MX3X Reference Guide

LXE
An EMS Technologies Company

E-EQ-MX3XRG-A

JAVA POWERED

Microsoft Windows Embedded

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Li-Ion Battery

When disposing of the MX3X 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

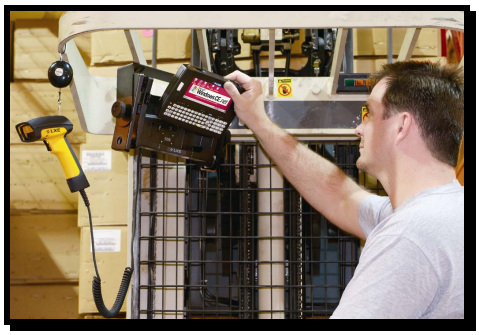
Overview

The MX3X is a rugged, portable, hand-held Microsoft® Windows® CE .NET equipped computer capable of wireless data communications. The MX3X 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, InfraRed, or USB port.

The MX3X is horizontally oriented and features backlighting for the display. The touch-screen display supports graphic features and Windows icons that the Windows CE .NET operating system supports. The keys on the keypad are constructed of a phosphorescent material that can easily be seen in dimly lighted areas.

This device is a Windows CE compatible computer that can be scaled from a limited function batch computer to an integrated RF scanning computer.

The stylus in the Stylus Kit (shipped with unit) is used to assist in entering data and configuring the unit. Protective film for the touch screen is available as an accessory.



*Note: Until the Main Battery and Backup Battery are completely depleted, the MX3X is **always** drawing power from the batteries (**On**).*

Related Manuals

The “MX3X User's Guide” contains MX3X installation, user instruction and safety statements.

Please refer to the "MX3 Cradle Reference Guide" for technical information relating to the MX3X-compatible Desk Top and Vehicle Mount cradles.

If you need to set up the integrated SE923 scanner **barcode reading parameters**, please refer to the “**Integrated Scanner Programming Guide**” on the LXE Manuals CD or the LXE website www.lxe.com.

Components

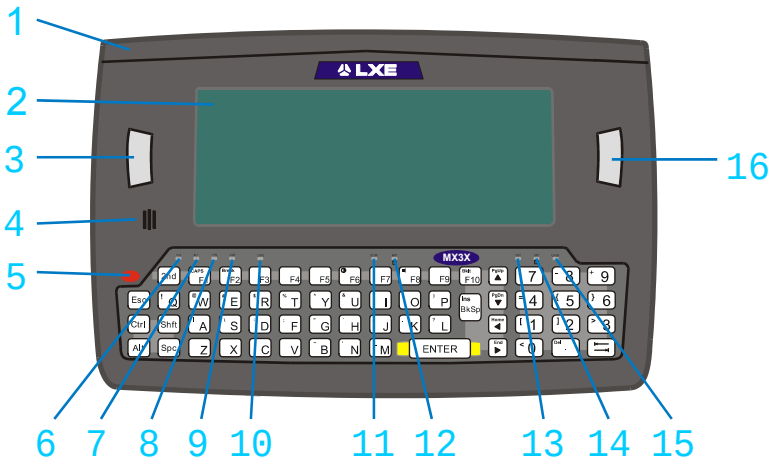


Figure 1-1 Front

1	Endcap	9	Shift LED
2	Display	10	Caps LED
3	Scan, Enter or Field Exit (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)

Note: The programmable Scan key (see number 3) is the Field Exit key when the MX3X is an IBM 5250 / TN5250 compatible device.

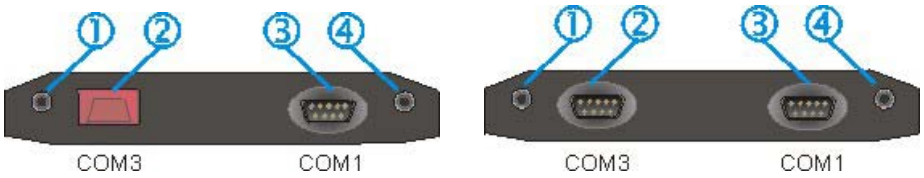


Figure 1-2 Standard Endcap

1	DC Power Jack	3	Serial Com 1 or USB Client Port
2	Serial Com 3 or USB Host or Scanner Port	4	Audio Jack

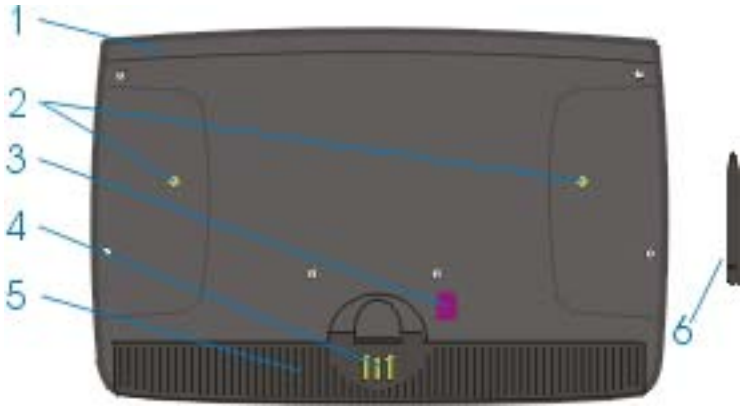


Figure 1-3 Back

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 MX3X 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 device and it's capabillities, 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 MX3X.

Operating and safety instructions for the general user are contained in the "MX3X User'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.

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

Chapter 4 "System Configuration" takes you through the system setup and file structure.

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

Appendix B "Technical Specifications" lists MX3X technical and environmental specifications.

Document Conventions

ALL CAPS	All caps are used to represent disk directories, file names, and application names.
Menu | Choice	Rather than use the phrase "choose the Save command from the File menu", this guide uses the convention "choose File | Save".
"Quotes"	Indicates the title of a book, chapter or a section within a chapter (for example, "Document Conventions").
< >	Indicates a key on the 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 user's guide.
	International fuse replacement symbol. When marked on the product, the label includes fuse ratings in volts (v) and amperes (a) for the product.
Note:	Keyword that indicates immediately relevant information.
CAUTION 	Keyword that indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
WARNING 	Keyword that indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
DANGER 	Keyword that indicates a imminent hazardous situation which, if not avoided, will result in death or serious injury.

Getting Started

Note: When your MX3X 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, MX3X, and components from electrostatic discharge.

Use this guide as you would any other source book -- reading portions to learn about the MX3X, 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 MX3X.

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 Plus and up to eight hours using the MX3X internal charger.*

Insert Main Battery

Press the Power button after the battery is inserted into the MX3X.

*Note: **New batteries must be charged prior to first use**. This process takes up to four hours in an LXE Multi-Charger Plus and eight hours with an external power source attached to the MX3X.*

Figure 1-4 MX3X Battery Contacts

The MX3X Battery Compartment is located at the bottom of the back of the computer. The arrows in the figure titled “MX3X Battery Contacts” point to the battery and cradle contacts in the computer.

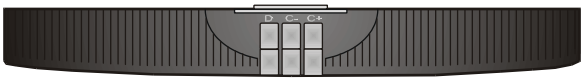


Figure 1-5 Main Battery

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 MX3X.

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 MX3X is always 'on' even when in the Suspend state and draws battery power at all times. Use the **Start | Settings | Control Panel | Power | Battery** tab to check the battery status and power reading.

Always replace the used Main Battery with a fully charged Main Battery. The Battery Low Warning LED illuminates red at approximately 35% of power left in the Main Battery. 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.

Attach Handstrap (Optional)

Once installed, the elastic 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 MX3X is in a cradle.

Figure 1-6 MX3X With Handstrap Installed

Tool Required: #1 Phillips Screwdriver

Installation

1. Place the MX3X, with the screen facing down, on a flat stable surface.
2. Attach the handstrap to the MX3X with the screws and washers provided.
3. Test the strap's connection making sure the MX3X is securely connected to each end of the strap connectors.

Attach the Stylus Clip (Optional)

Carefully remove the paper backing from the Stylus Clip sticky. Firmly press the sticky side of the clip onto the MX3X and hold in place for 15 seconds. Thread the tether through the end of the stylus and tie the ends firmly to the Stylus Clip so that the ends don't interfere with placing the stylus in the Stylus Clip or placing the MX3X in a cradle. Place the stylus in the Stylus Clip when not in use.

Attach to Hip-Flip (Optional)

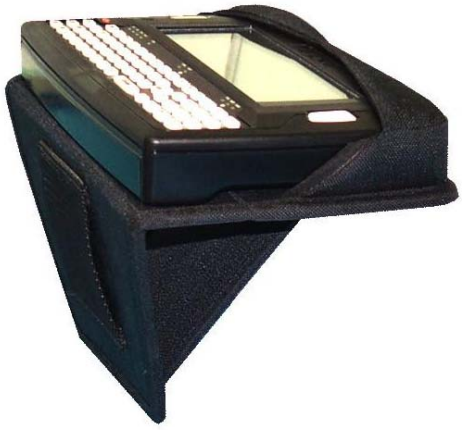


Figure 1-7 Hip-Flip Accessory

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

Once the MX3X is attached to the hip-flip and the hip-flip securely fastened to the user by a belt around their waist, the MX3X 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 MX3X must be removed from the hip-flip before being placed in a docking station.

Caution: Never use the MX3X in the hip-flip without first securing the unit to the hip-flip with the screws.

Installation

1. If the MX3X has a handstrap, remove the handstrap and set it aside along with the handstrap screws and washers.
2. Slide the MX3X 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 MX3X (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 used for the handstrap (if used) on the back of the MX3X.
5. Test the hip-flip's connection making sure the MX3X 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

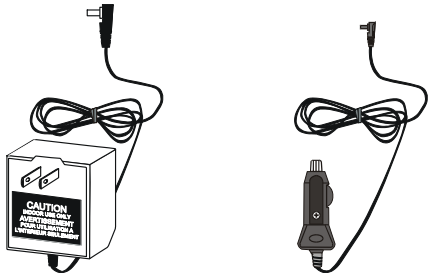


Figure 1-8 US AC/DC 12V Power Supply and Automotive Power Adapter

Figure 1-9 International AC/DC 12V Power Supply

The MX3X DC power jack is located on the endcap. The cradle power jack is located on the back of the cradle.

Figure 1-10 Connect External Power Supply

1. Insert the barrel connector into the MX3X power jack and push in firmly.

2. The CHGR LED above the keypad illuminates red when the main battery is charging and green when the main battery is fully charged. The BATT B illuminates orange when charging and unlit when charged. BATT M LED illuminates red when low or in critical suspend and is unlit at all other times.

Note: When the MX3X is receiving external power through a cradle, the cradle's Status LED and the MX3X's CHGR LED are illuminated.

Connect Audio Jack (Optional)

The MX3X audio jack is located on the endcap.

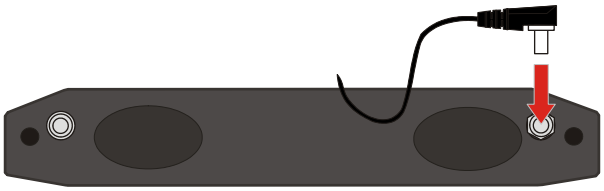


Figure 1-11 Connect Audio Jack

Insert the 2.5mm barrel end of the connector into the MX3X 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 MX3X.

Figure 1-12 Power Button

The power button is located above the ESC key on the keypad. When a battery is inserted in the MX3X press the Power button.

Quickly tapping the Power button places the MX3X immediately in Suspend mode. Quickly tapping the Power button again, or touching the screen, immediately returns the MX3X from Suspend.

When the Windows 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 guide for a list of the kinds of activities (Primary Events) that will return the MX3X from Suspend Mode.

Restart Sequence

Tap the **Start** button then tap **Restart**. If the touchscreen is not accepting taps or needs recalibration, press <Ctrl>+<Esc> to force the Start Menu to appear.

When the Windows CE. NET desktop is displayed or an application begins, the power up (or reboot) sequence is complete. If you have previously saved your settings, they will be restored on reboot.

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 MX3X 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 MX3X 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:

- 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 - Touch the screen with the stylus and hold it on the screen until the Context Menu appears. Tap the screen to clear the Context Menu.
- To force the Start menu to display, press Ctrl then press Esc.

Touch Screen Calibration

If the MX3X 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.

If the touchscreen is not accepting taps or needs recalibration, press <Ctrl>+<Esc> to force the Start Menu to appear.

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

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

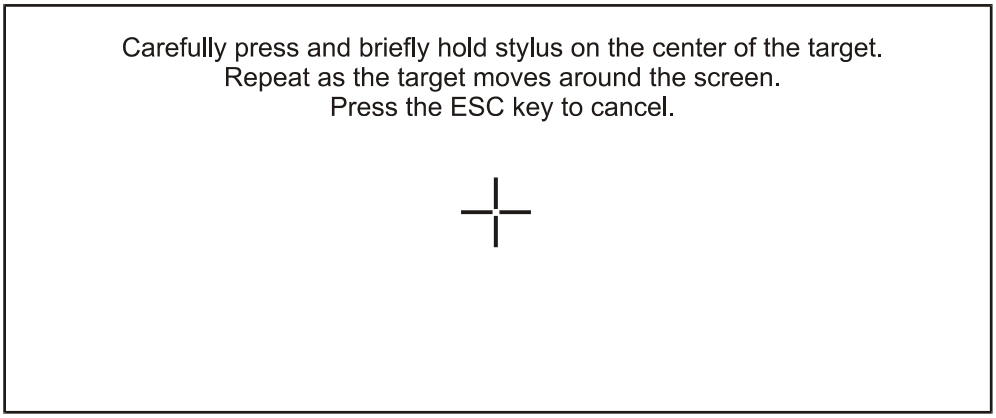


Figure 1-13 Touch Screen Recalibration

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

Radio and Network Setup

Prerequisites

- Network SSID or ESSID 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 Symbol Radio

When the MX3X boots up for the first time and all programs are loaded, the **NETWLAN1** windows appears. Select the **Wireless Information** tab.

Select **Add New**.

Enter the ESSID in the **Network Name** text box.

Disable WEP

- If WEP is to be disabled, tap the down arrow in the **Authentication** drop down box. Select **Open**.
- Tap the down arrow in the **Encryption** drop down box. Tap **Disabled** and WEP is disabled.

Enable WEP

- Tap the down arrow in the **Authentication** drop down box.
- Tap the **WEP Authentication** protocol.
- If the key is provided automatically by your network, check the "**Key provided automatically**" checkbox.
- If you wish to enter your Authentication key, uncheck the "**Key provided automatically**" checkbox and enter the Network Key in the **Network Key** text box.

Continue

Tap the **Advanced** … button.

Make sure there is a checkmark in the "**Use Windows to configure my wireless settings**" checkbox.

Make sure there is ***no*** checkmark in the "**Automatically connect to non-preferred networks**" checkbox.

Tap the **Connect** button.

To access NETWLAN1 Properties again, tap the **Network Connected icon** in the Toolbar.

Note: If the access point uses authentication protocol (WEP etc.) your radio must use the same authentication keys. Please contact your IS department for WEP encryption keys before contacting LXE. WEP is an authentication protocol used to encrypt data sent and received from the MX3X to the access point.

Set Up the Cisco Radio

The Cisco Radio icon is either on the Desktop or under **Start | Programs | Cisco.**

Tap the icon with the stylus.

Please contact your IS department for WEP and LEAP encryption information.

Access: Start | Programs | Cisco | Aironet Client Utility (ACU) | Profiles

1. Select an Active Profile. Tap Edit.
2. Select SSID and enter your device's SSID value.

Using WEP?

3. If the access point is using WEP, select **WEP** and click the Static WEP Key box.
4. Enter the **WEP Encryption Code** and click OK.
5. Tap OK.

Using LEAP?

3. If the access point is using LEAP, select **Network Security Type** and select LEAP.
4. Enter the User Name and Password when prompted. Tap OK.

Note: If the access point uses authentication protocol (LEAP, etc.) your radio must use the same authentication keys. Please contact your IS department for LEAP encryption keys before contacting LXE. LEAP is an authentication protocol used to encrypt data sent and received from the MX3X to the access point.

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 | Programs**, 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.

To change options such as Display, Colors, Cursor, Barcode, etc., please refer to the “RFTerm Reference Guide” on the LXE Manuals CD.

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.

Set the Display Backlight Timer

Note: Refer to the section titled "Power Modes" later in this guide for information relating to the power states of the MX3X.

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

The first option affects the MX3X when it is running on battery power only. The second option affects the MX3X when it is 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.**

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

Set The Display Brightness

The brightness adjustment feature depends on the display type, color versus monochrome. Adjusting screen brightness lightens or darkens the background to make characters visible at a comfortable level. The brightness on a color display is incremented or decremented one step each time the arrow key is pressed until either the maximum or minimum brightness is achieved (8 steps). The brightness setting is recalled at power up.

Color -- To adjust screen brightness, locate the <F10> key at the top of the keypad. Adjust the display brightness by pressing the:

- 2nd key [2], then the <F10> key
- Use the Up Arrow and Down Arrow keys to adjust brightness until the display lightens or darkens to your satisfaction.
- Press the Enter key to exit this mode.

Monochrome – The 2nd key + F10 key sequence toggles the backlight from it's brightest (On) to it's dimmest (Off) readable settings.

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

Set the MX3X Power Schemes Timers

Note: Refer to the section titled "Power Modes" later in this guide for information relating to the power states of the MX3X.

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

Battery Power Scheme

Use this option when the MX3X will be running on battery power only.

Switch state to User Idle:	Default is After 3 seconds
Switch state to System Idle:	Default is After 15 seconds
Switch state to Suspend:	Default is After 5 minutes

AC Power Scheme

Use this option when the MX3X will be running on external power (e.g. AC adapter, cigarette adapter, powered cradle).

Switch state to User Idle:	Default is After 2 minute
Switch state to System Idle:	Default is After 2 minutes
Switch state to Suspend:	Default is After 5 minutes

These mode timers are cumulative. The System Idle timer begins the countdown after the User Idle timer has expired and the Suspend timer begins the countdown after the System Idle timer has expired. When the User Idle timer is set to “Never”, the power scheme timers never place the device in User Idle, System Idle or Suspend modes (even when the MX3X is idle).

Because of the cumulative effect, and using the Battery Power Scheme Defaults listed above:

- The backlight turns off after 3 seconds of no activity,
- The display turns off after 18 seconds of no activity (15sec + 3sec),
- And the MX3X enters Suspend after 5 minutes and 18 seconds of no activity.

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 speaker is located on the front of the MX3X above the Power button. The audio volume can be adjusted to a comfortable level for the user. The volume is increased or decreased one step each time the volume key is pressed. The MX3X has an internal speaker and a jack for an external headset. Operational "beeps" are emitted from the speaker.

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

As the volume scrollbar is moved between Loud and Soft, the computer will emit a tone each time the volume increases or decreases in decibel range.

