MX3-CE Reference Guide

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Revision Notice

MX3-CE Reference Guide
Upgrade From Revision D to Revision E

Entire Manual	Updated figures/graphics to improve online viewing. Updated sections to call attention to "Appendix D – AppLock" where appropriate.
Chapter 1 - Introduction	Added 1800mAh battery to "Accessories". Updated Accessory part numbers. Added network connection section to "Getting Started".
Chapter 4 – System Configuration	Removed "Primary Events" section from "Control Panel". Corrected the Serial, IrDA and USB Connection path in the "Backup MX3-CE Files" section.
Appendix C – API Calls	Updated LXEScannerGetStatus, LXEScannerSetWindow. Added LXEScannerKeyStatus.
Appendix D - AppLock	Added "Appendix D - AppLock".

Li-Ion Battery

When disposing of the MX3-CE Main Battery, the following precautions should be observed:
The battery should be disposed of promptly. The battery should not be disassembled or crushed. The battery should not be heated above 212°F (100°C) or incinerated.

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Chapter 1 Introduction

Overview

The MX3-CE is a rugged, portable, hand-held Windows CE computer capable of wireless data communications. The MX3-CE can transmit information using a 2.4 GHz radio (with an internally mounted antenna) and it can store information for later transmission through an RS-232 or InfraRed port.

The MX3-CE is horizontally oriented and features backlighting for the display. The touch-screen display supports graphic features and Windows icons that the Windows CE operating system supports. The keys on the keypad are constructed of a phosphorescent material that can easily be seen in dimly lighted areas.

The MX3-CE is a Windows CE compatible computer that can be scaled from a limited function batch computer to an integrated RF scanning computer. A stylus is enclosed with the MX3-CE to assist in entering data and configuring the unit.

Note: Until the Main Battery and Backup Battery are completely depleted, the MX3-CE is ***always*** *drawing power from the batteries (**On**).*

Related Manuals

The "MX3-CE Installation and Operator's Guide" contains MX3-CE installation, user instruction and safety statements.

Please refer to the "MX3 Cradle Reference Guide" for technical information relating to the MX3-CE Desk Top and Vehicle Mount cradles.

If you need to set up the integrated scanner **barcode reading parameters**, please refer to the "**Integrated Scanner Programming Guide**" on the LXE Manuals CD or the LXE website www.lxe.com.

Important

If the MX3-CE has AppLock installed, please refer to "Appendix D – AppLock" for setup and processing information before continuing with "Getting Started."

Components

Figure 1-1 Front of MX3-CE

1	Endcap	9	Shift LED
2	Display	10	Caps LED
3	Scan or Enter (programmable)	11	Scanner LED
4	Beeper	12	Backup Battery LED
5	On/Off Button	13	Status LED
6	2nd LED	14	Main Battery LED
7	Alt LED	15	Charger LED
8	Ctrl LED	16	Scan or Enter (programmable)
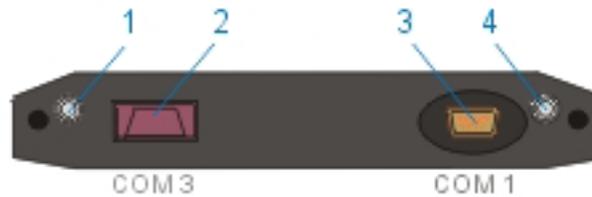
Figure 1-2 MX3-CE Endcap

1	DC Power Jack	3	Com 1 (Serial) Port
2	Com 3 (Serial or Scanner) Port	4	Audio Jack
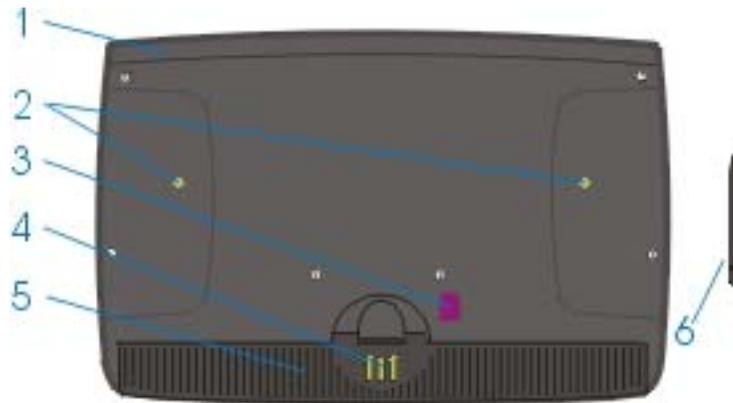
Figure 1-3 Back of MX3-CE

1	Endcap	4	Cradle Input Contacts
2	Leather Handstrap Connector	5	Main Battery
3	IR Port (Com 2 Port)	6	Stylus

When to Use This Guide

As the reference for LXE's MX3-CE computer, this guide provides detailed information on its features and functionality. Use this reference guide as you would any other source book -- reading portions to learn about the MX3-CE, and then referring to it when you need more information about a particular subject. This guide takes you through all aspects of installation and configuration for the LXE MX3-CE.

Operating and safety instructions for the general user are contained in the "MX3-CE Installation and Operator's Guide."

This chapter, **"Introduction",** describes this reference guide's 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 configuration, controls and connectors on the MX3-CE.

Chapter 3 "Power Supply" describes the power sources and battery charging stations.

Chapter 4 "System Configuration" takes you through the Win-CE system setup and the MX3-CE file structure.

Appendix A "Key Maps" describes the keypress sequences for the QWERTY keypad.

Appendix B "Technical Specifications" lists MX3-CE technical specifications.

Appendix C "API Calls" contains Application Programming Interface (API) calls for the MX3-CE.

Appendix D "AppLock" contains explanation and instruction when working with MX3-CE's running AppLock.

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 keypad (for example, <Enter>).
	Indicates a reference to other documentation.
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.

Getting Started

> *Note: When your MX3-CE is pre-configured, the radio, PCMCIA card and endcaps are assembled by LXE to your specifications.*

This section's instructions are based on the assumption that your new system is pre-configured and requires only accessory installation (e.g. handstrap, stylus) and a power source. LXE recommends that installation or removal of accessories be performed on a clean, well-lit surface. When necessary, protect the work surface, MX3-CE, and components from electrostatic discharge.
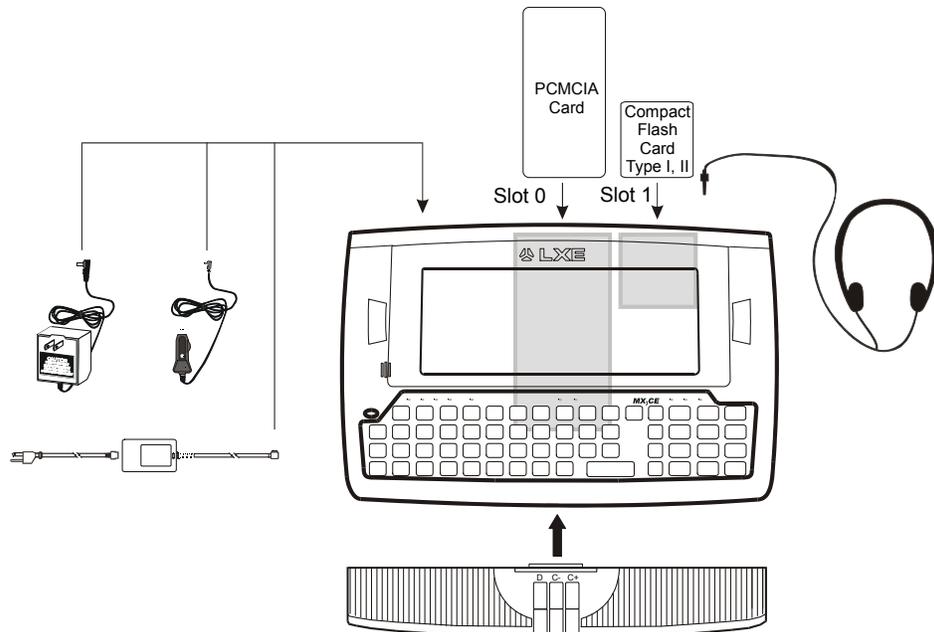
Figure 1-4 Hardware Configuration

Use this guide as you would any other source book -- reading portions to learn about the MX3-CE, and then referring to it when you need more information about a particular subject. This guide takes you through an introduction to and operation of the LXE MX3-CE.

In general, the sequence of events is:

1. Insert a fully charged battery and press the Power button.
2. Connect an external power source to the unit (if required).
3. Adjust screen display, audio volume and other parameters if desired.

> *Note: **New batteries must be fully charged prior to use.** This process takes up to four hours in an LXE Multi-Charger and up to eight hours using the MX3-CE internal charger.*

Important

If the MX3-CE has AppLock installed, please refer to "Appendix D – AppLock" for setup and processing information before continuing with "Getting Started."

Radio and Network Setup

Prerequisites

- Network SSID number of the Access Point

- WEP or LEAP Authentication Protocol Keys

Note: Insert a fully charged battery and power up the computer (or connect the computer to an external power source).

Set Up the Radio

Locate the Symbol, Lucent or Proxim Radio icon in the taskbar. The Cisco Radio icon is either on the Desktop or under Start | Programs.

Tap the icon with the stylus.

Note: If the access point uses authentication protocol (WEP, LEAP, etc.) your radio must use the same authentication keys. Please contact your IS department for WEP and LEAP encryption keys before contacting LXE.

Symbol

Access: Tap Symbol radio icon in taskbar

1. Select the Mode menu and enter the 802.11 ESSID number. The default is "101".

2. Select the IP Config menu and select either DHCP or input a static IP address.

3. If your network uses encryption, select the Encryption menu option and select the value that matches your network.

Lucent / ORiNOCO

Access: Start | Settings | Control Panel | Wireless Icon
OR select Start | Programs | ORiNOCO Client | Edit Wireless Profiles

1. Select a Configuration Profile, select Edit, enter the SSID.

2. If the access point is using WEP, select Enable Data Encryption.

3. Enter the WEP key in hexadecimal notation and click Finish.

Cisco

Access: Windows icon | Programs | Cisco | Aironet Client Utility (ACU)

1. Select SSID and enter your device's SSID number.

2. If the access point is using WEP, select WEP and click the Enable box.

3. Select WEP Keys, (password is Cisco) enter the WEP encryption code and click OK.

4. If the access point is using LEAP, select "No WEP" and enable LEAP.

5. Set the Network Security Type.

Proxim

Access: Tap Proxim radio icon in taskbar

1. The first screen displays the Master the computer is synchronized with, the network domain id and the node address.

2. Edit the factory default value of these parameters to match your network values. The default value for Security ID is "null".

3. Set the security ID of the computer. It must be the same security ID as other Proxim cards (e.g. access point security ID) with the same security ID.

Access Terminal Emulation Parameters

Before you make a host connection, you will, at a minimum, need to know:

- the alias name or IP address (Host Address) and
- the port number (Telnet Port) of the host system

to properly set up your host session.

1. Make sure the mobile client network settings are configured and functional. If you are connecting over wireless LAN (802.11B), make sure your mobile client is communicating with the Access Point.

2. From the **Start | Program**, run **LXE RFTerm** or tap the RFTerm icon on the desktop.

3. Select **Session | Configure** from the application menu and select the "host type" that you require. This will depend on the type of host system that you are going to connect to; i.e. 3270 mainframe, AS/400 5250 server or VT host.

4. Enter the "Host Address" of the host system that you wish to connect to. This may either be a DNS name or an IP address of the host system.

5. Update the telnet port number, if your host application is configured to listen on a specific port. If not, just use the default telnet port.

6. Select **OK**

7. Select **Session | Connect** from the application menu or tap the "Connect" button on the Command Bar. Upon a successful connection, you should see the host application screen displayed.

8. Select the **Connection** tab.

9. Tap the **Host Type**.

10. Enter the **Host Address**.

11. Select the **Telnet Port**.

To change options in the Display, Colors, Cursor, Barcode or Options tabs, please refer to the RFTerm Reference Guide on the LXE Manuals CD.

About Lithium-Ion Batteries

Li-Ion batteries (like all batteries) gradually lose their capacity over time (in a linear fashion) and never just stop working. This is important to remember -- the MX3-CE is always 'on' even when in the Suspend state and draws battery power at all times. Use the **Start | Settings | Control Panel | Power Properties | Charge** tab to check the battery status and power reading.

The following chart is an approximation. Actual battery capacity may vary based on usage, ambient temperature and peripherals drawing power from the MX3-CE:

100% capacity	1800 mAh minimum
80% capacity	1440 mAh minimum

Deciding when to put a fully charged Main Battery pack in the MX3-CE is difficult to quantify because it is very application specific. 1000 mAh may be the cutoff for one customer who uses the computer frequently, while 300 mAh may be perfectly fine for a customer who occasionally uses the computer. You need to determine the point at which battery life becomes unacceptable for your business practices and replace the Main Battery pack before that point.

Refer to the documentation received with the charger for complete information.

Tapping with a Stylus

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

Hold the stylus as if it were a pen or pencil. Touch an element on the screen with the tip of the stylus then remove the stylus from the screen. Firmly press the stylus into the stylus holder on the MX3-CE when the stylus is not in use.

Like using a mouse to left-click icons on a computer screen, using the stylus to tap icons on the MX3-CE display is the basic action that can:

- Open applications
- Choose menu commands
- Select options in dialog boxes or drop-down boxes
- Drag the slider in a scroll bar
- Select text by dragging the stylus across the text
- Place the cursor in a text box prior to typing in data or retrieving data using the integrated barcode scanner or an input/output device connected to the serial port.

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

Keypad Shortcuts

Use keyboard shortcuts instead of the stylus when the MX3-CE is running WinCE.

- Press Tab and an Arrow key to select a file.
- Press Shift and an Arrow key to select several files.
- Once you've selected a file, press Alt then press Enter to open its Properties dialog.
- Press 2nd then press numeric dot to delete a file.
- Right mouse click – press the Alt key and then tap the screen. Select a menu option.
- To force the Start menu to display, press Ctrl then press Esc.

Insert Main Battery

Press the Power button after the battery is inserted into the MX3-CE.

Note: ***New batteries must be charged prior to first use****. This process takes up to four hours in an LXE Multi-Charger and eight hours with an external power source attached to the MX3-CE.*
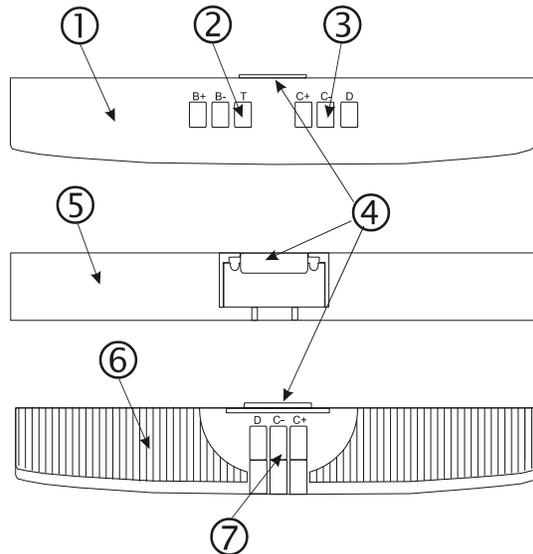
Figure 1-5 Main Battery

1   Front Side
2   Contacts, Main Battery
3   Contacts, Cradle Output
4   Retaining Clip
5   Top Side
6   Back Side
7   Contacts, External Cradle Input
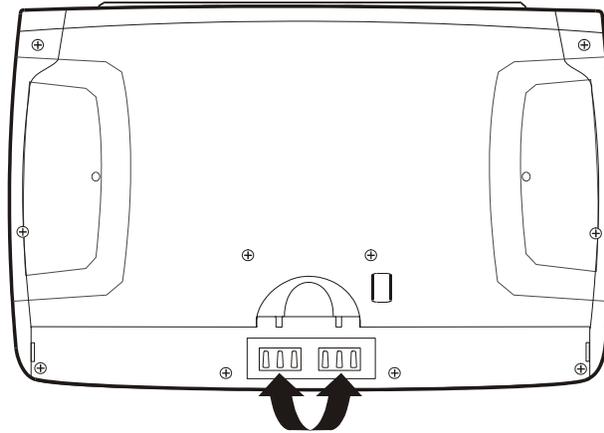
Figure 1-6 Battery Compartment

The MX3-CE Battery Compartment is located at the bottom of the back of the computer. The arrows in the figure above point to the battery contacts in the computer.
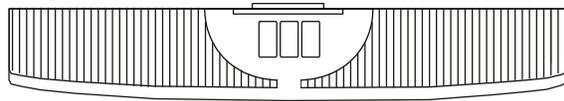
Figure 1-7 Main Battery

Place the battery in the compartment, making sure the side of the battery with six contacts matches up with the battery contacts in the computer battery compartment. Do not slide the battery sideways into the compartment.

Firmly press the battery into the compartment until it clicks. The battery is now securely fastened to the MX3-CE.

Attach Handstrap (Optional)

An elastic handstrap is available for the MX3-CE. Once installed, the handstrap provides a means for the user to secure the computer to their hand. It is adjustable to fit practically any size hand and does not interfere with battery charging when the MX3-CE is in a docking station.
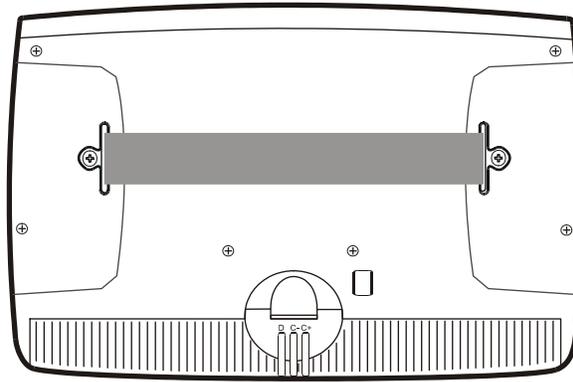
Figure 1-8 MX3-CE With Handstrap Installed

Tool Required: #1 Phillips Screwdriver

Installation

1. Remove the MX3-CE from the docking station.

2. Place the MX3-CE, with the screen facing down, on a flat stable surface.

3. Attach the handstrap to the MX3-CE with the screws and washers provided.

4. Test the strap's connection making sure the MX3-CE is securely connected to each end of the strap connectors.

Attach to Hip-Flip (Optional)

Figure 1-9 Hip-Flip Accessory

Note: #1 flat head screwdriver are not supplied by LXE. A waist belt can be ordered from LXE.

Once the MX3-CE is attached to the hip-flip and the hip-flip securely fastened to the user by a belt around their waist, the MX3-CE can be operated at a convenient height, leaving the user's hands free.

The hip-flip adjusts downward to allow removing and replacing the main battery without removing the unit from the hip-flip or the user's body.

The MX3-CE must be removed from the hip-flip before being placed in a docking station.

Caution: Never use the MX3-CE in the hip-flip without first securing the unit to the hip-flip with the screws.

Installation

1. If the MX3-CE has a handstrap, remove the handstrap and set it aside along with the handstrap screws and washers.

2. Slide the MX3-CE into the pocket in the hip-flip, making sure the keypad is up and the endcap ports are visible in the openings at the base of the hip-flip.

3. Place the MX3-CE (in the hip-flip) on a flat stable surface with the keypad down.

4. Tighten the assembly with the black screws provided, using the holes once used for the handstrap on the MX3-CE.

5. Test the hip-flip's connection making sure the MX3-CE is securely attached.

6. Slide the waist-belt through the loop in the hip-flip and secure the belt around your body.

Connect External Power Supply (Optional)

There are three external power supplies available:

- US AC/DC 12V Power Supply
- Cigarette Lighter Adapter
- International AC/DC 12V Power Supply
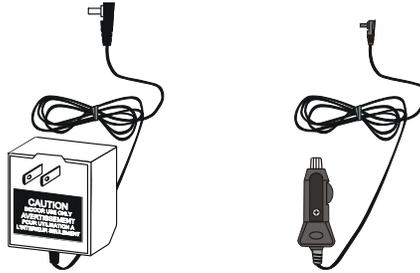
Figure 1-10 US AC/DC 12V Power Supply and Cigarette Lighter Adapter
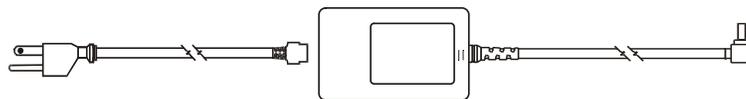
Figure 1-11 International AC/DC 12V Power Supply

The MX3-CE DC power jack is located on the endcap. The cradle power jack is located on the back of the cradle.
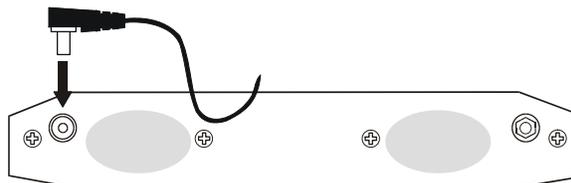
Figure 1-12 Connect External Power Supply

1. Insert the barrel connector into the MX3-CE power jack and push in firmly.

2. The CHGR LED above the keypad illuminates when the MX3-CE is receiving external power through the power jack. The Main Battery recharges when the MX3-CE is connected to an external power source.

Note: When the MX3-CE is receiving external power through a cradle, the cradle's Status LED and the MX3-CE's CHGR LED are illuminated.

Connect Audio Jack (Optional)

The MX3-CE audio jack is located on the endcap.
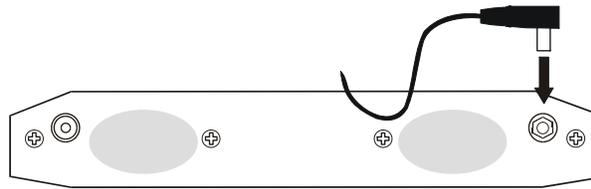
Figure 1-13 Connect Audio Jack

Insert the barrel end of the connector into the MX3-CE audio jack and push in firmly.

Note: The audio option draws power from the battery.

Power Button

Note: Refer to the section titled "Power Modes" later in this chapter for information relating to the power states of the MX3-CE.

The power button is located above the ESC key on the keypad. When a battery is inserted in the MX3-CE press the Power button.

Quickly tapping the Power button places the MX3-CE immediately in Suspend mode. Quickly tapping the Power button again, or touching the screen, immediately returns the MX3-CE from Suspend.

When the WinCE desktop is displayed or an application begins, the power up (or reboot) sequence is complete.

Please refer to the section titled "Power Modes" later in this manual for a list of the kinds of activities that will return the MX3-CE from Suspend Mode.

Troubleshooting

The MX3-CE will not turn off – force a Reboot by holding the Power key down for 15 seconds and the MX3-CE will reboot.

Touch Screen Calibration

If the MX3-CE is not responding properly to pen touch taps, you may need to recalibrate your screen. Recalibration involves tapping the center of a target. If you miss the center, keep the stylus on the screen, slide it over the target's center, and then lift the stylus.

To recalibrate the screen, select **Start | Settings | Control Panel | Stylus | Calibration tab**.

To start, tap the Recalibrate button on the screen with the stylus.

Carefully press and briefly hold stylus on the center of the target.
Repeat as the target moves around the screen.
Press the ESC key to cancel.
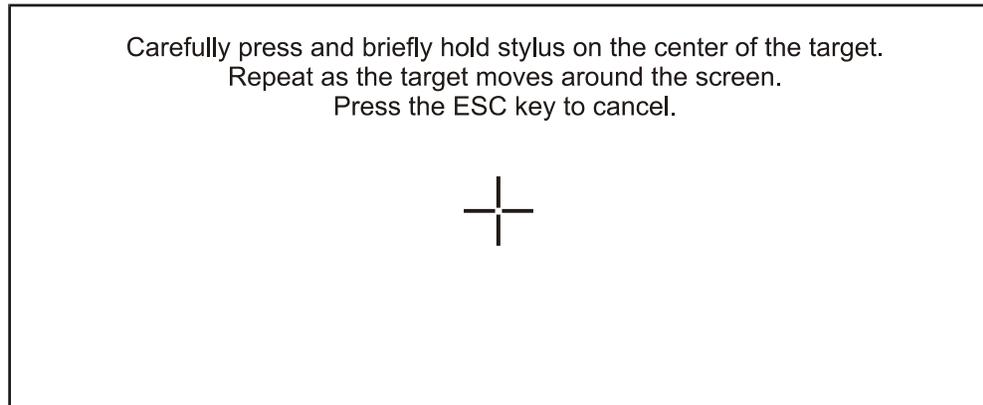
Figure 1-14 Touch Screen Recalibration

Follow the instructions on the screen and press the Enter key to save the new calibration settings or press Esc to cancel or quit.

Set The Display Contrast

Adjusting screen contrast lightens or darkens the characters to make them visible at a comfortable level. The contrast is incremented or decremented one step each time the contrast key is pressed.

◑   To adjust screen contrast, locate the <F6> key at the top of the keypad. Adjust the display contrast by pressing the:

- 2nd key[1], then the <F6> key

- Use the Up Arrow and Down Arrow keys to adjust contrast until the display lightens or darkens to your satisfaction.

Press the Enter key to exit this mode.

---

[1]   The LED for this key blinks until the special editing mode (set volume or contrast) is complete.

Set the Display Backlight Timer

> *Note: Refer to the section titled "Power Modes" later in this manual for information relating to the power states of the MX3-CE.*

Select **Start | Settings | Control Panel | Display | Backlight tab**. Change the parameter values and tap OK to save the changes.

The first option may be set when the MX3-CE will be running on battery power only. The second option may be set when the MX3-CE will be running on external power (e.g. AC adapter, cigarette adapter, powered cradle).

The default value for the battery power timer is 3 seconds. The default value for the external power timer is 2 minutes. **The backlight will remain on all the time when both checkboxes are blank.**
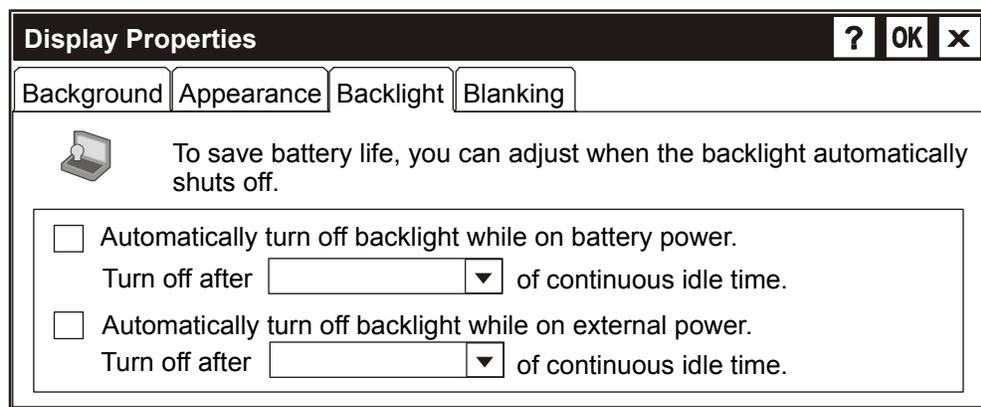
Figure 1-15 Display Properties / Backlight

This option is also available by selecting **Start | Settings | Control Panel | Power | Backlight tab**.

