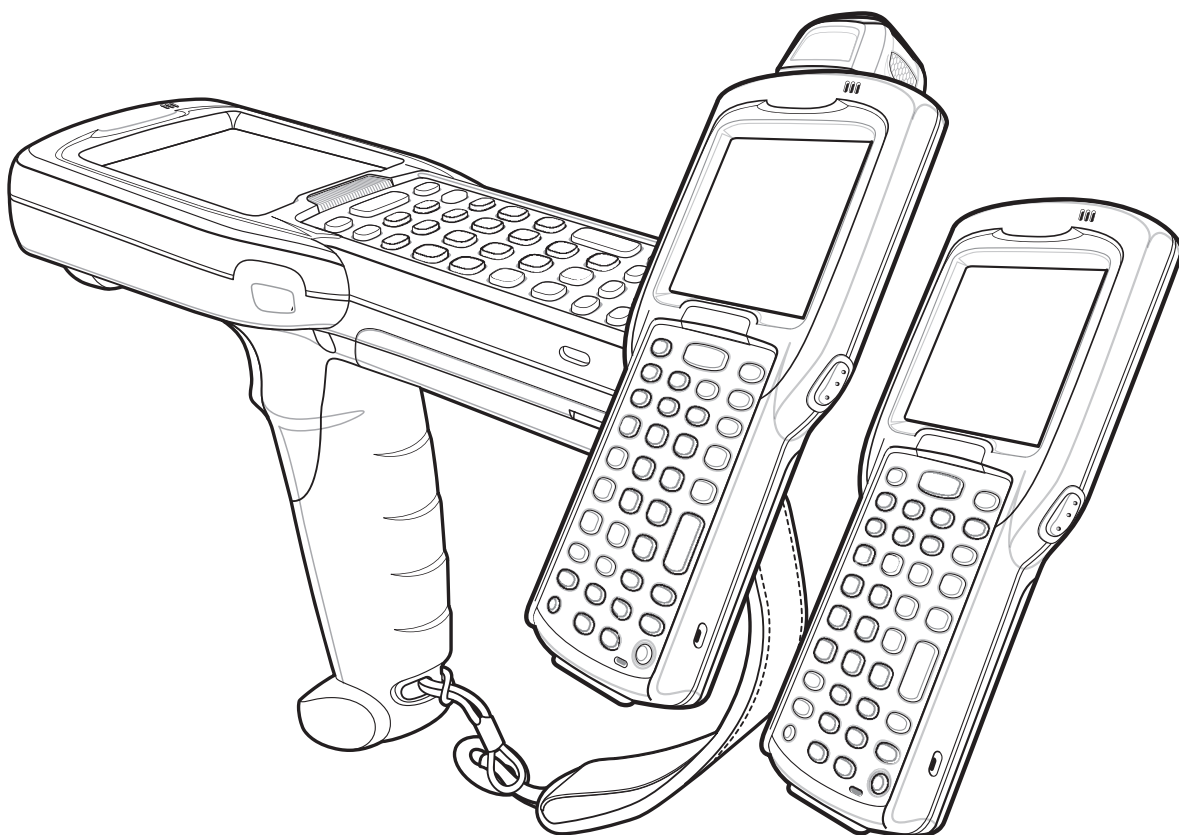


MC31XX Series Mobile Computer

User Guide



MC31XX Series Mobile Computer

User Guide

72E-124289-03

Revision B

March 2015

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Revision History

Changes to the original manual are listed below:

Change	Date	Description
-01 Rev A	October 2009	Initial release.
-02 Rev A	May 2010	Add Windows Mobile 6.5.3 support with OEM version 02.27.0000, new memory configurations
-03 Rev A	December 2014	Zebra Rebranding
-03 Rev B	March 2015	Zebra Rebranding

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Glossary

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About This Guide

Introduction

This guide provides information about using the MC31XX mobile computers and accessories.



NOTE

Screens and windows pictured in this guide are samples and may differ from actual screens.

For configurations with OEM version 02.27.000X and Windows Mobile 6.5 operating system, refer to [Appendix C, Windows Mobile 6.5](#) for information about new features.

Documentation Set

The documentation set for the MC31XX is divided into guides that provide information for specific user needs.

- **MC31XX Series Quick Start Guide** - describes how to use the MC31XXS and MC31XXR mobile computers.
- **MC3190G Quick Start Guide** - describes how to use the MC3190G mobile computer.
- **MC31XX Series Mobile Computer User Guide** - describes how to use the MC31XX mobile computer.
- **MC31XX Series Mobile Computer Integrator Guide** - describes how to set up the MC31XX mobile computer and the accessories.
- **Microsoft Applications for Windows Mobile 6.1 and CE 6.0 User Guide** - describes how to use Microsoft developed applications.
- **Application Guide for Zebra Devices** - describes how to use Zebra developed applications.
- **EMDK Help File** - provides API information for writing applications.

Configurations

This guide covers the following configurations:

Configuration	Radios	Display	Memory	Data Capture	Operating System	Keypads
MC3100R	WPAN: Bluetooth	Color	128 MB RAM/ 256 MB Flash or 256 MB RAM/512 MB Flash	1D laser scanner in rotating turret	Windows CE 6.0 Professional	28, 38 or 48 key
MC3100S	WPAN: Bluetooth	Color	128 MB RAM/ 256 MB Flash or 256 MB RAM/512 MB Flash	1D laser scanner, 2D imager	Windows CE 6.0 Professional or Windows Mobile 6.X Classic	28, 38 or 48 key
MC3190G	WLAN: 802.11a/b/g WPAN: Bluetooth	Color	128 MB RAM/ 512 MB Flash or 256 MB RAM/1 GB Flash	1D laser scanner or 2D imager	Windows CE 6.0 Professional or Windows Mobile 6.X Classic	28, 38 or 48 key
MC3190R	WLAN: 802.11a/b/g WPAN: Bluetooth	Color	128 MB RAM/ 512 MB Flash or 256 MB RAM/1 GB Flash	1D laser scanner in rotating turret	Windows CE 6.0 Professional or Windows Mobile 6.X Classic	28, 38 or 48 key
MC3190S	WLAN: 802.11a/b/g WPAN: Bluetooth	Color	128 MB RAM/ 512 MB Flash or 256 MB RAM/1 GB Flash	1D laser scanner, 2D imager or DPM imager	Windows CE 6.0 Professional or Windows Mobile 6.X Classic	28, 38 or 48 key

Software Versions

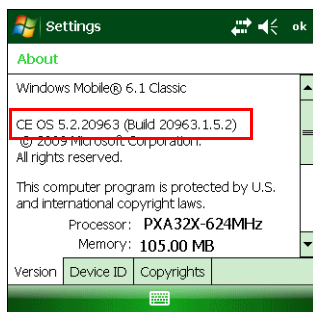
This guide covers various software configurations and references are made to operating system or software versions for:

- Adaptation Kit Update (AKU) version
- OEM version
- BTE Explorer version
- Fusion version.

AKU Version for Windows Mobile 6.X Devices

To determine the Adaptation Kit Update (AKU) version on a Windows Mobile 6.X device:

Tap **Start > Settings > System tab > About icon > Version tab**.

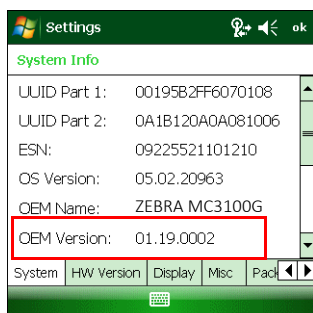


The second line lists the operating system version and the build number. The last part of the build number represents the AKU number. For example, *Build 20963.1.5.2* indicates that the device is running AKU version 1.5.2.

OEM Version on Windows Mobile 6.X Devices

To determine the OEM software version on a Windows Mobile 6.X device:

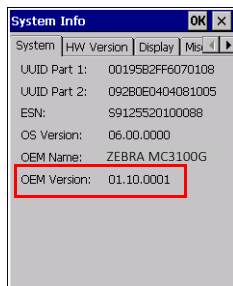
Tap **Start > Settings > System tab > System Information icon > System tab**.



OEM Version on Windows CE 6.0 Devices

To determine the OEM software version on a Windows CE 6.0 device:

Tap **Start > Settings > Control Panel > System Info icon > System tab**.



BTE Explorer Software

To determine the BTE Explorer software version on a Windows Mobile 6.X or Windows CE 6.0 device:

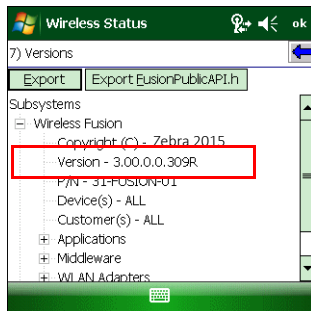
Tap **BTE Explorer icon > Show BTE Explorer > File > About**.



Fusion Software

To determine the Fusion software version on a Windows Mobile 6.X or Windows CE 6.0 device:

Tap **Wireless Strength** icon > **Wireless Status** > **Versions**.



Chapter Descriptions

Topics covered in this guide are as follows:

- [Chapter 1, Getting Started](#), describes the mobile computer's physical characteristics, how to install and charge the batteries, remove and replace the handstrap and how to start the mobile computer for the first time.
- [Chapter 2, Operating the MC31XX](#), provides basic instructions for using the mobile computer and navigating the mobile computer software.
- [Chapter 3, Using Bluetooth](#), explains how to perform Bluetooth functionality on the mobile computer.
- [Chapter 4, Accessories](#), describes the accessories available for the mobile computer and how to use the accessories to charge the mobile computer.
- [Chapter 5, Maintenance and Troubleshooting](#), includes instructions on cleaning and storing the mobile computer, and provides troubleshooting solutions for potential problems during mobile computer operation.
- [Appendix A, Technical Specifications](#), includes a table listing the technical specifications for the mobile computer.
- [Appendix B, Keypads](#), contains keypad descriptions and special character generation tables.
- [Appendix C, Windows Mobile 6.5](#), explains the new features in Windows 6.5.3.

Notational Conventions

The following conventions are used in this document:

- The term “mobile computer” refers to the Zebra MC31XX.
- *Italics* are used to highlight the following:
 - Chapters and sections in this and related documents
 - Dialog box, window and screen names
 - Drop-down list and list box names
 - Check box and radio button names
 - Icons on a screen.
- **Bold** text is used to highlight the following:
 - Key names on a keypad
 - Button names on a screen.
- Bullets (•) indicate:
 - Action items
 - Lists of alternatives
 - Lists of required steps that are not necessarily sequential.
- Sequential lists (e.g., those that describe step-by-step procedures) appear as numbered lists.

Related Documents and Software

The following items provide more information about the MC31XX mobile computers.

- *MC31XX Series Quick Start Guide*, p/n 72-124259-xx
- *MC3190G Quick Start Guide*, p/n 72-124276-xx
- *MC31XX Regulatory Guide*, p/n 72-124293-xx
- *MC31XX Series Mobile Computer Integrator Guide*, p/n 72E-68900-xx
- *Application Guide for Zebra Devices*, p/n 72E-68901-xx
- *Microsoft® Applications for Mobile 6.1 and CE 6.0 User Guide*, p/n 72E-108299-xx
- *Developer Kit (EMDK) Help File*, p/n 72E-38880-03
- *Windows CE Platform SDK for MC3100c50*, available at: <http://www.zebra.com/support>
- *Developer Kit for C (EMDK for C)*, available at: <http://www.zebra.com/support>
- ActiveSync software, available at: <http://www.microsoft.com>.

For the latest version of this guide and all guides, go to: <http://www.zebra.com/support>.

Service Information

If you have a problem with your equipment, contact Zebra support for your region. Contact information is available at: <http://www.zebra.com/support>.

When contacting support, please have the following information available:

- Serial number of the unit
- Model number or product name
- Software type and version number

Zebra responds to calls by email, telephone or fax within the time limits set forth in support agreements.

If your problem cannot be solved by Zebra Support, you may need to return your equipment for servicing and will be given specific directions. Zebra is not responsible for any damages incurred during shipment if the approved shipping container is not used. Shipping the units improperly can possibly void the warranty.

If you purchased your Zebra business product from a Zebra business partner, contact that business partner for support.

Chapter 1 Getting Started

Introduction

This chapter describes the mobile computer physical characteristics, how to install and charge the batteries, how to remove and replace the handstrap and how to start the mobile computer for the first time.

Unpacking the Mobile Computer

Carefully remove all protective material from around the mobile computer and save the shipping container for later storage and shipping. Verify that the equipment listed below is included:

- Mobile computer
- Battery
- Regulatory Guide
- Quick Start Guide.

Inspect the equipment for damage. If any equipment is missing or damaged, contact the Zebra Support immediately. See [Service Information on page xvi](#) for contact information.

Features

There are three versions of the MC31XX mobile computers, the MC31XXS with 1D laser and 2D Imager, the MC31XXR with Rotating Scan Turret and the MC3190G with 1D laser and 2D Imager. For more information on the Rotating Scan Turret, see [Figure 1-3 on page 1-3](#).

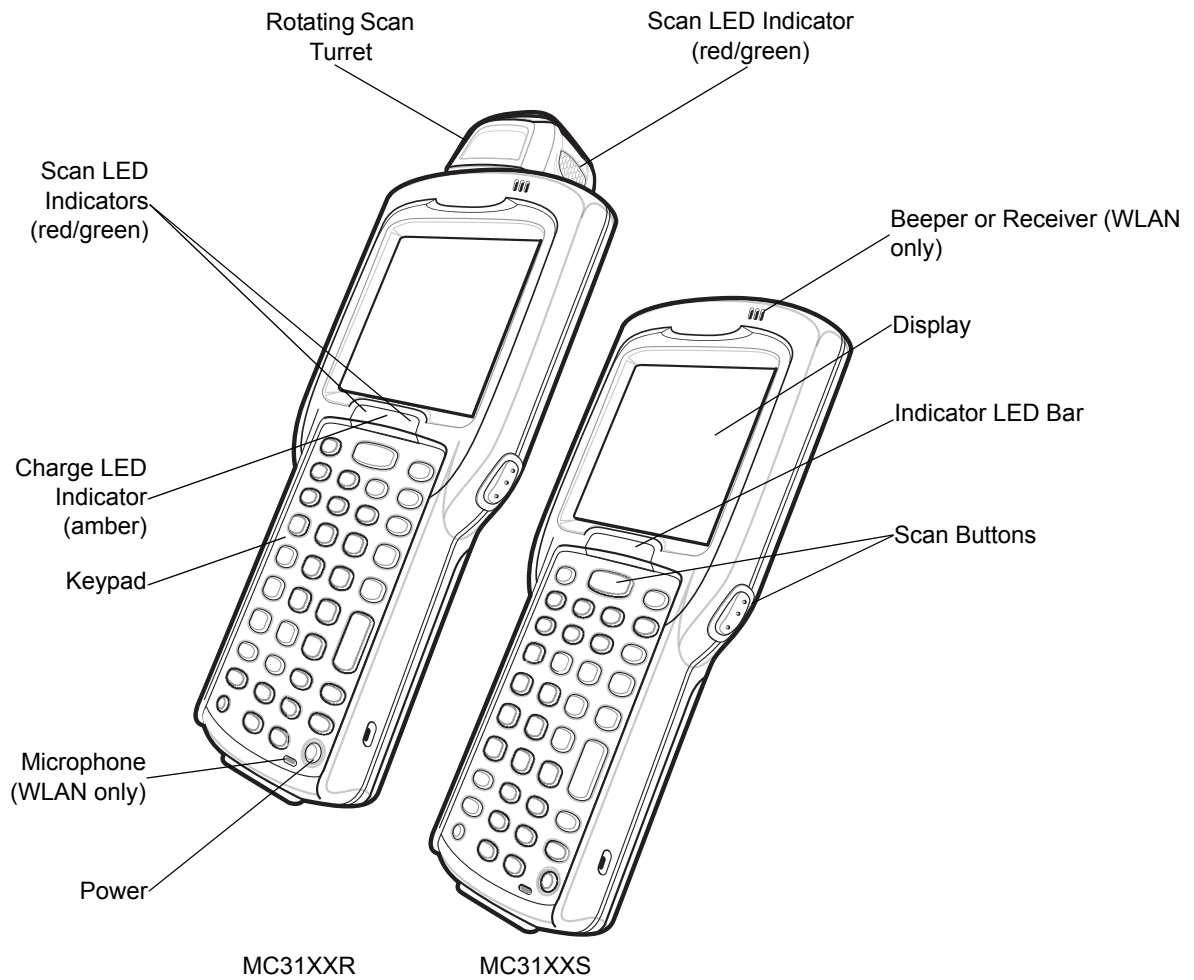


Figure 1-1 MC31XXS and MC31XXR Mobile Computers (Front View)

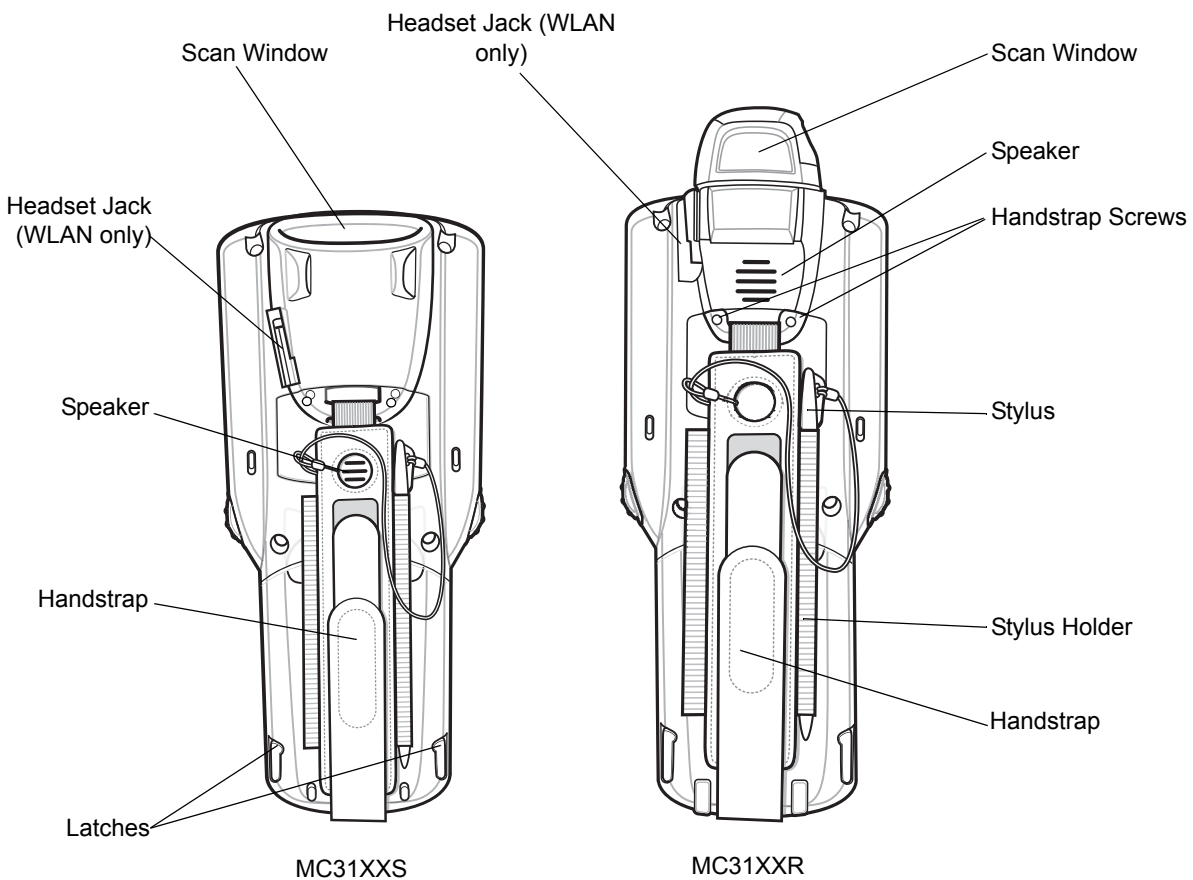


Figure 1-2 MC31XXS and MC31XXR Mobile Computers (Back View)

Rotating Scan Turret

The MC31XXR mobile computer features a Rotating Scan Turret with three position stops. This feature offers greater scanning flexibility.



CAUTION Do not try to rotate turret past side position stops. Damage to device can occur.

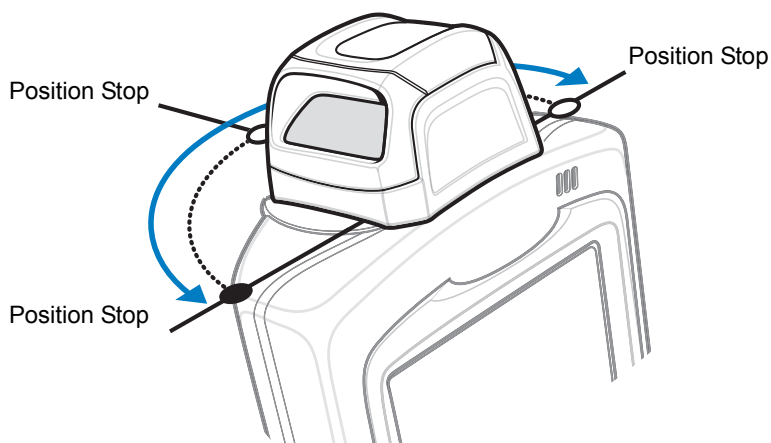


Figure 1-3 Rotating Scan Turret

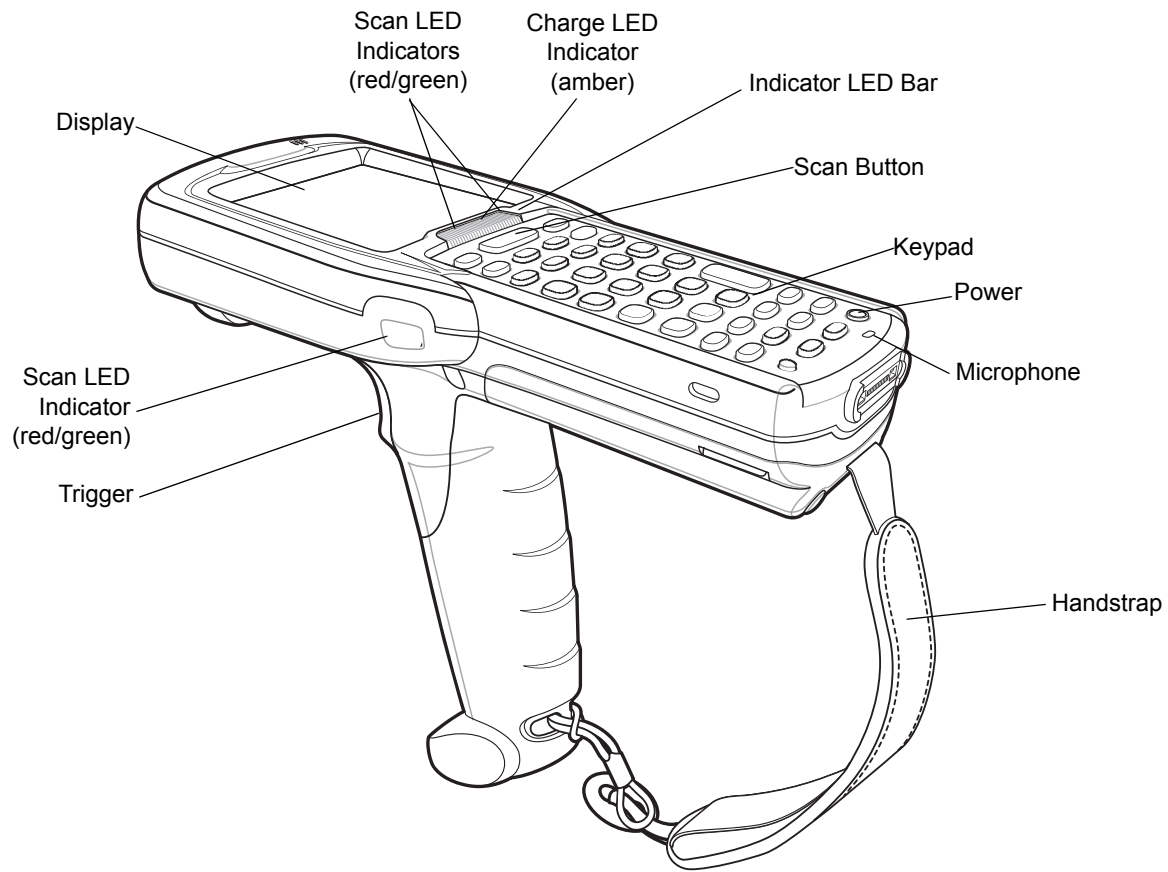


Figure 1-4 MC3190G Mobile Computer (Front View)

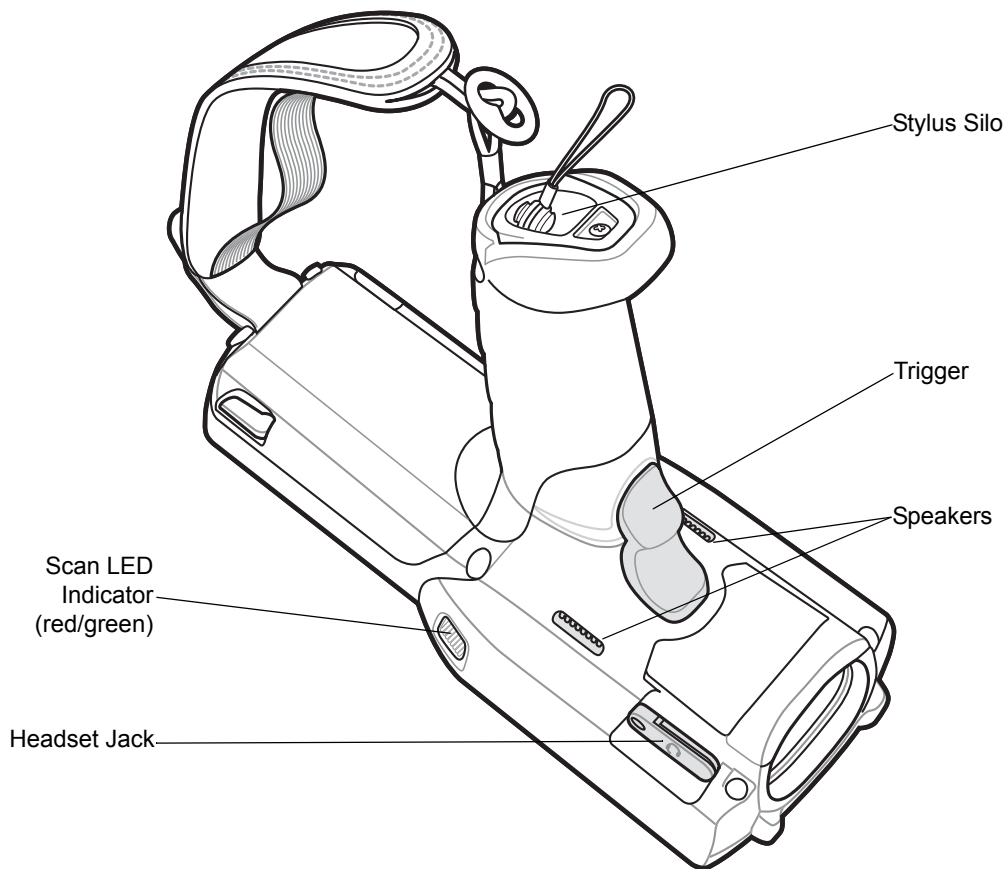


Figure 1-5 MC3190G Mobile Computer (Back View)

Mobile Computer Startup

To start using the mobile computer:

- Install the SD card.
- Install the main battery.
- Charge the main battery and the backup battery.
- Start the mobile computer.

Install SD Card

The Secure Device (SD) card provides secondary non-volatile storage (the flash memory is slower than RAM). The SD card holder is located under the battery.



CAUTION Follow proper Electro-Static Discharge (ESD) precautions to avoid damaging the SD card. Proper ESD precautions include, but are not limited to, working on an ESD mat and ensuring that the operator is properly grounded.

Do not use the SD card slot for any other accessories.

- ✓ **NOTE** Select SD cards with environmental and/or the write cycle performance specifications that meet or exceed the application requirements.

To insert the SD card:

1. Lift the SD card retaining door.
2. Position the SD card, with the contacts down, into the SD card slot. The SD card corner notch fits into the slot only one way.
3. Close SD card retaining door.

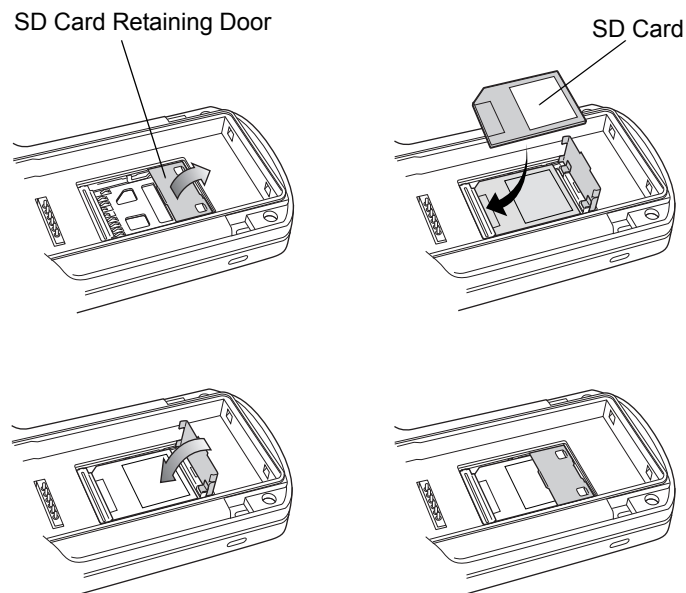


Figure 1-6 *Inserting the SD Card*

Install Main Battery

If the main battery is charged, the mobile computer can be used immediately. If the main battery is not charged, see [Battery Charging on page 1-8](#). To remove the main battery, see [Main Battery Removal on page 1-11](#).