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

ActiveSync – Initial Setup

The following instructions relate to initial setup of ActiveSync. When there is a Connect icon on the MX3X desktop, this section can be bypassed.

Serial Connection

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

Serial 1 @ 57600

Note: The default is 57600 baud.

This will set up the MX3X to use COM 1. If the MX3X has a dual-serial port endcap, the Serial 3 @ 57600 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 | Settings | Control Panel | PC Connection**. Click the Change button. From the popup list, choose

IR @ 115200

This will set up the MX3X 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 | Settings | Control Panel | PC Connection**. Click the Change button. From the popup list, choose

USB “Client”

This will set up the MX3X 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

Note: You must establish a partnership with a desktop computer prior to running ActiveSync on the MX3X. The initial partnership must be done using direct serial / USB cable connection.

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 | Settings | Programs | Communication | ActiveSync**. From the popup list, choose Network and then click the Connect button.

Connect

Connect the correct** cable to the PC (the host) and the MX3X (the client). Select "Connect" from the Start Menu on the MX3X (**Start | Programs | Communications | Connect**).

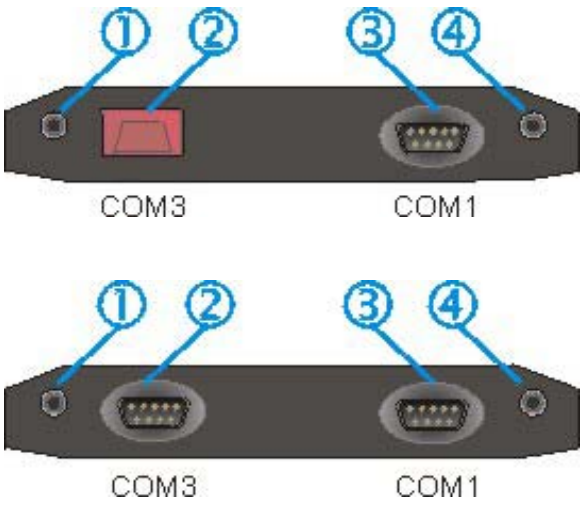
Note: Run "Connect" when the "Get Connected" wizard on the host PC is checking COM ports to establish a connection for the first time.

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

** Cables for initial ActiveSync Configuration:

USB Client to PC/Laptop	USB-Client cable	MX3XA069CBLD9USBCLNT
Serial Client to PC/Laptop	RS-232 9 Pin to 9 Pin	9000A054CBL6D9D9

Endcaps



1. DC Power Jack
2. Serial COM 3 or USB Host or Scanner Port
3. Serial COM 1 or USB Client Port
4. Audio Jack

Figure 1-14 Endcap

Endcap Configurations

Left Port	Right Port
Serial COM3	Serial COM1
Serial COM3	USB Client
USB Host	Serial COM1
USB Host	USB Client
Scanner	Serial COM1
Scanner	USB Client
Rear IR Port is COM2 Barcode scanners, tethered to the serial port on a cradle, send ASCII data to the MX3X in the cradle through the COM2 Port.	

See "Chapter 2 Physical Description and Layout", section titled "Endcaps" for further information.

PCMCIA and CF Cards

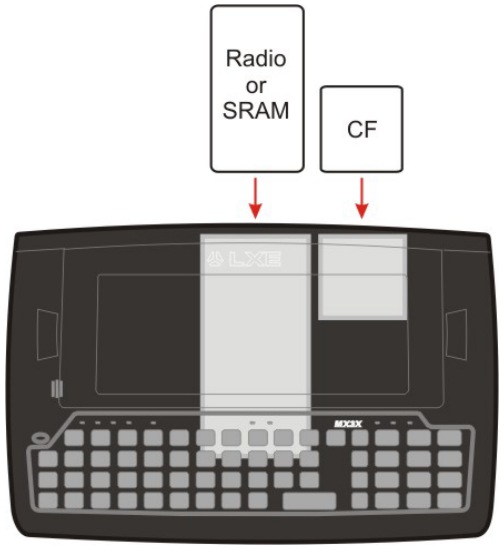


Figure 1-15 PCMCIA and CF Card Location

See "Chapter 2 Physical Description and Layout", section titled "PCMCIA Cards" for further information.

Slot 0 – Radio or SRAM Cards

Note: When removing or installing the radio, protect the MX3X internal components and the radio from electrostatic discharge.

The MX3X 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 a WAN radio in the slot.

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

Slot 1 – Compact Flash Card

The MX3X has one internal Compact Flash card port that supports Type I and II CF+ cards. The slot is accessible when the endcap has been loosened.

When removing or installing PCMCIA or CF cards, protect the MX3X internal components from electrostatic discharge.

Installing / Removing Cards

Preparation

Requirement: A screwdriver (not supplied by LXE)

- LXE recommends that installation or removal of the card be performed on a clean, well-lit surface.
- Using a screwdriver, remove or loosen the screws on the endcap.
- Carefully slide the endcap to the side, taking care not to dislodge or disconnect any cables.
- Remove or loosen all cables to the card(s) to be removed/replaced. If a radio card, disconnect the radio antenna from the radio card.

Installation

1. Slide the card, connector side first, into the slot until it seats. Use caution not to pull or snag the antenna connector on the MX3X.
2. If the card is difficult to seat in the slot, remove the card, turn it around and re-install.
   - The radio antenna connector must be positioned up and toward the front of the MX3X (near the display).
   - Gently snap the antenna cables into the connectors on the radio card. Use caution not to damage either the antenna cable connectors or the connectors on the radio. Connect **all** antenna cables to the PCMCIA radio card.
3. Replace the endcap, making sure all connections are secure and ribbons/antennas are not crimped between the endcap and the body of the MX3X.

Removal

1. Grasp the top of the 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 card out of the MX3X for a long period of time place it in an enclosed electrostatic-protected storage container. Store in an area that is protected from dirt, moisture, and electrostatic contact.

Enter Data

You can enter data into the MX3X through several different methods. The Scanner window provides barcode data entry, the RS-232 or the IR port are used to input/output data, and the keypad and stylus provide manual entry.

Keypad 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 MX3X 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 Entry

Note: This section is directed to the MX3X user. The assumption is that the unit has been configured and the touch panel calibrated by the System Administrator prior to releasing the MX3X for use. The touch screen should be calibrated before initial use.

The stylus performs the same function as the 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. 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. The touch screen responds to an actuation force (touch) of 4 oz. (or greater) of pressure.

The stylus can be used in conjunction with the keyboard and scanner and an input/output device connected to one of the MX3X's serial ports.

- Touch the stylus to the field of the data entry form to receive the next data feed.
- The cursor begins to flash in the field.
- The unit is ready to accept data from either the keyboard, integrated scanner or a scanner connected to the serial port, if the scanner applet is configured correctly.

Input Panel

To show or hide the input panel, tap the Input Panel button (the icon looks like a keyboard and is shown in the System tray). Use the input panel to enter information in any program.

Integrated Laser Scanner Data Entry

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

To scan with the integrated laser barcode reader, point the laser window towards a barcode and press the Scan button. You will see a red laser beam strike the barcode. The MX3X has an SE923 scan engine.

Figure 1-16 Scan Beam

Align the red beam so that the barcode is centered within the beam. The laser beam must cross the entire barcode. Move the MX3X towards or away from the barcode so that the barcode takes up approximately two-thirds the width of the beam.

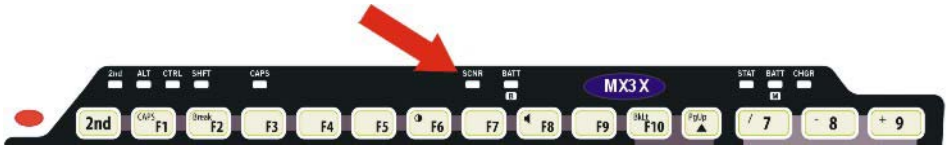


Figure 1-17 Scanner LED Location

The SCNR LED turns red when the laser beam is on. Following a barcode scan and read the SCNR LED turns green and the MX3X beeps, indicating a successful scan.

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.

Large barcodes can be scanned at the maximum distance. Hold the imager closer to small barcodes (or with bars that are very close together).

When the scan is successful, the Scan LED turns green, then switches off, and the MX3X will produce a distinctive audible tone.

When the scan is unsuccessful, the SCNR LED remains red until the 3 second timeout (default) occurs or the Scan key is released. The MX3X will produce distinctive audible tones. Check the following:

- Check the barcode for marks or physical damage e.g. ripped label, missing section, etc.
- Try scanning test symbols of the same code type at different distances and angles.
- Is the scan aperture unscratched and unsoiled?

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

MX3X User's Guide
MX3 Cradle Reference Guide
MX3 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	8011LS3203ERC20DUS
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, 20' 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
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	9000A501PASSIVEPEN
Stylus Kit	9000A501PASSIVEPEN
Touch Screen Protective Film, Monochrome Display	MX3XA502PROTFILMMONO
Touch Screen Protective Film, Color Display	MX3XA503PROTFILMCOLR
Headset with microphone	9000A503HEADSET

Battery Chargers and Battery	
Battery Charger/Analyzer, US	9000A377CHGR5US
Battery Charger/Analyzer, WW	9000A377CHGR5WW
Battery, Li-Ion	MX3A378BATT
Cradles and Power Supplies	
MX3X Desktop Cradle [4] See Note	2381A002DESKCRADLE
Vehicle Mount Cradle [4]	2381A003VMCRADLE
Vehicle Mount Cradle, 19.2K baud rate	9000A005VMCRADLE19KB
Power Supply, Vehicle Cradle, 9-30VDC	2381A054CRDLDCPWR30V
Power Supply, Vehicle Cradle, 30-80VDC	2381A055CRDLDCPWR80V
AC Power Supply, External, US	2335A301PSACUS
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, Bare Wire (Vehicle)	9000A316PS24V72VMX13
Power Adapter, 110-240 VAC	1300A303PSACWW
Cables for Cradle and MX3X Serial Ports	
Cable, Null Modem, PC, D9F to D9F, 6’	9000A054CBL6D9D9
Cable, Null Modem, Printer/PC, D9F to D25F, 6’	9000A053CBL6D9D25
Cable, USB Host D9F to USB, 6’	MX3XA068CBLD9USBHOST
Cable, USB Client D9F to USB, 6’	MX3XA069CBLD9USBCLNT
Cable, D9F to D9F for ActiveSync only, 6’ See Note	MX3XA070CBLD9RS232AS

Note: The MX3X Desktop Cradle supports RS-232 ActiveSync communication via the MX3XA070CBLD9RS232AS cable.

1 Cable, USB Host D9F to USB, 6’ (Endcap only)

2 Cable, D9F to D9F for ActiveSync only, 6’ (Cradle use only)

3 Cable, USB Client D9F to USB, 6’ (Endcap only)

[4] Power Adapter Required.

Chapter 2 Physical Description and Layout

Hardware Configuration

System Hardware

The MX3X hardware configuration is shown in the following figure.

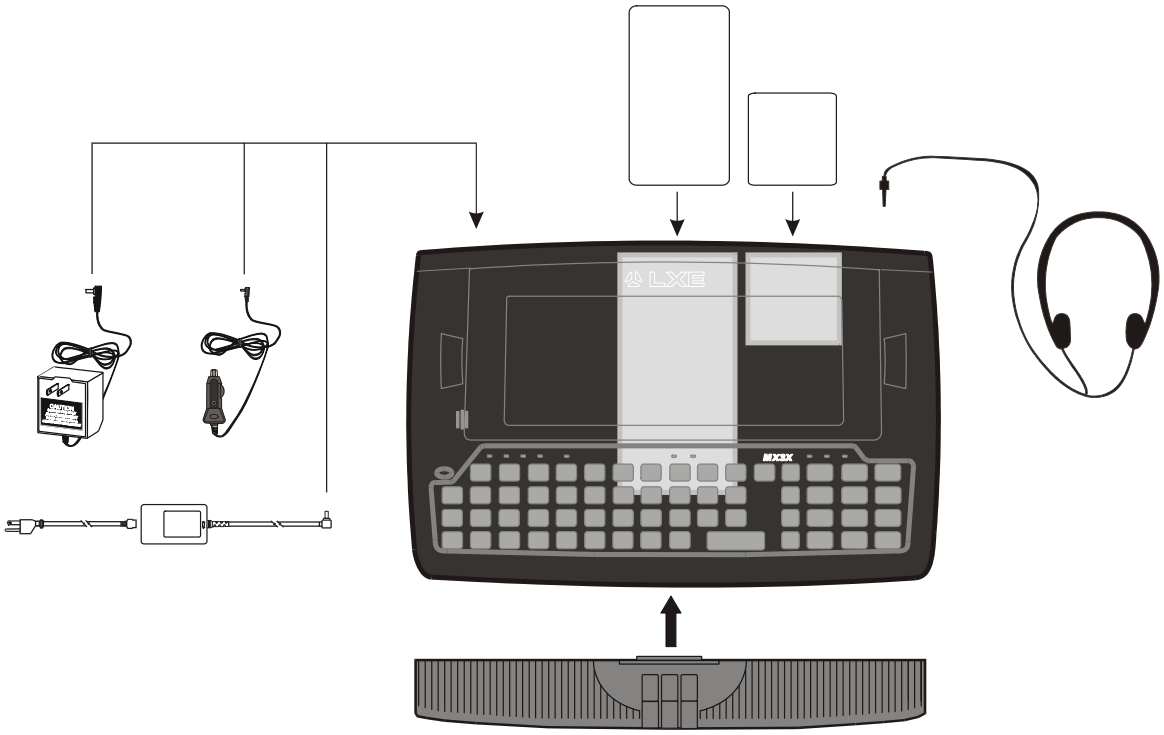


Figure 2-1 System Hardware

Central Processing Unit

The LXE MX3X CPU is an Intel Xscale PXA255 running at 400 MHz.

Core Logic

The MX3X supports the following I/O components of the core logic:

- One PCMCIA slot (supports Type I or II PCMCIA cards).
- One compact Flash card port (supports Type I and II cards).
- One InfraRed port.
- One Digitizer Input port (Touch screen).
- Two I/O ports in six configurations (see section titled "Endcaps.").

System Memory

A CF Card FLASH is used for ROM, Flash for Windows CE .NET and Flash memory for bundled applications. The Flash is configured as the primary boot device and contains the Windows CE .NET image, boot loader, OAL, applications, utilities and device drivers.

Any flash remaining beyond the Windows CE .NET image is formatted for use as a persistent memory drive (which appears in My Computer as the folder “System”). Any programs or data stored in this folder will not be lost if the memory backup battery fails.

The computer has one Type II CF+ slot. The MX3X 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 and can be adjusted 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 two types of displays available: transflective greyscale monochrome; and transmissive color.

The transmissive color display is optimized for indoor lighting. It cannot be used without the backlight. The transflective monochrome is 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 off. The transmissive display appears black when the display is off.

Power Supply

The LXE MX3X uses two batteries for operation.

- A 1900 mAh replaceable Lithium-Ion (Li-Ion) battery pack. The battery pack recharges while in the MX3X with the computer in a powered cradle or with the optional external power sources attached. The main battery pack can be removed from the MX3X and inserted in the MX3 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 MX3X. 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 MX3X has two serial ports configurable in six standard configurations:

Left Port	Right Port
Serial COM3	Serial COM1
Serial COM3	USB Client
USB Host	Serial COM1
USB Host	USB Client
Scanner	Serial COM1
Scanner	USB Client
Rear IR Port is COM2 Barcode scanners, tethered to the serial port on a cradle, send ASCII data to the MX3X in the cradle through the COM2 Port.	

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

COM Port Switching

The COM 2 port is always the IR port on the back of the MX3X, 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 MX3X COM1 serial port for use with a tethered scanner is as follows:

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.

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

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.

See section titled “Tethered Scanners”.

Audio Interface

An interface is available for headset operation. When the headset is plugged into the audio jack on the endcap, the main speaker is disabled.

PCMCIA Slots

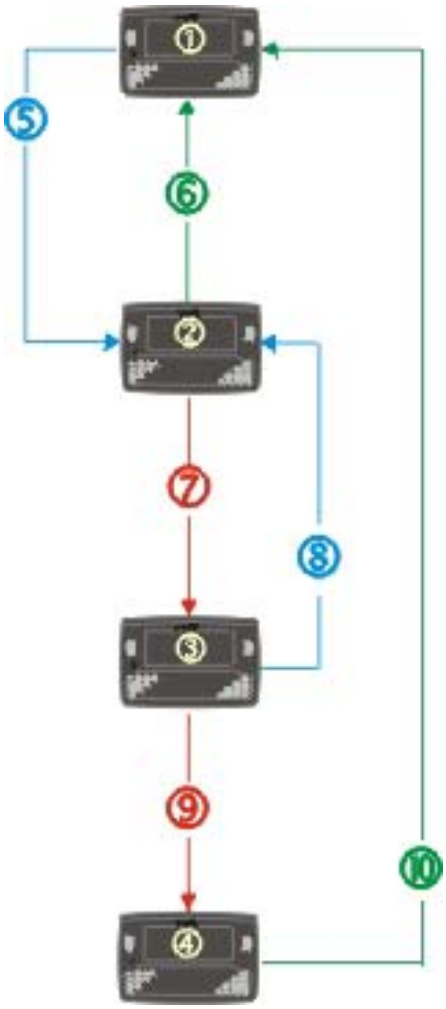
Use and operation of the Personal Computer Memory Card International Association (PCMCIA) device (e.g. PC card) is dependent upon both the type of device installed and the application(s) running on the computer.

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 MX3X. 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.

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. Tap the Power button.

Note: After event 8, the only primary event (6) which functions is a power button tap.

Figure 2-2 Power Modes – On, Suspend, Critical Suspend and Off

Primary Events Listing

Any key on the keypad	COM1 activity
Stylus touch on the touch screen	COM2 activity
Power button tap	COM3 activity
PC card activity	USB client connection
External power connection	Scanner activity

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 (default is 3 seconds) 15 seconds afterwards, the display turns off.
- when the Main Battery is hot-swapped, the display is turned Off.

The MX3X

After a new MX3X has been received, a charged Main Battery inserted, and the Power button tapped, the MX3X 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 to turn the device on.

User Idle Mode

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

User Idle timers are set using **Start | Settings | Control Panel | Power | Schemes** tab.

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

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

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

Any of the following primary events will wake the display and display backlight:

Any key on the keypad
Stylus touch on the touch screen
Power button tap

When the display backlight wakes up, the User Idle Timer begins the countdown again. When any of the above events occur prior to the timer expiring, the timer begins the countdown again.

The first display backlight wakeup key press or touch is sent to the operating system or running application. Once the display is On, the keyboard and touch screen function normally.

System Idle Mode

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

System Idle timers are set using **Start | Settings | Control Panel | Power | Schemes** tab.

The display is turned off when the System Idle timer expires before a wakeup event takes place.

The Power button is tapped which immediately wakes the unit up.

