		Two (2) CardBus Slots: Accepts Type I, II and III PCMCIA cards.	Compatible with the PCMCIA version 2.1 standard.
External Connectors/ Interfaces		Two (2) external RS-232C serial ports: COM1 and COM2 Two (1) Type A USB Port One (1) Ethernet Port	9-pin "D" (male) connectors Internal and via adapter cable RJ-45 via adapter cable
Power Connector		12-80V DC input power	5-pin connector
Power Switch		Sealed power switch	
Beeper		Minimum loudness greater than 95dBm at 10 cm in front of unit	
Dimensions		Length: 12.2 in (30.98 cm) Width: 9.5 in (24.13 cm) Depth: 4.3 in (10.92 cm)	
Battery for CMOS		Internal lithium Battery	

Features		Specification	Comments
External Power Supply	AC Adapter	120-240VAC to 12VDC	

Environmental Specifications

The VX5 will withstand the following environmental characteristics and has been tested in accordance with applicable sections of MIL-STD-810E.

Feature	Specification
Altitude	Operational to 10,000 ft. (3048 meters)
Operating Temperature	Standard w/rotating drives: 5 °C to +45 °C (41 °F to +113 °F) Standard w/non-rotating drives: 0 °C to +45 °C (32 °F to +113 °F) Extended temperature option: -20 °C to +50 °C (-4 °F to +122 °F)
Storage Temperature	Standard version: -10°C to +70 °C (14 °F to +158 °F) Extended temperature version: -25 °C to +70 °C (-13 °F to +158 °F)
Water, Sand and Dust	IP66 per IEC60529
Humidity	10-90% Non-condensing at 40°C (104°F)
Vibration	Bounce loose cargo for 0.5 hour duration. Common carrier transportation, transit face.
ESD	15 kV
Shock	75G, 5msec duration, 100 shock impacts

Display Specifications

Characteristic		Specification
Type	TFT	SVGA
Resolution		800 X 600 pixels (25 lines x 80 characters)
Cell Size		8 x 16 pixels (8 x 8 also supported – 25 lines x 80 chars)
Dot Dimensions		.30mm x .30mm
Display Dimensions		260mm x 121.7mm x 15mm
Viewing Area		165mm x 124mm (6.5" x 4.88")
Active Display Area		211.17mm x 79.17mm (8.31" x 3.12")

UPS Battery Pack Specifications

Feature	Specification
Altitude	Operational to 10,000 ft. (3048 meters)
Operating Temperature	-30 °C to +50 °C (-22 °F to +122 °F)
Storage Temperature	-40 °C to +70 °C (-40 °F to +158 °F)
Water, Sand and Dust	IP66 per IEC60529
Humidity	10-90% Non-condensing at 40°C (104°F)
Vibration	Bounce loose cargo for 0.5 hour duration. Common carrier transportation, transit face.
ESD	15 kV

Radio Specifications

PCMCIA Cisco 2.4GHz Type II

Bus Interface:	PCMCIA 2.0, Type II slot
Radio Frequencies:	2.4 - 2.4835 GHz IEEE 802.11b DS SS
RF Data Rates:	11 Mbps
RF Power Level:	100 mW
Channels	11 US, 13 Europe, 4 France, 1 Japan
Operating Temperature	see VX5 Environmental Specs
Storage Temperature	see VX5 Environmental Specs
Connectivity:	Novell, TCP/IP, Ethernet, ODI

PCMCIA Symbol 11Mb 2.4GHz Type II

Bus Interface:	PCMCIA 2.0, Type II slot
Radio Frequencies:	2.4 - 2.5 GHz IEEE 802.11b DS SS
RF Data Rates:	11 Mbps maximum
RF Power Level:	100 mW
Channels	11 US, 13 Europe, 4 France, 1 Japan
Operating Temperature	see VX5 Environmental Specs
Storage Temperature	see VX5 Environmental Specs
Connectivity:	Novell, TCP/IP, Ethernet, ODI

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