To install the main battery:

1. Remove the battery door.
2. Insert the battery into the slot, bottom first and press the battery gently into the slot. The battery clip locks the battery into place.

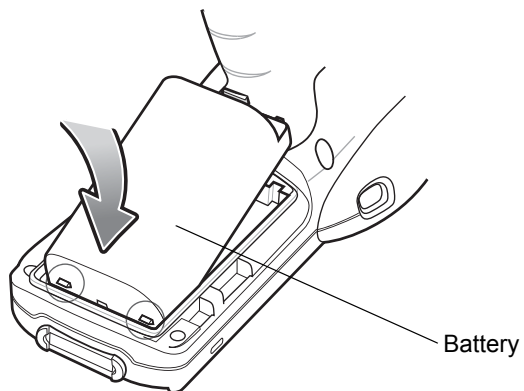


Figure 1-7 *Insert Battery*

3. With the latches in the open position, replace the battery door, top first and press to close.

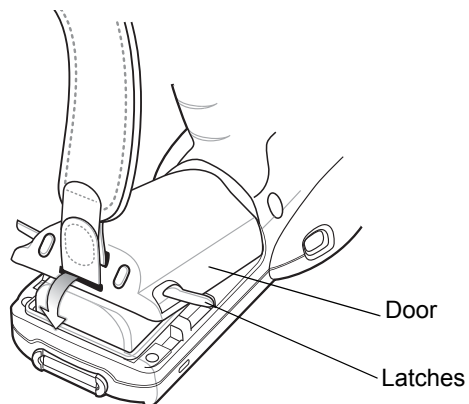


Figure 1-8 *Insert Battery Door*

4. Rotate the latches (to the lock position) to lock the door in place.

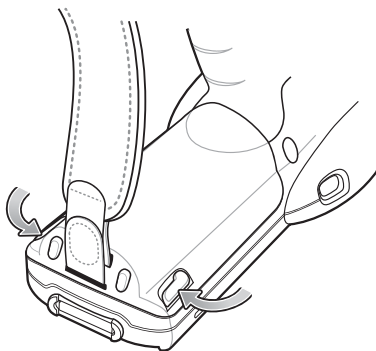


Figure 1-9 *Close Latches*

Battery Charging



CAUTION Ensure that you follow the guidelines for battery safety described in [Battery Safety Guidelines on page 5-2](#).

Use the mobile computer cradles, cables and spare battery chargers to charge the mobile computer main battery.

The main battery can be charged before insertion into the mobile computer or after it is installed. There are two main batteries for the MC31XX, the Standard Battery (1X) and the Extended Life Battery (2X). The standard capacity battery ships from the factory in all MC31X0-R configurations. The Extended Life Battery ships from the factory in all MC31X0-S and MC31X0-G configurations. To install an Extended Life Battery in the MC31X0-R configurations, purchase an Extended Life Battery and a Brick Extended Life Battery door. Use one of the spare battery chargers to charge the main battery (out of the mobile computer) or one of the cradles to charge the main battery while it is installed in the mobile computer.

Before using the mobile computer for the first time, fully charge the main battery until the amber Charge LED Indicator remains lit (see [Table 1-1 on page 1-9](#) for charge status indications). The Standard Battery fully charges in less than five hours and the Extended Life Battery fully charges in less than eight hours.

The mobile computer is equipped with a memory backup battery which automatically charges from the main battery whether or not the mobile computer is operating or is in suspend mode. The memory backup battery retains data in memory for at least 30 minutes when the mobile computer's main battery is removed or fully discharged. When the mobile computer is used for the first time or after the memory backup battery has fully discharged, the memory backup battery requires approximately 15 hours to fully charge. Do not remove the main battery from the mobile computer for 15 hours to ensure that the memory backup battery fully charges. If the main battery is removed from the mobile computer or the main battery is fully discharged, the memory backup battery completely discharges in several hours.

When the main battery reaches a very low battery state, the combination of main battery and backup battery retains data in memory for at least 72 hours.



NOTE Do not remove the main battery within the first 15 hours of use. If the main battery is removed before the backup battery is fully charged, data may be lost.

Batteries must be charged within the 0° to +40° C (32° to 104° F) ambient temperature range.

The following accessories can be used to charge batteries:

- Cradles (and a power supply):
 - Single Slot Serial/USB Cradle
 - Four Slot Cradles.
- Cables (and a power supply):
 - USB Client Charge Cable
 - Serial (RS232) Charge Cable.
- Spare Battery Chargers (and a power supply):
 - Single Slot Serial/USB Cradle
 - Four Slot Spare Battery Charger
 - Universal Battery Charger (UBC) Adapter.

To charge the mobile computer using the cradles:

1. Insert the mobile computer into a cradle. See [Chapter 4, Accessories](#) for accessory setup.
2. The mobile computer starts to charge automatically. The amber Charge LED Indicator indicates the charge status. See [Table 1-1 on page 1-9](#) for charging indications.

To charge the mobile computer using the cables:

1. Connect the MC31XX Communication/Charge Cable to the appropriate power source and connect to the mobile computer. See [Chapter 4, Accessories](#) for accessory setup.
2. The mobile computer starts to charge automatically. The amber Charge LED Indicator indicates the charge status. See [Table 1-1](#) for charging indications.

Table 1-1 Mobile Computer LED Charge Indicators

LED	Indication
Off	Mobile computer not placed correctly in the cradle; charge cable not connected correctly; charger is not powered.
Fast Blinking Amber	Error in charging; check placement of the mobile computer.
Slow Blinking Amber	Mobile computer is charging.
Solid Amber	Charging complete. Note: When the battery is initially inserted in the mobile computer, the amber LED flashes once if the battery power is low or the battery is not fully inserted.

Spare Battery Charging

There are three accessories that can be used to charge a spare battery:

- Single Slot Serial/USB Cradle
- Four Slot Spare Battery Charger
- UBC Adapter.

To charge a spare battery:

1. Connect the charging accessory to the appropriate power source. See [Chapter 4, Accessories](#) for setup instructions.
2. Insert the spare battery into the spare battery charging slot and gently press down on the battery to ensure proper contact.

The battery starts to charge automatically. The amber charge LED Indicator lights to indicate the charge status. See [Chapter 4, Accessories](#) for charging indications. The Standard Battery usually fully charges in less than five hours and the Extended Life Battery usually fully charges in less than eight hours.

Stylus

Use the stylus for selecting items and entering information on the screen. The stylus functions as a pen and a mouse. Tap the touch screen once with the stylus to select options and open menu items.

To remove the stylus, slide the stylus out of the stylus holder. To store the stylus, push the stylus back into the stylus holder in the handstrap (MC31XXR/S) or stylus silo (MC3190G).

Starting the Mobile Computer

Press the **Power** button to turn on the mobile computer. If the mobile computer does not power on, perform a cold boot. See [Resetting the Mobile Computer on page 2-23](#).

When the mobile computer is powered on for the first time, it initializes. The **Splash** screen appears for a short period of time, followed by the **Calibration** screen.

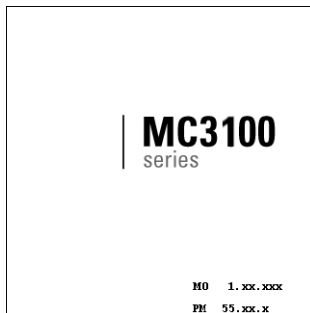


Figure 1-10 *Splash Screen*

On Windows CE 6.0 configurations, after the calibration procedure is performed the factory settings launch the **Sample Applications** window displays. Application specific shells may provide application specific windows instead of the **Sample Applications** window. These screens also appear when a cold boot is performed.

If the mobile computer does not power on, see [Resetting the Mobile Computer on page 2-23](#).

Calibration Screen

Use the **Calibration** screen to align the touch screen:

1. Remove the stylus from the stylus holder.
2. Carefully press and briefly hold the stylus tip on the center of the **Calibration** screen target. Repeat the procedure as the target moves and stops at different locations on the screen. This enters the new calibration settings.

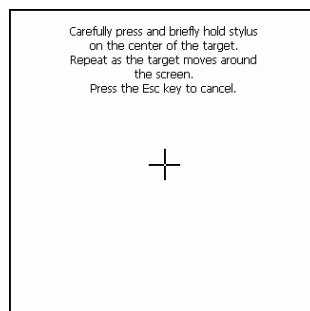


Figure 1-11 *Calibration Screen*

3. Once all of the new calibration settings are input, tap the screen or press the **ENTER** button to save the new calibration settings. Press **ESC** to discard the new calibration settings.

Waking the Mobile Computer

The wakeup condition settings are used to define what actions wake up the mobile computer. The settings are configurable so they are subject to change/update. For more information see, [Waking the Mobile Computer on page 2-24](#).

Main Battery Removal

To remove the main battery from an MC31XXS/R:

✓ **NOTE** On devices with Windows Mobile 6.5.3, a dialog box appears when pressing the Power button. See [Removing the Battery on page C-13](#) for more information.

1. If the MC31XXS/R is in suspend mode, press the Power button to wake the device.
2. Press the power button to place the MC31XXS/R in suspend mode.
3. Wait for the red Scan LED to turn on and then turn off.
4. Rotate the latches to the open position.



CAUTION Do not lift up on the latches when removing the door. Lift up on the handstrap only.

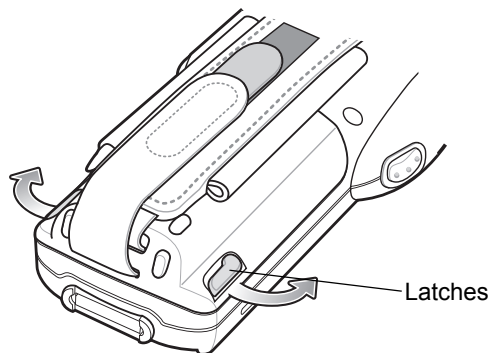


Figure 1-12 Open Latches

5. Lift the door off, bottom first.

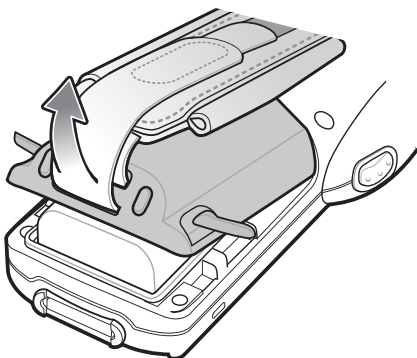


Figure 1-13 Lift Battery Door

6. With finger, press the battery clip in (at the top of the battery) and lift the battery out top first.



WARNING! Do not use a tool to remove the battery.

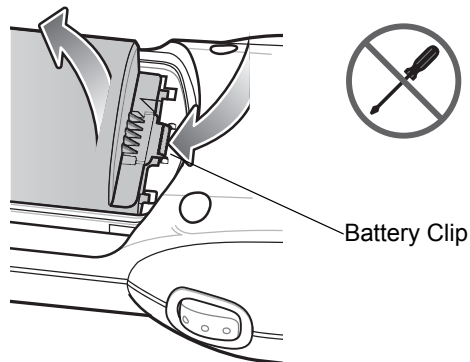


Figure 1-14 Remove Battery

To remove the main battery from an MC3190G:

- ✓ **NOTE** On devices with Windows Mobile 6.5.3, a dialog box appears when pressing the Power button. See [Removing the Battery on page C-13](#) for more information.

1. If the MC3190G is in suspend mode, press the Power button to wake the device.
2. Press the Power button to place the MC3190G in suspend mode.
3. Wait for the red Scan LED to turn on and then turn off.
4. Rotate the latches to the open position.

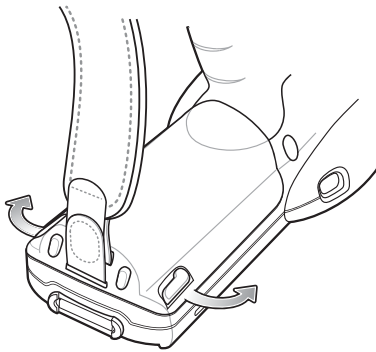


Figure 1-15 Open Latches



CAUTION Do not lift up on the latches when removing the door. Lift up on the handstrap only.

5. Lift the door off, bottom first.

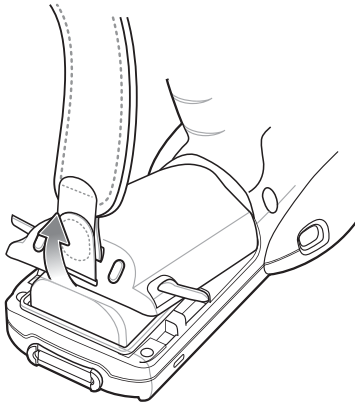


Figure 1-16 *Lift Door*

6. With two finger, press the battery toward the bottom of the mobile computer and lift the battery out top first.



WARNING! Do not use a tool to remove the battery.

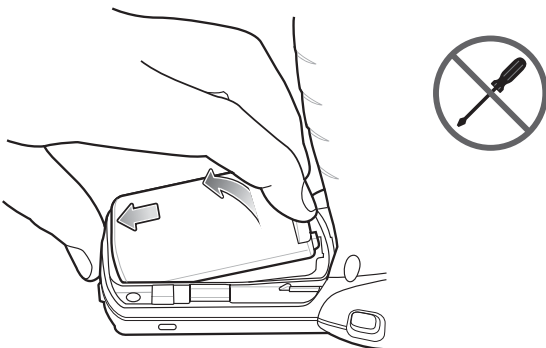


Figure 1-17 *Press the Battery Toward Bottom of MC3190G*

Handstrap Removal and Replacement (MC31XXS/R)

To remove the handstrap:

1. Use a #00 Phillips screwdriver to remove the screws.
2. Lift the mounting clip.
3. Slide the mounting clip out of the strap loop.
4. Open the handstrap flap and pull the handstrap through the battery door mounting slot.

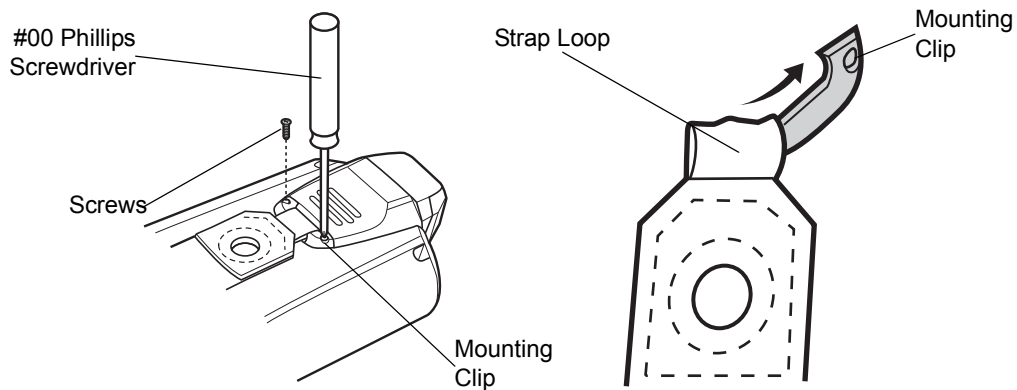


Figure 1-18 *Strap/Door Removal and Replacement (MC31XXS/R)*

To replace the handstrap:

1. Feed the mounting clip through the strap loop.
2. Secure the mounting clip to the housing using the two screws.
3. Feed the handstrap through the slot on the battery door.
4. Attach the hook material to the loop material and press together.

Handstrap Removal and Replacement (MC3190G)

To remove the handstrap:

1. Slip the button through the loop.

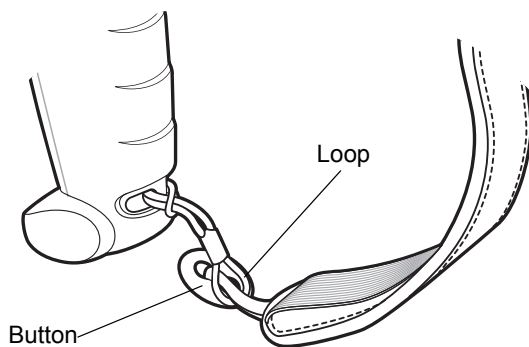


Figure 1-19 *Remove Button from Loop*

2. Remove loop section from handle.
3. Separate the loop and hook tape and pull the handstrap through the slot in the battery door.

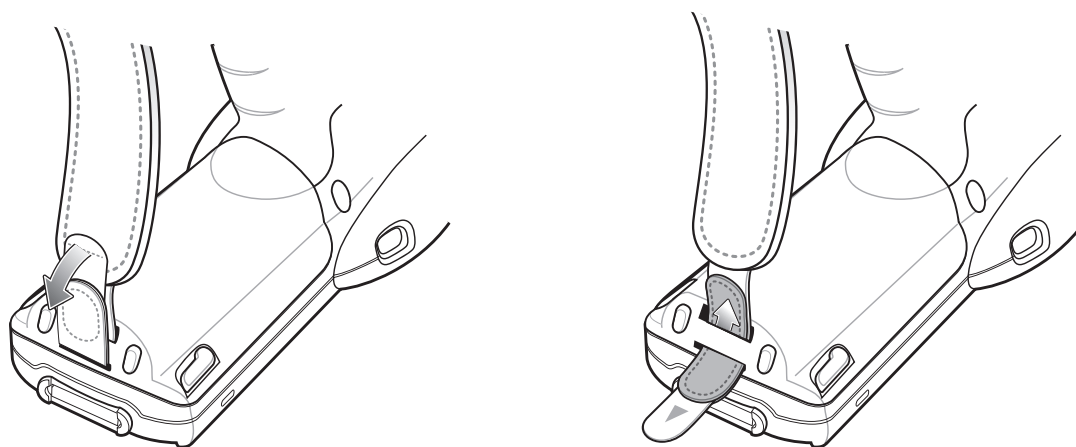


Figure 1-20 Remove Handstrap from Battery Door Slot

To install a new handstrap:

1. Insert one end of the loop section into the mounting slot in the handle.
2. Thread the other end of the loop section through the loop and pull to tighten the loop.

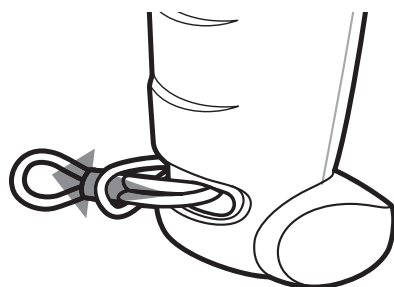


Figure 1-21 Thread Loop

3. Slip the button into the loop section.

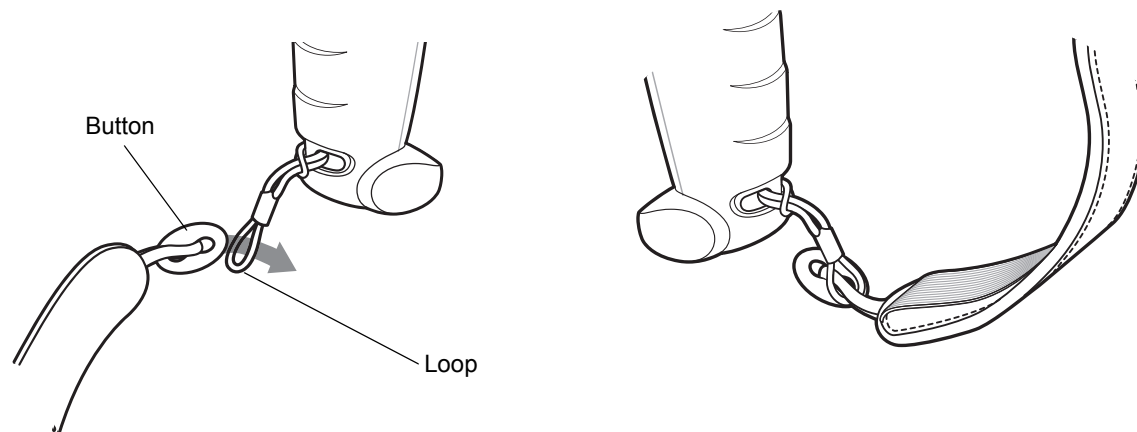


Figure 1-22 Slip Button Through Loop

4. Thread the end of the handstrap into the slot in the battery door.

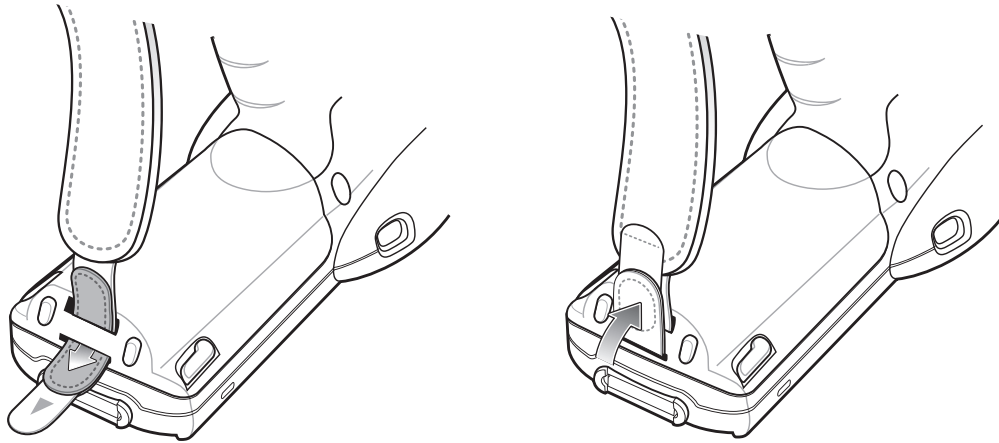


Figure 1-23 Thread Handstrap into Battery Door Slot

5. Press the hook material against the loop material.

Turning Off the Radios

On Device with Windows CE 6.0

WLAN Radio

To turn off the WLAN radio tap the **Fusion Signal Strength** icon on the task tray and select **Disable Radio**. A red X appears across the icon indicating that the radio is disabled (off).



Figure 1-24 Fusion Signal Strength Icon

To turn the radio back on, tap the **Fusion Signal Strength** icon on the task tray and select **Enable Radio**. The red X disappears from the icon indicating that the radio is enabled (on).

Bluetooth Radio with StoneStreet One Stack Enabled

To turn off the Bluetooth radio, tap the **Bluetooth** icon in the task tray and select **Disable Bluetooth**.



Figure 1-25 Bluetooth Icon

To turn on the Bluetooth radio, tap the **Bluetooth** icon in the task tray and select **Enable Bluetooth**.

On Devices with Windows Mobile 6.X

Windows Mobile 6.1 devices include **Wireless Manager**, which provides a simple method of enabling, disabling, and configuring all the device's wireless capabilities in one place.

To open **Wireless Manager**, tap the **Connectivity** icon.

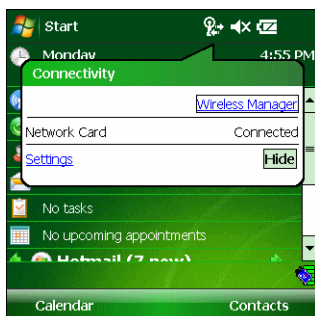


Figure 1-26 Opening Wireless Manager

Select **Wireless Manager**.



Figure 1-27 *Wireless Manager Window*

To enable or disable a wireless connection, tap its blue bar.

To enable or disable all wireless connections, tap and hold the **All** bar.

To configure settings for a connection, tap **Menu**.



Figure 1-28 *Wireless Manager Menu*

Chapter 2 Operating the MC31XX

Introduction

This chapter provides basic instructions for using the mobile computer and navigating the mobile computer software.

Power Button

Press the red **Power** button to toggle the mobile computer between suspend and resume. When the screen is off the mobile computer is in suspend mode and when the screen is on the mobile computer is on.

Windows CE Sample Applications Window

The MC31XX with Windows CE contains a set of sample applications that can be installed. By default an installation icon is on the Desktop. Double-tap the icon to install the sample applications. When installed, the **Sample Applications** window appears on the screen whenever the MC31XX re-boots. Refer to the MC31XX Series Mobile Computer Integrator Guide for installation and configuration.

The **Sample Applications** window links to sample applications. The sample applications are intended to be used by application developers as application development examples. These applications were not developed to support end users. Refer to the *Application Guide for Zebra Devices* for the *sample* applications.

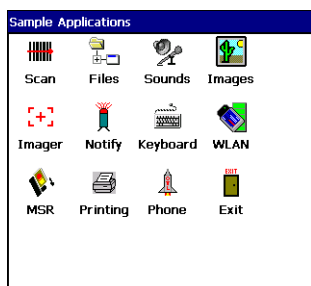


Figure 2-1 Sample Applications Window

Windows CE Desktop

The desktop displays the applications available with the Windows CE configurations. For information on using the Microsoft® applications refer to the *Microsoft® Applications for Mobile and CE 6.0 User Guide*, p/n 72E-78456-xx.

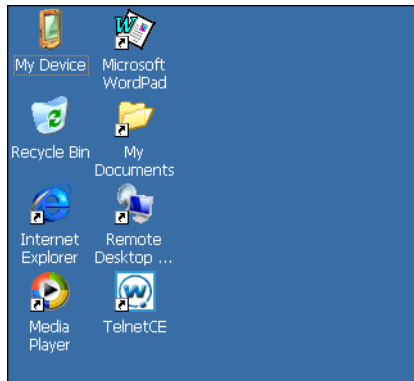


Figure 2-2 Windows CE Desktop

Windows CE Status Icons

The taskbar (at the bottom of the screen) displays the **Start** button, active programs, battery status and communication status. The taskbar icons are described in [Table 2-1](#). The taskbar icons display the function status, indicate what programs are active and indicate the battery charge status. The Taskbar buttons are used to access menus, select/deselect functions or to change display windows.

- **Status Icons:** The status icons indicate the function key status. If the **FUNC**, **SHIFT**, **CTRL**, **ALT** or **ALPHA** functions are active the appropriate status icon is displayed.
- **Active Programs Icons:** The active applications icons are displayed on the taskbar. If more than one program is active, icons can be used to toggle between the open programs (applications). Tap on a taskbar application to maximize the application.
- **AC Power/Battery Status Icons:** The AC Power/Battery Status icons are shown in the taskbar to indicate the present power supply status of the mobile computer. The main battery status icons provide the battery status in 10% increments from 10% to 100%. The backup battery low icon indicates that the backup battery charge is low. See [Battery Charging on page 1-8](#) for backup battery charging instructions.

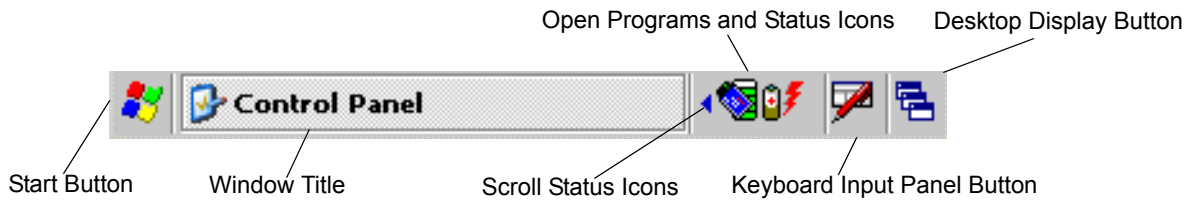


Figure 2-3 Taskbar

Table 2-1 Taskbar Icons

Icon	Description
	Indicates that the battery is charging.
	Indicates that the battery is fully charged (100% charged). The battery status icons provide the battery status in 10% increments from 10% to 100%.
	Indicates that communication with the smart battery has not been established. After a mobile computer reset, this icon may be displayed for up to 30 seconds. See, Battery Unknown Icon on page 2-4 for additional information.
	Indicates that the backup battery is low.
	Indicates that the battery is fully charged and the mobile computer is running on external power.
	Indicates IP status. Only displays when the mobile computer is in emulation mode.
	Indicates that the ActiveSync application is running.
	Indicates that the wireless application radio is connected to a wireless LAN network with excellent signal strength.
	Indicates that the wireless application radio is not connected to a wireless LAN network.
	The Bluetooth Enabled icon appears in the task tray and indicates that the Bluetooth radio is on (Displays only if the StoneStreet One Bluetooth stack is enabled).
	The Bluetooth Disabled icon appears in the task tray and indicates that the Bluetooth radio is off (Displays only if the StoneStreet One Bluetooth stack is enabled).
	The Bluetooth Communication icon appears in the task tray and indicates that the mobile computer is communicating with another Bluetooth device (Displays only if the StoneStreet One Bluetooth stack is enabled).
	Opens the IST control panel.
	Indicates that the SHIFT button function is selected.

Table 2-1 *Taskbar Icons (Continued)*

Icon	Description
F	Indicates that the FUNC button function is selected.
^	Indicates that the CTRL button function is selected.
ALT	Indicates that the ALT character selection is selected.
ALP	Indicates that the mobile computer is in ALPHA button mode is selected.

Battery Unknown Icon

The **Battery Unknown** icon displays when communication with the smart battery has not been established. As part of normal operation this icon may be displayed for 30 seconds following a mobile computer reset.

If the icon displays beyond this 30 second period:

1. Remove and re-seat the battery.
2. If after re-seating the battery, the icon remains, warm boot the mobile computer.
3. If after warm booting the mobile computer, the icon remains, then cold boot the mobile computer.
4. If after cold booting the mobile computer, the icon remains, install a new (tested and working) battery.
5. If the icon remains, return the mobile computer for servicing.