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

Any of the following primary events will wake the display and display backlight:

Any key on the keypad
Stylus touch on the touch screen
Power button tap

When the display wakes up, the System Idle Timer begins the countdown again. When any of the above events occur prior to the timer expiring, the timer begins the countdown again.

The first display wakeup key press or touch is sent to the operating system or running application. Once the display is On, the keyboard and touch screen function normally.

Suspend Mode

The Suspend mode is entered when the MX3X is inactive for a predetermined period of time, the user taps the Power button or the user selects **Start | Suspend**.

MX3X Suspend timers are set using **Start | Settings | Control Panel | Power | Schemes** tab.

Any of the following can be configured to wake the unit and reset both the display and display backlight timers:

Any key on the keypad	PC card activity
Power button tap	Stylus touch on the touch screen
COM1 CTS	External power connection
COM3 CTS	USB client connection

When the unit wakes up, the User Idle, System Idle and the Suspend timers begin the countdown again. When any one of the above events occurs prior to the Suspend 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 MX3X 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 MX3X 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 MX3X 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 MX3X transitions to the Suspend state. To resume operation tap the Power key.

If the Backup Battery is depleted before a fully charged Main Battery is inserted, the MX3X immediately turns itself Off and all unsaved information is lost. Insert a fully charged Main Battery and press the Power button to turn the MX3X 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 MX3X On.

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 MX3X.

The power button is located above the ESC key on the keypad. When a battery is inserted in the MX3X for the first time, the Power button must be pressed.

Figure 2-3 Location of the Power (PWR) Button

Quickly tapping the Power button places the MX3X immediately in Suspend mode. Quickly tapping the Power button again, or touching the screen, immediately returns the MX3X from Suspend.

Reboot Sequence

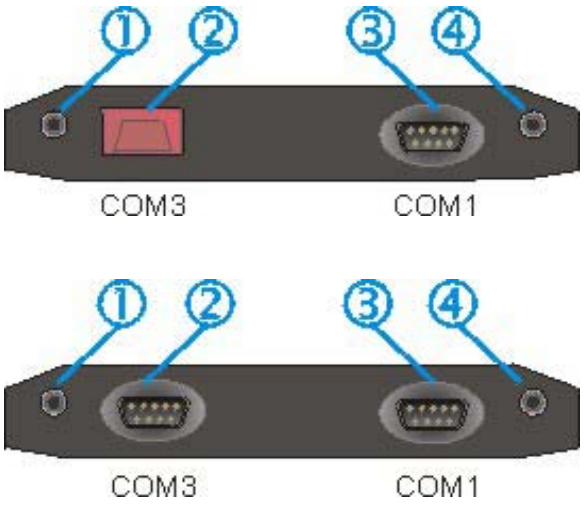
Tap the **Start** button then tap **Restart**. If the touchscreen is not accepting taps or needs recalibration, press <Ctrl>+<Esc> to force the Start Menu to appear.

When the Windows 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 "MX3X Command Line Utilities".

Endcaps

The MX3X 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 USB input/output at 12 Mbps.



1. DC Power Jack
2. Serial COM 3 or USB Host or Scanner Port
3. Serial COM 1 or USB Client Port
4. Audio Jack

Figure 2-4 Endcap

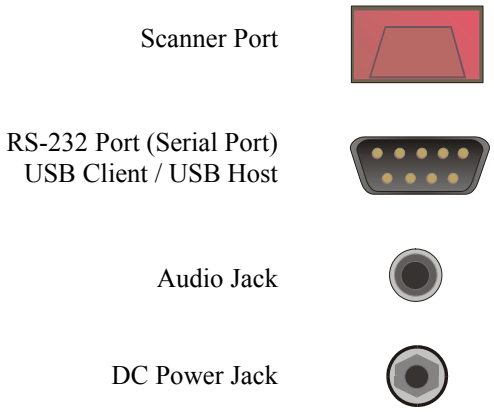


Figure 2-5 Endcap Configurations

Endcap Combinations

Left Port	Right Port
Serial COM3	Serial COM1
Serial COM3	USB Client
USB Host	Serial COM1
USB Host	USB Client
Scanner	Serial COM1
Scanner	USB Client
Rear IR Port is COM2 Barcode scanners, tethered to the serial port on a cradle, send ASCII data to the MX3X in the cradle through the COM2 Port.	

Integrated Scanner Port

The MX3X 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 a serial port on the MX3X or to the serial port on a cradle holding an MX3X. The SCNR LED illuminates during any MX3X internal scanner activation.

The MX3X has an SE923 scanner engine.

If you need to set up the integrated scanner **barcode reading parameters**, please refer to the "**Integrated Scanner Programming Guide**" and the "MX3" barcode scanner type. The guide is on the LXE Manuals CD and the LXE / ServicePass website.

After scanning the barcodes that change Baud Rate, Parity, or Stop Bits go to **Start | Control Panel | Scanner | COM 3,** make the same changes, and save the changes by tapping OK.

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 is a PC/AT standard 9-pin “D” male connector.

Figure 2-6 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 or +5V DC	Ring Indicator - Input

Figure 2-7 9-Pin RS-232 Description

USB Host / Client Port

*Note: Do **not** connect a tethered scanner cable to an MX3X USB-C or USB-H labeled endcap port. These ports cannot power a tethered scanner.*

USB Host / Client 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 2-8 MX3X Serial Port and Compatible Cables

USB Host Cable

MX3XA068CBLD9
USB Host Cable, USB-A and D9F

Host Port Label on MX3X

MX3X Host Pin	Signal	USB Host 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 2-9 USB-Host to Serial Port Cable Pinouts

USB Client Cable

MX3XA069CBLD9
USB Client Cable, USB-B and D9F

Client Port Label on MX3X

MX3X Client Pin	Signal	USB Client Pin
1 Not Used		1 From 9
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 To 1	Power Sense	9 Not Used

Figure 2-10 USB-Client to Serial Port Cable Pinouts

Tethered Scanners

*Note: Do **not** connect a tethered scanner cable to an MX3X USB-C or USB-H labeled endcap port. These ports cannot power a tethered scanner.*

The MX3X 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. The tethered scanner requires power on pin 9 of the MX3X serial port.

To set the MX3X 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 2-11 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 MX3X. When there is no integrated scanner installed, both buttons default to Enter buttons (with the exception of IBM 5250 terminal emulation devices – in this case, the left button is marked "Field Exit").

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 MX3X 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.

The default setting for the right button is Enter. The default setting for the left button is Scan. When the MX3X 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 (integrated scanner only)
- Enter Key
- Tab Key
- Field Exit (IBM 5250 / TN5250 devices only)
- Virtual Key (default values F20 and F21)

Note: Not to be confused with the process the system administrator can use to create Custom Key Maps for the MX3X keyboard. See Appendix A "Keymaps", section titled "Creating Custom Keymaps for the MX3X".

The Keypad

The QWERTY keypad is phosphorescent. A phosphorescent keypad does not use a keypad backlight but glows in dim/dark areas after exposure to a light source.

The keypad is installed and configured by LXE.

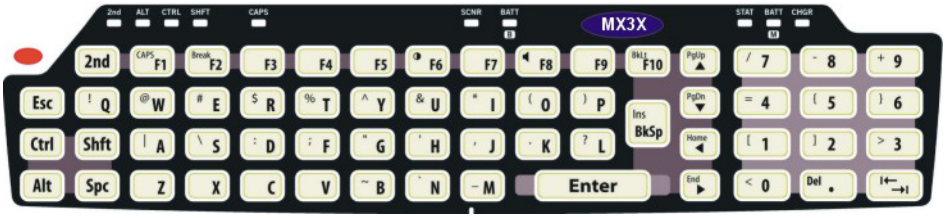


Figure 2-12 The QWERTY Keypad

The keymaps (keypress sequences) are located in "Appendix A - Key Maps."

Key Functions

Key	Function
Scan	***(MX3X'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. See previous section titled "Programmable Buttons." When there is no integrated scanner endcap, the Scan keys function as Enter keys. For IBM 5250 configurations, the left button is the "Field Exit" key.
Enter	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	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	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 key. When the Ctrl function is active, the Ctrl LED illuminates.

Key	Function
Alt	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	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. For example, when CAPS is on and the Shft key and the G key are pressed, a lower case g is displayed.
Spc	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.

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 2^{nd} + F1.

- No CapsLock AND No Shift keypress – result is a lowercase letter.
- CapsLock OR Shift – result is an uppercase letter.
- CapsLock AND Shift keypress – result is a lowercase letter.

Field Exit Key Function (IBM 5250/TN5250 Only)

The Field Exit key is used to exit an input field. If the field is an Auto Enter field, the auto transmit function is activated. This key function is present on the IBM 5250/TN5250 specific keypad only.

Keypress Sequences

See Appendix A for all key press sequences.

Custom Key Maps

Custom Key Maps should not be confused with the process the system administrator uses to re-map the Scan buttons on either side of the MX3X display.

See Appendix A “Keymaps”, section titled “Creating Custom Keymaps for the MX3X”.

To activate the Custom keymap, select **Start | Settings | Control Panel | Keyboard** icon. Select the Custom keymap from the keyboard popup menu, and close the control panel with the OK button. To return to the default keymap, select **0409** from the keymap popup and click OK.

*Note: MX3X and Custom Key Maps: before connecting to a host using Remote Desktop Connection, go to **Start | Settings | Control Panel | Keyboard** and select **0409** from the keymap popup. Click OK.*

LED Functions

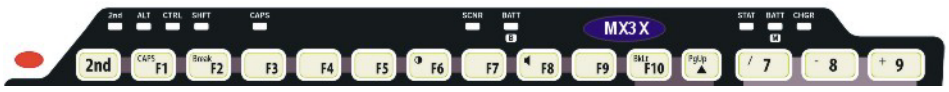


Figure 2-13 LED Functions

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 illuminated ...
2nd	The next keypress is a 2nd keypress. • Orange when on • Blinks orange during configuration key sequence.
ALT	The next keypress is an ALT keypress. • Orange when on and unlit when off.
CTRL	The next keypress is a CTRL keypress. • Orange when on and unlit when off.
SHFT	The next letter is the uppercase letter on alpha keys and the shifted character on the numeric keypad keys. • Orange when on and unlit when off.
CAPS	Uppercase letters are active until the CAPS key sequence is pressed again. • Orange when on and unlit when off.
SCNR	Barcode scanner function, affected by both tethered scanners and the scanner endcap. • Red - scanning. • Green - good scan. • Unlit - scanner is inactive.
BATT B	Backup Battery. When illuminated, the backup battery is charging. When unlit, the Backup Battery is not charging
STAT	Status Indicator. • Yellow – device is booting up. • Blinking Green when display Suspend state begins.
BATT M	Main Battery. When illuminated, main battery capacity is low. • Red – low battery. • Blinking Red – power fail. • Unlit - Main Battery is fully charged.
CHGR	Charger. When on, the MX3X is receiving external power either from the DC power jack or the MX3X is seated in a powered cradle. • Red - Main Battery is charging. • Green - battery charge is complete and the MX3X is connected to external power through the power jack or a powered cradle.

Display

The MX3X 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 two types of displays available: transflective greyscale monochrome and transmissive color. The transmissive color display is optimized for indoor lighting. It cannot be used without the backlight. The transflective monochrome is optimized for outdoor use but may also be used indoors. The monochrome display has an electroluminescent backlight. The color display has a CCFL (Cold-Cathode Fluorescent Lighting) backlight.

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

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 MX3X System Idle or Suspend timers expire.

Display and Display Backlight Timer

When the System Idle 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 User Idle timer expires the screen display backlight is turned off. 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 "Power | Schemes". Any of the following will wake the display and display backlight:

Any key on the keypad
Stylus touch on the touch screen
Power button tap

When the display wakes up, the 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 MX3X 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.

Applying the Protective Film to the Display

First, clean the display of fingerprints, lint particles, dust and smudges.

Remove the protective film from it's container. Remove any protective backing from the film sheet by lifting the backing from a corner of the film. Discard the backing.

Apply the film to the screen starting at one side and smoothing it across the display. If air bubbles appear, raise the film slightly and continue smoothing the film across the display until it covers the glass surface of the display.

If dust, lint or smudges are trapped between the protective film and the glass display, remove the protective film, clean the display and apply the protective film again.

Cleaning the Glass Display/Scanner Aperture

Note: These instructions are for components made of glass. If there is a removable protective film sheet on the display screen, remove the film sheet before cleaning the screen.

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

The speaker is located on the front of the MX3X above the Power button.

The MX3X 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 16 distinct volume levels. The minimum volume level is 0 (no sound) with a default setting of maximum non-distorted volume. 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.

Operational “beeps” are emitted from the speaker.

Infrared (IR) Port

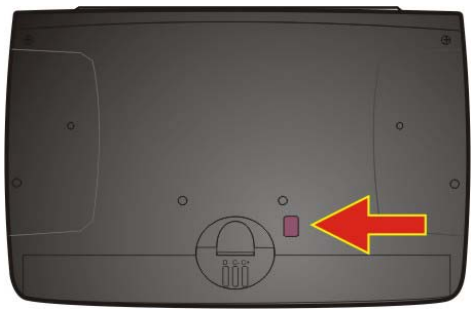


Figure 2-14 Infrared Port - COM2 Port

At the back of the MX3X computer there is an Infrared (IR) Data Port. The IR Port is designed to provide a data link between the MX3X and a similarly equipped piece of equipment such as a printer. The IR port is the MX3X’s COM 2 port and is a bi-directional half-duplex communication port. It supports baud rates up to 115k, SIR (Slow IR). It will support serial port emulation, as well as IrDA and Winsock over IR protocols. It also supports ActiveSync.

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 MX3X 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 MX3X and the IR port on the second MX3X are in close proximity to each other. IrDA is not required and not used by terminal emulation programs.

When the MX3X is docked in a cradle, the Status LED *on the cradle* is red when data is being transmitted through the IR port.

Storage Cradles

*Note: LXE recommends the correct Desktop Cradle always be used to store / charge / communicate with the MX3X. The MX3X Desktop Cradle label is located on the bottom of the device. The MX3X Desktop cradle Product Number is **2381A002DESKCRADLE**.*

There are two types of cradles for LXE's MX3X 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."

The cradles give the MX3X 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 MX3X and the MX3X Main Battery Pack, in turn, recharges the backup battery. The MX3X can be either on or in Suspend 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 transfers files over the RS-232 connector on the cradle.

Figure 2-15 ActiveSync Cable Connected to Serial port on Cradle

Chapter 3 Power Supply

Introduction

Note: LXE recommends that the correct MX3 Multicharger Plus always be used to charge the MX3X main battery pack. The Multicharger plus label is located on the back of the device and the charger must have been upgraded to V1.01. Please contact your LXE representative for further information about theV1.01 upgrade kit, if needed.

Note: LXE recommends the correct Desktop Cradle always be used to store / charge / communicate with the MX3X. The MX3X Desktop Cradle label is located on the bottom of the device. The MX3X Desktop cradle Product Number is ***2381A002DESKCRADLE****.*

The MX3X computer is designed to work with a Lithium-Ion (Li-Ion) battery pack from LXE.

The LXE MX3X 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 MX3X is connected to external power using the power jack. There is a 50 mAh Nickel-Cadmium (NiCd) Backup Battery inside the MX3X that is recharged only by the Main Battery Pack.

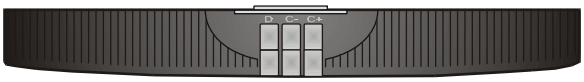


Figure 3-1 Main Battery Pack

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 MX3X 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 MX3X 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 MX3X 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, the radio, or the backlight at it's brightest setting, the shorter the time required between battery recharges.

Battery Hot-Swapping

When the main battery power level is low, the MX3X will signal the user 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 MX3X using the power jack, or the MX3X is placed in a powered cradle.

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

When the Main Battery is removed, the MX3X automatically transitions to the Critical Suspend state. During Critical Suspend, the MX3X's backup battery will continue to power the unit for at least five minutes. Though data is retained, the MX3X cannot be used until a fully charged main battery pack is installed. After installing the fully charged battery, the MX3X 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 MX3X will turn OFF and the Power key must be used after the main battery pack is installed.

All configuration data is saved to flash memory before the computer powers off.

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 MX3X, 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 MX3X 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 MX3X 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 Backup Battery fully depletes the MX3X will transition to the Suspend state. To resume operation tap the Power key.

Backup Battery

The MX3X 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 MX3X. 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 MX3X, 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 MX3X 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 MX3X is always 'on' even when in the Suspend state and draws battery power at all times. Use the **Start | Settings | Control Panel | Power | Battery** tab to check the battery status and power reading.

Always replace the used Main Battery with a fully charged Main Battery. The Battery Low Warning LED illuminates red at approximately 35% of power left in the Main Battery. 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 MX3X **before** running the Backup Battery Discharge Utility. The backup battery can be discharged and charged while the MX3X 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 | 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 MX3X can resume during the discharge, with the exception of Hot-Swapping the Main Battery. When the backup battery is fully discharged, the MX3X will automatically stop the discharge process and begin to recharge the backup battery.

DO NOT REMOVE THE MAIN BATTERY PACK from the MX3X until the backup battery is completely discharged -- in approximately 1 hour and recharged in approximately 2.5 hours.

Battery Chargers

Note: LXE recommends that the correct MX3 Multicharger Plus always be used to charge the MX3X main battery pack. The Multicharger plus label is located on the back of the device and the charger must have been upgraded to V1.01. Please contact your LXE representative for further information about theV1.01 upgrade kit, if needed.

MX3 Multi-Charger Plus

Figure 3-2 MX3 Multi-Charger Plus

The MX3X Main Battery Pack can be charged/analyzed in the MX3 Multi-Charger Plus.

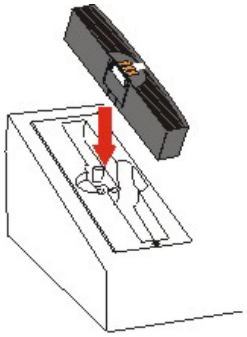


Figure 3-3 Insert Main Battery in Charge Pocket

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 MX3X DC power jack is located on the endcap. The Main Battery is trickle-charged using external power supplies.

The cradle power jack is located on the back of the cradle.The MX3X (and the Desktop Cradle) connect to any of the following power supplies through the DC Power Jack.

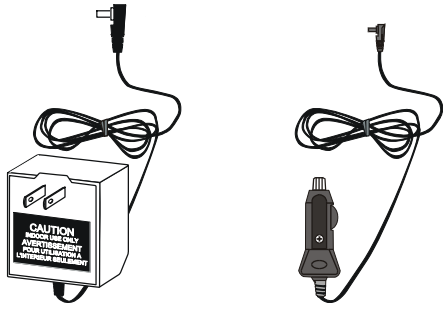


Figure 3-4 US AC/DC 12V Power Supply and Cigarette Lighter Adapter

Figure 3-5 International AC/DC 12V Power Supply

Note: When the MX3X is receiving external power through a cradle, the cradle's Status LED and the CHGR LED on the MX3X are illuminated.

