VX1 Reference Guide

LXE®
An EMS Technologies Company

Notices

Revision Notice

VX1 Reference Guide
Upgrade From Revision E to Revision F

Section	Explanation
Entire Manual	Replaced all references to Appendix E, PCMCIA Card Management with references to "PCMCIA Card Management and LXE DOS Computers". Replaced all references to Appendix B, API with references to "LXE DOS API Programming Guide".
Chapter 1 – Introduction	Revised "Terminal Emulation Screen Sizes" and "Manuals" sections.
Chapter 2 – Physical Description and Layout	Revised pinouts for Scanner Serial Connector (COM1) and Printer/PC Serial Connector (COM2). Revised "Install the 2.4GHz Type II PCMCIA Radio" and "Connect Antenna" sections.
Chapter 4 – System Configuration	Revised Symbol Radio Encryption information. Revised pertinent sections relating to the updated Datalight DOS Stack Release in November 2003. Added "API Calls" section.
Chapter 5 – Commands	Revised "ROM-DOS 6.22 Command Summary" section.
Appendix B – VX1 API	Removed. This information is now contained in the "LXE DOS API Programming Guide".
Appendix C – Technical Specifications	Renamed to Appendix B, Technical Specifications.
Appendix D – Utilities	Renamed to Appendix C, Utilities. Removed "International Language Support" section.
Appendix E – PCMCIA Card Management	Removed. This information is now contained in "PCMCIA Card Management and LXE DOS Computers".

Table of Contents

Illustrations

Chapter 1 Introduction

Overview

The VX1 Vehicle Mount Computer (VMT or VMC) is a rugged, vehicle mounted, DOS based PC (Personal Computer) capable of wireless data communications from a fork-lift truck or any properly configured vehicle. The unit uses a PCMCIA radio (spread spectrum 900MHz or 2.4GHz) for wireless data communications.

The VX1 is a DOS compatible tablet-style computer providing the power and functionality of a desktop computer in a vehicle mounted unit. The unit has a 486 25MHz CPU and 8MB of Flash memory. It is designed to run applications such as LXE's Terminal Emulator applications (ANSI Plus, LDS Plus, IBM DOS 3270, IBM DOS 5250, TN3270 and TN5250).

The "VX1 Installation and Operator's Guide" is directed toward the VX1 operator. 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 VX1 DOS TE computer, 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 VX1, 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 VX1.

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

Chapter 4 "System Configuration" takes you through the BIOS Setup, VX1 file structure, and setting configuration parameters using BAT, CFG and INI files.

Chapter 5 "Commands" explains the functions of ROM-DOS files loaded on the VX1.

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 different keypads.

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

Appendix C "Utilities" explains the function of VX1-specific utilities.

Document Conventions

This reference guide uses the following document conventions:

Convention	Meaning
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 manual 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.
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 operator'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 a imminent hazardous situation which, if not avoided, will result in death or serious injury.

Quick Start

Instructions for installing the Mounting Bracket in a vehicle are contained in the VX1 Installation and Operator's Guide. 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 barcode scanner) and a power source.

In general, the sequence of events is:

1. Install Mounting Bracket on vehicle.

2. Secure VX1 in Mounting Bracket Assembly.

3. Connect vehicle power source to VX1 power cable.

4. Connect power cable to the VX1.

5. Install accessories on VX1, e.g. scanner, antenna.

6. Secure cables to the VX1 with strain relief cable clamps.

7. Turn VX1 on.

The VX1 should be mounted in an area in the vehicle where it:

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

- Will be protected from rain or inclement weather.

- Will be protected from extremely high concentrations of dust or wind-blown debris.

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

Components

1   Antenna Connector

2   PC Card Slot

3   Speaker/Beeper

4   CAPS Lock
    Indicator

5   2nd Indicator

6   Status Indicator

7   COM1/SCANNER
    Connector

8   COM2 Connector

9   Power Connector

10 Fuse

11 Power Switch
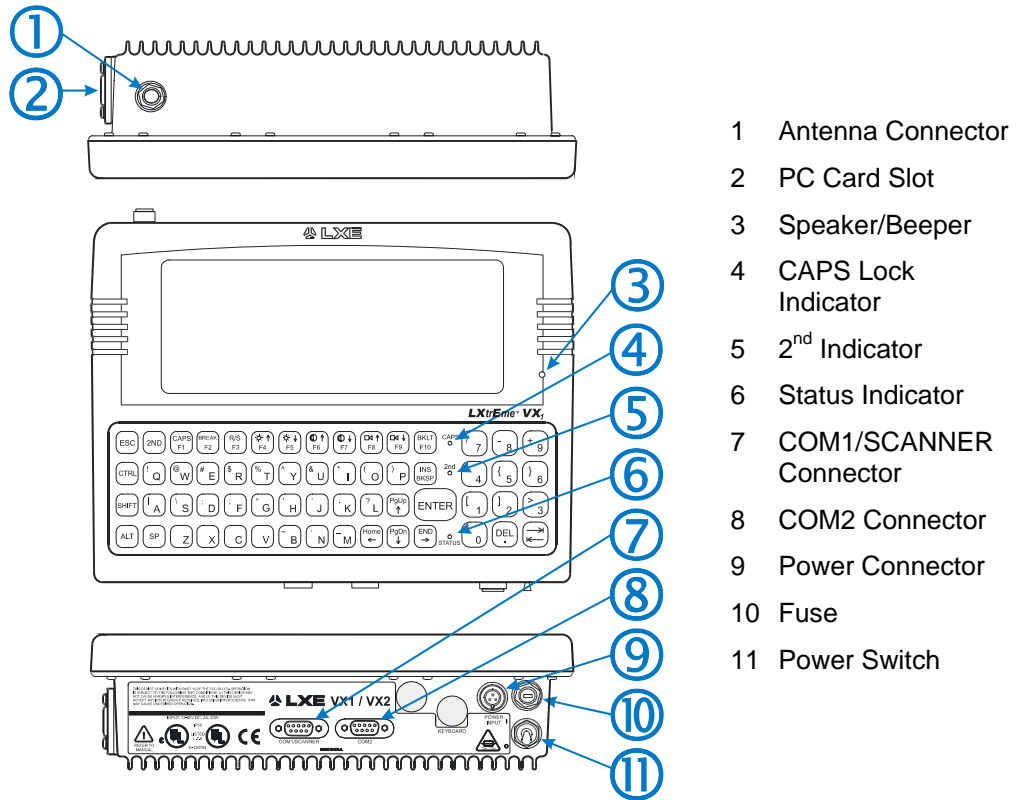
Figure 1-1 VX1 Components

Note: *Some VX1's may be equipped with a Diversity (Dual) Antenna option. These VX1's have*
            two antenna connectors located on the top of the VX1.

Data Entry

You can enter data into the VX1 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, and the keyboard provides manual entry.

Keyboard Data Entry

Once the terminal emulation program is started, data can be entered with the VX1 keyboard. Keyboard data can be entered into a data field and transmitted to the host. You might respond to a prompt sent by the host application with a keyboard entry, such as a menu listing choices for your next action.

Barcode Data Entry

The VX1 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. The serial port parameters may need to be changed (using the terminal emulation's configuration utility) to match the parameters of the scanner. COM port 1 is designed to be used with a hand held barcode scanner.

> The COM port must be set up to accept input from a barcode scanner using BIOS Setup. Refer to Chapter 4, "System Configuration" section titled "BIOS Setup" for instruction.

RS-232 Data Entry

The VX1 accepts input from an RS-232 device connected to either RS-232 port, COM1 or COM2. The VX1 processes data from the RS-232 port the same way it processes keyed data. 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.

Terminal Emulation

All terminal emulation radio controlled data flows and exchanges are over the radio to the base station or access point, then to the computer network and then to a host computer. The LXE Network Management System, as part of the 62XX wired network, can remotely configure the VX1's terminal emulation parameters.

- VX1's with 900MHz spread spectrum radios communicate only with 62XX Base Stations with installed 900MHz radios.
- VX1's with 2.4GHz spread spectrum radios communicate only with Access Points with installed 2.4GHz radios.

Please refer to the system specific terminal emulation reference guide for instruction when using a VX1 in a specific TE environment. A list of LXE reference guides is located at the end of this chapter in the section titled "Manuals."

Terminal Emulation Screen Sizes

The fonts/screen sizes available at the DOS prompt are:

- 12 rows by 80 columns
- 25 rows by 80 columns

Please refer to the appropriate terminal emulation reference guide for technical information about the terminal emulations and supported screen sizes.

ANSI Plus

Runs on a VX1 with either a 900MHz or a 2.4GHz radio. ANSI Plus uses a Telnet connection to communicate with the host computer. A VX1 with a 900MHz radio is radio interfaced to a computer network (Ethernet or Token-Ring) via 900MHz radio equipped 62XX Base Stations. A VX1 with a 2.4GHz radio is interfaced to a computer network (Ethernet or Token-Ring) via 2.4GHz radio equipped Access Points. ANSI Plus does not support Narrowband RF.

LDS Plus

Runs on a VX1 with either a 900MHz radio or a 2.4GHz radio. A VX1 with a 900MHz radio is radio interfaced to a computer network (Ethernet or Token-Ring) via 900MHz radio equipped 62XX Base Stations. A VX1 with a 2.4GHz radio is interfaced to a computer network (Ethernet or Token-Ring) via 2.4GHz radio equipped Access Points. ANSI Plus does not support Narrowband RF.

DOS 3270 TE

Runs on a VX1 with a 900MHz radio. A VX1 with a 900MHz radio is radio interfaced to a computer network (Ethernet or Token-Ring) via 900MHz radio equipped 62XX Base Stations.

DOS 5250 TE

Runs on a VX1 with a 900MHz radio. A VX1 with a 900MHz radio is radio interfaced to a computer network (Ethernet or Token-Ring) via 900MHz radio equipped 62XX Base Stations then to a 5250 host computer.

TN3270 TE and TN5250 TE

Runs on a VX1 with a 2.4GHz radio. The TE provides IBM host application support over the RF backbone and TCP/IP network. This product does not provide interconnectivity for LXE's narrowband and 900MHz RF backbones.

DOS Terminal Emulation User Defined Stored Forms

DOS terminal emulations have the following space requirements for user defined stored forms:

ANSI	2K required for each form
LDS	520 bytes required for each form
3270	1K required for each form
5250	1K required for each form

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.

Manuals and Accessories

Manuals

The following manuals are available on the LXE Manuals CD:

- VX1 Installation and Operator's Guide
- ANSI Plus Reference Guide
- LDS Plus Reference Guide
- 3270 Terminal Reference Guide (3270 DOS TE)
- 3270 Programmer's Reference Guide
- 5250 Terminal Reference Guide (5250 DOS TE)
- 5250 Programmer's Reference Guide
- 6200 Network Management Guide
- TN3270 Terminal Reference Guide
- TN5250 Terminal Reference Guide
- PCMCIA Card Management and LXE DOS Computers
- LXE DOS API Programming Guide

Accessories

Cables	
Cable, Shielded, DB-9F to DB-25F, 6 ft.	9000A052CBL6D9D25
Cable, Shielded, Printer/PC, DB-9F to DB-25F, 6 ft.	9000A053CBL6D9D25
Cable, Shielded, PC, DB-9F to DB-9F, 6 ft.	9000A054CBL6D9D9

Brackets	
Vehicle Mounting Bracket.	1380A001BRACKET

Power Supplies	
CBL, 12-80V, Input Power 12Ft.	1380A053CBL12ML3
External AC Input Power Supply	9000A304PSACWW

Scanners	
Scanner, LS3603, Std, 8' Cbl, EC.	8010LS3603STC08DEC
Scanner, LS3603, Std, 8' Cbl, US.	8010LS3603STC08DUS
Scanner, LS3603, Std, 20' Cbl, US.	8010LS3603STC20DUS
Scanner, LS3203, Ext Rng, 8' Cbl, EC.	8011LS3203ERC08DEC
Scanner, LS3203, Ext Rng, 8' Cbl, US	8011LS3203ERC08DUS
Scanner, LS3203, Ext Rng, 20' Cbl, US	8011LS3203ERC20DUS
Scanner, 5312IP, 7' Cbl, WW	8101IP5312XXC07DWW
Scanner, 530052IP, 7' Cbl, WW	8104IP530052C07DWW
Scanner, 5300721P, 7' Cbl, WW	8105IP530072C07DWW
Scanner, 5312IP, 15' Cbl, US	8101IP5312XXC15DUS
Scanner, 530052IP, 15' Cbl, US	8104IP530052C15DUS
Scanner, 5300721P, 15' Cbl, US	8105IP530072C15DUS
Scanner, Phase, 302 Fuzzy Logic, decoded, 20', DA9F	8200A327SCNRP30220DA9F

Chapter 2 Physical Description and Layout

Hardware Configuration

System Hardware

The VX1 hardware configuration is shown in the following figure.
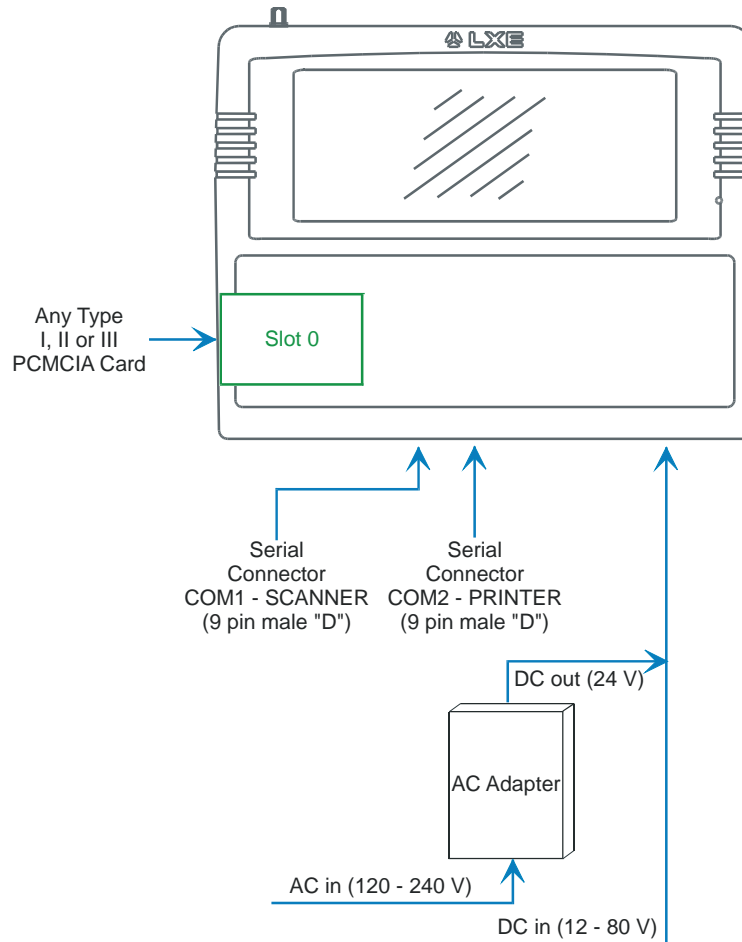
Figure 2-1 VX1 Hardware Configuration

Central Processing Unit

The LXE VX1 CPU is an Intel 486SX/ULP running at a clock rate of 25 MHz.

AT Compatible Core Logic

The LXE VX1 utilizes AT-compatible core logic. The VX1 supports the following I/O components of the AT-compatible core logic:

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

  COM1 - 03F8h; IRQ4 (SCANNER port),
  COM2 - 02F8h; IRQ3 (PRINTER/PC port)

- One PCMCIA 2.1 slots (supporting Type I, II or III PCMCIA cards)

Note: Under BIOS Setup and/or TE Configuration Utility control, Pin 9 of COM1 and COM2 may be configured to provide 5 volts DC to power a barcode scanner.

System Memory

Main system memory is 8MB flash array and 4MB on-board DRAM. The CPU also contains a 1 MB BIOS Flash. EMS is directly supported using memory management software.

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 Array

The 8MB Flash Array is used to store all of the system files on Drive C.

Video Subsystem

The LXE VX1 video subsystem consists of an electroluminescent monochrome display. The video subsystem complies with the VESA VL bus standard. The resolution of this display is 640 by 200 pixels. This resolution complies with the VGA graphics industry standard, allowing most PC/AT compatible software to run on the VX1.

The monochrome Electroluminescent (EL) display option is an active source of light and does not require a backlight.

The controller includes 512KB of video RAM and supports standard VGA modes.

Memory Map

Map Physical Address Range	Size (kB)	Function
000 00000 - 000 9FFFF	640	DRAM
000 A0000 - 000 AFFFF	64	VGA Video RAM -- SMI Space, SMIACT# is Active
000 B0000 - 000 BFFFF	64	VGA Video RAM -- SMI Space, SMIACT# is Active
000 C0000 - 000 C7FFF	32	Shadowed VGA BIOS
000 C8000 - 000 C9FFF	8	PCMCIA PCM Boot When Enabled and Bootable Card Present
000 CA000 - 000 CBFFF	8	PCMCIA
000 CC000 - 000 CFFFF	16	PCMCIA
000 D0000 - 000 DFFFF	64	IFA Memory Window
000 E0000 - 000 E7FFF	32	IFA BIOS
000 E8000 - 000 EFFFF	32	Shadowed System BIOS
000 F0000 - 000 FFFFF	64	Shadowed System BIOS
001 00000 - 003 FFFFF	4k	DRAM - lower 4k
004 00000 - 00F FFFFF	12k	DRAM
010 00000 - F8E FFFFF	3967k	Unused - 3.9MB
F8F 00000 - F8F FFFFF	1k	Flash BIOS Device - Alias
F90 00000 - F9E FFFFF	15k	Unused – 15k
F9F 00000 - F9F FFFFF	1k	Flash BIOS Device - Alias
FA0 00000 - FAE FFFFF	15k	Unused – 15k
FAF 00000 - FAF FFFFF	1k	Flash BIOS Device - Alias
FB0 00000 - FBE FFFFF	15k	Unused – 15k
FBF 00000 - FBF FFFFF	1k	Flash BIOS Device - Alias
FC0 00000 - FCE FFFFF	15k	Unused – 15k
FCF 00000 - FCF FFFFF	1k	Flash BIOS Device - Alias
FD0 00000 - FDE FFFFF	15k	Unused – 15k
FDF 00000 - FDF FFFFF	1k	Flash BIOS Device - Alias
FE0 00000 - FEE FFFFF	15k	Unused – 15k
FEF 00000 - FEF FFFFF	1k	Flash BIOS Device - Alias
FF0 00000 - FFE FFFFF	15k	Unused – 15k
FFF 00000 - FFF DFFFF	896	Flash BIOS Device - BIOS Block - 14 x 64k Sectors
FFF E0000 - FFF FFFFF	128	Flash BIOS Device - Boot Block - 15th 64k Sector and 8 x 8k Sectors

Power Supply

Vehicle power input for the VX1 is 12V to 80V DC nominal and is accepted without the need to perform any manual operation within the VX1.

If 12V to 80V 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.

CMOS Battery

The LXE VX1 has a permanent NiCd battery installed to maintain time, date and CMOS setup information. The battery maintains Time and CMOS settings for 96 hours with no external power supplied to the VX1.

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.

Note: When there is no external power supplied to the VX1, the unit is powered by the backup battery. When the backup battery is depleted, the BIOS parameters are reset to their factory default settings.

PCMCIA Slot

This slot must be configured before the VX1 can access the slot properly. The PCMCIA slot of the VX1 computer is pre-configured prior to shipment and typically need not be modified. The VX1 uses the Phoenix PicoCARD software to configure the PCMCIA slot.

PCMCIA cards are used in computers and computerized equipment and are commonly called PC Cards. The acronym PCMCIA means Personal Computer Memory Card International Association and represents a standard that has been set by the association against which the structure and data integrity of all PCMCIA cards are measured.

The PC card configuration software is discussed in detail in "PCMCIA Card Management and LXE DOS Computers", available on the LXE Manuals CD-ROM.

The VX1 has one Type III PCMCIA slot (Slot 0). This slot conforms electrically to the PCMCIA 2.1 and JEIDA 4.1 specifications. Slot 0 is on the right when the screen is uppermost.

Slot 0 (the right slot, usually configured as Drive D:) accepts Type I, II or III PCMCIA SRAM cards. LXE supports only Type II 2.4GHz Spread Spectrum and Type III 900MHz Spread Spectrum radio PC cards.

Power Management

The VX1 has three operating modes: Normal, Standby and Suspend.

In Normal operating mode all systems are powered up, the video display is on and the keyboard backlight is on. The RS-232 ports, any installed SRAM card or the installed PCMCIA radio card are active.

Transition from Normal to Standby (or Video Timeout State) happens when there has been no activity on the screen, keyboard or COM ports for the amount of time specified in the BIOS parameter Video Timer. When there is activity before the Video Timer expires, the Video Timer clock resets and begins counting down again.

In Standby operating mode (or Video Timeout State), the keyboard backlight is off as well as the video display. Any keyboard input, screen activity (e.g. message from host), or COM port activity will reset the Video Timer and transition the VX1 to Normal operating mode.

While the VX1 is in Standby mode, the only way the VX1 will enter Suspend mode is when the **Suspend/Resume key sequence**

$$<2^{nd}> + <F3>$$

is entered by the operator.

In Suspend mode, the VX1 is in its lowest power state. The keyboard backlight and display are off. Both COM port RI's are disabled and all keys and input are discarded -- except the Suspend/Resume key sequence. When the VX1 is turned off while in Suspend mode and then turned back on, the VX1 is in Normal operating mode.

Physical Controls

On/Off Switch

The power (on/off) switch is a toggle switch located on the bottom of the VX1. (O = off, I = on). The switch is sealed by a rubber boot seal. The Status LED, located on the keyboard of the VX1, is lit when the power is on.

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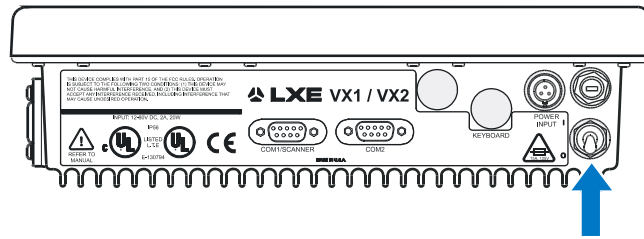
Figure 2-2 The Power (On/Off) Switch

ATTENTION:	*Powering off the VX1, before a write (to disk) function has completed, may result in the corruption of data on the hard drive.*

When the system is turned off, the current contents of RAM are lost. Save any needed data and exit in an orderly fashion from any running programs before turning the system off.

External Connectors

Most external connectors for the VX1 are located on the bottom of the unit.

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

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

The antenna connector is located on the top of the unit:

- For VX1's with a single antenna, the connector is located on the top left.

- For VX1's with diversity (dual) antennas, the connectors are located at the top left and top right.

---

[1] The COM port must be set up to accept input from a barcode scanner using BIOS Setup. Refer to the VX1 Reference Guide, Chapter 4: "System Configuration" section titled "BIOS Setup" for instruction.

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. Under software control, 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 "BIOS Setup" for more information on configuring pin 9.
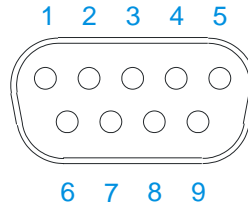
Figure 2-3 Scanner Serial Connector (COM1)

Pinout

Pin	Signal	Description
1	DCD	Data Carrier Detect – Not Connected
2	RXD	Receive Data – Input
3	TXD	Transmit Data – Output
4	DTR	Data Terminal Ready – Not Connected
5	GND	Signal/Power Ground
6	DSR	Data Set Ready – Not Connected
7	RTS	Request to Send – Output
8	CTS	Clear to Send – Input
9	+5VDC or RI	Barcode Scanner Power 300mA max (Default) or Ring Indicator - Input (Use BIOS Setup to configure)

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.
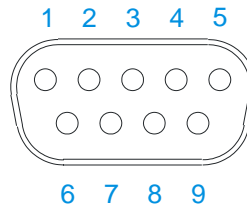
Figure 2-4 The Printer/PC Serial Connector (COM2)

Pinout

Pin	Signal	Description
1	DCD	Data Carrier Detect – Not Connected
2	RXD	Receive Data – Input
3	TXD	Transmit Data – Output
4	DTR	Data Terminal Ready – Not Connected
5	GND	Signal/Power Ground
6	DSR	Data Set Ready – Not Connected
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 -300mA max (Use BIOS Setup to configure)

Power Supply Connector

Power is supplied to the VX1 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 VX1 internal power supply can accept DC input voltages in the range of 10 to 80 Volts.
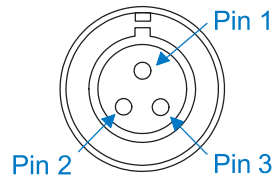
Figure 2-5 The Power Connector

Pinout

Pin	Signal
1	Chassis GND
2	DC-
3	DC+

Antenna Connector

> *Note:* *VX1's equipped with a radio require an external antenna. A VX1 without a radio does not use an antenna. VX1's equipped with the diversity option have two antenna connectors and require two external antennas.*

1   Antenna Base

2   Antenna Pin

2.4GHz Antenna   900MHz Antenna
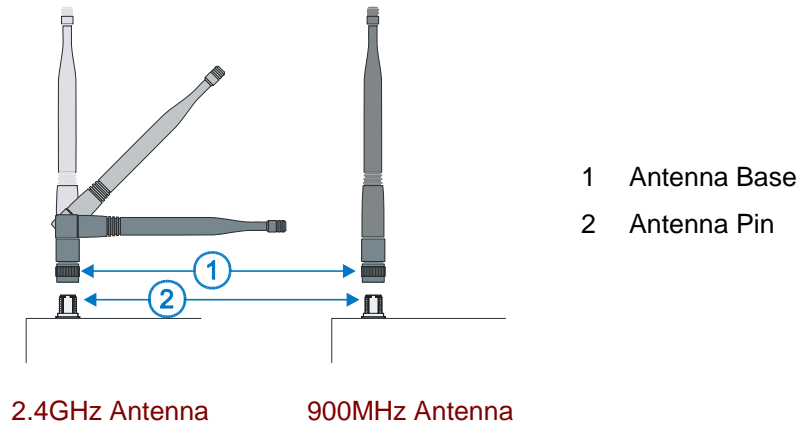
Figure 2-6 2.4GHz and 900MHz Antennas

The process for attaching the antenna to the antenna pin is the same for 900MHz and 2.4GHz spread spectrum radios.

Spread Spectrum RF Antenna Connector Pin
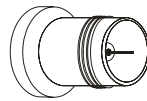
Figure 2-7 RF Antenna SS Connector

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.

The Keyboards

The VX1 has an internal, custom keyboard in one of four versions:

- QWERTY layout, with Standard overlay
- QWERTY layout, with IBM 3270 overlay
- QWERTY layout, with IBM 5250 overlay
- ABCD layout with Standard overlay

Each layout features a 60 key keyboard. The keyboard backlight is toggled with the key sequence 2nd + F10.

Both keyboards have 101 keyboard functions, including a numeric keyboard pad. Please refer to Appendix A "Key Maps" for keypress combinations.