Start Button

Tap the **Start** button to launch the **Start** menu.

- *Programs*: Use to access available programs.
- *Favorites*: Displays files in *Favorites* directory.
- *Documents*: Displays files in *Documents* directory.
- *Settings*: Accesses the Control Panel, the Network and Dial-up Connections and the Taskbar and *Start* menu.
- *Help*: Accesses the Windows CE Help.
- *Run*: Runs a program or application.
- *Suspend*: Places the mobile computer in the suspend state.

Programs Menu

From the **Start** menu, tap **Programs** to open the **Programs** menu. The programs installed on the MC31XX with Windows CE display in the **Programs** menu. Refer to the *Application Guide for Zebra Devices*, p/n 72-68901-xx and the *Microsoft® Applications for Mobile 6.1 and CE 6.0 User Guide*, p/n 72E-108299-xx for application information.

Keyboard Input Panel Button

Use the **Keyboard Input Panel** as an alternate input device. For more information, see [Entering Information Using the Keyboard Input Panel on page 2-15](#).

Desktop Display Button

Use the **Desktop Display** button to minimize all open programs and display the desktop.

- *My Computer*: Double-tap the icon to open My Computer.
- *Recycle Bin*: Deleted files remain in the recycle bin until the recycle bin is emptied. Once emptied the files cannot be retrieved.
- *Remote Desktop Connection*: Tap the **Remote Desktop Connection** icon to access the **Remote Desktop Connection** window.

Task Manager and Properties

Use the **Task Manager** to control an application's use and use the **Properties** functions to set display and clock options.

Task Manager

1. Select **FUNC - CTRL**, (to activate the **ALT** state) and tap on the taskbar to display the **Task Manager, Properties Selection** menu.
2. Tap **Task Manager** to display the **Task Manager** window.

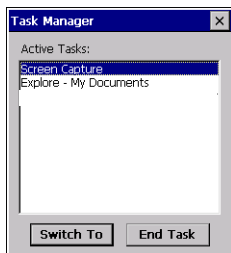


Figure 2-4 Task Manager Window

3. Tap a task in the **Active Tasks** list and tap **Switch To** to make that task the primary task, or tap **End Task** to end the selected task.
4. Tap **X** to exit the **Task Manager** window.

Properties

1. Tap **Start > Control Panel > Taskbar and Start Menu ...**. The **Task Manager, Properties** window displays, see [Figure 2-6 on page 2-6](#).
2. Tap **Properties** to display the **Taskbar and Start Menu, General** tab.
3. This menu provides taskbar options:
 - Check the **Always on Top** checkbox to keep the taskbar on top of all other windows.

- Check the **AutoHide** checkbox to make the taskbar disappear, touch the bottom of the display to make the taskbar return.
 - Check the **Show Clock** checkbox to display the clock on the taskbar.
4. Tap **OK** to save the settings and exit the window.

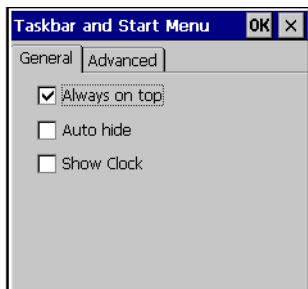


Figure 2-5 *Taskbar and Start Menu, General Tab*

Advanced Tab

1. Tap the **Advanced** tab to enter the **Taskbar and Start Menu, Advanced** tab.
2. Tap the **Clear** button to delete all of the documents listed in the **Start > Documents** entry, see [Start Button on page 2-4](#). Typically this list is empty, but if there were documents in the list the **Clear** button would delete them.
3. Tap the **Expand Control Panel** checkbox to display the entire contents of the MS control panel in list form, rather than icons.



Figure 2-6 *Taskbar and Start Menu, Advanced Tab*

4. Tap **OK** to save the settings and exit the window.

Windows Mobile 6.1 Today Screen



NOTE On devices with Windows Mobile 6.5.3, the Today screen is different. See [Home Screen on page C-1](#) for more information.

The Today screen displays important information, such as upcoming appointments and status indicators. Tap a section on the screen to open the associated program. Alternatively, tap **Start > Today** to display the **Today** screen.

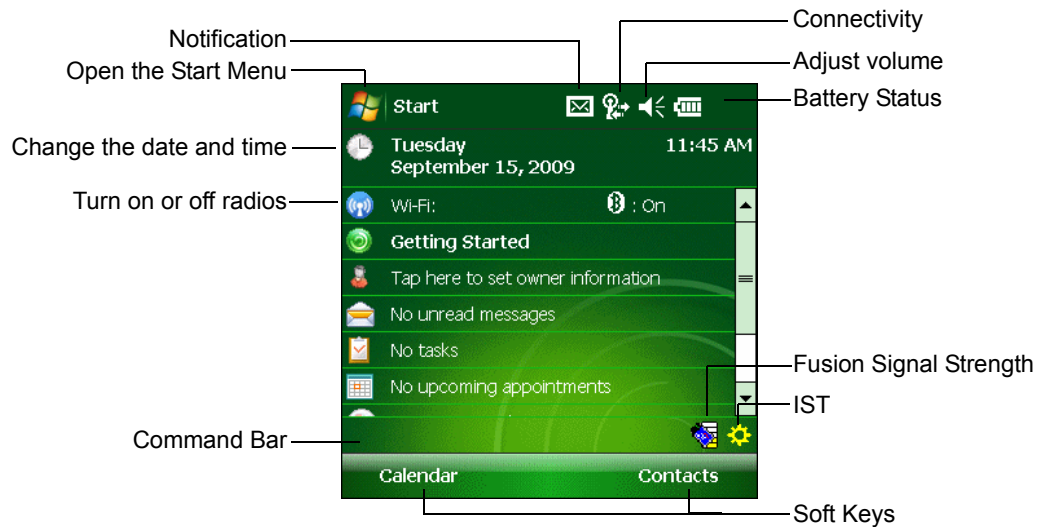


Figure 2-7 Today Screen

To customize the **Today** screen, tap **Start > Settings > Today** icon. Use the **Appearance** tab to customize the background and the **Items** tab to change the list and order of items that appear on the screen.

Windows Mobile 6.1 Status Icons

Status Bar

✓ **NOTE** On devices with Windows Mobile 6.5.3, see [Status Bar on page C-4](#) for more information.

Status icons are shown in the **Status Bar** to indicate present status of the mobile computer. Tapping each status icon displays the corresponding dialog box and enables you to change or adjust its settings. You may see the status icons listed in [Table 2-2](#) on the **Status Bar** located at the top of the screen.

Table 2-2 Status Icons

Icon	Function	Description
	Audio	Speaker is on.
		Speaker is off.
	Battery	Backup battery is very low.
		Main battery is charging.*
		Main battery level.*
		Main battery is very low.*

* Only appears in the **Time and Next Appointment** dialog box.

Table 2-2 Status Icons (Continued)

Icon	Function	Description
	Connectivity	Connection is active.
		ActiveSync error
		Synchronization is occurring.
	Instant Message	Notification that one or more instant messages were received.
	E-Mail	Notification that one or more e-mail messages were received.
	Time and Next Appointment	Displays current time in analog or digital format.
	Multiple Notifications	There are more notification icons than can be displayed. Tap to display remaining icons.

* Only appears in the **Time and Next Appointment** dialog box.

Command Bar

You may see the icons listed in [Table 2-3](#) on the Command Bar located at the bottom of the screen.

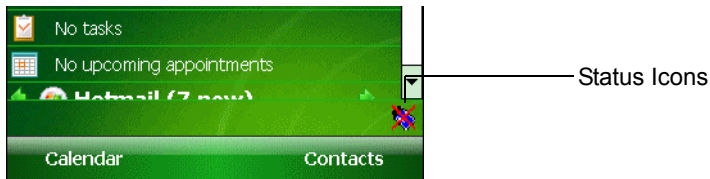





Figure 2-8 Command Bar

Table 2-3 Command Bar Icons

Icon	Description
	Wireless connection status icon. Indicates WLAN signal strength and opens the Wireless Applications menu.
	The Bluetooth Enabled icon appears in the task tray and indicates that the Bluetooth radio is on (Displays only if the StoneStreet One Bluetooth stack is enabled).
	The Bluetooth Disabled icon appears in the task tray and indicates that the Bluetooth radio is off (Displays only if the StoneStreet One Bluetooth stack is enabled).

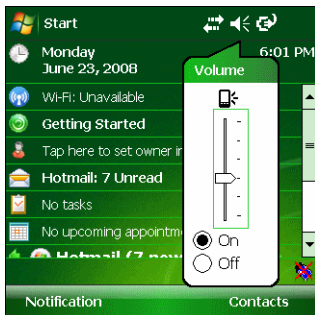
Table 2-3 *Command Bar Icons (Continued)*

Icon	Description
	The Bluetooth Communication icon appears in the task tray and indicates that the mobile computer is communicating with another Bluetooth device (Displays only if the StoneStreet One Bluetooth stack is enabled).
	Opens the IST control panel.
	The ActiveSync icon appears in the task tray and indicates an active serial connection between the mobile computer and the development computer.

Speaker Icon

You can adjust the system volume using the **Speaker** icon in the Status bar.

1. Tap the **Speaker** icon. The **Volume** dialog box appears.

**Figure 2-9** *Volume Dialog Box*

2. Tap and move the slide bar to adjust the volume.
3. Select the **On** or **Off** radio button to turn the volume on or off.

✓ **NOTE** Use can also adjust the system volume using the **Sounds & Notifications** window or by using the keypad.

Battery Icons

The **Main Battery** icon appears in the **Title Bar** when the Today screen is visible. The icon indicates the battery power level.

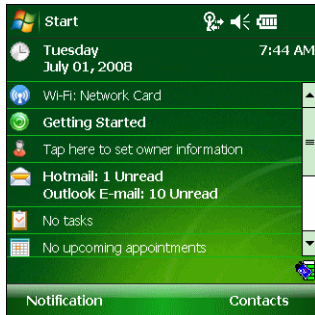


Figure 2-10 Battery Icon on the Title Bar

You can also view the battery status using the **Power** window.

When the main battery power falls below a predetermined level a **Main Battery** dialog box appears indicating the status of the main battery. When the backup battery power falls below a predetermined level a **Backup Battery** icon and dialog box appears indicating the status of the backup battery.

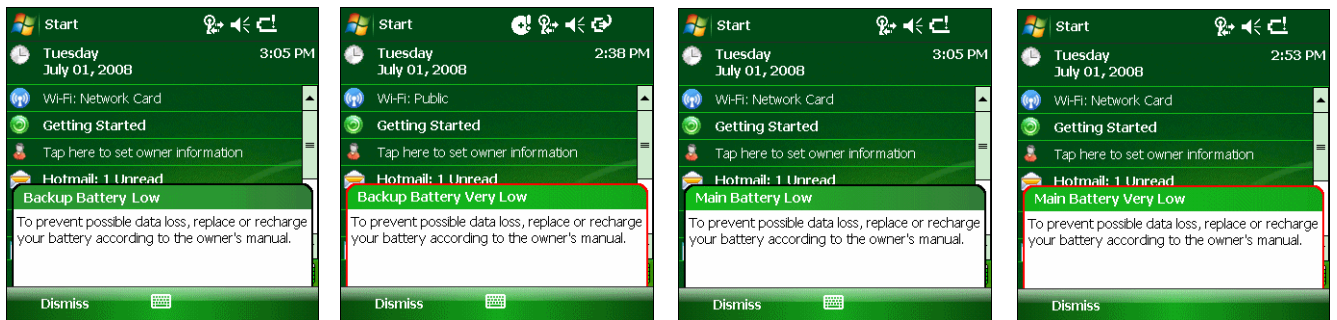


Figure 2-11 Battery Status Icons and Dialog Boxes

Connectivity Icon

The **Connectivity** icon indicates the communication status of the terminal when it's connecting to the internet or host computer.

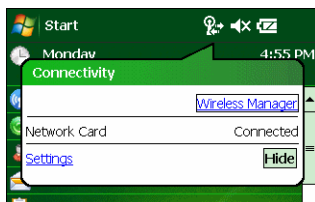


Figure 2-12 Connectivity Dialog Box

Time Icon



NOTE The **Time** icon only appears in the **Title Bar** when an application displays. It does not appear in the **Title Bar** when the **Today** screen displays.

The **Time** icon displays the current time in a digital or analog format. To change the time format, tap and hold the **Time** icon until a menu appears. Select the format you want.

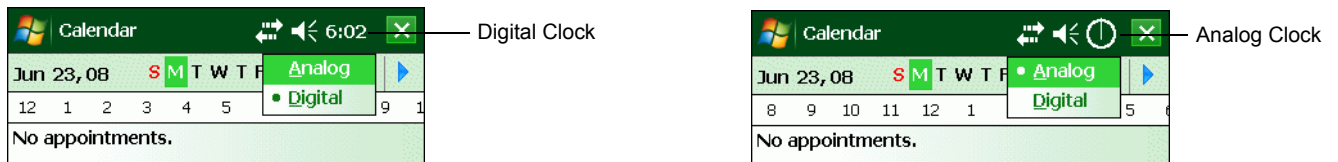


Figure 2-13 Time Icon Format Menu

To display current date, time and appointments:

1. Tap the **Time** icon to display the **Time and Next Appointment** dialog box.

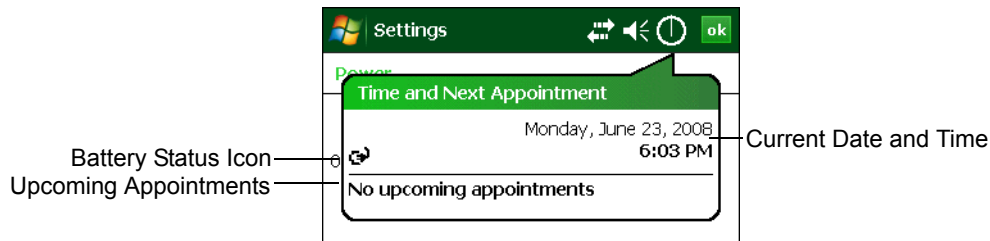


Figure 2-14 Time and Next Appointment Dialog Box

2. The dialog box displays the current date and time, the battery status and any upcoming appointments in the **Calendar**.

E-Mail Icon

The **E-Mail** icon notifies you when you have received incoming e-mails.

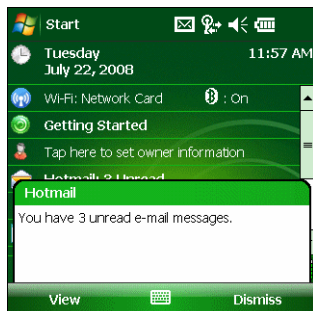


Figure 2-15 New E-mail Messages Dialog Box

Multiple Notification Icon

The **Multiple Notification** icon appears when two or more message notifications occur. Tap the icon to display the multiple notification icons.

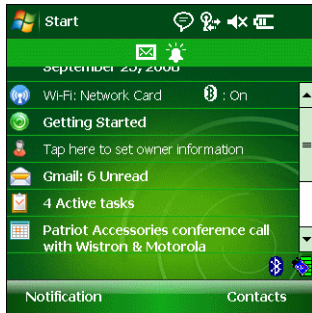


Figure 2-16 Multiple Notifications Icon

Locking the Mobile Computer (Windows Mobile 6.1 Only)

✓ **NOTE** On devices with Windows Mobile 6.5.3, the locking feature is different. See [Locking the MC3100 on page C-10](#) for more information.

You can lock the MC311XX by disabling key presses and screen tap or by requiring a password.

Keypad Locking

Locking the MC31XX turns off keyboard and touch screen functionality. This is helpful when the MC31XX is turned on and you want to prevent accidental key presses.

To lock the device, tap the **Device unlocked** icon. The icon changes to locked.

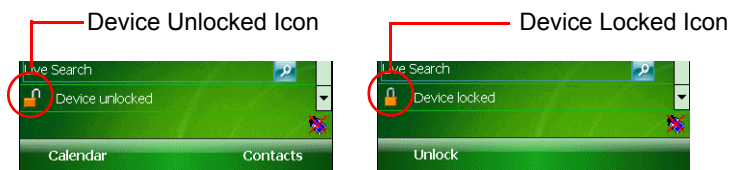


Figure 2-17 Device Locked/Unlocked Icons

To unlock the device and free it for use, tap **Unlock**.

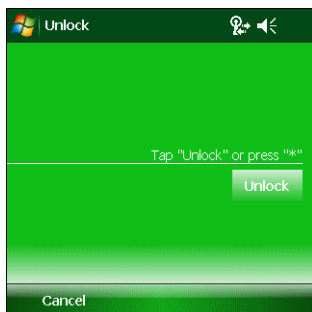


Figure 2-18 Unlock Device Window

Tap **Unlock** on the **Unlock** window.

Password Locking

Use the **Password** window to set a password to disable unauthorized access to the MC31XX.



NOTE If the device is configured to connect to a network, use a strong (difficult to figure out) password to help protect network security. Password cracking tools continue to improve and the computers used to crack passwords are more powerful than ever.

1. Tap **Start > Settings > Personal tab > Lock icon > Password tab**.



Figure 2-19 Password Window - Password Tab

2. Select **Prompt if device unused for** check box to enable password protection.
3. From the drop-down list, select a time value for the protection to take affect after non-use.
4. From the **Password type:** drop-down list, select either **Simple PIN** or **Strong alphanumeric**.
5. For a simple password, enter a four-digit password in the **Password** field.
For a stronger password:
 - a. Enter a seven character password in the **Password:** field. A strong password must contain at least seven characters and contain at least three of the following: uppercase and lowercase letters, numerals, and punctuation.
 - b. Re-enter the password in the **Confirm:** field.
6. Tap **ok**.
7. To set a hint to remember the password, tap the **Hint** tab.

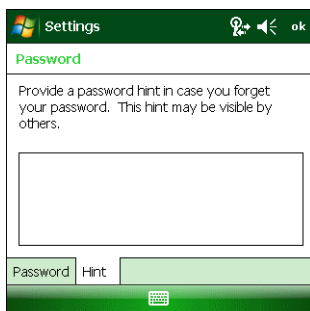


Figure 2-20 Password Window - Hint Tab

8. In the text box, enter a hint for a password reminder.
9. Tap **ok**.

When the MC31XX is not used for a period of time and the user tries to access the device, the **Password** window appears.

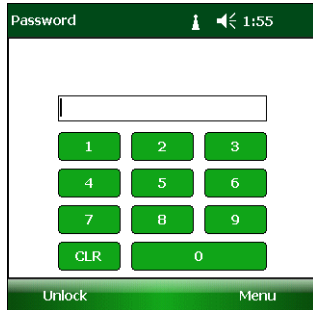


Figure 2-21 *Enter Password Windows*

Enter the password to un-lock the device.

Tap **Unlock**.

Entering Information


To enter information:

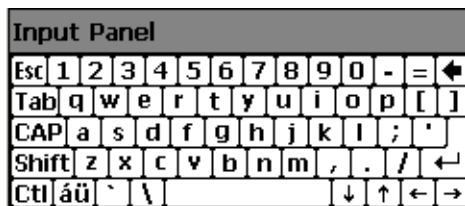
- Use the keypad.
- Use the keyboard input panel (soft keyboard) to enter text.
- Scan bar code data into data fields.
- Use Microsoft® ActiveSync® to synchronize or copy information from the host computer to the mobile computer. For more information on ActiveSync, refer to the *MC31XX Series Mobile Computer Integrator Guide*.

Entering Information Using Keypad

The 28, 38 and 48-key alphanumeric keypads produce the 26-character alphabet (A - Z), numbers (0 - 9), function keys and assorted characters. The keypads default characters/functions are printed black or white, the **ALPHA** character/functions are printed orange and the **FUNC** character/functions are printed blue. See [Appendix B, Keypads](#) for keypad configurations, keypad special functions and special character generation.

Entering Information Using the Keyboard Input Panel

Use the keyboard input panel (soft keyboard) to enter information in any program. To launch the keyboard input panel, tap the  button on the taskbar. Tap a key to enter the value. Tap the keyboard input panel button to display or to hide the keyboard input panel.



Windows CE 6.0



Windows Mobile 6.1

Figure 2-22 Keyboard Input Panel

Entering Data via the Bar Code Scanner

The sample bar code scanner application scans data into data fields in the same way data is entered via the keypad.

Interactive Sensor Technology

This section describes the functionality of the Interactive Sensor Technology (IST) feature on the MC31XX.

The IST supports the following features.

- Power Management – manage power by configuring IST to control switching on/off the backlight, control suspend mode of the MC31XX by monitoring motion and orientation.
- Display Orientation – switch the screen orientation to either landscape or portrait depending on the MC31XX orientation.
- Free Fall Detection – monitors free fall duration and records the time and type of the drop event.

Power Management

The MC31XX orientation and motion sensitive data can be used as an indicator of MC31XX usage and can be used to manage the battery power of the mobile computer. For example, IST can be configured to control the backlight on and off functionality or go into suspend according to a user gesture by placing screen facing down. It can also be used to keep the MC31XX active while it is in movement to prevent it from quickly going into suspend mode while in use.

Display Orientation

The screen can be rotated between portrait and landscape modes automatically, depending on the physical orientation of the MC31XX. For example, if the MC31XX is rotated 90° counterclockwise, IST rotates the display counterclockwise 90° so that the screen display appears correct.

This functionality is achieved by monitoring screen angle and rotating the display to counter any changes. IST only rotates the screen in multiples of 90°.

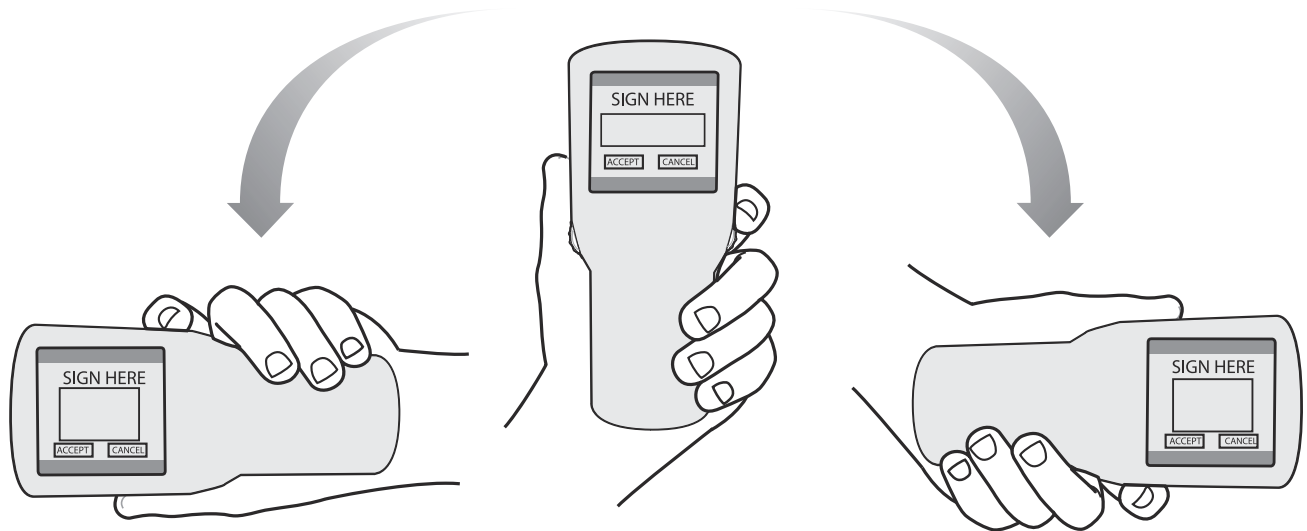


Figure 2-23 Display Orientation

Free Fall Detection

IST continuously monitors gravitational force on the MC31XX according to its current position. When the MC31XX free falls, IST detects the absence of gravitational force and records the event data if it detects a free fall more than 450 ms, which may indicate nearly a one meter drop. This data can be used as an indicator of potential abuse or misuse.

IST features a log for recording the free fall events. This log records the date, time and the time period of the free fall.

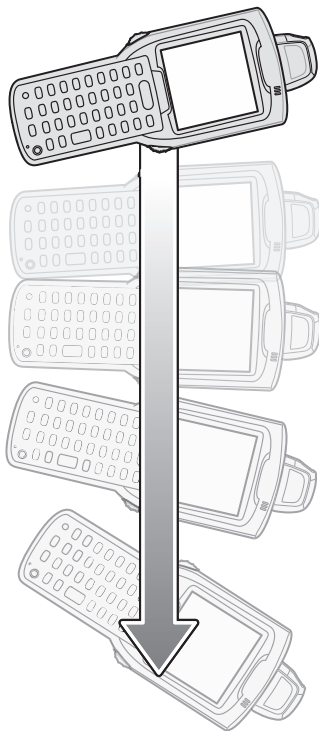


Figure 2-24 *Free Fall Detection*

Connecting a Wired headset

To connect a wired headset to the MC31XX:

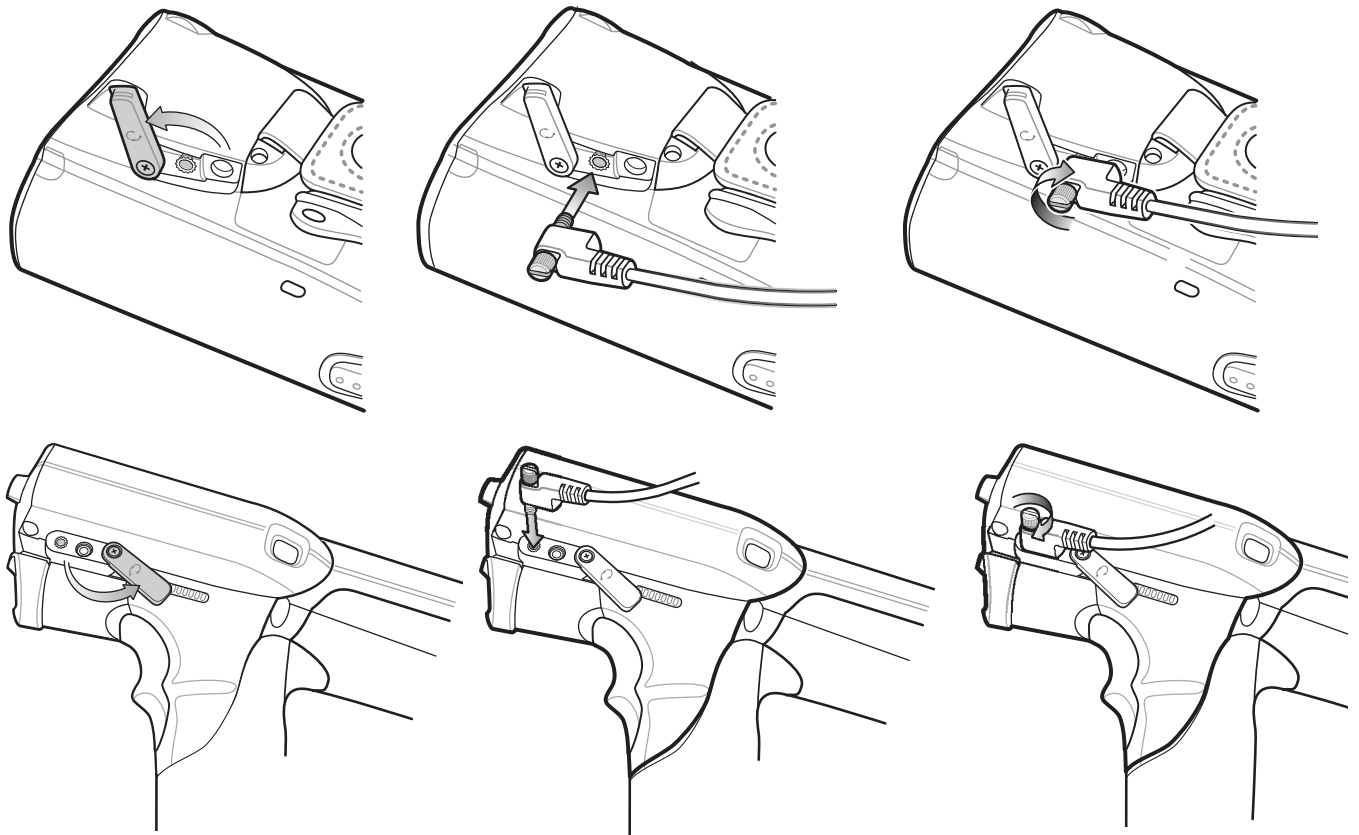


Figure 2-25 Connect Headset to MC31XX

Using a Bluetooth Headset

You can use a Bluetooth headset for audio communication when an audio enabled application is used. See [Chapter 3, Using Bluetooth](#) for information on connecting a Bluetooth device to the mobile computer. Ensure that the mobile computer's volume is set appropriately before putting the headset on. When a Bluetooth headset is connected the speaker is muted.

✓ **NOTE** If the mobile computer goes into suspend mode the Bluetooth connection is disabled and the mobile computer automatically switches to speakerphone mode.

Data Capture

The mobile computer has an integrated laser scanner or imager that collects data by scanning bar codes.

Laser Scanning

To scan bar codes with the mobile computer:

1. Ensure that the mobile computer is loaded with a scanning application.
2. If the mobile computer is equipped with a rotating head, adjust the head prior to scanning.
3. Aim the scan window at the bar code.
4. Press the scan button or trigger. Ensure the red scan beam covers the entire bar code. The Scan LED Indicators illuminate red to indicate that the laser is on. The Scan LED Indicators illuminate green and a beep sounds to indicate a successful decode.