Important Battery Charger Version Information

Battery Chargers Affected

MX3 Multi-Charger Plus
9000A377CHGR5

Use LXE V1.01 Upgrade Kit

MX3 Multi-Charger
MX3A378CHGR6
(Not Available After 7-2003)

Use LXE V1.20 Upgrade Kit

The MX3X Main Battery Pack may be incompatible with MX3 Battery Chargers that have not been upgraded to V1.20 or V1.01. To successfully charge the MX3X Battery Pack, pre-existing MX3 Battery Chargers must be returned to LXE for a software upgrade.

Using a Multi-Charger Plus Battery Charger with the MX3X Battery Pack

The MX3X device is designed to use a 2.2Ahr Main Battery Pack to achieve 8+ hours of continuous operation.

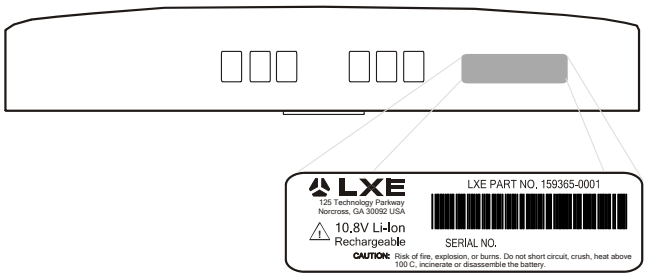
If the MX3X battery pack is inserted into a MX3 Multi-Charger Plus (without the V1.01 upgrade) bay , the battery may not become fully charged in the 4 hour time limit and a red LED illuminates after 4 hours have elapsed indicating a Battery Problem.

Remove and reinsert the MX3X battery pack into the same charging bay. This will reset the timer and allow the charger to complete the charge cycle for the battery in approximately 2 hours..

LXE does not supply an external timing device with the Multi-Charger Plus.

Battery Label Location

The MX3X battery pack has a silver label (as opposed to the white labels on LXE's MX3 and MX3-CE battery packs).



Chapter 4 System Configuration

Introduction

There are several different aspects to the setup and configuration of the MX3X. 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 MX3X computer may vary. The following sections provide a general reference for the configuration of the MX3X and some of it's optional features.

Windows CE. NET 4.2

For general use instruction, please refer to commercially available Windows CE .NET user's guides or the Windows CE .NET on-line Help application installed with the MX3X.

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 MX3X and it's Windows CE .NET 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 MX3X 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 MX3X.

This section lists the contents of the subdirectories and the general function of the files. Files installed in each MX3X are specific to the intended function of the MX3X.

Files installed in each MX3X 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. Cisco, Symbol) for the radios installed in the RF environment and are not interchangeable.

Software Load

The software loaded on the MX3X computer consists of Windows CE .NET 4.2 OS, hardware-specific OEM Adaptation Layer, device drivers, Internet Explorer 6.0 for Windows CE browser and utilities. The software supported by the MX3X is summarized below:

Operating System

- Microsoft CE .NET version 4.2.

Radio Drivers

- Only one radio is installed in the MX3X at any one time. The 2.4GHz type of PC radio card resident on the MX3X determines the type of radio driver running on the MX3X.

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

Software Applications

The following applications are included:

- WordPad (was PocketWord in previous versions of Windows CE)
- Pocket Inbox
- Word Viewer
- Excel Viewer
- PDF Viewer
- Image Viewer
- Scanner Wedge (LXE developed)
- Transcriber
- Media Player
- Internet Explorer

Note that the viewer applications allow viewing documents, but not editing them.

Desktop

For general use instruction, please refer to commercially available CE .NET user's guides or the CE .NET on-line Help application installed with the MX3X.

The MX3X Desktop appearance is similar to that of a desktop PC running Windows 95, 98, NT, 2000 or XP.

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 MX3X is always powered On (when a fully charged Main Battery and Backup Battery are present).

Click the Suspend button to turn the screen off or tap the red Power button to turn the screen off and place the MX3X 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).
My Documents	Storage for downloaded files / applications.
Start	Access programs, select from the Favorites listing, documents last worked on, change/view settings for the control panel or taskbar, on-line help, run programs or place the unit into Suspend mode.

My Computer Folders

Folder	Description	Preserved upon Reboot?
System	Internal ATA Card (64Meg total, 28 Meg free for User Applications)	Yes
Network	Mounted network drive	No
Storage Card	ATA Card in Compact Flash Slot 1	Yes
Windows	Operating System in ROM	Yes
Program Files	Applications	No
Application Data	Data saved by running applications	No
My Documents	Storage for downloaded files / applications	No
Temp	Location for temporary files	No

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.

Access: **Start | Programs**

Cisco	**Set Cisco radio / network parameters**
Communication	**Stores Network communication options**
ActiveSync	Transfer files between an MX3X and a desktop computer
Connect	Run this command after setting up a connection
Start FTP Server	
Stop FTP Server	
Diagnostics	**Diagnostic tests for the MX3X**
Registry Editor	Edit the MX3X registry (c a r e f u l l y)
Test Utility	Select a test to run e.g. Display, keyboard, audio.
Microsoft File Viewers	**View downloaded files** (see Note)
Excel Viewer	View Excel 97 / 2000 / 2002 documents
Image Viewer	View BMP, JPEG and PNG images
PDF Viewer	View Adobe Acrobat documents
Word Viewer	View Word 97 / 2000 / 2002 and RTF files
Symbol	Tap the Network icon in the toolbar to set up the Symbol radio
Command Prompt	The command line interface in a separate window
Inbox	Microsoft Outlook mail inbox.
Internet Explorer	Access web pages on the world wide internet
Media Player	Music management program
Microsoft WordPad	Opens an ASCII notepad
Remote Desktop Connection	Log on to a Windows Terminal Server.
Transcriber	Enter data using the stylus on the touch screen.
Windows Explorer	File management program

Note: The Microsoft File Viewers cannot display files that have been password protected.

Cisco – Aironet Client Utility (ACU)

Access: **Start | Aironet Client Utility *or* ACU Icon on Desktop**

Note: When making changes to profile parameters, the MX3X should be warmbooted afterwards.

Profiles Tab

Use this option to manage profiles and review firmware information, status, statistics and wireless radio survey data.

Profile Parameter	Default
SSID	Blank
Client Name	Blank
Infrastructure Mode	Yes
Power Save Mode	Fast PSP
Network Security Type	None
WEP	No WEP
Authentication Types	Open
LEAP	Disabled
Mixed Mode	Disabled
World Mode	Disabled
Data Rates	Auto
Transmit Power	MAX
Offline Channel Scan	Enabled

Select an active profile to manage.

Firmware Tab

Displays the current firmware version and allows you to load new firmware. Tap the Browse button to locate the new firmware file.

Status Tab

Immediately runs status on : signal strength and signal quality.

Statistics Tab

Select the Receive Stats or Transmit Stats. The data is displayed on the screen.

Survey Tab

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

Symbol

Note: When making changes to profile parameters, the MX3X should be warmbooted afterwards.

Access: Tap the Network Connected Icon in the Status Bar

IP Information Tab

After the IP Address has been assigned to the MX3X, tap the Renew button to renew the IP address if necessary.

Tap the Details button to view the Network Connection details.

IPv6 Information Tab

This is the TCP/IPv6 information screen. The contents cannot be edited by the user.

Wireless Information Tab

Factory Default Settings	
Wireless Information tab	
Notify when new networks available	Enabled
Advanced Button	
Use Windows to configure wireless settings	Enabled
Automatically connect to non-preferred networks	Disabled
Networks to access (Only APs, Only comp-to-comp)	All available
Encryption (WEP, TKIP)	WEP
Authentication (WPA, Open, Shared, WPA-PSK)	WPA
Ad hoc network	Disabled
Key provided automatically	Enabled
Enable 802.1X authentication	Enabled
EAP Type (MDF-Challenge, PEAP, TLS)	TLS

View Log

Displays the logon/connection data for the current network connection.

Add a new connection

Select **Add New**. Enter the ESSID in the **Network Name** text box.

Disable WEP

- If WEP is to be disabled, tap the down arrow in the **Authentication** drop down box. Select **Open**.
- Tap the down arrow in the **Encryption** drop down box. Tap **Disabled** and WEP is disabled.

Enable WEP

- Tap the down arrow in the **Authentication** drop down box.
- Tap the **WEP Authentication** protocol.
- If the key is provided automatically by your network, check the "**Key provided automatically**" checkbox.

- If you wish to enter your Authentication key, uncheck the "**Key provided automatically**" checkbox and enter the Network Key in the **Network Key** text box.

Continue

Tap the **Advanced** … button. Make sure there is a checkmark in the "**Use Windows to configure my wireless settings**" checkbox. Make sure there is ***no*** checkmark in the "**Automatically connect to non-preferred networks**" checkbox. Tap the **Connect** button.

To access NETWLAN1 Properties again, tap the **Network Connected icon** in the Toolbar.

Select a User Certificate

1. Select Wireless Information Tab
2. Select a network by doubletapping the network name.
3. In the IEEE 802.1X Authentication box, enable 802.1X authentication
4. Select an EAP type
5. Tap the Properties button. Validate Server is enabled by default.
6. At the Authentication Settings display, tap the Select button to choose a User Certificate.

Communication

Access: **Start | Programs | Communication**

Note: Some communication menu options require an external modem connection to the MX3X. Modems are not available from LXE nor supported by LXE.

ActiveSync

Once a relationship (partnership) has been established with Connect (on a desktop computer), ActiveSync will synchronize using the radio link, serial port, USB or the infrared port on the MX3X. See also: Chapter 1 "Introduction", section "ActiveSync – Initial Setup".

*Note: ActiveSync **does not transmit through the IR port in vehicle cradles**. It will through the IR port of specific desktop cradles. Please refer to section titled "Accessories", part identified as Desktop Cradle for the MX3X.*

Requirement: ActiveSync version 3.7 (or higher) must be resident on the host (desktop/laptop) computer. ActiveSync is available from the Microsoft website. Follow their instructions to locate, download and install ActiveSync on your desktop computer.

Using Microsoft ActiveSync version 3.7 or higher, you can synchronize information on your desktop computer with the MX3X and vice versa. Synchronization compares the data on your MX3X with your desktop computer and updates both with the most recent data.

For example, you can:

- Back up and restore your device data.
- Copy (rather than synchronize) files between your device and desktop computer.
- Control when synchronization occurs by selecting a synchronization mode. For example, you can synchronize continually while connected to your desktop computer or only when you choose the synchronize command.

If the MX3X is already in a docking cradle connected to a PC, remove and reinsert the MX3X into the cradle.

If the MX3X is connected to a PC by RS-232/USB cable, disconnect the cable from the MX3X and reconnect.

Check that the correct connection is selected (Serial or USB "Client").

Note: By default, ActiveSync does not automatically synchronize all types of information. Use ActiveSync Options to specify the types of information you want to synchronize. The synchronization process makes the data (in the information types you select) identical on both your desktop computer and your device.

When installation of ActiveSync is complete on your desktop computer, the ActiveSync Setup Wizard begins and starts the following processes:

- connect your device to your desktop computer,
- set up a partnership so you can synchronize information between your device and your desktop computer, and
- customize your synchronization settings.

Because ActiveSync is already installed on your device, your first synchronization process begins automatically when you finish setting up your desktop computer in the ActiveSync wizard.

For more information about using ActiveSync on your desktop computer, open ActiveSync, then open ActiveSync Help. See also section titled “Backup MX3X Files” for more ActiveSync information.

Synchronizing from the MX3X

You must have set up ActiveSync on your desktop computer and completed the first synchronization process before you initiate synchronization from your device.

To initiate synchronization from your device, tap **Start | Programs | Communication | ActiveSync** to begin the process.

Note: If you have a wireless LAN card, you can synchronize remotely from your device.

Tap to connect and synchronize.

View synchronization status.

Tap to synchronize via IR or change synchronization settings.

View connection status.

Tap to stop synchronization.

Tap **Start | Help** for context-sensitive help.

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 USB direct connect.

After a connect setup is selected, **Start | Programs | Communication | 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 MX3X Files" later in this chapter.

See Also: “Important Information – Cold Boot and Loss of Host Re-connection”

Start FTP Server / Stop FTP Server

These shortcuts call the Services Manager to start and stop the FTP server. The server defaults to Off (for security) unless it is explicitly turned on from the menu.

Command Prompt

Access: **Start | Programs | Command Prompt**

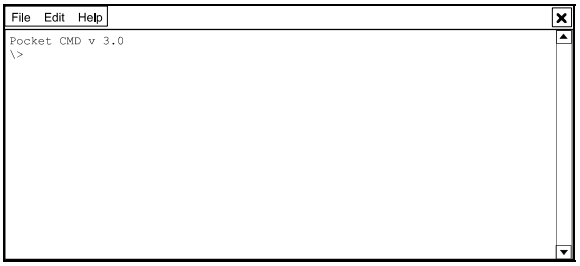


Figure 4-1 Pocket CMD Prompt Screen

Type help at the command prompt for a list of available commands.

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

Inbox

Access: **Start | Programs | Inbox**

This option requires a connection to a mail server. There are a few changes in the CE .NET 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 MX3X inbox and a desktop inbox.

Internet Explorer

Access: **Start | Programs | Internet Explorer**

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

Media Player

Access: **Start | Programs | Media Player**

There are few changes in the CE .NET version of Media Player as it relates to the general desktop Windows PC Microsoft Media Player options. Click the "?" button to access Media Player Help.

Remote Desktop Connection

Access: **Start | Programs | Remote Desktop Connection**

There are few changes in the CE .NET version of Remote Desktop Connection as it relates to the general desktop Windows PC Microsoft Remote Desktop Connection options.

Select a computer from the drop down list and tap the Connect button.

Tap the **Options >>** button to access the General, Display, Local Resources, Programs and Experience tabs. Click the "?" button to access Remote Desktop Connection Help.

*Note: MX3X and Custom Key Maps: before connecting to a host using Remote Desktop Connection, go to **Start** | **Settings** | **Control Panel** | **Keyboard** and select **0409** from the keymap popup. Click OK.*

Transcriber

Access: **Start | Programs | Transcriber**

Select Transcriber on the **Start** | **Programs** menu. To make changes to the Transcriber application, enable or disable the current Transcriber session, etc., click the “hand with a pen” icon in the toolbar. Click the "?" button or the Help button to access Transcriber Help.

Windows Explorer

Access: **Start | Programs | Windows Explorer**

There are a few changes in the CE .NET 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 and Start Menu**

The Taskbar can also be accessed by tapping on the taskbar and holding the stylus 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 CE .NET 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.

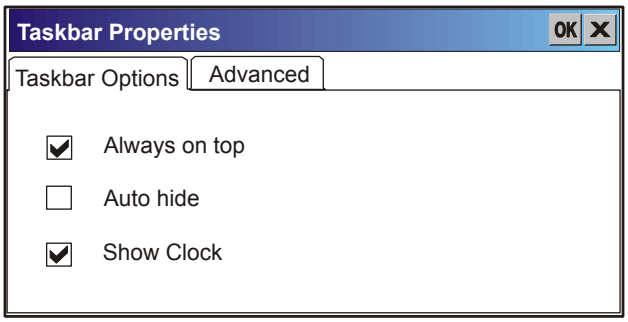


Figure 4-2 Taskbar Properties

Advanced Tab

Expand Control Panel

Tap the checkbox to have the Control Panel folders appear in drop down menu format from the Settings | Control Panel menu option.

Clear Contents of Document Folder

Tap the Clear button to remove the contents of the Document folder.

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.
Accessibility	Customize the way the keyboard, display or mouse functions.
Aironet Client Utility	Set the parameters for a Cisco radio. (See section "Start Menu Program Options".
Battery	View the status of the Main and Backup batteries.
Bluetooth Device	Set the parameters for a Bluetooth radio.
Certificates	Manage digital certificates used for secure communication.
Date/Time	Set Date, Time, Time Zone, and Daylight Savings.
Dialing	Set dialup properties for internal modems (not supplied/supported by LXE).
Display	Set background graphic, color scheme appearance, and power scheme properties.
Input Panel	Select the current key / data input method.
Internet Options	Set General, Connection, Security and Advanced options for Internet connectivity.
Keyboard	Set key repeat delay and key repeat rate.
Mixer	Adjust the volume, record gain, and sidetone for microphone input.
Mouse	Set the double-click sensitivity for stylus taps on the touch screen.
Network and Dial Up Options	Set network driver properties and network access properties.
Owner	Set MX3X owner details.
Password	Set MX3X access password properties.
PC Connection	Control the connection between the MX3X and a local desktop or laptop computer.
PCMCIA	Radio card in Slot 0, Internal ATA in Slot 2.
Power	Set Power Off, Backlight 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 user installed programs in their entirety.

Option	Function
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.
Storage Manager	Manage storage devices, create partitions.
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 CE .NET events.

About

Access: **Start | Settings | Control Panel | About**

Displays hardware and software details.

Tab Title	Contents
Software	GUID, Windows CE Version, OAL Version, Bootloader Version, Compile Version, FPGA Version and Language
Hardware	CPU Type, Codec Type, FPGA Version, Scanner type, Display, Flash memory, and DRAM memory
Versions	LXE Utilities, LXE Drivers, LXE Image, LXE API, and Internet Explorer
Network IP	Current network connection IP and MAC address.

User application version information can be shown in the Version window. Version window information is taken from the registry.

Modify the Registry using the Registry Editor (see section titled “MX3X Utilities”). LXE recommends **caution** when editing the Registry and also recommends making a backup copy of the registry before changes are made.

The registry settings for the Version window are under HKEY_LOCAL_MACHINE \ Software \ LXE \ Version in the registry.

Create a new string value under this key. The string name should be the Application name to appear in the Version window. The data for the value should be the version number to appear in the Version window.

Accessibility

Access: **Start | Settings | Control Panel | Accessibility**

Customize the way the keyboard, sound, display, mouse, automatic reset and notification sound function. There is no change from general desktop Accessibility options. Adjust the settings and click the OK box to save the changes. The changes take effect immediately.

Battery

Access: **Start | Settings | Control Panel | Battery**

View the status of the Main and Backup batteries.

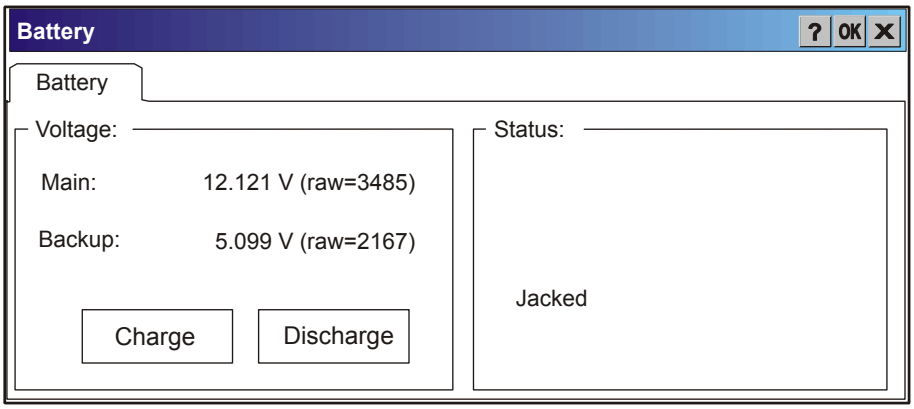


Figure 4-3 Battery

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.