The ABCD Keyboard
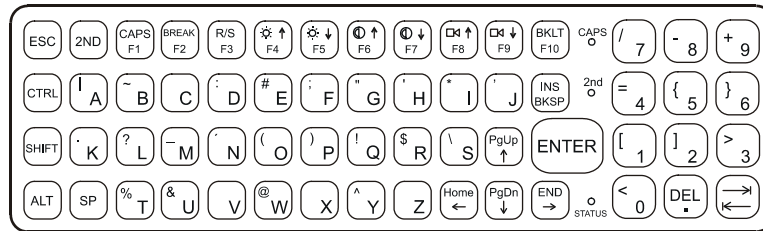
Figure 2-8 The ABCD Keyboard - Standard

The QWERTY Keyboard
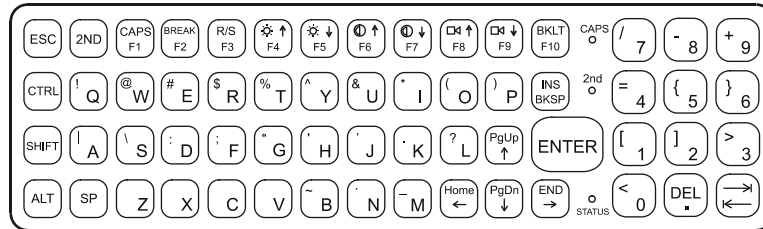
Figure 2-9 The QWERTY Keyboard - Standard

IBM 3270 Overlay
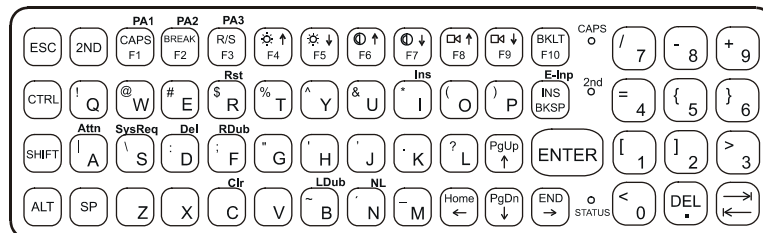
Figure 2-10 QWERTY Keyboard with IBM 3270 Overlay

IBM 5250 Overlay
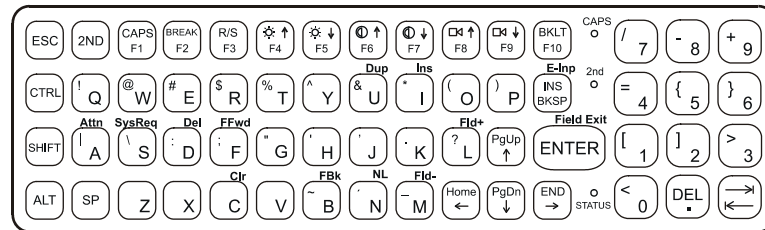
Figure 2-11 QWERTY Keyboard with IBM 5250 Overlay

Note: Press the <CTRL> + <Enter> keys to initiate the IBM 5250 Field Exit function.

Key Maps

The keyboard supports all 101 keyboard functions. However, because the keyboards only have 60 keys, all functions are not visible (or printed on the keyboard). Therefore the keyboards support what are 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 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 VX1 are listed in Appendix A, "Key Maps". The Key Maps appendix contains the key press sequences for the QWERTY keyboard and the ABCD keyboard.

The VX1 keyboard does not have a NUM LOCK indicator or key, however NumLock is always On. Although NumLock can be turned on or off via the computers BIOS Setup program, the VX1 ignores the Off setting.

DOS Key Functions Not Available on the VX1

Prnt Scrn   A function that is available at the DOS prompt on a desktop PC. The Prnt Scrn as a system function requires a parallel port and the VX1 has only serial ports.

Sys Req   A function that is available at the DOS prompt on a desktop PC. Sys Req is for use in a multi-tasking environment to switch between various running applications. The VX1 is not a multi-tasking computer, nor is DOS in general considered a multi-tasking environment.

Keyboard LEDs

The VX1 keyboard has three (3) LED indicators.

1   CAPS LOCK Mode LED Indicator

2   Secondary Mode LED Indicator

3   Status LED Indicator
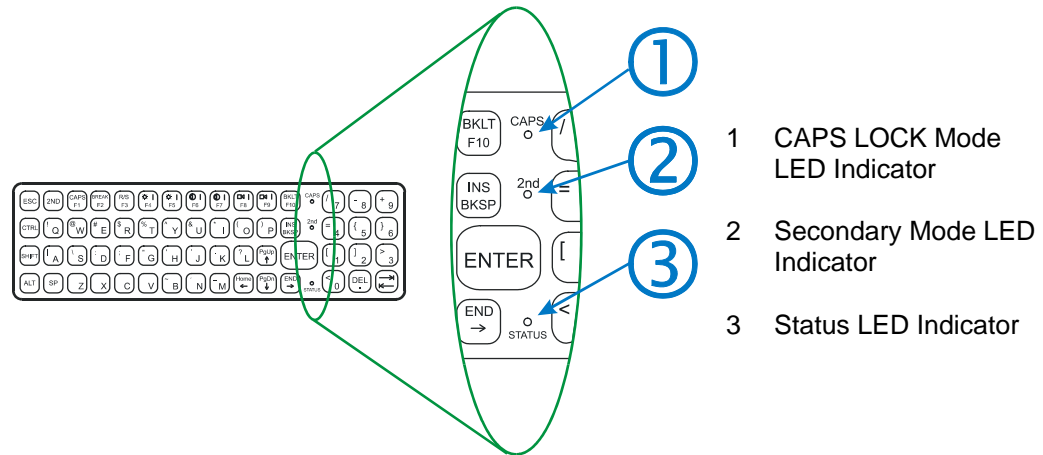
Figure 2-12 Keyboard LEDs

CAPS LED

This LED indicates the state of the keyboard Caps-Lock mode. If Caps-Lock is enabled this LED is illuminated green. When Caps-Lock is off, the LED is dark.

Press 2nd then <F1> to toggle Caps-Lock On and Off.

Caps-Lock can also be set On or Off using BIOS Setup.

The default or bootup value of Caps-Lock is "Off".

Secondary Keys LED

The VX1 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.
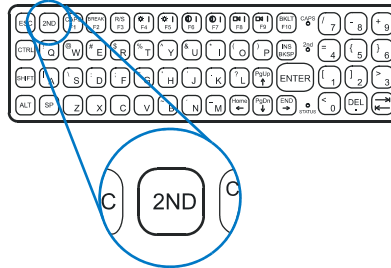
Figure 2-13 The Secondary Key

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 <F10> to toggle the keyboard backlight on and off.

Press 2nd and <F1> to turn Caps-Lock on and off.

Press 2nd and <F2> to initiate the DOS Pause command.

Press 2nd and <F3> to toggle the Resume/Suspend Mode on and off.

Status LED
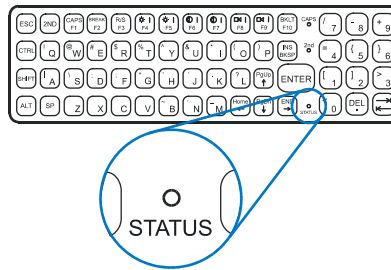
Figure 2-14 The Status LED

The Status LED, located on the front of the unit, is illuminated green when the unit is powered on. The Status LED is dark when power is disconnected.

Note: This LED should not be lit when power is disconnected from the VX1.

- Entering the Suspend Mode is performed by pressing the Resume/Suspend key sequence -- 2nd key then <F3>.

- Exiting the Suspend Mode is performed by pressing the Resume/Suspend key sequence -- 2nd key then <F3>.

The status LED is green when the VX1 is in Suspend Mode. Suspend Mode is the lowest power-consumption state possible, while still retaining the system's status.

When the VX1 enters Suspend Mode, the display and keyboard backlight are turned off and the status LED remains green. The beeper is active.

When the VX1 is in Suspend Mode and the Resume/Suspend key is pressed, the keyboard backlight and display are turned on if it's setting is On or Timed in BIOS Setup. If the keyboard backlight is set to Off in the BIOS Setup, it remains off.

Control Keys

The VX1 has several control keys. One key controls the keyboard backlight, a pair of keys control the volume and another pair of keys controls the display brightness. The VX1 must be placed in Secondary Mode to access these functions.

Note: The <F6> and <F7> keys (Contrast Up and Contrast Down) have no function as the VX1 has an electroluminescent screen. Contact your LXE representative for future enhancements using these keys.

1   Display Brightness Control Keys

2   Display Contrast Control Keys (not used)

3   Speaker Volume Control Keys

4   Backlight Control Key (Keyboard)
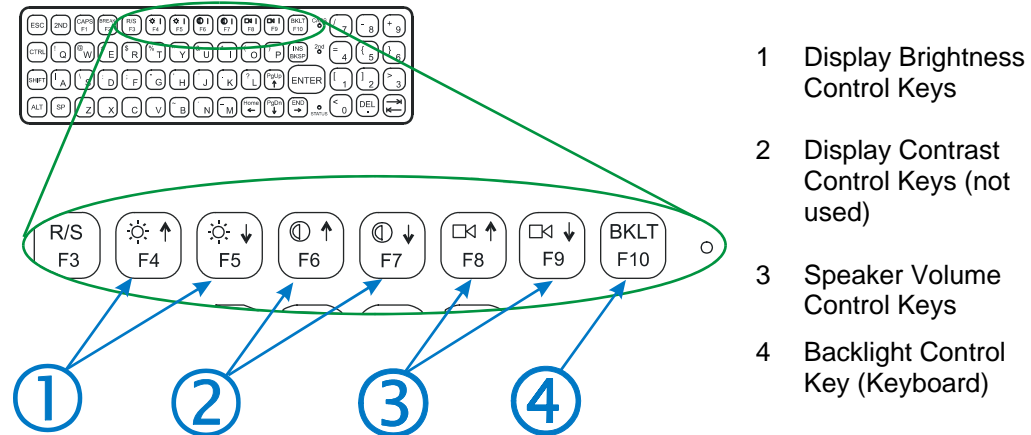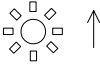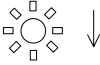
Figure 2-15 The VX1 Display Controls

Display Brightness Control Keys

First, press the 2nd key to place the VX1 in Secondary Mode.

The VX1 brightness keys control the display backlight in the following way:

Icon	Key	Description
☀ ↑	<F4>	Pressing and holding this key increases the brightness of the display
☀ ↓	<F5>	Pressing and holding this key decreases the brightness of the display

Note: If the display is too dim, press and hold the <F4> key several seconds.

Volume Control Keys

First, press the 2nd key to place the VX1 in Secondary Mode.

The VX1 volume keys control the speaker volume in the following way:

Icon	Key	Description
◁ ↑	\<F8\>	Pressing and holding this key increases the speaker volume of the VX1.
◁ ↓	\<F9\>	Pressing and holding this key decreases the speaker volume of the VX1.

Keyboard Backlight Control Key

The electroluminescent display remains on when the Backlight Control key turns the keyboard backlight off.

First, press the 2nd key to place the VX1 in Secondary Mode. Then press the \<F10\> or Backlight Control key.

When the keyboard backlight is on, pressing the Backlight Control key sequence (2nd and \<F10\>) turns the keyboard backlight off.

The Display

Display Controls

Display controls are located on the keyboard. Please refer to the "Control Keys" section, earlier in this chapter.

Cleaning the Display

Keep fingers and rough or sharp objects away from the scan aperture and 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.

Panning the Display

The VX1 192-pixel row physical display area can be panned up and down in order to view the entire virtual 480-pixel row display. Display panning can also be controlled by an application running on the VX1.

When at the DOS prompt:

Display Up   Press 2nd key then <Ctrl> then <UpArrow> to move the screen display up.

Display Down   Press 2nd key then <Ctrl> then <DownArrow> to move the screen display down.

When running an LXE terminal emulation program, refer to the Window Manager section of the Reference Guide for instruction on panning the display.

The VX1 default display window begins at line 1 and displays 12 lines.

```
.........10.........20.........30.........40.........50.........60.........70.........80
.                          INVENTORY/ORDER STATUS
.
.   PART NUMBER: 147265-0026            CODE:     13   STD. REORDER LEVEL:  150
.   QUANTITY:    416                                   STD. ORDER QUANTITY: 500
.   UNALLOCATED: 48
.
.
.
.
.      CUST. ORDER #        QUANTITY        SHIP DATE     PROJECTED INVENTORY
10        152876              23              09/17              393
.         153390              45              09/23              348
.         158723             122              10/07              226
.         159316              76              10/08              150
.         159736              55              10/22               95
.         160345              47              10/25               48
.
.
.
.
20
.
.
.
.
25   09/15                                                       PAGE 1/1
```

Figure 2-16 Panning, Upper Display Window

The first pan down command moves the pointer to line 11 and displays 12 lines (lines 11 through 22).

```
.........10 .........20 .........30 .........40 .........50 .........60 .........70 .........80
.          INVENTORY/ORDER STATUS
.
.     PART NUMBER: 147265-0026              CODE:    13   STD. REORDER LEVEL:  150
.     QUANTITY:   416                                     STD. ORDER QUANTITY: 500
.     UNALLOCATED: 48
.
.
.     CUST. ORDER #      QUANTITY       SHIP DATE      PROJECTED INVENTORY
10      152876              23           09/17                393
.       153390              45           09/23                348
.       158723             122           10/07                226
.       159316              76           10/08                150
.       159736              55           10/22                95
.       160345              47           10/25                48
.
.
.
20
.
.
.
.
25   09/15                                                         PAGE 1/1
```

Figure 2-17 Panning, Center Display Window

The second pan down command moves the pointer to line 14 and displays 12 lines (lines 14 through 25).

```
.........10 .........20 .........30 .........40 .........50 .........60 .........70 .........80
.          INVENTORY/ORDER STATUS
.
.     PART NUMBER: 147265-0026              CODE:    13   STD. REORDER LEVEL:  150
.     QUANTITY:   416                                     STD. ORDER QUANTITY: 500
.     UNALLOCATED: 48
.
.
.
.     CUST. ORDER #      QUANTITY       SHIP DATE      PROJECTED INVENTORY
10      152876              23           09/17                393
.       153390              45           09/23                348
.       158723             122           10/07                226
.       159316              76           10/08                150
.       159736              55           10/22                95
.       160345              47           10/25                48
.
.
.
.
20
.
.
.
25   09/15                                                         PAGE 1/1
```

Figure 2-18 Panning, Lower Display Window

At this point, a pan up command moves the pointer to line 4. The next pan up command moves the pointer to line 1. A pan up command at line 1 does not wrap the display.

Reset Key Sequence (Reboot)

To reboot the VX1 without turning the computer off, press

<CTRL> + <ALT> + <DEL>   or   <CTRL> + <ALT> + <numeric .>

ATTENTION:	*Rebooting the VX1, before a write (to disk) function has completed, may result in the corruption of data on the hard drive.*

When the system is rebooted, the current contents of RAM are lost. Save any needed data and exit in an orderly fashion from any running programs before rebooting.

When the VX1 is turned on or rebooted, the following settings are restored from flash memory and are configured using BIOS Setup.

Factory Default Settings

Boot Sequence	A: then C:
Show Setup Prompt	Disabled
Display POST Msgs	Disabled
Show Summary Screen	Disabled
Power Management	Enabled
CPU Timer	Aggressive (1 sec)
Keyboard Backlight	Timed
Keyboard Backlight Timer	1 min.
Display Timer	1 min.
Suspend Timer	0 min.
Off Timer	1 min.
Caps Lock at boot	Off
NumLock at boot	On
Repeat Delay	0.5 seconds
Repeat Rate	10 chars/sec
CTRL+ALT+DEL	Reboot
DOS Font	8x16
COM1 Pin 9	5V
COM2 Pin 9	RI
EL Op Mode	4-Bit

Power On Default Settings

Keyboard Backlight	uses BIOS setting
Beeper	Restored to prior setting
EL Brightness	100%

PCMCIA Slot

The VX1 has one PCMCIA Slot. The PCMCIA slot supports the Personal Computer Memory Card International Association (PCMCIA) 2.1 standards.

Slot 0 (the right slot, usually configured as Drive D:) accepts Type I, II or III PCMCIA SRAM cards. The left slot is not used. LXE supports only Type II 2.4GHz Spread Spectrum and Type III 900MHz Spread Spectrum radios.
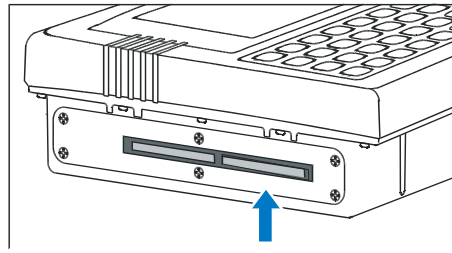
Figure 2-19 The PCMCIA Slot

The PC card configuration software is discussed in detail in "PCMCIA Card Management and LXE DOS Computers", available on the LXE Manuals CD-ROM.

PCMCIA Pinout

Pin	Signal	Pin	Signal	Pin	Signal
1	GND	24	A5	47	A17
2	D3	25	A4	48	A18
3	D4	26	A3	49	A19
4	D5	27	A2	50	A20
5	D6	28	A1	51	A21
6	D7	29	A0	52	SLOT_VCC
7	-CE1	30	D0	53	SLOT_VPP
8	A10	31	D1	54	A22
9	-OE	32	D2	55	A23
10	A11	33	WP/A_-IOIS16	56	A24
11	A9	34	GND	57	A25
12	A8	35	12V_RF_POWER	58	n.c. or VS2#
13	A13	36	GND	59	RESET
14	A14	37	-CDI	60	-WAIT
15	-WE	38	D11	61	-INPACK
16	RDY/-IREQ	39	D12	62	-REG
17	SLOT_VCC	40	D13	63	BVD2/-SPKR
18	SLOT-VPP	41	D14	64	BDV1/-STSCHG
19	A16	42	D15	65	D8
20	A15	43	-CE2	66	D9
21	A12	44	n.c. or VS1#	67	D10
22	A7	45	-IORD	68	-CD2
23	A6	46	-IOWR	69	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).

Install the 2.4GHz Type II PCMCIA Radio

Caution ⚠️	*The LXE Model VX1 Vehicle Mount Computer is specifically for use with LXE Part Numbers 480628-4096 and 480824-3300 or LXE Model Numbers 6526, 6726 and 6816 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 VX1 Vehicle Mount Computer and is strictly prohibited.*

1.   Turn the VX1 off and detach the power cable.

2.   Remove the side cover from the VX1, by unscrewing the six (6) screws located on the left side of the unit.

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

Slot 0
(Right)
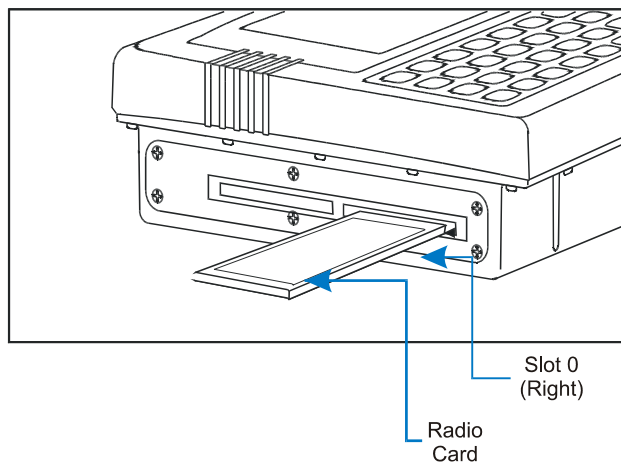
Radio
Card

Figure 2-20 Inserting the 2.4GHz Type II PCMCIA Radio

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.
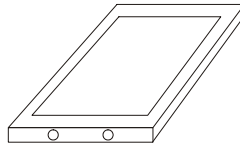
Figure 2-21 Cisco Antenna Cable Connections

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.
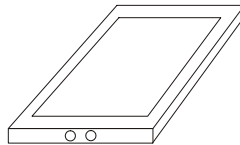
Figure 2-22 Symbol 11Mb Antenna Cable Connections

Symbol 2Mb or Proxim Radio Card

- Symbol 2Mb radio – Connect antenna cable to the port located in the center of the card.
- Proxim – Connect antenna cable to the port located in the center of the card.
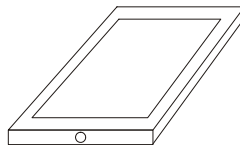
Figure 2-23 Symbol 2Mb Antenna Cable Connections

Lucent Radio Card

- Connect antenna to the port located in the center of the card, as shown below.
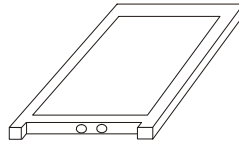
Figure 2-24 Lucent Antenna Cable Connections

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 side cover screws using a torque wrench capable of measuring to 9±1 inch pounds (1.016±.11 N/m). The six 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 VX1 on.

Install the 900MHz Type III PCMCIA Radio

Caution ⚠	The LXE Model VX1 Vehicle Mount Computer is specifically for use with LXE Model No. 4810P3S01XX 900MHz Type III PCMCIA radio. Substitution of other PCMCIA radios will void the FCC, Industry Canada and other international radio certifications for the Model VX1 Vehicle Mount Computer and is strictly prohibited.

1. Turn the VX1 off and detach the power cable.

2. Remove the side cover from the VX1, by unscrewing the six (6) screws located on the left side of the unit.

   Partially insert the 900MHz Type III PCMCIA Radio into Slot 0 (the right slot).
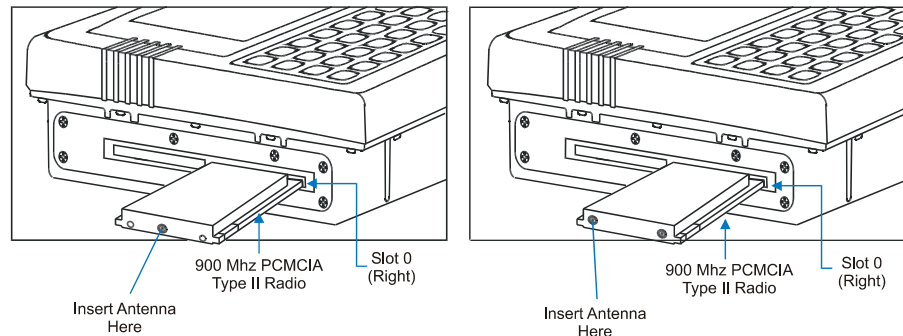
Figure 2-25 Inserting the 900MHz Type III PCMCIA Radio

3. Before completely inserting the 900MHz Radio, connect the Antenna Cable to the 900MHz Radio.

4. Now complete the insertion of the 900MHz Type III PCMCIA Radio into Slot 0.

5. Replace the side cover and the six (6) screws.

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

6. Re-connect the power cord/cable and turn the VX1 on.

Chapter 3 Power Supply

Introduction

AC to DC power input for the VX1 is delivered via an optional external power supply. See "External Power Supply".

Vehicle power input for the VX1 is 12V to 80V DC nominal and is accepted without the need to perform any manual operation within the VX1. See "Vehicle 12-80VDC Direct Connection."

Power input is fused for protection and the fuse is externally accessible on the VX1.

External Power Supply

1. AC Input Cable

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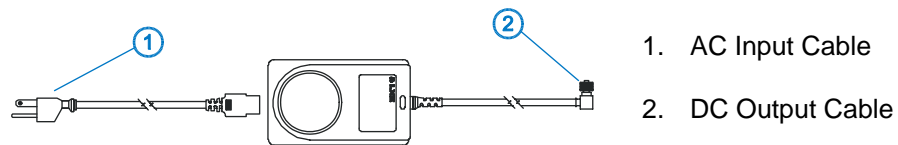
Figure 3-1 Optional Power Supply Cable

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 "VX1 Installation and Operator'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 US IEC input power cord
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 VX1 Environmental Specifications
Storage Temperature	see VX1 Environmental Specifications
Humidity	Operates in a relative humidity of: 5 – 95% (non-condensing)
ESD Immunity	Per IEC 801-1

CMOS Battery

The LXE VX1 has a permanent 50mAh NiCd battery installed to maintain time, date and CMOS setup information. The NiCd 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.

Note: When there is no external power supplied to the VX1, the unit is powered by the backup battery. When the backup battery is depleted, the BIOS parameters are reset to their factory default settings.

Vehicle 12-80VDC Direct Connection

Note: *Instructions for using this configuration are contained in "VX1 Installation and Operator's Guide" section titled "Installation".*

1	To Vehicle Battery
2	To Vehicle Mounted Device
3	Green (GND)
4	Red / White (DC+)
5	Red / Black (DC-)
6	12 – 80 VDC
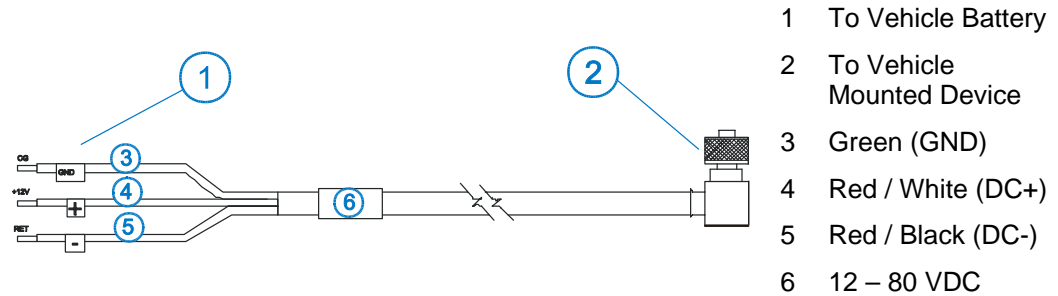
Figure 3-2 12-80 VDC Direct Vehicle Power Connection Cable (Fuse Not Shown)

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
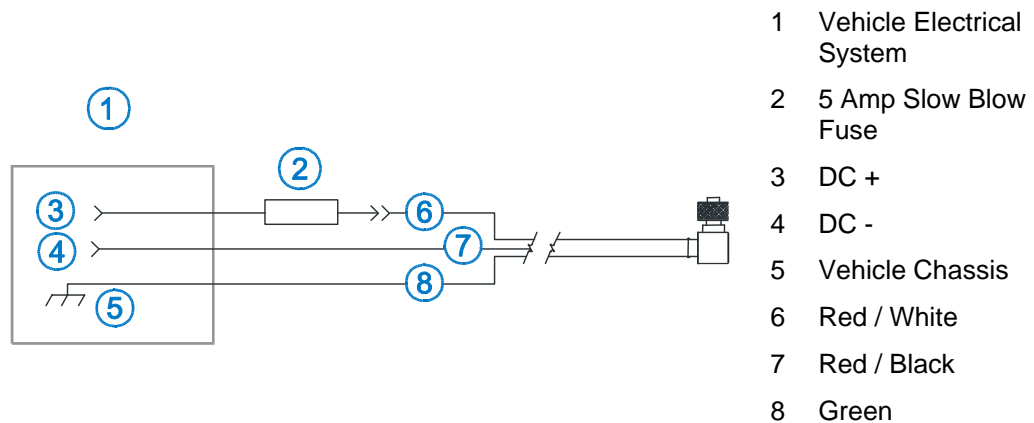
Figure 3-3 12-80 VDC Connecting the Power Cable to the Vehicle

Note: *Correct electrical polarity is required for safe and proper installation. Connecting the cable to the VX1 with the polarity reversed will cause the VX1's fuse to be blown. See the following figure titled "Vehicle Connection Wiring Color Codes" for additional 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 12-80VDC Vehicle Connection Wiring Color Codes

Note: *LXE's VX1 accepts a wide DC input voltage range. Do not connect the VX1 input power cable to any other LXE computer or damage to that computer may occur.*

VX1 Input Power Specifications (12-80 VDC)

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 Replacement for the VX1

The VX1 uses a 5A, 125V 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 -- Type Bussman GMC-5 (5x20mm).

1	Fuse
2	Twist in this direction to remove
3	Twist in this direction to insert
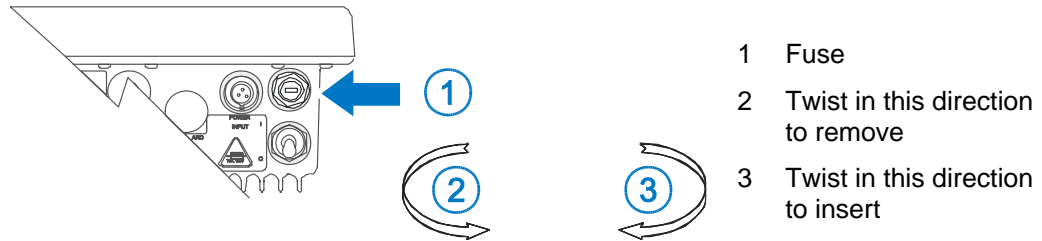
Figure 3-5 Fuse Replacement

Chapter 4 System Configuration

Introduction

Like any personal computer, there are many aspects to the setup and configuration of the VX1. Much of the setup and configuration of the VX1 is dependent upon the optional features (both hardware and software) installed on the computer. 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 VX1 and it's optional features.