The transmissive color display backlight timer *dims the backlight* at the end of the specified time. The transflective monochrome and color display backlight timer *turns the backlight off* at the end of the specified time.

Set the Display Blanking Timer

Note: Refer to the section titled "Power Modes" later in this manual for information relating to the power states of the MX3-CE.

Select **Start | Settings | Control Panel | Display | Blanking tab**. This option is also available by selecting **Start | Settings | Control Panel | Power | Blanking tab**. Change the parameter values and tap OK to save the changes.

The first option may be set when the MX3-CE will be running on battery power only. The second option may be set when the MX3-CE will be running on external power (e.g. AC adapter, cigarette adapter, powered cradle).

The default value for the battery power timer is 15 seconds. The default value for the external power timer is 2 minutes. **The display will remain on all the time when both checkboxes are blank.**
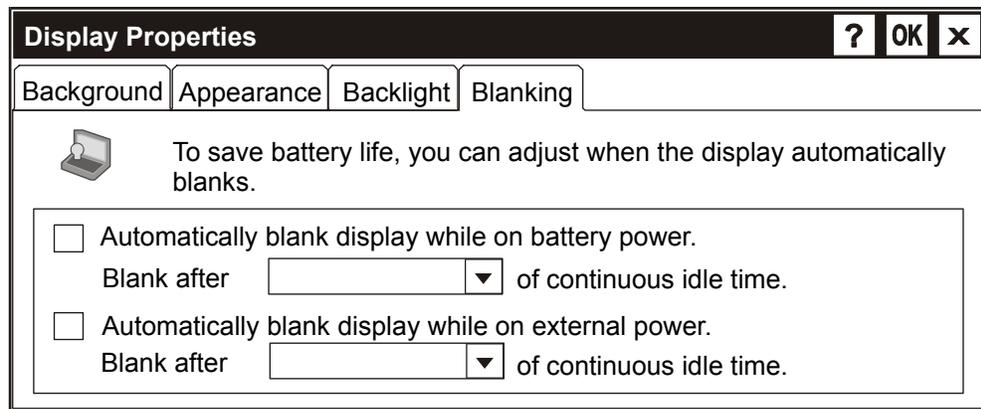
Figure 1-16 Blanking Timer

Set the MX3-CE Power Off Timer

Note: *Refer to the section titled "Power Modes" later in this manual for information relating to the power states of the MX3-CE.*

Select **Start | Settings | Control Panel | Power | Power Off tab**. Change the parameter values and tap OK to save the changes.

The first option may be set when the MX3-CE will be running on battery power only. The second option may be set when the MX3-CE will be running on external power (e.g. AC adapter, cigarette adapter, powered cradle).

The default value for both timers is 5 minutes. **The computer will remain on (not in Suspend Mode) all the time when both checkboxes are blank.**

Note: *When the Power Off timer expires, the computer enters Suspend Mode.*

Power Properties	?	OK	✕

Battery | Power Off | Backlight | Blanking | Charge

Save battery power and prevent unauthorized use (in conjunction with a password) by having your device turn off when not in use.

☐ Enable suspend while on battery power.
  Suspend after [▼] of continuous idle time.
☐ Enable suspend while on external power.
  Suspend after [▼] of continuous idle time.
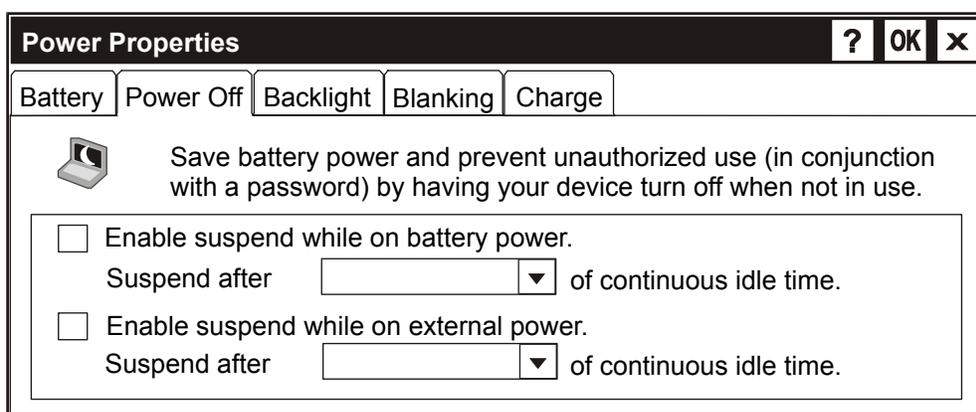
Figure 1-17 Power Off Timer

Saving Settings

To preserve configuration settings to non-volatile memory, tap the Start menu button, select "Run".

In the dialog box that pops up, type "RegSave" and tap Enter (or click the arrow on the popup box, select RegSave from the list, and tap Enter).

The cursor changes to an hourglass for a moment, then a dialog appears indicating the configuration has been saved.

The save process takes 10-15 seconds. After this, these settings are reloaded every time the unit reboots.

Set The Audio Speaker Volume

Note: An application may override the control of the speaker volume. Turning off sounds saves power and prolongs battery life.

The audio volume can be adjusted to a comfortable level for the operator. The volume is increased or decreased one step each time the volume key is pressed. The MX3-CE has an internal speaker and a jack for an external headset.

Using the Keypad

Note: Volume & Sounds (in Control Panel) must be enabled before the following key sequences will adjust the volume.

◄   To adjust speaker volume, locate the <F8> key at the top of the keypad. Adjust the speaker volume by pressing the:

- 2nd key[2], then the <F8> key to enter Volume change mode.
- Use the Up Arrow and Down Arrow keys to adjust volume until the speaker volume is satisfactory.
- Press the Enter key to exit this mode.

Using the Touch Screen

Select **Start | Settings | Control Panel | Volume & Sounds | Volume tab**. Change the volume setting and tap OK to save the change.

Volume & Sounds Properties   [?] [OK] [X]

| Volume | Sounds |

Enable sounds for:

▲ Loud
☑ Events (warnings, beeps and system events)
☑ Applications (program specific and all other sounds)
☑ Notifications (alarms, appointments and reminders)

Enable clicks and taps for:
☑ Key clicks: ◉ Loud   ○ Soft
▼ Soft
☑ Screen taps: ◉ Loud   ○ Soft
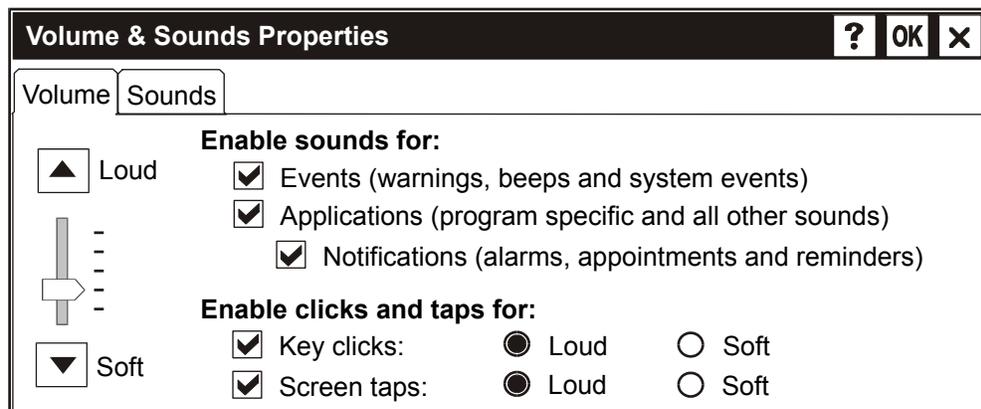
Figure 1-18 Adjust Audio Volume

You can also select / deselect sounds for key clicks and screen taps and whether each is loud or soft.

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[2]   The LED for this key blinks until the special editing mode (set volume or contrast) is complete.

Endcaps

Refer to the "MX3-CE Operator's Guide for the section titled "Scanner Warnings and Labels" for important laser safety information **before** using the scanner.

The MX3-CE supports three COM port options. Two external serial ports are dependent on the end cap chosen. A third serial port is used to support an infrared transceiver (barcode reader). An additional endcap configuration supports serial input/output at 1.5 MBps.

Scanner Port

RS-232 Port (Serial Port)
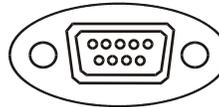
DC Power Jack

Audio Jack

COM Port Switching
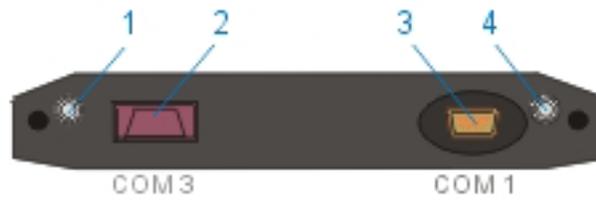
Figure 1-19 Endcap

1	DC Power Jack	3	Com 1 Port
2	Com 3 Port	4	Audio Jack

The COM 2 port is always the IR port on the back of the MX3-CE, regardless of the type of endcap installed.

On the Standard Range Scanner / Serial Port endcap COM 3 is the Integrated Scanner port.

On the Dual Serial Port endcap the COM1 port is the serial port on the right side of the endcap when the display is facing you.

The process used to enable the MX3-CE COM1 port for use with a tethered scanner has three steps:

Note: Use the scanner control panel to setup using both the integrated scanner and a tethered scanner.

To switch active scanner Com ports select **Start | Settings | Control Panel | Scanner | Main** tab.
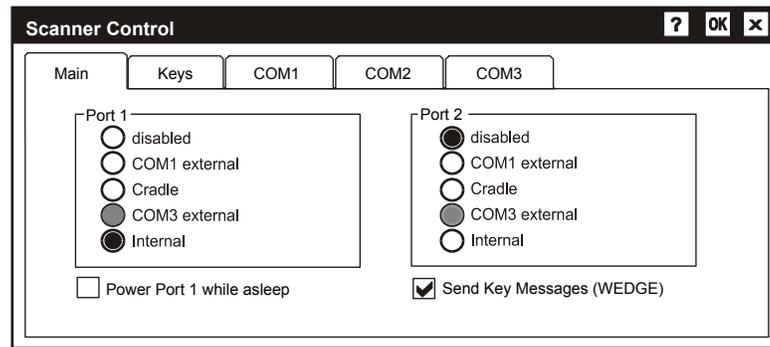
Figure 1-20 Scanner Port and Programmable Button Screen

Note: *If there is an internal scanner, COM3 is greyed out – if there is no internal scanner, Internal is greyed out.*

On units without an internal scanner, radio buttons on Port 1 and Port 2 are greyed out -- the COM3 external radio button is the only one that can be selected.

To assign baud rate, parity, stop bits and data bits to Com 1, Com 2 or Com3, select **Start | Settings | Control Panel | Scanner | COM ..** tab.
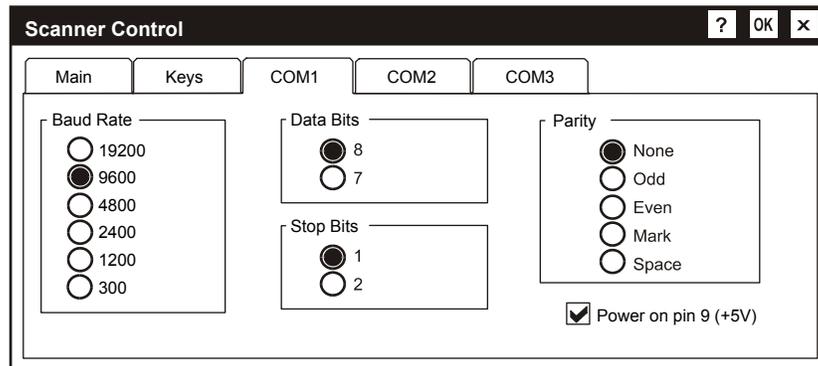
Figure 1-21 Assign COM Port Parameters

PCMCIA Cards

> *When removing or installing PCMCIA cards, protect the MX3-CE internal components from electrostatic discharge.*

Use and operation of the Personal Computer Memory Card International Association (PCMCIA) device (e.g. PC card) is dependent upon both the type of device installed and the application(s) running on the computer.

Make sure the proper software is pre-loaded and PC cards are properly configured.

There is one PC card slot (Slot 0) and one Compact Flash card slot (Slot 1) in the MX3-CE. Slot 0 powers a radio PC card, PC SRAM card, ATA Flash card or a linear Flash card. The slots hold only one card at a time. Slot 0 supplies .75 of an amp at 5V or 3.3V.

The second slot (Slot 1) is designed to support a Type I or II Compact Flash disk.
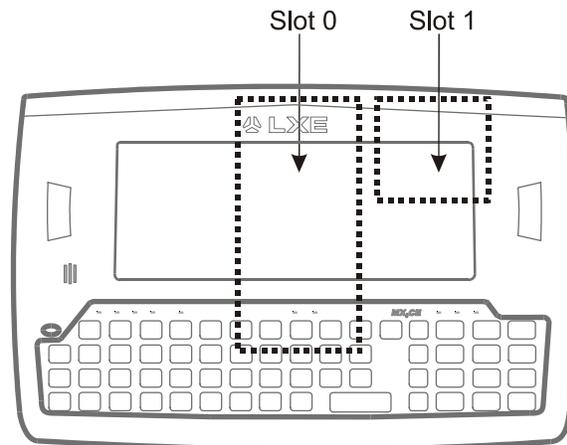
Figure 1-22 Slot Locations

Note: As there is no PC Card management software loaded on the MX3-CE, LXE recommends purchasing preformatted PC SRAM and Flash cards as well as preformatted Compact Flash disks.

Requirement: A screwdriver (not supplied by LXE)

Preparation

- LXE recommends that installation of the PC card be performed on a clean, well-lit surface.

- Using a screwdriver, loosen the endcap and carefully remove or loosen all cables. Disconnect the radio antenna from the radio card.

- Set both the endcap and the screws aside.

Installation

1. Slide the PC Card, connector side first, into the slot until it seats. Use caution not to pull or snag the antenna connector.

2. If the PC Card is difficult to seat in the slot, remove the card, turn it around and re-install.

Removal

1. Grasp the top of the PC Card and pull it straight upward to remove.

2. Use caution not to pull or snag the antenna connector on the Radio card, if installed.

If you anticipate keeping the PC card out of the MX3-CE for a long period of time place it in an enclosed storage container. Store in an area that is protected from dirt, moisture, and electrostatic contact.

PCMCIA Radio Card

> *Note:*   *When removing or installing the radio, protect the MX3-CE internal components and the*
> *radio from electrostatic discharge.*

Slot 0 accepts PCMCIA radio cards, specifically LXE System 6400, 6500 and 6700 radio PC
cards.

Preparation

- LXE recommends that installation of the radio card be performed on a clean, well-lit surface.

- Using a screwdriver, loosen the endcap and carefully remove or loosen all cables. Disconnect the radio antenna from the radio card.

- Set both the endcap and the screws aside.

Installation

1. Slide the PCMCIA Radio, connector side first, into the slot until it seats.

2. The radio antenna connector must be positioned up and toward the front of the MX3-CE (near the display). If the PCMCIA Radio is difficult to seat, remove the Radio card, turn it around and re-install.

3. Gently snap the antenna cable into the connector on the PCMCIA Radio. Use caution not to damage either the antenna cable connector or the connector on the radio.

   > *Note:*   *A 6400 System radio has one antenna cable. 6500 and 6700 System radios have two*
   > *antenna cables. Connect **all** antenna cables to the PCMCIA radio.*

4. Reinstall the endcap.

Removal

1. Disconnect the antenna cable from the radio, using caution not to damage the radio connector or the antenna cable connector.

2. Move the cable aside and grasp the top of the radio card and pull straight up until the radio is removed from the MX3-CE unit.

If you anticipate keeping the radio card out of the MX3-CE for a long period of time place it in an enclosed storage container. Store in an area that is protected from dirt, moisture, and electrostatic contact.

Data Entry

You can enter data into the MX3-CE through several different methods. The Scanner aperture provides barcode data entry, the RS-232 or the IR port are used to input/output data, and the keypad provides manually keyed entry. The stylus is used to select menu items and place the cursor in a text box, ready to accept data.

Keypad Data Entry

The keypad is used to manually input data that is not collected otherwise. Almost any function that a full sized computer keyboard can provide is duplicated on the MX3-CE keypad but it may take a few more keystrokes to accomplish a keyed task.

Almost every key has two or three different functions. The primary alpha or numeric character is printed on the key.

For example, when the 2nd key is selected pressing the desired second-function key will produce the 2nd character. The specific 2nd character is printed above the corresponding key. The 2nd key LED will illuminate and turn off after the next keypress (unless when setting volume or contrast – the 2nd key LED will flash at those times).

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

Stylus and the Touch Screen

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

The stylus performs the same function as a mouse that is used to point to and click elements on a desk top computer. The stylus is used in the same manner as a mouse – single tap or double tap to select menu options, drag the stylus across text to select, hold the stylus down to activate slider bars, etcetera.

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

Barcode Data Entry

The MX3-CE supports an accessory barcode label reading device (a tethered scanner). Keyboard data entries can be mixed with barcode data entries. Any tethered scanner that decodes the barcode internally and outputs an RS-232 data stream may be used. It sends the data to the computer in ASCII format. The serial port parameters may need to be changed to match the parameters of the tethered scanner.

RS-232 Data Entry

The MX3-CE accepts input from an RS-232 device connected to either RS-232 port, COM1 or COM3.

Note: *ActiveSync will not transfer files over the RS-232 connector on the MX3 cradle.*

Scanner Entry

Read all cautions, warnings and labels **before** using the laser scanner.

To scan with the laser barcode reader, point the laser window towards a barcode and press the Scan button. A red laser beam strikes the barcode. Align the red beam so that the barcode is centered within the beam.

The laser beam must cross the entire barcode. Move the MX3-CE towards or away from the barcode so that the barcode takes up approximately two-thirds the width of the beam. Following a barcode scan and read the SCNR LED turns green and the MX3-CE beeps, indicating a successful scan.

Beeps are heard during the barcode reading. The laser and SCNR LED automatically turn off after a successful or unsuccessful read. The scanner is ready to scan again when the Scan key is pressed.

Power Modes

1 – On

2 – Suspend

3 – Critical Suspend

4 – Off

5 – Power Button or Power Off Timer expires

6 – Primary Event

7 – Power fail. Also from Suspend (2) or On (1).

8 – Restoration of power

9 – Backup battery and main battery dead

10 – Power applied. New main battery installed or external power applied.
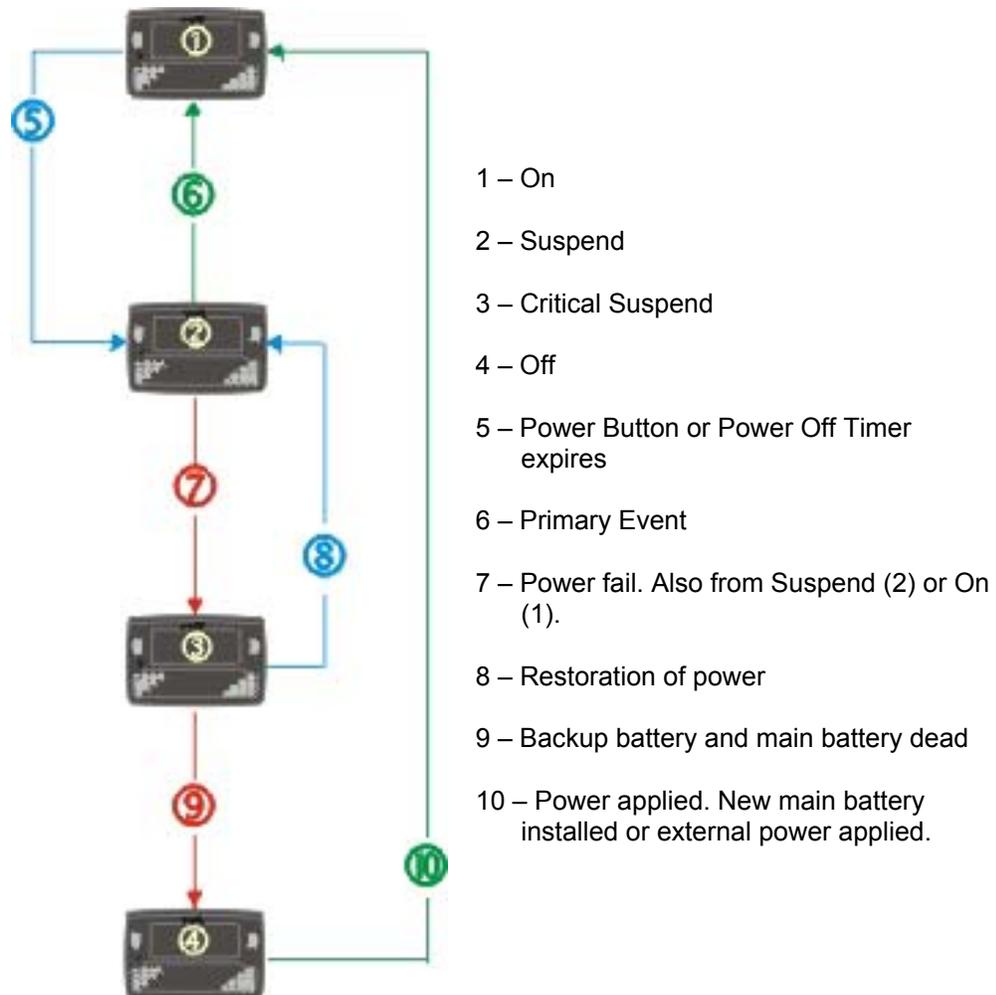
Figure 1-23 Power Modes – On, Suspend, Critical Suspend and Off

Primary Events and Power Modes

Any key on the keypad	PC card activity
Stylus touch on the touch screen	Serial connection
Power button tap	External device connection (e.g. cradle)
COM1 CTS	Display activity USB connection
COM3 CTS	

On Mode

The Display

When the display is On:

- the keyboard, touchscreen and all peripherals function normally

- the display backlight is on until the Backlight timer expires

- the display does not blank until the Blank timer expires

- when the Main Battery is hot-swapped, the display is turned Off.

The MX3-CE

After a new MX3-CE has been received, a charged Main Battery inserted, and the Power button tapped, the MX3-CE is always On until both batteries are drained completely of power.

When the Main Battery and Backup Battery are drained completely, the unit is in the Off mode. The unit transitions from the Off mode to the On mode when a charged Main Battery is inserted (or external power is applied). Press the Power button.

LED Indicators

LED	When On ...
2nd	Orange. The next keypress is a 2nd keypress. Blinks until key sequence is complete.
ALT	Orange. The next keypress is an ALT keypress.
CTRL	Orange. The next keypress is a CTRL keypress.
SHFT	Orange. The next letter is the uppercase letter on alpha keys and the shifted character on the numeric keypad keys.
CAPS	Orange. Uppercase letters are active until the CAPS key sequence is pressed again.
SCNR	Integrated barcode scanner function. • Red - scanning. • Green - good scan.
BATT B	Red. Backup Battery. When illuminated, the backup battery is charging.
STAT	Status Indicator. • Blinking Green when Display and/or Blank timer expires. • *Not illuminated when the MX3-CE is in Suspend Mode.*
BATT M	Main Battery. When illuminated, main battery capacity is low. • Steady Red – low battery. • Blinking Red – power fail.
CHGR	Charger. When on, the MX3-CE is receiving external power either from the DC power jack or the MX3-CE is seated in a powered cradle. • Red - Main Battery is charging. • Green - battery charge is complete and the MX3-CE is connected to external power through the power jack or a powered cradle.

Suspend Mode

The Display

Note: *When the display is Off, the unit is still On. The unit functions normally – tethered scanner trigger press, integrated scanner trigger press or Scan key presses will cause scans. Communications through the radio or serial ports continue.*

Display Suspend timers are set using **Start | Settings | Control Panel | Display | Blanking tab**.

The display is turned off when one of the following occurs:

- the display timer expires before a wakeup event takes place
- the Power button is tapped which immediately places the unit into Suspend Mode.

The display backlight is turned off at the same time as the Display is turned off. Display Backlight Suspend timers are set using **Start | Settings | Control Panel | Display | Backlight tab**.

The Status LED blinks green when the Display enters Off mode.

Any key on the keypad	COM1 activity
Stylus touch on the touch screen	COM2 activity
Power button tap	COM3 activity
PC card activity	USB connection
External device connection (e.g. cradle)	Scanner activity

When the display wakes up, the Display Blanking Timer and Display Backlight Timer begin the countdown again. When any of the above events occur prior to the timers expiring, the timers begin the countdown again.

The first wakeup key press or touch are not sent to the operating system or running application – the first keypress or touch are only used to turn the display and backlight On. Once the display (or backlight) is On, the keyboard and touch screen function normally.

The MX3-CE

The Suspend mode is entered when the unit is inactive for a predetermined period of time, the operator taps the Power button, or **Start | Suspend** is chosen.

MX3-CE Suspend timers are set using **Start | Settings | Control Panel | Power Properties | Power Off**.

By default, any of the following primary events will wake the unit and reset the display and display backlight timers -- any keypress on the keypad, a stylus-touch on the touch screen, a power button tap, COM1 CTS or COM3 CTS, PC card activity, display activity, or connection to an external device (e.g. dock).

When the unit wakes up, the Display, Display Backlight and the Power Off timers begin the countdown again. When any one of the above events occurs prior to the Power Off timer expiring, the timer starts the countdown again.

The first wakeup key press or touch is not sent to the operating system or running application – the first keypress or touch is only used to wake up the unit and reset the timers. Once the unit has transitioned from the Suspend mode to the On mode, the unit, keyboard and touch screen function normally.

Critical Suspend Mode

The purpose of the Critical Suspend mode is to reduce power consumption of the MX3-CE to a low level that still retains the contents of SDRAM. The unit enters Critical Suspend Mode only when the Main Battery has failed or is hot-swapped. The Backup Battery is supplying power to the unit during Critical Suspend Mode.

When hot-swapping (the Main Battery is removed), the display turns off, the BATT M LED begins to flash red, all peripherals are shut down, the CPU clock is stopped, and power is removed from the PCMCIA card.

When the MX3-CE is in the Critical Suspend state (the Main Battery is in place and the unit is being powered by the Backup Battery), the display turns off, the BATT M LED begins to flash red, all peripherals are shut down, the CPU clock is stopped, and power is removed from the PCMCIA card. The MX3-CE is saving the state prior to the Main Battery failing and cannot be used.