Tap the Charge or Discharge buttons to charge and discharge the backup battery. If the battery is Charging, tap the Discharge button to stop the Charge process. Tap Discharge a second time to begin the Discharge process. If the battery is Discharging, tap the Charge button to stop the Discharge process. Tap Charge a second time to begin the Charge process.

Bluetooth Manager

Access: **Start | Settings | Control Panel | Bluetooth Device Properties**

Set the parameters for a Bluetooth radio.

Factory Default Settings	
All Found Devices	Untrusted

Tap the Scan Device button to locate Bluetooth devices in your wireless area. Tap the "?" button and follow the instructions in the Help file to authenticate Bluetooth devices in your area.

Certificates

Access: **Start | Settings | Control Panel | Certificates**

Manage digital certificates used for secure communication.

Lists the Stored certificates trusted by the MX3X user. These values may change based on the type of radio security resident in the client, access point or the host system.

Date/Time

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

Set Date, Time, Time Zone, and Daylight Savings after cold boot or at anytime.

Factory Default Settings	
Current Time	Midnight
Time Zone	GMT-05:00
Daylight Savings	Disabled

Note: Date and time is reset to the default value each time the MX3X is rebooted.

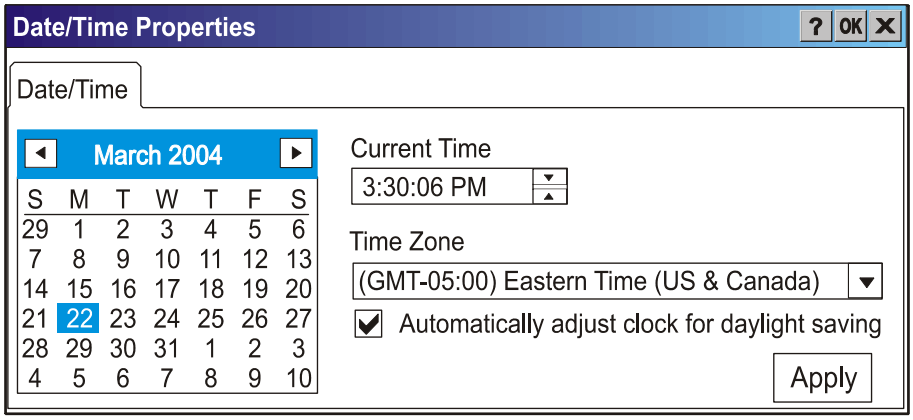


Figure 4-4 Date/Time Properties

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. Double-tapping the time displayed in the Taskbar causes this display to appear.

Dialing

Access: **Start | Settings | Control Panel | Dialing**

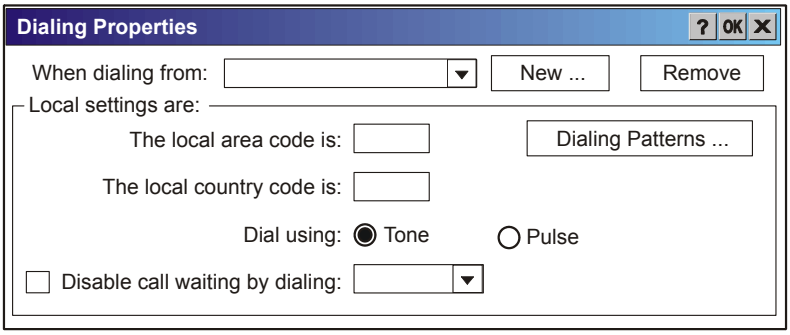


Figure 4-5 Dialing

Set dialup properties for internal modems (not supplied/supported by LXE). Tap the "?" and follow the instructions in Help.

Display

Access: **Start | Settings | Control Panel | Display Icon**

Set background graphic, color scheme appearance, and power scheme properties.

Factory Default Settings	
Background	Windows CE
Tile	Disable
Appearance	
Scheme: Monochrome Color	 High Contrast White Windows Standard
Backlight	
Battery Auto Turn Off	Enabled
Idle Time	30 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 monochrome displays and Windows Standard for color displays.

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

Backlight

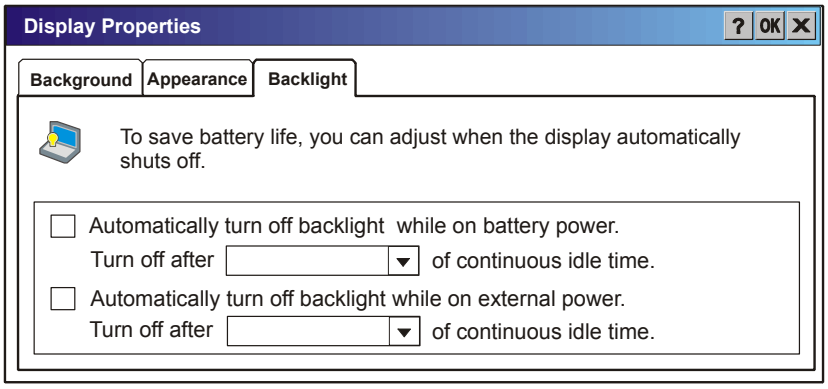


Figure 4-6 Display Properties / Backlight Tab

Adjust the settings and click the OK box to save the changes. The changes take effect immediately. When the backlight timer expires, the monochrome screen is turned off, the color transmissive backlight is dimmed not turned off.

Input Panel

Access: **Start | Settings | Control Panel | Input Panel**

Select the current key / data input method.

Factory Default Settings	
Input Method	Keyboard
Allow applications to change input panel state	Disabled
Keys	Small keys
Use gestures	Disabled

Use this option to make the Soft Keyboard or the keypad primarily available when entering data. Selecting Keyboard enables both.

Internet Options

Access: **Start | Settings | Control Panel | Internet Options**

Set General, Connection, Security and Advanced options for internet connectivity.

Factory Default Settings	
General	
Start Page	http://www.lxe.com/
Search Page	http://www.google.com
Cache Size	512 Kb
Connection	
Use LAN	Disabled
Autodial Name	Blank
Proxy Server	Disabled
Security	
Allow cookies	Enabled
Allow TLS 1.0 security	Disabled
Allow SSL 2.0 security	Enabled
Allow SSL 3.0 security	Enabled
Warn when switching	Enabled
Advanced	
Display web images	Enabled
Play web sounds	Enabled
Enable web scripting	Enabled
Display script error note	Disabled
Underline links	Never

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

Keyboard

Access: **Start | Settings | Control Panel | Keyboard Icon**

Set key repeat delay and key repeat rate.

Factory Default Settings	
Repeat	Enable
Delay	Short
Rate	Slow
Key Map	0409

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.

When new key maps are added to the registry, they will appear in the Key Map dropdown list on the Keyboard Panel.

These values do not affect virtual keyboard taps.

Mixer

Access: **Start | Settings | Control Panel | Mixer Icon**

Adjust the volume, record gain, and sidetone for microphone input.

Factory Default Settings	
Master Volume	0dB
Record Gain	22.5dB
Sidetone	12.0dB
Input	None

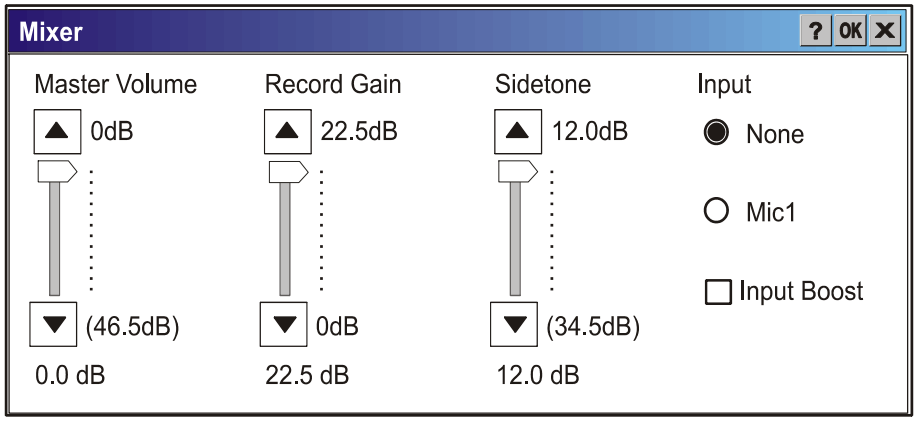


Figure 4-7 Mixer

Select the Input for the mixer. Move the sliders to adjust the decibel level. Tap OK to save the settings.

Mouse

Access: **Start | Settings | Control Panel | Mouse**

Set the double-click sensitivity for stylus taps on the touch screen.

Network and Dialup Connections

Access: **Start | Settings | Control Panel | Network and Dialup Connections**

Create a dialup, direct, or VPN connection on the MX3X.

Owner

Access: **Start | Settings | Control Panel | Owner Icon**

Set MX3X owner details.

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.

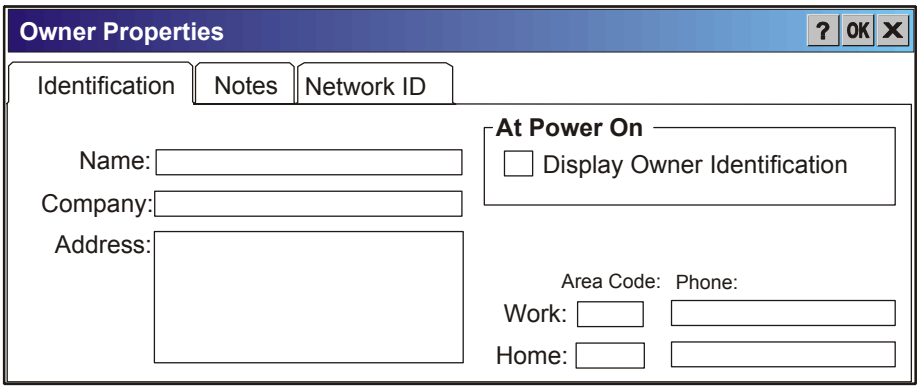


Figure 4-8 Owner Properties

Password

Access: **Start | Settings | Control Panel | Password Icon**

Set MX3X access/power up password properties.

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).

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.

Tap the Power On checkbox to set whether the user types a password at Power On.

Tap the Screen Saver checkbox to set whether the user types a password to clear the screensaver. If there is no screensaver chosen, this checkbox is ignored.

Note: Screensavers are not installed by LXE.

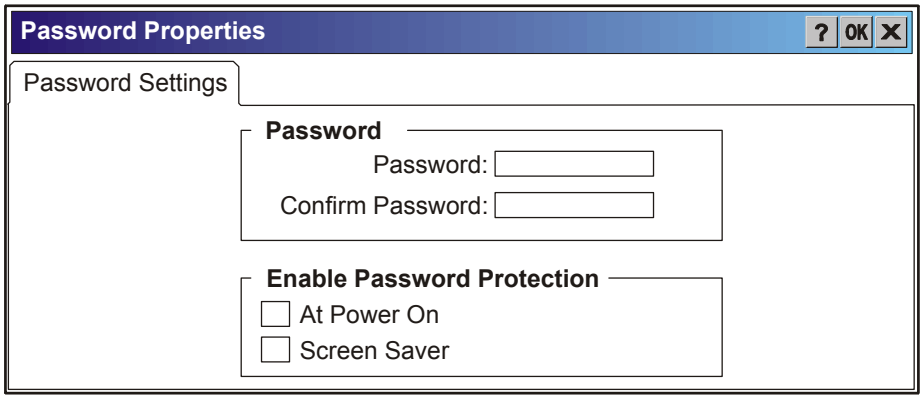


Figure 4-9 Password Properties

PC Connection

Access: **Start | Settings | Control Panel | PC Connection**

Control the connection between the MX3X and a nearby desktop/laptop computer.

Factory Default Settings	
Allow Connection	Enabled
Connect Using	'USB Client'

Tap the Change button to adjust the settings and click the OK button to save the changes. The changes take effect immediately.

Unchecking the "Allow connection with ….." disables ActiveSync.

Change ….

Clicking Change lists configured ActiveSync connections. In addition, there is a checkbox for Automatic Connect. If this checkbox is checked, when the serial driver detects a cable connection on the configured port, it will automatically try to start ActiveSync on that port. Note that this interferes with processes on the configured port at the same time.

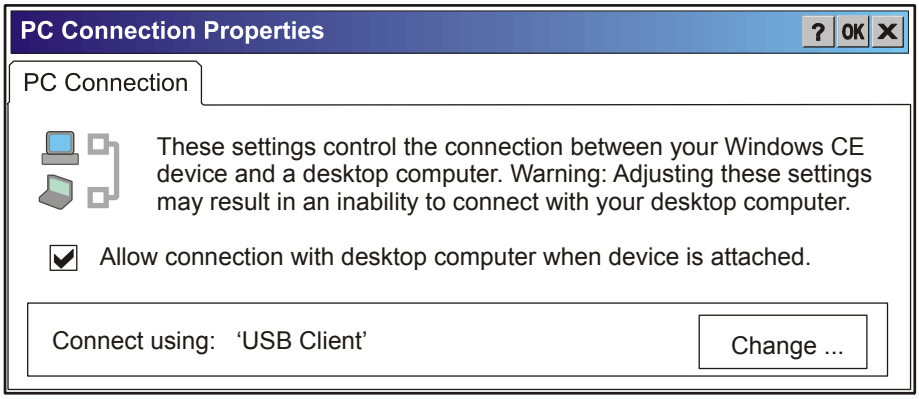


Figure 4-10 Communication / PC Connection Tab

Please refer to the "Backup MX3X Files" section later in this chapter for parameter setting recommendations.

PCMCIA

Access: **Start | Settings | Control Panel | PCMCIA**

Note: Radio card in Slot 0, Internal ATA in Slot 2.

Factory Default Settings	
Slot 0	**PCMCIA**
Disable slot now	Off
Power slot during sleep (3.3v)	Off
Power slot during sleep (5v)	Off
Write protect slot	Off
Slot 1	**Compact Flash**
Disable slot now	Off
Power slot during sleep (3.3v)	Off
Power slot during sleep (5v)	Off
Write protect slot	Off
Slot 2	**ATA Card**
Disable slot now	Off
Power slot during sleep (3.3v)	Off
Power slot during sleep (5v)	Off
Write protect slot	Off

The name of the card (from the CIS data on the card) in the slot is displayed. This information cannot be changed by the user.

When “Power slot during sleep” is checked, the slot will stay powered up in Suspend at the cost of reduced battery life.

When “Disable slot now” is checked, the slot is powered down as soon as the Control Panel is closed and the PCMCIA driver ignores any card in the slot.

Power

Access: **Start | Settings | Control Panel | Power**

Set Power Off, Backlight properties. Review battery status and perform backup battery charging/discharging.

Factory Default Settings	
Battery	N/A
Schemes – Battery Power	
User Idle	3 seconds
System Idle	15 seconds
Suspend	5 minutes
Schemes – AC Power	
User Idle	2 minutes
System Idle	2 minutes
Suspend	5 minutes

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 (removable). It also shows the status of the internal Backup Battery. The listed values cannot be changed by the user.

Schemes

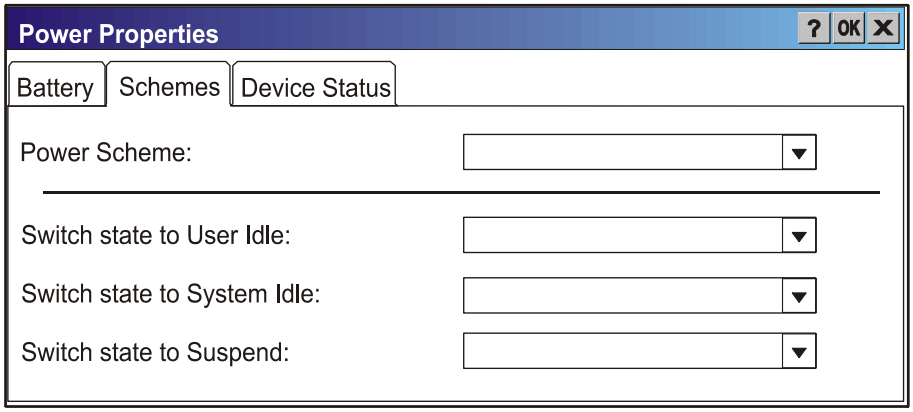


Figure 4-11 Power Schemes

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

Battery Power Scheme

Use this option when the MX3X will be running on battery power only.

Switch state to User Idle:	Default is After 3 seconds
Switch state to System Idle:	Default is After 15 seconds
Switch state to Suspend:	Default is After 5 minutes

AC Power Scheme

Use this option when the MX3X will be running on external power (e.g. AC adapter, auto outlet adapter, powered cradle).

Switch state to User Idle:	Default is After 2 minute
Switch state to System Idle:	Default is After 2 minutes
Switch state to Suspend:	Default is After 5 minutes

Device Status

This option displays the power levels being used by MX3X devices.

Regional Settings

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

Set the appearance of numbers, currency, time and date based on regional and language settings.

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

Remove Programs

Access: **Start | Settings | Control Panel | Remove Programs**

No change from general desktop Remove Programs options. Select a program and click Remove. Follow the prompts on the screen to uninstall ***user-installed only*** programs. The change takes effect immediately.

Scanner

Access: **Start | Settings | Control Panel | 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.

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 a COM port if that COM port is enabled in the Scanner applet as a scanner input. For example, if COM 1 is being used by the scanner, COM 1 can't be used by any other program.

Main

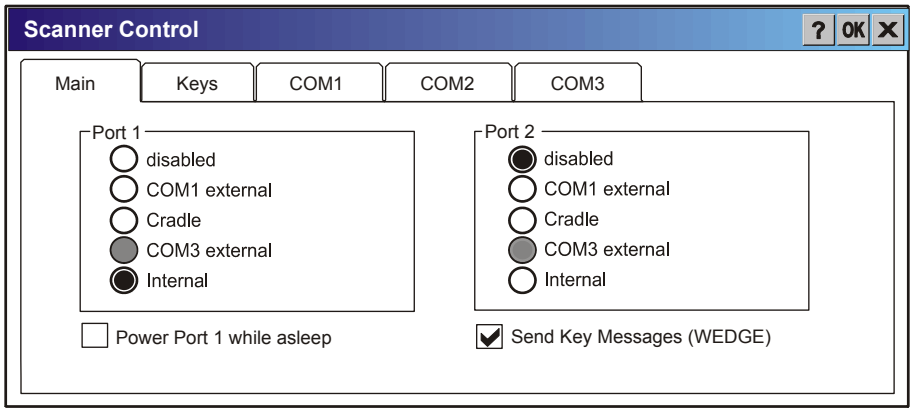


Figure 4-12 Scanner Properties / Main Tab

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

If “Power Port 1 while asleep” is checked, whichever serial port is enabled as Port 1 will remain powered while the device is in Suspend, at the cost of reduced battery life. This allows a tethered scanner to wake the device by pressing the trigger on the scanner.