BIOS Setup

Be very careful when using this utility to modify BIOS Setup parameters. The VX1 may generate unexpected results when incorrect or conflicting parameter values are entered. 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 VX1 **before** accessing BIOS Setup.*

Accessing the BIOS Setup

When you turn the VX1 on the unit will start to boot programs from the Internal Flash Array (IFA). If the Main Menu Setup Msg parameter is toggled On, watch the bootup sequence and when the following is displayed:

Press F2 to Enter Setup

Press the [F2] key. When the Main Menu Setup Msg parameter is toggled Off (default), the [F2] key is still available during the bootup sequence. The next screen displayed is the BIOS Setup Main Menu.

BIOS Setup has three menus: Main, Advanced 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	Main	A: then C:
Caps	Advanced / Keyboard	Off
COM1 Pin 9	Advanced / Other	5V
COM2 Pin9	Advanced / Other	RI
CPU	Advanced / Power Mgt	Aggressive
CtlAltDel	Advanced / Keyboard	Reboot
Date	Main	01/01/1988
Display	Advanced / Power Mgt	1 min
EL Op Mode	Advanced / Other	4 bit
Font	Advanced / Other	8x16
Keybd BL	Advanced / Power Mgt	Timed
Kybd BL	Advanced / Power Mgt	1 m
NumLock	Advanced / Keyboard	On
Off Timer	Advanced / Power Mgt	0 m
POST Msg	Main	Off
Power Mgt	Advanced / Power Mgt	Enabled
Rpt Delay	Advanced / Keyboard	0.50 s
Rpt Rate	Advanced / Keyboard	10 /s
Setup Msg	Main	Off
Summary	Main	Off
Suspend	Advanced / Power Mgt	0 m
Time	Main	00:00:00

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 will take effect when the VX1 reboots upon exiting BIOS Setup. If the VX1 does not automatically reboot upon exit, please reboot the VX1.

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.

Main Menu Parameters

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
Time	00:00:00
Date	01/01/1988
Boot	C: then A:
Setup Msg	Off
POST Msg	Off
Summary	Off

Parameter Changes

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 VX1 is rebooted.

Time

Specifies the current system time.

This parameter is shown in the following format:

hh:mm:ss

where:

hh is hours
mm is minutes
ss is seconds.

Each of these fields is selected and modified separately. When the parameter is highlighted, type the desired numeric entry and then press the <Tab> key to move from hours to minutes to seconds. The system time is set according to the standard 24-hour clock.

Default: 00:00:00

Date

Specifies the current system date.

This parameter is shown in the following format:

month/day/year

Each of these fields is selected and modified separately. When the parameter is highlighted, type the desired numeric entry and then press the <Tab> key to move from month to day to year. The backslashes are automatically added by the system. When daylight savings occurs, the system date is *not* automatically changed.

Default: 01/01/1988

Boot

This option is used to define how the system treats drive A: when booting. Booting can occur from A drive or directly from the C drive (Flash drive). To reduce the amount of time required to boot, the boot sequence should be set to "C: only".

Valid:

A: then C: Boot from the A drive, or if no media is present in the A drive, boot from the C drive.

C: Boot from the C drive without searching for an A drive.

Default: A: then C:

*Note: The A: drive is read only when an SRAM card is inserted. The VX1 does **not** recognize a radio card as an SRAM card. When there is no SRAM card installed, drive A: is ignored.*

Setup Msg

Use this option to allow or disallow the display of the message "Press F2 to enter Setup" upon initial bootup or reboot. When the parameter is set to Off, the message is not displayed to the user although the F2 key can still be pressed at the appropriate time to enter the Setup Menu.

Valid: On, Off

Default: Off

Post Msg

Set this parameter to On to stop the boot process if the Power On Self Test (POST) procedure encounters errors. Otherwise, the system continues to attempt to boot despite many startup error messages that display.

See Chapter 6 "Troubleshooting" section titled "System Testing" for more information on POST messages.

Valid:	On, Off
Default:	Off

A parameter setting of On only affects the following error conditions (messages are displayed) and the bootup is halted:

Messages that Halt Bootup

- IDE Unit Error

    No media connected
    Configured for 0 cylinders
    Controller reset failed
    Media not ready
    Track 0 seek timed out
    Media initialization failed
    Media recalibration failed
    Last track seek failed

- Timer Error

    System timer (0) failed

- Disk Error for Debug

    Floppy type does not match setup only for debug capabilities

- I/O Chip Error

    I/O conflicts exist for serial ports, parallel ports, and IDE units (any or all)

- Other Error

    IRQ conflict, unsupported COM port configuration, keyboard locked

Bootup Continues after These Messages

This option does not affect the following error conditions (messages are displayed and the bootup continues):

- Keyboard Error

    Keyboard reset failed
    Keyboard interrupts failed

- CMOS Error

    CMOS checksum failed
    CMOS time and date not set
    Real time clock failure

- Configuration Error

    Previous POST execution was incomplete

- Scanner Error

    Scanner detected, but attempts to read scanner configuration failed.

Summary

This option is used to enable or disable a summary of the system configuration which displays before the operating system starts to load. To speed up booting, this parameter can be set to Off.

Valid: On, Off

Default: Off

Advanced Menu Options

The Advanced Menu contains several sections – Power Management, Keyboard and Other. **To view all sections, press the down arrow key.**

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.

Parameter List

Menu Section	Option	Default Value
Power Mgt	Power Mgt	Enabled
	CPU	Aggressive (1 s)
	Keybd BL	Timed
	Kybd BL	1 m
	Display	1 m
	Suspend	0 m
	Off Timer	0 m
Keyboard	Caps	Off
	NumLock	On
	Rpt Delay	0.50 s
	Rpt Rate	10 /s
	CtlAltDel	Reboot
Other	EL Op Mode	4 bit
	Font	8x16
	COM1 Pin9	5V
	COM2 Pin 9	RI

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 VX1 is rebooted.

Power Management

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.

Power Mgt

This parameter must be set to Enabled before timers are activated. When Power Management is Disabled, the CPU setting is Full Speed.

Valid:	Enabled, Disabled
Default:	Enabled

CPU and Suspend Timers and RF Communication

When using a VX1 with a 2.4GHz radio driver (see section titled "\PCTCP Files"), the CPU and Suspend timers can be affected by the radio.

Note: *For extremely large file transfers with PCMCIA data cards (e.g. SRAM, ATA), Power Mgt should be disabled.*

CPU

Note: *Pwr Mgt Modes - Power Mgt must be set to Enabled before the value in CPU has any effect on the VX1.*

The CPU setting determines how Power Management values control the CPU performance and the VX1's draw on the external power supply (AC-DC converter or the vehicle battery).

Aggressive setting minimizes the draw on the external power supply.

Moderate will balance battery draw and performance.

Light will maximize performance.

Full Speed disables power management of the CPU only.

Custom setting is used to set the CPU timer in 1 second increments.

Valid:	Aggressive (1 second) Moderate (5 seconds) Light (15 seconds) Custom (15 seconds initial value, user configurable in 1 second increments; range = 1 - 63 seconds) Full On (0 seconds)
Default:	Aggressive (1 second)

Custom Setting

CPU Custom Setting is user configurable in 1 second increments up to 63 seconds. After selecting Custom, press the down arrow to move the highlight to the seconds setting. Use the numeric keys to enter number of seconds. Higher second values will adversely affect battery life.

Keybd BL

The Keybd BL parameter is used to set which of three modes the Keyboard Backlight will be in.

Off - the most battery-efficient way to operate the display.

On - provides full time backlighting whenever the unit is on.

Timed - provides backlighting for a predetermined amount of time from the last key input, or Com port activity. Set the time with the Keyb timer parameter.

Valid:	On, Off, Timed
Default:	Timed

Note: *When the Timed option is selected, use the Keyb BL time parameter to set the amount of time the keyboard backlight remains on.*

Keyb BL

The Keyb BL timer works in conjunction with the parameter setting of *Pwr Mgt Modes - Keybd BL*.

The keyboard backlight timer is reset every time the following occurs: video write, or Com port activity.

Valid:	1 - 63 minutes (in 1 minute increments)
Default:	1 minute

Note: *If Pwr Mgt Modes - Keybd BL setting is not "Timed" this setting is ignored.*

Display

The Display parameter designates, in minutes, how long the VX1 senses inactivity on the VX1 before shutting down. The display timer is reset every time the following occurs: video write or Com port activity.

When the display timer expires and the display turns off, the Status LED turns steady green.

When the display is off, the VX1 is still powered on. Tethered barcode trigger presses will initiate activity. Communications through the radio or serial ports will still continue. However, the keypad clears all sticky key modes and LEDs and a keypress functions only as a wakeup event (does not send to the operating system or application).

Press any key once to wake the display.

Valid:	0 - 63 minutes (in 1 minute increments)
Default:	1 minute

A value of 0 means Full On. To prevent possible display burn-in, setting the Display timer to 0 (always on) is *not* recommended.

Suspend

This parameter establishes how long the VX1 senses inactivity on the system before entering Suspend Mode. This option is used to conserve backup battery life.

Pressing the Suspend key sequence (2nd+F3) once also places the VX1 in Suspend Mode. Once in the Suspend state, the Status LED remains green.

Use the Suspend key sequence to wake the VX1 from suspend mode.

The Suspend Timer is reset every time one of the following occurs:

Video write	Keypress
Disk / IFA Access	COM 1 or COM 2 access
PCMCIA Slot 0 IRQ and/or Controller IRQ	

Note: Disabling the Suspend timer does not disable the Off Timer.

Valid: 0 - 63 minutes (in 1 minute increments)

Default: 0 Min

A value of 0 means "Disabled".

Off Timer

Note: *When the Off Timer parameter is set to 0, the VX1 waits for the IFA or PCMCIA slots to complete before changing to Critical Suspend state. It will not use backup battery power. The currently unsaved information is lost.*

Off Timer designates, in minutes, how long the VX1 waits in critical suspend mode before shutting down. The Off Timer begins its countdown when the VX1 is in the critical suspend state. Critical suspend state is initiated when the external power supply has been disconnected from the VX1 and the VX1 is still on (running on backup battery power). The Off Timer begins the countdown as soon as power draw is transferred to the Backup battery.

Note: *A fully charged Backup battery can keep the VX1 in the critical suspend state for at least 5 minutes.*

Valid: 0 - 63 minutes (in 1 minute increments)

Default: 5 minutes

The backup battery will continue to operate the VX1, in very low power mode, for the number of minutes set in the Off Timer parameter. When the VX1 is in critical suspend mode all peripherals shut down, the CPU clock is stopped, power is removed from the PCMCIA cards, and the Status LED is blinking green. The VX1 is saving the state prior to the backup battery failing and cannot be used.

- If external power is connected before the Off Timer time expires the VX1 will transition to On which allows the VX1 to resume operation where it left off.

- If the Off Timer expires the VX1 will turn itself off and all unsaved information is lost. Reconnect the external power supply and toggle the Power switch to turn the VX1 back on.

- When the Off Timer parameter is set to 0, the VX1 changes to the critical suspend state and then turns off immediately – it does not use backup battery power. The currently unsaved information is lost.

- When the external power supply is disconnected, the VX1 is still on and the VX1 completely drains the backup battery, the VX1's date and time settings are lost but all other parameters are recovered. When an external power supply is again connected to the VX1, the backup battery will recharge itself using the power from the external power supply. The backup battery life during the recharge session is lessened.

Keyboard

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.

Caps

This parameter is used to determine whether the CAPS function is turned on or off at bootup.

Valid:	On, Off
Default:	Off

NumLock

Note: NumLock is always on.

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 VX1.

Valid:	On, Off
Default:	On

Rpt Delay

The Rpt Delay parameter will designate the period of time from the depression of a key until the key repeats.

Valid:	0.25 to 1.00 second (0.25, 0.5, 0.75, 1.00)
Default:	0.5 seconds

Rpt Rate

The Rpt Rate parameter sets the number of times a keystroke will be repeated, per second, as the key is depressed.

Valid:	2 to 30 chars per second (2, 6, 10, 15, 20, 30)
Default:	10 chars per second

CtlAltDel

This parameter determines whether the user can restart the VX1 by pressing the reboot key sequence: CTRL+ALT+2nd + DOT.

When this parameter is *No Reboot*, the reboot key sequence will have no effect.

Valid:	Reboot, No Reboot
Default:	Reboot

Other

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.

EL Op Mode

This parameter determines the type of EL operating mode. Before changing to 8-bit, LXE recommends calling LXE Technical Support for assistance.

Valid:	4-bit, 8-bit
Default:	4-bit

Font

The Font parameter selects the screen display font size.

Note: *This font size choice may be overridden by an application.*

Valid:	8x8
	8x16
Default:	8x16

COM1 Pin9

This option is used to configure the endcap COM 1 serial port.

Valid:	RI (Ring Indicator)
	5V
Default:	5V

Power to the COM ports may be turned off using a terminal emulation configuration utility.

COM2 Pin9

This option is used to configure the endcap COM 2 serial port.

Valid:	RI (Ring Indicator)
	5V
Default:	RI

Power to the COM ports may be turned off using a terminal emulation configuration utility.

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 and the values saved, the next time the VX1 is turned on or rebooted, those saved values will be in effect.

Save and Exit

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, press <Enter> again to exit and reboot with the current values.

Exit w/o Save

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 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.

As changes are made to Setup values and the values saved, the next time the VX1 is turned on or rebooted, those saved values will be in effect.

Save this change by selecting "Save and Exit."

Load Previous

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 will be in effect the next time the VX1 is powered on or rebooted.

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

Drive C Internal Flash Directory Structure

The on-board Internal Flash Array (IFA) is 8MB, and it is configured as the C: drive - i.e., the equivalent of a disk drive in a PC. One inherent difference between Flash technology and a rotating media disk drive is the fact that it is solid-state, therefore it is much more rugged than a rotating media would be. Another difference is that its write (but not read) time can be slower than a rotating media.

Depending on which software configuration is ordered, the following sections list the files that may be stored on the Flash or C drive.

> **ATTENTION   Powering off the VX1 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 VX1 computer consists of BIOS, Card and Socket Services, PCMCIA card drivers, utilities, Datalight's ROM-DOS, a protocol stack for 2.4 GHz radio support, radio drivers, and LXE terminal emulators.

The software supported by the VX1 is summarized below.

LXE Terminal Emulations

Note: Only one LXE terminal emulator is loaded on the VX1 at any one time.

The terminal emulator resident on the VX1 determines the radio card type (900 MHz or 2.4 GHz) installed in the VX1.

- ANSI Plus 2.4 GHz Terminal Emulator
- ANSI Plus 900 MHz Terminal Emulator
- DOS LDS Plus 2.4 GHz Terminal Emulator
- DOS LDS Plus 900 MHz Terminal Emulator
- DOS IBM 3270 900 MHz Terminal Emulator
- DOS IBM 5250 900 MHz Terminal Emulator
- TN3270 2.4 GHz Terminal Emulator
- TN5250 2.4 GHz Terminal Emulator

PC/TCP

Used for 2.4 GHz radio management.

SNMP DOS Agent

The SNMP DOS agent executable resides in the \AGENT directory. For information on enabling the SNMP Agent, please refer to the "DOS Autoconfigurator Instructions". For details on Agent operation, please refer to the "SNMP Agent Reference Guide". Both manuals are available in electronic format on the LXE Manuals CD.

ROM-DOS

ROM-DOS files are loaded in the DOS subdirectory. Only those DOS files required for optimum performance are loaded on the VX1. Not all DOS files are available on the VX1, but may be added to the flash disk at a later time by the system administrator. See Chapter 5 "Commands" for explanations for the ROM-DOS command files.

PCMCIA

Used for PCMCIA card management. The following file types are resident in the VX1.

- Socket Services
- Card Services

Radio Drivers

Only one radio is installed in the VX1 at any one time. The radio resident on the unit determines the radio card drivers (900 MHz or 2.4 GHz) installed in the unit.

- LXE 900 MHz radio drivers
- System 6400 and System 6500 2.4 GHz radio drivers

Utilities

See Appendix C, "Utilities."

1. BCWedge
2. DOS Extensions
3. Utility Programs

- COM Port Utility
- Keyboard Utility
- Display Utility
- File Transfer Utility
- Beeper Utility
- Battery Discharge Utility
- Backup Battery Test Utility
- Parameter Auto-Detection Utility
- Set an API Function

\DOS

Please refer to Chapter 5 "Commands" for complete instructions or troubleshooting when using these ROM-DOS files.

Filename	Description
ANSI.SYS	Interprets ANSI escape sequences.
CHKDSK.EXE	Checks the status of a disk and displays a report. Can also fix disk errors.
COMMAND.COM	A DOS file that runs programs, manages files, controls information processing, directs input and output, among other functions.
FORMAT.COM	Formats a read-write disk drive (flash and RAM drives only) removing all data.
HIMEM.SYS	Extended memory manager.
MEM.EXE	Displays the amount of used and free memory on a computer.
MODE.COM	Configures system devices.
MORE.COM	Displays 25 lines of output at a time.
NED.CFG	Configuration file for NED.EXE ASCII text editor.
NED.EXE	This program is used when editing ASCII text files.
REMDISK.EXE	Companion file to REMSERV.EXE. Each computer must use the same baud rate and packet or non-packet-style transmission. This file runs on one computer and REMSERV.EXE runs on the other.
REMSERV.EXE	Companion file to REMDISK.EXE. This file runs on one computer and REMDISK.EXE runs on the other. Used for manipulating files on two computers' hard disks. Use a null modem cable connecting both serial ports.
SYS.COM	Adds system files to disks.
VER	Displays the current version identity of ROM-DOS. This command is run at the DOS prompt.
XCOPY.EXE	Copies multiple files and, optionally, subdirectories from one disk to another.

\PCMCIA

For complete instructions or troubleshooting when using these files, please refer to "PCMCIA Card Management and LXE DOS Computers", available on the LXE Manuals CD-ROM.

Filename	Description
CISDUMP	Permits user to list and interpret contents of a PC Card's Card Information Structure (CIS) for debug use.
CNFIGNAM.EXE	Driver that specifies which PC configuration should be accessed from the PCM.INI file. This file is added to the CONFIG.SYS file.
DPMS.EXE	Novell driver that provides memory management services.
PCMATA.SYS	Device driver for ATA–IDE hard disk emulation. Used with SRAM cards, rotating disk cards, or solid-state mass storage cards. This file is added to the CONFIG.SYS file.
PCMCS95.EXE	Card Services (driver), the operating-system–level program that manages all PCMCIA cards. This file is added to the CONFIG.SYS file.
PCMFDISK.EXE	Edits partition table for ATA PC Cards.
PCM.EXE	DOS-based utility for reviewing, modifying, or creating PC Card configurations.
Note:	*May or may not be present.*
PCM.INI	Stores PCMCIA configuration parameters.
PCMRMAN.SYS	Device driver that reads Card Services resources, passes data to Card Services which then makes device allocations. This file is added to the CONFIG.SYS file.
PCMSCD.EXE	Device driver for FAX/Modem and LAN cards. This file is added to the CONFIG.SYS file.
PCMSS.EXE	Socket Services (driver), the BIOS–level program that functions as the interface between the card socket and the Card Services program.

\UTILS

Please refer to Appendix C, "Utilities" for complete instructions or troubleshooting when using these files.

Filename	Description
BBDISVX.EXE	Backup battery discharge utility.
BBTSTVX.EXE	Backup battery test utility.
BCWEDGE.EXE	Redirects input from COM1 or COM2 to the BIOS key ring buffer.
BEEPVX.EXE	Beeper utility.
COMTSTVX.EXE	Communication port diagnosis utility.
DISPVX.EXE	Screen display test utility.
KEYVX.EXE	Keyboard functional test utility.
LXEF.EXE	File transfer utility.
PARAMVX.EXE	Collects setup configurable parameters and lists them in an ASCII text file.
SETAPI_4.EXE	Runs an API call to set a mode or change a parameter.

Radio-Specific Subdirectories

\PCTCP (2.4GHz Radio Specific Files)

The PCTCP files are included with VX1's that have a 2.4 Ghz radio installed.

Filename	Description
IPSTAT.EXE	Gives statistics on IP and memory.
LSL.COM	Link Support Layer driver.
NET.CFG	Contains radio parameters.
ODIPKT.COM	ODI Packet driver.
PDTEST.EXE	Test or diagnose the packet driver.
SETHOST.EXE	Manage host names and IP addresses.
SOCKET.CFG	Contains options for SOCKETP.EXE
SOCKETP.EXE	Sockets TCP/IP kernel for use with packet drivers.
TCP.EXE	Manipulate or view TCP parameters and status.
XPING.EXE	Test installation with a continuous ping.
Lucent Specific	
WVLAN43 (all WVLAN44 files)	Lucent radio driver files.
DRIVER.1ST	Radio driver file.
Proxim Specific	
RL2PCM.COM	Proxim radio driver file.
Cisco Specific	
CSCODI	Cisco radio driver file (350 series radios only).
AWCO48C	Cisco radio driver file (340 series radio only).
WEPDOS.EXE	Set WEP key into Cisco radio.
AWCLEAP.EXE	DOS utility to set LEAP (350 series radio only).
SETLEAP.BAT	Batch file to run the AWCLEAP utility (350 series radios only).
CLEAR.BAT	Batch file to clear LEAP username and password (350 series radio only).
Symbol 2Mb Specific	
SLAOID.COM	Symbol radio driver files.
SLAINIT.EXE	
Symbol 11Mb Specific	
S11ODIPC.COM	Symbol radio driver file.

\AGENT

The SNMP agent files are loaded on VX1's with a 2.4GHz radio.

Please refer to the "SNMP Agent Reference Guide" and "Client Configuration Manager Reference Guide" for more details on the SNMP agent.

AGENT.EXE   Diagnostic agent. Provided limited access to the LXE Private MIB.

CFGAGENT.EXE   Configuration agent. Provides full access to the LXE Private MIB.

LXE 900Mhz Radio Files

The LXE 900MHz radio files are installed in the Terminal Emulation subdirectories.

Filename	Description
LXE900SS.EXE	Spread spectrum radio driver.
LXE900SS.HEX	Modem control codes.
PCRFLIB.EXE	Interface between the radio driver and the terminal emulator.
RFPARSE.EXE	Used by PCRFLIB to obtain configuration settings.

Terminal Emulation Files

Please refer to the specific Terminal Emulation's reference guide for complete instructions.

Some VX1's do not have terminal emulation (TE) files and may or may not have a radio card. When a need exists to convert the unit to a TE unit or a different radio card, contact LXE Customer Services for assistance.

Note: 900 MHz radio files are loaded in the Terminal Emulation subdirectories, i.e. \APLUS, \LDSPLUS, \IBM (for both 3270 and 5250).

The terminal emulator resident on the VX1 determines the radio card type (900 MHz or 2.4 GHz) installed in the unit. Following are the directory names containing the TE program files:

\APLUS	ANSI Plus with 2.4 GHz radio
\APLUS	ANSI Plus with 900 MHz radio
\LDS24	DOS LDS Plus with 2.4 GHz radio
\LDSPLUS	DOS LDS Plus with 900 MHz radio
\IBM	DOS IBM 3270 with 900 MHz radio
\IBM	DOS IBM 5250 with 900 MHz radio
\IBM24	TN3270 with 2.4 GHz radio
\IBM24	TN5250 with 2.4 GHz radio

Dual Terminal Emulation

Dual TE's (if ordered) may be resident when the unit is used in conjunction with the LXE 6224 Session Manager, subject to the following conditions:

- Multiple Terminal Emulators on the same client device must use the same radio type (900MHz or 2.4GHz), and

- Only one IBM Terminal Emulator can be installed on the same client device (3270 or TN3270 or 5250 or TN5250).

For more information on items in this section, please refer to the LXE electronic manual titled "DOS Autoconfigurator Instructions" on the LXE Manuals CD.

TE Selection Menu

The user is presented with the TE Selection Menu listing the available terminal emulators. For example, a user could see:

```
[5] Launch 5250
[A] Launch ANSIPLUS
[E] Exit to DOS
Please select option:  [5, A, E]?
```

Upon selecting one of the terminal emulator options, the desired TE is launched. When the user selects E, the screen is cleared and system is returned to the DOS prompt.

In addition to multiple TE's, the TE Selection Menu can also display multiple Autologin hosts for some TE's. Please refer to the applicable TE Reference Guide for more information on multiple hosts.

Switching Terminal Emulators

2.4GHz Radios

When the user quits the TE with an ALT-X, the screen is cleared and the menu is presented again.

900MHz Radio

After exiting the active terminal emulator, the computer reboots and displays the TE Selection Menu.

Single Terminal Emulator Present

After the initial auto-configuration, the system will boot up and immediately launch the terminal emulator. No menu is presented.

Menu Customization

The system administrator may change almost every facet of the menu display by modifying the variables found at the top of **TESELECT.BAT**. Details on modifying the TESELECT.BAT file are included in the "DOS Autoconfigurator Instructions".

Configuration and Sample Files

When the VX1 is turned on, the operating system looks for several files in order to start up your system. Two of these files are hidden system files that cannot be seen when you perform a DOS directory command (DIR). The other files that are read at start up are:

COMMAND.COM

The COMMAND.COM file is essential to the operation of your system. Without it your system cannot boot. It contains the programming for resident DOS commands (the commands which allow you to change directories, copy, rename and delete files, etc.).

The COMMAND.COM file should be located in the root (C:\) directory.

CONFIG.SYS

The CONFIG.SYS file is not essential to the operation of the VX1, but it is essential to the operation of certain software programs. The information in this file may be altered and some software applications will automatically alter it during their installation process.

The default CONFIG.SYS file that is shipped with the VX1 varies depending on both the software and hardware configuration of the unit.

AUTOEXEC.BAT

The AUTOEXEC.BAT file is not essential to the operation of the VX1. The VX1 will boot without it. The AUTOEXEC.BAT file is a batch file that contains a series of commands. The VX1 reads the AUTOEXEC.BAT file and executes the commands in the order in which they appear. The information in this file may be altered and some software applications will automatically alter it during their installation process.

The default AUTOEXEC.BAT file that is shipped with the VX1 varies depending on both the software and hardware configuration of the unit.

For information on customizing the keyboard and display for international use, refer to a commercially available "ROM-DOS User's Manual."

The examples provided throughout this section are for illustration purposes only.

Do not use these examples for your operation, as each computer configuration is different.

Example AUTOEXEC.BAT File

For 900MHz Radio

Command	Explanation
@ECHO OFF	Do not display batch command text during AUTOEXEC.BAT file run
SET TEMP=C:\TEMP	Place temporary files/data here
PATH=c:\dos;c:\pcmcia;c:\utils\c:\;	
	*/ When the computer starts up, the operating system will look in these directories for the files it needs
prompt pg	
C:	Move DOS pointer to the C drive
cd \aplus	Move DOS pointer to the LXE Terminal Emulation (e.g. ANSI Plus) subdirectory
lxe900ss	Load the radio driver
xxxxx.xxx	Load the keyboard driver (for ANSI Plus only)
pcrflib	Load the interface between the radio driver and the terminal emulator
w84nsync	
aplus	Run the TE interface program (e.g. ANSI Plus)

For 2.4GHz Radio (with ANSI Plus)

Command	Explanation
@ECHO OFF	Do not display batch command text during AUTOEXEC.BAT file run
PATH=c:\dos;c:\pcmcia;c:\utils\c:\pctcp;c:\;	
	*/ When the computer starts up, the operating system will look in these directories for the files it needs
SET TEMP=C:\TEMP	Place temporary files/data here
set sockets = c:\pctcp	
c:\pctcp\lsl.com	
xxxxx.xxx	Load the 2.4GHz radio driver: WVLAN43 for Lucent radio RL2PCM for Proxim radio AWCO48C for Cisco 340 radio CSCODI for Cisco 350 radio
c:\pctcp\odipkt.com 0 0x69	
c:\pctcp\socketp.exe c:\pctcp\socket.cfg	
	Look in this file for radio parameters Note: The Proxim radio requires that /m=12288 follows socketp.exe
C:	Move DOS pointer to the C drive
cd \aplus	Move DOS pointer to the LXE Terminal Emulation (e.g. ANSI Plus) subdirectory
xxxxx.xxx	Load the 2.4GHz radio driver: WVLAN43 for Lucent radio RL2PCM for Proxim radio AWCO48C for Cisco radio
xxxxx.xxx	Load the keyboard driver (for ANSI Plus loads only)
aplus	Run the TE interface program (e.g. ANSI Plus)

Example CONFIG.SYS File

Note: *Do not use these examples for your operation, as each computer configuration is different.*

Please refer to commercially available ROM-DOS User's Guides for complete instructions or troubleshooting when using these DOS files.

```
DEVICE=C:\DOS\HIMEM.SYS /TESTMEM:ON
FILES=45
BUFFERS=15,0
FCBS=4,0
STACKS=9,256
DOS=HIGH,UMB
LASTDRIVE=Z
SHELL=C:\COMMAND.COM /E:1024  /P

Rem Card and Socket Services
DEVICE=C:\PCMCIA\DPMS.EXE
DEVICEHIGH=C:\PCMCIA\CNFIGNAM.EXE /DEFAULT
DEVICEHIGH=C:\PCMCIA\PCMSS.EXE
DEVICEHIGH=C:\PCMCIA\PCMCS95.EXE
DEVICEHIGH=C:\PCMCIA\PCMRMAN.SYS
DEVICEHIGH=C:\PCMCIA\PCMSCD.EXE
DEVICEHIGH=C:\PCMCIA\PCMATA.SYS
```

Lucent Radios

Note: Hex values are indicated with a leading 0x. NET.CFG values do not use the 0x.