If a new fully charged main battery is installed before the Backup Battery is depleted (approximately 5 minutes) the MX3-CE transitions to the Suspend state. To resume operation tap the Power key once or touch the screen with the stylus.

If the Backup Battery is depleted before a fully charged Main Battery is inserted, the MX3-CE immediately turns itself Off and all unsaved information is lost. Insert a fully charged Main Battery and press the Power button to turn the MX3-CE On.

Off Mode

The unit is in Off Mode when the Main Battery and the Backup Battery are depleted. Insert a fully charged Main Battery and press the Power button to turn the MX3-CE On.

Getting Help

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

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

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

Manuals

MX3-CE Installation and Operator's Guide
MX3 Cradle Reference Guide
Multi-Charger Operator's Guide
Multi-Charger Plus Operator's Guide

Accessories

Tethered Scanners

Scanner, LS3203, Ext. Range, 8' Cbl, US.	8011LS3203ERC08DUS
Scanner, LS3203, Ext. Range, 8' Cbl, EC.	8011LS3203ERC08DEC
Scanner, LS3203, Ext. Range, 20' Cbl, US	8011LS3203ERC08DUS
Scanner, 530092IP, 7' Cbl, WW.	8110IP530092C07DWW
Scanner, 530092IP, 15' Cbl, US.	8110IP530092C15DUS
Scanner, P302FZY, 8' Cbl, WW	8200A326SCNRP3028DA9F
Scanner, P302FZY, 20' Cbl, US	8200A327SCNRP30220DA9F
Scanner, P304PRO, 8' Cbl, WW	8210A326SCNRP3048DA9F
Scanner, P304PRO, 8' Cbl, US	8210A327SCNRP30420DA9F
Scanner, Powerscan SR, 8' Cbl, WW	8300A326SCNRPWRSR8DA9F
Scanner, Powerscan SR, 12' Cbl, US	8300A327SCNRPWRSR12DA9F
Scanner, Powerscan LR, 8' Cbl, WW	8310A326SCNRPWRLR8DA9F
Scanner, Powerscan LR, 12' Cbl, US	8310A327SCNRPWRLR12DA9F
Scanner, Powerscan XLR, 8' Cbl, WW	8320A326SCNRPWRXLR8DA9F
Scanner, Powerscan XLR, 12' Cbl, US	8320A327SCNRPWRXLR12DA9F

PCMCIA Cards

Standard Compact Flash Card, 1Gig HD	9000A254HDDCF1GB
PCMCIA Compact Flash Adapter	9000A106PCCCFADPTR

Holding Accessories

Strap, Hand, Nylon	2381A497HANDSTRAP
Nylon Holster for use with Belt	2381A401HOLSTER
Nylon Hip Flip	9000A408HIPFLIP
Adjustable Belt for Hip Flip, Velcro ends	9200L67
Nylon Case with Shoulder Strap	9000A409CASE
Stand, Scanner For 5300IP Series, Tethered	8100A001STAND
Bracket, Mounting LS300	8010A001BRKT
Holster, Hood, Nylon, 5300IP Series, Tethered	8100A401HLSTRHOOD

Miscellaneous

Pen, Stylus, Black, 2330	9000A501PASSIVEPEN

Headset with microphone	9000A503HEADSET

Battery Chargers and Battery

6 Unit Charger	9000A377CHGR6*
Battery, Li-Ion	MX3A378BATT

Cradles and Power Supplies

Desktop Cradle[3]	2381A001DESKCRADLE
Vehicle Mount Cradle[3]	2381A003VMCRADLE
Vehicle Mount Cradle, 19.2K Baud Rate[3]	9000A005VMCRADLE19KB
Power Supply, Vehicle Cradle, 9-30VDC	2381A054CRDLDCPWR30V
Power Supply, Vehicle Cradle, 30-80VDC	2381A055CRDLDCPWR80V
AC Power Supply, External, US	9000A301PSACUS
AC Power Supply, External, AC, International	9000A302PSACWW
Power Cord, AC, US	9000A066CBLPWRAC
P/S, External, Cigarette Lighter Adapter	9000A303PSCIGLTADPT
Power Adapter, Bare Wire 12 VDC	1300A053CBL12ML3
Power Adapter, 24-72 VDC, 20 Watts	1300A301PS24WW
Power Adapter, 110-240 VAC	1300A303PSACWW

Cables for Cradle and MX3-CE Serial Ports

Cable, PC, DA-9F to DA-9F, 6 ft. for download	9000A054CBL6D9D9
USB cable	9000A067CBL48D9USB
Cable, D9F to D25F, for printer	9000A053CBL6D9D25

* Either US or WW

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[3] Power Adapter Required.

Chapter 2 Physical Description and Layout

Hardware Configuration

System Hardware

The MX3-CE hardware configuration is shown in the following figure.
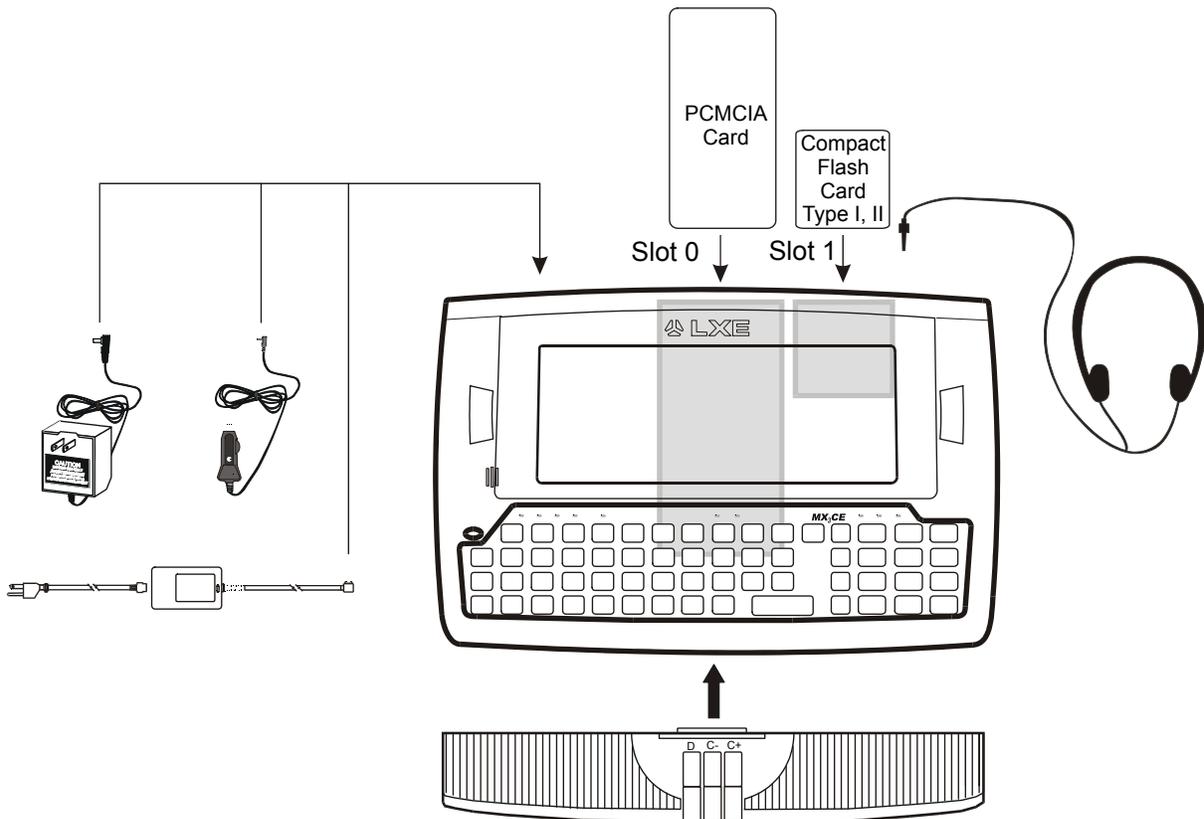
Figure 2-1 System Hardware

Central Processing Unit

The LXE MX3-CE CPU is a SA1110 running at 133MHz or 206 MHz.

Core Logic

The MX3-CE supports the following I/O components of the core logic:

- One PCMCIA slot (supports Type II or III PCMCIA cards).

- One compact Flash card port (supports Type I and II cards).

- One InfraRed port.

- One Digitizer Input port (Touch screen).

- Two serial ports in four configurations (see Chapter 1 "Introduction" section titled "Endcaps.").

Note: As the MX3-CE does not have PC Card Management software installed, LXE recommends purchasing pre-formatted cards.

System Memory

On-board FLASH is used for ROM, Flash for WindowsCE and Flash memory for bundled applications. Pads are available for 16 MB or 32 MB of Flash. The Flash is configured as the primary boot device and contains the Windows CE image, boot loader, OAL, applications, utilities and device drivers.

Any flash remaining beyond the Windows CE image is formatted for use as a persistent memory drive (which appears in My Computer as the folder IPSM). Any programs or data stored in this folder will not be lost if the memory backup battery fails. Currently, the persistent memory drive partition is from 3.7 to 21 MB in size, depending on the amount of flash available and options in the Windows CE image.

The computer has one Type II CF+ slot. The MX3-CE supports and auto detects up to 256MB of Type I compact flash memory.

Video Subsystem

The display has a 640 pixel (horizontal) by 240 pixel (vertical) format. The display contrast is adjustable with key sequences. Backlighting is available, can be turned on and off with key sequences. The turn-off timing is configured through the Control Panel. The display controller supports Windows CE graphics modes.

Touch screen allows mouse functions (pointing and clicking on the display or Signature Capture) using an LXE approved stylus.

There are three types of displays available: transflective greyscale monochrome; transmissive color and transflective color.

The transmissive color display is optimized for indoor lighting. It cannot be used without the backlight. The transflective monochrome and color display are optimized for outdoor use but may also be used indoors. The monochrome display has an electroluminescent backlight. The color displays have a CCFL (Cold-Cathode Fluorescent Lighting) backlight.

The transflective display appears to have a greenish hue when the display is blanked. The transmissive display appears black when the display is blanked.

Power Supply

The LXE MX3-CE uses two batteries for operation.

- A replaceable Lithium-Ion (Li-Ion) battery pack. The battery pack recharges while in the MX3-CE with the computer in a powered cradle or with the optional external power sources attached. The main battery pack can be removed from the MX3-CE and inserted in the LXE Multi-Charger which simultaneously charges up to six battery packs in four hours.

- An internal 50 mAh Nickel Cadmium (NiCd) backup battery. The backup battery is recharged directly by the main battery when it is installed. Full charging of the backup battery may take several hours. The recharging of the backup battery is automatically controlled by the MX3-CE. The backup battery must be replaced by qualified service personnel.

Optional AC adapters are available – external AC power supplies (US and International) and a cigarette lighter adapter.

COM Ports

The MX3-CE has two serial ports configurable in four configurations:

DB9 – COM 1	DB9 – COM 3
DB9 – COM 1	Scanner
DB9 - USB	DB9 – COM 3
DB9 - USB	Scanner
COM 2 is always the IR port.	

Power to the COM ports may be turned on and off using the Control Panel option "Scanner".

Audio Interface

An interface is available for headset operation. When the headset is plugged into the port, the main speaker is disabled.

PCMCIA Slots

Slot 0

The MX3-CE has one internal PCMCIA slot that conforms electrically to PCMCIA 2.1 specifications. The PC Slot supplies 0.75 of an amp at 5Volts or 3.3Volts. Battery voltage is supplied through unused pin 35 to support WAN radio in the slot.

The PC slot is accessible by the use of a Phillips screwdriver to first remove the endcap. It accepts Type II or III cards only. Slot 0 accepts PCMCIA 2.4GHz radio cards or SRAM/Flash memory cards.

Slot 1

The MX3-CE has one internal compact Flash card port that supports Type I and II CF+ cards. The slot is accessible when the endcap has been removed.

Physical Controls

Power Button

> *Note:*   *Refer to the section titled "Power Modes" in Chapter 1 "Introduction" for information relating to the power states of the MX3-CE.*

The power button is located above the ESC key on the keypad. When a battery is inserted in the MX3-CE for the first time, the Power button must be pressed.
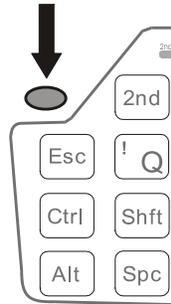
Figure 2-2 Location of the Power (PWR) Button

Quickly tapping the Power button places the MX3-CE immediately in Suspend mode. Quickly tapping the Power button again, or touching the screen, immediately returns the MX3-CE from Suspend.

Reboot Sequence

Hold the Power key down until the display goes out then release the Power button. The display goes out in 5 seconds when the MX3-CE is in optimal condition. When there is a hardware failure, the display goes out in 15 seconds. In either case, the MX3-CE will reboot.

When the WinCE desktop is displayed or an application begins, the power on (or reboot) sequence is complete. If any changes to the settings had been saved previously, they are restored on reboot.

> *Note:*   *To reset to factory default values, please refer to Chapter 4 "System Configuration" section titled "MX3-CE Command Line Utilities" and the RegClear, PSMFormat and ColdBoot programs.*

Endcaps

The MX3-CE supports three COM port options. Two external serial ports are dependent on the end cap chosen. A third serial port is used to support an infrared transceiver (barcode reader). An additional endcap configuration supports serial input/output at 12 Mbps or 1.5 MBps.

Integrated Scanner Port

RS-232 Port (Serial Port)

DC Power Jack

Audio Jack
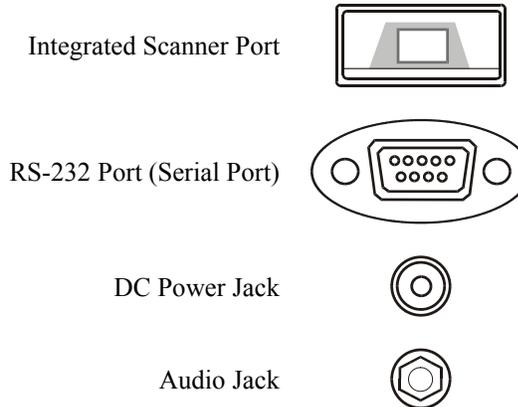
The default COM 2 port is always the IR port on the back of the MX3-CE, regardless of the type of endcap installed on the unit.

On the Standard Range Scanner / Serial Port endcap COM 3 is the Integrated Scanner port.

On the Dual Serial Port endcap the COM 1 port is the serial port on the right side of the endcap when the display is facing up.

Integrated Scanner Port

The MX3-CE Barcode Scanner is used to collect barcode data from any nearby compatible barcode label. Depending on the size of the barcode, size of bars and spacing and quality of the barcode, the scanner is used to read barcodes between 3" and 30". The barcode scanner reads UPC/EAN, Code 39, Code 93, I 2 of 5, Discrete 2 of 5, Code 128, Codabar and MSI symbologies.

The internal barcode scanner scans only when the Scan button is pressed. Scan buttons have no effect on tethered barcode scanners connected to the RS-232 port on the MX3-CE or a cradle containing an MX3-CE. The SCNR LED illuminates during any internal scanner activation.

If you need to set up the integrated scanner **barcode reading parameters**, please refer to the "**Integrated Scanner Programming Guide**" on the LXE Manuals CD or the LXE website www.lxe.com.

Serial Port

RS-232 connection is made through an RS-232 Serial Port if installed. The connector is an industry-standard RS-232. The connector includes a PC/AT standard 9-pin "D" male connector.
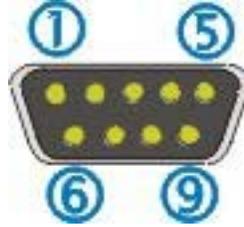
Figure 2-3 RS-232 Pinouts

PIN	SIGNAL	DESCRIPTION
1	DCD	Carrier Detect
2	RXD	Receive Data - Input
3	TXD	Transmit Data - Output
4	DTR	Data Terminal Ready
5	GND	Signal/Power Ground
6	DSR	Data Set Ready
7	RTS	Ready To Send
8	CTS	Clear To Send
9	RI	Ring Indicator - Input
	or	
	+5V DC	

Figure 2-4 9-Pin RS-232 Description

USB Port

USB connection is made through an optional USB Serial Port if installed. The connector is an industry-standard 9-pin "D" male connector.

The optional LXE USB cable is required to adapt the connection to a standard USB connector. Please refer to section titled "Accessories" for the USB part number when ordering.
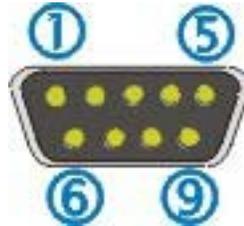
Figure 2-5 MX3-CE Serial Port

MX3-CE Connector Pin	SIGNAL	USB Connector Pin
1 Not Used		1 Not Used
2 Not Used		2 From 7
3 To 3	D + (Green Wire)	3 From 3
4 Not Used		4 From 5
5 To 4	Ground (Black Wire)	5 Not Used
6 Not Used		6 Not Used
7 To 2	D - (White Wire)	7 Not Used
8 Not Used		8 Not Used
9 Not Used		9 Not Used

Figure 2-6 USB-Serial Cable Pinouts

Tethered Scanners

The MX3-CE Scan buttons have no effect on tethered barcode scanners (connected to a serial port). Tethered scanners read barcode scans only when the trigger on the tethered scanner is pressed.

To set the MX3-CE to use a tethered scanner, select **Start | Settings | Control Panel | Scanner | COM1 (or 2 or 3)**.

Click the "**Power on Pin 9 (+5V)**" checkbox for the COM port selected. The COM port that accepts the scanner data can be configured for data rate, parity, stop bits and data bits.

Scan Buttons

Figure 2-7 Programmable Buttons

There are two buttons, one on each side of the display. The buttons are programmable and function as an integrated barcode scanner key or a numeric keypad Enter key. The Scan keys have no effect on scanners tethered to the MX3-CE. When there is no integrated scanner installed, both buttons default to Enter buttons.

Scan Buttons and the SCNR LED

The SCNR LED, located above the keypad, illuminates during an integrated barcode scanner function. It is affected by internal scanner algorithms.

- Red - scanning.
- Green - good scan.
- Unlit - scanner is inactive.

The MX3-CE Scan buttons have no effect on tethered barcode scanners (connected to a serial port). Tethered scanners read barcode scans only when the trigger on the tethered scanner is pressed.

Button Settings

To edit the button parameters, select **Start | Settings | Control Panel | Scanner**. Change the parameter values and tap OK to save the changes.

```
Scanner Control                                          ?   OK   ✕

  Main      Keys      COM1      COM2      COM3

 ┌─Left Scan Key───────────────┐  ┌─Right Scan Key──────────────┐
 │   ○ disabled                │  │   ● disabled                │
 │   ○ Scan                    │  │   ○ Scan                    │
 │   ○ Enter key               │  │   ○ Enter key               │
 │   ○ Tab key                 │  │   ○ Tab key                 │
 │   ● Virtual key             │  │   ○ Virtual key             │
 └─────────────────────────────┘  └─────────────────────────────┘
```
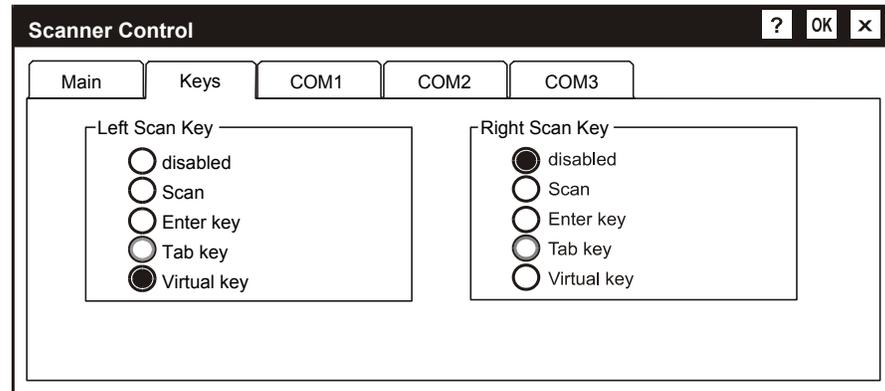
Figure 2-8 Left and Right Scan Button Programming

The default setting for the right button is Enter. The default setting for the left button is Scan. When the MX3-CE does *not* have an integrated scanner, both buttons default to Enter keys and the Scan selection is greyed out.

Each button can be setup as:

- Disabled – no response when pressed
- Scan – initiate a barcode scan sequence
- Enter Key
- Tab Key
- Virtual Key (default values F20 and F21)

Keypad

The keypad is phosphorescent. A phosphorescent keypad does not use a keypad backlight but glows in dim/dark areas *after exposure to a light source*. All keypads are installed and configured by LXE.

The keymaps (keypress sequences) are located in "Appendix A - Key Maps."
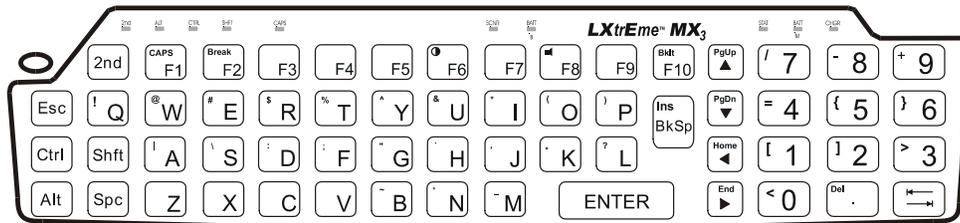
Figure 2-9 The QWERTY Keypad

Touch Screen and Keypad Shortcuts

Use keyboard shortcuts instead of the stylus when the MX3-CE is running WinCE. Press Tab and an Arrow key to select a file. Press Shift and an Arrow key to select several files. Once you've selected a file, press Alt-Enter to open its Properties dialog. Press Shift-Backspace to delete a file.

Scan Key Function

(*MX3-CE's with Scanner endcaps only.*) The Scan key activates the scanner when a scanner endcap is installed and the Scan button is pressed. The internal scanner scans only when the Scan button is pressed. A Scan button press has no effect on externally attached scanners.

When there is no integrated scanner endcap, the Scan keys function as Enter keys.

Enter Key Function

The Enter key is used to confirm a forms entry or to transmit information. How it is used is determined by the application running on the computer.

2nd Key Function

The 2nd key is used to activate the 2nd functions of the keypad. Printed on many keys at the upper left corner are small characters that represent the 2nd function of that key. Using the 2nd key activates the second key function. Note that the 2nd key only stays active for one keystroke. Each time you need to use the 2nd function you must press the 2nd key. To cancel a 2nd function before pressing another key, press the 2nd key again. When the 2nd function is active, the 2nd LED illuminates.

Ctrl Key Function

The Ctrl key enables the control functions of the keypad. This function is similar to a regular keyboard's Control key. Note that the Ctrl key only stays active for one keystroke. Each time you need to use a Ctrl function, you need to press the Ctrl key before pressing the desired character key. When the Ctrl function is active, the Ctrl LED illuminates.

Alt Key Function

The Alt key enables the alternate functions of the keypad. This function is similar to a regular keyboard's Alt key. Note that the Alt key only stays active for one keystroke. Each time you need to use an alternate function, you need to press the Alt key before pressing the desired key. When the Alt function is active, the Alt LED illuminates.

Shft Key Function

The Shft key enables the shifted functions of the keypad. This function is similar to a regular keyboard's Shift key. Note that the Shift key only stays active for one keystroke. Each time you need to use a Shifted function, you need to press the Shft key before pressing the desired key. When the Shft function is active, the Shft LED illuminates.

When the Shft key is pressed the next key is determined by the major key legends, i.e., the alpha keys display lower case letters -- when CAPS is On alpha characters are capitalized.

Spc Key Function

The Spc key adds a space to the line of data on the display. This function is similar to a regular keyboard's Spacebar. Note that the Spc key only stays active for one keystroke.

Mode Key Functions

Caps Key and CapsLock Mode

This function is similar to a regular keyboard's CapsLock key. Note that the CapsLock mode stays active until the CapsLock key sequence is pressed again. Each time you need to use a Caps function, you need to press the Caps key sequence first. To cancel a CapsLock function press the Caps key sequence again. When the CapsLock mode is active, the Caps LED illuminates.

The CapsLock key sequence is 2nd + F1.

Keypress Sequences

See Appendix A for key maps for all keypads.

LED Functions

Figure 2-10 Function LEDs

Across the top of the keypad are LEDs that provide visual cues to current computer operation. When the LED is not illuminated, the function is inactive.

LED	When On ...
2nd	Orange. The next keypress is a 2nd keypress. Blinks until key sequence is complete.
ALT	Orange. The next keypress is an ALT keypress.
CTRL	Orange. The next keypress is a CTRL keypress.
SHFT	Orange. The next letter is the uppercase letter on alpha keys and the shifted character on the numeric keypad keys.
CAPS	Orange. Uppercase letters are active until the CAPS key sequence is pressed again.
SCNR	Integrated barcode scanner function. • Red - scanning. • Green - good scan.
BATT B	Red. Backup Battery. When illuminated, the backup battery is charging.
STAT	Status Indicator. • Blinking Green when Display and/or Blank timer expires. • *Not illuminated when the MX3-CE is in Suspend Mode.*
BATT M	Main Battery. When illuminated, main battery capacity is low. • Steady Red – low battery. • Blinking Red – power fail.
CHGR	Charger. When on, the MX3-CE is receiving external power either from the DC power jack or the MX3-CE is seated in a powered cradle. • Red - Main Battery is charging. • Green - battery charge is complete and the MX3-CE is connected to external power through the power jack or a powered cradle.

Display

Figure 2-11 MX3-CE Display

The MX3-CE Touch Screen Display is an LCD unit capable of supporting VGA graphics modes. Display size is 640 x 240 pixels. The display covering is designed to resist stains. The touch screen allows signature capture and touch input. A pen stylus is included. The touch screen responds to an actuation force (touch) of 4 oz. of pressure (or greater).

There are three types of displays available: transflective greyscale monochrome; transmissive color and transflective color. The transmissive color display is optimized for indoor lighting. It cannot be used without the backlight. The transflective monochrome and color display are optimized for outdoor use but may also be used indoors. The monochrome display has an electroluminescent backlight. The color displays have a CCFL (Cold-Cathode Fluorescent Lighting) backlight.

The transflective display appears to have a greenish hue when the display is blanked. The transmissive display appears black when the display is blanked.

The choice between font sizes is made in the Control Panel option "Display | Appearance." Font size selection may be overridden by a user supplied application.

The display is automatically turned off when the MX3-CE enters the Suspend state, Critical Suspend or the Display Blanking timer expires (Display Blanking default is 15 seconds).

Display and Display Backlight Timer

When the Display Blanking timer expires the display is turned off. The default value for the battery power timer is 15 seconds. The default value for the external power timer is 2 minutes.

When the Display Backlight timer expires the transflective screen display backlights are turned off, a transmissive screen is dimmed. The default value for the battery power timer is 3 seconds. The default value for the external power timer is 2 minutes.