If “Send Key Messages …” is checked any data scan is converted to keystrokes and sent to the active window. When this box is not checked, the application will need to use the set of LXE Scanner APIs to retrieve the data from the scanner driver. Note that this latter method is significantly faster than using “Wedge”.

The Scan buttons have no effect on tethered external scanners connected to a port on the MX3X.

Do not connect a tethered scanner to these ports:

Keys

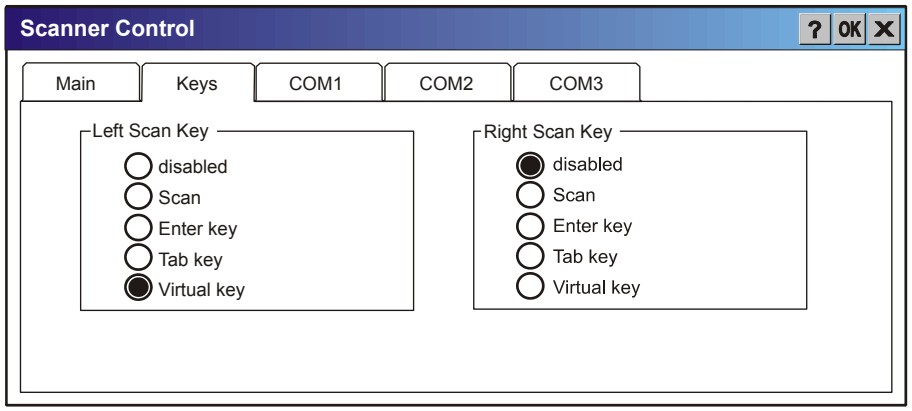


Figure 4-13 Scanner Properties / Keys Tab

The Keys tab sets up what happens when one of the Scan keys are pressed. Note that the two keys can do the same or different functions.

Disabled	When either scan key is set to Disabled, it does nothing when pressed.
Scan	When set to “Scan” the integrated scanner is activated. If no integrated scanner is present, the Scan selection is greyed out.
Enter	When set to “Enter”, both the Enter key and the (Scan button) / Enter key perform the same function.
Tab	When set to “Tab”, both the Tab key and the (Scan button) / Tab key perform the same function.
Virtual	When set to “Virtual”, the Virtual Left scan key produces an F20 and the Virtual Right scan key produces an F21.

Change a Virtual Key (F20 or F21) Value

Modify the Registry using the Registry Editor (see section titled "MX3X Utilities"). LXE recommends **caution** when editing the Registry and also recommends making a backup copy of the registry before changes are made.

Go to HKEY_LOCAL_MACHINE \ Software \ LXE \ Scanner.

Set either the ScanCodeLeft or ScanCodeRight to be the scan code of the key to be used as the virtual key when the Virtual Left key (Left Scan key) or Virtual Right key (Right Scan key) is pressed. The MX3X registry requires a decimal value.

COM Ports

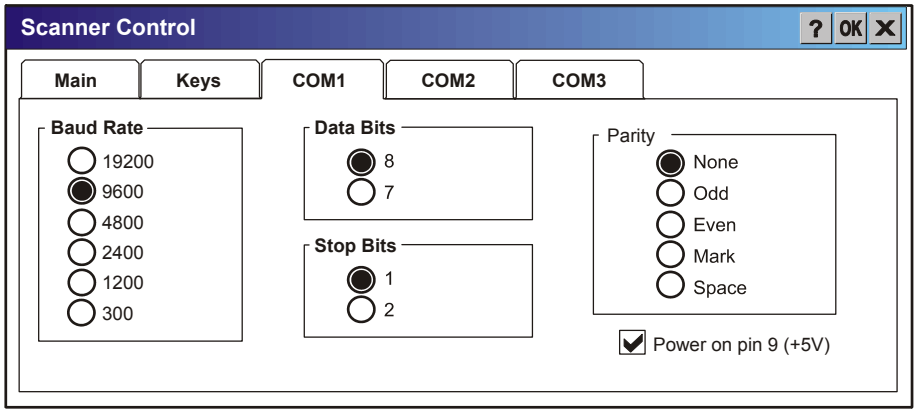


Figure 4-14 Scanner Properties / COM Port Settings

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.

Storage Manager

Access: **Start | Settings | Control Panel | Storage Manager**

Installed storage devices are listed by device name in the dropdown box. To view information about the disk or perform store operations, select a device from the list.

On-line help is available for this option.

- Topics available are:
  - Manage storage devices
  - Manage disk partitions
  - Creating a new partition
  - Advanced partition features

LXE recommends **caution** when formatting or dismounting storage devices and when creating new partitions or deleting partitions on the storage device.

Note: Contact LXE Customer Support prior to using management functions on the internal ATA card.

Stylus

Access: **Start | Settings | Control Panel | Stylus**

Set double-tap sensitivity properties and/or calibrate the touch panel.

Double Tap

Follow the instructions on the screen and click the OK box to save the changes. The changes take effect immediately.

Calibration

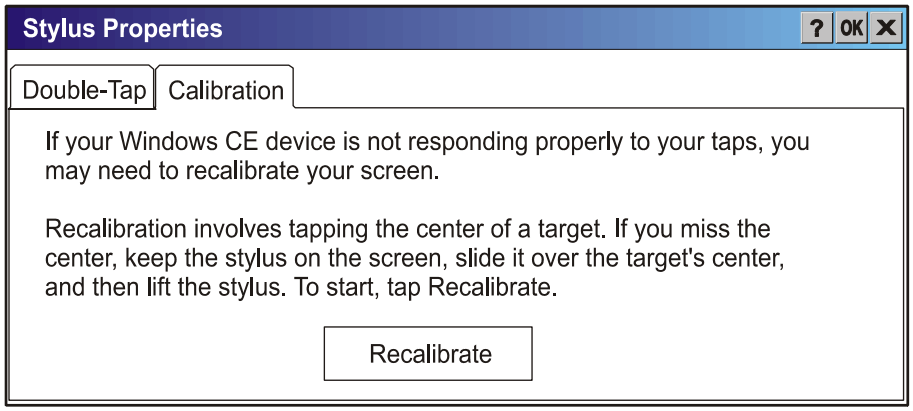


Figure 4-15 Stylus Properties / Recalibration Start

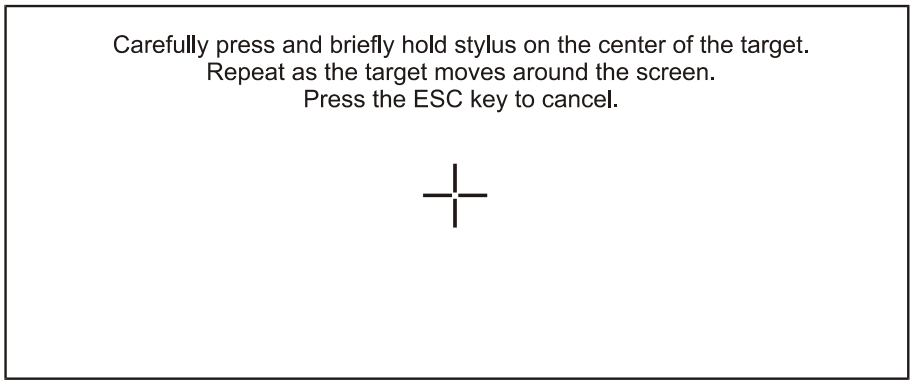


Figure 4-16 Stylus Properties / Recalibration

System

Access: **Start | Settings | Control Panel | System Icon**

Review System and Computer data and revision levels. Adjust Storage and Program memory settings.

Factory Default Settings	
General	N/A
Memory	Middle of Memory Bar
Device Name	MX3X001
Device Description	LXE MX3X
Copyrights	N/A

General

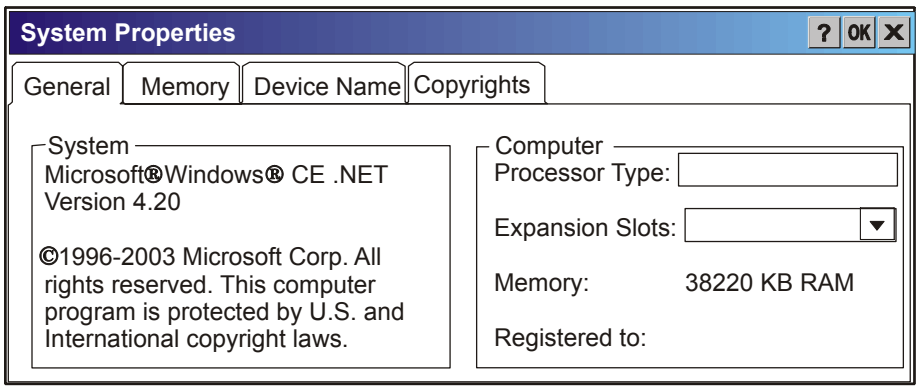


Figure 4-17 System / General tab

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

Computer: The processor type is listed. The type cannot be changed by the user. The name of the installed radio card is listed in the dropdown list. Total computer memory and the identification of the registered user is listed and cannot be changed by the user.

Memory sizes given do not include memory used up by the operating system. Hence, a system with 64 MB may only report 35 MB memory, since 29 MB is used up by the Windows CE .NET operating system. This is actual DRAM memory, and does not include internal flash or the internal ATA card used for storage.

Memory

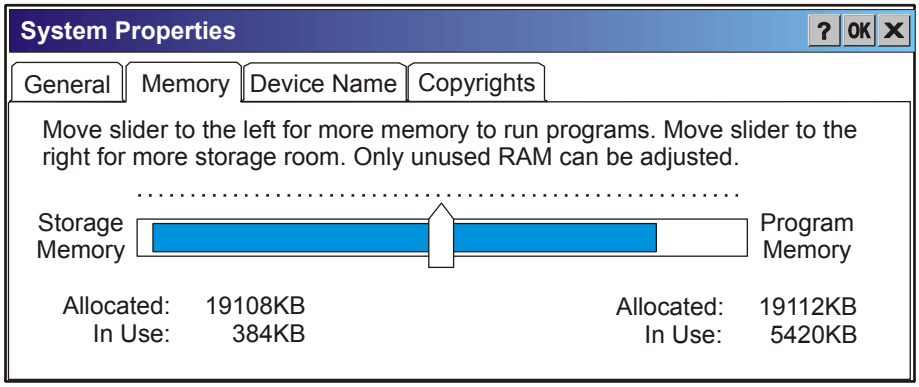


Figure 4-18 System / Memory

Move the slider to allocate more memory for programs or storage. If there isn't enough space for a file, increase the amount of storage memory. If the MX3X is running slowly, try increasing the amount of program memory. Adjust the settings and click the OK box to save the changes. The changes take effect immediately.

Device Name

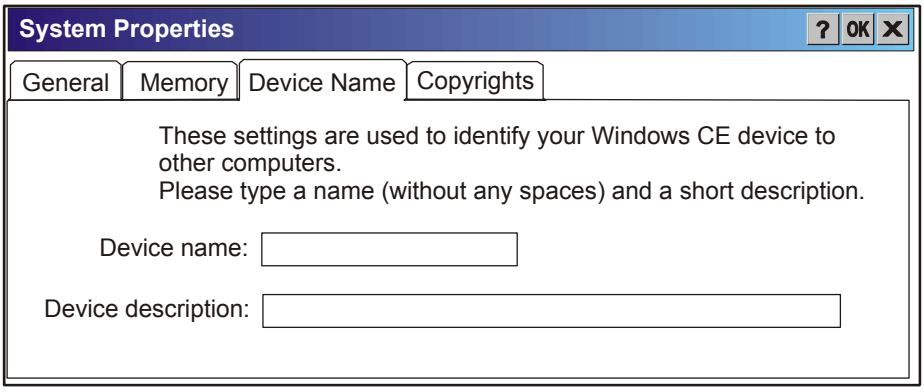


Figure 4-19 System / Device Name

The device name and description can be changed. Enter the name and description using either the keypad or the Input Panel and tap OK to save the changes. The changes take effect immediately.

Copyrights

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

Volume and Sounds

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

Set volume parameters and assign sound wav files to CE .NET events.

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

Follow the instructions on the screen and click the OK box to save the changes. The changes take effect immediately.

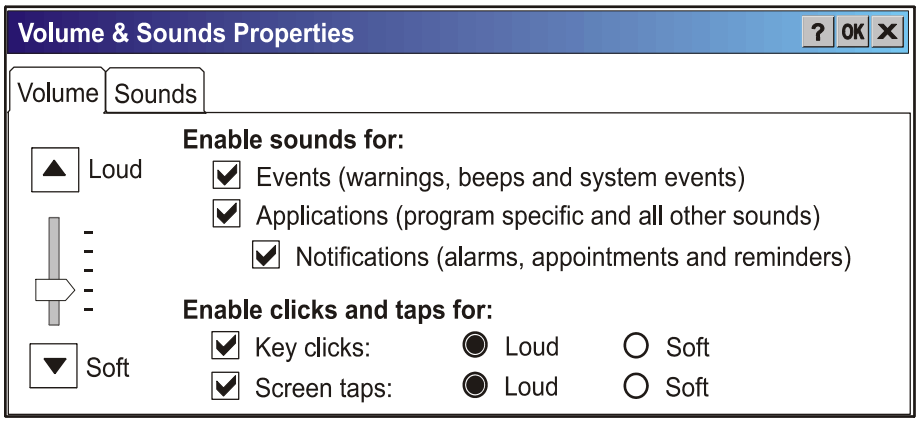


Figure 4-20 Volume and Sounds

Good Scan and Bad Scan Sounds

Good scan and bad scan sounds are stored in the Windows directory, as SCANGOOD.WAV and SCANBAD.WAV. These are unprotected WAV files and can be replaced by a WAV file of the user's choice. By default a good scan sound on the MX3X is a single 2700 Hz beep, and a bad scan sound is a double beep.

Backup MX3X Files using ActiveSync

Use the following to backup data files from the MX3X to a desktop or laptop PC using the appropriate cables and Microsoft's ActiveSync.

Prerequisites

MX3X and ActiveSync Partnership

A partnership between the MX3X and ActiveSync has been established. See section “ActiveSync – Initial Setup” in Chapter 1 “Introduction”, “Getting Started”.

Serial Port Transfer

- A desktop or laptop PC with an available serial port and an MX3X 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 MX3X 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 MX3X 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”.

Connect

Connect the modem cable to the PC (the host) and the MX3X (the client). Select "Connect" from the Start Menu on the MX3X (**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 on the Desktop PC, click on the Explore button, which allows you to explore the MX3X from the PC side, with some limitations. You can copy files to or from the MX3X by drag-and-drop. You will not be allowed to delete files or copy files out of the \Windows directory on the MX3X. (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 MX3X.
- Put the MX3X 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 MX3X 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 MX3X.
- 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 MX3X INTO SUSPEND WHILE CONNECTED VIA USB. The MX3X will be unable to connect to the host PC when it resumes operation.

Radio Connection

- Put the MX3X 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.

Important Information – Cold Boot and Loss of Host Re-connection

ActiveSync assigns a partnership between a client and a host computer. A partnership is defined by two objects -- a unique computer name and a random number generated when the partnership is first created. An ActiveSync partnership between a unique client can be established to two hosts.

If the MX3X is cold booted, the random number is deleted – and the partnership with the last one of the two hosts is also deleted. The host retains the random numbers and unique names of all devices having a partnership with it. Two clients cannot have a partnership with the same host if they have the same name. (**Control Panel | System | Device Name**)

If the cold booted MX3X tries to reestablish the partnership with the same host PC, a new random number is generated for the MX3X and ActiveSync will insist the unique name of the MX3X be changed. If the MX3X is associated with a second host, changing the name will destroy *that* partnership as well. This can cause some confusion when re-establishing partnerships with hosts.

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 MX3X, select **Start | Settings | Control Panel | Network and Dialup Connections**. 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 | 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 MX3X 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	7
2	3
3	2
4	6, 8
5	5
6, 8	4
7	1
9	no connection

Figure 4-21 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.

MX3X Utilities

The following files are pre-loaded by LXE.

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 device using ActiveSync, or using a Compact Flash ATA card. The CAB files are copied from ATA or using ActiveSync Explore into the folder System, 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 \System).

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 proceeds 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\Cisco Radio]

"FileName"="\System\CISCO.CAB"

"Installed"=dword:0

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

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

"FileName"="\System\SYMBOL.CAB"

"Installed"=dword:0

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

PREGEDIT.EXE

Pocket Registry Editor - part of Microsoft Power Tools for Windows CE. LXE recommends **caution** when editing the Registry and also recommends making a backup copy of the registry before changes are made.

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 this file to warm boot the computer (i.e., all RAM is preserved). It automatically saves the registry before rebooting which means configuration changes are not lost.

WAVPLAY.EXE

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

MX3X Command-line Utility

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).

Passwords are lost upon cold boot. If a password is set, that password must be entered to begin the cold boot power cycle process.

API Calls

See Also: LXE CE API Programming Guide E-SW-WINAPIPG

The LXE CE API Programming Guide documents only the LXE-specific API calls for the MX3X. It is intended as an addition to the standard Microsoft Windows CE API documentation. Details of many of the calls in the LXE guide may be found in Microsoft's documentation.

The APIs documented in the programming guide are included in the file LXEAPI.DLL, which is in the standard Windows CE image on the MX3X.

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 this DLL is installed in MX3X images with a version number of 1.2 or higher (as displayed on the screen during bootup).

A full SDK is now included for Microsoft Embedded Visual C++ 4.0 (which is available free on the Microsoft website).

Reflash the MX3X

Note: When reflashing, LXE recommends using a Compact Flash card that is greater than 64MB. Files to be loaded on the CF card are: NK.BIN, EBOOT.NB0, XSCALE.BIT

Requirement: A screwdriver (not supplied by LXE)

Preparation

- LXE recommends that installation of the CF card be performed on a clean, well-lit surface.
- Remove the screws on the endcap and slide the endcap to the side, being very careful not to disconnect the ribbon cables, 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 loosening the endcap.
- Carefully remove or loosen all cables to an existing CF card. Remove the CF card.

How To

1. Place the compact flash card with new image files on it in the right hand slot.
2. Double-click **My Computer**, then **Storage Card** folder.
3. Select NK.BIN, EBOOT.NB0, XSCALE.BIT. Select **Edit | Copy**.
4. Tap **Back Arrow**. Doubleclick **System Folder**.
5. Select **Edit | Paste**. When asked "Overwrite ?", click **Yes to All**.
6. When the copy process finishes, remove the CF card.
7. Select **Start | Run** and type **Coldboot**.
8. Before the splash screen appears, press and hold down the <A> key. Continue to hold it down until the displays shows "Writing to boot flash".