Link Support Layer

Buffers 4 1550   : required to avoid "Network jammed" message

```
Link Support
    BUFFERS 4 1550
```

TCPIP Protocol (located in the SOCKET.CFG file)

Substitute the appropriate IP addresses in order for your network to function properly.

```
Protocol TCPIP
    IP_Address XXX.XXX.XXX.XXX/net_bits
    Route add default if0 XXX.XXX.XXX.XXX
```

Note: Alphabetic parameter values must be in uppercase.

Sample NET.CFG

```
Link Support
        BUFFERS 4 1550
Link Driver WVLAN43
  FRAME ETHERNET_II
  WaveLAN_Network_Name  ANY
  Station_Name "station_name"
  AP_Distance  1
  Microwave_Robustness = N
  Transmit_Rate   3
  Medium_Reservation  2347
  Card_Power_Management 0
  Maximum_Sleep_Duration 100
  Receive_All_Multicasts N
  Enable_Encryption N
```

Parameters

The following is a list of parameters that can be modified in the NET.CFG file. For additional information about the parameters in this file see the WVLAN43.CFG file located in the PCTCP directory.

WaveLAN_Network_Name

Identifies the WaveLAN network the station will connect to.

Valid:	0 to 32 string of printable uppercase characters.
Default:	ANY

Note: *Setting this value to ANY will enable the station to connect to any IEEE 802.11 network.*

Note: *The string for WaveLAN_Network_Name is case-sensitive. The WaveLAN DOS ODI driver requires the use of only UPPERCASE characters. If you have configured the Access Points with lower-case names you will need to change your Access Point WaveLAN_Network_Name parameter to UPPERCASE characters for proper operation.*

Or, place double quotes around the WaveLAN_Network_Name to allow proper operation with upper and lower case letters e.g. "NameofUnit".

Station_Name

Identifies the stations on the network. This parameter is used when performing diagnostic tests.

Valid:	0 to 32 string of printable characters.
Default:	station_name

AP_Distance

Controls the roaming sensitivity of your computer. This parameter must be set according to the settings of the WavePOINT-II access points.

Valid:	1=Low
	2=Medium
	3=High
Default:	1

Microwave_Robustness

This option should only be used when troubleshooting slow performance of the network that could be related to in-band interference from microwave ovens.

Use this option when experiencing recurrent "bursts" of in-band interference exhibited by specific units where the unit (or the access point) is close to a microwave oven or a microwave oven is located in the signal path between the unit and the access point. The radio will try to retransmit the "lost messages". When retransmission fails again, the radio in Auto Transmit Rate Select Mechanism mode will attempt to retransmit the message again at a lower data speed. (See Transmit_Rate)

Selecting "Y" will enable fragmentation of data frames when the automatic transmit rate selection switches to a lower transmit rate. Fragmentation will avoid increased vulnerability due to longer frame lengths of transmissions at lower data speeds.

Valid:	Y=Yes, N=No
Default:	N

Transmit_Rate

Controls the data rate the WaveLAN card will use. Supported rates depend on the card. If the card does not support the selected rate, the default value of 3 is selected automatically.

Valid:	1=Fixed Low
	2=Fixed Standard
	3=Auto Rate Select (High)
	4=Fixed Medium
	5=Fixed High
	6=Auto Rate Select (Standard)
	7=Auto Rate Select (Medium)
Default:	3

Medium_Reservation

Enables RTS/CTS communications. Sets the frame length threshold that determines when the station should start using RTS/CTS.

Valid:	0-2347
Default:	2347

Note: *The use of Medium Reservation is recommended in network environments where the density of the WaveLAN stations and WavePOINT-II access points is very low, and where there is poor network performance due to excessive frame collisions at the WavePOINT-II access points.*

Card_Power_Management

Configures the power management used by the station in an ESS. The recommended mode is Enhanced Power Management (EPM) for hand held computers. In this mode, the station switches between Power Save Mode (PSM) and Continuous Active Mode (CAM), based on activity. Any frame transfer switches the station to CAM. Inactivity for 100ms switches the station to PSM. For vehicle mount computers, the default is CAM.

Valid:	0=CAM (No power management)
	1=EPM
	2=PSM (Maximum power savings)
Default:	0

Maximum_Sleep_Duration

Configures the maximum amount of time the radio will stay in Sleep mode.

Valid:	1-65535
Default:	100 (10 seconds)

Receive_All_Multicasts

Configures whether this station will receive Multicast packets.

Valid:	Y=Yes or N=No
Default:	N

Enable_Encryption

Configures whether this station will receive/send encrypted data traffic. When "Y" is chosen, the unit will be able to receive both non-encrypted data and messages encrypted with one of the listed WEP encryption key values (see Transmit_Key_ID).

If encryption is enabled (Y) while the card does not support WEP, an error is reported.

Valid:	Y=Yes or N=No
Default:	N

Transmit_Key_ID

If you enable WEP encryption, you can select one key for wireless data transmissions from the list of WEP Encryption Key Values.

Key1	abcde
Key2	0x123456789a
Key3	abcdefghijkl2
Key4	0x112233445566778899AABBCCDD

Valid:	1-4
Default:	1
Format	Transmit_Key_ID 1

Proxim Radios

Note: Hex values are indicated with a leading 0x. NET.CFG values do not use the 0x.

Link Support Layer

Buffers 2 1550   : required to avoid "Network jammed" message

```
Link Support
    BUFFERS 2 1550
```

TCPIP Protocol (located in the SOCKET.CFG file)

Substitute the appropriate IP addresses in order for your network to function properly.

```
Protocol TCPIP
    IP_Address XXX.XXX.XXX.XXX/net_bits
    Route add default if0 XXX.XXX.XXX.XXX
```

Sample NET.CFG

An example Proxim NET.CFG file:

```
Link Support
  buffers 2 1550
Link Driver RL2PCM
  Socket          A
  Initialize_365  Y
  Int             5
  Mem #1          ce00
  Port            270
  Inactivity_Min  0
  Inactivity_Sec  1
  Sniff_Time      0
  Domain          0
  Station_Type    0
  Peer_To_Peer    N
  Roam_Config     1
  Mac_Optimize    1
  Channel         1
  SubChannel      1
  Frame           Ethernet_II
```

Parameters

Int

Sets the interrupt (IRQ) line to be used.

    Default: 5

Port

Sets the I/O port address. Use 270 for the VX1.

    Default: 0x270

Mem#1 (ODI)

Memory_address (NDIS) Sets the resource memory location (0xC000 to 0xE800). Upper memory blocks from 0xA000 to 0xCFFF are used by VX1 system software.

The Proxim driver requires 0x4000 bytes (16 KB) for the memory address.

Default:	ce00

Domain

Sets the network domain. It can be any number from 0 through 15 and must match the domain of the server or access point to which you want to connect.

Valid:	0 through 15
Default:	0

Station_type

Sets the status of the PC card as a master (2), alternate master (1), or nonmaster (0) station.

Valid:	0, 1, 2
Default:	0

Socket

Sets the PCMCIA socket (A, B, C, or D) that has the PC card installed. The VX1 always uses socket A for PC cards.

Valid:	A, B, C D
Default:	A

Initialize_365

Determines whether to initialize the Intel 82365SL PCMCIA controller chip.

Valid:	Y, N
Default:	Y

Inactivity_min

Sets the number of minutes of inactivity before the PC card goes to sleep. To minimize draw on the vehicle battery, set this to 0.

Valid:	0 through 20 minutes
Default:	0

Inactivity_sec

> Sets the number of seconds of inactivity before the PC card goes to sleep. Valid settings are 0 through 55 (values above 5 are rounded to the nearest multiple of 5). To minimize draw on the vehicle battery, set this as low as possible, preferably to 1.
>
> > Valid: 0 through 55 seconds
> >
> > Default: 1

Channel

> Sets the channel to be used when the PC card is acting as the master.
>
> > Valid: 1 through 15
> >
> > Default: 1

Subchannel

> Sets the subchannel to be used when the PC card is acting as the master.
>
> > Valid: 1 through 15
> >
> > Default: 1

Mac_optimize

> Optimizes the PC card for the number of concurrent modes.
>
> > Valid: 0 (light) or 1 (normal)
> >
> > Default: 1

Roam_config

> Sets the roaming speed.
>
> > Valid: 0 (slow), 1 (normal) or 2 (fast)
> >
> > Default: 1

Peer_to_peer

> Sets the ability of the PC card to talk to other peers.
>
> > Valid: N (off) or Y (on)
> >
> > Default: N

Cisco Radios

Note: Hex values are indicated with a leading 0x. NET.CFG values do not use the 0x.

Link Support Layer

Buffers 4 1550   : required to avoid "Network jammed" message

```
Link Support
    BUFFERS 4 1550
```

TCPIP Protocol (located in the SOCKET.CFG file)

Substitute the appropriate IP addresses in order for your network to function properly.

```
Protocol TCPIP
    IP_Address XXX.XXX.XXX.XXX/net_bits
    Route add default if0 XXX.XXX.XXX.XXX
```

Sample NET.CFG

An example Cisco NET.CFG file:

```
Protocol ODIPKT
  Bind CSCODI
file handles=60
LINK DRIVER CSCODI
  SSID    ""      ;must match Access Point setting
  BusType "PCMCIA"
  Frame ETHERNET_II
protocol IPX 0 ETHERNET_II
show dots=on
```

Note: For Cisco 350 radios, the driver is CSCODI.COM. For Cisco 340 radios, the driver name is AWCO48C.Com.

Parameters

Following are some parameters that may be modified. For most situations the factory defaults are appropriate. Any omitted parameter assumes the factory default.

```
;Initialization file for Infrastructure operating mode

; NOTE: The following are some keyword parameters that may
;be modified.  Any commented or omitted keyword parameter
;assumes the factory default.  For most situations the
;factory defaults will be appropriate.  In situations where
;the factory default needs to be modified, uncomment or add the
;keyword parameter line and set the appropriate keyword value.

SSID            "" ;Must match Access Point setting
;NodeName        ""            ;Descriptive station name

LEAP            "OFF"   ;LEAP authentication (OFF -or- ON)
PowerSaveMode   "CAM"   ;Power save modes (CAM, FASTPSP, PSP)
MaxPowerSave    "OFF"   ;Maximum power save mode (OFF -or- ON)
LongRetryLimit  6
;WorldMode       "OFF"   ;World mode (OFF -or- ON)
;ShortPreamble   0       ;PLCP short preamble (0=auto, 1=long,
                            2=short)
```

```
;FragThreshold   2312   ;Packet size to start fragmenting
;RTSThreshold    2312   ;Packet size to start sending RTS/CTS
;DataRate1       0x02   ;(1)   Mbps supported data bit rate
;DataRate2       0x04   ;(2)   Mbps supported data bit rate
;DataRate3       0x0B   ;(5.5) Mbps supported data bit rate
;DataRate4       0x16   ;(11)  Mbps supported data bit rate
;RefreshInterval 10000  ;Inactivity time to check association


;To enable WEP uncomment the following line and set the
;key with the wepdos.exe utility
authtype    "open"      ; Set WEP key in radio before wepopen
                (WEPOPEN, WEPSHARED, MIXEDOPEN, MIXEDSHARED)


;The diversity parameter must be set according to the
;number of antennas for each terminal.
;setting for MX1, MX3 = on
;setting for 1380,1390,VX1,VX2,VX4 = right
;setting for 2325,MX2 = right
;diversity    "on"    ; for use on terminals with 2 antennas
;diversity    "left"  ; for use on terminals with 1 antenna left
                            port
diversity     "right"  ; for use on terminals with 1 antenna
                            right port


;The adapter needs 32 16-bit I/O ports, and 1 non-sharable IRQ.
;The following lines should be uncommented and the appropriate
;values set in the following scenarios:
; 1) PCMCIA mode: Override the I/O port base and/or IRQ
;                 assigned by PCMCIA card services.
; 2) PCMCIA mode: PCMCIA card services is not being used.
; 3) ISA mode: Override the I/O port base and/or IRQ assigned
;              by Plug and Play.
; 4) ISA mode: Non-Plug and Play operation.

;PortBase        140
;IRQ             5

;If the PCMCIA interface is being used without PCMCIA card
;services, uncomment the following lines and set the
;appropriate values.

Memory          c9000
;Socket          0

;If the PCMCIA interface is not being used, set the appropriate
;value of "ISA" or "PCI".

BusType         "PCMCIA"

Frame ETHERNET_II
; Frame ETHERNET_802.3
; Frame ETHERNET_802.2

protocol IPX 0 ETHERNET_II
show dots=on
```

Note: LEAP, WorldMode and ShortPreamble parameters are valid for Cisco 350 radios only.

Link Support

Parameter used to define resources for the LSL.COM file. Any modifications may cause resource conflicts.

Protocol

Instructs TCP/IP stack to bind to radio driver.

SSID

Identifies the 802.11B wireless network the station will connect to.

>   Default: ""

Note: Setting this value to "" will enable the station to connect to any IEEE 802.11b network.

LEAP

Used to set LEAP (Light Extensible Authentication Protocol) authentication on LXE computers equipped with Cisco 350 series radios.

```
Valid:    OFF or ON
Default:  OFF
```

Note: This parameter is valid for Cisco 350 series radios only.

WorldMode

Allows the radio to adopt the maximum transmit power level and frequency range of the access point to which it is associated (available only in infrastructure mode).

```
Valid:    OFF or ON
Default   OFF
```

Note: This parameter is valid for Cisco 350 series radios only.

ShortPreamble

This parameter allows the radio to use short radio headers (or preambles). Short radio headers improve throughput performance. Long radio headers ensure compatibility if a client or access point does not support short radio headers.

```
Valid:    0=auto
          1=long
          2=short
Default:  0
```

Note: This parameter is valid for Cisco 350 series radios only.

FragThreshold

Packet size to start fragmenting.

>   Default: FragThreshold   2312

RTSThreshold

Packet size to start sending RTS/CTS.

Default: RTSThreshold   2312

DataRateX

To set a data rate other than 11 MB default uncomment rate desired and all data rates less than that rate.   Example to set for 5.5MB data rate uncomment the DataRate1, DataRate2 and DataRate3.

1 Mbps supported data bit rate

DataRate1   0x02

2 Mbps supported data bit rate

DataRate2   0x04

5.5 Mbps supported data bit rate

DataRate3   0x0B

11 Mbps supported data bit rate

DataRate4   0x16

RefreshInterval

Inactivity time to check association with AP

RefreshInterval   10000

PowerSaveMode

PowerSaveMode   "CAM"

Constant Awake Mode

Note: *The VX1 is a vehicle mounted and powered computer and does not use PowerSaveMode.*
           PSP and fastPSP modes are not valid options for a VX1 computer.

MaxPowerSave

Maximum power save mode

MaxPowerSave   "OFF"

Note: *The VX1 is a vehicle mounted and powered computer and does not use MaxPowerSave.*
           ON is not a valid option for a VX1 computer.

NodeName

Descriptive station name

NodeName   " "

WEP enable

To enable WEP change the "authtype" line and set the key with the wepdos.exe utility

```
authtype     "wepopen"
```

Valid:	wepopen
	wepshared
	mixedopen
	mixedshared
Default:	wepopen

Set WEP key in radio before wepopen using the WEPDOS program in the PCTCP directory.

Diversity

The diversity parameter must be set according to the number of antennas for each computer. To determine left and right, hold the Cisco radio with the label side up and look directly at the antenna ports. **Please note the default Diversity value is "right". For VX1's with dual antennas, edit the NET.CFG file and change the value for the Diversity parameter to "on" as shown below.**

VX1 Equipped with Single Antenna

VX1's equipped with a single antenna use the right antenna port on the Cisco radio card. Make sure the Diversity section of the NET.CFG is set as follows:

```
;Diversity "on"      ;for use on terminals with 2 antennas
;Diversity "left"    ;for use on terminals with 1 antenna port left
 Diversity "right"   ;for use on terminals with 1 antenna port left
```

VX1 Equipped with Dual Antennas

VX1's equipped with dual antennas use both antenna ports on the Cisco radio card. Make sure the Diversity section of the NET.CFG is set as follows:

```
 Diversity "on"      ;for use on terminals with 2 antennas
;Diversity "left"    ;for use on terminals with 1 antenna port left
;Diversity "right"   ;for use on terminals with 1 antenna port left
```

PortBase – IRQ – Memory - Socket

The adapter needs 32 16-bit I/O ports, and 1 non-sharable IRQ. These values are set by PCMCIA card & socket services and should not be changed or uncommented.

Note: Any commented lines are managed by Card Services.

```
;PortBase   140
;IRQ        5
 Memory     C9000
;Socket     1
```

BusType

PCMCIA interface is used on all LXE DOS computers.

```
BusType    "PCMCIA"
```

Frame

Frame type of wired and wireless network.

```
(Default) Frame ETHERNET_II
Frame ETHERNET_802.3
Frame ETHERNET_802.2
```

LongRetryLimit

Specifies the number of times an unfragmented packet is retried before it is dropped and an error is reported.

Valid:	0-255
Default:	6

AWCLEAP

AWCLEAP is a DOS utility used to set the LEAP (Light Extensible Authentication Protocol) authentication on Cisco 350 radios. The SETLEAP.BAT file runs the AWCLEAP utility. To set LEAP, use the SETLEAP.BAT utility:

```
setleap <username> <password>
```

The CLEAR.BAT utility is used to clear the LEAP username and password. To clear LEAP, type *clear* at the C:\PCTCP prompt.

Using LEAP

To enable LEAP, change the LEAP parameter in NET.CFG:

```
LEAP    "ON"
```

Next, use the SETLEAP batch file at the C:\PCTCP prompt to set a username and password:

```
setleap <username> <password>
```

To clear the LEAP username and password, at the C:\PCTCP prompt, type:

```
clear
```

Using WEPDOS to set WEP in Cisco Radios

WEPDOS utility is used to program the WEP key into the Cisco 340 radios. Once the key value and key number to be used is set the NET.CFG file must be modified.

Syntax

```
WEPDOS [-ascii|-hex] [-key#|-home] key      set a key
WEPDOS [-key#|-home] -clear           clear a key
WEPDOS [-tx#]               select transmit key index
WEPDOS [-d]                display settings
```

Where

key is a 5 character ascii string

key is a 10 character hex-digit number

WEP128 allows 5 or 13 character ascii, and 10 or 26 hex-digit keys

-key# is default key index 1, 2, 3 or 4

-home selects the home key for use with home access points

-tx# selects the transmit key index 1, 2, 3 or 4 (enterprise networking)

Standard Options

```
-p[iobase]    io base address (hex) [380]
-b[membase    memory base address (hex) [D000]
-i[irq]interrupt request (decimal) [10]
-s[slot]      slot number (decimal) [0]
-365          82365 startup of card
Default:      no startup, IO:380, MEM:D000:0, IRQ:10, SLOT:0
```

Examples

To check wep key on a LXE computer the correct syntax type at c:\ prompt

```
Wepdos -365 -p340 - bcc00 -d
```

To set key for use type

```
Wepdos -365 -hex -key# <10 or 26 byte key> -tx# -d
```

WEPDOS supports up to 4 keys. As an example of setting key number 3 to 0f0f0f0f0f for use in transmitting type:

```
Wepdos -365 -p340 -bcc00 -s1 -hex -key3 1234567890 -tx3 -d
```

Symbol Radios

Note: Hex values are indicated with a leading 0x. NET.CFG values do not use the 0x.

The following is a list of parameters that can be modified in the NET.CFG file. To set the TCP/IP parameters see the *SOCKET.CFG* file documentation.

Link Support Layer

Buffers 4 1550   : required to avoid "Network jammed" message

```
Link Support
   BUFFERS 4 1550
```

TCPIP Protocol (located in the SOCKET.CFG file)

Substitute the appropriate IP addresses in order for your network to function properly.

```
Protocol TCPIP
    IP_Address XXX.XXX.XXX.XXX/net_bits
    Route add default if0 XXX.XXX.XXX.XXX
```

Sample NET.CFG for Symbol 2Mb Radios

```
IMPORTANT NOTE: commented lines must have a ; in column 1.
; Lines that are not commented out must have a space in column
; 1 and the parameter starts on column 2.
;

link support
 buffers 4 1550

protocol odipkt
 bind slaodi

link driver slaodi
 frame ethernet_ii

 ess_id       "LXE"

 cardservices    yes        ; must load slainit before
 socketservices  yes        ; slaodi to use CS&SS
 mode io

; ioaddress 300             ; assigned by CS&SS
; memory CC00
; interrupt 5
; tx_rate 1
; tx_rate 2
/; socket 2
; powermgmt       yes
  beacon_alg      11
  beacon_minimum 1
  beacon_maximum 10


;------------------
;  The following keywords are used to enable and manage the
802.11 WEP Encryption
```

```
;
;  Auth_Type can be either Open_System or Shared_Key for the
MU, the MAP will
;  support both Auth_Type settings at the same time.
;  The MU will only associate with APs or MAPs that support the
it's Auth_Type.  The
;  MAP will only allow MUs to associate if the MAP supports the
Auth_Type of the MU
;  The default Auth_Type is Open_System
;
;  Encrypt_Key# (where # is 1, 2, 3, or 4) will update the 1st,
2nd, 3rd, or 4th
;  key encryption key in the adapter, according to the value of
#.  The parameter
;  to these Keywords is 5 pairs of hex digits([0-9,a-f,A-F]) in
a string.
;  DO NOT prefix each pair with 0x.
;  The default keys for the MU match the default keys of the
UAP and MAP
;
;  Encrypt_Key_ID indicates which key the adapter is to use for
encrypting packets
;  for transmission. The parameter is a decimal digit from 1 to
4.
;  The default Encrypt_Key_ID is 1
;  Note: The key to by used to decrypt packets being received
is contained in the
;  received packet.
;------------------
;  Auth_Type       Open_System
;  Auth_Type       Shared_Key
;  Encrypt_Key1    "xx xx xx xx xx"
;  Encrypt_Key2    "xx xx xx xx xx"
;  Encrypt_Key3    "xx xx xx xx xx"
;  Encrypt_Key4    "xx xx xx xx xx"
;  Encrypt_Key_ID n


link driver slainit

 verbose yes
 DynWindowRsrcs yes
```

Sample NET.CFG Symbol 11MB Radio

```
;  1. A semicolon as the first non blank character denotes a
;     comment line.
;  2. Commented out parameter lines create the default setting.
;  3. Rate control only works with 2 Mbps (or greater) radios
;  4. Encryption controls only work with 2Mbps (or greater)
;     radios
;  5. ESSID must be changed to reflect the local network.

link support
 Buffers 4 1550

Protocol ODIPKT
 Bind s11odi

link driver s11odi
 frame ethernet_II
; frame ethernet_802.2

;  The ESS_ID can be a string of 1 to 32 case sensitive
;  characters.

 ess_id 101
 station_name


;  Use the following keyword to specify rates at which the
;  Adapter is allowed to operate.  If no rates are specified,
;  the Adapter will use all rates available on the radio.
;  Regardless of what is specified, the radio will allow either
;  1 and 2 Mbps or all four rates, i.e., 1, 2, 5.5, and 11
;  Mbps.
;  Tx_Rate 1 (1 Mbps)
;  Tx_Rate 2 (2 Mbps)
;  Tx_Rate 5 (5.5 Mbps)
;  Tx_Rate 11 (11 Mbps)
;
; Tx_Rate 1
; Tx_Rate 2
; Tx_Rate 5
; Tx_Rate 11

;  Note: IO Mode is required if using Card/Socket Services

 Mode IO
 IOAddress 340
 Memory C9000
 Interrupt 5

; Set performance index to "0" for VX1 and "1" for MX3. 0=CAM ,
;  1=Power Management On
 performance_index 0

; Set diversity to "Both" for two antennas and "A" for one
; antenna.
 diversity BOTH
```

```
; To enable WEP you must set encrypt_enable to "y" and the set
; the encryption key to the same value as the AP is set for.
; For 128 bit encryption keys you must have 13 pairs of hex
; digits and 5 pairs of hex digits for 40 bit encryption. Once
; the key is set use the "encrypt_key_index" parameter to
; select which key is transmitted.

; encrypt_enable y
; Encrypt_Key1 12 34 56 78 90 12 34 56 78 90 12 34 56
; Encrypt_Key2 12 34 12 34 12 34 12 34 12 34 12 34 12
; Encrypt_Key3 AB CD EF 12 34 56 78 90 AB CD EF 12 34
; Encrypt_Key4 12 34 56 78 12 34 56 78 12 34 56 78 12
; encrypt_key_index 1
; encrypt_level
```

WEP - Prior to November 2003

```
; To enable WEP you must set encrypt_enable to "y" and then set the
; encryption key to the same value as the AP is set for. For 128 bit
; encryption keys you must have 13 pairs of hex digits and 5 pairs of
; hex digits for 40 bit encryption. Once the key is set use the
; "encrypt_key_index" parameter to select which key is transmitted.

; encrypt_enable y
; Encrypt_Key1 12 34 56 78 90 12 34 56 78 90 12 34 56
; Encrypt_Key2 12 34 12 34 12 34 12 34 12 34 12 34 12
; Encrypt_Key3 AB CD EF 12 34 56 78 90 AB CD EF 12 34
; Encrypt_Key4 12 34 56 78 12 34 56 78 12 34 56 78 12
; encrypt_key_index 1
; encrypt_level 2
```

WEP - After November 2003

```
; To enable WEP you must set Encrypt_Enable_Index to the number of the
; Encrypt_Key# to use and then set the encryption key to the same
value
; as the AP is set for. Zero means No Encryption and is the default.
; For 128 bit encryption keys you must have 13 pairs of hex digits and
; 5 pairs of hex digits for 40 bit encryption.

; Encrypt_Enable_Index 0
; Encrypt_Key1 12 34 56 78 90 12 34 56 78 90 12 34 56
; Encrypt_Key2 12 34 12 34 12 34 12 34 12 34 12 34 12
; Encrypt_Key3 AB CD EF 12 34 56 78 90 AB CD EF 12 34
; Encrypt_Key4 12 34 56 78 12 34 56 78 12 34 56 78 12
```

Parameters

Link Support

Parameter used to define resources for the LSL.COM file. Any modifications may cause resource conflicts.

Protocol

Instructs TCP/IP stack to bind to radio driver.

ESS_ID

Identifies the 802.11B wireless network the station will connect to. The ESS_ID is a string of 1 to 31 case sensitive characters. Spaces may be included by using quotes.

    Default: "LXE"

cardservices

To use card and socket services, you must load slainit before slaodi. iodaddress, memory, interrupt and socket lines must be comment with ;.

    Default: yes

Note: This parameter is valid for Symbol FHSS radios only.

socketservices

To use card and socket services, you must load slainit before slaodi. iodaddress, memory, interrupt and socket lines must be comment with ;.

    Default: yes

Note: This parameter is valid for Symbol FHSS radios only.

mode

IO mode required if using card and socket services.

    Default: IO

ioaddress

Sets the I/O address location.

    Default: 300

memory

Sets the resource memory location.

    Default: CC00

interrupt

Sets the interrupt (IRQ) line to be used.