Both values can be adjusted using the Control Panel option "Display | Backlight" or "Display | Blanking". Any of the following will wake the display and display backlight:

Any key on the keypad	COM1 activity
Stylus touch on the touch screen	COM2 activity
Power button tap	COM3 activity
PC card activity	USB connection
External device connection (e.g. cradle)	Scanner activity

When the display wakes up, the Display Blanking and Backlight timers will begin the countdown again. When any of the above events occurs prior to the timers expiring, the timers start the countdown again.

Touchscreen

The touchscreen provides a means of inputting information into the MX3-CE by touching the screen using the LXE approved stylus (the Passive Pen – see Chapter 1 section titled "Accessories.")

Touchscreen operation is not affected by Display Backlighting.

Touchscreen operation is affected by the Display mode. If the display is off, a touch to the display will turn on the display but no touch data will be sent to the running application until the next touch.

Cleaning the Glass Display/Scanner Aperture

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(R) 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.

Speaker

Figure 2-12 Speaker Location

The MX3-CE Speaker has a loudness of at least 90 dB (2700 Hz) at 10 cm measured from the front of the unit. The Speaker volume is adjustable via the keypad or the Control Panel or by an application through the use of an API call. There are 8 distinct volume levels. The minimum volume level is 0 (no sound) with a default setting of midrange. The volume sticks at maximum and minimum levels.

The speaker is disabled when a headset is plugged into the Audio Jack on the endcap.

Speaker volume is enabled and adjusted using the Control Panel "Volume & Sounds" option. After the speaker has been enabled using the Control Panel option, speaker volume is adjusted using the 2nd + <F8> key sequence, if desired.

Infrared (IR) Port
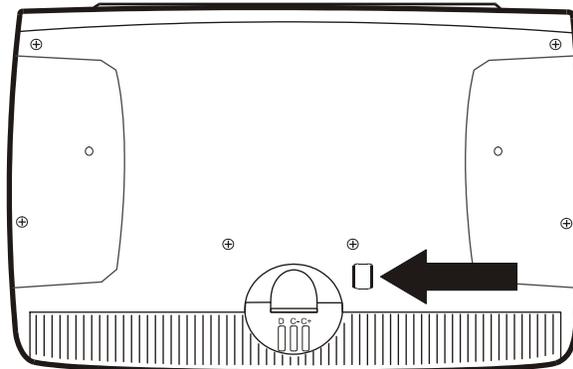
Figure 2-13 Infrared Port - COM2 Port

At the back of the MX3-CE Computer there is an Infrared (IR) Data Port. The IR Port is designed to provide a data link between the MX3-CE and a similarly equipped piece of equipment such as a printer. The IR port is the MX3-CE's COM 2 port and is a bi-directional half-duplex communication port. It supports baud rates up to 115k. It will support serial port emulation, as well as IrDA and Winsock over IR protocols.

The IR operating envelope has a distance range of 2 cm (.79 inches) to 1 meter (3.2 feet) with a viewing angle of 30 degrees.

The MX3-CE uses IrDA protocol to send data in both directions, but not simultaneously. When sending data through the IR port, make sure the IR port on the first MX3-CE and the IR port on the second MX3-CE are in close proximity to each other. IrDA is not required and not used by terminal emulation programs.

When the MX3-CE is docked in a cradle, the Status LED *on the cradle* is red when data is being transmitted through the IR port.

Storage Cradles

There are two types of cradles for LXE's MX3-CE mobile computer: a desk top cradle for tabletop charging / communication applications and a vehicle mount cradle for vehicle mounted charging / communication applications. See the "MX3 Cradle Reference Guide."

Figure 2-14 Desktop Cradle   **Figure 2-15 Vehicle Mounted Cradle**

The cradles give the MX3-CE the ability to communicate with a host computer and other equipment. In addition, using wall AC adapters or DC/DC converters, the cradle transfers power to the internal charging circuitry of the MX3-CE and the MX3-CE, in turn, recharges the Main Battery. The MX3-CE can be either on or off while in the cradle.

Cables are available from LXE for connecting the cradle to a printer, a personal computer or a barcode printer. Tethered scanners (for RS-232 cradle connection) are also available from LXE. See Chapter 1 "Introduction" section titled "Accessories."

Note: ActiveSync will not transfer files over the RS-232 connector on the cradle.

Chapter 3 Power Supply

Introduction

The MX3-CE computer is designed to work with a Lithium-Ion (Li-Ion) battery pack from LXE.

The LXE MX3-CE receives continuous power from two batteries. There is a Lithium-Ion Main Battery Pack that can be recharged separately by an LXE approved battery charging unit. The Main Battery is recharged, if required, while installed in a powered cradle or when the MX3-CE is connected to external power using the power jack. There is a 50 mAh Nickel-Cadmium (NiCd) Backup Battery inside the MX3-CE that is recharged only by the Main Battery Pack.

The MX3-CE maintains the date and time for a minimum of four days using a Main Battery that has reached the Low Warning point and a fully charged Backup Battery. The MX3-CE retains data, during a Main Battery hot swap, for at least 5 minutes.
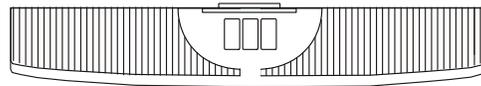
Figure 3-1 Main Battery Pack

Note: ***New batteries must be charged prior to use***. *This process takes up to four hours in an LXE Multi-Charger and eight hours when the MX3-CE is connected to external power through it's power jack.*

Handling Batteries Safely

- Never dispose of a battery in a fire. This may cause an explosion.
- Do not replace individual cells in a battery pack.
- Do not attempt to pry open the battery pack shell.
- Be careful when handling any battery. If a battery is broken or shows signs of leakage do not attempt to charge it. Dispose of it using proper procedures.

Caution   Nickel-based cells contain a chemical solution which burns skin, eyes, etc. Leakage from cells is the only possible way for such exposure to occur. In this event, rinse the affected area thoroughly with water. If the solution contacts the eyes, get immediate medical attention.

Caution   NiCd and Li-Ion batteries are capable of delivering high currents when accidentally shorted. Accidental shorting can occur when contact is made with jewelry, metal surfaces, conductive tools, etc., making the objects very hot. Never place a battery in a pocket or case with keys, coins, or other metal objects.

Li-Ion Battery

When disposing of the MX3-CE Main Battery, the following precautions should be observed:

The battery should be disposed of promptly. The battery should not be disassembled or crushed. The battery should not be heated above 212°F (100°C) or incinerated.

Main Battery Pack

The main battery pack has a rugged plastic enclosure that is designed to withstand the ordinary rigors of an industrial environment. Exercise care when transporting the battery pack making sure it does not come in contact with excessive heat or any power source other than the LXE Multi-Charger or the MX3-CE unit.

When the Main Battery Pack is properly installed in the unit it provides up to eight hours of operation depending upon operation and accessories installed. The battery pack is resistant to impact damage and falls of up to four feet to a concrete surface.

Under normal conditions it should last approximately eight hours before requiring a recharge. The more you use the scanner or the transmitter, the shorter the time required between battery recharges.

Battery Hot-Swapping

When the main battery power level is low, the MX3-CE will signal the operator with a warning dialog box on the display and the BATT M LED illuminates red. The Batt-M LED is illuminated until the main battery is replaced, the battery completely depletes, external power is applied to the MX3-CE using the power jack, or the MX3-CE is placed in a powered cradle.

You can replace the main battery by simply removing the discharged battery and installing a charged battery within a five minute time limit (or before the backup battery depletes).

When the Main Battery is removed, the MX3-CE automatically transitions to the Critical Suspend state. During Critical Suspend, the MX3-CE's backup battery will continue to power the unit for at least five minutes. Though data is retained, the MX3-CE cannot be used until a new main battery pack is installed. After installing the new battery, the MX3-CE automatically transitions to the Suspend state. To resume from the Suspend state, tap the Power button. Full operational recovery from Suspend can take several seconds while the radio (if installed) is reestablishing an RF link.

If the backup battery depletes before a fully charged main battery can be inserted, the MX3-CE will turn OFF and the Power key must be used after the main battery pack is installed.

Low Battery Warning

It is recommended that the Main Battery Pack be removed and replaced when it's energy depletes. When the Low Battery Warning appears do an orderly shut down of the MX3-CE, minimizing the operation of any installed devices and insuring any information is saved that should be.

When the unit is in an ON state, a low battery warning dialog box appears on the display and the Batt-M LED illuminates red.

Note: Once you receive the Low Battery Warning, you have approximately 5 minutes to perform an orderly shutdown and replace the main battery pack before the unit powers off. The Low Battery Warning will transition to Critical Suspend before the computer powers off.

Critical Suspend State

The Critical Suspend state or mode can only be entered because of a Main Battery Power failure. A Main Battery Power failure can occur because the battery's energy has been depleted or the battery has been removed.

When the MX3-CE is in the Critical Suspend state the main battery LED illuminates, the System LED blinks red, all peripherals are shut down, the CPU clock is stopped, and power is removed from the PCMCIA card(s). The MX3-CE is saving the state prior to the backup battery failing and cannot be used.

If a new fully charged main battery is installed before the timer expires the MX3-CE will transition to the Suspend state. To resume operation tap the Power key.

If the Off Timer expires the MX3-CE will turn itself off and all unsaved information is lost. Insert a fully charged main battery and press the Power button to turn the MX3-CE back on.

Note: The Off Timer can be configured in the Control Panel.

Backup Battery

The MX3-CE has a backup battery that is designed to provide limited-duration electrical power in the event of Main Battery Pack failure. The Backup Battery is a 50 mAh Nickel Cadmium (NiCd) battery that is factory installed in the unit. The need for recharging of the backup battery is automatically detected and controlled by the MX3-CE. The energy needed to charge the backup battery comes from the Main Battery.

It takes several hours of operation before the Backup Battery is capable of supporting the operation of the computer. The duration of Backup Battery life is dependent upon operation of the MX3-CE, it's features and any operating applications.

The backup battery is replaced by LXE.

Note: An uninterrupted external power source (wall AC adapters or DC/DC converters) transfers power to the MX3-CE internal charging circuitry which, in turn, recharges the Main Battery and Backup Battery.

About Lithium-Ion Batteries

Li-Ion batteries (like all batteries) gradually lose their capacity over time (in a linear fashion) and never just stop working. This is important to remember -- the MX3-CE is always 'on' even when in the Suspend state and draws battery power at all times. Use the Start|Settings|Control Panel|Power Properties| Charge tab to check the battery status and power reading.

The following chart is an approximation. Actual battery capacity may vary based on usage, ambient temperature and peripherals drawing power from the MX3-CE:

100% capacity	1800 mAh minimum
80% capacity	1440 mAh minimum

Deciding when to put a fully charged Main Battery pack in the MX3-CE is difficult to quantify because it is very application specific. 1000 mAh may be the cutoff for one customer who uses the computer frequently, while 300 mAh may be perfectly fine for a customer who occasionally uses the computer. You need to determine the point at which battery life becomes unacceptable for your business practices and replace the Main Battery pack before that point.

Maintenance

> *Note: Make sure there is a fully charged main battery in the MX3-CE **before** running the Backup Battery Discharge Utility. The backup battery can be discharged and charged while the MX3-CE is receiving external power through the Power Jack or from a powered cradle.*

The NiCd backup battery should be discharged completely once or twice a year. The Main Battery Pack will fully charge the backup battery. This process will allow longer life for the Backup Battery.

The backup battery is discharged by selecting **Control Panel | Power Properties | Battery** and clicking the "Discharge" button. The discharge utility shows the progress of the discharging. At this time, the program can be exited while continuing the discharge process. Normal use of the MX3-CE can resume during the discharge, with the exception of Hot-Swapping the Main Battery. When the backup battery is fully discharged, the MX3-CE will automatically stop the discharge process and begin to recharge the backup battery.

DO NOT REMOVE THE MAIN BATTERY PACK from the MX3-CE until the backup battery is completely discharged -- in approximately 1 hour and recharged in approximately 2.5 hours.

Battery Maintenance Publication

The LXE publication "Getting the Most from Your Batteries" is available on the LXE Manuals CD and is a single-source guide to battery management. The document contains information about battery recharging, conditioning, and other pertinent issues.

Battery Chargers

MX3 Multi-Charger
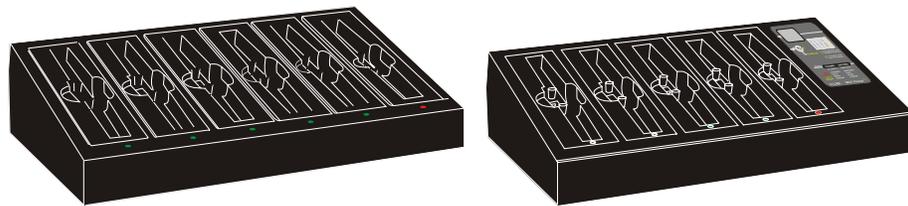
Figure 3-2 MX3 Multi-Charger and MX3 Multi-Charger Plus

The MX3-CE Main Battery Pack can be charged in the LXE Multi-Charger and charged/analyzed in the MX3 Multi-Charger Plus.
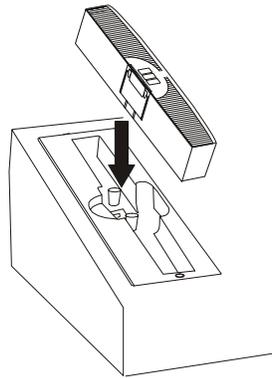
Figure 3-3 Insert Main Battery in Charge Pocket

Lower the battery pack straight into the battery charger pocket and push it down firmly until the retaining clip catches on the retaining pins.

Do not "slam" the battery into the charging cup or slide it in sideways.

Failure to follow these instructions can result in damage to the main battery or the charger.

Please refer to the specific battery charger user's guide for technical information and operating instructions.

External Power Supply (Optional)

The MX3-CE DC power jack is located on the endcap.

The cradle power jack is located on the back of the cradle.The MX3-CE (and the Desktop Cradle) connect to any of the following power supplies through the DC Power Jack.
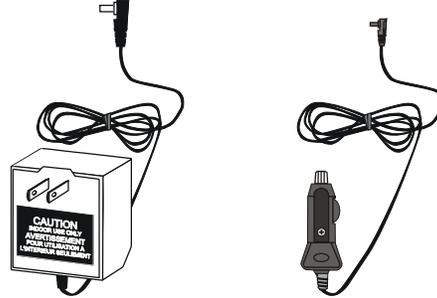
Figure 3-4 US AC/DC 12V Power Supply and Cigarette Lighter Adapter
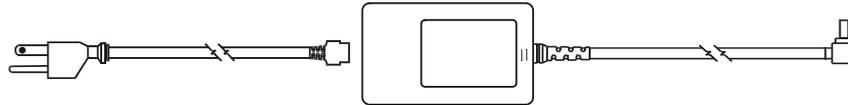
Figure 3-5 International AC/DC 12V Power Supply

Note: When the MX3-CE is receiving external power through a cradle, the cradle's Status LED and the CHGR LED on the MX3-CE are illuminated.

Chapter 4 System Configuration

Introduction

There are several different aspects to the setup and configuration of the MX3-CE. Many of the setup and configuration settings are dependent upon the optional features such as hardware and software installed on the unit. The examples found in this chapter are to be used *as examples only*, the configuration of your specific MX3-CE computer may vary. The following sections provide a general reference for the configuration of the MX3-CE and some of it's optional features.

WinCE 3.0

For general use instruction, please refer to commercially available WinCE user's guides or the WinCE on-line Help application installed with the MX3-CE.

This chapter's contents assumes the system administrator is familiar with Microsoft Windows options and capabilities loaded on most standard Windows 95, 98, NT, XP or 2000 desktop computers.

Therefore, the sections that follow describe only those Windows capabilities that are unique to the MX3-CE and it's WinCE environment.

Installed Software

Note: Some standard Windows options require an external modem connection. Modems are not available from LXE nor supported by LXE.

When you order an MX3-CE you receive the software files required by the separate programs needed for operation and radio communication. The files are loaded by LXE and stored in subdirectories in the MX3-CE.

This section lists the contents of the subdirectories and the general function of the files. Files installed in each MX3-CE are specific to the intended function of the MX3-CE.

Files installed in each MX3-CE configured for an RF environment contain PCMCIA card radio specific drivers – the drivers for each type of radio are specific to the manufacturer (e.g. Proxim, Lucent) for the radios installed in the RF environment and are not interchangeable.

Software Load

The software loaded on the MX3-CE computer consists of Windows CE 3.0 OS, hardware-specific OEM Adaptation Layer, device drivers, MS Pocket Internet Explorer browser and utilities.

The software supported by the MX3-CE is summarized below:

Operating System

- Microsoft CE, which is Windows CE 3.0 with MFC support.

Radio Drivers

- Only one radio is installed in the MX3-CE at any one time. The 2.4GHz type of PC radio card resident on the MX3-CE determines the type of radio driver running on the MX3-CE.

Note: Please contact your LXE representative to get access to CAB files as they are released by LXE.

Intel Persistent Memory Folder (IPSM)

Persistent memory creates a virtual drive in free flash memory, which appears in Windows Explorer or ActiveSync Explorer as the folder IPSM (Intel Persistent Storage Manager). Any files stored in this folder are preserved during a reboot (warm or cold boot) or power fail, even during installation of a new system image. Normally, installed applications go into DRAM, which is lost on battery fail or cold boot.

The Windows CE application path includes the directories \IPSM and \IPSM\bin. Thus, any applications or DLLs put in these folders will execute directly from these directories, without specifying any additional path information.

This method does not, however, work for device drivers, since they are loaded before persistent storage starts up. As a result, the auto-launch utility (LAUNCH.EXE) uses registry settings to load CAB files from persistent storage into DRAM, and to reload those same CAB files if it detects that the drivers have disappeared from DRAM (e.g. during battery fail). The detail of how the auto-launch utility works and how to configure it for your own applications are in a separate app note.

Saving files to the persistent memory folder can be extremely slow - developers should not create applications that save files to this directory. Due to the wear on the flash memory chips, which also contain the Windows CE operating system, this usage will invalidate the LXE computer warranty.

See Also: PSMFORMAT.EXE

Persistent Registry

The registry database, which holds all configuration settings, may be saved to flash. When this has been done, the registry is detected when the computer reboots and all settings are loaded from the saved flash version instead of from DRAM (where they are stored while running). This means battery failure does not lose all settings. It also means that if you have made changes to the settings, and have not saved them, on reboot your changes are lost. If you reboot using the Boot icon on the desktop (or WarmBoot from the command line) your registry settings are automatically saved for you before rebooting.

The utility RegSave is used to save the registry to flash (**Start | Run | RegSave**). This takes 10-15 seconds to execute, during which the computer is essentially non-responsive to any input or primary event.

In the rare event that you want to erase saved settings, use the utility RegClear (c a r e f u l l y). Many unusual problems may be caused by having registry settings for a device that has been removed. When an application is uninstalled, its registry settings are removed; it is then necessary to save the registry again. If you don't save it, and reboot or get a battery failure, the settings for the application are still present and it may even try to run, which can crash the system if the application does not exist. RegClear can help in these situations.

When an application is installed from a CAB file or via ActiveSync, the installer automatically saves the registry when the installation is completed to be sure the new settings are preserved. Due to a bug in Microsoft's installer, there is no indication of this situation (no hourglass cursor), so it appears that the computer has locked up for the 10-15 seconds it takes to save the registry. Be patient, and control will return.

See Also: LAUNCH.EXE, REGCLEAR.EXE and REGSAVE.EXE

Java Virtual Machine (Optional)

The MX3-CE optionally includes the Insignia Jeode Java virtual machine. This VM supports Sun Personal Java specification 1.2, with enhancements unique to the Windows CE environment. The VM is fully integrated with the Pocket Internet Explorer browser, and can also run Java applications from the Windows CE desktop. Selecting **Start | Programs | Java** gives a selection of demo programs using the Java virtual machine.

This installed option is indicated by the appearance of a splash screen with the Java logo on bootup.

Desktop

> For general use instruction, please refer to commercially available WinCE user's guides or the WinCE on-line Help application installed with the MX3-CE.

The MX3-CE Desktop appearance is similar to that of a desktop PC running Windows 95, 98, NT or 2000.

At a minimum, it has the following icons that can be tapped with the stylus to access My Computer, Internet Explorer, and the Recycle Bin.

At the bottom of the screen is the Start button. Clicking the Start Button causes the Start Menu to pop up. It contains the standard Windows menu options: Programs, Favorites, Documents, Settings, Help, and Run.

The Start Menu Shutdown option found on most desktop PC's has been replaced with a single command: "Suspend" because the MX3-CE is always powered On (when a fully charged Main Battery and Backup Battery are present).

Click the Suspend button to blank the screen or tap the red Power button to blank the screen and place the MX3-CE into Suspend mode. Tap the screen once more or tap the Power button to "wake" the unit up.

Desktop Icon	Function
My Computer	Access files and programs.
Recycle Bin	Storage for files that are to be deleted.
Internet Explorer	Connect to the internet/intranet (requires radio card and Internet Service Provider – ISP enrollment is not available from LXE).
MS Office Apps	Pocket Word and/or Inbox.
Start	Access programs, favorite listing, documents last worked on, settings for the control panel or taskbar, on-line help, run programs or place the unit into Suspend mode.

Start Menu Program Options

The following options represent the factory default program installation. Your system may be different based on the software and hardware options purchased.

Accessories

Pocket Registry Editor

This program is similar to the Microsoft Windows program REGEDIT.

LXE cautions the user to edit parameters in the Registry with care, making sure a backup copy is first saved before any changes are made. Contact LXE Customer Support before making changes to the Pocket Registry parameters.

CISCO

Aironet Client Utility

Parameter	Default
SSID	Blank
Client Name	Blank
Infrastructure Mode	Yes
Power Save Mode	CAM
WEP	Disabled
Authentication Types	Open
LEAP	Disabled
Mixed Mode	Disabled
World Mode	Disabled
Data Rates	Auto
Transmit Power	MAX

Cisco Link Status

Immediately runs status on : signal strength, signal quality and overall link quality.

Client Encryption Manager

Enter the password to set encryption codes.

Client Statistics Utility

Immediately runs statistics, cumulative. An option is available to forward statistics from the client.

Load New Firmware

The current firmware version number is displayed. An option is available to load different firmware if supplied by the user.

Site Survey Tool

Immediately runs signal strength and quality and link speed. An option is available to Setup parameters for Active Mode reporting.

Wireless Login Module

LEAP must be enabled before this option can be edited or viewed.

Communications

Note: Some communication menu options require an external modem connection to the MX3-CE. Modems are not available from LXE nor supported by LXE.

ActiveSync

Once a relationship has been established with Connect, ActiveSync will synchronize using the radio link, serial ports, or the infrared port on the MX3-CE.

Note: ActiveSync does not transmit through the IR port in cradles.

Connect

Connect is used to initiate a hardwired connection to a host. Several pre-defined connect setups are included in the factory setup:

- COM1 direct connect at 57600 or 115200 baud
- Infrared connect at 57600 or 115200 baud
- COM3 direct connect at 57600 or 115200 baud
- USB direct connect

The default connect setup is COM1 at 57600 baud.

After a connect setup is selected, **Start | Communications | Connect** will start to connect to a host. After this connection is made and an ActiveSync relationship established, the ActiveSync menu item can be used to establish the connection over the radio link.

Select "Make New Connection" and follow the instructions on the screen to create a connection while following the directions in the section titled "Backup MX3-CE Files" later in this chapter.

Remote Networking

Remote networking is used to create a connection with a different baud rate than the default baud rate. The connections are then displayed in the PC Connection tab of the Communications control panel.

Select "Make New Connection" and follow the instructions on the screen to create a new connection.

Terminal

This option requires a radio card. Use this option to connect the MX3-CE to an online service or intranet that requires TTY or VT-100 terminal emulation. Use this option only when communicating with services that require terminal emulation.

Select "Make New Session" and follow the instructions on the screen to create a Terminal Session.

Terminal Client

Terminal Client allows a connection to be made to a Microsoft Terminal Server or a compatible Citrix Terminal Server over the radio card. It will support RDP 4 or RDP 5 protocols. This allows an application to be run on the server and display on the MX3-CE computer. Refer to Microsoft Terminal Services documentation for configuration information (not included in the LXE installed configuration).

Command Prompt

Figure 4-1 Pocket CMD Prompt Screen

Type `help` at the command prompt for a list of available commands. There are slight changes from general desktop Windows PC MS/DOS Prompt options.

Exit the Command Prompt by typing `exit` at the command prompt or select File | Close.

Inbox

This option requires a connection to a mail server. There are a few changes in the WinCE version of Inbox as it relates to the general desktop Windows PC Microsoft Outlook Inbox options. Click the "?" button to access Inbox Help. ActiveSync can be used to transfer messages between the MX3-CE inbox and a desktop inbox.

Internet Explorer

This option requires a radio card and an Internet Service Provider. There are a few changes in the WinCE version of Internet Explorer as it relates to the general desktop Windows PC Internet Explorer options. Click the "?" button to access Internet Explorer Help.

Microsoft Pocket Word

There are a few changes in the WinCE version of Microsoft Word as it relates to the general desktop Windows PC Microsoft Word options. PocketWord documents are saved with a .PWD extension instead of .DOC extension although they can be saved as .RTF or .DOC files on the MX3-CE. Microsoft Word templates (.DOT files) are converted to PocketWord templates (.PWT). Click the "?" button to access PocketWord Help. When ActiveSync transfers .pwd files to the desktop from the MX3-CE, the file is converted to .doc files by ActiveSync.

ORiNOCO Client

Set the parameters for installed Orinoco (or Lucent) radios using the Client Utility.
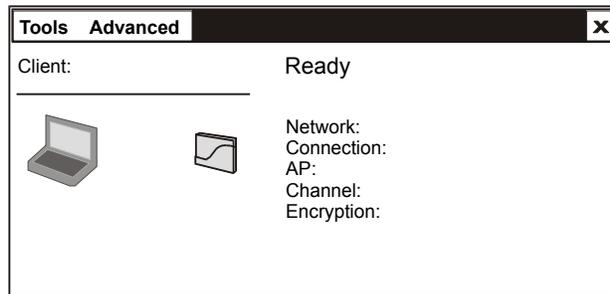
Figure 4-2 ORiNOCO Client Setup

Tools

Edit Wireless Profiles	Add / edit the configuration profiles
Version Info	Displays the version levels of the radio, MX3-CE hardware and software
Load/Unload Automatically	The default is "Load Automatically." Use this option to load the radio drivers when the MX3-CE is rebooted.
Suspend While Connected	Do not use this option when Lucent radio is installed in the MX3-CE.
Exit	

Advanced

Link Test	Test the link between the Access Point and the client radio.
Site Monitor	Test the link between all stations connected to the same Access Point as this MX3-CE.