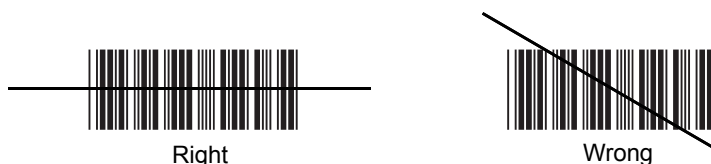


Figure 2-26 *Laser Aiming*

Optimal scanning distance varies with bar code density and scanner optics.

- Hold the scanner farther away for larger symbols.
- Move the scanner closer for symbols with bars that are close together.

✓ **NOTE** Scanning procedures depend on the application and mobile computer configuration. An application may use different scanning procedures from the one listed above.

Scan LED Indicators

The red/green Scan LED Indicators (located in the Indicator LED Bar and in the rotating turret) indicates the scan status. For the location of the Scan LED Indicators see, [Figure 1-1 on page 1-2](#).

Table 2-4 Scan LED Indicators

LED Status	Indication
Off	Not scanning.
Solid Red	Laser enabled, scanning in process.
Solid Green	Successful decode.

Scanning Considerations

Scanning consists of; aim, scan and decode. Scanning performance can be optimized by considering the range and the scanning angle:

- Range

Any scanning device decodes well over a particular working range (minimum and maximum distances from the bar code). This range varies according to bar code density and scanning device optics.

Scanning within range brings quick and constant decodes; scanning too close or too far away prevents decodes. Move the scanner closer and further away to find the right working range for the bar codes being scanned. However, the situation is complicated by the availability of various integrated scanning modules. The best way to specify the appropriate working range per bar code density is through a chart called a decode zone for each scan module. A decode zone simply plots working range as a function of minimum element widths of bar code symbols.

- Angle

The scan angle is important for optimizing decode performance. When laser beams reflect directly back into the scanner from the bar code, this specular reflection can “blind” the scanner.

To avoid this, scan the bar code so that the beam does not bounce directly back. But do not scan at too sharp an angle; the scanner needs to collect scattered reflections from the scan to make a successful decode. Practice quickly shows what tolerances to work within.



NOTE Contact the Zebra Support Center if chronic scanning difficulties develop. Decoding of properly printed bar codes should be quick and effortless.

Imaging

MC31XX with an integrated imager have the following features:

- Omnidirectional (360°) reading of a variety of bar code symbologies, including the most popular linear, postal, PDF417, and 2D matrix code types.
- The ability to capture and download images to a host for a variety of imaging applications.
- Advanced intuitive laser aiming for easy point-and-shoot operation.

The imager uses digital camera technology to take a digital picture of a bar code, stores the resulting image in its memory, and executes state-of-the-art software decoding algorithms to extract the data from the image.

Operational Modes

MC31XX with an integrated imager support three modes of operation, listed below. Activate each mode pressing the **Scan** button.

- **Decode Mode:** In this mode, the MC31XX attempts to locate and decode enabled bar codes within its field of view. The imager remains in this mode as long as you hold the scan button, or until it decodes a bar code.

✓ **NOTE** To enable Pick List Mode, download the Control Panel applet from the Support Central web site at <http://www.zebra.com/support>. Pick List can also be set in an application using a API command.

- **Pick List Mode:** This mode allows you to selectively decode a bar code when more than one bar code is in the MC31XX's field of view. To accomplish this, move the aiming crosshair center dot over the required bar code to decode only that bar code. This feature is ideal for pick lists containing multiple bar codes and manufacturing or transport labels containing more than one bar code type (either 1D or 2D).
- **Image Capture Mode:** Use this mode to capture an image within the MC31XX's field of view. This is useful for capturing signatures or images of items like damaged boxes.

Imager Scanning

1. Ensure that a scan-enabled application is loaded on the MC31XX.
2. Aim the exit window at the bar code.
3. Press the scan button.

The red laser aiming pattern turns on to assist in aiming. Ensure the cross-hair is on top of the bar code.

The Scan LED lights red to indicate that scanning is in process, then lights green and a beep sounds, by default, to indicate the bar code was decoded successfully. Note that when the MC31XX is in Pick List Mode, the imager does not decode the bar code until the crosshair center dot touches the bar code.

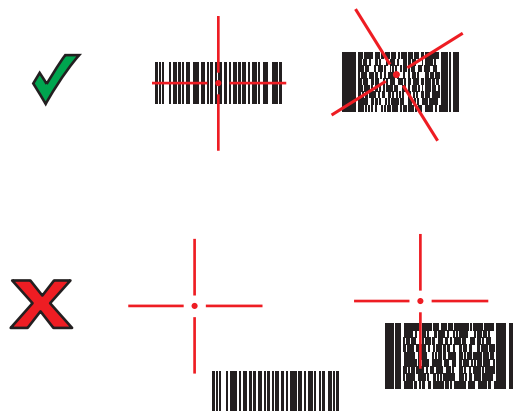


Figure 2-27 Imager Aiming Pattern



Figure 2-28 Pick List Mode with Multiple Bar Codes

4. Release the scan button.



NOTE Imager decoding usually occurs instantaneously. The MC31XX repeats the steps required to take a digital picture (image) of a poor or difficult bar code as long as the scan button remains pressed.

Resetting the Mobile Computer

Windows CE 6.0 Devices

If the mobile computer stops responding to input, reset it. There are two reset functions, warm boot and cold boot. A warm boot restarts the mobile computer by closing all running programs. All data that is not saved is lost.

A cold boot also restarts the mobile computer, but erases all stored records and entries from RAM. In addition it returns formats, preferences and other settings to the factory default settings.

Perform a warm boot first. If the mobile computer still does not respond, perform a cold boot.

Performing a Warm Boot

To perform a warm boot:

1. Press the **Power** button for five seconds.
2. As the mobile computer initializes MC31XX **Sample Applications** window appears.



CAUTION Files that remain open during a warm boot may not be retained.

Performing a Cold Boot

A cold boot restarts the mobile computer and erases all user stored records and entries from RAM. *Never perform a cold boot unless a warm boot does not solve the problem.*



CAUTION Cold boot resets the mobile computer, to the default settings. All added applications and all stored data are removed. Do not cold boot without support desk approval.

To perform a cold boot:

1. Simultaneously press and then release the **1**, **9** and **Power** keys. Do not hold down any other keys or buttons. As the mobile computer initializes, the splash window, [Figure 1-10 on page 1-10](#), appears for about a minute.
2. Calibrate the touch screen. See [Calibration Screen on page 1-10](#) to calibrate the mobile computer screen.

Windows Mobile 6.1 Devices

There are two reset functions, warm boot and cold boot.

- A warm boot restarts the mobile computer and closes all running programs.
- A cold boot also restarts the mobile computer and closes all running programs but also resets the Real-Time-Clock (RTC).

Data saved in flash memory or a memory card is not lost. Perform a warm boot first. This restarts the mobile computer and saves all *stored* records and entries. If the mobile computer still does not respond, perform a cold boot.

Performing a Warm Boot

To perform a warm boot:

1. Press the **Power** button for five seconds.

2. As the mobile computer initializes Today screen appears.

Performing a Cold Boot

A cold boot restarts the mobile computer. The operating system and all applications are restarted. File storage is preserved and some drivers are initialized. *Only perform a cold boot if a warm boot does not solve the problem.*

1. To perform a cold boot, simultaneously press and then release the **1**, **9** and **Power** keys. Do not hold down any other keys or buttons.
2. As the mobile computer initializes, the splash window, [Figure 1-10 on page 1-10](#), appears.

Waking the Mobile Computer

The wakeup conditions define what actions wake up the mobile computer after it has gone into suspend mode. The mobile computer can go into suspend mode by either pressing the Power button or automatically by Control Panel time-out settings. These settings are configurable and the factory default settings are shown in [Table 2-5](#).

Table 2-5 *Wakeup Default Settings*

Condition for Wakeup	Power Button	Automatic Time-out
AC power is applied.	No	Yes
Mobile computer is inserted into a cradle.	No	Yes
Mobile computer is removed from a cradle.	No	Yes
Mobile computer is connected to a serial device.	No	Yes
Mobile computer is connected to a USB device.	No	Yes
Mobile computer is disconnected from a USB device.	No	Yes
A key is pressed.	No	Yes
The scan triggered is pressed.	No	Yes
The screen is touched.	No	No
Bluetooth	Yes	Yes
On Motion	No	Yes
USB Host	No	No
Wireless LAN activity is detected.	No	No

To access the Wakeup settings:

On Window CE 6.0 devices, tap **Start** > **Settings** > **Control Panel** > **Power** icon > **Wakeup** tab.

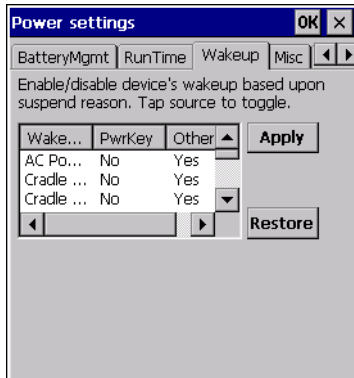


Figure 2-29 Windows CE 6.0 Wakeup Tab

On Windows Mobile 6.1 devices, tap **Start** > **Settings** > **System** tab > **Power** icon > **Wakeup** tab.

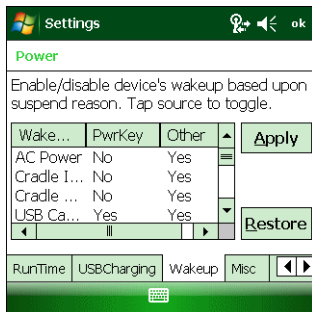


Figure 2-30 Windows Mobile 6.1 Wakeup Tab

Chapter 3 Using Bluetooth

Introduction

Bluetooth-equipped devices can communicate without wires, using frequency-hopping spread spectrum (FHSS) radio frequency (RF) to transmit and receive data in the 2.4 GHz Industry Scientific and Medical (ISM) band (802.15.1). Bluetooth wireless technology is specifically designed for short-range (30 feet/10 meters) communication and low power consumption.

MC31XXs with Bluetooth capabilities can exchange information (e.g., files, appointments, and tasks) with other Bluetooth enabled devices such as phones, printers, access points, and other mobile computers. To use the MC31XX as a modem, create a dial-up modem connection between a computer and MC31XX.

The MC31XX with Bluetooth technology uses either the StoneStreet Bluetooth stack or the Microsoft Bluetooth stack. To write an application that uses the StoneStreet One Bluetooth stack APIs, refer to the Enterprise Mobility Developer Kit (EMDK) Help.

Adaptive Frequency Hopping

Adaptive Frequency Hopping (AFH) is a method of avoiding fixed frequency interferers, and can be used with Bluetooth voice. All devices in the piconet (Bluetooth network) must be AFH-capable in order for AFH to work. There is no AFH when connecting and discovering devices. Avoid making Bluetooth connections and discoveries during critical 802.11b communications. AFH for Bluetooth consists of four main sections:

- Channel Classification - A method of detecting an interference on a channel-by-channel basis, or pre-defined channel mask.
- Link Management - Coordinates and distributes the AFH information to the rest of the Bluetooth network.
- Hop Sequence Modification - Avoids interference by selectively reducing the number of hopping channels.
- Channel Maintenance - A method for periodically re-evaluating the channels.

When AFH is enabled, the Bluetooth radio “hops around” (instead of through) the 802.11b high-rate channels. AFH coexistence allows Zebra mobile computers to operate in any infrastructure.

The Bluetooth radio in this MC31XX operates as a Class 2 device power class. The maximum output power is 2.5mW and the expected range is 32.8 feet (10 meters). A definition of ranges based on power class is difficult to obtain due to power and device differences, and whether one measures open space or closed office space.



NOTE It is not recommended to perform Bluetooth wireless technology inquiry when high rate 802.11b operation is required.

Security

The current Bluetooth specification defines security at the link level. Application-level security is not specified. This allows application developers to define security mechanisms tailored to their specific need. Link-level security occurs between devices, not users, while application-level security can be implemented on a per-user basis. The Bluetooth specification defines security algorithms and procedures needed to authenticate devices, and if needed, encrypt the data flowing on the link between the devices. Device authentication is a mandatory feature of Bluetooth while link encryption is optional.

Pairing of Bluetooth devices is accomplished by creating an initialization key that is used to authenticate the devices and create a link key for them. Entering a common PIN number in the devices being paired generates the initialization key. The PIN number is never sent over the air. By default, the Bluetooth stack responds with no key when a key is requested (it is up to user to respond to the key request event). Authentication of Bluetooth devices is based-upon a challenge-response transaction. Bluetooth allows for a PIN number or passkey that is used to create other 128-bit keys used for security and encryption. The encryption key is derived from the link key used to authenticate the pairing devices. Also worthy of note is the limited range and fast frequency hopping of the Bluetooth radios that makes long-distance eavesdropping difficult.

Recommendations are:

- Perform pairing in a secure environment
- Keep PIN codes private and don't store the PIN codes in the mobile computer
- Implement application-level security.

The Microsoft stack supports Smart-pairing. For detailed information, refer to the Microsoft MSDN.

Bluetooth Configuration

By default, the MC31XX is configured to using the Microsoft stack. Refer to the *MC31XX Series Mobile Computer Integrator Guide*, for information on switching between the Microsoft Bluetooth stack and the StoneStreet One Bluetooth stack.

If the MC31XX is configured to use the StoneStreet One Bluetooth stack, the Bluetooth icon appears at the bottom right corner of the Today screen on Windows Mobile devices and in the Status bar for WinCE devices. If the Microsoft Bluetooth stack is configured, the Bluetooth icon does not appear.

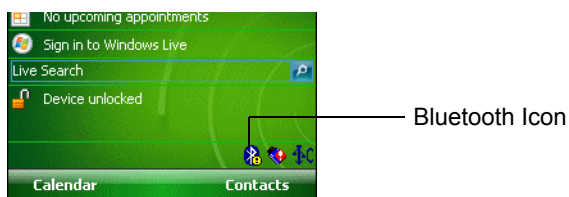


Figure 3-1 Bluetooth Icon

[Table 3-1](#) list the services supported by the StoneStreet One Bluetooth stack and the Microsoft Bluetooth stack.

Table 3-1 *Bluetooth Services*

Microsoft Bluetooth Stack		StoneStreet One Bluetooth Stack	
Windows Mobile	WinCE	Windows Mobile	WinCE
Serial Port Service	Serial Port Service	Serial Port Service	Serial Port Service
Dial-Up Networking Client Service		Dial-Up Networking Client Service	Dial-Up Networking Client Service
OBEX Object Push Service		OBEX Object Push Client and Host Services	OBEX Object Push Client and Host Services
HID Client Service		HID Client Services	HID Client Services
A2DP/AVRCP Service		LAN Client Services	LAN Client Services
		Headset Audio Gateway Client Services	Headset Audio Gateway Services
		Personal Area Networking Services	Personal Area Networking Services
		File Transfer Client and Host Services	File Transfer Client and Host Services
		A2DP/AVRCP Services	

[Table 3-2](#) list the COM ports available for the StoneStreet One Bluetooth stack and the Microsoft Bluetooth stack.

Table 3-2 *COM Ports*

Microsoft Bluetooth Stack	StoneStreet One Bluetooth Stack
COM5	COM5
COM9	COM9
	COM11
	COM21
	COM22
	COM23

Bluetooth Power States

Cold Boot

With StoneStreet One Bluetooth Stack

Performing a cold boot on the MC31XX turns off Bluetooth after initialization (which takes a few moments). It is normal to see the **Bluetooth** icon appear and disappear, as well as a wait cursor, when initialization proceeds in all modes.

With Microsoft Bluetooth Stack

Performing a cold boot retain the state of the Bluetooth radio prior to the cold boot.

Warm Boot

With StoneStreet One Bluetooth Stack

Performing a warm boot turns off Bluetooth.

With Microsoft Bluetooth Stack

Performing a warm boot retain the state of the Bluetooth radio prior to the warm boot.

Suspend

When there is an active Bluetooth connection, the Bluetooth radio goes into low power mode maintaining the active connection. When there is no active connection, the Bluetooth radio turns off.

With StoneStreet One Bluetooth Stack

- ✓ **NOTE** If there is an active Bluetooth connection between the MC31XX and another Bluetooth device, the MC31XX will not timeout. However, if the user presses the Power button on the MC31XX, the MC31XX will suspend and upon receiving data from a remote Bluetooth device, the MC31XX will wake from suspend mode. For example, Bluetooth scanner sending data to the MC31XX.

With Microsoft Bluetooth Stack

- ✓ **NOTE** If there is an active Bluetooth connection between the MC31XX and another Bluetooth device and there is no data activity, the MC31XX will timeout. However, if the user presses the Power button on the MC31XX, the MC31XX will suspend (except when on a call) and upon receiving data from a remote Bluetooth device, the MC31XX will wake from suspend mode. For example, headset redial or Bluetooth scanner sending data to the MC31XX.

Resume

When the MC31XX resumes, Bluetooth turns on if it was on prior to suspend.

Using Microsoft Bluetooth Stack with Windows Mobile 6.1

The following sections provide information on using the Microsoft Bluetooth stack with the Windows Mobile 6.1 operating system.

Turning the Bluetooth Radio Mode On and Off

Turn off the Bluetooth radio to save power or if entering an area with radio restrictions (e.g., an airplane). When the radio is off, other Bluetooth devices cannot see or connect to the MC31XX. Turn on the Bluetooth radio to exchange information with other Bluetooth devices (within range). Communicate only with Bluetooth radios in close proximity.

✓ **NOTE** To achieve the best battery life turn off radios not in use.

Enabling Bluetooth

To enable Bluetooth:

1. Tap **Wireless Manager** and then tap the **Bluetooth** bar or
Tap **Start > Setting > Connections > Bluetooth icon > Mode** tab.



Figure 3-2 Bluetooth Mode Tab

2. Check the **Turn On Bluetooth** checkbox.
3. Tap **ok**.

Disabling Bluetooth

To disable Bluetooth:

1. Tap **Wireless Manager** and then tap the **Bluetooth** bar or
Tap **Start > Setting > Connections > Bluetooth icon > Mode** tab.
2. Un-check the **Turn On Bluetooth** checkbox.
3. Tap **ok**.

Discovering Bluetooth Device(s)

The MC31XX can receive information from discovered devices without bonding. However, once bonded, the MC31XX and a bonded device exchange information automatically when you turn the Bluetooth radio on. See [Bonding with Discovered Device\(s\) on page 3-30](#) for more information.

To find Bluetooth devices in the area:

1. Ensure that Bluetooth is enabled on both devices.
2. Ensure that the Bluetooth device to discover is in discoverable and connectable modes.
3. Ensure that the two devices are within 30 feet (10 meters) of one another.
4. Tap **Start > Settings > Connections tab > Bluetooth icon > Devices tab**.



Figure 3-3 Bluetooth - Devices Tab

5. Tap **Add new device**. The MC31XX begins searching for discoverable Bluetooth devices in the area.



Figure 3-4 Searching for Bluetooth Devices

6. Select a device from the list.
7. Tap **Next**. The **Enter Passcode** window appears.



NOTE If Smart-pairing is configured and the device is requesting one of the pre-defined PINs, the **Enter Passcode** window does not appear.

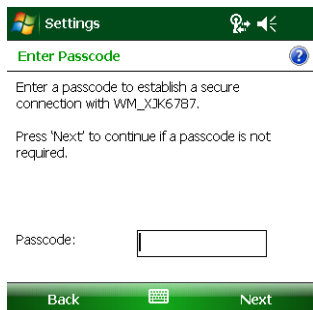


Figure 3-5 *Enter Passcode*

8. Enter the Passcode on the other device. The device is added to the Bluetooth list.



Figure 3-6 *Bluetooth Connection Confirmation*

You are prompted to enter a passcode. If the device has a specific passcode, enter it in the Passcode field and tap Next. If the device does not have a specific passcode, enter one in the Passcode field and tap Next. The Bluetooth radio tries to connect with the device.

9. If you created a passcode, you will be prompted by the other device to enter the same passcode. Enter the created passcode to establish a paired connection. (If you entered a passcode from the device, you shouldn't have to do anything on the other device.)
10. When the connection is complete, a list of matching and supported services on the device appears.
11. Select the services you want to use and tap Finish. The services on the new devices have to be selected or else the pairing won't include those services, even though the devices are paired. If services are not selected, you will be continually reprompted for the passcode from the device.
12. The device appears in the list on the main window.

After the passcodes have been accepted on both sides, you have a trusted ("paired") connection.

Available Services

✓ **NOTE** Some devices might not require a PIN. This depends upon the device's authentication.

The MC31XX with Microsoft Bluetooth stack and Windows Mobile 6.1 offers the following services:

- OBEX Object Push via Beam
- Serial Port
- Personal Area Networking

- HID
- Dial-up Networking
- A2DP/AVRCP.

See the following sections for information on these services.

Object Push Services via Beam

✓ **NOTE** You can only send files to a remote device using the Beam function.

Use the OBEX Push Service to send files and contacts to another Bluetooth device. To transfer files between the MC31XX and another Bluetooth enabled device:

1. Ensure that Bluetooth is enabled and discoverable on both devices.
2. Ensure that the two devices are within 30 feet (10 meters) of one another.
3. Tap **Start > Programs > File Explorer**.
4. Navigate to the file to transfer.
5. Tap and hold on the filename until the pop-up menu appears.

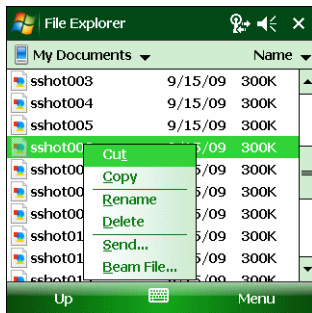


Figure 3-7 File Explorer Window

6. Select **Beam File**. The MC31XX searches for Bluetooth devices in the area.
7. Tap **Tap to send** next to the Bluetooth device to send the file to. The MC31XX communicates with the device and send the file. When completed, **Tap to send** changes to **Done**.

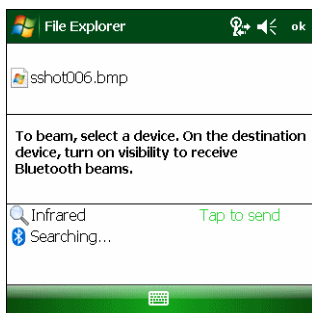


Figure 3-8 Beam File Window

To transfer a contact between the MC31XX and another Bluetooth enabled device:

1. Ensure that Bluetooth is enabled and discoverable on both devices.
2. Ensure that the two devices are within 30 feet (10 meters) of one another.
3. Tap **Start > Contacts**
4. Navigate to the contact to transfer.
5. Tap and hold on the contact until the pop-up menu appears.

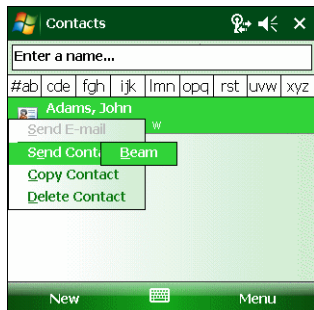


Figure 3-9 Contact Window

6. Select **Send Contact > Beam**. The MC31XX searches for Bluetooth devices in the area.
7. Tap **Tap to send** next to the Bluetooth device to send the file to. The MC31XX communicates with the device and send the contact. When completed, **Tap to send** changes to **Done**.

Serial Port Services

Use the wireless Bluetooth serial port connection as you would a physical serial cable connection. Configure the application that will use the connection to the correct serial port.

To establish a serial port connection:

1. Ensure that Bluetooth is enabled and discoverable on both devices.
2. Ensure that the two devices are within 30 feet (10 meters) of one another.
3. Tap **Start > Settings > Connections** tab > **Bluetooth** icon > **Devices** tab.
4. Tap **Add new device**. The MC31XX begins searching for discoverable Bluetooth devices in the area.
5. Select a device from the list.
6. Tap **Next**. The **Enter Passcode** window appears.
 - ✓ **NOTE** If Smart-pairing is configured and the device is requesting one of the pre-defined PINs, the **Enter Passcode** window does not appear.
7. Enter the Passcode and the tap **Next**. The device is added to the Bluetooth list.
8. In the device list, tap the serial device. The **Partnership Settings** window displays.
9. Select the **Serial Port** checkbox.
10. Tap **Save**.
11. Tap **COM Ports** tab.
12. Tap **New Outgoing Port**. The add device window appears.

13. Select the serial device in the list and then tap **Next**.
14. Select a COM port from the drop-down list.
15. Tap **Finish**.

✓ **NOTE** No connection is made at this point. An application must open the selected COM port to trigger Microsoft Bluetooth stack to open the connection.

ActiveSync Using Serial Port Services

Use the wireless Bluetooth serial port connection for ActiveSync just as you would a physical serial cable connection. You must configure the application that will use the connection to the correct serial port.

To set up a Bluetooth ActiveSync connection:

Before setting up a Bluetooth ActiveSync connection, configure the Bluetooth function of your device.

✓ **NOTE** For additional security, disable network bridging on the computer (specifically, bridging to a Remote NDIS adapter) before connecting to the computer to pass through to the Internet or a network. For more information on network bridging, see **Windows Help** on your computer.

The instructions below are for computers that support the Windows XP SP2 or later version operating system.

1. Ensure that Bluetooth is enabled and discoverable on both devices.
2. Ensure that the two devices are within 30 feet (10 meters) of one another.
3. On the computer, click **Start > Settings > Control Panel**.
4. Double-click **Bluetooth Devices**.
5. On the **Options** tab, select the **Turn discovery on** and **Allow Bluetooth devices to connect to this computer** checkboxes.

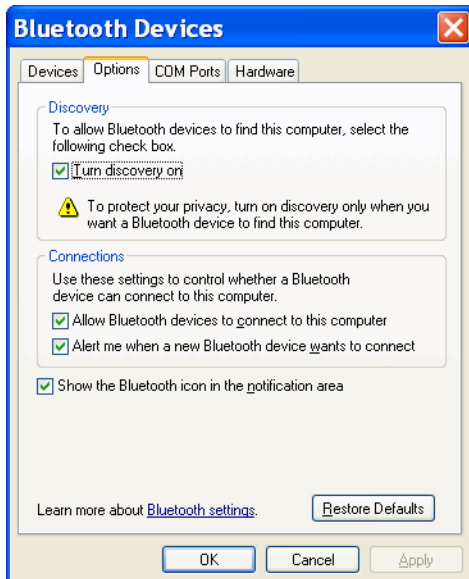


Figure 3-10 Computer Bluetooth Devices Window

6. On the **COM Ports** tab, click **Add**.
7. Select the **Incoming (device initiates the connection)** option, then click **OK**.
Note the number of the COM port that was added.
8. Click **OK**.
9. Click **Start > All Programs > Microsoft ActiveSync**.
10. Click **File > Connection Settings**.



Figure 3-11 ActiveSync Connection Settings

11. On the **Allow connections to one of the following** drop-down list, select the COM port with the number you noted earlier.
12. On the MC31XX, tap **Start > Programs > ActiveSync**.
13. Tap **Menu > Connect via Bluetooth**.

Synchronization is automatically initiated. The **ActiveSync** icon appears on the lower right corner of the **Today** screen.

If an Authentication is required, the **Enter Passcode** screen appears, type an alphanumeric passkey (PIN code), then tap **Next**; enter the same passkey on the other device.

The passkey is recommended for enhanced security. Your passkey must be between 1 to 16 alphanumeric characters.

If you do not want to use a passkey, tap **Next**.

14. To disconnect the ActiveSync connection, tap the **ActiveSync** icon on the Today screen.
15. Tap **Disconnect**.

Using Microsoft Bluetooth Stack with Windows CE 6.0

The following sections provide information on using the Microsoft Bluetooth stack with Windows CE 6.0 operating system.

Power Modes

The Bluetooth radio switches between normal and low power modes automatically. When data transfer is required, the radio goes into normal mode. After five seconds of inactivity, the radio goes into low power mode.

Discovering Bluetooth Device(s)

The MC31XX can receive information from discovered devices without bonding. However, once bonded, the MC31XX and a bonded device exchange information automatically when you turn the Bluetooth radio on. See [Bonding with Discovered Device\(s\) on page 3-30](#) for more information.

To find Bluetooth devices in the area:

1. Ensure that Bluetooth is enabled on both devices.
2. Ensure that the Bluetooth device to discover is in discoverable and connectable modes.
3. Ensure that the two devices are within 30 feet (10 meters) of one another.
4. Tap **Start > Settings > Control Panel > Bluetooth Device Properties** icon.

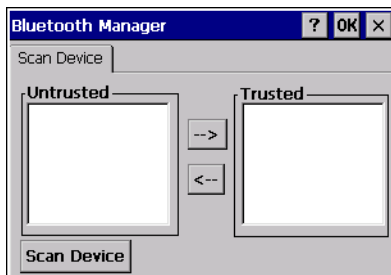


Figure 3-12 Bluetooth Manager

5. Tap **Scan Device** button. The MC31XX begins searching for discoverable Bluetooth devices in the area. Discovered devices appear in the **Untrusted** list.

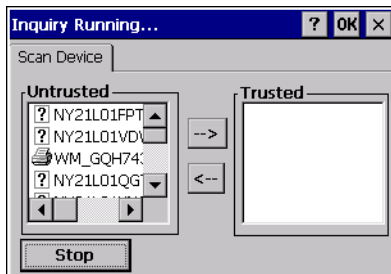


Figure 3-13 Searching for Bluetooth Devices

6. Select a device from the **Untrusted** list.
7. Tap --> button. A dialog box appears.

8. Tap **Yes**.
9. The **Bluetooth Enter PIN** window appears.



Figure 3-14 Enter PIN

10. Enter the PIN on the other device. The device is added to the **Trusted** list.
You are prompted to enter a PIN. If the device has a specific PIN, enter it in the PIN field and tap Next. If the device does not have a specific passcode, enter one in the Passcode field and tap Next. The Bluetooth radio tries to connect with the device.
11. If you created a passcode, you will be prompted by the other device to enter the same passcode. Enter the created passcode to establish a paired connection. (If you entered a passcode from the device, you shouldn't have to do anything on the other device.)
12. When the connection is complete, a list of matching and supported services on the device appears.
13. Select the services you want to use and tap Finish. The services on the new devices have to be selected or else the pairing won't include those services, even though the devices are paired. If services are not selected, you will be continually reprompted for the passcode from the device.
14. The device appears in the list on the main window.