    Default: 5

powermgmt

Configures whether the Symbol FHSS radio card will perform power management.

    Valid: Y=Yes or N=No
    Default: N

Note: This parameter is valid for Symbol FHSS radios only.

performance_index

Configures whether the Symbol 4121 series radio will perform power management.

```
Valid:          0=CAM Constant Awake Mode
                1=Power Management On
Default:        1
```

Note: This parameter is valid for Symbol 4121 series radios only.

Auth_type

This parameter is used to enable and manage the 802.11 WEP encryption. The radio card will only associate with APs that support the same Auth_type.

```
Valid:          "Open_System" or "Shared_Key"

Default:        "Open_System"
```

Note: This parameter is valid for Symbol 4121 series radios only.

Encrypt-Key#

Updates the first, second, third or fourth encryption key, according to the value of #.

For Symbol FHSS radio cards, the key consists of 5 pairs of hex digits (0-9, a-f, A-F) in a string.

For Symbol 4121 series radio cards, use 5 pairs of hex digits for 40 bit encryption. Use 13 pairs of hex digits for 128 bit encryption.

encrypt_enable

Enables encryption on Symbol 4121 series radios.

```
Valid:          yes or no
Default:        yes
```

Note: This parameter is valid for Symbol 4121 series radios only.

Encrypt_Key_ID

The key ID indicates which key the adapter is to use for encrypting packets.

```
Valid:          1 to 4

Default:        1
```

Note: This parameter is valid for Symbol FHSS radios only.

encrypt_key_index

The index indicates which key the adapter is to use for encrypting packets.

```
Valid:          1 to 4

Default:        1
```

Note: This parameter is valid for Symbol 4121 series radios only.

Encrypt_Enable_Index

This parameter indicates which key the adapter is to use for encrypting packets for transmission. Zero means No Encryption (i.e. turn encryption off), and numbers 1 through 4 mean turn encryption on and use the specified key (i.e. key #1, key #2, key #3 or key #4). The key to be used to decrypt packets being received is contained in the received packet.

```
Valid:         0,1,2,3,4

Default:       0   (No Encryption)
```

Note: This parameter is valid for Symbol 4121 series radios only.

diversity

Set diversity to "both" for two antennas and "A" for one antenna. Please note that the default value is "A" (for a VX1 delivered with a single antenna) or "Both" (for a VX1 delivered with dual antennas).

Note: This parameter is valid for Symbol 4121 series radios only.

VX1 Equipped with Single Antenna

VX1's equipped with a single antenna use the left antenna port (Port A) on the Symbol radio card. Make sure the Diversity section of the NET.CFG is set as follows:

```
diversity A
```

VX1 Equipped with Dual Antennas

VX1's equipped with a single antenna use both antenna ports on the Symbol radio card. Make sure the Diversity section of the NET.CFG is set as follows:

diversity Both

Tx_rate

Use this parameter to specify that rates at which the radio is allowed to operate. If no rates are specified, the radio will use all available rates.

```
Valid:            1    1 Mbps
                  2    2 Mbps
                  5    5.5 Mbps (Symbol 4121 series only)
                  11   11 Mbps  (Symbol 4121 series only)
```

SOCKET.CFG

Note: To enable DHCP set the IP address of the terminal to 0.0.0.1 in SOCKET.CFG.

Note the following procedure for specifying the subnet mask in the socket.cfg file.

The net mask is specified as part of the ip address in the socket.cfg file. In the ip address command an optional */net_bits* can be used to indicate the number of bits in the network ID. The net mask is used to determine whether an incoming datagram is a broadcast and also for sending UDP broadcasts.

Net masks are more easily represented in binary or hexadecimal format. For example, the IP address 128.1.1.5/24 corresponds to a net mask of 255.255.255.0 (FFFFFF00h), 25 bits to 255.255.255.128 (FFFFFF80h) and 26 bits to 255.255.255.192 (FFF FFC0h).

The default net mask used corresponds to the class of address used if not explicitly specified.

Net Bits	Net Mask	Class	IP address range
8	255.0.0.0	A	0.x.x.x to 127.x.x.x
16	255.255.0.0	B	128.x.x.x to 191.x.x.x
24	255.255.255.0	C	192.x.x.x or higher

If you want to subdivide your network, you can divide it by two for every net bit added. The following table provides information on converting between net bits and net mask. The number of net bits to add when changing a 0 in the net mask to:

Net Bits	Net Mask			Net Bits	Net Mask		
1	1	2	8	5	2	4	8
2	1	9	2	6	2	5	2
3	2	2	4	7	2	5	4
4	2	4	0	8	2	5	5

Bootstrap Protocol (BOOTP)

BOOTP is a UDP/IP based protocol that provides a means to assign an IP address to a booting host dynamically and without user supervision. BOOTP can also supply the net mask, host name, and address of a domain name server. One obvious advantage of this procedure is the centralized management of network addresses, which eliminates the need for per-host unique configuration files. Sockets implements the BOOTP client whenever it is started with no (or the 0.0.0.0) IP address supplied. For file server based networks, Sockets workstations can be configured in a similar way using the SETHOST utility.

Sample SOCKET.CFG File

> *Note: Some parameter values in the SOCKET.CFG file are dependant upon the type of radio
> card installed. Please refer to "Sockets Parameters" later in this chapter for details.*

```
# Socket.cfg sets the options for Data Light socketp.exe
# The section xxx.xxx.xxx.xxx is for this machines IP
# The net mask is specified as part of the ip address.
# In the ip address command an optional /net_bits can be
# used to indicate the number of bits in the network ID.

#   Net Bits Net Mask        Class IP address range
#   8           255.0.0.0       A     0.x.x.x to 127.x.x.x
#   16          255.255.0.0   B     128.x.x.x to 191.x.x.x
#   24          255.255.255.0 C     192.x.x.x or higher

# The network can be subdivided by two for every net bit added.

#   Net Bits  Net Mask Net Bits   Net Mask
#   1           128        5          248
#   2           192        6          252
#   3           224        7          254
#   4           240        8          255

# To enable DHCP set the IP address to 0.0.0.1

IP address 0.0.0.1/16

# The ARP INIT parameter makes this stack the same as
# before. The stack will not send a DHCP ARP (DEFAULT) when
# booting up. For added IP address checking you may comment
# this line out if you are NOT using proxy ARP.

ARP INIT GRAT

# Interface sets the physicalinterfaces
# pdr=packet driver
# if0=interface_card
# dix=frame type
# 1500=MTU
# 10=Buffers
# 0x69=ioaddr

Interface pdr if0 dix 1500 10 0x69

# When using a gateway (IP router) to the rest of the world,
# replace "XXX.XXX.XXX.XXX" with your gateway ip and
# remove the # at the beginning of the line.

# route add default if0 XXX.XXX.XXX.XXX

# When using a domain name server (DNS),
# replace XXX.XXX.XXX.XXX with the IP address of the DNS,
# and remove the # at the beginning
# of the line

# domain server XXX.XXX.XXX.XXX

# domain suffix        # example lxe.com
```

```
# Redisplay IP information

IP address

# options, refer to documentation to change

ip ttl 15
tcp mss 1360
tcp window 2920
tcp retry 8
tcp irtt 500ms
```

Setting SOCKETS.CFG Parameters

Set IP Address

To enable DHCP set the IP address to 0.0.0.1

IP address XXX.XXX.XXX.XXX/16

where

XXX.XXX.XXX.XXX is the IP address

16 indicates the number of bits in the network ID

Set ARP INIT

Controls whether a DHCP ARP is sent when booting up.

ARP INIT GRAT

Using this option makes the stack behave the same as before. The stack does not send a DHCP ARP when booting up (In this mode, the ARP contains the MAC and IP addresses in the sender's field). This option is the default.

ARP INIT DHCP

Using this option sends a DHCP ARP on boot up (the sender's IP address field is zero filled).

Set Interface

For all radios except Symbol DS 11MB

Interface sets the physical interfaces

```
Interface pdr if0 dix 1500 10 0x69
```

where

> pdr = packet driver
> if0 = interface_card
> dix = frame type
> 1500 = MTU
> 10 = Buffers
> 0x69 = ioaddr

For Symbol DS 11MB radios

Interface sets the physical interfaces

```
Interface pdr if0 dix 1400 10 0x69
```

where

> pdr = packet driver
> if0 = interface_card
> dix = frame type
> 1400 = MTU
> 10 = Buffers
> 0x69 = ioaddr

Set Router IP (Gateway only)

When using a gateway (IP router) to the rest of the world, replace "XXX.XXX.XXX.XXX" with your gateway ip and remove the # at the beginning of the line.

```
# route add default if0 XXX.XXX.XXX.XXX
```

Set Domain Name Server

When using a domain name server (DNS), replace XXX.XXX.XXX.XXX with the IP address of the DNS, and remove the # at the beginning of the line.

```
# domain server XXX.XXX.XXX.XXX
```

Display IP Address

Redisplay IP information when SOCKET.CFG runs.

```
IP address
```

Options

For all radios except Symbol DS 11MB

Refer to documentation to change.

```
ip ttl 15
tcp mss 1460
tcp window 2920
tcp retry 8
tcp irtt 500ms
```

For Symbol DS 11MB radios

Refer to documentation to change.

```
ip ttl 64
tcp mss 1360
tcp window 2920
tcp retry 8
tcp irtt 500ms
```

Sockets Parameters

domain

If a host name is not a decimal (dotted) address and it is not found in the HOSTS file and at least one Domain Name Server has been defined, an attempt is made to obtain the address from the defined DNS server(s). The number of times any server is polled (retries), in addition to the time to wait for a response, can also be specified. A suffix may be specified and is attached to all names not containing any dots.

All of the following sub-commands can be issued without the optional parameters to obtain information on the current status.

Syntax

```
domain server [host_name]
domain retry [retry_count]
domain time [wait_time]
domain suffix [domain]
```

domain server adds a DNS address or lists the current servers if host_name not specified.

domain retry specifies the retry count for polling each server. domain retry lists the retry count if retry_count not specified.

domain time specifies or lists the time (milliseconds) to wait for a response before attempting retry.

domain time lists the time (milliseconds) to wait if wait_time not specified.

domain suffix specifies the domain suffix to add to all simple names; names that contains no dots.

domain suffix lists the domain suffix if domain is not specified.

Example

```
domain retry 3
domain server 196.2.1.1
domain suffix myorg.co.za
domain time 2000
```

iface

iface is a synonym for the interface command.

---

interface

interface informs Sockets of the hardware or software communications interface(s) to be used at the network interface level. At least one network interface is required, and two or more are used in gateway (router) applications.

The class or mode of each interface defines the encapsulation used for packaging the data frame into the transport frame. Some types of interface support only one class.

When using more than one interface, Sockets assigns the previous given IP address in the .CFG file to this interface and uses its net mask to add a route to that net through this interface. Using the same IP address would result in multiple routes to the same network. The default route is set on the first interface with an IP address with a zero net mask (for example, IP address 19.63.10.11/0).

Each interface statement uses the IP address from the last supplied IP address statement.

Syntax (general)

```
interface type name class other parameters
```

Syntax (specific)

```
interface pdr name dix mtu numbuf intvec [irq]
interface asy name [slip | cslip | ppp] mtu buflim ioaddr
iovec speed [modemfile]
```

Parameters

Type

Type defines the type of hardware or software interface.

interface supports the following software interfaces.

Interface	Description
Asy	Standard PC asynchronous interface (RS232 port)
Pdr	packet driver interface

name

name defines the name by which the interface is known on the local host. *name* is a symbolic name known only to the local host on which it is used.

name may be arbitrarily assigned. Each interface command on the same host must have a unique name assigned. This name is used by commands such as route, trace, param, and so on.

class

class specifies how IP datagrams are to be encapsulated in the link level protocol of the interface.

Some interfaces offer a choice between classes while others use a fixed class. The following classes are available and are listed with their associated types.

Type	Class (defined in the following list)
Pdr	dix, ieee, token, driver, slip
Asy	raw, slip, cslip, ppp

Class	Description
Dix	The DEC/Intel/Xerox Ethernet interface also known as Blue Book Ethernet or Ethernet II.
Token	IBM Token Ring. Source routing is supported for multiple rings.
Ieee	IEEE: 802.3 Ethernet with SNAP headers.
Driver	Use the default class for the packet driver.
Slip	Serial Link Internet Protocol (SLIP) for point-to-point asynchronous links. This mode is compatible with UNIX SLIP.
Cslip	Compressed Serial Link Internet Protocol (SLIP) for faster reaction over point-to-point synchronous links.
Ppp	Point-to-point protocol over asynchronous links.

mtu

mtu specifies the Maximum Transmission Unit size, in bytes. Datagrams larger than this limit are fragmented into smaller pieces at the IP layer. The maximum value of *mtu* for the various interfaces is:

Ethernet - 1500

For serial links a standard value for *mtu* is 576. (576 is the maximum according to specifications, but may be increased on reliable connections as long as both sides use the same value.)

numbuf

numbuf specifies how many incoming datagrams may be queued on the receive queue at one time. If this limit is exceeded, further received datagrams are discarded. This mechanism is used to prevent fast interfaces from filling up memory when data cannot be handled fast enough.

buflim

buflim specifies the maximum number of outgoing datagrams or packets to queue before starting to discard datagrams. This mechanism is used to prevent the memory from filling up when a serial link goes down.

bufsize

bufsize specifies the size of the ring buffer in bytes to be allocated to the receiver in raw mode.

intvec

intvec specifies the software interrupt number (vector) in hexadecimal to use for resident packet drivers.

ioaddr

ioaddr is the I/O base address in hexadecimal of a serial port or the hardware controller and must correspond with the jumper or switch settings used during the setup of the controller board. The standard values for serial ports are:

COM1	03F8h
COM2	02F8h
COM3	03E8h
COM4	02E8h

iovec

iovec is the hardware interrupt vector used by the serial port or controller and must correspond with the jumper or switch settings used during setup of the controller. The standard values for serial ports are:

COM1	4
COM2	3
COM3	4
COM4	3

irq

irq is the hardware interrupt vector used by the network interface controller. This is only used for faster response in Sockets.

modemfile

A file containing the modem commands and scripts.

speed

speed specifies the transmission speed for serial interface devices (baud rate). Before using a serial connection you have to set flow control with the param command.

Examples

```
interface pdr if0 dix 1500 5 0x60
interface asy ser0 cslip 576 15 0x3f8 4 9600
interface asy p0 ppp 1500 30 0x3f8 4 9600 pppmod.mod
```

ip

ip displays or sets the values of the options selected when defining the IP (internet protocol) host address of the next interface to be defined.

Syntax

```
ip address [hostid [/net_bits] ]
ip status
ip ttl [number]
```

ip address sets the IP host address of the next interface to be defined. A route is automatically added to each interface for the default or specified net mask for its address. To make an automatic route the default, specify the net bits as zero. When specified without the optional parameters, ip address displays the current value(s) of the local host IP address(es). To assign different IP addresses to different interfaces on the same host, an ip address statement must precede each interface definition. The last IP address given is used in case of missing ip address statements.

ip status displays Internet Protocol (IP) statistics, such as total packet counts and error counters of various types. It also displays statistics on the Internet Control Message Protocol (ICMP). This includes the number of ICMP messages of each type sent or received.

ip ttl sets the default time-to-live value which is placed in each outgoing IP datagram. The ttl value limits the number of gateway hops the datagram is allowed to take in order to kill datagrams that got stuck in loops.

Parameters

hostid

hostid specifies the IP host address to assign to the next interface to be defined. This may be a symbolic name from the HOSTS file, or a dotted decimal address.

/net_bits

A net mask can be specified for the host. In the ip address command an optional */net_bits* can be used to indicate the number of bits in the network ID. The net mask is used to determine whether an incoming datagram is a broadcast and also for sending UDP broadcasts.

Net masks are more easily represented in binary or hexadecimal format. For example, the IP address 128.1.1.5/24

corresponds to a net mask of 255.255.255.0 (FFFFFF00h),

25 bits to 255.255.255.128 (FFFFFF80h)

and 26 bits to 255.255.255.192 (FFF FFC0h).

The default net mask used corresponds to the class of address used if not explicitly specified.

Net Bits	Net Mask	Class	IP address range
8	255.0.0.0	A	0.x.x.x to 127.x.x.x
16	255.255.0.0	B	128.x.x.x to 191.x.x.x
24	255.255.255.0	C and higher	192.x.x.x or higher

If you want to subdivide your network, you can divide it by two for every net bit added. The following table provides information on converting between net bits and net mask. The number of net bits to add when changing a 0 in the net mask to:

Net Bits	Net Mask	Net Bits	Net Mask
1	128	5	248
2	192	6	252
3	224	7	254
4	240	8	255

number

When *number* is omitted, **ip ttl** displays the current value of the time to live parameter.

param

param invokes a device-specific control routine. When executed without parameters, param displays defined interface names and device-specific flags. param operates differently for each interface type and even interface mode. In many cases it is used to interrogate the status of an interface. The ifstat and param commands perform similar and, in some cases, exactly the same function.

Syntax

```
param ifname [arg1...argn]
```

Parameters

ifname

ifname defines the name used in the interface command for the device to be controlled.

arg1...argn

These parameters depend on the type of interface in use.

Example

To display current serial link settings and restart the statistics on it, use:

```
param sl0 clear
```

param, Alternative Routing Control Sub-commands

The Alternative Routing Control Sub-commands set up and check the Sockets alternative route mechanism. More than one route can be specified to a target host or network. The first route which has an associated interface in the up state is used.

An interface is in the up state when it is defined by the interface command. It enters the query state when it does not receive valid input within a specified up-time period after sending data expecting a response. At this stage three (catering for links with a high data loss) ICMP echo requests (ping) are sent to a query IP address. It enters the down state by a Sockets command or when it does not receive valid input within the specified up-time period after entering the query state. If an up-time has never been specified or a value of 0 is specified, the interface will stay in the up state whether valid input is received or not.

An interface enters the up state by a Sockets command or when valid input is received on that interface when in the down or query states. An ICMP echo request is sent on an interface in the down state every down-time period. If a down-time has never been specified or a value of 0 is specified, the ICMP echo request will not be sent. Up-time and down-time is specified in seconds.

Syntax

```
param ifname [ uptime | downtime ] time
param ifname query hostname
```

Example Alternative Routing

Two X.25 interfaces are used to get to the target network 192.6.1.0. The first interface, named if0 should preferably be used, but if it stops receiving for a period of 20 seconds, it should try to ping 192.6.1.2 and if no response is received within another 20 seconds, if1 should take over, but if0 should be tried every five seconds. Interface if1 should disconnect after 80 seconds of no traffic.

The SOCKET.CFG file should contain the following:

```
interface x25 if0 ... ... ...
param if0 uptime 20
param if0 downtime 5
param if0 query 192.6.1.2
interface x25 if1 ... ... ...
param if1 uptime 80
param if1 downtime 5
param if1 query 192.6.1.2
route add 192.6.1.0 if0
route add 192.6.1.0 if1
```

In the case of both if0 and if1 failing, both are tried every five seconds until one comes up. The return paths should also be maintained in a similar way with Sockets or by using RIP.

param, RIP Advertising Sub-command for Interfaces

When the rip advertise command has been used, this param sub-command makes allowance to disable and re-enable RIP advertising on a specific interface.

Syntax

```
param ifname [ ripadv | noripadv ]
```

Examples

```
param if0 noripadv
param if1 ripadv
```

route

route creates an entry in the IP routing table for Sockets to determine where to send data. The Alternative Routing mechanism allows more than one route to be specified to a particular host or network. Failure of one route causes an automatic switch to the next route.

Refer also to the ip address command for specifying the net mask, because a route is automatically added to each interface for the default or specified net mask for that address. When multiple routes are defined to the same address, Sockets uses the route with the network size (largest number of bits in the net mask).

Syntax (general)

```
route [ add | drop destination ifname [gateid |none [ metric
[proxy] [private] [static] ] ] ]
```

Syntax (specific)

```
route add [ hostid | netid ] ifname [gateid]
route add [ hostid | netid[/mask] ] ifname [gateid]
route add default ifname
route drop [ hostid | netid ]
route drop [ hostid | netid[/mask] ]
route drop default
```

Parameters

add or drop

Sub-command to add or drop (remove) a route from the routing table.

default

All transmissions to IP addresses not otherwise defined in routing commands are sent via the network interface specified by *ifname*.

hostid

hostid is the IP address of a destination remote host to which data must be sent, or a remote host which must be removed from the routing table (dropped).

netid

netid is the IP address of a destination network to which data must be sent. Any host with this IP network address is able to receive the data. Whether a particular host will use the data depends on the host portion of the specific IP address in the IP header.

mask

mask specifies the number of bits in the network portion of the address if sub-netting is used. If not used, the network portion of the address is determined according to the class (A, B or C) of the address.

ifname

ifname defines the name used in the interface command for the immediate network on which the data for the designated host must be sent. This is the network level interface to be used by the local host to reach the remote host.

gateid

gateid parameter specifies the IP address of a host, on the same physical network as the local host, which is used as a gateway or router to a different network. The gateway or router host specified in *gateid* must be directly reachable on the same physical network as the local host defining this gateway. In other words, this must be the nearest gateway to this local host.

metric

When using RIP or Proxy ARP a value from 0 to 16 for *metric* must be specified indicating the distance or cost of that route. A *metric* of 16 indicates that the route is down.

proxy, private and static

To support the Routing Information Protocol (RIP) the route command utilizes the proxy, private and static key words. These words can be used in any order following *metric*.

Proxy ARP should be used with care and not in conjunction with RIP. When more than one host responds to an ARP request, it can cause confusion and even lead to system crashes. This is possible in situations where more than one gateway implements Proxy ARP to a common destination.

When "RIP advertising" is selected, all interfaces advertise all routes except those routes making use of that specific interface (split horizon) and routes marked private. A route which is dropped as a result of a RIP update or which becomes unavailable as a result if its associated interface going into the down state, is immediately advertised as being infinite (metric = 16) and is not advertised until it becomes available again. In order for an interface to be used for advertising, a route without a gateway using that interface must be available. The advertisement is sent as a sub-net broadcast using the net mask of the host and the IP address of the interface.

When "RIP using" is selected, routes are updated according to received RIP advertisements. Routes added or amended as a result of RIP, have a timeout associated with them. If another RIP advertisement is not received during that time, the route is dropped. A route is also dropped if an advertisement of infinity (metric = 16) is received. To prevent dropping a route, it must be marked as static. The metric of a route marked static is never updated by a RIP advertisement. Instead a duplicate route is added before the static route. If the duplicate route is dropped as a result of a timeout or RIP, the static route is used again.

Examples

```
route add default ipx0
route add unix_net eth0
route add unix_host ipx1 unx_gate
route add unix_net2 eth0 /eth 1
route add unix_ net ipx0 unx_ gate
route add subnet/26 eth0 sub_gw
route drop unix_net
```

route can specify a Proxy ARP on a route, as follows:

```
route add net interface gateway metric [proxy]
```

When using Proxy ARP, gateway and metric must be specified. If no gateway is used, none can be specified. For example:

```
route add 192.6.1.0 ifx25 none 5 proxy
```

---

tcp

tcp commands display or set various TCP operating parameters. The TCP configuration commands are put into SOCKETS.CFG.

Syntax

```
tcp irtt [time]
tcp lport [port_number]
tcp mss [size]
tcp retry [number]
tcp rtt [time]
tcp smss [size]
tcp timemax [time]
tcp window [size]
```

Parameters

time

time is the new time value in seconds, or milliseconds if "ms" is appended to the number, as in 2000ms.

port_number

port_number is the local port starting number.

size

For tcp mss, *size* is the maximum segment size in bytes sent on all outgoing TCP connect requests (SYN segments). *size* tells the remote host the size of the largest segment that may be received by this host. When changing the MSS value, any existing connections remain unchanged.

For tcp smss, *size* is the send maximum segment size in bytes sent on all outgoing TCP connect requests. This limits the size of the largest segment that may be sent by this host. When changing the SMSS value, any existing connections remain unchanged.

For tcp window, *size* is the size of the receive window in bytes for any new TCP connections. Existing connections are unaffected.

number

number is the number of retries attempted without receiving an acknowledge from the remote host before the connection is broken. If the value exceeds 255, it implies an infinite number of retries; such a connection does not time-out. The default value for *number* is 6.

---

tcp irtt Sub-command

tcp irtt displays or sets the initial round-trip-time estimate. When specified without an argument, the command displays the current values of TCP parameters including the initial round-trip-time in milliseconds.

time is the initial round-trip-time (IRTT) estimate and is used for new TCP connections until the actual value can be measured and adapted to. By increasing this value when operating over slow communication links, unnecessary retransmissions that otherwise occur before the smoothed estimate value approaches the correct value are minimized. The system default is 5000 milliseconds.

To affect incoming connections, tcp irtt should be executed before the servers are started.

Example

```
tcp irtt 120
```

Sample Output

```
TCP: IRTT 5 ms Retry 6 MSS 1460 SMSS 1460 Window 2920
```

tcp lport Sub-command

tcp lport specifies the local port starting number. When specified without a number the current value of the next free local port number is displayed.

Example

```
tcp lport 2004
```

Sample output

```
Lport = 2004
```

tcp mss Sub-command

tcp mss displays or sets the TCP maximum segment size in bytes. When size is not specified, the current values of the TCP parameters, including the maximum segment size, are displayed. It is recommended to reduce the MSS and SMSS on bad network connections.

Example

```
tcp mss 1460
```

tcp retry Sub-command

tcp retry displays or sets the retry count before a connection is broken. When specified without the number parameter, tcp retry displays the current values of TCP parameters, including the retry count.

tcp rtt sub-command

tcp rtt replaces the automatically computed round-trip time (RTT) for the specified connection with the time in milliseconds. Sockets calculates the RTT as a smooth average of past measured RTTs, starting with the IRTT on a new connection.

To get the current RTT in use for a connection n, use the tcp status n command that will give the smoothed average RTT indicated by SRTT.

Because tcp rtt provides a manual override of the normal back-off retransmission timing mechanisms, it may be used to speed up recovery from a series of lost packets.

Example

```
tcp rtt 4 100
```

tcp smss sub-command

tcp mss displays or sets the TCP send maximum segment size in bytes. When size is not specified, the current values of the TCP parameters, including the SMSS, are displayed.

A small SMSS causes the remote to reduce its segment size. tcp mss can reduce the MSS and SMSS on bad network connections with high loss rates or where large packets get lost.

Example

```
tcp smss 512
```

tcp window sub-command

tcp window displays or sets the default and maximum receive window size.

When specified without the size parameter the current TCP parameters, including the current window size, are displayed.

Example

```
tcp window 2920
```

tcp timemax sub-command

tcp timemax sets the maximum duration of a tcp retry. If a value greater than 255 seconds is specified, connections will never timeout.

This is very useful in wireless applications where nodes roam in and out of service.

Example

```
tcp timemax 2000ms
```

API Calls

See Also: LXE DOS API Programming Guide E-SW-DOSAPIPG-A

The LXE DOS Computer Application Programmer's Interface (API) is designed to enable application programmers to access the functionality of the computer hardware without requiring them to understand the details of the hardware design.

The LXE VX1 Vehicle Mount Computer is architecturally an AT Clone with power management features required for mobile use. Like all AT computers, it uses a BIOS software layer to provide a hardware programming interface to both DOS and the Application Programs. It is functionally a 486 mobile AT customized for data collection applications. Both BIOS and DOS are available for programming ease, but applications must be customized to make use of the enhanced features as well as to operate with the reduced function LCD and keypad. The VX1 is not designed to be a general-purpose computer.

API services are accessed through software interrupts 10h and 15h. The 486 API is the application-level and driver-level software interface for all of the unique VX1 hardware.

A simple register-based procedure parameter passing architecture has been implemented with a similar structure used by IBM BIOS. All procedural calls to the 486 API microcode is to be done via a software interrupt.

Sample Code for API Calls

The following is a brief code segment that enables the scanner on the combination Scanner/RS-232 endcap, demonstrating the proper use of API calls:

```
#include <stdio.h>
#include <dos.h>

#define PROT_INT        0x15
#define PROT_EXT        0xba
#define SCAN_CONTROL    0x56
#define COM1_MODE       0x41
#define SCANNER         0x00
#define RS_232          0x01
```

Chapter 5 Commands

Introduction

This chapter describes the Datalight ROM-DOS commands *that are loaded in the VX1 by LXE*. The information in this chapter is taken from Datalight's "ROM-DOS 6.22 User's Guide" and is used by permission.