Symbol Client

Mode Menu

Factory Default Settings	
802.11 ESSID	101
Operating Mode	Infrastructure

Info Menu

Gives information on current radio that is installed in unit.

- Driver Version
- Firmware Version
- Hardware Version
- Supported Rates
- Adapter Type
- Firmware Type
- Country
- Operating Mode
- Encryption Mode
- Transmit Power

IP Config Menu

Use DHCP or input a static IP address.

Power Menu

Adjust power management.

Factory Default Settings	
Infrastructure	Automatic
Automatic Power Save Mode	Enabled

Options Menu

Default for the following options is Disabled.

- Enable sounds
- International roaming
- These settings are only temporary
- Allow handheld PC to suspend when wireless network is used

Encryption

Listed below are the different encryption options for this menu.

- Open System (No Encryption) – Default
- 40-bit Shared Key
- 128-bit Shared Key
- Keberos

Ping Menu

A test utility that pings a host using the MX3-CE.

Signal Menu

A test utility that displays the signal quality between the MX3-CE and the connected access point.

AP Menu

To connect to the host, select an access point from the list.

Windows Explorer

There are a few changes in the WinCE version of Windows Explorer as it relates to the general desktop PC Windows Explorer options. Click the "?" button to access Windows Explorer Help.

Taskbar

Access: Start | Settings | Taskbar

The Taskbar can also be accessed by pressing Alt then tapping on the taskbar. Choose Properties from the popup menu.

Factory Default Settings	
Always on Top	Enabled
Auto hide	Disabled
Show Clock	Enabled

There are a few changes in the WinCE version of Taskbar as it relates to the general desktop PC Windows Taskbar options.

When the taskbar is auto hidden, press the Ctrl key then the Esc key to make the Start button appear.
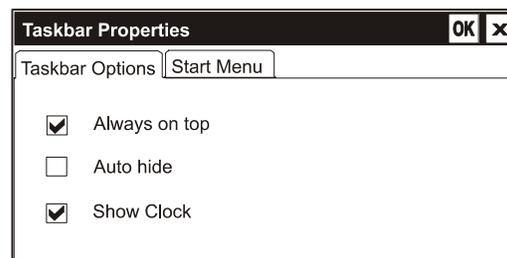
Figure 4-3 Taskbar Properties

Clear Contents of Document Folder

Select the **Start | Settings | Taskbar | Start Menu** tab and tap the Clear button to remove the contents of the Document folder.

Proxim Radio Options (From Taskbar)

Tap the Proxim radio icon on the taskbar (located on the right hand side of taskbar).

The following are the parameters that can be accessed and modified using the *Task Bar* Proxim icon for computers with Proxim 2.4GHz radios. The first screen displays the Master the computer is synchronized with, the network domain id and the node address.

Configuration

Parameter	Default	Description
Network Domain	0	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.
Set Security ID	null	Set the security id of the computer. It must be the same security id as other Proxim cards with the same security id. The default value is null.

Site Survey Tools

Master Search

This tool locates all Master stations within range of the computer. Upon clicking the Masters button, a listing of all masters found is displayed. Using the options on the list screen, link quality testing can be performed. Select a master and click the Directed Link button. Select Done to exit Master Search tool.

Advanced

Parameter	Default	Description
Inactivity Seconds	1	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.
Inactivity Minutes	0	Sets the number of minutes of inactivity (up to 20 minutes) before the PC card goes to sleep. To minimize draw on the vehicle battery, set this to 0.
Roam Config	Normal	Sets the roaming speed. Slow, Normal or Fast

About

Displays radio card software version number, ROM version and contact information for Proxim Inc.

About

Displays ROM, current network connection IP address and radio driver version.

Control Panel Options

Access: Start | Settings | Control Panel
or My Computer | Control Panel

Getting Help

Please click the "?" box to get Help when changing Control Panel options.

Option	Function
About	Displays hardware and software details.
Communication	Set Device Name and PC Connection properties.
Date/Time	Set Date, Time, Time Zone, and Daylight Savings.
Display	Set background graphic, color scheme appearance, screen backlight timeout and screen blanking timeout properties.
Keyboard	Set key repeat delay and key repeat rate.
Network	Set network driver properties and network access properties.
Owner	Set MX3-CE owner details.
Password	Set MX3-CE access password properties.
Power	Set Power Off, Backlight, Blanking properties. Review battery status and perform backup battery charging/discharging.
Regional Settings	Set appearance of numbers, currency, time and date based on regional and language settings.
Remove Programs	Remove programs in their entirety.
Scanner	Set scanner keyboard wedge, scanner icon appearance, active scanner port, and scan key settings. Assign baud rate, parity, stop bits and data bits for available COM ports.
Stylus	Set double-tap sensitivity properties and/or calibrate the touch panel.
System	Review System and Computer data and revision levels. Adjust Storage and Program memory settings.
Volume and Sounds	Set volume parameters and assign sound wav files to WinCE events.
Wireless Network	Set network parameters.

Communication

Factory Default Settings	
Device Name	MX3CE001
Device Description	LXE MX3-CE
PC Connection	
Allow Connection	Enabled
Connect Using	Serial 1 @ 57600

Device Name
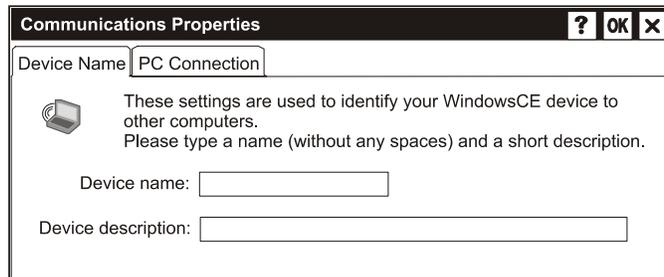
Figure 4-4 Communications / Device Name Tab

Adjust the settings and click the OK box to save the changes. The changes take effect immediately.

PC Connection

Please refer to the "Backup MX3-CE Files" section later in this chapter for parameter setting recommendations.
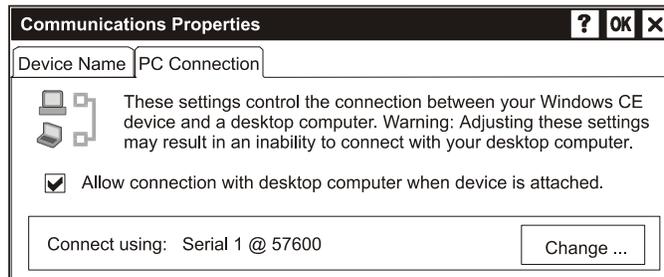
Figure 4-5 Communication / PC Connection Tab

Date/Time

Access: Start | Settings | Control Panel | Date|Time Icon

Factory Default Settings	
Current Time	Current
Time Zone	GMT-5
Daylight Savings	Disabled

Date/Time Properties   ? OK ✕

Date/Time

◄   **January 2001**   ►
S	M	T	W	T	F	S
31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3
4	5	6	7	8	9	10

Current Time
3:30:06 PM

Time Zone
(GMT-05:00) Eastern Time (US & Canada)
☑ Daylight savings time currently in effect
Apply
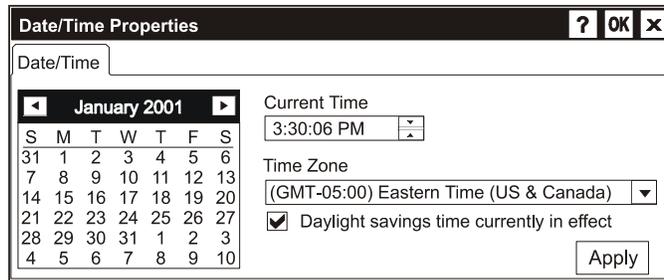
Figure 4-6 Date/Time Properties

There is no change from general desktop PC Date/Time Properties options. Adjust the settings and click the OK box or the Apply button to save the changes. The changes take effect immediately.

Display

Access: Start | Settings | Control Panel | Display Icon

Factory Default Settings	
Background	None
Tile	Enable
Appearance	
Scheme	High Contrast White
Backlight	
Battery Auto Turn Off	Enabled
Idle Time	3 Seconds
External Auto Turn Off	Enabled
Idle Time	2 minutes
Blanking	
Battery Auto Turn Off	Enabled
Idle Time	15 Seconds
External Auto Turn Off	Enabled
Idle Time	2 minutes

Background

There is no change from general desktop PC Display Properties / Background options. Adjust the settings and click the OK box to save the changes. The changes take effect immediately.

Appearance

No change from general desktop PC Display Properties / Appearance options. Adjust the settings and click the OK box to save the changes. The changes take effect immediately. The default is High Contrast White for both monochrome and color displays.

Note: The color screens display Windows standard colors (or the color scheme selected) instead of shades of grey.

Backlight
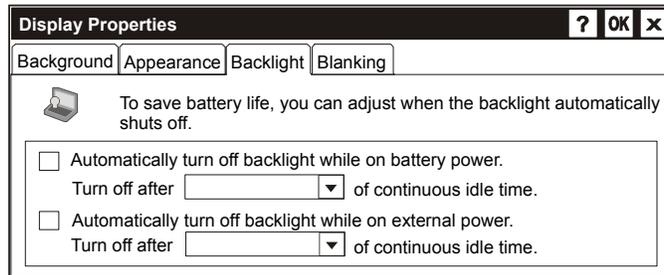
Figure 4-7 Display Properties / Backlight Tab

Adjust the settings and click the OK box to save the changes. The changes take effect immediately. This option is also available in Power.

When the backlight timer expires, the transflective screens are turned off, the color transmissive backlight is dimmed not turned off.
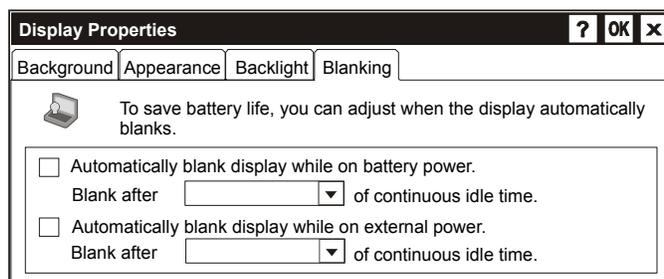
Blanking

Figure 4-8 Display Properties / Blanking Tab

Adjust the settings and click the OK box to save the changes. The changes take effect immediately. This option is also available in Power.

Keyboard

Access: Start | Settings | Control Panel | Keyboard Icon

Factory Default Settings	
Repeat	Enable
Delay	Short
Rate	Slow
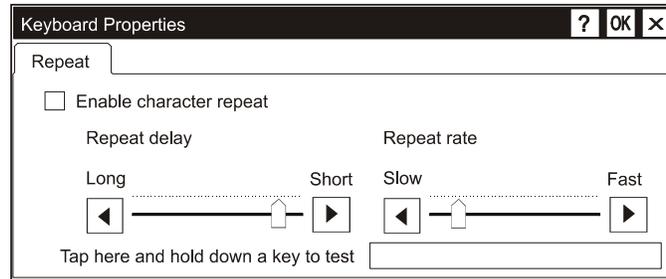
Figure 4-9 Keyboard Properties

There is no change from general desktop PC Keyboard Properties options. Adjust the settings and click the OK box to save the changes. The changes take effect immediately.

Network

Access: Start | Settings | Control Panel | Network Icon

Factory Default Settings	
Adapter	Radio Card Specific
Identification	
User Name	Blank
Password	Blank
Domain	Blank

Reset Radio Parameters

After changing radio card adapter parameters, and when prompted, the radio card must be removed from the MX3-CE slot, pause for three seconds and reinsert the radio card in the MX3-CE. The new radio parameters will then be in effect.

Adapters
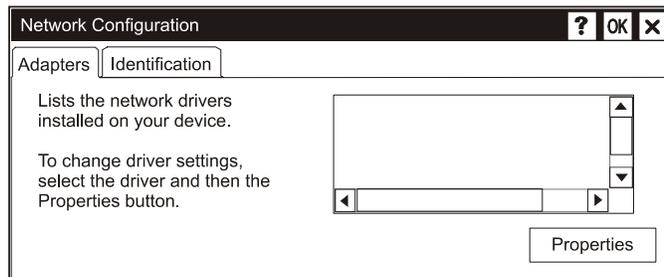
Figure 4-10 Network Configuration / Adapters Tab

Upon selecting a driver, click the Properties button.

The next screen displayed is used to set the IP Address and Name Server Address parameters. Adjust the settings and click the OK box to save the changes.

Identification
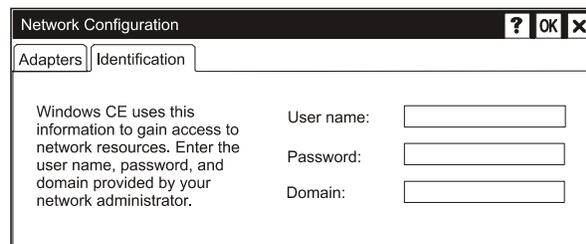
Figure 4-11 Network Configuration / Identification Tab

There is no change from general desktop PC Network Configuration / Identification display. Enter the user name, password and domain information and click the OK box to save the changes.

Owner

Access: Start | Settings | Control Panel | Owner Icon

Factory Default Settings	
Identification	Blank
Notes	Blank

There is no change from general desktop PC Owner Properties display. Enter the information and click the OK box to save the changes. The changes take effect immediately.

Figure 4-12 Owner Properties

Password

Access: Start | Settings | Control Panel | Password Icon

Factory Default Settings	
Password	Blank
At Power On	Disabled

Note: Once a password is assigned, each Control Panel option requires the password be entered before the Control Panel option can be accessed. If you forget the password, it cannot be restored without performing a cold boot on the unit (which erases all memory).

There is no change from general desktop PC Password Properties options. Enter the password, then type it again to confirm it and click the OK box to save the changes. The password is immediately in effect.

Figure 4-13 Password Properties

Power

Access: Start | Settings | Control Panel | Power Icon

Factory Default Settings	
Battery	N/A
Power Off	
Suspend on Battery	Enabled
Battery Suspend Timer	5 minutes
Suspend on External Power	Enabled
External Power Suspend Timer	5 minutes
Backlight	
Auto Turn Off on Battery	Enabled
Battery Idle Time Off Timer	3 Seconds
Auto Turn Off on External Power	Enabled
External Idle Time Off Timer	2 minutes
Blanking	
Auto Blank on Battery	Enabled
Battery Idle Time Blank Timer	15 Seconds
Auto Blank on External Power	Enabled
External Idle Time Blank Timer	2 minutes
Charge	N/A

Please refer to Chapter 1 "Introduction" section titled "Power Modes".

Battery

The Battery tab shows the status and the percentage of power left in the Main Battery (external). It also shows the status of the Backup Battery. The listed values cannot be changed by the user.

Power Off
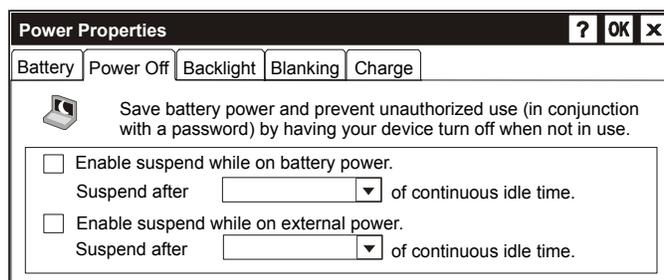
Figure 4-14 Power Properties / Power Off Tab

There is no change from general desktop PC Power Properties options. Adjust the settings and click the OK box to save the changes. The changes take effect immediately.

Backlight

These options are the same as those accessible through Display Properties. Adjust the settings and click the OK box to save the changes. The changes take effect immediately.

When the backlight timer expires, the transflective screens are turned off, the color transmissive backlight is dimmed not turned off.

Blanking

These options are the same as those available using Display Properties. Adjust the settings and click the OK box to save the changes. The changes take effect immediately.

Charge

This option presents the Voltage and Status of the Main and Backup batteries.

The option to charge and discharge the backup battery is available on this Power Properties | Charge tab. Once the backup battery is completely discharged, the MX3-CE automatically begins the Recharge process.

Regional Settings

Access: Start | Settings | Control Panel | Regional Settings Icon

No change from general desktop PC Regional Settings Properties options. Adjust the settings and click the OK box to save the changes. The changes take effect immediately.

Factory Default Settings	
Regional Setting	English (United States)
Number	123,456,789.00 / -123,456,789.00 neg
Currency	$123,456,789.00 pos / ($123,456,789.00) neg
Time	h:mm:ss tt (tt=AM or PM)
Date	M/d/yy short / dddd,MMMM,dd,yyyy long

Scanner

Access: Start | Settings | Control Panel | Scanner Icon

Factory Default Settings	
Main	
Port 1	Internal
Port 2	Disabled
Power Port 1 while asleep	Disabled
Send key messages WEDGE	Enabled
Keys	
Left	Scan
Right	Enter
COM Ports (COM1- COM2 – COM3)	
Baud Rate	9600
Parity	None
Stop Bits	1
Data Bits	8
Power on Pin 9	Off

Note: If the internal scanner has to be configured to operate at any communication settings other than 9600, N, 8, 1 and the computer either loses power or a cold boot command is entered, the Scanner applet must be reconfigured to match the scanner communication settings.

Note: ActiveSync will not work over the COM1 port if COM1 external is enabled in the Scanner applet as a scanner input.

Main
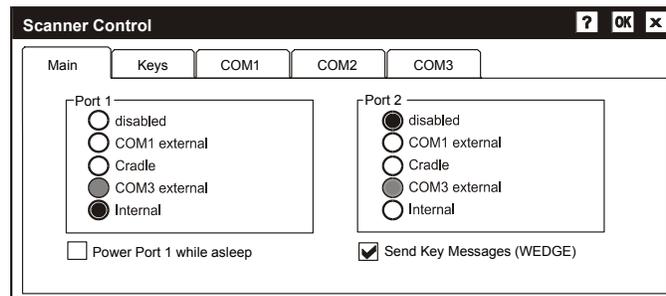
Figure 4-15 Scanner Properties / Main Tab

Adjust the settings and click the OK box to save the changes. The changes take effect immediately.

The Scan buttons have no effect on tethered external scanners connected to a serial port on the MX3-CE or the MX3 cradle ports.

Keys
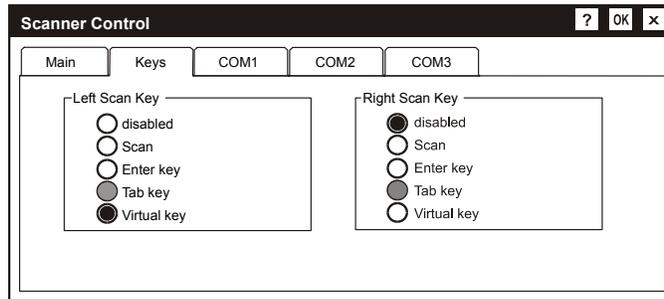
Figure 4-16 Scanner Properties / Keys Tab

COM Ports
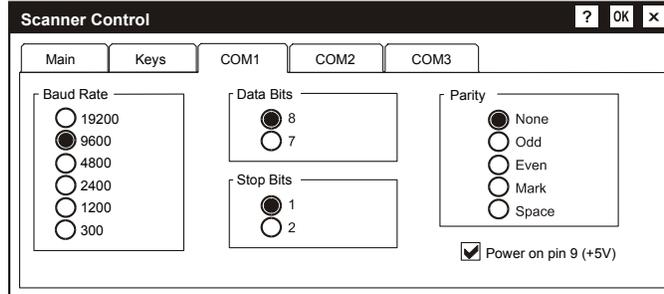
Figure 4-17 Scanner Properties / COM Port Settings

Adjust the settings and click the OK box to save the changes. The changes take effect immediately.

The COM 1 display contains the same parameters as the COM 2 and COM 3 Tab. Adjust the settings and click the OK box to save the changes. The changes take effect immediately.

Stylus

Access: Start | Settings | Control Panel | Stylus Icon

Factory Default Settings

N/A

Double Tap

There is no change from general desktop PC Mouse / Double Tap Properties display. Follow the instructions on the screen and click the OK box to save the changes. The changes take effect immediately.

Calibration
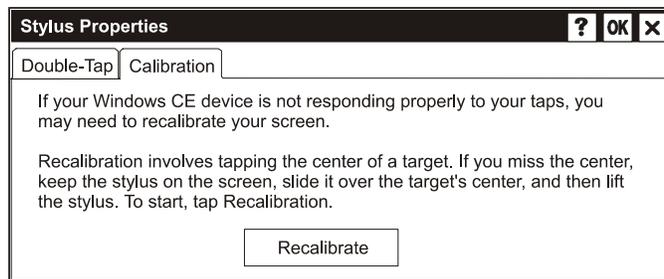
Figure 4-18 Stylus Properties / Recalibration Start
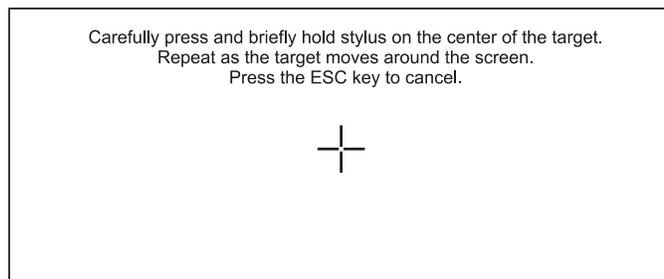
Figure 4-19 Stylus Properties / Recalibration

System

Access: Start | Settings | Control Panel | System Icon

Factory Default Settings	
General	N/A
Memory	Middle of Memory Bar

General
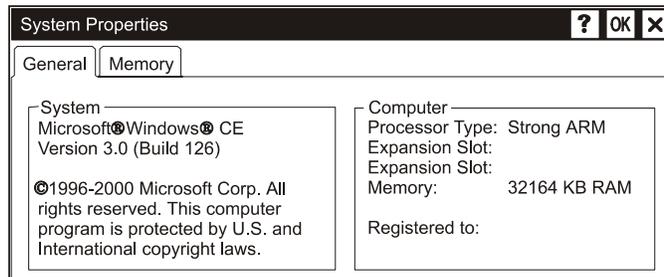
Figure 4-20 System Properties / General Tab

This screen is presented for information only. The parameters cannot be changed by the user.

Memory
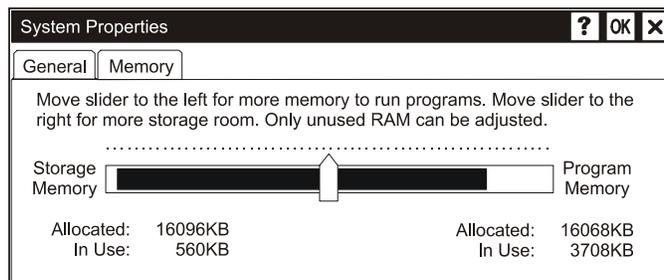
Figure 4-21 System Properties / Memory Tab

There is no change from general desktop PC System Properties / Memory options. Adjust the settings and click the OK box to save the changes. The changes take effect immediately.

Volume and Sound

Access: Start | Settings | Control Panel | Volume & Sounds Icon

Factory Default Settings	
Volume	
Events	Enabled
Application	Enabled
Notifications	Enabled
Volume	Middle of Bar
Key click	Loud
Screen tap	Loud
Sounds	
Scheme	LOUD!

Volume
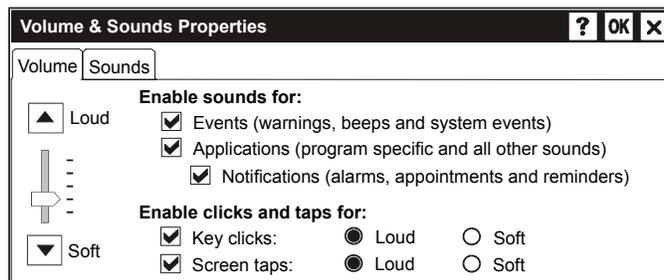
Figure 4-22 Volume and Sounds Properties / Volume Tab

Sounds

There is no change from general desktop PC Volume and Sound Properties / Sounds options. Adjust the settings and click the OK box to save the changes. The changes take effect immediately.

Wireless (only for Lucent Radios)

Access: Start | Settings | Control Panel | Wireless Icon

Factory Default Settings	
Configuration Profile	
Default	Access Point
Data Security	Disabled
Encrypt	Key 1 alpha
Card Power Management	Off

Select the Profile, adjust the settings on the following screens and click the OK box to save the changes. Help is available by clicking the question mark in the edit window.

Backup MX3-CE Files

Use the following to backup data files from the MX3-CE to a desktop or laptop PC using the appropriate cables and Microsoft's ActiveSync (NOT included in LXE file load).

Prerequisites

Serial Port Transfer

- A desktop or laptop PC with an available serial port and an MX3-CE with a serial port. The desktop or laptop PC must be running Windows 95, 98, NT or 2000.

- Null modem cable with all control lines connected. LXE recommends using the null modem cable part number listed in Chapter 1 "Introduction", subsection "Accessories".

Infrared Port Transfer

- A desktop or laptop PC with an infrared port and an MX3-CE with an infrared port. The desktop or laptop PC must be running Windows 95 SR2, 98 or 2000.

USB Transfer

- A desktop or laptop PC with an available USB port and an MX3-CE with a USB port. The desktop or laptop PC must be running Windows 98 SR2 or Windows 2000.

- LXE-specific USB cable as listed in Chapter 1 "Introduction", subsection "Accessories".

Configure the MX3-CE

The following instructions relate to initial setup of ActiveSync. When there is a Connect icon on the MX3-CE desktop, this section can be bypassed.

Serial Connection

Select **Start | Control Panel | Communications | PC Connection**. Click the Change button. From the popup list, choose

Serial 1 @ 115200

Note: The default is 57600 baud.

This will set up the MX3-CE to use COM 1. If the MX3-CE has a dual-serial port endcap, the Serial 3 @ 115200 can also be selected. Click OK and ensure the check box for "Allow connection with desktop computer when device is attached" is checked.

Click OK to return to the Control Panel.

Select Scanner and ensure the integrated scanner is set to a port that is NOT the same as the ActiveSync port.

IrDA Connection

> *Note:*   *The ActiveSync connection does true IrDA, not serial over IR, or TCP/IP (Winsock) over IR, like many infrared connections. Therefore, it is important to use a PC infrared interface which supports the handshaking needed for ActiveSync. This, unfortunately, precludes using many brands of laptops, which only use a simple infrared interface, even though they may call it IrDA.*

Select **Start | Control Panel | Communications | PC Connection**. Click the Change button. From the popup list, choose

> IR @ 115200

This will set up the MX3-CE to use the Infrared port. Click OK and ensure the check box for "Allow connection with desktop computer when device is attached" is checked.

Click OK to return to the Control Panel.

Select Scanner and ensure the integrated scanner is set to a port that is NOT the same as the ActiveSync port.