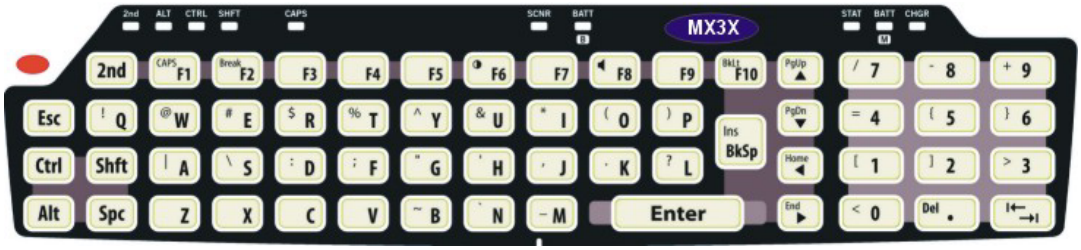
   Note: If you do not press and hold the <A> key quickly enough, the display shows "Loading OS Image". Remove the Main Battery for 2 seconds, re-insert the battery and press the Power button. Press and hold the <A> key again.
9. The MX3X will automatically reboot after flashing the bootloader. "Loading OS Image" is displayed on the screen and when the new OS finishes loading, all software upgrades are complete.
10. Replace the endcap, being careful not to pinch any leads or cables. The touch screen will need to be re-calibrated.

Clearing Persistent Storage

Cold boot now sets all registry settings back to LXE factory defaults. No other clearing is available or necessary.

Appendix A Key Maps

Keypad



Note: *The key mapping in this appendix relates to the physical keypad on the MX3X. See section titled "Input Panel" for the Virtual (or Soft) Keypad used with the stylus.*

Key Map 101-Key Equivalencies

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 [5]						Scan
Esc						Esc
Space						Spc
Enter						Enter
CapsLock (Toggle)	x					F1
Back Space						BkSp
Tab						Tab

[5] 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	
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
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

To get this key	Press These Keys and Then					Press this key
	2nd	Shift	Ctrl	Alt	CapsLock	
j					Off	J
k					Off	K
l					Off	L
m					Off	M
n					Off	N
o					Off	O
p					Off	P
q					Off	Q
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

To get this key	Press These Keys and Then					Press this key
	2nd	Shift	Ctrl	Alt	CapsLock	
S		x				S
T		x				T
U		x				U
V		x				V
W		x				W
X		x				X
Y		x				Y
Z		x				Z
1						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

To get this key	Press These Keys and Then					Press this key
	2nd	Shift	Ctrl	Alt	CapsLock	
, (comma)	x					J
‘ (apostrophe)	x					H
~ (tilde)	x					B
\	x					S
|	x					A
“	x					G
!	x					Q
@	x					W
#	x					E
$	x					R
%	x					T
^	x					Y
&	x					U
(	x					O
)	x					P

Creating Custom Key Maps for the MX3X

Prerequisite: LXE SDK CD

Introduction

A command-line compiler called KEYCOMP.EXE is provided on the SDK CD. Using this compiler, the System Administrator can convert a sample default key map text file into a custom key map text file which, when loaded onto the MX3X, can be chosen by the user to replace the default MX3X keymap and then switched back when they are finished using the customized keys. This custom key map file can be made to re-define the system return code for each of the 61 keys, key press or key press combinations. All keys, except the power key, can be re-mapped.

Custom keymaps for the MX3X are created on a desktop PC using the command line compiler KEYCOMP.EXE. Keycomp processes the input keymap source file and outputs a registry text file.

Note: Each VK_code has a numeric value (for example, VK_F20 = hex 83), these are documented in the SDK include file WINUSER.H (from Microsoft). The numeric value is what needs to go into the registry. Whether the value is hex or decimal depends on the registry editor being used - the one in the MX3X requires decimal, but the desktop one used over ActiveSync that a developer may use requires hex.

For Example
Default values: ScanCodeLeft = hex 83, decimal 131
ScanCodeRight = hex 84, decimal 132

Example:

KEYCOMP DEFAULT.KEY (writes KEYCOMP.REG to local directory)

Input File	→	Compiler	→	Text File
DEFAULT.KEY		KEYCOMP.EXE		KEYCOMP.REG

This output file should be renamed to **xxx.REG** (the suffix must remain REG), then copied to the MX3X over ActiveSync. Once the file is loaded on the MX3X, double-click the file from the Windows CE Explorer desktop. This will run the REGLOAD utility to put it into the registry, and save the registry to non-volatile flash. The keymap is now a permanent part of the MX3X, and the REG file is no longer needed unless it is necessary to perform a cold boot; this will return the registry to factory defaults, and it will be necessary to double-click the REG file again.

Once the keymap has been added to the registry, it should appear in the Keyboard control panel, in the Keymap popup menu. To activate the keymap, select the keymap from the popup menu, and close the control panel with the OK button. To return to the default keymap, select **0409** from the keymap popup and click OK.

The compiler has three functional stages:

- First, the input file is read and parsed for any syntax errors. The data read is stored in internal tables.
- Second, the data parsed from the input file is validated to see that all of the items required by the keyboard driver for normal operation are present.

- Third and finally, the KEYCOMP.REG file is written out in the format required by the REGLOAD utility on the Windows CE device.

Programmable Scan Buttons and Custom Key Mapping

The Left and Right Scan buttons can be reset using Custom Key Mapping. Custom keymapping changes the placement of the buttons (e.g., F1 can now be Scan Left).

The keycode that the Scan Left (or F1) button generates is then determined by the setting in the scanner control panel (See Chapter 4 "System Configuration", Control Panel", "Scanner").

Remapping does not allow multiple entries. If the System Administrator uses Custom Key Mapping set a Scan button to ENTER, the original ENTER key must be redefined to something else. However, if the scanner control panel is used to change the Scan button to generate an ENTER, the original ENTER key is maintained as well.

Note: Tethered scanners are not activated/affected by the Scan buttons on the MX3X.

Keymap Source Format

The source file **DEFAULT.KEY** is supplied with the keymap compiler. This is the commented source for the default keymap **0409**. The comments in this file should make the majority of this document redundant. There is a copy of this file at the end of this section, in "Sample Input File**"**. This section should be read while referring to this sample source, for simplicity.

It is an important limitation that the keymap must have a 4, 5, or 6 digit numeric name; this is a limit of the Microsoft Windows CE layout manager.

The format of this file is familiar to anyone who has used .INI files under Windows. There is a section header in square brackets, followed by various values in the form *value=data*.

Lines beginning with a semicolon (;) or empty lines are ignored as comments. Spaces or tabs before or after the information are stripped off and ignored. Case is ignored in section names, value names, and value data.

*Note: MX3X and Remote Desktop Connection: before connecting to a host using Remote Desktop Connection, go to **Start | Settings | Control Panel | Keyboard** and select **0409** from the keymap popup. Click OK.*

COLxROWx Format

All keys are specified in COLxROWx format. In this format, the first x is the 1 or 2 digit column in the keymap, and the second x is the 1 or 2 digit row in the keymap. All rows and columns are enumerated starting with zero (0).

In the **MAP** section, the **COLxROWx** is the value name, and the values must be less than the **MAPROWS** and **MAPCOLS** specified in the **GENERAL** section.

In the **SPECIAL** section, the **COLxROWx** is the value data, and the values given can be outside the normal key map limits.

GENERAL Section

The first section is the **GENERAL** section. This contains the keymap name (all numerics), as well as the number of rows and columns in the keymap, and the algorithm for converting rows and columns to a data byte to go into the keymap table.

```
.
[General]
MAPNAME=0409
MAPCNT=4
.
```

MAPNAME	Name of this map. This is what appears in the popup menu in the keyboard control panel.
MAPCNT	Gives the number of MAP sections (and hence keymap tables) in this source file.
MAPCOLS	Number of columns in each keymap table. This is defined by the hardware keyboard.
MAPROWS	Number of rows in each keymap table. This is defined by the hardware keyboard.
ALGOR	Defines the algorithm for converting row/column to internal scan code. Current values are: MX3X scancode = ((column << 3) + row)

SPECIAL Section

```
.
[Special]
KEYSHIFT=COL8ROW0
KEYALT=COL9ROW0
.
```

The second section is the **SPECIAL** section, which contains the row and column definitions for certain modifier keys which must be processed independent of the overall keymap. Currently, these are only modifier keys.

The only recognized names are: **KEYSHIFT**, **KEYALT**, **KEY2ND**, and **KEYCONTROL**, and these specify the row and column of these 4 specific modifier keys, in COLxROWx format. Note the row and column for these keys can be outside the keymap limits specified in the **GENERAL** section, since these are not loaded as part of the keymap proper.

MAP Section

```
.
[Map]
MAP=MAP_NORMAL
;;;;;;;;;;;;;;;;;;;;;;;;;
COL0ROW0=VK_ESCAPE
COL0ROW1=VK_F1
.
```

There will be several (4 to 7) **MAP** sections, each defining the keymap for a given combination of modifier keys. The keyboard driver requires keymaps for normal (no modifiers), SHIFT only, 2ND only, and 2ND-SHIFT combined.

The CTRL modifier and ALT modifier do not have individual keymaps; the keystrokes are passed to the operating system, which is allowed to parse these keys according to Microsoft specifications (for example, ALT-keys are defined to only pulldown menus, with no other function).

The only recognized value names are **MAP** and **COLxROWx** (defining a key code). The only valid values for **MAP** are:

MAP_NORMAL	no modifier keys
MAP_2ND	2nd modifier only
MAP_SHIFT	shift modifier only
MAP_2NDSHF (or) MAP_2NDSHIFT	2nd and shift modifiers together

In addition, certain keymaps are used for special adjustment functions within the keyboard driver, via the **CHANGE+mapname** specification:

MAP_VOLUM (or) MAP_VOLUME	special keymap for volume adjustment
MAP_CONTR (or) MAP_CONTRAST	special keymap for contrast adjustment
MAP_BRITE (or) MAP_BRIGHT	special keymap for brightness adjustment

When these maps are selected, the keyboard driver handles the up arrow and down arrow as adjusting the particular parameter up and down, and any other key exits the adjustment state. Keys in these modes are handled completely inside the keyboard driver, and are not propagated to the operating system.

Key codes are defined by **COLxROWx=scancode**. **Scancode** has a number of options, as follows:

VK_code	any valid Windows VK code (see below for valid codes)
'x'	a single ASCII character ('A','b','1','@',' ', etc.)
SHIFT+VK_code	for a shifted VK code (see below for valid codes)
SHIFT+'x'	for a shifted ASCII character (should not be needed)
ACTION+code	special function key (valid codes listed below)
CHANGE+mapname	for modifier keys, change keymaps to mapname, as specified above
OPEN	an unused key position, does nothing when pressed

Valid **ACTION** codes are as follows:

SCAN1	Scan key 1 (left side of display on MX3X)
SCAN2	Scan key 2 (right side of display on MX3X)
SCAN3	Handle trigger button (unused on MX3X, but specified)
POWER	power button
BACKLIGHT	backlight on/off function

Note that specifying the power button in a different location will affect suspend/resume functions. The "15-second hold to force reboot" function is controlled by hardware, and will only work with the default power button.

Keycomp Error Messages

Most error messages will specify the line within the keymap source file where the error occurred.

Duplicate key

A COLxROWx code was found in a MAP table, but that COL/ROW already has a value assigned.

GENERAL section must come before MAP

The GENERAL section must come first, or at least before any MAP sections. The GENERAL section defines parameters which are needed to process Maps

Header line missing close bracket

The section header line must have square brackets before and after the section name

Header line missing open bracket

The section header line must have square brackets before and after the section name

Invalid ACTION code %s

The key scan code is specified as ACTION+code, but the ACTION code parsed is not recognized. The following values are valid: SCAN1, SCAN2, SCAN3, POWER, or BACKLIGHT.

Invalid keycode %s

The keycode parsed is not recognized. The following values are valid:

- VK code from the VK code table (below)
- 'x' where x is an ASCII code (e.g. 'A' or '#').
- OPEN for unused entries (will not do anything when pressed)

Invalid MAP value %s

The MAP value parsed is not one the following list: MAP_NORMAL, MAP_2ND, MAP_SHIFT, MAP_2NDSHF, MAP_2NDSHIFT, MAP_VOLUM, MAP_VOLUME, MAP_CONTR, MAP_CONTRAST, MAP_BRITE, or MAP_BRIGHT.

Invalid MAPCNT (1-%d valid)

The specified MAPCNT exceeds the limits of the KEYCOMP compiler.

Invalid MAPCOLS (1-%d valid)

The specified MAPCOLS exceeds the limits of the KEYCOMP compiler.

Invalid MAPROWS (1-%d valid)

The specified MAPROWS exceeds the limits of the KEYCOMP compiler.

Invalid ROWCOL format

A COLxROWx was expected, but the format was not correct. The only valid formats are: COLxROWx, COLxxROWx, COLxROWxx, or COLxxROWxx, where xx are decimal numeric digits (0-9).

Invalid scan code

The scan code parsed is not recognized. The scan code can take one of the following formats:

- VK_code
- 'x'
- SHIFT+VK_code
- SHIFT+'x'
- ACTION+code
- CHANGE+mapname
- OPEN

Invalid section name %s

The section name parsed is invalid. The only recognized names are: GENERAL, SPECIAL, or MAP

Invalid SHIFT code %s

The key scan code is specified as SHIFT+code, but the SHIFT code parsed is not recognized. The following values are valid:

- VK code from the VK code table (below)
- 'x' where x is an ASCII code (e.g. 'A', '3', or '#').

Invalid value %s in GENERAL section

The value name parsed is invalid for the GENERAL section. The recognized names are: MAPNAME, MAPCNT, MAPCOLS, MAPROWS, or ALGOR

Invalid value %s in MAP section

The value name parsed is not expected in the SPECIAL section. The only recognized names are: MAP and COLxxx.

Invalid value %s in SPECIAL section

The value name parsed is not expected in the SPECIAL section. The only recognized names are: KEYSHIFT, KEYALT, KEY2ND, and KEYCONTROL.

Invalid VK_ code %s

The VK code parsed is not recognized. See the VK Code Table (below) for valid values.

Map ended without MAP value

The MAP section must contain a MAP value, so the data fields can be parsed.

MAPNAME must be all numerics

Because of limitations in Microsoft Layout Manager, the map name must be all numeric (4, 5, or 6 digits). The name parsed did not fit this limitation.

No definition for map MAP_2ND

There is no 2nd keymap defined. The keyboard driver requires this keymap to be defined. This message comes from the post-parse validation, so no line # is specified.

No definition for map MAP_2NDSHIFT

There is no 2nd-SHIFT keymap defined. The keyboard driver requires this keymap to be defined. This message comes from the post-parse validation, so no line # is specified.

No definition for map MAP_NORMAL

There is no Normal keymap defined. The keyboard driver requires this keymap to be defined. This message comes from the post-parse validation, so no line # is specified.

No definition for map MAP_SHIFT

There is no SHIFT keymap defined. The keyboard driver requires this keymap to be defined. This message comes from the post-parse validation, so no line # is specified.

No definition for MapHead.key2nd

No 2ND modifier key definition was found. The keyboard driver requires this key to be defined somewhere in one of the keymaps. This message comes from the post-parse validation, so no line # is specified.

No definition for MapHead.keyalt

No ALT modifier key definition was found. The keyboard driver requires this key to be defined somewhere in one of the keymaps. This message comes from the post-parse validation, so no line # is specified.

No definition for MapHead.keycontrol

No CTRL modifier key definition was found. The keyboard driver requires this key to be defined somewhere in one of the keymaps. This message comes from the post-parse validation, so no line # is specified.

No definition for MapHead.keydnarrow

No down arrow definition was found The keyboard driver requires this key to be defined somewhere in one of the keymaps. This message comes from the post-parse validation, so no line # is specified.

No definition for MapHead.keypower

No power key definition was found. The keyboard driver requires this key to be defined somewhere in one of the keymaps. This message comes from the post-parse validation, so no line # is specified.

No definition for MapHead.keyscan1

No Scan Key 1 definition was found. The keyboard driver requires this key to be defined somewhere in one of the keymaps. This message comes from the post-parse validation, so no line # is specified.

No definition for MapHead.keyscan2

No Scan Key 2 definition was found. The keyboard driver requires this key to be defined somewhere in one of the keymaps. This message comes from the post-parse validation, so no line # is specified.

No definition for MapHead.keyscan3

No Trigger Button definition was found. The keyboard driver requires this key to be defined somewhere in one of the keymaps. This message comes from the post-parse validation, so no line # is specified.

No definition for MapHead.keyshift

No SHIFT modifier key definition was found. The keyboard driver requires this key to be defined somewhere in one of the keymaps. This message comes from the post-parse validation, so no line # is specified.

No definition for MapHead.keyuparrow

No up arrow definition was found The keyboard driver requires this key to be defined somewhere in one of the keymaps. This message comes from the post-parse validation, so no line # is specified.

No equal in value line

A value line must be of the form *value=data*. A value line was expected, but there was no equal in it. *(or)* A comment line did not begin with a semicolon (;).

No MAPNAME defined

There is no map name defined. The keyboard driver requires this name to be able to load the keymap tables. This message comes from the post-parse validation, so no line # is specified.

Scan code algorithm required

A COLxROWx data value was found before any ALGOR statement. ALGOR algorithm is parsed to decide how to encode COLxROWx into a keymap value.

Too many maps for specified MAPCNT

There are more MAP sections defined that the MAPCNT field specified.

Unknown scan code algorithm

The ALGOR algorithm specified is not one that KEYCOMP understands.

Unrecognized scancode algorithm %s

The ALGOR algorithm specified is not one that KEYCOMP understands.

Value outside of section

A value (defined as *value=data*) is only valid within a section (defined as *[section]*). A value line was found when a section header line was expected.