ROM-DOS Commands

Each entry includes an explanation of the command's purpose, the command entry syntax, remarks, and examples. Where applicable, command syntax and parameters are given. Parameters may be supplied using either uppercase or lowercase letters, and the hyphen (-) may be substituted for the forward slash (/).

Each command also has a label to designate whether it is an internal or external command. Internal commands are part of the command processor program, COMMAND.COM. These functions are available only while COMMAND.COM is running. External commands are actually stand-alone utility programs. They are independent from COMMAND.COM.

ANSI.SYS

Type

Installable Device Driver

Purpose

ANSI.SYS is a console device driver that allows you to support ANSI codes on the local display.

Syntax

```
Device=ANSI.SYS [options]
```

Remarks

ANSI.SYS supports standard ANSI escape sequences.

ANSI.SYS writes directly the screen when using text video mode.

Options

The */K* option forces use of the extended keyboard BIOS calls which sense F11 and F12.

The */X* option lets you redefine the extended keys independently.

The */S* option disables the keyboard redefinition feature.

The */Tnn* option indicates that the video mode *nn* is a text mode. By default, modes 0, 1, 2, 3 and 7 are text modes.

Examples

```
DEVICE=ANSI.SYS
```

This example loads ANSI.SYS with default settings.

```
DEVICE=ANSI.SYS /T54 /S
```

Load ANSI.SYS with mode 54h as a video text mode and disable keyboard redefinition.

ATTRIB.EXE

Type

External

Purpose

The ATTRIB command either displays or modifies the attribute of a file.

Syntax

```
ATTRIB [+ ¦ -][option][filespec]
```

Remarks

The file attributes define the characteristics of a file. They determine if a file may be deleted or modified, or if it is archived. The ATTRIB command is used to manage these file attributes.

Wildcard characters may be used in the ATTRIB **filespec**.

The ATTRIB command will modify file attributes if modify commands are given to ATTRIB. The modify commands are:

Command	Description
+/-	Add(+) or remove(-) attribute
A	Archive attribute
C	Clear all attributes
H	Hidden file attribute
R	Read only attribute
S	System file attribute

If no modify commands are found by ATTRIB, then the files are displayed along with the file names and their current attributes.

Examples

ATTRIB will add the read-only attribute to the file myfile.dat.

```
ATTRIB +r myfile.dat
```

ATTRIB will remove the read-only attribute and the archive attribute for all files with the DAT extension.

```
ATTRIB -a -r *.dat
```

ATTRIB will display the attributes of all files with the DAT extension.

```
ATTRIB *.dat
```

CHKDSK.EXE

Type

External

Purpose

The CHKDSK command checks the disk directories and File Allocation Table (FAT) and displays a disk and memory report.

Syntax

CHKDSK [*d:*][*path*][*filespec*][/C] [/F] [/V]

Remarks

CHKDSK examines a disk and determines if the disk has any errors in the File Allocation Table (FAT) and will optionally fix errors.

Options

The */F* option causes CHKDSK to fix errors on the disk if any were found. The errors that can be found are directory or FAT errors. If the /F is not specified then CHKDSK acts as if it will fix the disk, but the corrections will not be written out to the disk.

If errors are detected, you will be prompted with a message similar to the following:

```
15 lost allocation units found in 5 chains.
Convert lost chains to files?
```

If you answer Y for Yes, each lost chain will be written to a file in the root directory of the current default drive. Each file will have the name file*nnnn*.chk. *nnnn* will be a sequential number. The first chain will be in FILE000.CHK. These files can be verified to see if they contain valuable information, and then deleted if desired. If you select N for No to the above prompt, CHKDSK will still make the corrections, but the lost chains do not get saved to the disk.

The */C* option allows CHKDSK to correct errors without user confirmation. This option must be used along with the /F option for corrections to be made.

The */V* option causes CHKDSK to display each path and file as it is processed.

If a file specification is specified, then CHKDSK displays all files matching the specification that have noncontiguous data areas on the disk. Files that are stored in noncontiguous areas, especially .exe files, have slower disk access times. If CHKDSK reports a large number of files with this problem, a utility program that optimizes the files and free space on your disk should be used.

After checking the disk, CHKDSK displays any error messages followed by a report on the state of the disk that was checked. An example of the report is shown below.

```
Volume ROM-DOS created June 1,1990 1:00a
Volume Serial Number is 190E-4AA2
 362496 bytes total disk space
 0 bytes in 1 hidden files
 6144 bytes in 2 user files
 356352 bytes available on disk
 655360 bytes total memory
 595360 bytes free
```

CHKDSK does not wait for a disk to be inserted before the checking is initiated nor does it repair any errors.

Examples

CHKDSK will check the integrity of drive A. The report will be printed to the console.

```
CHKDSK a:
```

CHKDSK will check the integrity of RAM disk D. The report will be saved in a file called DRIVE_D.RPT.

```
CHKDSK d: >drive_d.rpt
```

COMMAND.COM

Type

External

Purpose

Start a new command processor.

Syntax

```
COMMAND[device][/E:number][/K:filename]
 [/P][/C string][/MSG]
```

Remarks

This command starts a new copy of the ROM-DOS command processor. The command processor is the program that has all the internal DOS commands in it.

Starting a new command processor will also produce a new environment. The size of the environment is 128 bytes by default, but it can be changed using the /E switch.

Command and its arguments can also be used in a SHELL= statement in your config.sys file. See the full description of SHELL for more details.

Options

The *device* option specifies that COMMAND.COM should use a different device, such as AUX, for input and output.

The */E:number* switch sets the environment size. Number represents the size of the environment in bytes. Number must be in the range from 160 to 32768. All other values will be ignored and the default value of 256 will be used. ROM-DOS will round the value entered up to the nearest multiple of 16.

The */K:filename* option tells the command processor to run the specified filename and then display the ROM-DOS command prompt. It is not recommended that this option be used in a CONFIG.SYS SHELL= statement.

The */P switch* causes COMMAND not to exit, or in other words, to remain permanent. The /P switch should be used only when command is used in a CONFIG.SYS SHELL statement.

The */c string* switch causes COMMAND to execute the command in string and then terminate. The string command can be any internal or external command.

The */MSG* option indicates that all error messages should be stored in memory. This option is recommended only for diskette based systems. ROM-DOS keeps many of its error messages in the resident part of COMMAND.COM rather than using valuable memory to store them. If an error message is needed and you have loaded ROM-DOS from a diskette, the message will only be available if the boot disk is still in the drive. By using the /MSG option, the messages will be available in memory at all times. The /P option must be used along with the /MSG option.

Examples

The following command will cause a new copy of COMMAND to be executed. It will perform a DIR command on the C drive and then exit back to the previous Command Processor.

```
COMMAND /C DIR C:
```

The following example shows loading of a permanent copy of command with an environment size of 256 bytes.

```
SHELL=C:\COMMAND.COM /P /E:256
```

DELTREE.EXE

External Command

The DELTREE command deletes one or more directory trees or individual files.

Syntax

```
DELTREE [/Y] [drive:]path [[drive:]path[...]]
```

Remarks

/Y prevents DELTREE from prompting before deleting.

[drive:]path indicates the name(s) of the file(s) or directory tree(s) to delete. Wildcards are allowed.

Examples

Datalight DELTREE deletes one or more directory trees. For example, to delete all files and directories in the tree C:\TEMP, enter

```
DELTREE C:\TEMP.
```

You can also use DELTREE to delete individual files, one at a time, using wildcards. For example, to delete selected files in the current directory, enter

```
DELTREE *.*
```

DELTREE then prompts you for each file it finds, allowing you to choose whether to delete them.

Caution: *Take care when using wildcards with DELTREE. DELTREE deletes all specified files and subdirectories regardless of their attributes. Multiple files and/or subdirectories may be specified.*

FORMAT.COM

External Command

The FORMAT command initializes a disk so ROM-DOS can access files on that disk. A disk must be formatted before ROM-DOS can use it.

Syntax

    FORMAT [drive:] [/options]

Remarks

FORMAT initializes the disk and directory of the specified drive. The size of the formatted disk is the largest possible size that the specified drive supports, unless a different size is specified via a command line option.

Options

The */4* switch causes the floppy disk to be formatted as a 360KB disk even if the drive is a 1.44MB, 2.88MB, or 1.2MB drive.

The */7* switch causes the floppy disk to be formatted as a 720KB disk even if the drive is a 1.44MB or 2.88MB drive.

The */B* option causes FORMAT to use BIOS Int 13h calls. By default, FORMAT checks the DOS version, and if it is DOS 5.0 or higher, it uses the floppy device driver to do the format. Using the /B option forces FORMAT to bypass the floppy or hard disk controller and use BIOS calls. /B makes FORMAT device independent.

The */C* switch causes FORMAT to format one disk without operator input. The disk is assumed to be in the specified drive, and FORMAT exits immediately when the format is complete. This switch is useful in batch files or programs that require a formatted disk without user input.

The /F:*size* option specifies the size of the floppy disk to be formatted. Available size values are 360, 720, 1.2, 1.44, and 2.88, and are entered as /F:*size*. For example, /F:1.2.

The */H* switch causes the system files not to be hidden or write-protected. This can be used along with the /S option.

The */I* option forces FORMAT to use IOCTL calls and never use BIOS calls. Normally, FORMAT first tries to access the device driver IOCTL calls to format the disk. If this fails, BIOS calls are used (unless the /B option is specified). BIOS calls are always used for DOS 3.3 and earlier.

The */Q* option causes FORMAT to do a quick format. A quick format reinitializes the disk, deleting each file and subdirectory from the disk. A quick format can only be performed on a previously fully formatted disk.

The */S* switch causes FORMAT to copy the ROM-DOS system files, ROM-DOS.SYS and COMMAND.COM, onto the disk. The file ROM-DOS.SYS is renamed and stored on the disk as files IBMBIO.COM and IBMDOS.COM, which are stored as hidden files, unless the /H option is used.

The */V*:LABEL switch causes FORMAT to place a volume label on the disk. If the volume label is not provided on the command line, you are prompted for the volume label once the format is complete.

The */[* switch causes FORMAT to run without display of the sign-on message.

If FORMAT encounters an error, the exit code returned to DOS indicates the type of error. The error codes are listed in the following table.

Error Level	Type of Error
0	No error encountered
1	Invalid drive
2	Unsupported drive format
3	Attempted hard drive format (unsupported)
4	Write-protect error

HIMEM.SYS

Installable Device Driver

The HIMEM.SYS device driver manages extended memory and the High Memory Area (HMA) in a 286, 386 or greater, or PS/2 systems. HIMEM prevents programs from simultaneously using the same area of memory for two different purposes. HIMEM supports the Extended Memory Specification (XMS) 2.0. HIMEM is installed as a device driver in CONFIG.SYS.

Syntax

```
DEVICE = [d:] [path] HIMEM.SYS [/machine:n] [/A20[+]] [/PS2]
[/CONTROLA20:OFF]
```

Remarks

The HIMEM driver can be used to allow ROM-DOS to run in High Memory.

HIMEM supports a default of 32 handles.

HIMEM should not be used with older versions of Datalight's VDISK. Current versions of VDISK use XMS memory if it is available.

HIMEM recognizes PS/2-style A20 line control and determines whether to use the PS/2 A20 control or the AT A20 control method automatically by calling Int 15h, function C0h (get system configuration). This automatic detection can be overridden with the /Machine:n, /A20, A20+, or /PS2 command line switches in the event that the auto detection on a given system fails.

/Machine:1 and /A20 both designate the PC AT A20 control method. These switches instruct HIMEM *not* to wait for the A20 line to settle.

/Machine:2 and /PS2 both designate the PS/2 control method.

/A20+ is similar to /A20 but instructs HIMEM to wait for the A20 line to settle.

/Machine:3 designates support for the Phoenix Cascade BIOS A20 control methods.

Alternately, /CONTROLA20:OFF instructs HIMEM to *not* detect the control method for the A20 line and assumes the A20 line is always on.

The /BIOS switch forces the use of BIOS Int15h, Function 87h, for data transfers to and from XMS memory.

The /QUIET switch forces HIMEM to remove the sign-on message when loading.

Error Conditions

No Extended Memory—An extended memory error condition can occur if the BIOS (via Int 15H, function 88H) notifies HIMEM that there is no extended memory. In this situation, HIMEM displays an appropriate error message and does not install.

Failure to Control the A20 Line—When HIMEM installs, it attempts to control the A20 line, which controls access to the HMA. HIMEM first attempts control via the AT method (using the 8259 keyboard control). If that fails, HIMEM then attempts control via the PS/2 method (using I/O port 60H). If both methods fail, HIMEM assumes it can't control the A20 line and displays the message

```
A20 Control (OFF)
```

If either of these errors occur, try using the /A20, /A20+, or /PS2 in the HIMEM command line.

Note also that some older programs assume that the machine is a 1MB 8086 and so require that the A20 line to be disabled (OFF) while they run. Current programs typically do not require that the A20 line be disabled.

Examples

```
Device = HIMEM.SYS
```

Installs the XMS device driver. Once this driver is installed, accessing the HMA and Extended Memory (XMS) memory areas is legal. The Extended Memory area can contain up to 2GB of memory. Typical systems have 4, 8, or 16MB of XMS memory installed.

```
Device = HIMEM.SYS /machine:1
```

Forces the use of the AT-style A20 line control.

The HIMEM driver fails to load when either the machine does not have memory above the 1MB boundary or the BIOS does not provide support for it. It also fails to load when another XMS manager has been previously installed.

MEM.EXE

External Command

The MEM command displays the used and free memory in your system.

Syntax

```
MEM [/BiosExtensions] [/Classify] [/Raw]
```

Remarks

Options	Description
/B	Displays each BIOS extension and its size.
/C	Classifies the memory usage.
/R	Does raw dump of the MCB chain.

MEM displays a list of the DOS memory contents, what free space is available, and how much memory is in conventional memory, upper memory, the HMA and extended memory. This program is useful to fine tune the system to have as much free memory as possible for applications.

Options

The */B* option displays BIOS extensions in the range from C000:0 to F800:0.

The */C* option shows program, TSR, and device driver sizes.

The */R* option shows a low-level DOS listing of MCBs (Memory Control Blocks).

MODE.COM

External Command

The MODE command modifies the operation of the printer, serial port, and active video display.

Syntax

```
MODE LPT#[:]=COM#[:]
MODE COM#:baud[,parity[,databits[,stopbits[,P]]]]
MODE <video mode>
MODE <display lines>
```

Remarks

The first syntax above redirects line printer output to the serial port.

The second syntax above changes the operation of the specified communications port. The options that can be modified are listed below. Invalid values for any of the options are flagged with an error message.

```
baud 110, 150, 300, 600, 1200, 2400, 4800, 9600
parity N - None, O - Odd, E - Even
databits Either 7 or 8
stopbits Either 1 or 2 stop bits
P Printer Port
```

Using the P option as the last argument causes output to be sent repeatedly to the printer port until successfully received. Without the P, output is sent only once, causing a critical error if unsuccessful.

The third syntax changes the active video mode for the display terminal. The valid choices for this version of the MODE command are as follows:

*4*0—Indicates 40 characters per line.

*8*0—Indicates 80 characters per line.

*bw4*0—For a color graphics adapter with color disabled and 40 characters per line.

*bw8*0—For a color graphics adapter with color disabled and 80 characters per line.

*co4*0—Indicates a color monitor with color enabled and 40 characters per line.

*co8*0—Indicates a color monitor with color enabled and 80 characters per line.

*mon*o—For a monochrome display. Assumes 80 characters per line.

The final syntax sets the number of display lines. Valid values included L25, L43, and L50.

Note: A serial port should be initialized before an LPT device is redirected to it.

Examples

```
MODE COM1:9600,n,8,1
```

Modifies the settings for the COM1 device to a baud rate of 9600, no parity, eight data bits, and one stop bit.

```
MODE LPT2:=COM2
```

Redirects the output from LPT2 to the COM2 serial port. All following output to LPT2 actually goes to the COM2 device.

```
MODE mono
```

Indicates a monochrome display adapter.

MORE.COM

External Command

The MORE command displays a text file one screen at a time.

Syntax

```
MORE [filename]
     or
<command> | MORE
```

Remarks

The input to MORE may come from a file, or it may be piped in from another filter or a DOS command. If the *filename* is present, then the file is viewed; otherwise MORE reads from the Standard Input.

Once a screen has been viewed, a line is displayed on the bottom of the screen indicating the percent of the file that has been viewed. At this point, there are several options for the next lines of text to be viewed.

B	Display the previous full page.
<enter>	Display just one more line.
T	Display starting at the top of the file.
Spacebar	Display the next full page of text.
Q	Exit MORE

Examples

```
DIR | MORE
```

Displays a directory one screen at a time.

```
MORE READ.ME
```

Displays the file READ.ME one page at a time.

NED.EXE and NED.CFG

External Command

ASCII text Editor Program

The NED editor is a menu-based text editor available for use with ROM-DOS. This editor is similar to other desktop editors but has special functions designed for use in editing C-source and assembly code.

Starting the Editor

To start the editor, enter

```
NED [filename] [filename]
```

NED may be initiated with or without filename arguments. Wildcard file specifications are allowed.

Up to ten files can be entered on the command line. If NED is run without arguments, it loads all files accessed during the last editing session, returning you to the exact position in the file. You can switch between the open files.

You can also enter

```
NED @errfile
```

where *errfile* is the name of your compiler error output file. NED loads all files that had errors and allows you to move between errors.

Once NED is running, you may load files into memory by using the File/Open menu command. File/Reload replaces the current file with a new file or reloads a new copy of the same file. File/Reload confirms before replacing an unsaved file.

Basic Editor Operation

NED uses the standard Microsoft Windows® interface for cut, copy, and paste operations. Del and Shift+Del both move the selected block to the clipboard. There is no true undo command, but Ctrl+V or Shift+Ins may be used to paste the clipboard contents to the current cursor position. Table 1 lists all the default shortcut keys.

If a search string is all lowercase, NED treats it as a case-insensitive search. If a search string contains any uppercase letters, it is case sensitive. The replacement string is inserted exactly as entered. Repeating a Search command repeats the last Forward or Backward Search operation, not the last Replace operation.

There is one bookmark for all files. Once the bookmark is set, going to the bookmark returns you to the file and position where you set it.

The Indent and Remove-indent (referred to as Undent in the Options/Do Command) commands work on tabs. Indent inserts a tab at the beginning of the current line, or if a block is active, at the beginning of each line in the block. Remove-indent removes the first tab from the current line or from each line in the block. If there are no tabs, Remove-indent has no effect.

Toggle case inverts the case of the current character if no block is active. If a block is active, Toggle case sets the entire block to uppercase if the first character was lower and to lowercase if the first character was uppercase.

Tabs are currently set to 3 for .C, .H, .CPP, .HPP, and .T files. They are set to 8 for all other files.

File/Print prints the current block if there is one, otherwise it prints the current file. NED prompts for a device to print to, which may be a filename. Tabs are expanded to spaces.

The Options/Do Command is intended primarily for debugging. This command allows you to execute any editor command by choosing it from a menu list.

The macro commands (Record Macro/Play Macro) allow you to define a sequence of keystrokes that can be repeated repetitively. Select Record Macro (ALT=), enter the keystrokes, then press ALT= again. The macro sequence can be played by selecting Play Macro or by pressing ALT-. Keyboard bindings are saved in NED.CFG in the same directory as NED.EXE. NED.CFG also contains the list of active files and positions.

If you record and play a recursive macro, it plays continuously.

If you press an invalid key on a menu, NED operates as if you pressed enter.

If you run out of memory, such as when you have more than 300KB of files open, NED returns to DOS.

NED Default Hot Keys

Many of the editor commands can be accessed directly by pressing key combinations. For example, press Alt-X to exit the editor and save any open files. The following table lists the default hot keys.

Key	Function	Key	Function
Alt-Q	Quit without saving	F1	Help
Alt-X	Exit, saving as needed	F7	Load file into current buffer
Ctrl-A	Search again	F9	Save file
Ctrl-B	Search backward	F10	Exit asking for save as needed
Ctrl-C	Copy the block to clipboard	Left-Arrow	Left one character
Ctrl-D	Find the mark	Right-Arrow	Right one character
Ctrl-E	Erase to end-of-line	Up arrow	Up one line
Ctrl-F	Search forward	Down arrow	Down one line
Ctrl-G	Go to a line number	Home	Beginning of line
Ctrl-I	Indent the block	End	End of line
Ctrl-K	Toggle block mode	Page Up	Up one screen
Ctrl-L	Delete line to the clipboard	Page Down	Down one screen
Ctrl-M	Set the mark	Center (5)	Center the cursor onscreen
Ctrl-N	Read a file into a new buffer	Ctrl-Left-Arrow	Left one word
Ctrl-P	Move to the previous position	Ctrl-Right-Arrow	Right one word
Ctrl-Q	Quote the next character	Ctrl-Up-Arrow	Up one C function
Ctrl-R	Replace text	Ctrl-Down-Arrow	Down one C function
Ctrl-S	Switch to the next buffer	Ctrl-Home	Scroll toward beginning of file
Ctrl-T	Toggle the case of character(s)	Ctrl-End	Scroll toward end of file
Ctrl-U	Remove indent from the block	Ctrl-Page	Up Beginning of file
Ctrl-V	Insert the clipboard	Ctrl-Page	Down End of file
Ctrl-W	Delete word to the clipboard Ins	Toggle	Insert/Overwrite mode
Ctrl-X	Delete block to the clipboard	Del	Delete character
Ctrl-Z	Cancel the selected block	Backspace	Delete character backward
Alt =	Start/end recording macro	Ctrl-Ins	Copy block to clipboard.
Alt -	Playback macro	Ctrl-BackSpace	Delete word backward
Alt-F7	Previous error	Shift-Ins	Insert the clipboard
Alt-F8	Next error	Shift-Del	Delete block to clipboard

PRINT.COM

External Command

The PRINT command prints a single file or a list of files.

Syntax

    PRINT [/drive:] [filename] [/options]

Remarks

PRINT allows you to enter between one and 32 files for spooling to the printer. The files are output to the device in a spooled manner (while you perform other operations).

If PRINT is entered without any parameters, it displays all the files that are in the queue.

The first time PRINT is used, the operator is prompted with this message for the device to perform the operation.

    Name of list device [PRN]:

The legal devices for printing are LPT1, LPT2, LPT3, LPT4, COM1, COM2, COM3, COM4, AUX, or PRN.

Options

The */B* option sets the buffer size. The default buffer size is 512 bytes. A larger buffer size causes print to operate faster. The maximum buffer size is 32KB and the minimum size is 256 bytes. This option is only allowed the first time PRINT is run.

The */C* option cancels only the filenames listed after the /C command.

The */F* option sets the maximum number of files to be queued up at one time. The default number of files is ten. The minimum is two and the maximum is 32. Support for more files is often useful when using wildcards in filenames. This option is only allowed the first time PRINT is run (or until the next system reboot).

The */P* option causes all files listed after this option to be submitted for printing. This is the default for filenames encountered on the PRINT command line.

The */T* option cancels all the files from the print queue (list).

The */H* option displays the help screen.

Examples

    PRINT FILE1.TXT FILE2.TXT FILE3.TXT

Puts three files into the print queue. The first file prints after the command ends.

    PRINT /C FILE2.TXT

Removes file FILE2.TXT from the print queue. All other files in the queue print normally.

    PRINT /T

Cancels all files in the print queue. Printing may continue for a short time because of the buffer in your printer.

REMDISK.EXE

Remote Disk Program

See Also: REMSERV.EXE

REMSERV is usually run on the VX1 (host). REMDISK is usually run on the client (e.g. a desktop PC).

The remote disk program allows you to access a disk drive on a remote system via a serial cable and standard PC-style (8250UART) serial port. In a remote disk setup, one system, the one that shares its drives, is termed the server. The other system, the one that accesses and uses the remote drives, is called the client. The serial ports on both systems must be connected via a null modem cable. Remdisk / Remserv works across a standard 3-pin serial cable. The cable does not require the CTS/RTS DTS/DTR pins.

To use the remote disk, both REMDISK and REMSERV must be running on their respective systems and must use the same baud rate and packet or nonpacket-style transmission. After starting both programs, you can access the new drive on the client system. You can change the default directory to this new drive, copy files to and from the remote drive, and also run utilities such as CHKDSK on the drive. The remote drive on the server system can be used as any other drive on the client system.

Syntax

The program REMDISK runs on the client system and creates a new drive letter for the client. REMDISK uses the next available system drive letter.

For example, if the last assigned drive was D:, REMDISK creates drive E:. This drive acts like any other drive, except that it requires the serial port. REMDISK.EXE can be loaded by a DEVICE= command in the CONFIG.SYS or AUTOEXEC.BAT files or it can be entered at the DOS prompt.

```
CONFIG.SYS --- DEVICE=REMDISK.EXE /T15
AUTOEXEC.BAT - REMDISK /B9600 / COM2 /T10
```

The syntax for REMDISK is:

```
REMDISK [/U] [/H] [/Bnnnn] [+|-][/Tnnn] [/COMn]
```

The default is : /B115K+ /COM1 /T3

Option	Description
/U	Unloads REMDISK from memory, thereby disabling the drive letter and freeing the memory occupied by REMDISK. This option can only be used when REMDISK is installed from the DOS command line. A remote disk installed via CONFIG.SYS cannot be unloaded.
/H	Selects hardware handshaking for flow control.
/Bnnnn	Selects the baud rate for transmission. Available baud rates are 300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115000. The default baud rate is 115000.
+/-	The plus sign (+) specifies packet-style transmission and is recommended for any baud rate over 19200. The default setting is to include + for packet transmission. Use the minus sign (-) to specify polling operation under Microsoft Windows 95. Both sides must agree on using either (+) or (-).

Option	Description
/*Tnnn*	Sets the time-out in the range of 3 to 3,640 seconds. 15 seconds is not unusual for Flash drives.
/IR*Qn*	Set the IRQ for the communications port. Valid settings are 3 – 15. Default is IRQ3 for COM 2 and COM4, and IRQ4 for COM1 and COM3.
CO*Mn*	Selects the communication port. Choose 1, 2, 3 or 4. COM1 is the default port.

To install the REMDISK program from CONFIG.SYS at 19200 baud, on COM1, using packet-style transmission, insert the following line in CONFIG.SYS and then reboot the system (remember to include the full path to find REMDISK.EXE if not located in the root directory).

```
DEVICE=REMDISK.EXE /B19200 +
```

To display a help screen for REMDISK from the DOS prompt, enter

```
REMDISK /?
```

To install REMDISK from the DOS prompt or from a batch file (such as AUTOEXEC.BAT) at 9600 baud, without packet-style transmission, on COM2, enter

```
REMDISK /B9600 /COM2
```

To unload the REMDISK installed from the batch file or the DOS prompt, enter REMDISK /U

REMSERV.EXE

Remote Disk Program

See Also: REMDISK.EXE

REMSERV is usually run on the VX1 (host). REMDISK is usually run on the client (e.g. a desktop PC).

The remote disk program allows you to access a disk drive on a remote system via a serial cable and standard PC-style (8250UART) serial port. In a remote disk setup, one system, the one that shares its drives, is termed the server. The other system, the one that accesses and uses the remote drives, is called the client. The serial ports on both systems must be connected via a null modem cable. Remdisk / Remserv works across a standard 3-pin serial cable. The cable does not require the CTS/RTS DTS/DTR pins.

To use the remote disk, both REMDISK and REMSERV must be running on their respective systems and must use the same baud rate and packet or nonpacket-style transmission. After starting both programs, you can access the new drive on the client system. You can change the default directory to this new drive, copy files to and from the remote drive, and also run utilities such as CHKDSK on the drive. The remote drive on the server system can be used as any other drive on the client system.

The server system runs the program REMSERV.EXE that can make a single drive on the server system available to the client. The available drive can be changed at any time by quitting the REMSERV program and then running the program again with a new drive letter.

The server program can be terminated at any time by pressing the Esc key. The client can then no longer access the server's drive until the REMSERV program is run again.