USB Connection

Select **Start | Control Panel | Communications | PC Connection**. Click the Change button. From the popup list, choose

> USB

This will set up the MX3-CE to use the USB port. Click OK and ensure the check box for "Allow connection with desktop computer when device is attached" is checked.

Click OK to return to the Control Panel.

Radio

Once the relationship is established using the serial port, the ActiveSync link in the Start Menu gives a choice of connections, one of which is radio.

Select **Start | Programs | Communication | ActiveSync**. Click the Change button. From the popup list, choose Ethernet.

> *Note:*   *This will not work unless you establish a relationship first, using a direct (serial / USB / infrared) connection.*

Connect

Connect the modem cable to the PC (the host) and the MX3-CE (the client). Select "Connect" from the Start Menu on the MX3-CE (Start / Programs / Communications / Connect).

> *Note:*   *Run "Connect" when the "Get Connected" wizard on the host PC is checking COM ports to establish a connection for the first time.*

> *Note:*   *USB will start automatically when the cable is connected, not requiring you to select "Connect" from the start menu.*

Explore

From the ActiveSync dialog, click on the Explore button, which allows you to explore the MX3-CE from the PC side, with some limitations. You can copy files to or from the MX3-CE by drag-and-drop. You will not be allowed to delete files or copy files out of the \Windows directory on the MX3-CE. (Technically, the only files you cannot delete or copy are ones marked as system files in the original build of the Windows CE image. This, however, includes most of the files in the \Windows directory).

Disconnect

Serial Connection

- Disconnect the cable from the MX3-CE.
- Put the MX3-CE into suspend by tapping the red Suspend button.
- Click the status bar icon in the lower right hand corner of the status bar. Then click the Disconnect button.

IRDA Connection

- Move the MX3-CE so the infrared beam is broken.
- Click the status bar icon in the lower right hand corner of the status bar. Then click the Disconnect button.

USB Connection

- Disconnect the cable from the MX3-CE.
- Click the status bar icon in the lower right hand corner of the status bar. Then click the Disconnect button.

WARNING - DO NOT PUT THE MX3-CE INTO SUSPEND WHILE CONNECTED VIA USB. The MX3-CE will be unable to connect to the host PC when it resumes operation.

Radio Connection

- Put the MX3-CE into suspend by tapping the red Suspend button.
- Click the status bar icon in the lower right hand corner of the status bar. Then click the Disconnect button.

Troubleshooting

> ***ActiveSync on the host says that a device is trying to connect, but it cannot identify it***

One or more control lines are not connected. This is usually a cable problem, but on a laptop or other device, it may indicate a bad serial port.

> ***ActiveSync indicator on the host (disc in the toolbar tray) turns green and spins as soon as you connect the cable, before clicking the Connect icon (or REPLLOG.EXE in the Windows directory).***

One or more control lines are tied together incorrectly. This is usually a cable problem, but on a laptop or other device, it may indicate a bad serial port.

> ***ActiveSync indicator on the host turns green and spins, but connection never occurs***

Baud rate of connection is not supported or detected by host.

> -or-

Incorrect or broken data lines in cable.

> ***ActiveSync indicator on the host remains gray***

The host doesn't know you are trying to connect. May mean a bad cable, with no control lines connected, or an incompatible baud rate. Try the connection again, with a known-good cable.

> ***Testing connection with a terminal emulator program, or a serial port monitor***

You can use HyperTerminal or some other terminal emulator program to do a rough test of ActiveSync. Set the terminal emulator to 8 bits, no parity, 1 stop bits, and the same baud rate as the connection on the CE device. After double-clicking REPLLOG.EXE on the CE device, the word "CLIENT" appears on the display in ASCII format. When using a serial port monitor, you see the host echo "CLIENT", followed by "SERVER". After this point, the data stream becomes straight (binary) PPP.

Create a Communication Option

1. On the MX3-CE, select **Start | Programs | Communication | Remote Networking**. A window is displayed showing the existing connections.

2. Assuming the one you want does not exist, double-click **Make New Connection**.

3. Give the new connection an appropriate name (IR @ 9600, etc.). Click the **Direct Connection** radio button. Click the Next button.

4. From the popup menu, choose the port you want to connect to. Only the available ports are shown.

5. Click the **Configure...** button.

6. Under the **Port Settings** tab, choose the appropriate baud rate. Data bits, parity, and stop bits remain at 8, none, and 1, respectively.

7. Under the **Call Options** tab, be sure to turn off **Wait for dial tone**, since a direct connection will not have a dial tone. Set the timeout parameter (default is 90 seconds). Click OK.

8. **TCP/IP Settings** should not need to change from defaults. Click the **Finish** button to create the new connection.

9. Close the **Remote Networking** window.

10. To activate the new connection select **Start | Settings | Control Panel | Communication | PC Connection** and click the **Change** button.

11. Select the new connection. Click OK twice.

12. Close the Control Panel window.

13. Connect the desktop PC to the MX3-CE with the appropriate cable.

14. Click the desktop Connect icon to test the new connection.

You can activate the connection by double-clicking on the specific connection icon in the Remote Networking window, but this will only start an RAS (Remote Access Services) session, and does not start ActiveSync properly.

Technical Specifications – Connection Cable

The exact serial cable is crucial. Many commercial null modem cables will not work. LXE recommends the following cable:

Serial cable:

9000A054CBL6D9D9
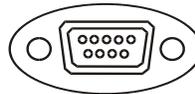
Pinout:

DB9 female	DB9 female
1,6	4
2	3
3	2
4	1,6
5	5
7	8
8	7
9	no connection

Figure 4-23 Pinout – Serial Cable for Synchronization

Some laptop devices do not properly implement all control lines on the serial port – the laptop connection will not work.

MX3-CE Utilities

The following files are pre-loaded by LXE.

Graphic Utilities

ABOUT.CPL

Control panel which gives all available version information for system.

LAUNCH.EXE

Launch works in coordination with registry settings to allow drivers or applications to be loaded automatically into DRAM at system startup. Registry settings control what gets launched; see the App Note for information on these settings. For examples, you can look at the registry key

HKEY_LOCAL_MACHINE\Software\LXE\Persist

Launch will execute .CAB files, .BAT files, or .EXE files.

App Note

All applications to be installed into persistent memory must be in the form of Windows CE CAB files. These CAB files exist as separate files from the main installation image, and are copied to the CE terminal using ActiveSync, or using a Compact Flash ATA card. The CAB files are copied from ATA or using ActiveSync Explore into the folder IPSM, which is the persistent storage virtual drive. Then, information is added to the registry, if desired, to make the CAB file auto-launch at startup.

The registry information needed is under the key HKEY_LOCAL_MACHINE \ SOFTWARE \ LXE \ Persist, as follows. The main subkey is any text, and is a description of the file. Then 3 values are added:

FileName is the name of the CAB file, with the path (usually \IPSM)

Installed is a DWORD value of 0, which changes to 1 once auto-launch installs the file

FileCheck is the name of a file to look for to determine if the CAB file is installed. This will be the name of one of the files (with path) installed by the CAB file. Since the CAB file installs into DRAM, when memory is lost this file is lost, and the CAB file must be reinstalled.

The auto-launch process goes as follows. The launch utility opens the registry database and reads the list of CAB files to auto-launch. First it looks for FileName to see if the CAB file is present. If not, the registry entry is ignored. If it is present, and the Installed flag is not set, auto-launch makes a copy of the CAB file (since it gets deleted by installation), and runs the Microsoft utility WCELOAD to install it. If the Installed flag is set, auto-launch looks for the FileCheck file. If it is present, the CAB file is installed, and that registry entry is complete. If the FileCheck file is not present, memory has been lost, and the utility calls WCELOAD to reinstall the CAB file. Then, the whole process repeats for the next entry in the registry, until all registry entries are analyzed.

Registry information is already in the default image for the following:

[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\Lucent Radio]

"FileName"="\IPSM\LUCENT.CAB"

"Installed"=dword:0

"FileCheck"="\WINDOWS\WMLUC46.EXE"

[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\Proxim Radio]

"FileName"="\IPSM\PROXIM.CAB"

"Installed"=dword:0

"FileCheck"="\WINDOWS\PROXIM.DLL"

[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\Cisco Radio]

"FileName"="\IPSM\CISCO.CAB"

"Installed"=dword:0

"FileCheck"="\WINDOWS\CISCO.DLL"

[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\Symbol Radio]

"FileName"="\IPSM\SYMBOL.CAB"

"Installed"=dword:0

"FileCheck"="\WINDOWS\NICTT.EXE"

[HKEY_LOCAL_MACHINE\SOFTWARE\LXE\Persist\VB Runtime]

"FileName"="\IPSM\VBRT.CAB"

"Installed"=dword:0

"FileCheck"="\WINDOWS\PVBLOAD.EXE"

PREGEDIT.EXE

Pocket Registry Editor - part of Microsoft Power Tools for Windows CE.

REGLOAD.EXE

Double-tapping a registry settings file (e.g. REG) causes RegLoad to open the file and make the indicated settings in the registry. This is similar to how RegEdit works on a desktop PC. The .REG file format is the same as on the desktop PC.

WARMBOOT.EXE

Double click to warm boot the computer (i.e., all RAM is preserved). It automatically saves the registry before rebooting, to be sure configuration changes are not lost. See REGSAVE for details on the process of saving the registry.

WAVPLAY.EXE

Double-tapping a sound file (e.g. WAV) causes WavPlay to open the file and run it in the background.

MX3-CE Command-line Utilities

Command line utilities can be executed by Start | Run | [program name].

COLDBOOT.EXE

Command line utility which performs a cold boot (all RAM is erased).

PING.EXE

Command line utility - similar to the ping utility under Windows NT. You can type **ping hostname**, and a DNS lookup is performed on hostname, then a ping is sent. Alternatively, you can type **ping nnn.nnn.nnn.nnn**, and the IP address is used as given. The ping attempt will retry 5 times, but stops as soon as it succeeds.

REGSAVE.EXE

RegSave writes the current configuration registry to a special partition in persistent memory. When the device starts up on reboot or after a main battery failure, the registry settings are all reloaded. While running (10-15 seconds) it displays a message box stating ".. saving settings ..", and at completion it displays a dialog box if the procedure fails.

REGCLEAR.EXE

RegClear erases the saved registry configuration from persistent memory. This is rarely needed, but important when it is needed. Loading a new system image does not erase the old registry settings, which causes various puzzling problems; running RegClear before installing the new image removes those problems. While running (5-10 seconds) it displays a message box saying "...clearing settings...", and at completion it displays a dialog box if the procedure fails.

Note that to return your MX3-CE completely to factory defaults, you must perform RegClear to erase the stored settings, followed by ColdBoot, to erase settings stored in DRAM.

PSMFORMAT.EXE

PSMFormat reformats the entire persistent memory folder (IPSM). This function runs automatically when first booting with a new flash image. Saved registry settings are not affected. This is useful for quickly deleting numerous files in the IPSM folder. While running (30-45 seconds) it displays a message box saying "...erasing PSM...", and at completion it displays a dialog box if the procedure fails.

See Also: Sections titled "Persistent Memory" and "Persistent Registry" earlier in this chapter.

WHOAMI.EXE

Command line utility - returns all IP addresses for the computer. Syntax is: **whoami** [no options]. If not connected to the network, it will display the loopback IP (127.0.0.1). If connected via ActiveSync, it will display the ActiveSync IP (192.168.55.100). If connected to the network, it will display a valid local IP address.

Appendix A Key Maps

MX3-CE Keypad

Note: *This key mapping is used on hand held computers that are NOT running an LXE Terminal Emulator.*

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

Note: *When the computer boots, the default condition of NumLock is On and the default condition of Caps (or CapsLock) is Off. The Caps (or CapsLock) condition can be toggled with a 2nd+F1 key sequence. The CAPS LED is illuminated when CapsLock is On.*

To get this key	Press These Keys and Then					Press this key
	2nd	Shift	Ctrl	Alt	CapsLock	
Contrast	x					F6
Volume	x					F8
Backlight	x					F10
2nd						2nd
Shift						Shft
Alt						Alt
Ctrl						Ctrl
Scan[4]						Scan
Esc						Esc
Space						Spc
Enter						Enter
CapsLock (Toggle)	x					F1
Back Space						BkSp
Tab						Tab
BackTab	x					Tab
Break	x					F2
Pause	x	x				F3
Up Arrow						Up Arrow
Down Arrow						Down Arrow
Right Arrow						Right Arrow
Left Arrow						Left Arrow
Insert	x					BkSp

---

[4] Left Scan key default value is Scan. Right Scan key default value is Enter.

To get this key	Press These Keys and Then					Press this key
	2nd	Shift	Ctrl	Alt	CapsLock	
Delete	x					DOT
Home	x					Left Arrow
End	x					Right Arrow
Page Up	x					Up Arrow
Page Down	x					Down Arrow
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					Off	A
b					Off	B
c					Off	C
d					Off	D
e					Off	E
f					Off	F
g					Off	G
h					Off	H
i					Off	I
j					Off	J
k					Off	K
l					Off	L
m					Off	M
n					Off	N
o					Off	O
p					Off	P
q					Off	Q

To get this key	Press These Keys and Then					Press this key
	2nd	Shift	Ctrl	Alt	CapsLock	
r					Off	R
s					Off	S
t					Off	T
u					Off	U
v					Off	V
w					Off	W
x					Off	X
y					Off	Y
z					Off	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

To get this key	Press These Keys and Then					Press this key
	2nd	Shift	Ctrl	Alt	CapsLock	
1						1
2						2
3						3
4						4
5						5
6						6
7						7
8						8
9						9
0						0
DOT						DOT
<	x					0
[	x					1
]	x					2
>	x					3
=	x					4
{	x					5
}	x					6
/	x					7
-	x					8
+	x					9
*	x					I
: (colon)	x					D
; (semicolon)	x					F
?	x					L
`	x					N
_ (underscore)	x					M
, (comma)	x					J
' (apostrophe)	x					H
~ (tilde)	x					B
\	x					S
		x					A
"	x					G
!	x					Q
@	x					W

To get this key	Press These Keys and Then					Press this key
	2nd	Shift	Ctrl	Alt	CapsLock	
#	x					E
$	x					R
%	x					T
^	x					Y
&	x					U
(	x					O
)	x					P

Appendix B Technical Specifications

Physical Specifications

Features		Specifications	Comments	
CPU		SA1110 CPU operating at 133 MHz or 206 MHz	32 bit CPU (with on-chip cache)	
Memory	ROM	16 or 32 MB Flash		
	RAM	16, 32 or 64MB of SDRAM	System Memory	
Display	LCD	Monochrome Transflective Transmissive Color Transflective Color	Transflective LCD with touchscreen. Customer Configurable Backlighting	
Mass Storage	Removable PC Card (Customer Installable)	SRAM or Flash PCMCIA Type III PC Cards (Various Sizes) Compact Flash Card Bootable SRAM PC Card, ATA Flash PC Card, or ATA Hard Drive PC Card		
PCMCIA Interface		Slot 0 accepts Type I, II, and III Slot 1 accepts Type I and II CF+	Compatible with the PCMCIA version 2.1 standard.	
Weights		Unit with radio, battery and scanner endcap	Less than 30 oz	>850g
		Battery	5.6 oz	157g
		Radio Card - 2.4GHz Type II	1.0 oz 1.6 oz	28g 45g
		SRAM Card	1 oz	28g
External Connectors/Interface		IrDA Connector (COM 2) bi-directional half-duplex	Supports 115k baud	
		Endcap - Dual Serial, DA-9 or DB-9 Connector (COM 1 and COM 3)	9 Pin "D" (male) Connector. Provides connection to external devices such as a printer.	
		Endcap - incl Scanner (COM 3), DA-9 or DB-9 Connector (COM 1)	9 Pin "D" (male) Connector. Provides connection to external devices such as a printer.	
		Endcap – incl Scanner (COM 3), DA-9 (COM 1)		

Features		Specifications	Comments	
Power Connector		8.5V - 15 VDC Input Power	External Battery Charger Contacts	
		10.8 - 16VDC Input Power	Power Jack	
Audio Connector			Audio Jack	
Dimensions w/Endcap		Length	6.5"	165 cm
		Width	9"	228 cm
		Depth	1.5"	38 cm
Batteries	Main	10.8V, 3 cell, Li-Ion battery pack	In-Unit Chargeable or Externally Chargeable	
	Backup (CMOS)	Internal Nickel-Cadmium (NiCd) 5.7V max.	Automatically charges from Main Battery during normal operation	
			Memory operational for 5 minutes when Main Battery is depleted	

Display Specifications

Feature	Specification
Type	LCD - Transflective Monochrome, Transflective Color, Transmissive Color
	Electroluminescent Backlighting
Resolution	640x240 pixels
Size	½ VGA landscape
Diagonal Viewing Area	5.92 in (150.4mm)
Dot Pitch	0.22mm
Dot Size	0.20mm x 0.20mm
Color Scale	Monochrome - 16 Shades of Gray
	Transmissive – 256 colors
	Transflective – 256 colors

Environmental Specifications

MX3-CE and Endcaps

Feature	Specification
Operating Temperature	-4°F to 122°F (-20°C to 50°C) monochrome -2°F to 122°F (-10°C to 50°C) color
Storage Temperature	-22°F to 158°F (-30°C to 70°C)
Water and Dust	IEC IP65 (with standard endcaps)
Operating Humidity	Up to 90% non-condensing at 104°F (40°C)
Ambient Light – ranging from total darkness to direct sunlight	Display readable (with backlight on) for <= two hours Keypad readable (after previous exposure to a 60W bulb for 30 minutes) for <= 15 minutes.
Contamination	Resistant to exposure to skin oil and other lubricants.
Vibration	Based on MIL Std 810D
ESD	8 KV air, 4kV direct contact
Shock	Multiple 4 foot drops to concrete. 6 foot with protective cover/boot

Power Supplies

US AC Wall Adapter

Feature	Specification
Input Power Switch	None
Power "ON" Indicator	None
Input Fusing	Thermal Fuse
Input Voltage	108VAC min - 132VAC max
Input Frequency	47 - 63 Hz
Input Connector	North American wall plug, no ground
Output Connector	Barrel connector, female, 5.5 x 2.5 x 11.5mm, Center Positive
Output Voltage	+12VDC, unregulated
Output Current	0 Amps min, 1.5 A max
Operating Temperature	32° F to 104° F / 0° C to 40° C
Storage Temperature	-13° F to 158° F / -25° C to 70° C
Humidity	Operates in a relative humidity of 5 – 95% (non-condensing)

International AC Adapter

Feature	Specification
Operating Temperature	32°F to 104°F (-0°C to 40°C)
Storage Temperature	-13°F to 158°F (-25°C to 70°C)
Operating Humidity	Up to 90% non-condensing at 104°F (40°C)
Input Power Switch	None
Power "ON" Indicator	None
Input Voltage	108VAC min - 264VAC max
Input Frequency	47 - 63 Hz
Input Connector	Customer supplied
Output Connector	Barrel connector, female, 5.5 x 2.5 x 11mm, Center Positive
Output Voltage	+12VDC, regulated
Output Voltage Regulation	+/- 5%
Output Current	0 Amps min, 1.00 Amps max

Radio Specifications

PCMCIA Proxim 2.4 GHz Type II

Bus Interface	PCMCIA 2.0, Type II slot
Radio Frequencies	2.4 - 2.4835 GHz FH SS
RF Data Rates	0.8 / 1.6 Mbps
RF Power Level	100 mW (varies by country)
Channels	15
Operating Temperature	see MX3-CE Environmental Specs
Storage Temperature	see MX3-CE Environmental Specs
Connectivity	TCP/IP, Ethernet, NDIS
Antenna	Internal

PCMCIA Lucent 2.4 GHz 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	1 / 2 Mbps
RF Power Level	100 mW nominal (varies by country)
Channels	11 US, 13 Europe, 4 France, 1 Japan
Operating Temperature	see MX3-CE Environmental Specs
Storage Temperature	see MX3-CE Environmental Specs
Connectivity	NDIS, TCP/IP, Ethernet
Antenna	Internal

PCMCIA Cisco 2.4GHz Type II

Bus Interface	PCMCIA 2.0, Type II slot
Radio Frequencies	2.4 - 2.4835 GHz IEEE 802.11b DS SS
RF Data Rates	11 Mbps
RF Power Level	100 mW max.
Channels	11 US, 13 Europe, 4 France, 14 Japan
Operating Temperature	see MX3-CE Environmental Specs
Storage Temperature	see MX3-CE Environmental Specs
Connectivity	Novell, TCP/IP, Ethernet, ODI
Antenna	Internal

PCMCIA Symbol 11Mb 2.4GHz Type II

Bus Interface:	PCMCIA 2.0, Type II slot
Radio Frequencies:	2.4 - 2.5 GHz IEEE 802.11b DS SS
RF Data Rates:	11 Mbps maximum
RF Power Level:	100 mW
Channels	11 US, 13 Europe, 4 France, 1 Japan
Operating Temperature	see MX3-CE Environmental Specs
Storage Temperature	see MX3-CE Environmental Specs
Connectivity:	TCP/IP, Ethernet, NDSI

Appendix C API Calls

Introduction

This appendix documents only the LXE-specific API calls for the MX3-CE. It is intended as an appendix to the standard Microsoft Windows CE API documentation. Details of many of the calls in this appendix to the MX3-CE Reference Guide may be found in Microsoft's documentation.

The APIs documented in this Appendix are included in the file LXEAPI.DLL, which is in the standard Windows CE image.

For ease of software development, the files LXEAPI.H and LXEAPI.LIB are available on the accessories CD, which are the C/C++ include files and the link library for the DLL, respectively. Note that is DLL is installed in all images with a version number of 1.2 or higher (as displayed on the screen during bootup). On older images, the DLL will have to be included in the application install.

These LXE specific API calls and registry settings cover the following:

- Battery
- PCMCIA
- Power Management
- Scanner
- Serial Ports
- Version Control
- Miscellaneous

Also included are instructions on reflashing the MX3-CE.

API Calls

Battery API

LXEBatteryChargeBackup

```
int LXEBatteryChargeBackup(void);
```

This function generates a system event which causes the battery driver to start charging the backup battery. This would not be used in normal operation, as the power management driver monitors the battery voltage and initiates a charge as necessary.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEBatteryDischargeBackup

```
int LXEBatteryDischargeBackup(void);
```
This function generates a system event which causes the battery driver to start discharging the backup battery. This is used to condition the NiCad battery. When the battery discharges to a sufficiently low value, the hardware will detect this and automatically begin the recharge cycle.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEBatteryIsACPower

```
int LXEBatteryIsACPower(int *status);
```
This function sets the status variable to a 1 if the computer has external power supplied, or to a 0 if the computer is powered only by battery. This reflects the power state as of the last status loop of the battery driver, which occurs (by default) every 500 ms.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEBatteryReadVoltage

```
int LXEBatteryReadVoltage(int *vmain, int *vback);
```
This function returns the current voltage of both the main battery (vmain) and the backup battery (vback), in millivolts. This will be the value read by the last poll of the battery driver, which occurs (by default) every 10 seconds.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEBatteryReadPercent

```
int LXEBatteryReadPercent(int *pmain, int *pback);
```
This function returns the current percentage of full charge of both the main battery (vmain) and the backup battery (vback), in tenths of a percent. This will be the value read by the last poll of the battery driver, which occurs (by default) every 10 seconds. In addition, the battery driver assumes a linear charge lifetime, which will only be approzimately accurate. This value reflects the distance between fully charged (100%) and discharged to the critically low voltage trip point (0%).

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

PCMCIA API

LXEPcmciaHasCard

```
#define SLOT_PCMCIA        0
#define SLOT_COMPACTFLASH1
int LXEPcmciaHasCard(int slot, int *status);
```

This function returns the current status of the specified slot. If a card is inserted in the slot, a 1 is returned in status. Otherwise, 0 is returned.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEPcmciaDisableSlot

```
#define SLOT_PCMCIA        0
#define SLOT_COMPACTFLASH1
int LXEPcmciaDisableSlot(int slot);
```

This function disables the specified slot. It does this by setting an internal flag which causes any card insertions on the slot to be ignored. It then removes power from the slot. Normally the card would be detected by the PCMCIA driver and power restored to the slot; the internal flag prevents this happening, and the card is disabled. The slot can still be powered and accessed by application or diagnostic software, it is just inhibited from detection by the PCMCIA driver.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEPcmciaEnableSlot

```
#define SLOT_PCMCIA        0
#define SLOT_COMPACTFLASH1
int LXEPcmciaEnableSlot(int slot);
```

This function enables the specified slot, generally after being deactivated by the disable function above. It does this by clearing an internal flag which causes any card insertions on the slot to be ignored. The card is then detected by the PCMCIA driver and power restored to the slot, restoring the card to normal operation.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEPcmciaWriteProtect

```
#define SLOT_PCMCIA      0
#define SLOT_COMPACTFLASH1
int LXEPcmciaWriteProtect(int slot, int val);
```

This function causes the card in the specified slot to be write protected. This sets an internal flag which inhibits the PCMCIA driver from allowing writes to the card. It is undefined what happens when a non-memory card is write protected; it is safe to assume the card will not function properly.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

Power Management API

LXEPowerMgrEnable

`int LXEPowerMgrEnable(void);`

This function generates a system event which causes the power management driver to return to normal operation, usually following an AlwaysOn command, below.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEPowerMgrAlwaysOn

`int LXEPowerMgrAlwaysOn(void);`

This function generates a system event which causes the power management driver to disable operation, leaving all power always on. This disables all display and backlight controls, as well as the OS suspend timer.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEPowerMgrDisplayNormal

`int LXEPowerMgrDisplayNormal(void);`

This function generates a system event which causes the power management driver to start handling display on/off timing and events normally, usually after a DisplayAlwaysOn command, below.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEPowerMgrDisplayOn

`int LXEPowerMgrDisplayOn(void);`

This function generates a system event which causes the power management driver to disable monitoring display on/off timing and events, leaving display power always on. This has no effect on other power management subsystems.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEPowerMgrBacklightNormal

`int LXEPowerMgrBacklightNormal(void);`

This function generates a system event which causes the power management driver to start handling backlight on/off timing and events normally, usually after a BacklightAlwaysOn command, below.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEPowerMgrBacklightOn

`int LXEPowerMgrBacklightOn(void);`

This function generates a system event which causes the power management driver to disable monitoring backlight on/off timing and events, leaving backlight power always on. This has no effect on other power management subsystems.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEPowerMgrLoopTime

`int LXEPowerMgrLoopTime(int val);`

This function changes the value of the power manager loop interval (given in milliseconds) and saves it to the registry. The function then generates the event necessary to cause the driver to reload its registry information, so that the new value takes effect immediately.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEPowerMgrBacklightTimeout

`int LXEPowerMgrBacklightTimeout(int valbatt, int valac);`

This function changes the values of the backlight power management timeouts (given in seconds) and saves them to the registry. The value **valbatt** is the timeout when running under battery power, and the value **valac** is the timeout when running under external AC power. The function then generates the event necessary to cause the driver to reload its registry information, so that the new value takes effect immediately.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEPowerMgrDisplayTimeout

`int LXEPowerMgrDisplayTimeout(int valbatt, int valac);`

This function changes the values of the display power management timeouts (given in seconds) and saves them to the registry. The value **valbatt** is the timeout when running under battery power, and the value **valac** is the timeout when running under external AC power. The function then generates the event necessary to cause the driver to reload its registry information, so that the new value takes effect immediately.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEPowerMgrPrimaryEvents

```
int LXEPowerMgrPrimaryEvents(unsigned long val);
```
This function changes the bitmask of primary events that affect display blanking, and saves it to the registry. The function then generates the event necessary to cause the driver to reload its registry information, so that the new value takes effect immediately.