After the passcodes have been accepted on both sides, you have a trusted ("paired") connection.

✓ **NOTE** Some devices might not require a PIN. This depends upon the device's authentication.

Available Services

✓ **NOTE** In order to connect to the Bluetooth device, the application must create the connection to the remote device. Please refer to the MSDN Help for detailed information.

The MC31XX with Microsoft Bluetooth stack and Windows CE 6.0 offers the Serial Port service.

Using Bluetooth StoneStreet One Bluetooth Stack

The following sections provide information on using the Stone Street One Bluetooth stack.

Turning the Bluetooth Radio Mode On and Off

Turn off the Bluetooth radio to save power or if entering an area with radio restrictions (e.g., an airplane). When the radio is off, other Bluetooth devices cannot see or connect to the MC31XX. Turn on the Bluetooth radio to exchange information with other Bluetooth devices (within range). Communicate only with Bluetooth radios in close proximity.

✓ **NOTE** To achieve the best battery life turn off radios not in use.

Disabling Bluetooth

To disable Bluetooth, tap **Bluetooth** icon > **Disable Bluetooth**. The **Bluetooth** icon changes to indicate that Bluetooth is disabled.

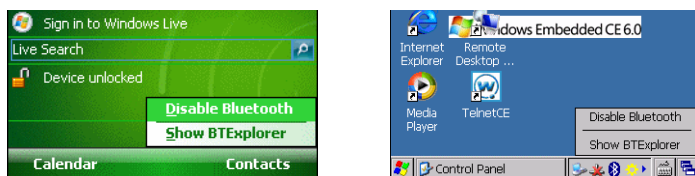


Figure 3-15 *Disable Bluetooth*

Enabling Bluetooth

To enable Bluetooth, tap **Bluetooth** icon > **Enable Bluetooth**. The **Bluetooth** icon changes to indicate that Bluetooth is enabled.

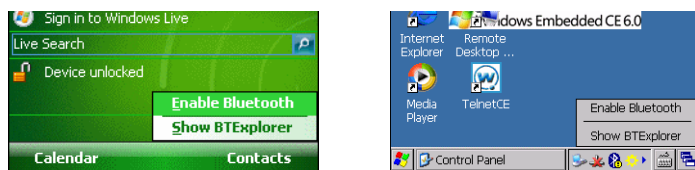


Figure 3-16 *Enable Bluetooth*

Modes

The BTE Explorer application has two modes for managing Bluetooth connections: Wizard Mode and Explorer Mode. The Wizard Mode is for novice Bluetooth users and the Explorer Mode is for experienced Bluetooth users. To switch between modes, select **View** > **Wizard Mode** or **View** > **Explorer Mode**.

Wizard Mode

Wizard Mode provides a simple process for discovering and connecting to Bluetooth devices.

✓ **NOTE** Switching between Wizard Mode and Explorer Mode closes all active connections.

Wizard Mode shows the devices and services in a simple Favorites view created by following the step-by-step wizard.

Explorer Mode

The **Explorer Mode** window is easy to navigate and provides greater control to users familiar with Bluetooth. The menu bar provides quick access to the options and tools used to connect to devices. To access Explorer Mode, tap **View > Explorer Mode**.

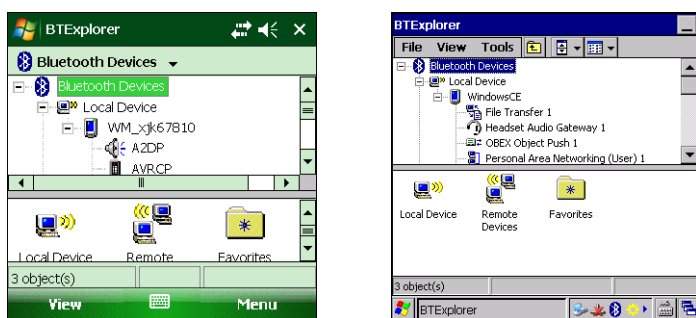


Figure 3-17 Explorer Mode Window

You can also use the “tap and hold” technique to view available options. Scroll bars and view options are similar to those on the Windows desktop. The tree structure lists the following sub-items:

- Local Device - This device
- Remote Device - Other Bluetooth devices
 - Trusted Devices - Bonded (paired) Bluetooth devices
 - Untrusted Devices - Discovered devices that are not bonded
- Favorites - Selected services that are set as *Favorite* for quick access.

✓ **NOTE** Switching between Wizard Mode and Explorer Mode closes all active connections.

Discovering Bluetooth Device(s)

The MC31XX can receive information from discovered devices without bonding. However, once bonded, the MC31XX and a bonded device exchange information automatically when you turn the Bluetooth radio on. See [Bonding with Discovered Device\(s\) on page 3-30](#) for more information.

To find Bluetooth devices in the area:

1. Ensure that Bluetooth is enabled on both devices.
2. Ensure that the Bluetooth device to discover is in discoverable and connectable modes.
3. Ensure that the require profile is enabled on the MC31XX. See [Profiles Tab on page 3-42](#) for more information.
4. Ensure that the two devices are within 30 feet (10 meters) of one another.
5. Tap the **Bluetooth** icon and select **Show BTE Explorer**. The **BTE Explorer** window appears.

- ✓ **NOTE** If favorite connections have already been created, the **Favorites** screen displays. If no favorite connections have been created, the **New Connection Wizard** screen displays.

6. Tap **Menu > New Connection**. The **New Connection Wizard** appears.

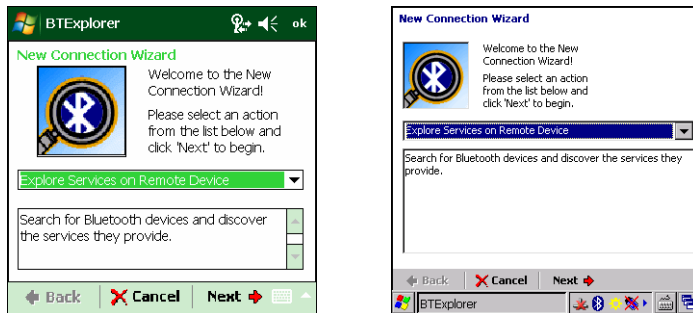


Figure 3-18 BTE Explorer Window

7. Select **Explore Services on Remote Device** or another from the drop-down list and tap **Next**.

The following actions are available in the drop-down list (actions may vary depending upon configurations):

- Explore Services on Remote Device
- Pair with a Remote Device
- Active Sync via Bluetooth
- Browse Files on Remote Device
- Connect to Headset
- Connect to Internet using Access Point
- Connect to Internet using Phone/Modem
- Connect to Personal Area Network
- Connect to Printer
- Send or Exchange Objects
- Associate Serial Port
- Connect to High-Quality Audio (not available on Windows CE 6.0 devices).

- ✓ **NOTE** If a device discovery action has not been previously performed, a device discovery is automatically initiated. If a device discovery has previously been performed, the device discovery process is skipped, and the previously found list of devices displays. To start a new device discovery, tap and hold in the window and select **Discover Devices** from the pop-up menu.

8. **BTE Explorer** searches for Bluetooth devices in the area.

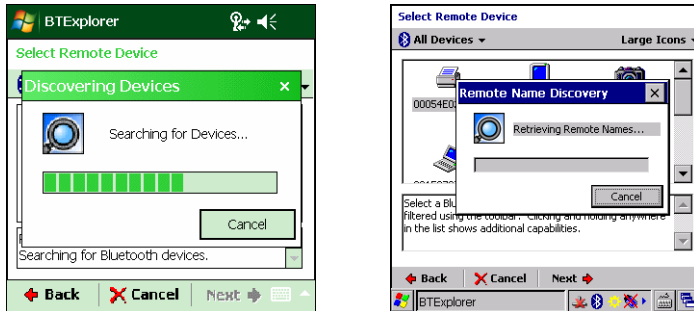


Figure 3-19 Discover Devices Dialog Box

The discovered devices display in the **Select Remote Device** window.

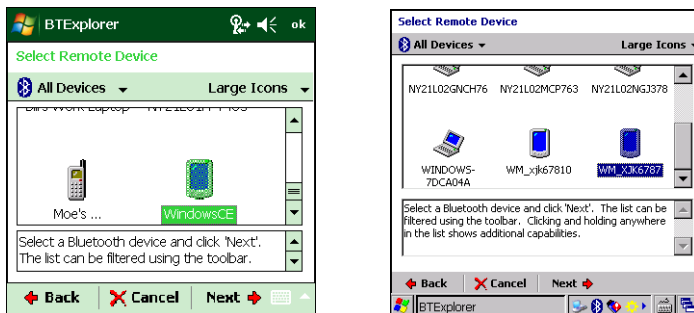


Figure 3-20 Select Remote Device Window

9. Select a device from the list and tap **Next**. The MC31XX searches for services on the selected Bluetooth device.

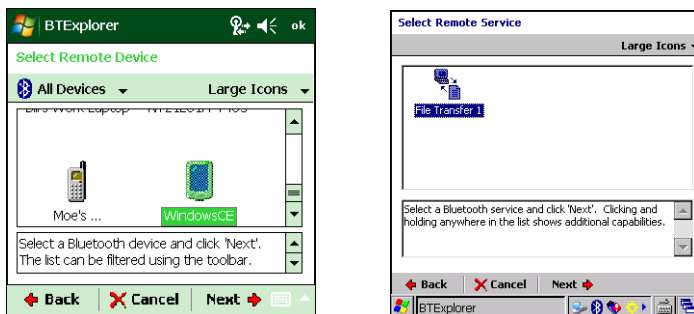


Figure 3-21 Device Services



NOTE If the MC31XX discovers a service but the service is not supported, the service icon is grayed-out.

10. Select a service from the list and press **Next**. The **Connection Favorite Options** window appears.

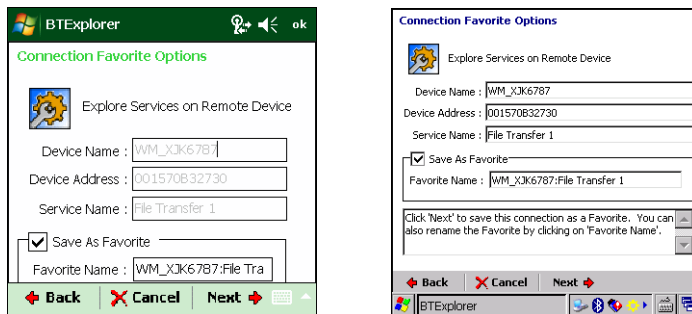


Figure 3-22 Connection Favorite Options Window

11. In the **Favorite Name** text box, enter a name for this service that will appear in the **Favorite** window.
12. Tap **Next**. The **Connection Summary** window appears.
13. Tap **Connect** to add the service to the **Favorite** window and connect to the service.

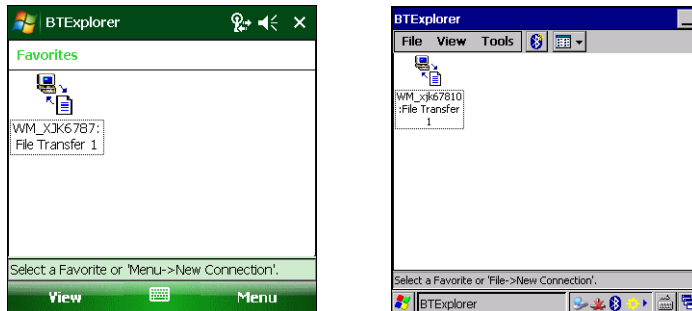


Figure 3-23 Favorites Window

Available Services

✓ **NOTE** Some devices might not require a PIN. This depends upon the device's authentication.

The MC31XX offers the following services:

- File Transfer
- Dial-Up Networking
- OBEX Object Push
- Headset Audio Gateway
- Serial Port
- Personal Area Networking
- A2DP/AVRCP.

See the following sections for information on these services.

File Transfer Services

✓ **NOTE** Shared folders are a security risk.

To transfer files between the MC31XX and another Bluetooth enabled device:

1. Ensure that OBEX File Transfer profile is enabled on the MC31XX. See [Profiles Tab on page 3-42](#) for more information.

✓ **NOTE** If favorite connections have already been created, the **Favorites** screen displays. If no favorite connections have been created, the **New Connection Wizard** screen displays.

2. Use the **Connection Wizard** to search for a Bluetooth device.
3. Select the device and tap **Next**. The **Select Remote Service** window appears.
4. Tap **Next**. The **Connection Favorite Options** window appears.
5. Tap **Next**. The **Connection Summary** window appears.
6. Tap **Connect**. The remote device's accessible folders appear.

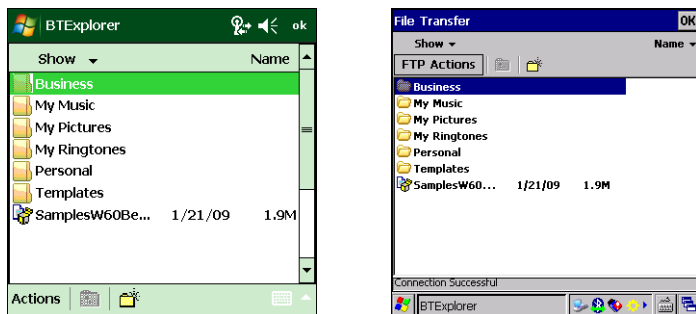


Figure 3-24 File Transfer Window

7. Double-tap the file to copy. The **Save Remote File** window appears.

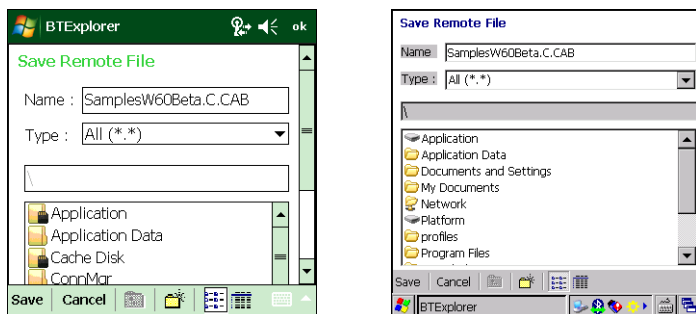


Figure 3-25 Save Remote File Window

8. Tap and hold on the file. A pop-up menu appears.
9. Select the action to perform:
 - **New** - create a new file or folder on the remote device
 - **Delete** - delete the selected file on the remote device.

- **Get File** - copy the file from the remote device to the MC31XX.
- **Put File** - copy a file from the MC31XX to the remote device.

Creating a New File or Folder

To create a new folder or file on the remote device:

1. Tap and hold on the screen and select **New > Folder** or **New > File**. The **Create New Folder** or **Create New File** window appears.
2. Enter the name for the new folder or file.
3. Tap **OK** to create the new folder or file on the remote device.

Deleting a File

To delete a file from the remote device:

1. Tap and hold on the file to delete and select **Delete**.
2. In the **Delete Remote Device File** dialog box tap **Yes**.

Getting a File

To copy a file from a remote device:

1. Double-tap or tap and hold on the file and select **Get**. The **Save Remote File** window appears.
2. Navigate to the directory to save the file.
3. Tap **Save**. The file is transferred from the remote device to the MC31XX.

Copying a File

To copy a file to a remote device:

1. Tap **Action > Put**. The **Send Local File** window appears.
2. Navigate to the directory to save the file and select a file.
3. Tap **Open**. The file copies from the MC31XX to the remote device.

Connecting to the Internet Using an Access Point

This section explains how to access a Bluetooth-enabled LAN access point (AP) for a network connection. Use Internet Explorer to connect to a server.

1. Ensure the MC31XX is discoverable and connectable. See [Device Info Tab on page 3-33](#).
2. Ensure that the **Personal Area Networking** profile is enabled on the MC31XX. See [Profiles Tab on page 3-42](#) for more information.
3. Use the **Connection Wizard** to search for a Bluetooth AP.



NOTE If favorite connections have already been created, the **Favorites** screen displays. If no favorite connections have been created, the **New Connection Wizard** screen displays.

4. Select the **Personal Area Network** or **Network Access** service and select **Connect** from the pop-up menu. The MC31XX connects with the access point.

5. Tap **Start > Internet Explorer**. The **Internet Explorer** window appears.
6. In the address field, enter an internet address and tap the **Enter** button. The web page loads.

✓ **NOTE** Network Access profile is not supported.

Dial-Up Networking Services

Dial-up networking allows the user to connect the MC31XX to a Bluetooth Phone and use the Bluetooth Phone as a modem to connect to an office network or ISP.

Before setting up dial-up networking, obtain dial-up information and other necessary settings (username, password and domain name, if required) for the office network or ISP.

To create a new Bluetooth connection:

1. Ensure the Bluetooth Phone is discoverable and connectable.
2. Ensure that the **Dial-Up Networking** profile is enabled on the MC31XX. See [Profiles Tab on page 3-42](#) for more information.
3. Tap **Menu > New Connection**.
4. Select **Explore Services on Remote Device** or another from the drop-down list and tap **Next**.
5. **BTE Explorer** searches for Bluetooth devices in the area.
The discovered devices display in the **Select Remote Device** window.
6. Select the Bluetooth Phone from the list and tap **Next**. The MC31XX searches for services on the Bluetooth Phone.

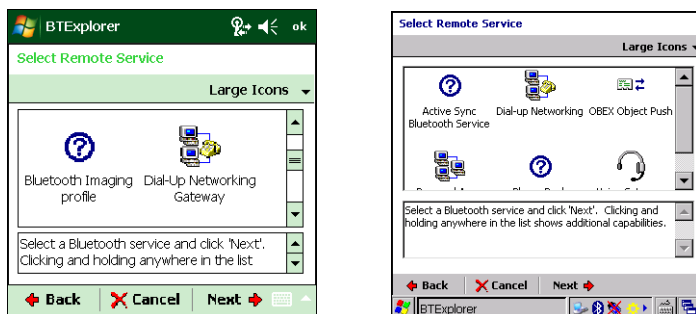


Figure 3-26 Select Remote Service Window

7. Select **Dial-up Networking Gateway** service from the list and tap **Next**. The **Connection Favorite Options** window appears.

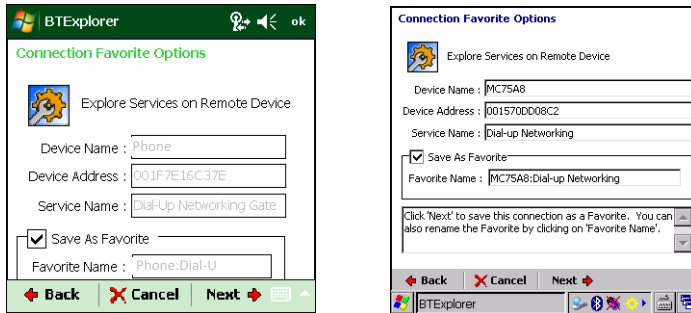


Figure 3-27 Connection Favorite Options Window

8. In the **Favorite Name** text box, enter a name for this service that will appear in the **Favorite** window.
9. Tap **Next**. The **Connection Summary** window appears.
10. Tap **Connect**. The **Select Dial-up Networking Entry** window appears.

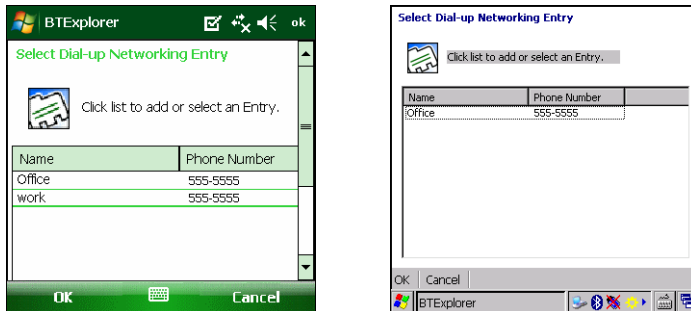


Figure 3-28 Select Dial-up Networking Entry Window

11. Select the entry and tap **OK**. The MC31XX begins to communicate with the Bluetooth phone. If required, the phone requests permission to communicate with the MC31XX.
12. Confirm the connection on the phone. The **Network Log On** window appears.

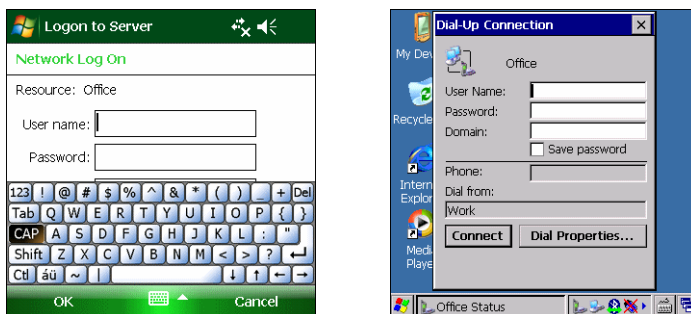


Figure 3-29 Network Log On Window

13. In the **User name** text box, enter the user name for this connection.
14. In the **Password** text box, enter the password for this connection.
15. In the **Domain** text box, enter the domain name for this connection, if required.
16. Tap **Finish** or **Connect**.
17. The phone begins dialing and connects to the network.

18. To end a session, tap the **Connection** icon and then tap **Disconnect** in the dialog box.

Add a Dial-up Entry

To add a dial-up entry:

1. In the **Select Dial-up Networking Entry** window, tap and hold and then select **Add Entry** from the pop-up menu.

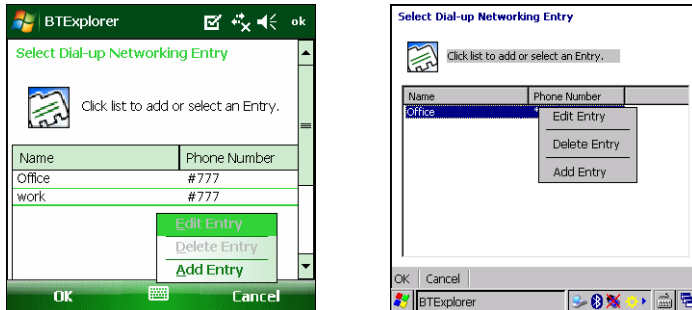


Figure 3-30 Select Dial-up Networking Entry Window

2. The **Add Phone Book Entry** window appears.

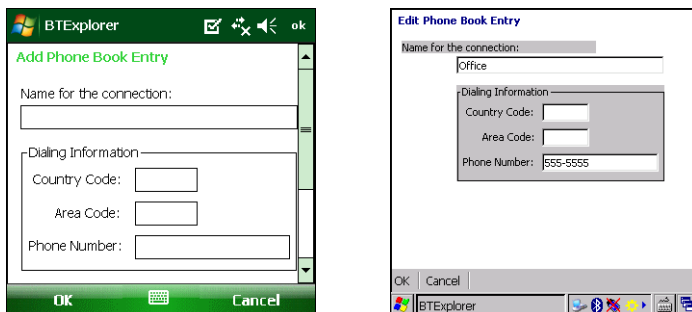


Figure 3-31 Add Phone Book Entry Window

3. In the **Name for the connection** text box, enter a name for this connection.
4. In the **Country Code** text box, enter the country code for the country that you are calling.
5. In the **Area Code** text box, enter the area code.
6. In the **Phone Number** text box, enter the phone number.
7. Tap **OK**.

Object Exchange Push Services

Object Exchange (OBEX) is a set of protocols that allows sharing objects such as Contacts or pictures using Bluetooth.

To exchange contact information with another Bluetooth enabled device:

1. Ensure the MC31XX is discoverable and connectable. See [Device Info Tab on page 3-33](#).
2. Ensure that the **OBEX Object Push** profile is enabled on the MC31XX. See [Profiles Tab on page 3-42](#) for more information.

- ✓ **NOTE** If favorite connections have already been created, the **Favorites** screen displays. If no favorite connections have been created, the **New Connection Wizard** screen displays.

3. Use the **Connection Wizard** to search for a Bluetooth device.
4. Select the device and tap **Next**.
5. Select the **OBEX Object Push** service and select **Next**. The **Connection Favorite Options** window appears.
6. Tap **Next**. The **Connection Summary** window appears.
7. Tap **Connect**. The **OBEX Object Push** window appears.
8. In the **Action** drop-down list, select one of the following options: **Send Contact Information**, **Swap Contact Information**, **Fetch Contact Information**, or **Send a Picture**.

Sending a Contact

To send a contact to another device:

- ✓ **NOTE** Prior to sending and receiving contacts, a default contact must be set up before attempting to send a contact.

1. Tap and hold on **OBEX Object Push** and select **Connect**. The **OBEX Object Push** window appears.

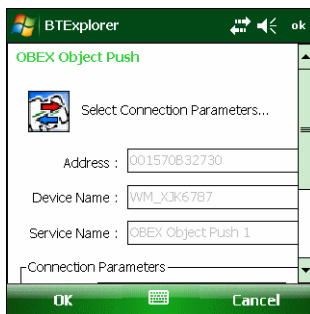



Figure 3-32 *OBEX Object Push Window*

2. In the **Action:** drop-down list, select **Send Contact Information**.
3. Tap . The **Select Contact Entry** window appears.

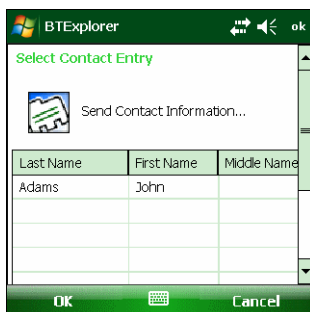


Figure 3-33 *Select Contact Entry Window*

4. Select a contact to send to the other device.

5. Tap **OK**.
6. Tap **OK** to send the contact to the other device and display a confirmation dialog box on the other device to accept the contact. A **Send Contact** dialog appears.
7. Tap **Ok**.

Swapping Contacts

To swap contacts with another device:

- ✓ **NOTE** Prior to swapping contacts, a default contact must be set up before attempting to send a contact.
Ensure that the MC31XX is connectable.

1. Tap and hold on **OBEX Object Push** and select **Connect**. The **OBEX Object Push** window appears.

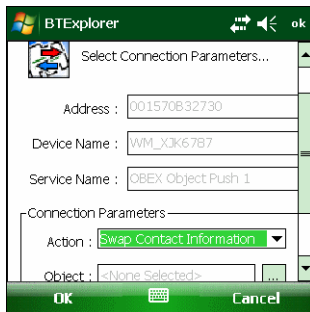


Figure 3-34 OBEX Object Push Window

2. In the **Action:** drop-down list, select **Swap Contact Information**.
3. Tap **...**. The **Select Contact Entry** window appears.

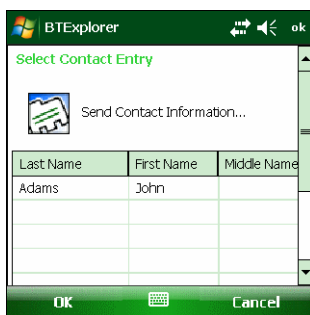


Figure 3-35 Select Contact Entry Window

4. Select a contact to send to the other device.
5. Tap **OK**.
6. Tap **OK** to swap contacts with the other device and display a confirmation dialog box on the other device to accept the contact.
7. Tap **Ok**.

Fetching a Contact

To fetch a contact from another device:

- ✓ **NOTE** Prior to sending and receiving contacts, a default contact must be set up before attempting to send a contact.
Ensure that the MC31XX is connectable.

1. Tap and hold on **OBEX Object Push** and select **Connect**. The **OBEX Object Push** window appears.

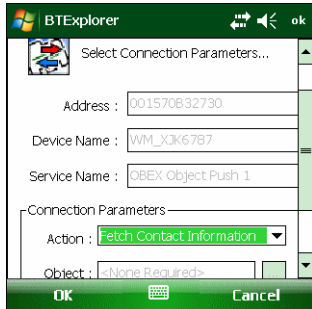


Figure 3-36 OBEX Object Push Window

2. In the **Action:** drop-down list, select **Fetch Contact information**.
3. Tap **OK**. The contact on the other device is copied.

Sending a Picture

To send a picture to another device:

1. Tap and hold on **OBEX Object Push** and select **Connect**. The **OBEX Object Push** window appears.

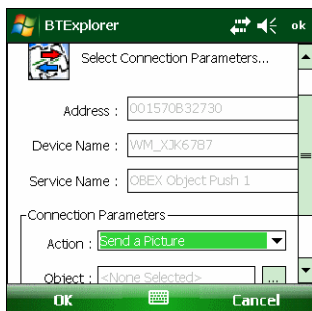



Figure 3-37 OBEX Object Push Window

2. In the **Action:** drop-down list, select **Send A Picture**.
3. Tap . The **Send Local Picture** window appears.

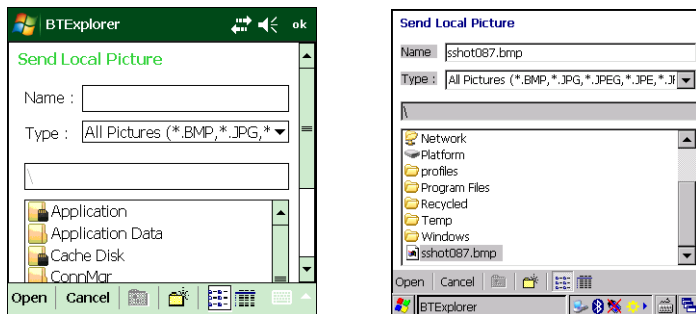


Figure 3-38 Send Local Picture Window

4. Navigate to the picture to send to the other device.
5. Tap **Open**.
6. Tap **OK** to send the picture to the other device and display a confirmation dialog box on the other device to accept the picture. A **Send Picture** dialog appears.
7. Tap **Ok**.