Syntax

```
REMSERV.EXE d: [/Tnnnn] [/H] [/Bnnnn][+|-] [/COMn] [/IRQn]
[/Tnnn] [/S]
```

where d: represents the letter of the drive the server makes available to the client.

The default is `/B115+ /COM1 /T2`

Option	Description
/Bnnnn	Selects the baud rate for transmission. Available baud rates are 300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115000. The default baud rate is 115000.
+/-	The plus sign (+) after the BAUD specifies packet-style transmission and is recommended for any baud rate over 19200. The default setting is to include + for packet transmission. Use the minus sign (-) to specify polling operation under Microsoft Windows 95. By default, packet transfers will be used for all baud rates higher than 9600. Both sides must agree on using either (+) or (-).
COMn	Selects the communication port. Available ports are 1, 2, 3 or 4. COM1 is the default port.
/IRQn	Set the IRQ for the communications port. Valid settings are 3 – 15. Default is IRQ3 for COM 2 and COM4, and IRQ4 for COM1 and COM3.
/Tnnn	Sets the time-out in the range of 2 to 3,640 seconds. 15 seconds is not unusual for Flash drives.
/S	Instructs REMSERV to run without any display output (Silent).
/H	Selects hardware handshaking for flow control.

Example

To select drive B: as the available server drive at 115000 baud, packet transmission, using COM1, enter

```
REMSERV B:
```

To set drive C: as the server disk at 38400 baud, without packet-style transmission, on COM2, with a timeout of 10 seconds, enter:

```
REMSERV C: /B38400 /COM2 /T10
```

SYS.COM

External Command

The SYS command copies the ROM-DOS system files ROM-DOS.SYS and COMMAND.COM from the disk in the default drive to the disk in the specified drive. The file ROM-DOS.SYS is renamed and stored on the disk as files IBMBIO.COM and IBMDOS.COM, which are stored as hidden files.

Syntax

        SYS *drive:* [/*option*s]

Remarks

Use the SYS command to transfer the ROM-DOS system files to a floppy disk or hard disk. The disk can be a formatted blank disk or can contain files; it is not necessary for the system files to be the first files on the disk. The only requirement is that there is enough contiguous free space on the disk for the new system files to be placed. If the disk already contains system files, installing the new system files deletes the existing files.

The command processor, COMMAND.COM, is also transferred to the disk and does not need to be copied into the same contiguous space as the system files.

You can run SYS three different ways. The first is to boot and run your system with ROM-DOS. When you run the SYS command this way, SYS copies the ROM-DOS system files and COMMAND.COM from the root directory of the default/current disk drive.

The second method is to run SYS from the root directory of a disk drive that has been previously prepared with the SYS command, but isn't booted and running. For example, you can run SYS from a bootable floppy disk to copy the files to the hard disk without actually booting from the floppy disk itself.

The third method uses the file ROM-DOS.SYS, the equivalent of the hidden system files IBMBIO.COM and IBMDOS.COM. ROM-DOS.SYS should be present in the same directory with COMMAND.COM and SYS.COM. These three files can be placed in the root directory or subdirectory on a floppy disk (that need not be booted or bootable), or in a subdirectory on the hard drive. Run the SYS command from the directory where the files reside to transfer the system files to the destination drive.

Options

The */C* option prevents confirmation before transferring system files.

The */H* option shows the newly transferred system files on the destination disk.

The */]* option prevents display of the sign-on message.

Example

        SYS B:

Copies the ROM-DOS system files to drive B:.

VER

Type

Internal

Purpose

Displays the version number of ROM-DOS in use. Allows revision of this version number.

Syntax

```
VER [n.nn] [/R]
```

Remarks

If a new version number is specified, two digits after the decimal are required. Note that this command revises only the record of the DOS version number; it does not change the actual operating system loaded in the computer.

The version command shows both the version of the VER command itself and the version of DOS in operation.

Options

The /R option shows the full version and release number of ROM-DOS.

Example

The following example changes the record of current DOS version in use to DOS 5.0. Any programs that are executed, following this command, will recognize that DOS 5.0 is running.

```
VER 5.0
```

XCOPY.COM

External Command

The XCOPY command copies multiple files and, optionally, subdirectories from one disk to another.

Syntax

```
XCOPY [source] [target] [/options]
```

Remarks

Use the XCOPY command to copy multiple files and subdirectories, if they exist.

The *source* and the *target* parameter are complete drive-path and file-specification descriptions.

If you do not specify a path, XCOPY assumes the default path. If a filename is not specified, then *.* is assumed.

The ATTRIB command may be used to modify the archive bit for the various XCOPY options that check the archive status of files. Refer to the ATTRIB command for instructions.

Options

The */A* option copies only source files that have the archive bit set in them. The archive is not reset.

The */D<mm-dd-yy>* option copies only those files with a date later than that specified.

The */E* option creates subdirectories on the target even if they are empty.

The */M* option copies only those source files that have the archive bit set. Once the source file is

copied, the archive bit is reset.

The */P* option prompts before each file is copied. The prompt appears as follows; enter Y to copy the file:

```
C:\COMMAND.COM (Y/N)?
```

The */S* option copies files in subdirectories of the source directory.

The */V* option verifies each write to the disk.

The */W* option waits before starting to copy files and prompts with the following message.

```
Press any key to begin copying file(s)
```

Example

```
XCOPY \bin\*.exe a: /a
```

Copies all files in the BIN subdirectory to the A: drive that have an .EXE extension and that have the archive bit set.

ROM-DOS 6.22 Command Summary

📖 For information on ROM-DOS commands, please refer to a commercially available ROM-DOS user guide.

Following are brief descriptions of ROM-DOS commands, including batch file commands.

Note: **(*) Files marked with an asterisk in the table that follows are the only external ROM-DOS files loaded on the VX1 by LXE (and supported by LXE).** *ROM-DOS internal commands are a part of the ROM-DOS operating system.*

ROM-DOS Command	Command Type	Description
?	Internal	CONFIG.SYS command. It directs ROM-DOS to pause for confirmation before processing a command.
@	Internal	Used to suppress the display of a single batch-file command line.
;	Internal	Identifies nonexecuting lines. The same as the REM command.
ANSI.SYS*	Installable	A console device driver that allows you to support Ansi codes on the local screen.
ATTRIB.COM*	External	Displays or modifies the attributes associated with a file.
BREAK	Internal	Turns on or off the ability to stop program execution at a non-I/O point.
BUFFERS	Internal	Sets the number of internal data buffers.
CALL	Internal	Batch file command. Invokes execution of a secondary batch file.
CHDIR (also CD)	Internal	Changes the current directory (also CD).
CHKDSK.COM*	External	Checks the integrity of data on a disk. Displays information.
CLS	Internal	Clears all information from the monitor's screen.
COMMAND.COM*	External	Starts a second DOS command processor.
COPY	Internal	Copies files from one storage location to another.
COUNTRY.SYS[2]	External	Designates the country code for displays.
CTTY	Internal	Changes the default terminal interacting with ROM-DOS.
DATE	Internal	Displays the date from the system's internal calendar. Allows revision.

---

[2] International keyboards and code pages require COUNTRY.SYS, DISPLAY.SYS and KEYB.COM. These files are placed on the computer by the user when needed. They are not part of the LXE installed and supported file load.

ROM-DOS Command	Command Type	Description
DEL	Internal	Deletes specified files.
DELTREE.EXE*	External	Deletes one or more directory trees or individual files.
DEVICE	Internal	Installs a device driver into ROM-DOS.
DEVICEHIGH	Internal	Loads a device into the upper memory area, if available.
DIR	Internal	DIRectory. Lists contents of a specified directory.
DISPLAY.SYS[3]	Installable	Displays international letters and symbols.
DOS (ROM-DOS)	Internal	Installs ROM-DOS into High Memory Area (HMA).
ECHO	Internal	Batch file command. Turns on or off display of batch execution on the monitor.
EGA/EGA3.CPI	Internal	Font data files for use with the International video display driver, DISPLAY.SYS.
ERASE	Internal	Erases specified files (same as DEL).
EXIT	Internal	Used to exit nested running of ROM-DOS within another program.
FCBS	Internal	Specifies the number of File Control Blocks (FCBS) open at one time.
FILES	Internal	Sets the maximum number of files that can be open at one time on the system.
FOR	Internal	Batch file command. Performs one DOS command on a set of files.
FORMAT.COM*	External	Initializes a disk so that ROM-DOS can access files on that disk.
GOTO	Internal	Batch file command. Moves control to a specified line in the batch file.
HELP	Internal	Lists all available ROM-DOS commands along with brief descriptions.
HIMEM.SYS*	Installable	Manages extended memory and the high memory area in a 286, 386, PS/2 system.
IF	Internal	Batch file command. Performs a command based on a specified condition.

---

[3] International keyboards and code pages require COUNTRY.SYS, DISPLAY.SYS and KEYB.COM. These files are placed on the computer by the user when needed. They are not part of the LXE installed and supported file load.

ROM-DOS Command	Command Type	Description
INCLUDE	Internal	Allows instructions in one configuration block to be included with instructions in another configuration block.
INSTALL	Internal	Loads Terminate and Stay Resident (TSR) programs during CONFIG.SYS processing.
KEYB.COM[1]	External	Allows altering of the keyboard layout for a different language or nationality.
KEYBOARD/ KEYBRD2.SYS	Internal	Keyboard code page data files for use with the International keyboard driver, KEYB.COM.
LASTDRIVE	Internal	Sets the maximum number of drives.
LOADHIGH	Internal	Loads a program into the upper memory area, if available.
MEM.EXE*	External	Displays the used and free memory in your system.
MENUCOLOR	Internal	Allows setting of text and background colors for the startup menu.
MENUDEFAULT	Internal	Sets the default menu-item choice and time-out value for making a selection.
MENUITEM	Internal	Specifies an item to be placed on the startup menu display during system boot
MKDIR	Internal	Creates a new subdirectory.
MODE.COM*	External	Modifies the operation of the printer, serial port, and active video display.
MORE.COM*	External	Displays a text file one screen at a time.
MOVE.EXE	Internal	Moves files and renames files and directories.
NED.CFG*	Installable	Configuration file for NED.EXE ASCII text editor.
NED.EXE*	Installable	This program is used when editing ASCII text files.
NEWFILE	Internal	Allows continuation of CONFIG.SYS processing from a new file.
NUMLOCK	Internal	Sets the NUMLOCK keyboard key to on or off when your computer starts. This setting is ignored by the VXX OS.
PATH	Internal	Displays current command search path(s). A new path line can be specified.
PAUSE	Internal	Batch file command. Causes execution to halt until a key is pressed.
PRINT.COM*	External	Prints a list of files, up to ten files.

ROM-DOS Command	Command Type	Description
PROMPT	Internal	Resets the appearance of the system prompt line.
REM	Internal	A batch file command for identifying non-executing lines.
REMDISK.EXE*	Installable	A remote disk management program. Usually run on the client.
REMSERV.EXE*	Installable	A remote disk management program. Usually run on the host.
REN	Internal	Renames files.
RMDIR (also RM)	Internal	Deletes a specified subdirectory.
SET	Internal	Sets environment variables and command processor strings.
SHELL	Internal	Allows selections of a command interpreter other than COMMAND.COM.
SHIFT	Internal	Batch file command. Shifts replaceable parameters one position to the left.
STACKDEV.SYS	Internal	Increases the number of stacks available for IRQ handlers and Int13h.
STACKS	Internal	Allows for the use of dynamic data stacks to handle interrupts.
SUBMENU	Internal	Defines a menu item that represents a secondary menu.
SWITCHES	Internal	Allows special CONFIG.SYS file options.
SYS.COM*	External	Transfers the hidden system files to a specified drive.
TIME	Internal	Displays current time from the system's internal clock. Also allows revision.
TYPE	Internal	Displays the contents of a text file on the monitor.
UMBLINK.SYS UMBLINK.EXE	Internal	A non-protected mode program that can allow the creation of Upper Memory Blocks using existing RAM areas.
VER*	Internal	Displays current version of ROM-DOS on the monitor.
VERIFY	Internal	Displays the current VERIFY state or sets the VERIFY state to on or off.
VERSION.SYS	Internal	Modifies the version number ROM-DOS reports.
VOL	Internal	Displays the volume label on a disk.
XCOPY.COM*	External	Copies multiple files and optionally subdirectories.

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. ROM-DOS, 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 B, "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.

A Reminder

The VX1 192-pixel row physical display area can be panned up and down in order to view the entire virtual 480-pixel row display. Display panning can also be controlled by an application running on the VX1.

When at the DOS prompt:

> Display Up   Press 2nd key then <Ctrl> then <Up Arrow> to move the screen display up.
>
> Display Down   Press 2nd key then <Ctrl> then <Down Arrow> to move the screen display down.

When running an LXE terminal emulation program, refer to the Window Manager section of the Reference Guide for instruction on panning the display.

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 VX1 remains off, refer to the "Power Source" section of this chapter.

Problem	Solution
VX1 computer stops working and locks up each time you start it.	Your CONFIG.SYS or AUTOEXEC.BAT file might be corrupt. To recover from this error, follow the steps in the "Bypassing the Configuration Files" section of this chapter.
The VX1 displays the "Non-System disk or disk error" message.	Make sure the VX1 is booting from the proper drive. To recover from this error, follow the steps in the "Verifying Boot Order" section of this chapter.
The VX1 displays the "Bad or missing Command Interpreter" message.	You're missing the COMMAND.COM file, which should be located in the root directory of the C drive. To recover from this error, follow the steps in the "Missing COMMAND.COM" section of this chapter.
The VX1 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 the Configuration Files

If you are using DOS 6.0 or higher, you may want to bypass the configuration files and restore configuration files from backup. To bypass the configuration files:

1.   Turn on the VX1.

2.   When `Starting ROM-DOS` appears press the <F5> key or hold down the Shift key to display the following message:

      `ROM-DOS is bypassing your CONFIG.SYS and AUTOEXEC.BAT files.`

3.   Your system then continues the boot process using the basic default configurations.

You may notice differences in the way your system behaves. For instance, installable device drivers and memory device drivers are not loaded, and system prompts and path have default values. If the command interpreter COMMAND.COM is not in the root directory, ROM-DOS may not be able to locate it.

Verifying Boot Order

1. During bootup, the <F2> key may be pressed to enter BIOS Setup. Turn on the VX1. Press <F2> immediately.

2. At the BIOS Setup Main Menu, select the Boot parameter.

3. If the Boot parameter is not already highlighted, press the <Down Arrow> to highlight it.

4. Make sure the field entry is set to "C: Only", if not Press space, or <+> or <-> and change the field entry to "C: Only".

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

6. Select "Save and Exit" to save the changes. Press <Enter>. If the VX1 does not reboot automatically, reboot the VX1.

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

Missing COMMAND.COM

Pre-requisite: A DOS bootup SRAM PCMCIA Card (not supplied by LXE)

If the computer displays "Bad or missing Command Interpreter", the computer is configured to start from the hard disk and...

- the COMMAND.COM file was accidentally deleted, or

- the operating system can't find the COMMAND.COM file (it may be in a directory other than the root directory), or

- an incompatible version of COMMAND.COM was copied over the COMMAND.COM version supplied with the VX1.

To replace the command interpreter, follow these steps:

1. Make sure the VX1 is powered off and disconnect the power cord/cable.

2. Remove the side cover from the VX1.

3. Insert the DOS boot SRAM card into Slot 0.

4. Re-connect the power cord/cable.

5. Power on the VX1.

6. If you receive the "Bad or missing command interpreter" message continue with step 7, otherwise go to step 13.

Edit BIOS Setup

7. During bootup the <F2> key may be pressed to enter setup. Press <F2> immediately. You may need to reboot.

8. At the BIOS Setup Main Menu, select Boot parameter.

9. If the Boot parameter is not already highlighted, press the <Down Arrow> to highlight it.

10. Press space, or <+> until the field entry is changed to "A: then C:".

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

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

Copy File

13. When the DOS prompt appears, type

    `Copy  COMMAND.COM  C:\`

    and press <Enter>.

14. Type

    `Type  C:\AUTOEXEC.BAT`

    and press <Enter>.

    If your AUTOEXEC.BAT file contains a COMSPEC command, confirm that it identifies the correct location for COMMAND.COM (i.e. the C:\ directory).

    > Please refer to commercially available ROM-DOS User's Guides for complete instructions or troubleshooting when using these DOS files or commands.

15. Type

    `Type  C:\CONFIG.SYS`

    and press <Enter>.

    If your CONFIG.SYS file contains a SHELL command, confirm that it identifies the correct location for COMMAND.COM (the C:\ directory).

16. Power off the VX1 and disconnect the power cord/cable.

17. Remove the DOS boot SRAM card.

18. Replace the side cover.

19. Re-connect the power cord/cable and power on the VX1.

Setting System Time and Date

1.   If the VX1 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 VX1 does not automatically reboot, turn the VX1 off and then on again.

Hardware Problems

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

Power Source

The VX1 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 VX1. LXE assumes no liability for damage to the VX1 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 toggle 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 VX1 power cable.

If you can not find the source of the problem, consult LXE Customer Support.

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.
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

For general display problems follow these guidelines.

Problem	Solution
Only half of the application screen is displayed	The application was developed for a 25 x 80 display. Try placing the VX1 into 50 line mode prior to running the application. (i.e. type 'MODE L50' at the DOS prompt) *- or -* use the panning keypresses to display the bottom portion of the screen.

Hard Disk Drive

If you have problems with the hard disk drive, run the DOS CHKDSK utility. CHKDSK analyzes the directories, files and File Allocation Tables (FAT) on the flash disk.

> For information on running CHKDSK, refer to the ROM-DOS documentation.

If CHKDSK does not report any errors and the hard disk still has problems, contact LXE Technical Support.

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 CHKDSK command, which analyzes the directories, files and the File Allocation Table (FAT) on the card.
CHKDSK reports no errors and you're still experiencing problems.	Can you access the PCMCIA card? Try to view the contents of the directory. For example, try using the DIR command. If the DIR command doesn't display all the files stored in the directory, recovering data is unlikely.
SRAM card will not work.	PicoCard supports SRAM cards with the Phoenix ATA driver PCMATA. Run PicoCard SETUP. When asked, "Do you wish to use ATA?" answer, "yes," then finish the program and reboot. You will now notice the drive letter that is assigned to the slot.
Data files are damaged or corrupted.	Refer to your software documentation for file recovery procedures. Many software packages automatically create backup files.
Receive message "Warning: conflict with system COM".	The COM port selected is already being used by another device. Run PCMSETUP.EXE and select a new COM port. If you know what COM ports are available, you can edit the PCM.INI file and change the COMORDER= number to an available COM port. Note: COM4 seems to be the best choice for PC Cards.
Receive message "Invalid command line switch".	Command line switches are in the PCM.INI file, not the CONFIG.SYS file.
Receive message "A previous version of Card and Socket Services has been detected. You must first remove this version and rerun install."	Please refer to "PCMCIA Card Management and LXE DOS Computers", available on the LXE Manuals CD-ROM, section titled "Removing PicoCard Drivers."

Upper Memory Conflicts

Some drivers require an unused upper memory block. In this case, "unused" means that the upper memory block does not contain any ROM or RAM and that the addresses are excluded from use by a memory manager.

Driver	Memory Required	Default Address Range
PCMCS95.EXE	4K	C800-C8FF
PCMATA.SYS	16K per SRAM card	D000-D3FF
PCMFFCS.EXE	4K to 64K	D000 - (dependent on variable size)
PCMFDD.EXE	16K	D000-D3FF

Available upper memory (C800 - DFFF) is crucial to using PCMCIA cards successfully. The addresses shown above have the following characteristics:

- The system has no RAM at these addresses.

- The system has no ROM at these addresses.

IRQ Assignments

AT compatible systems have 16 IRQs, numbered 0 through 15, many of which are already assigned as follows:

IRQs	Device(s)
IRQ0	Timer Output
IRQ1	Keyboard
IRQ2	Route to Interrupt Controller 2, IRQ8-IRQ15
IRQ3	Serial Port COM2
IRQ4	Serial Port COM1
IRQ5	Parallel Printer Port 2
IRQ6	Floppy Disk Controller
IRQ7	Parallel Printer Port 1
IRQ8	Real Time Clock
IRQ9	Software redirect to IRQ2 (INT 0Ah)
IRQ10	Reserved (default PC Card events)
IRQ11	Reserved
IRQ12	Reserved
IRQ13	80x87 Math Coprocessor
IRQ14	Hard Disk Controller
IRQ15	Some Hard Disk/SCSI Controllers (Default)

The default is IRQ15 for card events. For Card Services, first try /irq=15, then /irq=10, then /irq=12. If none of these work, try /poll. With /poll enabled, Card Services tests the socket 18.2 times per second to check whether a card has been inserted or extracted.

Either IRQ4 or IRQ3 is the default IRQ for modems. The default IRQ for Ethernet LAN cards is IRQ5, while Token Ring LAN cards use IRQ9.

Optional Devices

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

Note: Make sure the VX1 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. Turn the computer off and remove all devices. Turn the computer on and write down any error messages.

- Turn the computer off. Add one optional device and turn the computer on again. Continue this procedure of adding one device at a time until you resolve the problem.

- Device Configuration. The smooth operation of the system depends on the interaction of all devices, programs and features.

Note: Before you make any changes to your configuration files, make a copy of each file (typically with a different extension, for example, copy AUTOEXEC.BAT to AUTOEXEC.OLD). After you modify the configuration files, restart the computer for the changes to take effect.

The following table provides some solutions to common configuration problems:

Problem	Solution
You connected a device and the device isn't operating properly.	• If you start programs or drivers from the configuration files (CONFIG.SYS and AUTOEXEC.BAT), remove the commands that start those programs from the configuration files and restart the computer. • Add the program commands back into the configuration files one at a time until the problem reappears. Experiment with the order of the programs. (Keep in mind that some files must be loaded prior to others in order for your system to operate properly. Check the software documentation for any configuration requirements.)
You connected an external device and the computer isn't operating properly.	• Make sure you chose the correct setting for the device in the BIOS Setup utility. • You may have plugged in a device when the VX1 was on. Turn the VX1 off, reconnect the device and turn the VX1 on again. • The cable wiring may be faulty. Try a different cable or check the device's wiring requirements. Check all the connections. Try operating the system again.

Radio Problems

Problem: The radio is on, configured properly and still won't transmit or receive data.

Solution   Make sure the sending system is not busy or off-line.

The 2.4GHz Radios

Problem: The 6400 System 2.4GHz radio won't receive or transmit properly.

Solution: Check the settings in the NET.CFG or SOCKET.CFG files (i.e. communications parameters: station type, Domain, etc.) Refer to "Chapter 4: System Configuration" for information on how to modify these settings.

Problem: The 6500 System 2.4GHz radio won't connect to the network even though everything else seems to be working properly.

Solution: Check WaveLAN/IEEE Advanced Setup configuration for the Access Point and to see if you have configured the wireless network as a "Closed System". If this is the case then the WaveLAN Network Name on the station must match what is configured in the Access Point.

                  - or -

                  The string for WaveLAN_Network_Name is case-sensitive. The WaveLAN DOS ODI driver requires the use of only UPPER-CASE characters. If you have configured the Access Points with lower-case names you will need to change your Access Point WaveLAN_Network_Name parameter to UPPER-CASE characters for proper operation.

The 900MHz Radios

Problem: The 900MHz radio won't receive or transmit properly.

Solution: Refer to the appropriate Terminal Emulation Reference Guide for information on how to modify RF parameters for the 900MHz PCMCIA radio.

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 ROM-DOS documentation.

- If you cannot load a software package, the SRAM card (or diskette if using REMSERVE.EXE) may be corrupt. Try another card/disk. If you have received a bad disk/SRAM card call the manufacturer for a new one.

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

- Some software may require more time than the Video Timer parameter maximum value (15 minutes) to install. In this case, press an arrow key or the spacebar to keep the VX1 "awake" until the software installation is complete.

- Be sure you have enough memory and hard disk space to handle the software being installed.

IP Stack

If you cannot connect to the network or if you do not have any success using XPING try the following:

1. Ensure that you have restarted your system, after making changes to any configuration files. Changes to your configuration files will not take effect until you restart your system.

2. Verify that you have a valid entry in the SOCKET.CFG file for IP addresses.

3. Ensure that network driver parameters and configuration files, such as NET.CFG, have the correct entries.

4. Verify that your system files (AUTOEXEC.BAT and CONFIG.SYS) have the correct entries. Refer to Chapter 4 "System Configuration" for the correct parameters for AUTOEXEC.BAT and CONFIG.SYS.

Memory

This section lists possible solutions to some common memory problems.

If your program reports that there isn't enough memory for it to run, you may not have enough conventional memory available for that program. To determine the memory needs of the program and the availability of memory in the VX1, follow these steps:

1. Check the software documentation to see what kind of memory the program can use (conventional, extended or expanded). You may need to upgrade the memory of the VX1. Contact LXE to upgrade memory.

2. At the system prompt, type MEM to run the DOS MEM command and check how much conventional memory is left for your programs. (MEM reports the number of bytes available.)

3. Refer to the program's documentation to verify that this is enough memory to run the program. If not, you may need to remove (or load into upper memory) device drivers or memory-resident programs from the CONFIG.SYS or AUTOEXEC.BAT files. (If unsure of how to accomplish this, contact LXE Technical Support.)

When you start the computer and it displays an error during the memory test, write down the error and call LXE Technical Support.

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 Messages

There are three types of POST messages:

- Error
- Informational
- Beep Codes

The error and informational messages are displayed for operator action. These messages result from errors detected during the POST diagnostics. In the event that the system does not complete the POST, a beep code will sound. If this happens, contact LXE Technical Support.

POST Error Messages

The following table lists the POST error messages for the VX1. If problems persist, contact LXE's Customer Support (refer to "Contacting LXE" file on the LXE Manuals CD).

Diskette read failure – press <F1> to retry boot

or may also say,

Press <F1> to retry boot, <F2> for BIOS Setup

Possible Cause

The PCMCIA card is either not formatted or is defective.

Action

Replace the PCMCIA card with a bootable PCMCIA card and retry.

Display adapter failed; using alternate

Possible Cause 1

The color/monochrome switch is set incorrectly.

Action 1

Turn the power off, then back on again. If the problem persists, contact LXE's Customer Support. The switch to correct the setting may need to be changed.

Possible Cause 2

The primary video adapter failed.

Action 2

Turn the power off, then back on again. If the problem persists, contact LXE's Customer Support. The primary video adapter may need to be checked.

GateA20 failure

Possible Cause

The keyboard controller is not accepting commands, specifically, the enable and disable A20 commands.

Action

Turn the power off, then back on again. If the problem persists, contact LXE's Customer Support. The keyboard controller and the system board may need to be checked.

> **Fixed disk configuration error**

Possible Cause

The specified configuration is not supported or doesn't match the actual hardware flash disk installed.

Action

Correct the fixed disk configuration in the BIOS Setup.

> **Hard disk read failure press <F1> to retry boot**

or may also say,

> **press <F1> to retry boot, <F2> for BIOS Setup**

Possible Cause

The flash may be configured incorrectly or is defective.

Action

Check the drive type selected in BIOS Setup. Turn the power off, then back on again. If the problem persists, contact LXE's Customer Support. The VX1 flash may need to be replaced.

> **No boot device available press <F1> to retry boot**

or may also say,

> **press <F1> to retry boot, <F2> for BIOS Setup**

Possible Cause

Either the PCMCIA card in drive A:, the flash disk or both the PCMCIA card and flash disk are defective.

Action

Turn the power off, then back on again. If the problem persists, contact LXE's Customer Support. The flash disk may need to be replaced.

> **No boot sector on hard disk – press <F1> to retry boot**

or may also say

> **press <F1> to retry boot, <F2> for BIOS Setup**

Possible Cause

The C: drive is not formatted or is not bootable.

Action

Format the C: drive and make it bootable.

> **Not a boot diskette – press <F1> to retry boot**

or may also say,

> **press <F1> to retry boot, <F2> for SETUP utility**

Possible Cause

The PCMCIA card in drive A: is not formatted as a bootable diskette.

Action

Replace the PCMCIA card with a bootable PCMCIA card and try rebooting.