The values within the bitmask are as follows:

```
#define PRIMARYEVT_POWER        0x00000001
#define PRIMARYEVT_KEY          0x00000002
#define PRIMARYEVT_TOUCH        0x00000004
#define PRIMARYEVT_PCMCIA       0x00000018
#define PRIMARYEVT_COM1         0x00000100
#define PRIMARYEVT_COM2         0x01000000
#define PRIMARYEVT_COM3         0x00001000
#define PRIMARYEVT_SCAN         0x02000000
#define PRIMARYEVT_USB          0x10000000
#define PRIMARYEVT_DOCKED       0x40000000
```
This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEPowerMgrBacklightPrimaryEvents

```
int LXEPowerMgrBacklightPrimaryEvents(unsigned long val);
```
This function changes the bitmask of primary events that affect backlight power on/off, and saves it to the registry. The function then generates the event necessary to cause the driver to reload its registry information, so that the new value takes effect immediately.

The values within the bitmask are given above, under **LXEPowerMgrPrimaryEvents**.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEPowerMgrDisplayPrimaryEvents

```
int LXEPowerMgrDisplayPrimaryEvents(unsigned long val);
```
This function changes the bitmask of primary events that affect display blanking, and saves it to the registry. The function then generates the event necessary to cause the driver to reload its registry information, so that the new value takes effect immediately.

The values within the bitmask are given above, under **LXEPowerMgrPrimaryEvents**.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEForcePowerKeyPrimaryEvent

```
int LXEForcePowerKeyPrimaryEvent(void);
```
This function generates a system event which simulates a power keypress to the power management driver. This is primarily of use in diagnostic software, or to force a wakeup of the power management system. Note that this event has no effect on the computer going into suspend, only the display / backlight controls.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEForceKeyPrimaryEvent

```
int LXEForceKeyPrimaryEvent(void);
```
This function generates a system event which simulates a keypress to the power management driver. This is primarily of use in diagnostic software, or to force a wakeup of the power management system. Note that this event has no effect on the computer going into suspend, only the display / backlight controls.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEForceTouchPrimaryEvent

```
int LXEForceTouchPrimaryEvent(void);
```
This function generates a system event which simulates a screen touch to the power management driver. This is primarily of use in diagnostic software, or to force a wakeup of the power management system. Note that this event has no effect on the computer going into suspend, only the display / backlight controls.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

Scanner API

The scanner has 2 different usage methods, depending upon whether or not the scanner wedge is active.

If the scanner wedge is active, the serial port or ports it is configured to will be locked so other applications cannot open them. The scanner will buffer all data sent through it, which may be retrieved with standard file open / read / close calls to the scanner wedge, device WDG0:. This data may also be sent as keystroke messages to the frontmost window, allowing use of the scanner with applications which otherwise do not support it. Even if sent as keystrokes, scanned data will remain in the driver buffer until a new scan is executed. The buffer can hold up to 2048 characters of data, to support 2D scanners.

If the scanner wedge is not active, the scanner data can be read through direct file I/O to the COM port attached to (see **Serial Port API** section). The internal scanner is accessible on COM3.

LXEHasIntScanner

```
int LXEHasIntScanner(void)
```
This function polls the computer to see if it has an integrated scanner. Tethered scanner connections will generate a 0 result.

This function returns 1 if the computer has an internal scanner, else 0.

LXEScannerEnable

```
int LXEScannerEnable(void);
```
This function generates a system event which causes the scanner driver to return to normal operation, usually after a disable command. When resuming operation, it will reread all registry settings, so any unsaved settings (setup via API calls) will revert to their permanent settings.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

Note: After making this call, wait 1.5 seconds before attempting a scan. This will allow the COM ports to be configured.

LXEScannerDisable

```
int LXEScannerDisable(void);
```
This function generates a system event which causes the scanner driver to disable operation. This will close all serial ports being monitored by the scanner driver, and any unread data in the scanner driver buffer will be lost.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEScannerStart

```
int LXEScannerStart(void);
```
This function generates a system event which causes the scanner driver to start a scan operation on the internal scanner; note that this API call has no effect on external tethered scanners. This turns the laser on to execute a read, and will continue until a successful read occurs, the laser-on timeout is reached, or the LXEScannerStop API call (below) is executed.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEScannerGetStatus

`int LXEScannerGetStatus(void)`

This function returns:

SCAN_SCANNING (1) if scan is in progress.

SCAN_COMPLETE (0) if scan has finished.

SCAN_NOSCAN (2) if scan was unsuccessful.

SCAN_ERROR (3) if an error occurred during scanning.

SCAN_BUSY (4) if the scanner is still busy from a previous scan.

LXEScannerGetData

`int LXEScannerGetData(char *buf, int *buflen)`

Call with a pointer to the output buffer in **buf**, and a pointer to a length value in **buflen**. On call, **buflen** should be set to the length of the actual buffer. On return, it will have the length of the scanned string. The string is automatically terminated with a zero byte.

The call itself returns 0 on error (unable to open or read failure), or 1 on success. GetLastError() may be used to get a detailed error message.

LXEScannerStop

`int LXEScannerStop(void);`

This function generates a system event which causes the scanner driver to terminate a scan operation on the internal scanner.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEScannerKeysOff

`int LXEScannerKeysOff(void);`

This function generates a system event which causes the scanner driver to stop processing scanned data as keystroke messages. Note that this setting is **NOT** saved in the registry, so to make it permanent, it should be changed in the Scanner control panel.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEScannerKeysOn

`int LXEScannerKeysOn(void);`

This function generates a system event which causes the scanner driver to start processing scanned data as keystroke messages sent to the frontmost window. Note that this setting is **NOT** saved in the registry, so to make it permanent, it should be changed in the Scanner control panel.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEScannerKeyStatus

```
Boolean LXEScannerKeyStatus(void);
```
This function returns True if the scanner wedge is processing data as keystroke messages and False if the data is being buffered.

LXEScannerPowerOff

```
int LXEScannerPowerOff(void);
```
This function generates a system event which causes the scanner driver to power down all active scanner devices.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEScannerPowerOn

```
int LXEScannerPowerOn(void);
```
This function generates a system event which causes the scanner driver to apply power to all active scanner devices.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEScannerForcePower

```
// values for scanner port
#define SCANPORT_COM1          1
#define SCANPORT_COM3          3
#define SCANPORT_INTERNAL 4
int LXEScannerForcePower(int port, int value);
```
This function forces serial port to supply power to a scanner, regardless of the registry setting, or whether this is an active serial port or not. This allows an application to activate a scanner independently from the scanner driver. Value is set to 1 to supply output power, or set to 0 to turn power off. Using this call on ports COM1 and COM3 applies 5 volt power to pin 9; using this call on the internal scanner will power it off and on. Using this call on any other port returns an error.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEScannerAttachPort

```
// values for wedge attachment port
#define WEDGEPORT1        1
#define WEDGEPORT2        2
// values for scanner port
#define SCANPORT_DISABLED 0
#define SCANPORT_COM1           1
#define SCANPORT_COM2           2
#define SCANPORT_COM3           3
#define SCANPORT_INTERNAL 4
int LXEScannerAttachPort(int port, int val);
```

This function changes the port attached to the scanner driver as specified and saves it to the registry. The function then generates the event necessary to cause the driver to reload its registry information, so that the new value takes effect immediately.

There are 2 possible ports to attach to the scanner driver, indicated by WEDGEPORT1 and WEDGEPORT2. These can be attached to any of the indicated ports; by default the ports are disabled, unless there is an internal scanner, in which case WEDGEPORT1 is attached to the internal scanner.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEScannerSetKey

```
// values for scan keys
#define SCANKEYLEFT       1
#define SCANKEYRIGHT            2
// values for key action
#define SCANKEY_DISABLED 0
#define SCANKEY_SCAN            1
#define SCANKEY_ENTER           2
#define SCANKEY_TAB       3
#define SCANKEY_VIRTKEY  4
int LXEScannerSetKey(int port, int val);
```

This function changes the action of the scan key specified to the action specified and saves it to the registry. The function then generates the event necessary to cause the driver to reload its registry information, so that the new value takes effect immediately.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEScannerSetSerial

```
#define SCANPORT_DISABLED 0
#define SCANPORT_COM1          1
#define SCANPORT_COM2          2
#define SCANPORT_COM3          3
#define SCANPORT_INTERNAL 4
int LXEScannerSetSerial(int port, int baud, int data,
int parity, int stop);
```

This function changes the configuration of the scanner serial port on the indicated port and saves it to the registry. The function then generates the event necessary to cause the driver to reload its registry information, so that the new value takes effect immediately.

Note that this setting has no effect on the serial ports unless they are handled by the scanner driver. Regular serial ports are configured using the standard Win32 API calls.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEScannerSetPower

```
#define SCANPORT_DISABLED 0
#define SCANPORT_COM1          1
#define SCANPORT_COM2          2
#define SCANPORT_COM3          3
#define SCANPORT_INTERNAL 4
int LXEScannerSetPower(int port, int val);
```

This function changes the value of the scanner serial port power pin (0=ring indicator, 1=5 volts) on the indicated serial port, and saves it to the registry. This function is only valid for COM1 and COM3 serial ports, and will return an error for all others. The function then generates the event necessary to cause the driver to reload its registry information, so that the new value takes effect immediately.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEScannerSetWindow

```
#define WM_LXE_SCANDONE  0x600
#define WM_LXE_SCANERR   0x601
#define WM_LXE_SCANFULL  0x602
int LXEScannerSetWindow(HWND window);
```

This function attaches an application window to the scanner driver. When a scan occurs, the scanner driver then sends a Windows message to the application window, indicating that a scan has occurrred.

The message WM_LXE_SCANDONE or WM_LXE_SCANFULL indicates the scan is complete, and the data may be read using standard Win32 file/device API calls, opening the scanner device. The message WM_LXE_SCANERR indicates a configuration error which prevents the scanner from processing data correctly. There is no message generated on a failed scan. Other messages may be added to this list in the future, as new capabilities emerge.

This function may be called up to 8 times. All 8 window handles are sent the message when the events occur. The window handle is tested for validity before sending the message; invalid handles are removed from the list. Thus, the application is not required to clean up the connection.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

Note: WM_LXE_SCANFULL is an updated replacement for WM_LXE_SCANDONE. WM_LXE_SCANDONE is retained in this API for backwards compatibility.

Serial Ports API

For the most part, all of the standard Win32 API calls for serial ports will work on the MX3-CE serial ports. If the scanner wedge is running, it will lock the ports it is configured to monitor, and will prevent those from being opened, since Windows CE lacks the ability to share serial ports.

Endcap Right Serial Port

This port is addressable as COM1, and supports all baud rates up to 115200. All control lines that are present on a DB-9 connector are functional. To apply +5 volt power via Ring Indicator, see Power Management APIs.

Endcap Left Serial Port (Dual Serial Port Endcaps Only)

This port is addressable as COM3, and supports all baud rates up to 115200. All control lines that are present on a DB-9 connector are functional. To apply +5 volt power via Ring Indicator, see Power Management APIs.

IRDA Port

This port can be used as a standard serial port when addressed as COM2, and supports all baud rates up to 115200. Because it is an infrared port, no control lines are implemented. The Win32 standard SETIR test for infrared ports works:

```
if (EscapeCommFunction(port, SETIR))
 printf("This is an Infrared port\n");
else
 printf("This is an RS-232 port\n");
```

This port can be used as an IRDA port when addressed as COM5, and supports all baud rates up to 115200. It also has full support through WinSock for doing a TCP/IP sockets connection over I/R.

Note that ActiveSync usage supports only true IRDA connections.

USB Port (USB Endcaps Only)

This port is addressable as COM4. Because it is a USB port, baud rate support is irrelevant. There is no implemented client support for HID or HCD devices. It is intended to be used only for ActiveSync.

Version Control API

LXEVersionOS

```
int LXEVersionOS(char *str);
```
This function will return the version number and patch information of the Windows CE OS, and formats the number into a string like:

```
Windows CE n.n build nnn patched through mm/dd/yy
```
The space for this string may be allocated using the global value from **LXEAPI.h**, as follows:

```
char VersionString[VERSION_STRSIZE]
```
This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEVersionOAL

```
int LXEVersionOAL(char *str);
```
This function will return the version number of the OAL code and OS image, and format the number into a string like:

```
MX3-CE vn.n.n ARM SA1100 04/01/2002 12:35
```
The date and time specified are the actual date and time that the OAL was compiled. The space for this string may be allocated using the global value from **LXEAPI.h**, as follows:

```
char VersionString[VERSION_STRSIZE]
```
This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEVersionBoot

```
int LXEVersionBoot(char *str);
```
This function will return the version number of the bootloader code, and format the number into a string like:

```
MX3-CE vn.n.n ARM SA1100 04/01/2002 12:35
```
The date and time specified are the actual date and time that the bootloader was compiled. The space for this string may be allocated using the global value from **LXEAPI.h**, as follows:

```
char VersionString[VERSION_STRSIZE]
```
This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEVersionFPGA

```
int LXEVersionFPGA(char *str);
```
This function will return the version number of the FPGA code, and format the number into a string like:

```
 FPGA rev nn
```
The space for this string may be allocated using the global value from **LXEAPI.h**, as follows:

```
char VersionString[VERSION_STRSIZE]
```
This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEVersionAPI

```
int LXEVersionAPI(char *str);
```
This function will return the version number of the API library, and format the number into a string like:

```
 MX3-CE xxxxxxxxxx ARM SA1100 04/01/2002 12:35
```
The date and time specified are the actual date and time that the API was compiled. The space for this string may be allocated using the global value from **LXEAPI.h**, as follows:

```
char VersionString[VERSION_STRSIZE]
```
This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEInfoCopyright

```
int LXEInfoCopyright(char *str, int len);
```
This function will return the image build copyright as a string.

The space for this string may be allocated using the global value from **LXEAPI.h**, as follows:

```
char CopyrightString[COPYRIGHT_STRSIZE]
```
This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEInfoGetCodecInfo

```
int LXEInfoGetCodecInfo(char *str)
```
This function will return information about the hardware codec, formatted into a string as follows:

```
1004 = UCB1200
```
- where 1004 is the hardware code returned, and UCB1200 is the text interpretation of this code.

The space for this string may be allocated using the global values from LXEAPI.h, as follows:

```
char InfoString[VERSION_STRSIZE];
```
This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEInfoGetCPUInfo

```
int LXEInfoGetCPUInfo(char *str)
```
This function will return information about the hardware codec, formatted into a string as follows:

```
2577 [8] = SA1110 B4 206 MHz (jumper=206)
```
- where the first number is the type code of the CPU (2577=SA1110),

- the second number in brackets is the revision of the CPU (8 = rev B4 of StrongARM CPU),

- the speed is read from the CPU registers,

- and the jumper number represents the position of the onboard speed jumper.

The space for this string may be allocated using the global values from LXEAPI.h, as follows:

```
char InfoString[VERSION_STRSIZE];
```
This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEInfoGetROMInfo

```
typedef struct {
 unsigned long BlockSize;
 unsigned long BlockCount;
 unsigned long BusWidth;
 unsigned long BaseAddress;
 unsigned long TotalSize;
 unsigned long BootloaderBase;
 unsigned long BootloaderSize;
 unsigned long OsBase;
 unsigned long OsSize;
 unsigned long RegistryBase;
 unsigned long RegistrySize;
 unsigned long FilesysBase;
 unsigned long FileSysSize;
} ROMINFO;
int LXEInfoGetROMInfo(ROMINFO *rtn);
```
This function will return information about the ROM (flash memory) in the system in the data block specified. Because this information is established at image compile time, these values will not change.

BlockSize is the minimum erasable block size in bytes. This is a function of the flash chip hardware. This will be the value of the chip erase block times the number of chips in the array.

BlockCount is the total number of blocksize blocks in all of the flash devices.

BusWidth returns the flash bus width, in bits. This is normally 32.

BaseAddress is the memory address in mapped kernel space where the flash memory starts.

TotalSize is the total number of bytes of flash ROM in the computer. This is BlockSize times BlockCount.

BootloaderBase and BootloaderSize return the base address and allocated size for the bootloader partition of flash.

OsBase and OsSize return the base address and allocated size for the operating system image partition of flash.

RegistryBase and RegistrySize return the base address and allocated size for the Persistent Memory registry configuration backup partition.

FilesysBase and FileSysSize return the base address and allocated size for the Persistent Memory flash file system partition.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEInfoGetRAMInfo

```
typedef struct {
 unsigned long BaseAddress;
 unsigned long TotalSize;
 unsigned long StorageSize;
 unsigned long StorageFree;
 unsigned long ProgramSize;
 unsigned long ProgramFree;
 unsigned long PagefileSize;
 unsigned long PagefileFree;
 unsigned long VirtualSize;
 unsigned long VirtualFree;
} RAMINFO;
int LXEInfoGetRAMInfo(RAMINFO *rtn);
```

This function will return information about the RAM in the system in the data block specified. Because this information is read using standard Win32 APIs, it represents the state of the system at the moment the API call is made.

BaseAddress is the memory address in mapped kernel space where the RAM starts. This will not change.

TotalSize is the total detected RAM in the computer. This is the sum of StorageSize and ProgramSize.

StorageSize and StorageFree return the total size and bytes free values for storage memory. This is set as a proportion of physical RAM by the System control panel.

ProgramSize and ProgramFree return the total size and bytes free values for program memory. This is set as a proportion of physical RAM by the System control panel.

PagefileSize and PagefileFree return the total size and bytes free values for memory. In a CE device, these should be 0.

VirtualSize and VirtualFree return the total size and bytes free values for virtual memory.

This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

LXEInfoGetUUID

```
int LXEInfoGetUUID(char *str);
```
This function will read the UUID (Universal Unit IDentifier) out of global memory, and format the number into a string of the generic format of:

```
XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX
```
The space for this string may be allocated using the global value from **LXEAPI.h**, as follows:

```
Char UUIDString[GUID_STRSIZE]
```
This function returns 0 on error, or 1 on success. GetLastError() may be used to get a detailed error message.

Miscellaneous API

LXEHasColorLCD

```
#define DISPLAY_MONO              0
#define DISPLAY_COLOR_TRANSFLECT     1
#define DISPLAY_COLOR_TRANSMISS 3
#define DISPLAY_INVALID       -1
int LXEHasColorLCD(void);
```

This function allows an application to test for a color display. This should not be necessary in most applications, but may provide enhancements on a color terminal. The possible return codes are listed above. Note that because monochrome display is zero, the test can be a simple

```
if (!LXEHasColorLCD())
   // process as monochrome
else
    // process as color
```

to avoid the (probably unnecessary) need to parse for color display type.

LXEBoot

```
int LXEBoot(void);
```

This function will perform a warm boot, preserving the contents of RAM and all configuration settings. However, any network sessions will be lost, and any data in running applications that has not been specifically flushed to storage may be lost.

Note that it is up to the application making this call to validate the usage of it, provide a warning, ask for a password, etc. Calling this function arbitrarily can result in loss of data, requiring a lot of time to correct.

This function returns 0 on error, or 1 on success.

LXEBootClear

```
int LXEBootClear(void);
```

This function will perform a cold boot, erasing the contents of RAM and returning all registry configuration settings to factory defaults. This routine should not return.

Note that it is up to the application making this call to validate the usage of it, provide a warning, ask for a password, etc. Calling this function arbitrarily can result in loss of data, requiring a lot of time to correct.

This function returns 0 on error, or 1 on success.

LXEShowTaskbar

```
void LXEShowTaskbar(int flag)
```
Convenience function to show or hide the taskbar, similar to PocketPC.

Flag is SW_SHOW or SW_HIDE, like standard Win32 API calls.

HIDE must occur before main app window is created (right after RegisterClass(), or similar)

SHOW should happen right before PostQuitMessage()

Reflash the MX3-CE

> **How To**

Note: When reflashing, LXE recommends using a Compact Flash card that is greater than 16MB.

1. Remove the endcap from the MX3-CE being very careful not to damage the leads to the external power jack, the headphone jack or the antenna. The antenna may be taped to the endcap so great care must be taken when removing the endcap.

2. Place the compact flash card with both the NK.BIN and BOOT.BIN files on it in the right hand slot.

3. Power cycle the computer. This is accomplished by holding the power key down for 15 seconds.

4. When the display switches off release the power key. The computer automatically loads the new BOOT loader. This will take approximately 5 seconds.

5. Next, the computer automatically loads the new NK image and programs the flash. This will take approximately 2 minutes.

6. When the computer displays "Remove card to Reboot" remove the flash card and the MX3-CE will reboot.

7. Replace the endcap, being careful not to pinch any leads.

Troubleshooting

During this procedure, if the prompt "Starting Windows CE" is displayed before the final boot sequence, the loading failed – the file on the compact flash card may be corrupt or not copied on the card correctly. Some compact flash card management software requires the card to be ejected from a computer using a software command – if the card is pulled out of the PC and then plugged into the MX3-CE, the data file will be corrupt.

Clearing Persistent Storage

Before loading a new OS software image, it is often a good idea to clear flash memory completely. The utilities RegClear and PSMFormat will clear their particular areas, but they will not reformat the partitions. Because of bugs in Intel's Persistent Storage Manager, there may be unpredictable results if the size of the persistent storage partition changes in the new image, and the old one is not completely erased.

To deal with this situation, a mechanism has been added to the bootloader which will erase all of flash memory. This is performed by loading a Compact Flash card with all 3 files BOOT.BIN, NK.BIN, and the new file FLASH.ZAP on the card. The bootloader sees the FLASH.ZAP file, and in response erases all of flash in the computer before writing the new OS image. The flash erase will not occur if any of these files are missing, since it has to write all the new ones to flash or else the computer will be dead on next startup; in this state it will need to be returned to the factory to be reloaded.

In addition, the FLASH.ZAP file must not be zero bytes in size. The data that it contains are unimportant; only its existence matters. It can be created by copying any small file to the Compact Flash card and renaming it FLASH.ZAP.

When the bootloader senses the presence of the FLASH.ZAP file, it will wait 10 seconds, prompting with a countdown:

```
Erasing flash in nn seconds
Remove compact flash card to abort
```

This gives you a chance to change your mind without erasing memory. The erase process takes 10-15 seconds, and the load and erase of the new bootloader and OS images takes another 15-20 seconds. After this procedure, it will prompt, as during a normal OS load:

```
Remove compact flash card to reboot
```

The computer will then startup with the new image. There may be a pause at the bootup screen for an extra 10-15 seconds while the persistent storage drive reformats itself.

Appendix D AppLock

Introduction

LXE's AppLock is designed to be run on LXE certified Windows CE and Pocket PC based devices only. LXE installs the program as part of the factory-installation process.

An MX3-CE running AppLock becomes a dedicated, single application device. In other words, only the application or feature specified in the AppLock configuration by the Administrator is available to the MX3-CE user.

AppLock also contains a component which sets configuration parameters as specified by the Administrator.

If the MX3-CE is reset to factory default values, the Administrator may need to reconfigure the AppLock application.

Note: To reset an MX3-CE to factory default values, please refer to Chapter 4 "System Configuration" section titled "MX3-CE Command Line Utilities" and the RegClear, PSMFormat and ColdBoot executable files.

Setup a New Device

LXE devices with the AppLock feature are shipped to boot in Administration mode with no default password, thus when the device is first booted, the user has full access to the device and no password prompt is displayed. After the administrator specifies an application to lock, a password is assigned and the device is rebooted or the hotkey is pressed, the device switches to end-user mode.

Briefly, the process to configure a new device is as follows:

1. Insert a fully charged battery and press the Power button.
2. Connect an external power source to the device (if required).
3. Adjust screen display, audio volume and other parameters if desired. Install accessories (e.g. handstrap, stylus).
4. Tap **Settings | Control Panel | Administration** icon.
5. Assign an application on the Control tab screen.
6. Assign a password on the Security tab screen.
7. Select a view level on the Status tab screen, if desired.
8. Tap OK
9. Press the hotkey sequence to launch AppLock and lock the configured application.
10. The device is now in end-user mode.

Note: LXE has made the assumption, in this appendix, that the first user to power up a new MX3-CE is the system administrator.

Administration Mode

Administration mode gives full access to the device and configuration options.

The administrator must enter a valid password (when a password has already been assigned) before access to Administration mode and configuration options are allowed. The administrator can configure the following options:

1. Create/change the keystroke sequence to activate administrator access.

2. Create/change the password for administrator access.

3. Assign the name of the application to lock.

4. Select the command line of the application to lock.

In addition to these configuration options, the administrator can view and manage the status logs of AppLock sessions.

Administrator default values for the MX3-CE:

Admininstrator Hotkey	Shift+Ctrl+A
Password	none
Application path and name	none
Application command line	none

End User Mode

End-user mode locks the end-user into the configured application. The end user can still reboot and respond to dialog boxes. The single application is automatically launched, and runs in full screen mode, when the MX3-CE boots up.

The user cannot unintentionally or intentionally exit the application nor can the end user execute any other applications. Normal application exit or switching methods and all Microsoft defined Windows CE key combinations, such as close (X) icon, File Exit, File Close, Alt-F4, Alt-Tab, etc. are disabled. The Windows CE desktop icons, menu bars, task bar and system trays are not visible or accessible. Task Manager is not available.

If the end-user selects File/Exit or Close from the applications menu bar, the menu is cleared and nothing else happens; the application remains active. Nothing happens when the end-user clicks on the Close icon on the application's title bar and the application remains active.

Note: A few applications do not follow normal procedures when closing. AppLock cannot prevent this type of application from closing, but is notified that the application has closed. For these applications, AppLock immediately restarts the application which causes the screen to flicker. If this type of application is being locked, the administrator should close all other applications before switching to end user mode to minimize the screen flicker.

Windows accelerator keys such as Alt-F4 are disabled.

Administration and Configuration

The default Administrator Hotkey sequence is **Shift+Ctrl+A.**

Administrator mode allows access to all features on the device. When the hotkey is pressed to switch into Administrator mode, a password prompt is displayed (if a password has been configured). A password must be entered within 30 seconds (and in three tries) or the password prompt is removed and the device remains in end-user mode with the focus returned to the locked application. Without entry of a valid password, the switch into Administrator mode will not occur.