Headset Services

To connect to a Bluetooth headset:

✓ **NOTE** Newer Bluetooth headsets are device dependant and remember the last device they connected to. If problems occur while connecting to the headset, place the headset in discovery mode. Refer to the headset user manual for more information.

1. Ensure the MC31XX is connectable (required when automatic re-connect is initiated). See [Device Info Tab on page 3-33](#).
2. Ensure that the **Headset** profile is enabled on the MC31XX. See [Profiles Tab on page 3-42](#) for more information.
3. Use the **Connection Wizard** to search for a Bluetooth headset.
4. Select the device and tap **Next**.
5. Select the **Headset** service name and select **Connect**. The MC31XX connects to the headset. Refer to the headset user manual for instructions on communicating with a Bluetooth device.

✓ **NOTE** When using a Bluetooth headset with Headset Services, you cannot accept or end a call from the headset. You must accept or end a call on the MC31XX.

6. Press the communication button on the headset. This routes both system and voice call audio to the headset.
7. When a call is received on the MC31XX, tap the **Accept** button to answer the call.
8. Press the communication button on the headset to route the audio back to the MC31XX.

Serial Port Services

Use the wireless Bluetooth serial port connection as you would a physical serial cable connection. Configure the application that will use the connection to the correct serial port.

To establish a serial port connection:

1. MC31XX Use the **Connection Wizard** to search for a Bluetooth serial device.
2. Select the device and tap **Next**. The **Connection Favorite Options** window appears.
3. In the **Local COM Port:** drop-down list select a COM port.
4. Tap **Finish**.

ActiveSync Using Serial Port Services

- ✓ **NOTE** By default, COM ports COM5, COM9, COM11, COM21, COM22 and COM23 are Bluetooth virtual ports. If an application opens one of these ports, the Bluetooth driver activates and guides you through a Bluetooth connection.

Use the wireless Bluetooth serial port connection for ActiveSync just as you would a physical serial cable connection. You must configure the application that will use the connection to the correct serial port.



Figure 3-39 ActiveSync Connection Settings Window on PC

To establish an ActiveSync connection:

1. Ensure that the **Sync** profile is enabled on the MC31XX. See [Profiles Tab on page 3-42](#) for more information.
2. Use the **Connection Wizard** to search for a Bluetooth device, such as a PC. In the drop-down list select **ActiveSync via Bluetooth**.
3. Select the device and tap **Next**. The **Connection Favorite Options** window appears.
4. Tap **Connect**. The **Remote Service Connection** window appears.

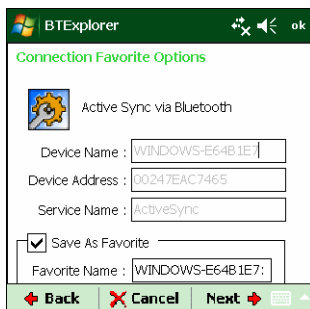


Figure 3-40 Remote Service Connection Window

5. In the **Service Type** drop-down list, select **Active Sync**.
6. Tap **OK**. The MC31XX connects the PC and an ActiveSync session begins.
7. Tap **Finish**. The Connection Favorite Options window appears.
8. To end the session, tap the ActiveSync icon in the **Favorite** window and select **Disconnect** from the pop-up window.

Personal Area Network Services

✓ **NOTE** This profile supports Ad-hoc and PAN User. Network Access Profile is not supported.

Connect two or more Bluetooth devices to share files, collaborate, or play multi-player games. To establish a Personal Area Network connection:

1. Ensure that the **Personal Area Networking** profile is enabled on the MC31XX. See [Profiles Tab on page 3-42](#) for more information.
2. Use the **Connection Wizard** to search for a Bluetooth device.
3. Select the device and tap **Next**. The **Connection Favorite Options** window appears.
4. Tap **Next**. The **Connection Summary** window appears.
5. Tap **Connect**. The MC31XX connects to the Bluetooth device.

A2DP/AVRCP Services

A2DP/AVRCP is used to connect to a high-quality stereo headset:

1. Ensure the MC31XX is connectable (required when automatic re-connect is initiated). See [Device Info Tab on page 3-33](#).
2. Ensure that the remote Bluetooth device is in discoverable mode. See the devices user manual for instructions.
3. Ensure that the **A2DP/AVRCP** profile is enabled on the MC31XX. See [Profiles Tab on page 3-42](#) for more information.
4. Tap **Menu > Settings > Services** tab.
5. Tap **Add** button.
6. Select **Advanced Audio Distribution Services**.
7. Tap **OK**. The **Edit Local Services** window appears.
8. Tap **OK** twice.
9. Tap **Menu > New Connection**.
10. Select **Connect to High-Quality Audio** from the drop-down list.
11. Tap **Next**.
12. Select the device and tap **Next**.
13. Enter the PIN Code for the remote device and then tap **OK**. The **Connection Favorite Options** window appears.

14. Tap **Next**.

15. Tap **Connect**. The MC31XX connects to the high-quality audio headset.

For stereo headsets that can use hands-free services, connect to the hands-free service after connecting to the A2DP service:

1. Tap **Menu > New Connection**.
2. Select **Connect to Headset** from the drop-down list.
3. Tap **Next**.
4. Select the stereo headset and tap **Next**.
5. Select the **Hands-Free unit** service and then tap **Next**.
6. Tap **Next**.
7. Tap **Connect**.

Connect to a HID Device

The MC31XX can connect to an Human Interface Device (HID) device such as a Bluetooth keyboard:

1. Ensure the MC31XX is connectable (required when automatic re-connect is initiated). See [Device Info Tab on page 3-33](#).
2. Ensure that the remote Bluetooth device is in discoverable mode. See the device user manual for instructions.
3. Ensure that the **HID Client** profile is enabled on the MC31XX. See [Profiles Tab on page 3-42](#) for more information.
4. Tap **Menu > New Connection**.
5. Select **Explore Services on Remote Device** from the drop-down list.
6. Tap **Next**.
7. Select the device and tap **Next**.
8. Select the service and tap **Next**.
9. The **Connection Favorite Options** window appears.
10. Tap **Next**.
11. Tap **Connect**. The MC31XX connects to the HID device.

Bonding with Discovered Device(s)

A bond is a relationship created between the MC31XX and another Bluetooth device in order to exchange information in a secure manner. Creating a bond involves entering the same PIN on the two devices. After creating a bond and turning on the Bluetooth radios, the devices recognize the bond and can exchange information without re-entering a PIN.

To bond with a discovered Bluetooth device:

- ✓ **NOTE** If favorite connections have already been created, the **Favorites** screen displays. If no favorite connections have been created, the **New Connection Wizard** screen displays.

1. Tap the **Bluetooth** icon and select **Show BTEplorer**. The **BTEplorer** window appears.
2. Tap **Menu > New Connection**. The **New Connection Wizard** window appears.
3. In the drop-down list, select **Pair with Remote Device**.
4. Tap **Next**. The **Select Remote Device** window appears.

✓ **NOTE** Devices discovered previously are listed to save time. To start a new device discovery, tap and hold on the list area and select **Discover Devices** from the pop-up menu.

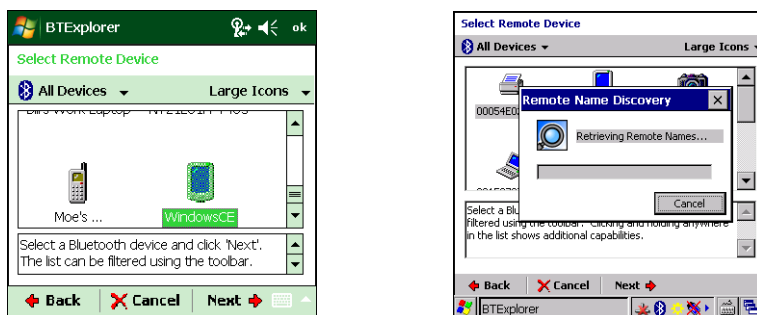


Figure 3-41 Select Remote Device Window

5. Select a device from the list and tap **Next**. The **PIN Code Request** window appears.

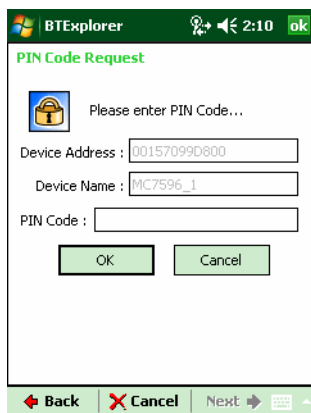


Figure 3-42 Connection Favorite Options Window

6. In the **PIN Code** field, enter the PIN code.
7. Tap **OK**. The **Pairing Status** window displays.

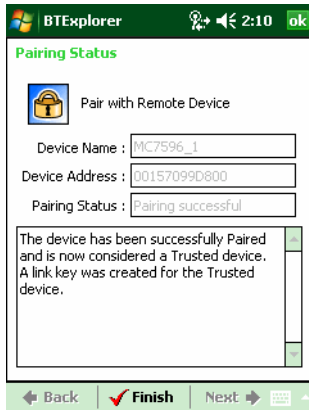


Figure 3-43 Pairing Status Window

8. Tap **Finish**. The devices are successfully paired. The device name moves to the **Trusted Devices** window.

Deleting a Bonded Device

To delete a device no longer needed:

1. Tap the **Bluetooth** icon and select **Show BTExplorer**. The **BTExplorer** window appears.
2. Tap **Menu > Trusted Devices**. The **Trusted Devices** window appears.
3. Tap and hold on the device select **Delete Link Key** in the pop-up menu.
4. A confirmation dialog appears. Tap **Yes**.

Accepting a Bond

When a remote device wants to bond with the MC31XX, enter a PIN when requested to grant permission.

1. Ensure that the MC31XX is set to discoverable and connectable. See [Bluetooth Settings on page 3-33](#). When prompted to bond with the remote device the **PIN Code Request** window appears.

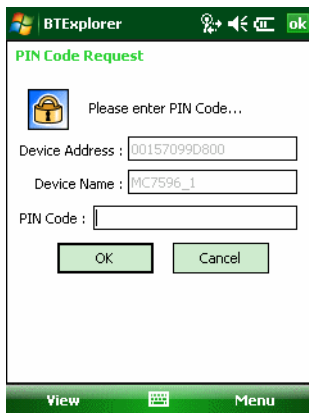


Figure 3-44 PIN Code Request Window

2. In the **PIN Code**: text box, enter the same PIN entered on the device requesting the bond. The PIN must be between 1 and 16 characters.
3. In the **Device Name**: text box, edit the name of the device requesting the bond, if desired.

4. Tap **OK** to create the bond. The MC31XX can now exchange information with the other device.

Bluetooth Settings

Use the **BTE Explorer Settings** window to configure the operation of the **BTE Explorer** application. Tap **Menu > Settings**. The **BTE Explorer Settings** window appears.

Device Info Tab

Use the **Device Info** tab to configure the MC31XX's Bluetooth connection modes.

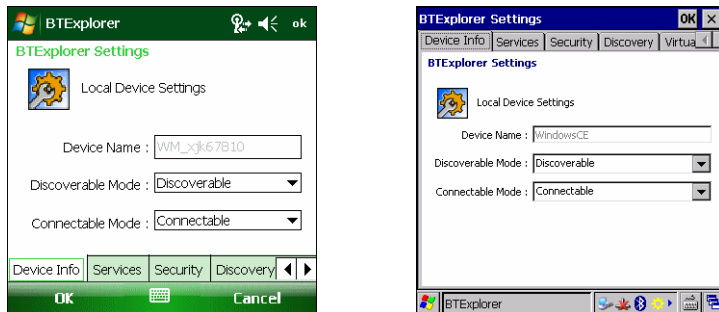


Figure 3-45 BTE Explorer Settings - Device Info Tab

Table 3-3 Device Info Tab Data

Item	Description
Device Name	Displays the name of the MC31XX.
Discoverable Mode	Select whether or not the MC31XX is discoverable by other Bluetooth devices.
Connectable Mode	Select whether or not the MC31XX is connectable by other Bluetooth devices.

Services Tab

- ✓ **NOTE** Ensure that the MC31XX is discoverable and connectable when remote devices use MC31XX services.

Use the **Services** tab to add or delete Bluetooth services.

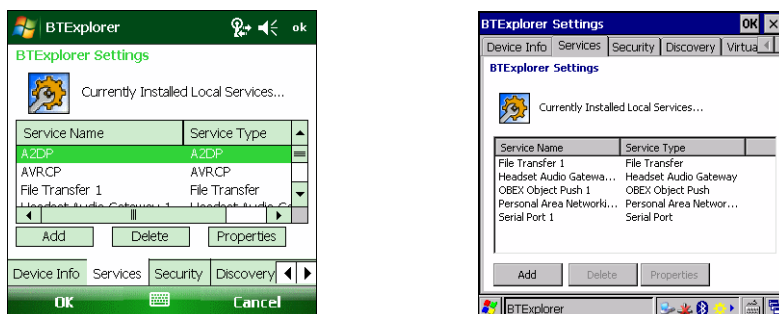


Figure 3-46 BTE Explorer Settings - Services Tab

To add a service:

1. Tap **Add**. The **Add Local Service** window displays.

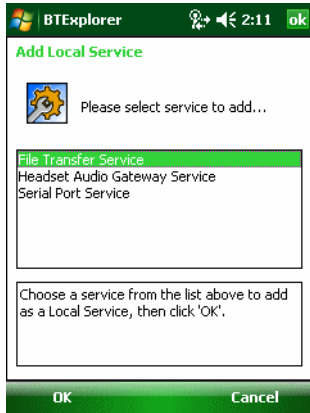


Figure 3-47 Add Local Service Window

2. In the list, select a service to add.
3. Tap **OK**. The **Edit Local Service** window displays for the selected service.
4. Select the appropriate information and then tap **OK**. See the following sections for information on the available services.

Dial-Up Networking Service

Dial-up Networking allows other Bluetooth devices to access a dial-up modem.

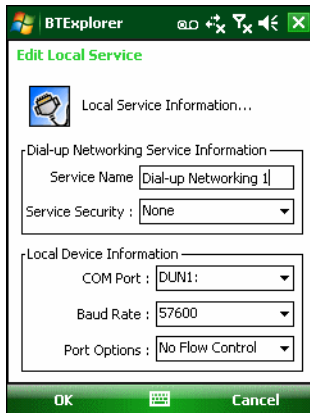


Figure 3-48 BTE Explorer Settings - Dial-up Networking Information

Table 3-4 Dial-up Networking Information Data

Item	Description
Service Name	Displays the name of the service.
Service Security	Select the type of security from the drop-down list. Options are None , Authenticate , or Authenticate/Encrypt .

Table 3-4 *Dial-up Networking Information Data*

Item	Description
Local COM Port	Select the COM port.
Local Baud Rate	Select the communication baud rate.
Local Port Options	Select the port option.

File Transfer Service

File transfer allows other Bluetooth devices to browse files.

**Figure 3-49** *BTE Explorer Settings - File Transfer Information***Table 3-5** *File Transfer Information Data*

Item	Description
Service Name	Displays the name of the service.
Service Security	Select the type of security from the drop-down list. Options are None , Authenticate , or Authenticate/Encrypt .
Root Directory	Select the directory that other Bluetooth devices can access.
File Permissions	Select the file permissions for the selected directory. Check the appropriate box to grant read access, write access, and delete access.

Headset Audio Gateway Service

Headset Service Audio Gateway allows connection to headset devices.

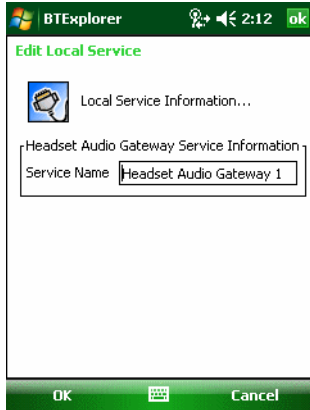


Figure 3-50 BTE Explorer Settings - Headset Audio Gateway

Table 3-6 Headset Audio Gateway Data

Item	Description
Service Name	Lists the name of the audio service.

OBEX Object Push Service

OBEX Object Push allows other Bluetooth devices to push contacts, business cards, pictures, appointments, and tasks to the MC31XX.

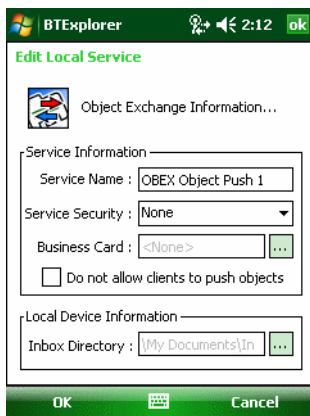


Figure 3-51 BTE Explorer Settings - OBEX Exchange Information

Table 3-7 OBEX Exchange Information Data

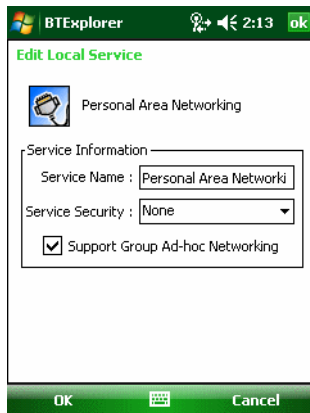
Item	Description
Service Name	Displays the name of the service.

Table 3-7 OBEX Exchange Information Data

Item	Description
Service Security	Select the type of security from the drop-down list. Options are None , Authenticate , or Authenticate/Encrypt .
Do not allow clients to push objects	Disables clients from pushing objects to the MC31XX.
Inbox Directory	Select a directory where another Bluetooth device can store files.

Personal Area Networking Service

Personal Area Networking hosts a Personal Area Network which allows communication with other Bluetooth devices.

**Figure 3-52** BTE Explorer Settings - Personal Area Networking**Table 3-8** Personal Area Networking Data

Item	Description
Service Name	Displays the name of the service.
Service Security	Select the type of security from the drop-down list. Options are None , Authenticate , or Authenticate/Encrypt .
Support Group Ad-Hoc Networking	Select to enable Ad-Hoc networking.

Serial Port Service

Serial port allows other Bluetooth devices to access COM ports.

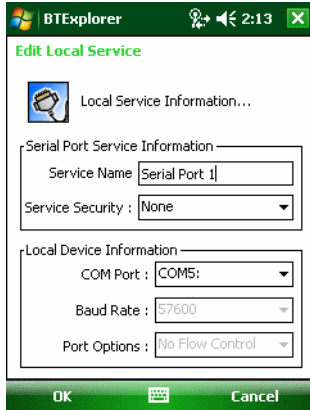


Figure 3-53 BTE Explorer Settings - Serial Port Services

Table 3-9 Serial Port Services Data

Item	Description
Service Name	Displays the name of the service.
Service Security	Select the type of security from the drop-down list. Options are None , Authenticate , or Authenticate/Encrypt .
Local COM Port	Select the COM port.
Local Baud Rate	Select the communication baud rate.
Local Port Options	Select the port option.

Advanced Audio Distribution Service

Advanced Audio Distribution hosts connects from Bluetooth devices supporting high-quality stereo audio.

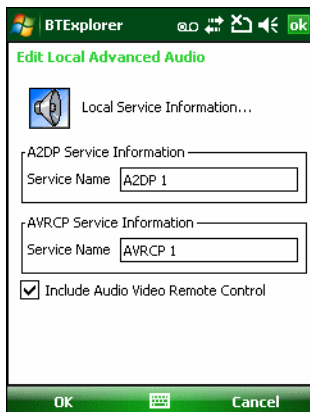


Figure 3-54 BTE Explorer Settings - Advanced Audio Distribution

Table 3-10 Advanced Audio Distribution Data

Item	Description
Service Name	Lists the name of the audio service.

Audio Video Remote Control Service

Audio Video Remote Control hosts connections from Bluetooth devices supporting audio remote-control functionality.

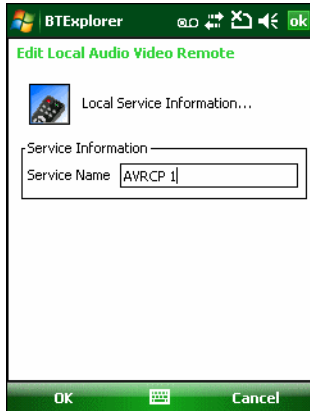


Figure 3-55 BTE Explorer Settings - Audio Video Remote Control

Table 3-11 Audio Video Remote Control Data

Item	Description
Service Name	Lists the name of the audio service.

Security Tab

Security settings allows you to set global security policies for Bluetooth. Note that these settings are only active on local Services that are set to Authenticate or Authenticate/Encryption. You can set authentication on local Services under the Services tab.

To adjust the security settings for an individual service, select the **Services** tab first, then select the individual service, then **Properties**.

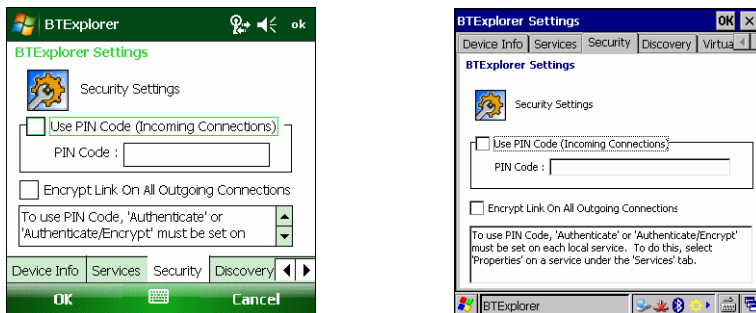


Figure 3-56 BTE Explorer Settings - Security Tab



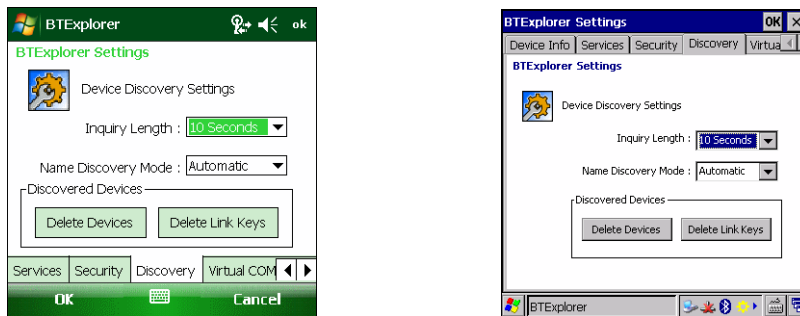
NOTE To use PIN Code, select **Authenticate** or **Authenticate/Encrypt** from the Service Security drop-down list on each local service.

Table 3-12 Security Tab Data

Item	Description
Use PIN Code (Incoming Connection)	Select for automatic use of the PIN code entered in the PIN Code text box. It is recommended not to use this automatic PIN code feature. See Security on page 3-2 for more information.
PIN Code	Enter the PIN code.
Encrypt Link On All Outgoing Connections	Select to enable or disable encryption on all outgoing connections to other Bluetooth devices.

Discovery Tab

Use the **Discovery** tab to set and modify discovered devices.

**Figure 3-57** BTE Explorer Settings - Discovery Tab**Table 3-13** Discovery Tab Data

Item	Description
Inquiry Length	Sets the amount of time the MC31XX takes to discover Bluetooth devices in the area.
Name Discovery Mode	Select either Automatic or Manual to automatically attempt to discover a Bluetooth device's name after finding the device.
Discovered Devices - Delete Devices	Deletes all discovered devices and link keys from memory.
Discovered Devices - Delete Linked Keys	Removes all pairing from remote Bluetooth devices, and makes them all un-trusted.

Virtual COM Port Tab

Virtual COM Port defines which COM ports BTE Explorer attempts to use for virtual COM ports. Check the appropriate checkbox to use the port as a virtual COM port. When finished, choose **Apply** to enforce changes, or **Revert** to restore the original settings.

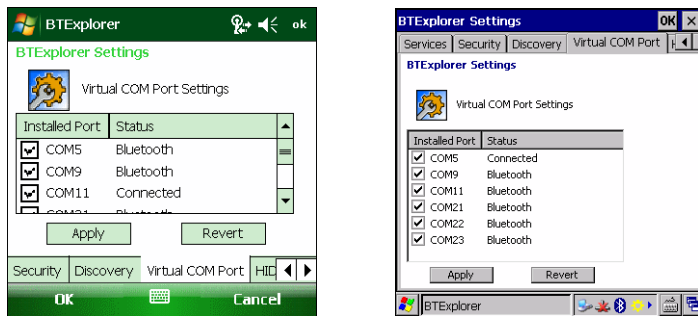


Figure 3-58 BTE Explorer Settings - Virtual COM Port Tab

Table 3-14 Virtual COM Port Tab Data

Item	Description
COM5:Bluetooth	Enable or disable COM Port 5.
COM9:Bluetooth	Enable or disable COM Port 9.
COM11:Bluetooth	Enable or disable COM Port 11.
COM21:Bluetooth	Enable or disable COM Port 21.
COM22:Bluetooth	Enable or disable COM Port 22.
COM23:Bluetooth	Enable or disable COM Port 23.

HID Tab

Use the **HID** tab to select The Human Interface Device Profile programming interface defines the protocols and procedures to be used to implement HID capabilities.

Provides support for devices such as mice, joysticks, keyboards.

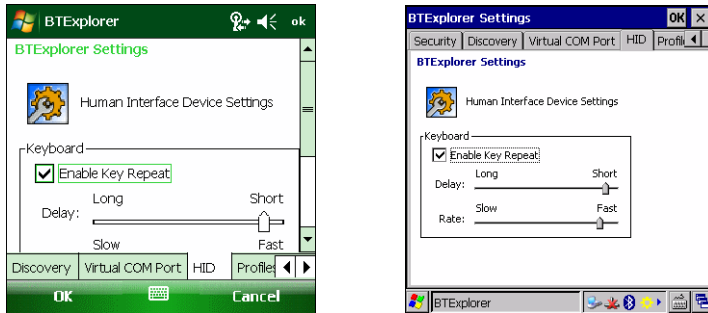


Figure 3-59 BTE Explorer Settings - HID Tab

Table 3-15 HID Tab Data

Item	Description
Enable Key Repeat	Enables key repeat functionality.
Delay	To increase key repeat delay, drag the Delay slider to the right. To decrease key repeat delay, drag the Delay slider to the left.
Rate	To increase key repeat speed, drag the Rate slider to the left. To decrease key repeat speed, drag the Rate slider to the right.

Profiles Tab

Use the **Profile** tab to load or remove Bluetooth services profiles. If a profile is not used, it can be removed to save memory.

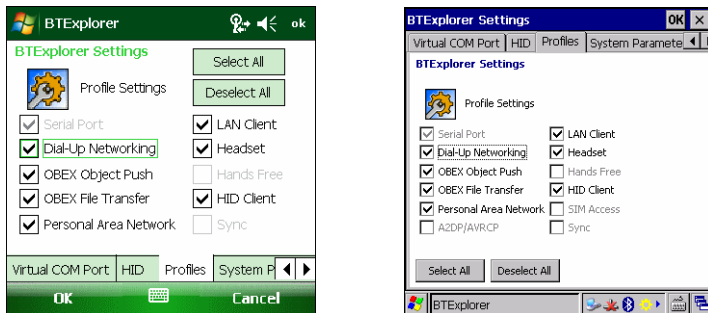


Figure 3-60 BTE Explorer Settings - Profile Tab

1. Tap a check box next to the profile to load (activate).
The Serial Port profile is always active and cannot be removed.
2. Tap **Select All** to select all profiles or tap **Deselect All** to deselect all profiles.
3. Tap **Apply** to activate the profiles and then **Close** to exit the application.

System Parameters Tab

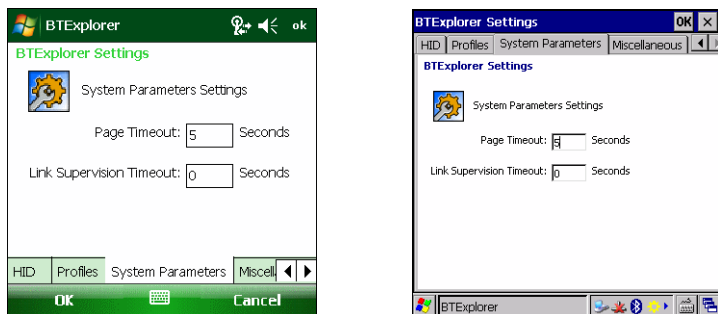


Figure 3-61 BTE Explorer Settings - System Parameters Tab

Table 3-16 System Parameters Tab Data

item	Description
Page Timeout	Sets the amount of time the MC31XX searches for a device before moving on the next device.
Link Supervision Timeout	Sets the amount of time that the MC31XX will wait for a device to come back into range after it has gone out of range. If the device does not come back into range by the set time, the MC31XX drops the connection.