Sample Input File

```
;;-----------------------------------------------------
;; keymap file for MX3X default keyboard
;;-----------------------------------------------------

;;-----------------------------------------------------
;; general parms give the size of arrays
;; all numeric values are decimal
;; these numbers are validated with the data below
;; at compile time
;; MAPNAME must be all numerics
;;-----------------------------------------------------
[General]
MAPNAME=0409
MAPCNT=4
MAPCOLS=8
MAPROWS=8
ALGOR=MX3X

;;-----------------------------------------------------
;; special keys are accessed outside the map
;; this specifies the row and column
;; these should not need to change, but...
;;-----------------------------------------------------
[Special]
KEYSHIFT=COL8ROW0
KEYALT=COL9ROW0
KEY2ND=COL10ROW0
KEYCONTROL=COL11ROW0

;;-----------------------------------------------------
;; the name of this key doesn't matter
;; the important part is the MAP value
;; codes are defined in docs
;; this is the map for keys with no modifier
;;-----------------------------------------------------
[Map]
MAP=MAP_NORMAL
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL0ROW0=VK_ESCAPE
COL0ROW1=VK_F1
COL0ROW2=ACTION+POWER
COL0ROW3=VK_F2
COL0ROW4=VK_F5
COL0ROW5=VK_F7
COL0ROW6='8'
COL0ROW7=ACTION+SCAN1
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL1ROW0='Q'
COL1ROW1='9'
COL1ROW2=ACTION+SCAN3
COL1ROW3='T'
COL1ROW4='U'
COL1ROW5='4'
COL1ROW6='O'
COL1ROW7=ACTION+SCAN2
;;;;;;;;;;;;;;;;;;;;;;;;;;
```

```
COL2ROW0='A'
COL2ROW1=open
COL2ROW2='D'
COL2ROW3='G'
COL2ROW4='J'
COL2ROW5='1'
COL2ROW6='L'
COL2ROW7='3'
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL3ROW0=' '
COL3ROW1=open
COL3ROW2='X'
COL3ROW3='V'
COL3ROW4='N'
COL3ROW5='0'
COL3ROW6=VK_LEFT
COL3ROW7=VK_TAB
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL4ROW0=VK_F9
COL4ROW1='S'
COL4ROW2=VK_RIGHT
COL4ROW3='F'
COL4ROW4='H'
COL4ROW5='K'
COL4ROW6='2'
COL4ROW7=VK_UP
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL5ROW0='6'
COL5ROW1='Z'
COL5ROW2=VK_BACK
COL5ROW3='C'
COL5ROW4='B'
COL5ROW5='M'
COL5ROW6=VK_PERIOD
COL5ROW7=VK_DOWN
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL6ROW0=VK_F10
COL6ROW1='W'
COL6ROW2=VK_RETURN
COL6ROW3='R'
COL6ROW4='Y'
COL6ROW5='I'
COL6ROW6='5'
COL6ROW7='P'
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL7ROW0='E'
COL7ROW1=open
COL7ROW2=VK_F3
COL7ROW3=VK_F4
COL7ROW4=VK_F6
COL7ROW5='7'
COL7ROW6=VK_F8
COL7ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;
```

```
;;-----------------------------------------------------
;; the name of this key doesn't matter
;; the important part is the MAP value
;; codes are defined in docs
;; this is the map for keys with only 2ND
;;-----------------------------------------------------
[Map]
MAP=MAP_2ND
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL0ROW0=open
COL0ROW1=VK_CAPITAL
COL0ROW2=ACTION+POWER
COL0ROW3=SHIFT+VK_PAUSE
COL0ROW4=open
COL0ROW5=open
COL0ROW6=VK_HYPHEN
COL0ROW7=ACTION+SCAN1
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL1ROW0=SHIFT+'1'
COL1ROW1=SHIFT+VK_EQUAL
COL1ROW2=ACTION+SCAN3
COL1ROW3=SHIFT+'5'
COL1ROW4=SHIFT+'7'
COL1ROW5=VK_EQUAL
COL1ROW6=SHIFT+'9'
COL1ROW7=ACTION+SCAN2
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL2ROW0=SHIFT+VK_BACKSLASH
COL2ROW1=open
COL2ROW2=SHIFT+VK_SEMICOLON
COL2ROW3=SHIFT+VK_APOSTROPHE
COL2ROW4=VK_COMMA
COL2ROW5=VK_LBRACKET
COL2ROW6=SHIFT+VK_SLASH
COL2ROW7=SHIFT+VK_PERIOD
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL3ROW0=open
COL3ROW1=open
COL3ROW2=open
COL3ROW3=open
COL3ROW4=VK_BACKQUOTE
COL3ROW5=SHIFT+VK_COMMA
COL3ROW6=VK_HOME
COL3ROW7=SHIFT+VK_TAB
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL4ROW0=open
COL4ROW1=VK_BACKSLASH
COL4ROW2=VK_END
COL4ROW3=VK_SEMICOLON
COL4ROW4=VK_APOSTROPHE
COL4ROW5=VK_PERIOD
COL4ROW6=VK_RBRACKET
COL4ROW7=VK_PRIOR
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL5ROW0=SHIFT+VK_RBRACKET
COL5ROW1=open
COL5ROW2=VK_INSERT
COL5ROW3=open
COL5ROW4=SHIFT+VK_BACKQUOTE
```

```
COL5ROW5=SHIFT+VK_HYPHEN
COL5ROW6=VK_DELETE
COL5ROW7=VK_NEXT
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL6ROW0=ACTION+BACKLIGHT
COL6ROW1=SHIFT+'2'
COL6ROW2=open
COL6ROW3=SHIFT+'4'
COL6ROW4=SHIFT+'6'
COL6ROW5=SHIFT+'8'
COL6ROW6=SHIFT+VK_LBRACKET
COL6ROW7=SHIFT+'0'
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL7ROW0=SHIFT+'3'
COL7ROW1=open
COL7ROW2=open
COL7ROW3=open
COL7ROW4=CHANGE+MAP_CONTRAST
COL7ROW5=VK_SLASH
COL7ROW6=CHANGE+MAP_VOLUME
COL7ROW7=open

;;-----------------------------------------------------
;; the name of this key doesn't matter
;; the important part is the MAP value
;; codes are defined in docs
;; this is the map for keys with 2ND and SHIFT
;;-----------------------------------------------------
[Map]
MAP=MAP_2NDSHIFT
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL0ROW0=open
COL0ROW1=VK_F11
COL0ROW2=ACTION+POWER
COL0ROW3=VK_F12
COL0ROW4=open
COL0ROW5=open
COL0ROW6='8'
COL0ROW7=ACTION+SCAN1
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL1ROW0=open
COL1ROW1='9'
COL1ROW2=ACTION+SCAN3
COL1ROW3=open
COL1ROW4=open
COL1ROW5='4'
COL1ROW6=open
COL1ROW7=ACTION+SCAN2
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL2ROW0=open
COL2ROW1=open
COL2ROW2=open
COL2ROW3=open
COL2ROW4=open
COL2ROW5='1'
COL2ROW6=open
COL2ROW7='3'
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL3ROW0=open
COL3ROW1=open
```

```
COL3ROW2=open
COL3ROW3=open
COL3ROW4=open
COL3ROW5='0'
COL3ROW6=open
COL3ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL4ROW0=open
COL4ROW1=open
COL4ROW2=open
COL4ROW3=open
COL4ROW4=open
COL4ROW5=open
COL4ROW6='2'
COL4ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL5ROW0='6'
COL5ROW1=open
COL5ROW2=open
COL5ROW3=open
COL5ROW4=open
COL5ROW5=open
COL5ROW6=open
COL5ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL6ROW0=open
COL6ROW1=open
COL6ROW2=open
COL6ROW3=open
COL6ROW4=open
COL6ROW5=open
COL6ROW6='5'
COL6ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL7ROW0=open
COL7ROW1=open
COL7ROW2=VK_PAUSE
COL7ROW3=VK_SCROLL
COL7ROW4=VK_SNAPSHOT
COL7ROW5='7'
COL7ROW6=open
COL7ROW7=open
;;;;;;;;;;;;;;;;;;;;;;;;;;
```

```
;;-----------------------------------------------------
;; the name of this key doesn't matter
;; the important part is the MAP value
;; codes are defined in docs
;; this is the map for keys with only SHIFT
;;-----------------------------------------------------
[Map]
MAP=MAP_SHIFT
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL0ROW0=SHIFT+VK_ESCAPE
COL0ROW1=SHIFT+VK_F1
COL0ROW2=ACTION+POWER
COL0ROW3=SHIFT+VK_F2
COL0ROW4=SHIFT+VK_F5
COL0ROW5=SHIFT+VK_F7
COL0ROW6=SHIFT+'8'
COL0ROW7=ACTION+SCAN1
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL1ROW0=SHIFT+'Q'
COL1ROW1=SHIFT+'9'
COL1ROW2=ACTION+SCAN3
COL1ROW3=SHIFT+'T'
COL1ROW4=SHIFT+'U'
COL1ROW5=SHIFT+'4'
COL1ROW6=SHIFT+'O'
COL1ROW7=ACTION+SCAN2
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL2ROW0=SHIFT+'A'
COL2ROW1=open
COL2ROW2=SHIFT+'D'
COL2ROW3=SHIFT+'G'
COL2ROW4=SHIFT+'J'
COL2ROW5=SHIFT+'1'
COL2ROW6=SHIFT+'L'
COL2ROW7=SHIFT+'3'
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL3ROW0=SHIFT+' '
COL3ROW1=open
COL3ROW2=SHIFT+'X'
COL3ROW3=SHIFT+'V'
COL3ROW4=SHIFT+'N'
COL3ROW5=SHIFT+'0'
COL3ROW6=SHIFT+VK_LEFT
COL3ROW7=SHIFT+VK_TAB
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL4ROW0=SHIFT+VK_F9
COL4ROW1=SHIFT+'S'
COL4ROW2=SHIFT+VK_RIGHT
COL4ROW3=SHIFT+'F'
COL4ROW4=SHIFT+'H'
COL4ROW5=SHIFT+'K'
COL4ROW6=SHIFT+'2'
COL4ROW7=SHIFT+VK_UP
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL5ROW0=SHIFT+'6'
COL5ROW1=SHIFT+'Z'
COL5ROW2=SHIFT+VK_BACK
COL5ROW3=SHIFT+'C'
COL5ROW4=SHIFT+'B'
```

```
COL5ROW5=SHIFT+'M'
COL5ROW6=SHIFT+VK_PERIOD
COL5ROW7=SHIFT+VK_DOWN
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL6ROW0=SHIFT+VK_F10
COL6ROW1=SHIFT+'W'
COL6ROW2=SHIFT+VK_RETURN
COL6ROW3=SHIFT+'R'
COL6ROW4=SHIFT+'Y'
COL6ROW5=SHIFT+'I'
COL6ROW6=SHIFT+'5'
COL6ROW7=SHIFT+'P'
;;;;;;;;;;;;;;;;;;;;;;;;;;
COL7ROW0=SHIFT+'E'
COL7ROW1=open
COL7ROW2=SHIFT+VK_F3
COL7ROW3=SHIFT+VK_F4
COL7ROW4=SHIFT+VK_F6
COL7ROW5=SHIFT+'7'
COL7ROW6=SHIFT+VK_F8
COL7ROW7=open
```

Sample Output File

```
[HKEY_CURRENT_USER\Keyboard Layout\0409]
;; header limits and special keys
;;   MAPCNT
;;   MAPCOLS
;;   MAPROWS
;;   # of keys in each map
;;   (unused)
;;   (unused)
;;   scancode value for power key
;;   scancode value for up arrow
;;   scancode value for down arrow
;;   scancode value for scan key 1
;;   scancode value for scan key 2
;;   scancode value for trigger button
;;   scancode value for SHIFT
;;   scancode value for ALT
;;   scancode value for 2ND
;;   scancode value for CTRL key
"Head"=hex: 04,08,08,40,00,00,02,27,2F,07,0F,0A,40,48,50,58

;; Map0 is the scancode values for the NORMAL key map
"Map0"=hex:\
    1B,70,DF,71,74,76,38,87,51,39,89,54,55,34,4F,88,\
    41,00,44,47,4A,31,4C,33,20,00,58,56,4E,30,25,09,\
    78,53,27,46,48,4B,32,26,36,5A,08,43,42,4D,BE,28,\
    79,57,0D,52,59,49,35,50,45,00,72,73,75,37,77,00

;; Flag0 is the shift codes for the NORMAL key map
"Flag0"=hex:\
    00,00,A0,00,00,00,00,A0,00,00,A0,00,00,00,00,A0,\
    00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,\
    00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,\
    00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00

;; Map1 is the scancode values for the 2ND key map
"Map1"=hex:\
    00,14,DF,13,00,00,BD,87,31,BB,89,35,37,BB,39,88,\
    DC,00,BA,DE,BC,DB,BF,BE,00,00,00,00,C0,BC,24,09,\
    00,DC,23,BA,DE,BE,DD,21,DD,00,2D,00,C0,BD,2E,22,\
    8A,32,00,34,36,38,DB,30,33,00,00,00,00,BF,00,00

;; Flag1 is the shift codes for the 2ND key map
"Flag1"=hex:\
    00,00,A0,10,00,86,00,A0,10,10,A0,10,10,00,10,A0,\
    10,00,10,10,00,00,10,10,00,00,00,00,00,10,00,10,\
    00,00,00,00,00,00,00,00,10,00,00,00,10,10,00,00,\
    A0,10,00,10,10,10,10,10,10,00,00,00,85,00,84,00

;; Map2 is the scancode values for the 2ND-SHIFT key map
"Map2"=hex:\
    00,7A,DF,7B,00,00,38,87,00,39,89,00,00,34,00,88,\
    00,00,00,00,00,31,00,33,00,00,00,00,00,30,00,00,\
    00,00,00,00,00,00,32,00,36,00,00,00,00,00,00,00,\
    00,00,00,00,00,00,35,00,00,00,13,91,2C,37,00,00
```

```
;; Flag2 is the shift codes for the 2ND-SHIFT key map
"Flag2"=hex:\
    00,00,A0,00,00,00,00,A0,00,00,A0,00,00,00,00,A0,\
    00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,\
    00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,\
    00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00

;; Map3 is the scancode values for the SHIFT key map
"Map3"=hex:\
    1B,70,DF,71,74,76,38,87,51,39,89,54,55,34,4F,88,\
    41,00,44,47,4A,31,4C,33,20,00,58,56,4E,30,25,09,\
    78,53,27,46,48,4B,32,26,36,5A,08,43,42,4D,BE,28,\
    79,57,0D,52,59,49,35,50,45,00,72,73,75,37,77,00

;; Flag3 is the shift codes for the SHIFT key map
"Flag3"=hex:\
    10,10,A0,10,10,10,10,A0,10,10,A0,10,10,10,10,A0,\
    10,00,10,10,10,10,10,10,10,00,10,10,10,10,10,10,\
    10,10,10,10,10,10,10,10,10,10,10,10,10,10,10,10,\
    10,10,10,10,10,10,10,10,10,00,10,10,10,10,10,00
```

List of Valid VK Codes for CE .NET

This is the list of codes parsed by KEYCOMP compiler. Refer to Microsoft Windows documentation for further clarification of the meaning of these key codes. Any VK keys not defined here are not valid for use under Windows CE .NET.

VK_LBUTTON	VK_EXECUTE	VK_F9	VK_BROWSER_REFRESH
VK_RBUTTON	VK_SNAPSHOT	VK_F10	VK_BROWSER_STOP
VK_CANCEL	VK_INSERT	VK_F11	VK_BROWSER_SEARCH
VK_MBUTTON	VK_DELETE	VK_F12	VK_BROWSER_FAVORITES
VK_BACK	VK_HELP	VK_F13	VK_BROWSER_HOME
VK_TAB	VK_LWIN	VK_F14	VK_VOLUME_MUTE
VK_CLEAR	VK_RWIN	VK_F15	VK_VOLUME_DOWN
VK_RETURN	VK_APPS	VK_F16	VK_VOLUME_UP
VK_SHIFT	VK_SLEEP	VK_F17	VK_MEDIA_NEXT_TRACK
VK_CONTROL	VK_NUMPAD0	VK_F18	VK_MEDIA_PREV_TRACK
VK_MENU	VK_NUMPAD1	VK_F19	VK_MEDIA_STOP
VK_PAUSE	VK_NUMPAD2	VK_F20	VK_MEDIA_PLAY_PAUSE
VK_CAPITAL	VK_NUMPAD3	VK_F21	VK_LAUNCH_MAIL
VK_KANA	VK_NUMPAD4	VK_F22	VK_LAUNCH_MEDIA_SELECT
VK_HANGUL	VK_NUMPAD5	VK_F23	VK_LAUNCH_APP1
VK_JUNJA	VK_NUMPAD6	VK_F24	VK_LAUNCH_APP2
VK_FINAL	VK_NUMPAD7	VK_NUMLOCK	VK_LBRACKET
VK_HANJA	VK_NUMPAD8	VK_SCROLL	VK_BACKSLASH
VK_KANJI	VK_NUMPAD9	VK_LSHIFT	VK_RBRACKET
VK_ESCAPE	VK_MULTIPLY	VK_RSHIFT	VK_APOSTROPHE
VK_CONVERT	VK_ADD	VK_LCONTROL	VK_OFF
VK_NOCONVERT	VK_SEPARATOR	VK_RCONTROL	VK_ATTN
VK_SPACE	VK_SUBTRACT	VK_LMENU	VK_CRSEL
VK_PRIOR	VK_DECIMAL	VK_RMENU	VK_EXSEL
VK_NEXT	VK_DIVIDE	VK_SEMICOLON	VK_EREOF
VK_END	VK_F1	VK_EQUAL	VK_PLAY
VK_HOME	VK_F2	VK_COMMA	VK_ZOOM
VK_LEFT	VK_F3	VK_HYPHEN	VK_NONAME
VK_UP	VK_F4	VK_PERIOD	VK_PA1
VK_RIGHT	VK_F5	VK_SLASH	VK_OEM_CLEAR
VK_DOWN	VK_F6	VK_BACKQUOTE	
VK_SELECT	VK_F7	VK_BROWSER_BACK	
VK_PRINT	VK_F8	VK_BROWSER_FORWARD	

Appendix B Technical Specifications

Physical Specifications

Features		Specifications	Comments	
CPU		Xscale PXA255 CPU operating at 400 MHz. Turbo mode switching is supported.	32 bit CPU (with on-chip cache)	
Compact Flash (Internal)		Supports an ATA interface only.	3.3v ATA flash card. Inaccessible by customer.	
Memory	ROM RAM	64 MB Flash 64 or 128MB of SDRAM	 System Memory	
Display	LCD	Monochrome Transflective Transmissive Color	Transflective LCD with touchscreen. Customer Configurable Backlighting	
Mass Storage	Removable PC Card	SRAM or Flash PCMCIA Type I or II PC Cards (Various Sizes) Compact Flash Card	Bootable SRAM PC Card, ATA Flash PC Card, or ATA Hard Drive PC Card (Customer Installable)	
PCMCIA Interface		Slot 0 accepts Type I and II 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 USB Host / Client Ports		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)	Scanner – SE923 Symbol engine	

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”	cm
		Width	8”	cm
		Depth	1.35”	cm
Batteries	Main	1900 mAh 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

Type	LCD - Transflective Monochrome, 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

Environmental Specifications

MX3X and Endcaps

Operating Temperature	-4°F to 122°F (-20°C to 50°C) monochrome 32°F to 122°F (0°C to 50°C) color
Storage Temperature	-22°F to 158°F (-30°C to 70°C)
Water and Dust	IEC IP66
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 810F
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

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

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 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 MX3X Environmental Specs
Storage Temperature	see MX3X 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 MX3X Environmental Specs
Storage Temperature	see MX3X Environmental Specs
Connectivity:	TCP/IP, Ethernet, NDSI

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