Configuration

Access: Settings | Control Panel | Administration icon

The password prompt is displayed if a password has been configured. When the valid password is entered, the Administration Control panel is displayed. When a valid password is not entered within 30 seconds, the user is returned to the System Control Panel.

If a password has not been configured, the Administrator Control panel is displayed.

Control Panel
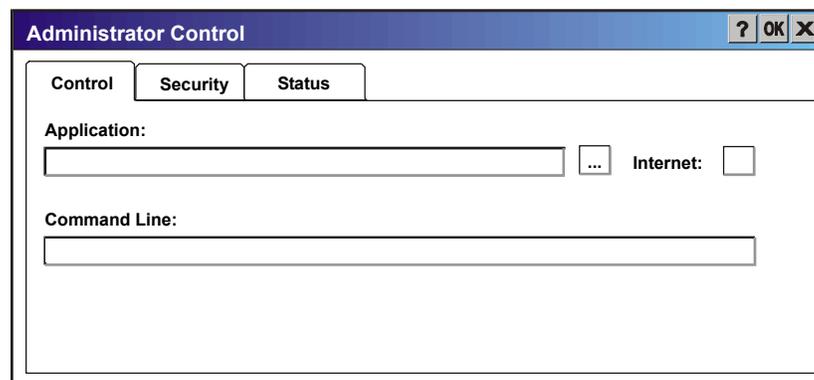
Administrator Control panel

Use the Control tab options to select the application to launch when the MX3-CE boots up.

Move the cursor to the Application text box and either type the application path or click the Browse icon (the … icon). The standard Windows CE Browse dialog is displayed. After selecting the application from the Browse dialog, click OK.

Enter the command line parameters for the application in the Command Line text box.

If no application is specified when the Administrator Control panel is closed, the device reboots into Administrator mode. If a password has been set, but the application has not been specified, the user will be prompted for the password before entering administration mode. The password prompt remains on the display until a valid password is entered.

End User Internet Explorer

AppLock supports applications that utilize Internet Explorer, such as .html pages and Java applications. The end user can run an application by entering the application name and path in Internet Explorer's address bar.

To prevent the end user from executing an application using this method, the address bar and Options settings dialog are restricted in Internet Explorer. This is accomplished by creating an Internet Explorer that is used in end user mode, End-user Internet Explorer (EUIE). The EUIE executes the Internet Explorer application in full screen mode which removes the address bar and status bar. The Options Dialog is also removed so the end user cannot re-enable the address bar.

The administrator specifies the EUIE by simply checking the "Internet" checkbox in the Control tab of the Administrator applet. The internet application should then be entered in the "Application" text box. If the standard Internet Explorer that is shipped with the device is desired, it should be treated like any other application. This means that IEXPLORER.EXE should be specified in the Application text box and the internet application should be entered in the command line. In this case, do not check the Internet checkbox.

Security Panel

Administrator Control	? OK X
Control **Security** **Status**	
Hot Key:	
Password:	
Confirm Password:	

Administrator Security panel

Hotkey

Specify the hotkey sequence that triggers AppLock to switch between administrator and user modes and the password required to enter Administrator mode. The default hotkey sequence is **Shift+Ctrl+A**.

A 2nd key keypress is an invalid keypress for a hotkey sequence.

Move the cursor to the Hot Key text box. Enter the new hot key sequence by first pressing the Shift state key followed by a normal key. The hotkey selected must be a key sequence that the application being locked does not use. The hotkey sequence is intercepted by AppLock and is not passed to the application.

Input from the keyboard or Soft Input Panel (SIP) is accepted with the restriction that the normal key must be pressed from the keyboard when switching modes. The hotkey sequence is displayed in the Hot key text box with "Shift", "Alt", and "Ctrl" text strings representing the shift state keys. The normal keyboard key completes the hotkey sequence.

For example, if the 'Ctrl' key is pressed followed by 'A', "Ctrl+A" is entered in the text box. If another key is pressed after a normal key press, the hotkey sequence is cleared and a new hotkey sequence is started.

A normal key is required for the hotkey sequence and is unlike pressing the normal key during a mode switch; this key can be entered from the SIP when configuring the key. However, when the hotkey is pressed to switch modes, the normal key must be entered from the keypad; it cannot be entered from the SIP.

Password

Move the cursor to the Password text box. The passwords entered in the Password and Confirm Password fields must match. Passwords are case sensitive.

When the user exits the Administrator Control panel, the two passwords are compared to verify that they match. If they do not match, a dialog box is displayed notifying the user of the error. After the user closes the dialog box, the Security Panel is displayed and the password can then be entered and confirmed again. If the passwords match, the password is encrypted and saved.

See Also: Passwords

Status Panel
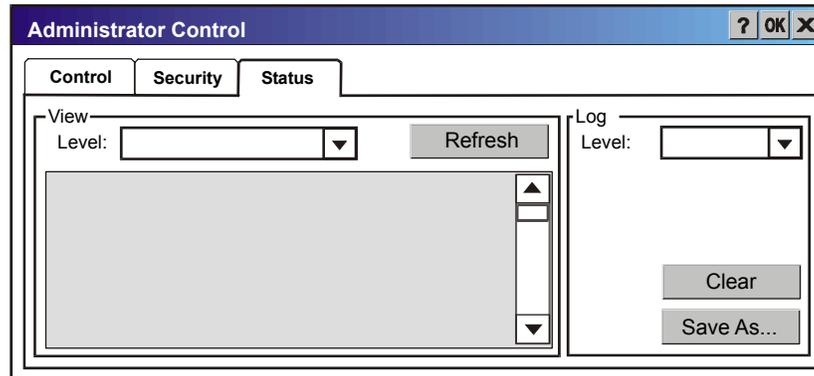
Administrator Status Panel

Use the Status panel to view the log of previous AppLock operation and to configure which messages are to be recorded during AppLock operation.

As the status information is stored in the registry and accumulates during AppLock configuration and operation, it is very important that the administrator periodically clear the status information to reduce the amount of registry space used. For this reason, the administration can configure the type of status information that is logged, as well as clear the status information.

View

Error	Error status messages are logged when an error occurs and is intended to be used by the administrator to determine why the specified application cannot be locked.
Process	Processing status shows the flow control of AppLock components and is mainly intended for LXE Customer Service when helping customers troubleshoot problems with their AppLock program.
Extended	Extended status provides more detailed information than that logged by Process Logging.
All	All messages are displayed.

Tap the Refresh button after changing from one view level to another. The filtered records are displayed, all others are not displayed.

Levels

Note: If a level higher than Error is selected, the status should be cleared frequently by the administrator.

In addition to the three view levels the administrator can select that all status information be logged or turn off all status information logging completely. The system default is Error Logging; however to reduce registry use, the administrator may want to select 'None' after verifying the configuration. Tap the Clear button to clear the status information from the registry.

- None
- Error
- Processing
- Extended
- All

Save As

When the 'Save As'… button is selected, a standard Windows CE 'Save As' dialog screen is displayed. Specify the path and filename. If the filename exists, the user is prompted whether the file should be overwritten. If the file does not exist, it is created.

See Also: Error Messages

Passwords

A password must be configured. If the password is not configured, a new device switches into Administration mode without prompting for a password. In addition to the hotkey press, a mode switch occurs if inaccurate information has been configured or if mandatory information is missing in the configuration.

There are several situations that display a password prompt after a password has been configured.

If the configured hotkey is pressed, the password prompt is displayed. In this case the user has 30 seconds to enter a password. If a valid password is not entered within 30 seconds, the password prompt is dismissed and the device returns to end-user mode.

All other situations that present the password prompt do not dismiss the prompt -- this is because the other situations result in invalid end-user operation.

These conditions include:

1. If inaccurate configuration information is entered by the administrator, i.e. an application is specified that does not exist.

2. If the application name, which is mandatory for end-user mode, is missing in the configuration.

3. Invalid installation of AppLock (e.g. missing DLLs).

4. Corrupted registry settings.

To summarize, if an error occurs that prevents AppLock from switching to user mode, the password will not timeout and AppLock will wait until the correct password is entered.

Troubleshooting

Forgotten the password that has been set? Enter this LXE back door key sequence: Ctrl+L Ctrl+X Ctrl+E

Error Messages

Any messages whose first word is an 'ing' word is output prior to the action described in the message. For example, "Switching to admin-hotkey press" is logged after the administrator has pressed the hotkey but prior to starting the switch process.

For all operations that can result in an error, an Error level message is displayed when a failure occurs. These messages contain the word "failure". These messages have a partner Extended level message that is logged which contains the word "OK" if the action completed successfully rather than with an error.

For processing level messages, "Enter…" is logged at the beginning of the function specified in the message and "Exit…" is logged at the end (just before the return) of the function specified in the message.

Message	Explanation and/or corrective action	Level
Error reading hotkey	The hotkey is read but not required by AppLock.	LOG_EX
Error reading hotkey; using default	A hotkey is required. If there is a failure reading the hotkey, the internal factory default is used.	LOG_ERROR
App Command Line= <Command line>	Command line of the application being locked	LOG_PROCESSING
App= <Application name>	Name of the application being locked	LOG_PROCESSING
dwProcessID= <#>	Device ID of the application being locked	LOG_EX
Encrypt exported key len <#>	Size of encrypt export key	LOG_EX
Encrypt password length= <#>	The length of the encrypted password.	LOG_EX
Encrypted data len <#>	Length of the encrypted password	LOG_EX
hProcess= <#>	Handle of the application being locked	LOG_EX
Key pressed = <#>	A key has been pressed and trapped by the hotkey processing.	LOG_EX
****************	The status information is being saved to a file and the file has been opened successfully.	LOG_EX
Address of keyboard hook procedure failure	Applock found the kbdhook.dll, but was unable to get the address of the initialization procedure. For some reason the dll is corrupted. Look in the \Windows directory for kbdhook.dll. If it exists, delete it. Also delete applock.exe from the \Windows directory and reboot the unit. Deleting applock.exe triggers the applock system to reload.	LOG_ERROR
Address of keyboard hook procedure OK	Applock successfully retrieved the address of the keyboard filter initialization procedure.	LOG_EX

Message	Explanation and/or corrective action	Level
Alt pressed	The Alt key has been pressed and trapped by the HotKey processing.	LOG_EX
Alt	Processing the hotkey and backdoor entry	LOG_EX
Application handle search failure	The application being locked did not complete initialization.	LOG_ERROR
Application handle search OK	The application initialized itself successfully	LOG_ERROR
Application load failure	The application could not be launched by AppLock; the application could not be found or is corrupted.	LOG_ERROR
Backdoor message received	The backdoor keys have been pressed. The backdoor hotkeys provide a method for customer service to get a user back into their system without editing the registry or reloading the device.	LOG_PROCESSING
Cannot find kbdhook.dll	The load of the keyboard filter failed. This occurs when the dll is missing or is corrupted. Look in the \Windows directory for kbdhook.dll. If it exists, delete it. Also delete applock.exe from the \Windows directory and reboot the unit. Deleting applock.exe triggers the applock system to reload.	LOG_ERROR
Converted Pwd	Converted password from wide to mbs.	LOG_EX
Could not create event EVT_HOTKEYCHG	The keyboard filter uses this event at the Administrator Control panel. The event could not be created.	LOG_ERROR
Could not hook keyboard	If the keyboard cannot be controlled, AppLock cannot process the hotkey. This failure prevents a mode switch into user mode.	LOG_ERROR
Could not start thread HotKeyMon	The keyboard filter must watch for hot key changes. The watch process could not be initiated.	LOG_ERROR
Ctrl after L or X	Processing the backdoor entry.	LOG_EX
Ctrl pressed	The Ctrl key has been pressed and trapped by the HotKey processing.	LOG_EX
Ctrl	Processing the hotkey and backdoor entry.	LOG_EX
Decrypt acquire context failure	Unable to decrypt password.	LOG_ERROR
Decrypt acquired context OK	Decryption process ok.	LOG_EX
Decrypt create hash failure	Unable to decrypt password.	LOG_ERROR
Decrypt created hash OK	Decryption process ok.	LOG_EX
Decrypt failure	Unable to decrypt password.	LOG_ERROR

Message	Explanation and/or corrective action	Level
Decrypt import key failure	Unable to decrypt password.	LOG_ERROR
Decrypt imported key OK	Decryption process ok.	LOG_EX
Encrypt acquire context failure	Unable to encrypt password.	LOG_ERROR
Encrypt acquire encrypt context failure	Unable to encrypt password.	LOG_ERROR
Encrypt acquired encrypt context OK	Encrypt password process successful.	LOG_EX
Encrypt create hash failure	Unable to encrypt password.	LOG_ERROR
Encrypt create key failure	Unable to encrypt password.	LOG_ERROR
Encrypt created encrypt hash OK	Encrypt password process successful.	LOG_EX
Encrypt export key failure	Unable to encrypt password.	LOG_ERROR
Encrypt export key length failure	Unable to encrypt password.	LOG_ERROR
Encrypt exported key OK	Encrypt password process successful.	LOG_EX
Encrypt failure	The password encryption failed.	LOG_ERROR
Encrypt gen key failure	Unable to encrypt password.	LOG_ERROR
Encrypt generate key failure	Unable to encrypt password.	LOG_ERROR
Encrypt get user key failure	Unable to encrypt password.	LOG_ERROR
Encrypt get user key ok	Encrypt password process successful.	LOG_EX
Encrypt hash data failure	Unable to encrypt password.	LOG_ERROR
Encrypt hash data from pwd OK	Encrypt password process successful.	LOG_EX
Encrypt length failure	Unable to encrypt password.	LOG_ERROR
Encrypt out of memory for key	Unable to encrypt password.	LOG_ERROR
Encrypted data OK	The password has been successfully encrypted.	LOG_EX
Enter AppLockEnumWindows	In order for AppLock to control the application being locked so it can prevent the application from exiting, AppLock launches the application and has to wait until it has created and initialized its main window. This message is logged when the function that waits for the application initialization is entered.	LOG_EX
Enter DecryptPwd	Entering the password decryption process.	LOG_PROCESSING

Message	Explanation and/or corrective action	Level
Enter EncryptPwd	Entering the password encryption processing.	LOG_PROCESSING
Enter FullScreenMode	Entering the function that switches the screen mode. In full screen mode, the taskbar is hidden and disabled.	LOG_PROCESSING
Enter GetAppInfo	Processing is at the beginning of the function that retrieves the application information from the registry.	LOG_PROCESSING
Enter password dialog	Entering the password dialog processing.	LOG_PROCESSING
Enter password timeout	Entering the password timeout processing.	LOG_PROCESSING
Enter restart app timer	Some application shut down before AppLock can stop it. In these cases, AppLock gets notification of the exit. When the notification is received, AppLock starts a timer to restart the application. This message logs that the timer has expired and the processing is at the beginning of the timer function.	LOG_PROCESSING
Enter TaskbarScreenMode	Entering the function that switches the screen to non-full screen mode and enable the taskbar.	LOG_PROCESSING
Enter ToAdmin	Entering the function that handles a mode switch into admin mode.	LOG_PROCESSING
Enter ToUser	Entering the function that handles the mode switch to user mode	LOG_PROCESSING
Enter verify password	Entering the password verification processing.	LOG_PROCESSING
Exit AppLockEnumWindows-Found	There are two exit paths from the enumeration function. This message denotes the enumeration function found the application.	LOG_PROCESSING
Exit AppLockEnumWindows-Not found	There are two exit paths from the enumeration function. This message denotes the enumeration function did not find the application.	LOG_PROCESSING
Exit DecryptPwd	Exiting password decryption processing.	LOG_PROCESSING
Exit EncryptPwd	Exiting password encryption processing.	LOG_PROCESSING
Exit FullScreenMode	Exiting the function that switches the screen to full screen.	LOG_PROCESSING
Exit GetAppInfo	Processing is at the end of the function that retrieved the application information from the registry.	LOG_PROCESSING
Exit password dialog	Exiting password prompt processing.	LOG_PROCESSING
Exit password dialog-cancel	Exiting password prompt w/cancel.	LOG_PROCESSING
Exit password dialog-OK	Exiting password prompt successfully.	LOG_PROCESSING

Message	Explanation and/or corrective action	Level
Exit password timeout	Exiting password timeout processing.	LOG_PROCESSING
Exit restart app timer	Processing is at the end of the timer function	LOG_PROCESSING
Exit TaskbarScreenMode	Exiting the function that switches the screen mode back to normal operation for the administrator.	LOG_PROCESSING
Exit ToAdmin	Exiting the function that handles the mode switch into admin mode.	LOG_PROCESSING
Exit ToUser	Exiting the user mode switch function.	LOG_PROCESSING
Exit ToUser-Registry read failure	The AppName value does not exist in the registry so user mode cannot be entered.	LOG_PROCESSING
Exit verify password-no pwd set	Exiting password verification.	LOG_PROCESSING
Exit verify password-response from dialog	Exiting password verification.	LOG_PROCESSING
Found taskbar	The handle to the taskbar has been found so that AppLock can disable it in user mode.	LOG_PROCESSING
Getting address of keyboard hook init procedure	AppLock is retrieving the address of the keyboard hook.	LOG_PROCESSING
Getting configuration from registry	The AppLock configuration is being read from the registry. This occurs at initialization and also at entry into user mode. The registry must be re-read at entry into user mode in case the administration changed the settings of the application being controlled.	LOG_PROCESSING
Getting encrypt pwd length	The length of the encrypted password is being calculated.	LOG_EX
Hook wndproc failure	AppLock is unable to lock the application. This could happen if the application being locked encountered an error after performing its initialization and shut itself down prior to being locked by AppLock.	LOG_ERROR
Hook wndproc of open app failure	The application is open, but AppLock cannot lock it.	LOG_ERROR
Hot key event creation failure	The Admin applet is unable to create the hotkey notification.	LOG_ERROR
Hot key pressed	Processing the hotkey and backdoor entry	LOG_EX
Hot key pressed	Processing the hotkey and backdoor entry	LOG_EX
Hot key set event failure	When the administrator changes the hotkey configuration the hotkey controller must be notified. This notification failed.	LOG_ERROR
Hotkey press message received	The user just pressed the configured hotkey.	LOG_PROCESSING

Message	Explanation and/or corrective action	Level
In app hook:WM_SIZE	In addition to preventing the locked application from exiting, AppLock must also prevent the application from enabling the taskbar and resizing the application's window. This message traps a change in the window size and corrects it.	LOG_EX
In app hook:WM_WINDOWPOSCHANGED	In addition to preventing the locked application from exiting, AppLock must also prevent the application from enabling the taskbar and resizing the application's window. This message traps a change in the window position and corrects it.	LOG_EX
Initializing keyboard hook procedure	Applock is calling the keyboard hook initialization.	LOG_PROCESSING
Keyboard hook initialization failure	The keyboard filter initialization failed.	LOG_ERROR
Keyboard hook loaded OK	The keyboard hook dll exists and loaded successfully.	LOG_EX
L after Ctrl	Processing the backdoor entry.	LOG_EX
Loading keyboard hook	When Applock first loads, it loads a dll that contains the keyboard hook processing. This message is logged prior to the load attempt.	LOG_PROCESSING
Open failure	The status information is being saved to a file and the file open has failed. This could occur if the file is write protected. If the file does not exist, it is created.	LOG_ERROR
Open registry failure	If the Administration registry key does not exist, the switch to user mode fails because the AppName value in the Administration key is not available.	LOG_ERROR
Opened status file	The status information is being saved to a file and the file has been opened successfully.	LOG_EX
Out of memory for encrypted pwd	Not enough memory to encrypt the password.	LOG_ERROR
pRealTaskbarWndProc already set	The taskbar control has already been installed.	LOG_EX
Pwd cancelled or invalid-remain in user mode	The password prompt was cancelled by the user or the maximum number of failed attempts to enter a password was exceeded.	LOG_EX
Read registry error-hot key	The hotkey registry entry is missing or empty. This is not considered an error. The keyboard hook uses an embedded default if the value is not set in the registry.	LOG_ERROR
Read registry failure-app name	AppName registry value does not exist or is empty. This constitutes a failure for switching into user mode.	LOG_ERROR

Message	Explanation and/or corrective action	Level
Read registry failure-Cmd Line	AppCommandLine registry entry is missing or empty. This is not considered an error since command line information is not necessary to launch and lock the application.	LOG_ERROR
Read registry failure-Internet	The Internet registry entry is missing or empty. This is not considered an error since the Internet value is not necessary to launch and lock the application.	LOG_ERROR
Registering Backdoor MSG	The AppLock system communicates with the keyboard hook via a user defined message. Both AppLock.exe and Kbdhook.dll register the message at initialization.	LOG_PROCESSING
Registering Hotkey MSG	The applock system communicates with the keyboard hook via a user defined message. Both Applock.exe and Kbdhook.dll register the message at initialization.	LOG_PROCESSING
Registry read failure at reenter user mode	The registry has to be read when entering user mode is the AppName is missing. This user mode entry is attempted at boot and after a hotkey switch when the administrator has closed the application being locked or has changed the the application name or command line.	LOG_ERROR
Registry read failure at reenter user mode	The registry has to be read when switching into user mode. This is because the administrator can change the settings during administration mode. The read of the registry failed which means the Administration key was not found or the AppName value was missing or empty.	LOG_ERROR
Registry read failure	The registry read failed. The registry information read when this message is logged is the application information. It the Adminstration key cannot be opened or if the AppName value is missing or empty, this error is logged. The other application information is not required. If the AppName value is not available, AppLock cannot switch into user mode.	LOG_ERROR
Reset system work area failure	The system work area is adjusted when in user mode to cover the taskbar area. The system work area has to be adjusted to exclude the taskbar area in administration mode. AppLock was unable to adjust this area.	LOG_ERROR
Shift pressed	The Shift key has been pressed and trapped by the HotKey processing.	LOG_EX
Shift	Processing the hotkey and backdoor entry	LOG_EX
Show taskbar	The taskbar is now being made visible and enabled.	LOG_PROCESSING
Switching to admin-backdoor	The system is currently in user mode and is now switching to admin mode. The switch occurred because of the backdoor key presses were entered by the administrator.	LOG_PROCESSING

Message	Explanation and/or corrective action	Level
Switching to admin-hotkey press	The system is currently in user mode and is now switching to admin mode. The switch occurred because of a hotkey press by the administrator.	LOG_PROCESSING
Switching to admin-kbdhook.dll not found	The keyboard hook load failed, so Applock switches to admin mode. If a password is specified, the password prompt is displayed and remains until a valid password is entered.	LOG_PROCESSING
Switching to admin-keyboard hook initialization failure	If the keyboard hook initialization fails, Applock switches to admin mode. . If a password is specified, the password prompt is displayed and remains until a valid password is entered.	LOG_PROCESSING
Switching to admin-registry read failure	See the explanation of the "Registry read failure" above. AppLock is switching into Admin mode. If a password has been configured, the prompt will be displayed and will not be dismissed until a valid password is entered.	LOG_PROCESSING
Switching to TaskbarScreenMode	In administration mode, the taskbar is visible and enabled.	LOG_EX
Switching to user mode	The registry was successfully read and AppLock is starting the process to switch to user mode.	LOG_PROCESSING
Switching to user-hotkey press	The system is currently in admin mode and is now switching to user mode. The switch occurred because of a hotkey press by the administrator.	LOG_PROCESSING
Taskbar hook failure	Applock is unable to control the taskbar to prevent the locked application from re-enabling it.	LOG_ERROR
Taskbar hook OK	AppLock successfully installed control of the taskbar.	LOG_EX
Timeout looking for app window	After the application is launched, AppLock must wait until the application has initialized itself before proceeding. The application did not start successfully and Applock has timed out.	LOG_ERROR
ToUser after admin, not at boot	The user mode switch is attempted when the device boots and after the administrator presses the hotkey. The mode switch is being attempted after a hotkey press.	LOG_EX
ToUser after admin-app still open	The switch to user mode is being made via a hotkey press and the administrator has left the application open and has not made any changes in the configuration.	LOG_EX
ToUser after admin-no app or cmd line change	If user mode is being entered via a hotkey press, the administrator may have left the configured application open. If so, AppLock does not launch the application again unless a new application or command line has been specified; otherwise, it just locks it.	LOG_EX

Message	Explanation and/or corrective action	Level
Unable to move desktop	The desktop is moved when switching into user mode. This prevents them from being visible if the application is exited and restarted by the timer. This error does not affect the screen mode switch; processing continues.	LOG_ERROR
Unable to move taskbar	The taskbar is moved when switching into user mode. This prevents them from being visible if the application is exited and restarted by the timer. This error does not affect the screen mode switch; processing continues.	LOG_ERROR
Unhook taskbar wndproc failure	AppLock could not remove its control of the taskbar. This error does not affect AppLock processing	LOG_ERROR
Unhook wndproc failure	AppLock could not remove the hook that allows monitoring of the application.	LOG_ERROR
Unhooking taskbar	In administration mode, the taskbar should return to normal operation, so AppLock's control of the taskbar should be removed.	LOG_EX
Unhooking wndproc	When the administrator leaves user mode, the device is fully operational; therefore, AppLock must stop monitoring the locked application.	LOG_EX
WM_SIZE adjusted	This message denotes that AppLock has readjusted the window size.	LOG_EX
X after Ctrl+L	Processing the backdoor entry.	LOG_EX
Ret from password <#>	Return value from password dialog.	LOG_EX
Decrypt data len <#>	Length of decrypted password.	LOG_EX
Window handle to enumwindows=%x	The window handle that is passed to the enumeration function. This message can be used by engineering with other development tools to trouble shoot application lock failures.	LOG_EX
WM_WINDOWPOSCHG adjusted=%x	Output the window size after it has been adjusted by AppLock	LOG_EX

AppLock Registry Settings

This system application runs at startup via the "launch" feature of LXE Windows CE devices. When the launch feature is installed on the device, the following registry settings are created. The launch feature registry settings are embedded in the MX3-CE OS image:

```
HKEY_LOCAL_MACHINE\\Software\\LXE\\Persist\\Filename=AppLock.exe
HKEY_LOCAL_MACHINE\\Software\\LXE\\Persist\\Installed=
HKEY_LOCAL_MACHINE\\Software\\LXE\\Persist\\FileCheck=
```

AppLock registry settings identify the application that is going to be locked and any parameters that are needed by the application. These registry settings are as follows:

```
HKEY_LOCAL_MACHINE\\Software\\LXE\\Administration\\AppName
HKEY_LOCAL_MACHINE\\Software\\LXE\\AppCommandLine=
```

In addition to the registry settings needed to specify the application, additional registry settings are needed to store the configuration options for AppLock. These options include, among others, the administrator's password and hotkey.

```
HKEY_LOCAL_MACHINE\\Software\\LXE\\AppLock\\Administration\\HotKey=
HKEY_LOCAL_MACHINE\\Software\\LXE\\AppLock\\Administration\\EP=
```

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