Miscellaneous Tab

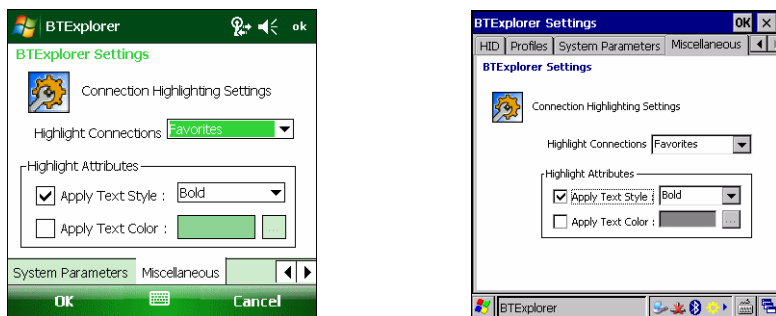


Figure 3-62 BTE Explorer Settings - Miscellaneous Tab

Table 3-17 Miscellaneous tab Data

Item	Description
Highlight Connections	Select the connection type to highlight when connected. In the Wizard Mode, the only options are <i>Favorites</i> or <i>None</i> . In the Explorer Mode the options are None , Tree View Only , List View Only , or Tree and List View .
Apply Text Style	Select the text style to apply to the connection text.
Apply Text Color	Select the text color to apply to the connection text.

Chapter 4 Accessories

Introduction

The MC31XX accessories provide a variety of product support capabilities. Accessories include cradles, cables and spare battery chargers. [Table 4-1](#) lists the MC31XX accessories.

Table 4-1 MC31XX Accessories

Accessory	Part Number	Description
Cradles		
Single Slot Serial/USB Cradle	CRD3000-1001RR	Charges the mobile computer main battery and a spare battery, and synchronizes the mobile computer with a host computer through either a serial or USB connection.
Four Slot Ethernet Cradle	CRD3000-4001ER	Charges up to four mobile computers and provides Ethernet communications.
Four Slot Charge Only Cradle	CHS3000-4001CR	Charges up to four mobile computers.
Mounting Bracket	8710-050006-01R	Used to mount four slot cradles onto a wall.
Chargers		
Four Slot Spare Battery Charger	SAC7XX000-4000CR	Charges up to four mobile computer spare batteries.
Universal Battery Charger (UBC)	UBC2000-I500DR	Chargers up to four batteries.
MC31XX Universal Battery Charger Adapter (UBC)	21-32665-45AR	Adapts the UBC for use with MC31XX batteries.
UBC Mounting Bracket	KT-32665-01R	Used to mount UBC onto a wall.
Charge Only Cable	25-70103-03R	Plugs into a vehicle cigarette lighter to charge the mobile computer.
Auto-charge Cable	25-67873-03R	Provides power to the mobile computer

Table 4-1 MC31XX Accessories (Continued)

Accessory	Part Number	Description
Power Supply for Single Slot Serial/USB Cradle	KT-14000-148R	Provides power to the Single Slot Serial/USB Cradle and Four Slot Battery Charger.
Power Supply for Four Slot Cradles	50-14000-241R	Provides power to the Four Slot Charge Only and Ethernet Cradles.
Power Supply for Charging Cables	50-14000-249R	Provides power to the charge only, serial cable and USB cable.
US AC Line Cord	23844-00-00R	Provides power to the 3-wire power supplies.
Cables		
USB Client Charge Cable	25-67868-03R	Provides USB client communication capabilities and charges the mobile computer.
USB Host Charge Cable	25-67869-03R	Provides USB host communication capabilities and charges the mobile computer.
RS232 Charge Cable	25-67866-03R	Provides RS232 communication capabilities and charges the mobile computer.
O'Neil Printer Cable	25-91512-01R	Provides printer specific communication capabilities.
Zebra Printer Cable	25-91513-01R	Provides printer specific communication capabilities.
Zebra Road Warrior Printer Cable	25-91514-01R	Provides printer specific communication capabilities.
Single Slot Cradle RS232 Cable	25-63852-01R	Provides serial host communication through the Single Slot Serial/USB cradle.
Single Slot Cradle USB Cable	25-68596-01R	Provides USB communication through the Single Slot Serial/USB cradle.
Miscellaneous		
Magnetic Stripe Reader	MSR3000-100R	Reads magnetic stripe cards.
Modem Dongle	MDM9000-100R	Provides modem connectivity through mobile computer or Single Slot Serial/USB cradle.
Modem Adapter Cable	25-63856-01R	Connects Modem Dongle to Single Slot Serial/USB cradle.
Cradle Modem Kit	KT-MC3000SERMODE MR	Provides modem connectivity to the Single Slot Serial/USB cradle. Kit includes Modem Dongle and Modem Adapter Cable.
Modem Kit	KT-70924-01R	Provides modem connectivity to the mobile computer. Kit includes Modem Dongle and Modem Cable.
Modem Cable	25-70924-01R	Connects the Modem Dongle to the mobile computer.

Table 4-1 MC31XX Accessories (Continued)

Accessory	Part Number	Description
Headset Adapter Cable: MC3100 2.5 mm jack with unique locking screw to bare wires	25-124389-01R	Connects a headset with unique Quick Disconnect Connector to the mobile computer. Bare wires can be soldered to user defined unique Quick Disconnect Connector.
Headset Adapter cable: MC3100 2.5mm jack with unique locking screw to Headsets like VXI and RCH50	25-124411-01R	Connects a VXI and RCH50 headset to the mobile computer.
MC31XXR Audio Jack Cover	11-128366-02R	Replacement audio jack cover for the MC31XXR (5-pack).
MC31XXS Audio Jack Cover	11-128366-01R	Replacement audio jack cover for the MC31XXS (5-pack)
MC3190G Audio Jack Cover	11-128366-03R	Replacement audio jack cover for the MC3190G (5-pack)
2740 mAh Battery	BTRY-MC3XKAB0E BTRY-MC3XKAB0E-10 BTRY-MC3XKAB0E-50	Replacement standard capacity (1X) battery. 10-pack 50-pack.
4800 mAh Battery	BTRY-MC31KAB02 BTRY-MC31KAB02-10 BTRY-MC31KAB02-50	Replacement extended capacity (2X) battery. 10-pack 50-pack.
UBC Power Supply Kit	KT-32665-02R	Provides power to the Universal Battery Charger.
DC Line Cord	50-16002-042R	Provides power from the power supply to the Four Slot Ethernet cradle or Four Slot Charge Only cradle.
MC31XXR/S Stylus	11-42794-03R	Replacement stylus (3-pack).
MC31XXR/S Stylus	11-42794-50R	Replacement stylus (50-pack).
MC31XXR/S Tether	11-42722-03R	Replacement tether (3-pack).
MC31XXR/S Tether	11-42722-50R	Replacement tether (50-pack).
MC31XXR/S Stylus and Tether Kit	11-43912-03R	Replacement stylus and tether kit (3-pack).
MC31090G Stylus	KT-68144-10R	Replacement stylus for MC3190G (3-pack).
MC3190G Stylus	KT-68144-50R	Replacement stylus for MC3190G (50-pack).
MC3190G Stylus and Tether	KT-81680-03R	Replacement stylus and tether for MC3190G (3-pack).
MC3190G Stylus and Tether	KT-81680-50R	Replacement stylus and tether for MC3190G (50-pack).
MC3190G Handstrap	SG-MC3123242-01R	Replacement handstrap for MC3190G.
MC3190G Handstrap Button	KT-97258-01R	Replacement button for MC3190G handstrap (250-pack).

Table 4-1 MC31XX Accessories (Continued)

Accessory	Part Number	Description
MC31XXR/S Handstrap	SG-MC3123243-01R	Replacement handstrap for MC31XXR and MC31XXS.
MC31XX 1X Battery Door	KT-128372-01R	Replacement 1X battery door for MC31XXR and MC31XXS.
MC31XX 2X Battery Door	KT-128373-01R	Replacement 2X battery door for MC31XXR and MC31XXS.
MC3190G 2X Battery Door	KT-128374-01R	Replacement 2X battery door for MC3190G.
Plastic Holster	8710-050005-01R	Provides a clip on holder for the MC31XXR and MC31XX S.
Fabric Holster	SG-MC3021212-01R	Provides a soft, clip on holder and a shoulder strap for the mobile computer.
Fabric Holster	11-76201-02R	Provides a soft holder for MC3190G and used with a shoulder strap.
Belt	11-08062-02R	Belt for fabric holster.
MC3190G Rubber Boot	11-72959-04R	Provides additional protection for both the laser and imager configurations.
MC31XXS Rubber Boot	11-70899-04R	Provides additional protection for both the laser and imager configurations.
MC31XXR Rubber Boot	BOOTSCANTURRETR	Provides additional protection for the MC31XXR.
Screen protector	KT-82057-03R	Replacement screen protectors (3-pack).

Single Slot Serial/USB Cradle



CAUTION Ensure that you follow the guidelines for battery safety described in [Battery Safety Guidelines on page 5-2](#).

The Single Slot Serial/USB cradle:

- Provides 5.4VDC power for operating the mobile computer, charging the battery and charging a spare battery.
- Provides a serial port and a USB port for data communication between the mobile computer and a host computer or other serial devices (e.g., a printer).
- Synchronizes information between the mobile computer and a host computer. With customized or third party software, it can also synchronize the mobile computer with corporate databases.
- Provides serial connection through the serial pass-through port for communication with a serial device, such as a host computer. For communication setup procedures, refer to the *MC31XX Mobile Computer Integrator Guide*.
- Provides USB connection through the USB pass-through port for communication with a USB device, such as a host computer. For communication setup procedures, refer to the *MC31XX Mobile Computer Integrator Guide*.

Battery Charging

The Single Slot Serial/USB cradle can charge the mobile computer main battery and a spare battery simultaneously.

To charge the mobile computer:

1. Slide the mobile computer into the mobile computer slot. The mobile computer amber Charge LED Indicator, indicates the mobile computer battery charging status. The Standard Battery charges in less than five hours and the Extended Life Battery charges in less than eight hours. See [Table 4-2](#) for charging status indications.

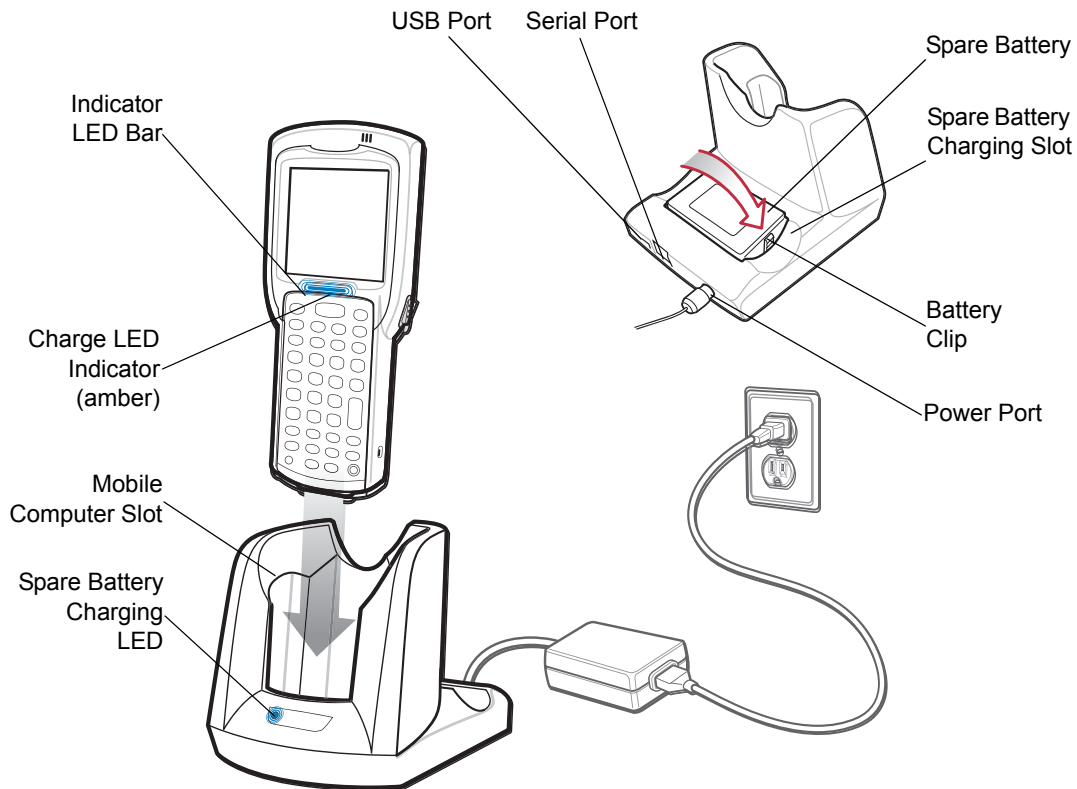


Figure 4-1 Single Slot Serial/USB Cradle

2. When charging is complete, remove the mobile computer from the mobile computer slot.

To charge the spare battery:

1. Insert the spare battery into the spare battery charging slot, bottom first, and pivot the top of the battery down onto the contact pins.
2. Gently press down on the battery to ensure proper contact.
3. The Spare Battery Charging LED (see [Figure 4-1 on page 4-6](#)) indicates the spare battery charging status. The Standard Battery charges in less than five hours and the Extended Life Battery charges in less than eight hours. See [Table 4-2](#) for charging status indications.
4. When charging is complete, press the battery clip and lift the battery out of the slot.



WARNING! Do not use a tool to remove the battery.

LED Charge Indications

The Single Slot Serial/USB cradle uses the mobile computer amber Charge LED Indicator to indicate the battery charging status and the Spare Battery Charging LED to indicate spare battery charging status. See [Table 4-2](#) for charging status indications.

Table 4-2 LED Charging Status Indicators

LED	Indication
Mobile Computer Charging (LED on mobile computer)	
Off	Mobile computer not placed correctly in the cradle; cable not connected correctly; charger is not powered.
Fast Blinking Amber	Error in charging; check placement of mobile computer.
Slow Blinking Amber	Mobile computer is charging.
Solid Amber	Charging complete. Note: When the battery is initially inserted in the mobile computer, the amber LED flashes once if the battery power is low or the battery is not fully inserted.
Spare Battery Charging (LED on cradle)	
Off	No spare battery in slot; spare battery not placed correctly; cradle is not powered.
Fast Blinking Amber	Error in charging; check placement of spare battery.
Slow Blinking Amber	Spare battery is charging.
Solid Amber	Charging complete.

Four Slot Cradles



CAUTION Ensure that you follow the guidelines for battery safety described in [Battery Safety Guidelines on page 5-2](#).

There are two four slot cradles, Four Slot Charge Only cradle and Four Slot Ethernet cradle. The Four Slot Ethernet cradle provides Ethernet communications. Both four slot cradles:

- Provide 5.4 VDC power for operating the mobile computer and charging the battery.
- Simultaneously charges up to four mobile computers.

Battery Charging

The four slot cradle can charge up to four mobile computers simultaneously. To charge the mobile computer:

1. Slide the mobile computer into the mobile computer slot.

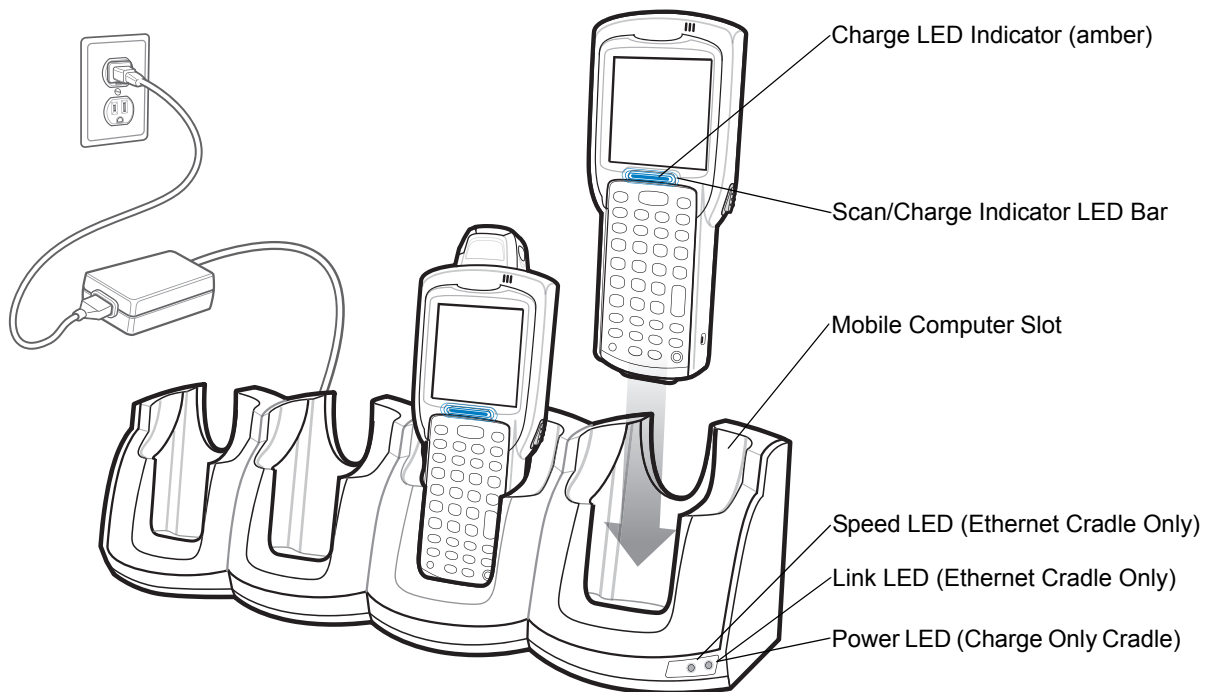


Figure 4-2 Four Slot Cradles

2. The mobile computer amber Charge LED Indicator, indicates the mobile computer battery charging status. The Standard Battery usually charges in less than five hours and the Extended Life Battery usually charges in less than eight hours. See [Table 4-2](#) for charging status indications.
3. When charging is complete, remove the mobile computer from the cradle.

LED Charge Indications

The Four Slot cradles use the mobile computer amber Charge LED Indicator to indicate the battery charging status. See [Table 4-2 on page 4-7](#) for charging status indications.

Power LED

The green Power LED (only on the Four Slot Charge Only cradle) lights to indicate that the Four Slot Charge Only cradle is connected to a power source.

Speed LED

The green Speed LED (only on the Four Slot Ethernet cradle) lights to indicate that the transfer rate is 100 Mbps. When it is not lit it indicates that the transfer rate is 10 Mbps.

Link LED

The yellow Link LED (only on the Four Slot Ethernet cradle) blinks to indicate activity, or stays lit to indicate that a link is established. When it is not lit, it indicates that there is no link.

Four Slot Spare Battery Charger



CAUTION Ensure that you follow the guidelines for battery safety described in [Battery Safety Guidelines on page 5-2](#).

The Four Slot Spare Battery Charger simultaneously charges up to four spare batteries.

Spare Battery Charging

To charge up to four MC31XX spare batteries:

1. Insert the spare battery into the spare battery charging slot, bottom first.
2. Pivot the top of the battery down onto the contact pins.

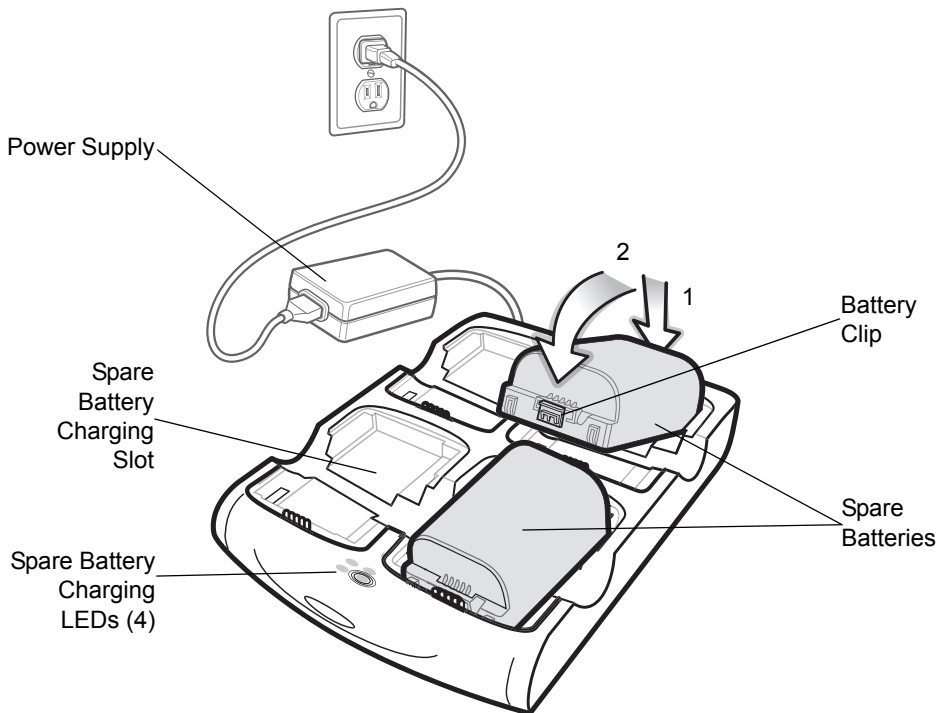


Figure 4-3 Four Slot Spare Battery Charger

3. Gently press down on the battery to ensure proper contact. The Standard Battery usually charges in less than five hours and the Extended Life Battery usually charges in less than eight hours. See [Table 4-2 on page 4-7](#) for charging status indications.
4. When charging is complete, press the battery clip and lift battery out of the slot.



WARNING! Do not use a tool to remove the battery.

LED Charge Indications

The Spare Battery Charging LEDs indicate the spare battery charging status. The Spare Battery Charging LEDs are arranged in the same pattern as the spare battery charging slots so that the charging status of each battery can be identified. See [Table 4-2 on page 4-7](#) for charging status indications.

Cables

The cables are available with a variety of connection capabilities.

MC31XX Communication/Charge cables:

- Provide the mobile computer with operating and charging power when used with the Zebra approved power supply.
- Synchronize information between the mobile computer and a host computer. With customized or third party software, it can also synchronize the mobile computer with corporate databases.
- Provide serial connection through the serial pass-through port for communication with a serial device, such as a host computer. For communication setup procedures, refer to the *MC31XX Series Mobile Computer Integrator Guide*.
- Provide USB connection through the USB pass-through port for communication with a USB device, such as a host computer. For communication setup procedures, refer to the *MC31XX Series Mobile Computer Integrator Guide*.

The following MC31XX Communication/Charge cables are available:

- Serial (RS232) Charge cable (9-pin D female with power input receptacle)
- USB Client Charge cable (standard-A connector and a barrel receptacle for power).

Dedicated Printer cables, provide communication with a dedicated printer.

The following printer cables are available directly from the printer manufacturer:

- O'Neil printer cable
- Zebra printer cable
- Monarch printer cable.

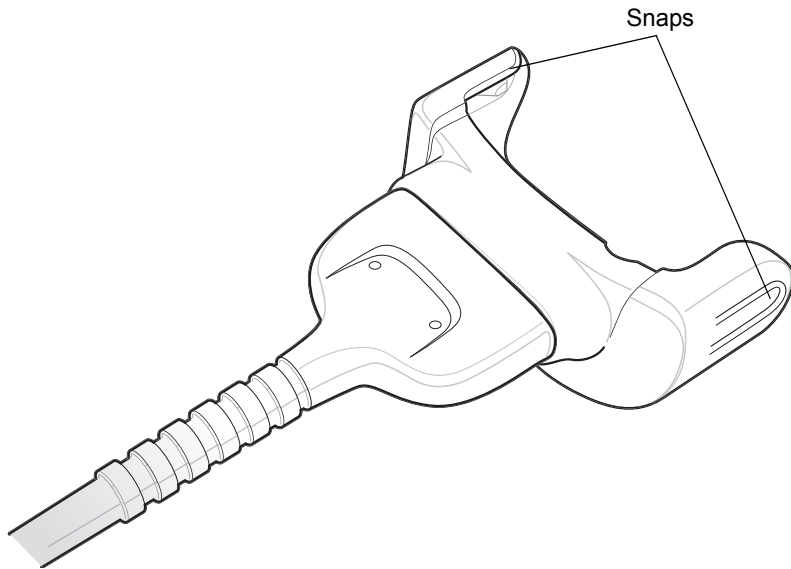


Figure 4-4 Cables

Battery Charging and Operating Power



CAUTION Ensure that you follow the guidelines for battery safety described in [Battery Safety Guidelines on page 5-2](#).

The MC31XX Communication/Charge cables can charge the mobile computer battery and supply operating power.

To charge the mobile computer battery:

1. Connect the MC31XX Communication/Charge cable power input connector to the Zebra approved power source.
2. Slide the bottom of the mobile computer into the MC31XX connector end of the MC31XX Communication/Charge cable and gently press in until the snaps latch into the mobile computer.
3. The mobile computer amber Charge LED Indicator indicates the mobile computer battery charging status. The Standard Battery usually charges in less than five hours and the Extended Life Battery usually charges in less than eight hours. See, [Table 4-2 on page 4-7](#) for charging status indications.
4. When charging is complete, remove the cable by gently pulling the mobile computer and the cable apart until the snaps release the mobile computer.

LED Charge Indications

The MC31XX Communication/Charge cables use the amber Charge LED Indicator to indicate the MC31XX battery charging status. See, [Table 4-2 on page 4-7](#) for charging status indications.

Universal Battery Charger (UBC) Adapter



CAUTION Ensure that you follow the guidelines for battery safety described in [Battery Safety Guidelines on page 5-2](#).

The UBC Adapter can be used with a power supply as a standalone spare battery charger or it can be used with the four station UBC2000 to simultaneously charge up to four spare batteries. For additional information on the UBC 2000, refer to the *UBC 2000 Quick Reference Guide p/n 70-33188-xx*.

Spare Battery Charging

To charge spare batteries:

1. Insert the spare battery into the spare battery charging slot, bottom first.
2. Pivot the top of the battery down onto the contact pins.

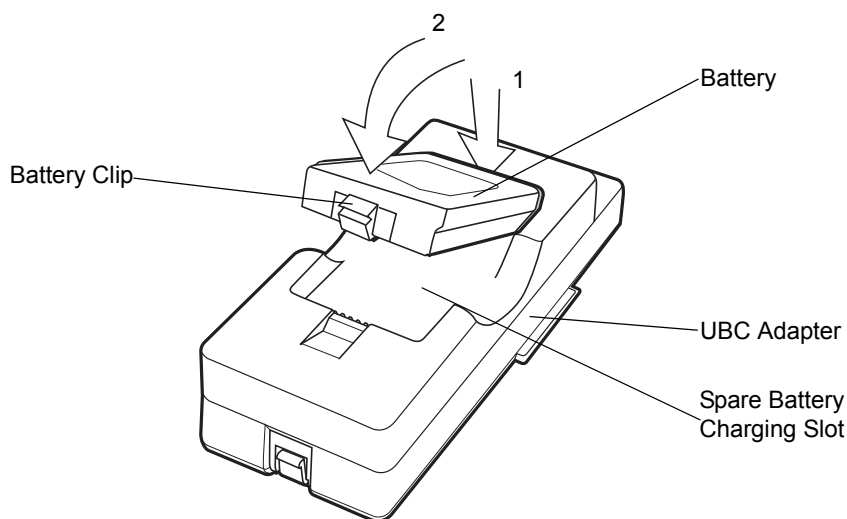


Figure 4-5 UBC Adapter Battery Insertion

3. Gently press down on the battery to ensure proper contact. The Standard Battery usually charges in less than five hours and the Extended Life Battery usually charges in less than eight hours. See, [Table 4-3 on page 4-14](#) for charging status indications.
4. When charging is complete, press the battery clip and lift the battery out of the slot.



WARNING! Do not use a tool to remove the battery.

UBC Adapter LED Charge Indications

The UBC Adapter charging LEDs indicate the battery charging status. The Standard Battery usually charges in less than five hours and the Extended Life Battery usually charges in less than eight hours.

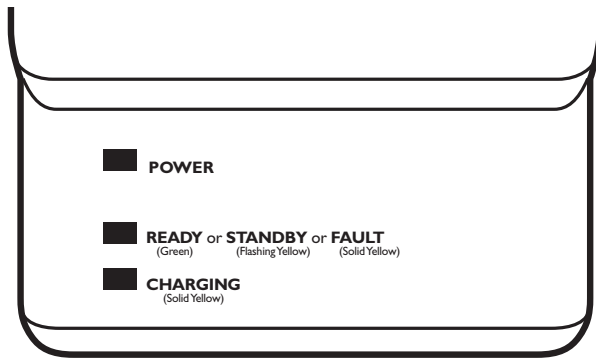


Figure 4-6 UBC Adapter LEDs

Table 4-3 UBC Adapter Charge LED Status Indications

LED	Indication	Description
POWER	Green	Power is connected to the UBC Adapter.
READY or	Green	Charging complete.
STANDBY or	Flashing-Yellow	The battery was deeply discharged and is being trickle charged to bring the voltage up to the operating level. After operating level voltage is achieved, the battery charges normally.
FAULT	Yellow	Charging error, check placement of mobile computer/spare battery.
CHARGING	Yellow	Normal charge.

Plastic Holster

The Plastic Holster provides a holder for the mobile computer. It consists of a mobile computer holder and a detachable belt clip. Press the release button to remove the detachable belt clip.