> **No timer tick interrupt**

Possible Cause

The timer chip has failed.

Action

Turn the power off, then back on again. If the problem persists, contact LXE's Customer Support. The system board may need to be checked.

> **ROM bad checksum**

Possible Cause

The Flash part (or EPROM) has been corrupted.

Action

Turn the power off, then back on again. If the problem persists, contact LXE's Customer Support. PHLASH may need to be run to restore the CMOS on a flash part. The EPROM may need to be replaced if a flash part is not being used.

Shutdown failure

Possible Cause

Either the keyboard controller is not accepting the reset command or the associated reset logic has failed.

Action

Turn the power off, then back on again. If the problem persists, contact LXE's Customer Support. The keyboard controller and the system board may need to be checked.

Time of day not set – run BIOS Setup

Possible Cause

Clock not set.

Action

Run BIOS Setup utility.

Timer 2 failure

Possible Cause

The timer chip has failed.

Action

Turn the power off, then back on again. If the problem persists, contact LXE's Customer Support. The system board may need to be checked.

Invalid configuration information – please run BIOS Setup

Possible Cause

Configuration error.

Action

Run the BIOS Setup utility and check configuration settings.

Keyboard controller failure

Possible Cause

The keyboard controller firmware has failed.

Action

Turn the power off, then back on again. If the problem persists, contact LXE's Customer Support. The keyboard controller and the system board may need to be checked.

Keyboard stuck key failure

Possible Cause

A key is jammed.

Action

Locate the jammed key and fix it. Turn the power off, then back on again. If the problem persists, contact LXE's Customer Support.

Memory failure at hex-value, read hex-value, expecting hex-value

Possible Cause

Circuitry associated with the memory chips has failed.

Action

Turn the power off, then back on again. If the problem persists, contact LXE's Customer Support.

Unexpected interrupt in protected mode

Possible Cause

Hardware interrupt occurred while in protected mode.

Action

Turn the power off, then back on again. If the problem persists, contact LXE's Customer Support. The timer chip or the interrupt controller on the system board may need to be checked.

POST Informational Messages

The following table lists the POST informational messages for the VX1.

Message	Meaning
nnnK Base Memory	The amount of base memory that tested successfully.
nnnK Extended	The amount of extended memory that tested successfully.
Memory tests terminated by keystroke	This message indicates that a user pressed the <Spacebar> while the memory tests were running and stopped the memory tests
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.
Beginning memory test. Press the <Spacebar> to terminate the memory test	A user can stop the memory test by pressing the <Spacebar>.
Press the <F1> key to continue, <F2> to run the BIOS Setup	This message indicates that an error was found during POST. Pressing the <F1> key allows the system to attempt to boot. Pressing <F2> allows users to run the ROM-based BIOS Setup to correct configuration information.

POST Beep Codes

The system speaker emits a coded beep to alert the user that the system failed the Power On Self Test. If this happens, contact qualified service personnel. Do not attempt to fix the problem yourself.

Beep codes are listed below with a short description of the error.

Beep Seq.	Description
1-1-3	CMOS write/read test in-progress or failure.
1-1-4	BIOS ROM checksum in-progress or failure.
1-2-1	Programmable Interval Timer test in-progress or failure.
1-2-2	DMA initialization in-progress or failure.
1-2-3	DMA page register write/read test in-progress or failure.
1-3-1	RAM refresh verification in-progress or failure.
1-3-3	1st 64K RAM chip or data line failure - multi-bit.
1-3-4	1st 64K RAM odd/even logic failure.
1-4-1	1st 64K RAM address line failure.

Beep Seq.	Description
1-4-2	1st 64K RAM parity test in-progress or failure.
2-1-1	1st 64K RAM chip or data line failure - bit 0.
2-1-2	1st 64K RAM chip or data line failure - bit 1.
2-1-3	1st 64K RAM chip or data line failure - bit 2.
2-2-4	1st 64K RAM chip or data line failure - bit 3.
2-2-1	1st 64K RAM chip or data line failure - bit 4.
2-2-2	1st 64K RAM chip or data line failure - bit 5.
2-2-3	1st 64K RAM chip or data line failure - bit 6.
2-2-4	1st 64K RAM chip or data line failure - bit 7.
2-3-1	1st 64K RAM chip or data line failure - bit 8.
2-3-2	1st 64K RAM chip or data line failure - bit 9.
2-3-3	1st 64K RAM chip or data line failure - bit A.
2-3-4	1st 64K RAM chip or data line failure - bit B.
2-4-1	1st 64K RAM chip or data line failure - bit C.
2-4-2	1st 64K RAM chip or data line failure - bit D.
2-4-3	1st 64K RAM chip or data line failure - bit E.
2-4-4	1st 64K RAM chip or data line failure - bit F.
3-1-1	Slave DMA register test in-progress or failure.
3-1-2	Master DMA register test in-progress or failure.
3-1-3	Master interrupt mask register test in-progress or failure.
3-1-4	Slave interrupt mask register test in-progress or failure.
3-2-4	Keyboard controller test in-progress.
3-4-4	Screen memory test in-progress or failure.
3-4-1	Screen initialization in-progress or failure.
3-4-2	Screen retrace tests in-progress or failure.
4-2-1	Timer tick interrupt test in-progress or failure.
4-2-2	Shutdown test in-progress or failure.
4-2-3	Gate A20 failure.
4-2-4	Unexpected interrupt in protected mode.
4-3-1	RAM test in-progress or failure above address 0FFFFh.
4-3-3	Interval timer channel 2 test in-progress or failure.
4-4-1	Serial port test in-progress or failure.
4-4-3	Math coprocessor test in-progress or failure.

Run Time Messages

The following messages are displayed if an error occurs after the boot procedure has completed. If the problems persist, contact LXE's Customer Support.

> **Memory parity interrupt at address. Type (S)hut off NMI, (R)eboot, other keys to continue**

Possible Cause

At least one memory chip has failed.

Action

Turn the power off, then back on again. The memory on the system board may need to be checked.

> **Unexpected HW interrupt at address. Type (R)eboot, other keys to continue**

Possible Cause

Hardware problem. Not displayed if the extended interrupt handler is not enabled.

Action

Check all the hardware in the system. Turn the power off, then back on again. If the problem persists, contact LXE's Customer Support.

> **Unexpected SW interrupt at address. Type (R)eboot, other keys to continue**

Possible Cause

Error(s) in the software program. Not displayed if the extended interrupt handler is not enabled.

Action

Turn the machine off and then on again. If that doesn't work, check the software program. If the problem persists, contact LXE's Customer Support.

> **Unexpected type 02 interrupt at xxxxxh. Type (S)hut off NMI, (R)eboot, other keys to continue**

Possible Cause

A parity error occurred, but the source can not be determined.

Action

Turn the power off, then back on again. If the problem persists, contact LXE's Customer Support.

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 ROM-DOS documentation.

- If the problem occurs while running software applications loaded after your purchase of the VX1, consult the software documentation for troubleshooting suggestions. Contact the software company's technical support department for assistance.

If you still need assistance refer to the "Contacting LXE" file on the LXE Manuals CD.

Appendix A Key Maps

Standard Keypad
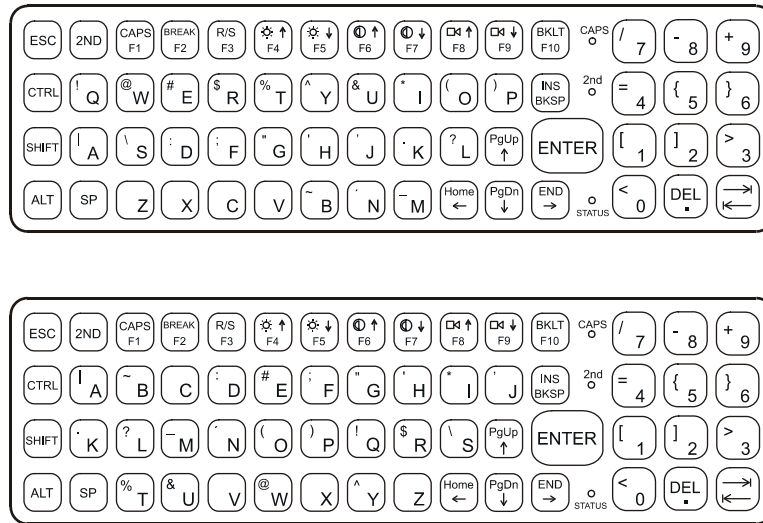
Figure A-1 QWERTY and ABCD Keyboards

The key map table that follows lists the commands used when running LXE's ANSI Plus (with either 900MHz or 2.4GHz radios) or LDS Plus (with either 900MHz or 2.4GHz radios) Terminal Emulation (TE) programs. When running these programs please refer to the following terminal emulation reference guides for equivalent keys and keypress sequences:

- ANSI Plus Reference Guide
- LDS Plus Reference Guide

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: NumLock is always On. 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 using BIOS Setup or 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[4]	x					F4
Decrease Brightness[4]	x					F5
Increase Contrast[4]	x					F6
Decrease Contrast[4]	x					F7
Increase Volume	x					F8
Decrease Volume	x					F9
Keyboard Backlight	x					F10
Suspend/Resume	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
BackTab	x					Tab
Ctrl-Break[5]	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

---

[4] The Brightness adjustment and Display Contrast adjustment keys have no function because the VX1 is equipped with an Electroluminescent display.
[5] 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	
Delete (numeric)	x					DEL (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
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
i						I
j						J
k						K
l						L
m						M
n						N
o						O
p						P
q						Q
r						R
s						S

To get this key	Press These Keys and Then					Press this key
	2nd	Shift	Ctrl	Alt	CapsLock	
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
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

To get this key	Press These Keys and Then					Press this key
	2nd	Shift	Ctrl	Alt	CapsLock	
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		x			I
* (alpha)	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

To get this key	Press These Keys and Then					Press this key
	2nd	Shift	Ctrl	Alt	CapsLock	
"	x					G
!	x					Q
@	x					W
#	x					E
$	x					R
%	x					T
^	x					Y
&	x					U
(	x					O
)	x					P

IBM 3270 and TN3270 Terminal Emulator Keypad
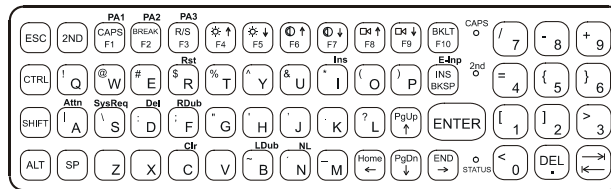
Figure A-2 IBM 3270 Specific Keypad

This keypad is designed to allow the user to enter terminal emulator commands when running LXE's IBM 3270 and TN3270 Terminal Emulation (TE) programs. When running these programs please refer to the following terminal emulation reference guides for equivalent keys and keypress sequences:

- 3270 Terminal Reference Guide (3270 DOS TE)
- 3270 Programmer's Reference Guide
- TN3270 Terminal Reference Guide

IBM 5250 and TN5250 Terminal Emulator Keypad
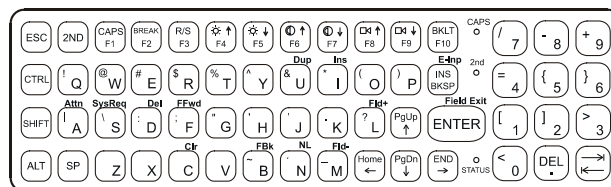
Figure A-3 IBM 5250 Specific Keypad

This keypad is designed to allow the user to enter terminal emulator commands when running LXE's IBM 5250 and TN5250 Terminal Emulation (TE) programs. When running these programs please refer to the following terminal emulation reference guides for equivalent keys and keypress sequences:

- 5250 Terminal Reference Guide (5250 DOS TE)
- 5250 Programmer's Reference Guide
- TN5250 Terminal Reference Guide

Appendix B Technical Specifications

Physical Specifications

Features		Specification	Comments
CPU		Intel 486 SX/ULP 25 MHz	
Memory	BIOS Flash	1 MB BIOS Flash	
	RAM	4MB	
Display	Controller	VGA compatible controller	512 KB of VRAM
	Type	Mono Electroluminescent	
Mass Storage	Flash	8MB (DOS)	Drive C:
PCMCIA Interface		Two (2) PCMCIA Slots: Slot 1 not used. Accepts Type I, II and III PCMCIA cards.	Compatible with the PCMCIA version 2.1 standard.
Weight		<8.0 pounds (<3.62 Kg)	Basic unit
External Connectors/ Interfaces		Two (2) external RS-232C serial ports: COM1 and COM2	9-pin "D" (male) connectors
Power Connector		12-80V DC input power	3-pin connector
Power Switch		ON/OFF sealed power switch	Toggle Switch
Beeper		Minimum loudness greater than 95dBm at 10 cm in front of unit	Adjusted with control on front panel.
Dimensions		Length: 12.0 in (30.48cm) Width: 9.0 in (22.86cm) Depth: 3.25 in (8.25cm)	
Battery for CMOS		Internal NiCd Battery	
External Power Supply	AC Adapter	120-240VAC to 12VDC	

Environmental Specifications

The VX1 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	w/Heater Option: -30 °C to +50 °C (-22 °F to +122 °F) Electroluminescent: -20 °C to +50 °C (-4 °F to +122 °F)
Storage Temperature	-30°C to +70 °C (-22 °F to +160 °F)
Water, Sand and Dust	IP66
Humidity	5-90% 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	Electroluminescent	Monochrome
Resolution		640 X 200 pixels (12 lines x 80 characters)
Cell Size		8 x 16 pixels (8 x 8 also supported)
Dot Dimensions		.30mm x .30mm
Display Dimensions		260mm x 121.7mm x 15mm
Viewing Area		216mm x 83.2mm (8.5" x 3.28")
Active Display Area		211.17mm x 79.17mm (8.31" x 3.12")

Radio Specifications

PCMCIA 900 MHz Type III

Bus Interface:	PCMCIA 2.0, Type III slot
Radio Frequencies:	902.2 MHz to 927.8 MHz FH SS
RF Data Rates:	64K bits/sec CPFSK
RF Power Output:	250 mW ± 2.0 dB into 50 Ohms
Channel Spacing:	400 KHz or 200 KHz
Operating Temperature VX1	see VX1 Environmental Specs
Storage Temperature VX1	see VX1 Environmental Specs
Connectivity:	Novell, TCP/IP, Ethernet, NDIS, ODI

PCMCIA Proxim 2.4GHz Type II

Bus Interface:	PCMCIA 2.0, Type II slot
Radio Frequencies:	2.4 - 2.4835 GHz FH SS
RF Data Rates:	1.6 Mbps
RF Power Level:	100 mW
Channels	15
Operating Temperature	see VX1 Environmental Specs
Storage Temperature	see VX1 Environmental Specs
Connectivity:	Novell, TCP/IP, Ethernet, NDIS, ODI

PCMCIA Lucent 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:	2 Mbps
RF Power Level:	15 dBm nominal
Channels	11 US, 13 Europe, 4 France, 14 Japan
Operating Temperature	see VX1 Environmental Specs
Storage Temperature	see VX1 Environmental Specs
Connectivity:	Novell, TCP/IP, Ethernet, ODI

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 maximum
RF Power Level:	35 mW nominal
Channels	11 US, 13 Europe, 4 France, 1 Japan
Operating Temperature	see VX1 Environmental Specs
Storage Temperature	see VX1 Environmental Specs
Connectivity:	Novell, TCP/IP, Ethernet, ODI

PCMCIA Symbol 2Mb 2.4GHz Type II

Bus Interface:	PCMCIA 2.0, Type II slot
Radio Frequencies:	2.4 - 2.5 GHz FH SS
RF Data Rates:	2 Mbps maximum
RF Power Level:	100 mW
Channels	15
Operating Temperature	see VX1 Environmental Specs
Storage Temperature	see VX1 Environmental Specs
Connectivity:	Novell, TCP/IP, Ethernet, NDIS, 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:	10 mW
Channels	11 US, 13 Europe, 4 France, 1 Japan
Operating Temperature	see VX1 Environmental Specs
Storage Temperature	see VX1 Environmental Specs
Connectivity:	Novell, TCP/IP, Ethernet, ODI

Appendix C Utilities

VX1-Specific Utilities

The VX1 comes equipped with several utility programs. These programs can be run to make adjustments as indicated.

Note: *LXE does not recommend running these commands in a DOS window from Microsoft Windows.*

LXE BCWEDGE

This Terminate and Stay Resident (TSR) program is used to redirect input from COM1 or COM2 to the BIOS key ring buffer. With this TSR running, input from a communication port appears as if it was typed in from the keyboard.

This utility is most useful with applications that do not know about the VX1's scanner port. This utility, therefore, allows an off-the-shelf application to accept barcode data.

LXE Diagnostics

Use the utility programs to verify, test and program the VX1:

- COM Port Utility
- Keyboard Utility
- Display Utility
- File Transfer Utility
- Beeper Utility
- Battery Discharge Utility
- Backup Battery Test Utility
- Parameter Auto-Detection Utility
- Set an API Function

DOS Extensions

International language support driver for units without a Terminal Emulation (TE) program.

The following utilities are included with terminal emulation configurations.

BBDISVX.EXE	BBTSTVX.EXE	BCWEDGE.EXE
COMSTSVX.EXE	PARAMVX.EXE	KEYVX.EXE
SETAPI_4.EXE	BEEPVX.EXE	DISPVX.EXE

All utilites are included in non-TE configurations.

LXE BCWEDGE

This DOS based utility, BCWEDGE.EXE, is installed by LXE.

This Terminate and Stay Resident (TSR) program is used to redirect input from COM1 or COM2 to the BIOS key ring buffer. This DOS based utility enables the use of a barcode scanner on a COM port, provided power is available on that port. The software interprets data from the scanner as keyboard data, thus it will work with DOS applications such as NED. It will not function on Microsoft Windows 95 platforms.

When a terminal emulator program is started after the wedge utility has initialized, the keyboard interrupt used by the wedge utility is trapped and used by the terminal emulator. The keyboard interrupt needed by the wedge utility is no longer available.

Note: It is the responsibility of the application programmer to make the VX1 beep on errors, etc., when running the wedge utility.

Parameters

Command line:

```
BCWEDGE c=# b=baud s=dps [opt unitname]
```

Example:

```
BCWEDGE c=1 b=9600 s=8N1 2381
```

Sets BCWEDGE to use COM1, 9600 baud, 8 data bits, no parity, and 1 stop bit on an VX1 platform.

The command to unload the wedge TSR is BCWEDGE -u.

Default options for BCWEDGE are: COM1, 9600 baud, 8, N, 1. Options are not case sensitive.

Parameter	Explanation
-h	Displays BCWEDGE command line options.
-u	Uninstall the TSR
c=#	Communications port. Default: COM1 Options: 1, 2
B=baud	Sets the baud rate. Default: 9600 Options: 9600, 19200

Parameter	Explanation
s=dps	data / parity /stop
	Data
	Default: 8
	Options: 5, 6, 7, 8
	Parity
	Default: N
	Options: N, O, E, M, S
	(None, Odd, Even, Mark, Space)
	Stop
	Default: 1
	Options: 1, 2
unitname	Optional. Enables the scanner for the specifically designated computer.
	Default: 2381
	Options: 1330, 2330, 2381

LXE Diagnostics

Note: When using an external power supply, make sure there is an uninterrupted power source
for the VX1.

The VX1 comes equipped with several utility programs. These programs can be run to make
adjustments as indicated.

LXE does not recommend running these commands in a DOS window from any Microsoft
Windows application.

Filename	Description
BBDISVX.EXE	Battery Discharge Utility
	Condition the 50 mAh NiCd Backup Battery mounted on the system board. The battery discharge starts and when discharged switches to backup battery charge mode.
BBTSTVX.EXE	Backup Battery Test Utility
	Indicates the current status of the backup battery and the voltage.
BEEPVX.EXE	Beeper Utility
	Changes the volume of the beeper using the up and down arrow keys on the keypad/keyboard.
COMTSTVX.EXE	Communication Port Utility
	To diagnose the serial communication port, a simple loop back test routine is included in this file. The figure showing how to build a loop back plug is included in this chapter. The test results will read PASS or FAIL. A failure is identified and described.
DISPVX.EXE	Display Utility
	Activates every pixel on the display to verify functionality.
KEYVX.EXE	Keyboard Utility
	This utility performs a contact functional test of each key on the keyboard. When activated, the key labels appear on the screen and then each key, when initialized, clears the key label from the screen.
LXEF.EXE	File Transfer Utility
	Transfer files to and from a PC through any of the VX1's COM ports, as well as act as the agent for the Win32 Developer Toolkit Application.
PARAMVX.EXE	Parameter Dump Utility
	This utility collects the setup configurable parameters and lists them in a text file.

Filename	Description
SETAPI_4.EXE	Set An API Function
	Runs an API call to set a mode or change a parameter.

Backup Battery Test Utility (BBTSTVX.EXE)

This command is run at the DOS prompt. There are no parameters.

Run this command file to view the current status of the backup battery and the voltage.

If the backup battery needs to be replaced, the unit must be returned to LXE for service (see Chapter 1, section titled "Getting Help".)

Battery Discharge Utility (BBDISVX.EXE)

This command is run at the DOS prompt. There are no parameters.

Use this command file to condition the backup battery mounted on the system board. When the program is initiated, the battery discharge process begins, "Discharging" is displayed on the screen and the voltage changes are displayed. When discharge is complete (at approximately 4V), the battery charge process begins. The word "Charging" appears on the screen and the voltage changes are displayed.

If the backup battery needs to be replaced, the unit must be returned to LXE for service (see Chapter 1, section titled "Getting Help".)

Beeper Utility (BEEPVX.EXE)

This command is run at the DOS prompt. There are no parameters.

Running this executable file will set the beeper to a single beep and turn the beeper on. The beeper or speaker volume can be changed at this time using the up or down arrow keys. The volume is increased or decreased one step each time the volume key is pressed and the changed beep tone is emitted. The program is ended by pressing the right arrow key.

To adjust the beeper volume, locate the <F8> key at the top of the keypad. Adjust the beeper volume by pressing the:

- 2nd key, then the <F8> key
- Use the Up Arrow or Down Arrow keys to adjust volume until the beeper volume is satisfactory.
- Press <Right Arrow> to accept the change and exit the Volume change mode.

Communication Port Utility (COMTSTVX.EXE)

This command is run at the DOS prompt. There are no parameters. **The program requires LXE cable part number 155746-0001**.

This command file is used to test the TX, RX and handshaking lines of the unit's COM port. A loopback connector is needed to perform this test. The configuration of the connector for the RS-232 endcap follows.

RS-232 Endcap Connector
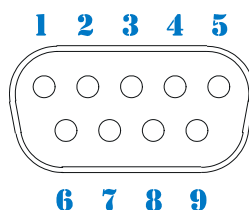
Figure C-1 RS-232 Serial Connector (COM1 or COM2)

Pin	Signal	Description
1	DCD	Data Carrier Detect – Not Connected
2	RXD	Receive Data – Input
3	TXD	Transmit Data – Output
4	DTR	Data Terminal Ready – Not Connected
5	GND	Signal/Power Ground
6	DSR	Data Set Ready – Not Connected
7	RTS	Request to Send – Output
8	CTS	Clear to Send – Input
9	RI or +5V DC	Ring Indicator – Input (Default) or Bar Code Scanner Power -400mA max (Use BIOS Setup software to configure)

RS-232 Endcap COM Port Loopback Configuration

7	RTS		CTS	8
3	TX		RX	2

Figure C-2 RS-232 COM Port Loopback Configuration

Display Utility (DISPVX.EXE)

This command is run at the DOS prompt. There are no parameters.

Run this command file to test the screen display. It will draw a border around the display, wait for an <Enter> keypress, and then fill the inside of the box by turning on all the pixels. There are a total of 640 pixels across and 200 pixels down the display area – 0,0 is located at the upper left and 640,200 is located at the lower right.

File Transfer Utility (LXEF.EXE)

The LXEF.EXE utility gives you the ability to both transfer files to and from a PC through the VX1's serial port, as well as act as the agent for the Mobile Enterprise SDK Application. If neither the transmit file (/t) or the receive file (/r) option is specified, LXEF runs in client mode, and will respond to both file transfer requests and remote information requests from the Mobile Enterprise SDK Application.

Syntax:

```
LXEF  [ /option1 /option2 … ] [ filename ]
```

Options:

/Com? [: #]	where either Com1 or Com2 is used to indicate which com port is to be used and optionally # can be set to represent the baud rate. E.g: /Com2:9600 (default) tells the utility to use the serial transfer protocol through COM2 at 9600 baud.
/h	displays the help message for the LXEF command.
/o	Existing files may be overwritten during file transfers. If this option is not used, file transfers will return an error if the specified file exists.
/r	receives the specified file and then LXEF exits.
/t	transmits the specified file and then LXEF exits.
/q	Indicates that the LXEF utility should restrict its display messages to a minimum.

Filename is either the name of the file to send or receive if LXEF is being used to transfer files.

Keyboard Utility (KEYVX.EXE)

This command is run at the DOS prompt. There are no parameters.

Use this command file to display the keyboard key labels on the screen. As each key is pressed, its label is cleared from the screen.

Parameter Auto-Detect Utility (PARAMVX.EXE)

The Parameter Auto-Detect Utility (PARAMVX.EXE) is used to search for user-configurable parameter files and then write the data to a text file. The utility is a DOS stand-alone program -- it does not require that other files (except standard DOS operating system files) be present in the VX1 before it will run.

The utility captures data from the following files:

BIOS Setup	The VX1 setup parameters. See Chapter 4 "System Configuration".
AUTOEXEC.BAT	DOS command file. See Chapter 4 "System Configuration" for an example.
CONFIG.SYS	DOS command file. See Chapter 4 "System Configuration" for an example.
LXE.INI file	LXE terminal emulation parameter file.
NET.CFG file	Radio command file. See Chapter 4 "System Configuration" for an example.
SOCKET.CFG file	Radio command file. See Chapter 4 "System Configuration" for an example.

and places the data in an ASCII text file called PARAM.DAT.

The ASCII text file should then be printed out or copied to a PC or floppy disk and stored for safekeeping. The information in the text file may be used, as a reference, to reconstruct parameter values if the files become unreadable or to program several VX1's with the same values.

The Parameter Auto-Detect Utility filename is PARAMVX.EXE and it creates a text file called PARAM.DAT. The PARAM.DAT file may be renamed and the next time PARAMVX.EXE is run, a new PARAM.DAT file will be created. The combined file size is approximately 50K and both files may be deleted from the VX1 if more disk space is needed in the unit.

Run Parameter Auto-Detect Utility

The file must be run from the DOS command line.

Using DOS commands, change the DOS prompt to the drive letter and subdirectory of the DOS files (for example, C:>\DOS).

At the DOS prompt type the following command to run the utility:

PARAMVX and press Enter.

The PARAM.DAT file is created and stored in the DOS subdirectory on the VX1.

Use DOS commands to copy the PARAM.DAT file to another media or print the file.

Set An API Function (SETAPI_4.EXE)

This command is run at the DOS prompt. Run this command at the DOS prompt to set a mode or change a parameter.

All arguments are in HEX format. Put an X in the place of arguments that are not used.

Format for INT 10:

SETAPI_4 *arg1 arg2 arg3 arg4 arg5 arg6*

where

- *arg1* is always 10
- *arg2* - (AH) = 12
- *arg3* - (BL) = BA (Panning) or BC (DOS Font)
- *arg4* - (AL) = Function Requested
- *arg5* - (BH) = Value Requested
- *arg6* - (CX) = Value Requested

Format for INT 15:

SETAPI_4 *arg1 arg2 arg3 arg4 arg5 arg6 arg7*

where

- *arg1* is always 15
- *arg2* - (AH) = BA
- *arg3* - (AL) = Service Group
- *arg4* - (BH) = Function Number
- *arg5* - (BL) = Action
- *arg6* - (CX) = 16 Bit Register Value (where appropriate)
- *arg7* - (DX) = 16 Bit Register Value (where appropriate)

INT 15 Example:

Sound Beeper   SETAPI_4 15 BA 53 4 30 07D0 000A

Please refer to "LXE DOS API Programming Guide", available on the LXE Manuals CD-ROM, for complete details on API calls.

Index

C

D

Q

R

S

T

U

V

W

X