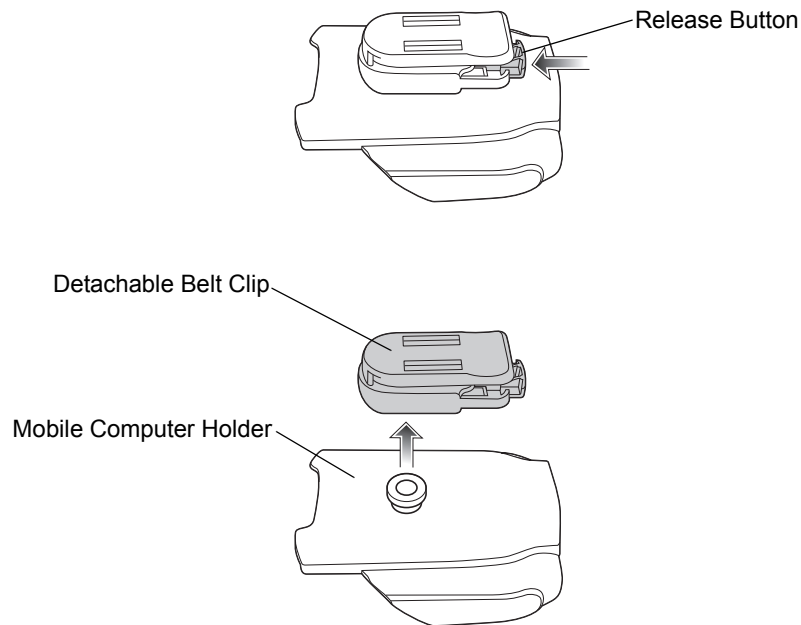


Figure 4-7 *Plastic Holster*

Pinch the clip release and attach the Plastic Holster to a belt or waist band.

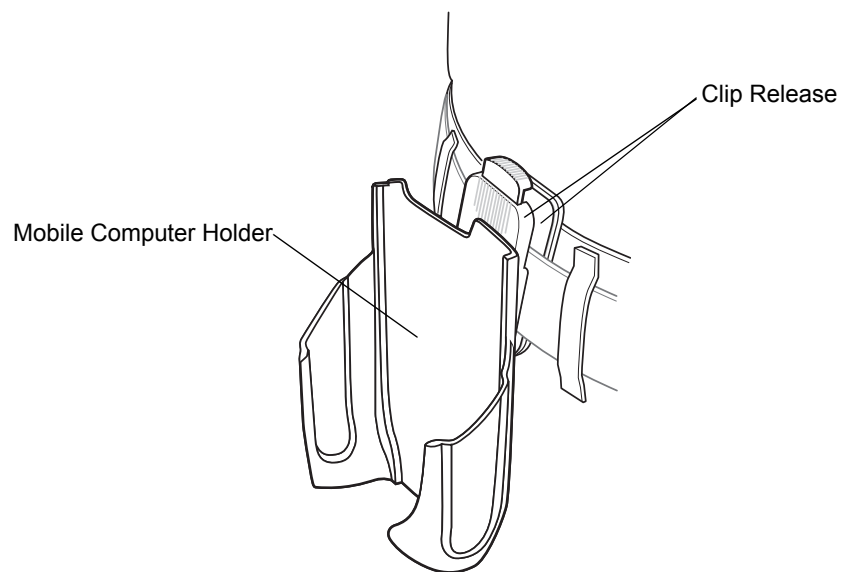
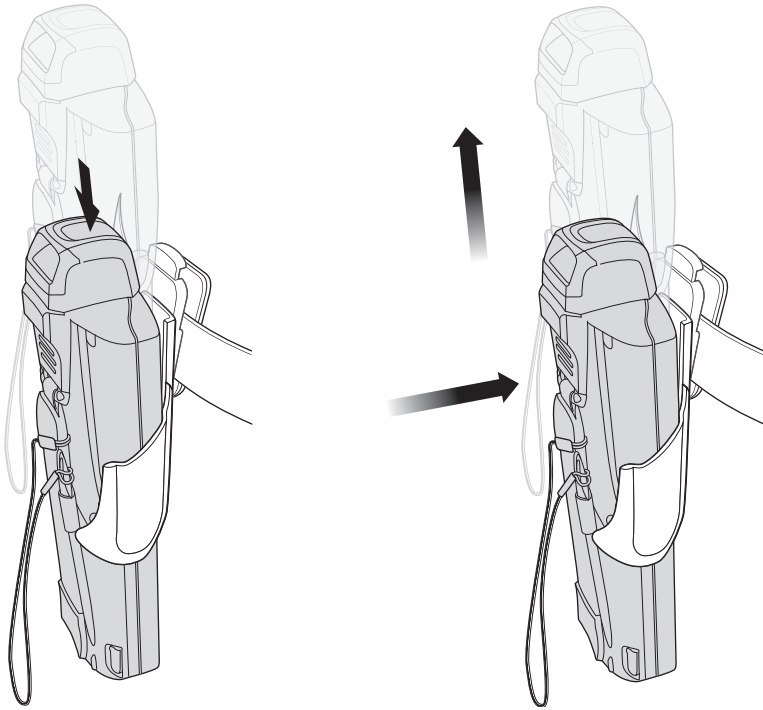


Figure 4-8 *Attaching the Plastic Holster*

The Plastic Holster holds the mobile computer on a belt or waist band.

To insert the mobile computer, slide the mobile computer into the Plastic Holster with the screen facing the user.

To remove the mobile computer, press and lift to remove the mobile computer.



Insert Mobile Computer

Remove Mobile Computer

Figure 4-9 *Insert and Remove the Mobile Computer*

Fabric Holster

The Fabric Holster provides a soft holder for the mobile computer. It consists of a fabric mobile computer holder, a detachable shoulder strap and a detachable belt clip. Press the release button to remove the detachable belt clip. See [Figure 4-10](#) to remove the detachable clip see [Figure 4-11 on page 4-17](#) to attach the Fabric Holster to a belt and see [Figure 4-12 on page 4-18](#) to attach the Fabric Holster to a shoulder strap.

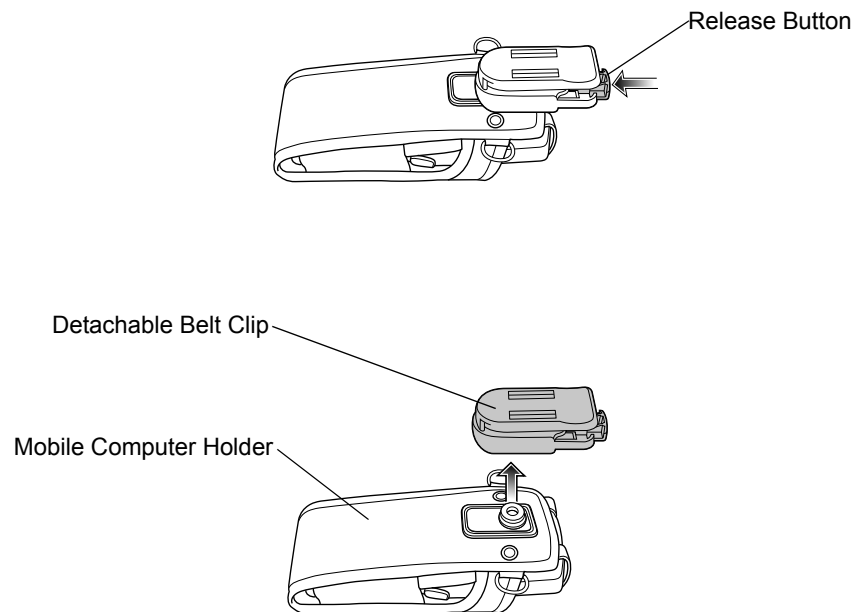


Figure 4-10 *Fabric Holster Detachable Belt Clip*

Belt Clip

Pinch the clip release and attach the Fabric Holster to a belt or waist band.

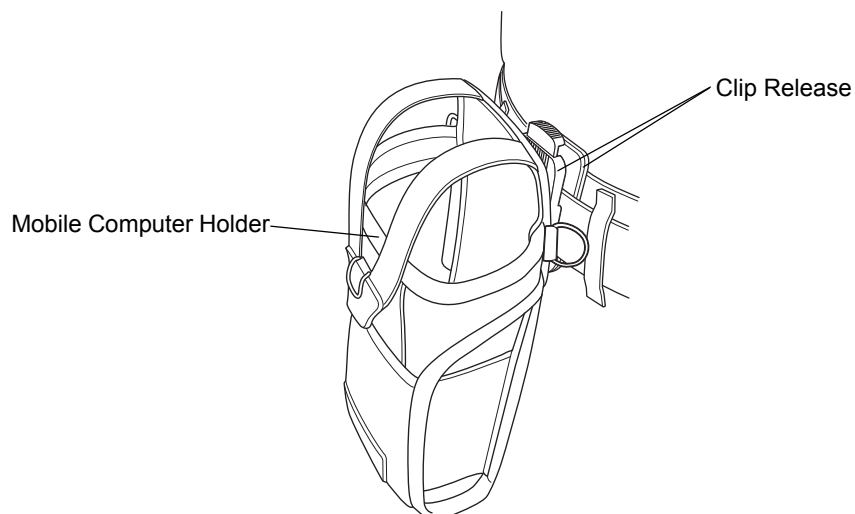


Figure 4-11 *Attaching the Fabric Holster To a Belt*

Shoulder Strap

Remove the detachable belt clip (see [Figure 4-10 on page 4-17](#)) and attach the shoulder strap.

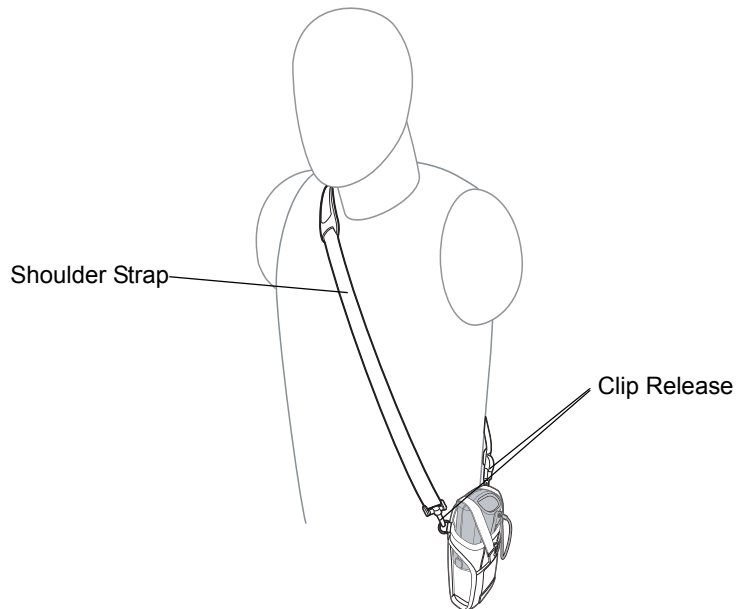


Figure 4-12 *Attach the Fabric Holster To the Shoulder Strap*

The Fabric Holster holds the mobile computer on a belt or waist band.

1. To insert the mobile computer, slide the mobile computer into the Fabric Holster with the screen facing the user.
2. Pull restraining strap over mobile computer and secure in the clip.
3. To remove the mobile computer, pull down on restraining strap to release from clip and lift retaining strap clear.
4. Lift mobile computer out of Fabric Holster.

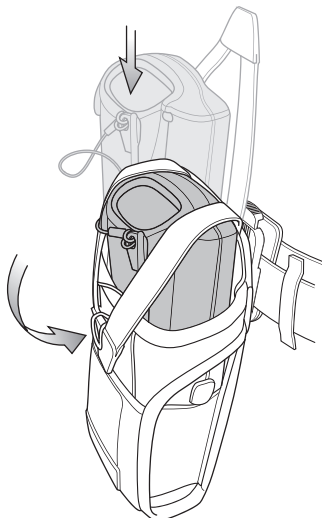


Figure 4-13 *Insert and Remove the Mobile Computer*

Chapter 5 Maintenance and Troubleshooting

Introduction

This chapter includes instructions on cleaning and storing the mobile computer, and provides troubleshooting solutions for potential problems during mobile computer operation.

Maintaining the Mobile Computer

For trouble-free service, observe the following tips when using the mobile computer:

For trouble-free service, observe the following tips when using the MC31XX:

- Do not scratch the screen of the MC31XX. When working with the MC31XX, use the supplied stylus or plastic-tipped pens intended for use with a touch-sensitive screen. Never use an actual pen or pencil or other sharp object on the surface of the MC31XX screen.

Zebra recommends using a screen protector, p/n KT-122010-01R.

- The touch-sensitive screen of the MC31XX is glass. Do not drop the MC31XX or subject it to strong impact.
- Protect the MC31XX from temperature extremes. Do not leave it on the dashboard of a car on a hot day, and keep it away from heat sources.
- Do not store or use the MC31XX in any location that is dusty, damp, or wet.
- Use a soft lens cloth to clean the MC31XX. If the surface of the MC31XX screen becomes soiled, clean it with a soft cloth moistened with a diluted window-cleaning solution.
- Periodically replace the rechargeable battery to ensure maximum battery life and product performance. Battery life depends on individual usage patterns.

- A screen protector is applied to the MC31XX. Zebra recommends using this to minimize wear and tear. Screen protectors enhance the usability and durability of touch screen displays. Benefits include:
 - Protection from scratches and gouges
 - Durable writing and touch surface with tactile feel
 - Abrasion and chemical resistance
 - Glare reduction
 - Keeping the device's screen looking new
 - Quick and easy installation.

Battery Safety Guidelines



WARNING! Failure to follow these guidelines may result in fire, explosion, or other hazard.

- The area in which the units are charged should be clear of debris and combustible materials or chemicals. Particular care should be taken where the device is charged in a non commercial environment.
- Follow battery usage, storage, and charging guidelines found in the user's guide.
- Improper battery use may result in a fire, explosion, or other hazard.
- Do not use a tool to remove the battery from the mobile computer or battery charging accessory.
- To charge the mobile device battery, the battery and charger temperatures must be between +32 °F and +104 °F (0 °C and +40 °C)
- Do not use incompatible batteries and chargers. Use of an incompatible battery or charger may present a risk of fire, explosion, leakage, or other hazard. If you have any questions about the compatibility of a battery or a charger, contact Zebra support.
- For devices that utilize a USB port as a charging source, the device shall only be connected to products that bear the USB-IF logo or have completed the USB-IF compliance program.
- To enable authentication of an approved battery, as required by IEEE1725 clause 10.2.1, all batteries will carry a Zebra hologram. Do not fit any battery without checking it has the Zebra authentication hologram.
- Do not disassemble or open, crush, bend or deform, puncture, or shred.
- Severe impact from dropping any battery-operated device on a hard surface could cause the battery to overheat.
- Do not short circuit a battery or allow metallic or conductive objects to contact the battery terminals.
- Do not modify or remanufacture, attempt to insert foreign objects into the battery, immerse or expose to water or other liquids, or expose to fire, explosion, or other hazard.
- Do not leave or store the equipment in or near areas that might get very hot, such as in a parked vehicle or near a radiator or other heat source. Do not place battery into a microwave oven or dryer.
- Battery usage by children should be supervised.
- Please follow local regulations to properly dispose of used re-chargeable batteries.
- Do not dispose of batteries in fire.

- In the event of a battery leak, do not allow the liquid to come in contact with the skin or eyes. If contact has been made, wash the affected area with large amounts of water and seek medical advice.
- If you suspect damage to your equipment or battery, contact Zebra support to arrange for inspection.

Cleaning



CAUTION Always wear eye protection.

Read warning label on compressed air and alcohol product before using.

If you have to use any other solution for medical reasons please contact Zebra for more information.



WARNING! Avoid exposing this product to contact with hot oil or other flammable liquids. If such exposure occurs, unplug the device and clean the product immediately in accordance with these guidelines.

Materials Required

- Alcohol wipes
- Lens tissue
- Cotton tipped applicators
- Isopropyl alcohol
- Can of compressed air with a tube.

Cleaning the MC31XX

Housing

Using the alcohol wipes, wipe the housing including keys and in-between keys.

Display

The display can be wiped down with the alcohol wipes, but care should be taken not to allow any pooling of liquid around the edges of the display. Immediately dry the display with a soft, non-abrasive cloth to prevent streaking.

Scanner Exit Window

Wipe the scanner exit window periodically with a lens tissue or other material suitable for cleaning optical material such as eyeglasses.

Connector

1. Remove the main battery from mobile computer. See [Main Battery Removal on page 1-11](#).
2. Dip the cotton portion of the cotton tipped applicator in isopropyl alcohol.
3. Rub the cotton portion of the cotton tipped applicator back-and-forth across the connector on the bottom of the MC31XX. Do not leave any cotton residue on the connector.
4. Repeat at least three times.

5. Use the cotton tipped applicator dipped in alcohol to remove any grease and dirt near the connector area.
6. Use a dry cotton tipped applicator and repeat steps 4 through 6.
7. Spray compressed air on the connector area by pointing the tube/nozzle about ½ inch away from the surface. CAUTION: Do not point nozzle at yourself and others, ensure the nozzle or tube is away from your face.
8. Inspect the area for any grease or dirt, repeat if required.

Cleaning Cradle Connectors

To clean the connectors on a cradle:

1. Remove the DC power cable from the cradle.
2. Dip the cotton portion of the cotton tipped applicator in isopropyl alcohol.
3. Rub the cotton portion of the cotton tipped applicator along the pins of the connector. Slowly move the applicator back-and-forth from one side of the connector to the other. Do not let any cotton residue on the connector.
4. All sides of the connector should also be rubbed with the cotton tipped applicator.
5. Spray compressed air in the connector area by pointing the tube/nozzle about ½ inch away from the surface. CAUTION: do not point nozzle at yourself and others, ensure the nozzle or tube is pointed away from your face.
6. Ensure that there is no lint left by the cotton tipped applicator, remove lint if found.
7. If grease and other dirt can be found on other areas of the cradle, use lint free cloth and alcohol to remove.
8. Allow at least 10 to 30 minutes (depending on ambient temperature and humidity) for the alcohol to air dry before applying power to cradle.

If the temperature is low and humidity is high, longer drying time is required. Warm temperature and dry humidity requires less drying time.

Cleaning Frequency

The cleaning frequency is up to the customer's discretion due to the varied environments in which the mobile devices are used. They may be cleaned as frequently as required. However when used in dirty environments it may be advisable to periodically clean the scanner exit window to ensure optimum scanning performance.

Troubleshooting

Mobile Computer

Table 5-1 *Troubleshooting the Mobile Computer*

Problem	Cause	Solution
Mobile computer does not turn on.	Main battery not charged.	Charge or replace the main battery.
	Main battery not installed properly.	Ensure the battery is installed properly. See Install Main Battery on page 1-6 .
	System crash.	Perform a warm boot. If the mobile computer still does not turn on, perform a cold boot. For more information see, Resetting the Mobile Computer on page 2-23 .
Battery did not charge.	Battery failed.	Replace battery. If the mobile computer still does not operate, try a warm boot, then a cold boot. For more information see, Resetting the Mobile Computer on page 2-23 .
	Mobile computer removed from cradle while battery was charging.	Insert mobile computer in cradle and begin charging. The Standard Battery requires up to five hours to recharge fully and the Extended Life Battery requires up to eight hours to recharge fully.
	Extreme battery temperature.	Battery does not charge if ambient temperature is below 32°F (0°C) or above 104°F (40°C).
Cannot see characters on screen.	Mobile computer not powered on.	Press the Power button.
During data communication, no data was transmitted, or transmitted data was incomplete.	Mobile computer removed from cradle or unplugged from host computer during communication.	Replace the mobile computer in the cradle, or reattach the cable and re-transmit.
	Incorrect cable configuration.	See the system administrator or refer to the <i>MC31XX Series Mobile Computer Integrator Guide</i> .
	Communication software was incorrectly installed or configured.	See the system administrator or refer to the <i>MC31XX Series Mobile Computer Integrator Guide</i> .
Mobile computer does not emit sound.	Volume setting is low or turned off.	Click on the speaker icon to increase the volume.

Table 5-1 *Troubleshooting the Mobile Computer (Continued)*

Problem	Cause	Solution
Mobile computer turns itself off.	Mobile computer is inactive.	The mobile computer turns off after a period of inactivity. This period can be set from one to five minutes, in one-minute intervals.
	Battery is depleted.	Recharge or replace the battery.
	Battery is not inserted properly.	Insert the battery properly. For more information see, Install Main Battery on page 1-6 .
Tapping the window buttons or icons does not activate the corresponding feature.	Touch screen not calibrated correctly.	Re-calibrate the screen. From the mobile computer, <i>Demo window</i> double-tap the <i>Ctl Panel</i> icon and double-tap on <i>Touch Calibrate</i> . Follow the screen prompts.
	The system crashed.	Warm boot the system. To perform a warm boot, see Resetting the Mobile Computer on page 2-23 .
A message appears stating that the mobile computer memory is full.	Too many files stored on the mobile computer.	Delete unused memos and records. If necessary, save these records on the host computer.
	Too many applications installed on the mobile computer.	Remove unused installed applications from the mobile computer to recover memory.
The mobile computer does not accept scan input.	Scanning application is not loaded.	Verify that the mobile computer is loaded with a scanning application. See the system administrator.
	Unreadable bar code.	Ensure the symbol is not defaced.
	Distance between scan window and bar code is incorrect.	Ensure the mobile computer is within proper scanning range.
	Mobile computer is not programmed for the bar code type.	Ensure the mobile computer is programmed to accept the type of bar code scanned.
	Mobile computer is not programmed to generate a beep.	If a beep on a good decode is expected and a beep is not heard, check that the application is set to generate a beep on good decode.
	Battery is low.	Check the battery level. When the battery is low, the mobile computer automatically goes into suspend mode.

Single Slot Serial/USB Cradle

Table 5-2 Troubleshooting the Single Slot Serial/USB Cradle

Symptom	Possible Cause	Solution
Mobile computer amber Charge LED Indicator does not light when mobile computer inserted.	Cradle is not receiving power.	Ensure the power cable is connected securely to both the cradle and to AC power.
	Mobile computer is not correctly seated.	Remove and re-insert the mobile computer into the cradle, ensuring it is correctly seated.
Spare Battery Charging LED does not light when spare battery is inserted.	Spare battery is not correctly seated.	Remove and re-insert the spare battery into the charging slot, ensuring it is correctly seated.
Mobile computer battery is not charging.	Mobile computer was removed from cradle or cradle was unplugged from AC power too soon.	Ensure cradle is receiving power. Ensure the mobile computer is seated correctly. If the mobile computer battery is fully depleted, it can take up to five hours to fully recharge a Standard Battery and it can take up to eight hours to fully recharge an Extended Life Battery.
	Battery is faulty.	Verify that other batteries charge properly. If so, replace the faulty battery.
	The mobile computer is not fully seated in the cradle.	Remove and re-insert the mobile computer into the cradle, ensuring it is correctly seated.
Spare battery is not charging.	Battery not fully seated in charging slot.	Remove and re-insert the spare battery into the cradle, ensuring it is correctly seated.
	Battery inserted incorrectly.	Ensure the contacts are facing down and toward the back of the cradle.
	Battery is faulty.	Verify that other batteries charge properly. If so, replace the faulty battery.
During data communication, no data was transmitted, or transmitted data was incomplete.	Mobile computer removed from cradle during communication.	Replace mobile computer in cradle and retransmit.
	Incorrect cable configuration.	See the system administrator or refer to the <i>MC31XX Series Mobile Computer Integrator Guide</i> .
	Communication software is not installed or configured properly.	See the system administrator or refer to the <i>MC31XX Series Mobile Computer Integrator Guide</i> .

Four Slot Charge Only Cradle

Table 5-3 *Troubleshooting the Four Slot Charge Only Cradle*

Problem	Cause	Solution
Mobile computer amber Charge LED Indicator does not light when mobile computer inserted.	Cradle is not receiving power.	Ensure the power cable is connected securely to both the cradle and to AC power.
	Mobile computer is not correctly seated.	Remove and re-insert the mobile computer into the cradle, ensuring it is correctly seated.
Mobile computer battery is not charging.	Mobile computer was removed from cradle or cradle was unplugged from AC power too soon.	Ensure cradle is receiving power. Ensure the mobile computer is seated correctly. If the mobile computer battery is fully depleted, it can take up to five hours to fully recharge a Standard Battery and it can take up to eight hours to fully recharge an Extended Life Battery.
	Battery is faulty.	Verify that other batteries charge properly. If so, replace the faulty battery.
	The mobile computer is not fully seated in the cradle.	Remove and re-insert the mobile computer into the cradle, ensuring it is correctly seated.

Four Slot Ethernet Cradle

Table 5-4 *Troubleshooting the Four Slot Ethernet Cradle*

Problem	Cause	Solution
Mobile computer amber Charge LED Indicator does not light when mobile computer inserted.	Cradle is not receiving power.	Ensure the power cable is connected securely to both the cradle and to AC power.
	Mobile computer is not correctly seated.	Remove and re-insert the mobile computer into the cradle, ensuring it is correctly seated.
Mobile computer battery is not charging.	Mobile computer was removed from cradle or cradle was unplugged from AC power too soon.	Ensure cradle is receiving power. Ensure the mobile computer is seated correctly. If the mobile computer battery is fully depleted, it can take up to five hours to fully recharge a Standard Battery and it can take up to eight hours to fully recharge an Extended Life Battery.
	Battery is faulty.	Verify that other batteries charge properly. If so, replace the faulty battery.
	The mobile computer is not fully seated in the cradle.	Remove and re-insert the mobile computer into the cradle, ensuring it is correctly seated.

Table 5-4 Troubleshooting the Four Slot Ethernet Cradle (Continued)

Problem	Cause	Solution
During data communication, no data was transmitted, or transmitted data was incomplete.	Mobile computer removed from cradle during communication.	Replace mobile computer in cradle and retransmit.
	Incorrect cable configuration.	See the system administrator or refer to the <i>MC31XX Series Mobile Computer Integrator Guide</i> .
	Ethernet connection error. Link LED is not lit (see Link LED on page 4-9).	See the system administrator. Probable Ethernet connection error.

Four Slot Spare Battery Charger

Table 5-5 Troubleshooting the Four Slot Spare Battery Charger

Symptom	Possible Cause	Solution
Spare Battery Charging LED does not light when spare battery is inserted.	Spare battery is not correctly seated.	Remove and re-insert the spare battery into the charging slot, ensuring it is correctly seated.
Spare battery is not charging.	Charger is not receiving power.	Ensure the power cable is connected securely to both the charger and to AC power.
	Spare battery is not correctly seated.	Remove and re-insert the battery into the charger, ensuring it is correctly seated.
	Spare battery was removed from charger or charger was unplugged from AC power too soon.	Ensure charger is receiving power. Ensure the spare battery is seated correctly. If a battery is fully depleted, it can take up to five hours to fully recharge a Standard Battery and it can take up to eight hours to fully recharge an Extended Life Battery.
	Spare battery is faulty.	Verify that other batteries charge properly. If so, replace the faulty battery.

UBC Adapter

Table 5-6 *Troubleshooting the UBC Adapter*

Symptom	Possible Cause	Solution
Battery Charging LED does not light when spare battery is inserted.	Spare battery is not correctly seated.	Remove and re-insert the spare battery into the charging slot, ensuring it is correctly seated.
Battery not charging.	Charger is not receiving power.	Ensure the power cable is connected securely to both the charger and to AC power.
	Spare battery is not correctly seated.	Remove and re-insert the spare battery into the charger, ensuring it is correctly seated.
	Spare battery was removed from charger or charger was unplugged from AC power too soon.	Ensure charger is receiving power. Ensure the spare battery is seated correctly. If a battery is fully depleted, it can take up to five hours to fully recharge a Standard Battery and it can take up to eight hours to fully recharge an Extended Life Battery.
	Spare battery is faulty.	Verify that other batteries charge properly. If so, replace the faulty battery.

Cables

Table 5-7 *Troubleshooting the Cables*

Symptom	Possible Cause	Solution
Mobile computer amber Charge LED Indicator does not light when mobile computer attached.	Cable is not receiving power.	Ensure the power cable is connected securely to both the cable and to AC power.
	Mobile computer is not seated correctly in the cable.	Remove and re-attach the mobile computer to the MC31XX connector, ensuring it is correctly seated.
Mobile computer battery is not charging.	Mobile computer was detached from cable or cable was unplugged from AC power too soon.	Ensure cable is receiving power. Ensure the mobile computer is seated correctly. If the mobile computer battery is fully depleted, it can take up to five hours to fully recharge a Standard Battery and it can take up to eight hours to fully recharge an Extended Life Battery.
	Battery is faulty.	Verify that other batteries charge properly. If so, replace the faulty battery.
	The mobile computer is not fully seated in the cable.	Remove and re-attach the mobile computer to the cable, ensuring it is correctly seated.

Table 5-7 *Troubleshooting the Cables (Continued)*

Symptom	Possible Cause	Solution
During data communication, no data was transmitted, or transmitted data was incomplete.	Cable removed from mobile computer during communication.	Reattach cable to mobile computer and retransmit.
	Incorrect cable configuration.	See the system administrator or refer to the <i>MC31XX Series Mobile Computer Integrator Guide</i> .
	Communication software is not installed or configured properly.	See the system administrator or refer to the <i>MC31XX Series Mobile Computer Integrator Guide</i> .

Appendix A Technical Specifications

Mobile Computer and Accessory Technical Specifications

[Table A-1](#) summarizes the mobile computer technical specifications and intended operating environments.

[Table A-2](#) summarizes the accessory technical specifications and the intended operating environments.

Table A-1 MC31XX Technical Specifications

Item	Description
Physical Characteristics	
Dimensions	<p>MC31XXS: 7.49 in L x 3.25 in W x 1.77 in D (190.4 mm L x 82.6 mm W x 45.2 mm D) At grip: 2.40 in. W x 1.44 in. D/61.2 mm x 36.8 mm</p> <p>MC31XXR: 8.55 in L x 3.25 in W x 1.57 in D (217.12 mm L x 82.6 mm W x 39.9 mm D) At grip: 2.40 in. W x 1.14 in. D/61.2 mm x 29 mm</p> <p>MC3190G: 7.5 in L x 3.2 in W x 6.5 in D (193 mm L x 80.8 mm W x 166 mm H)</p>
Weight (including battery, stylus, and handstrap)	<p>MC31XXR (with standard battery)* - 13.52 oz (384 g) MC31XXS (with extended battery)* - 14.95 oz (424 g) MC3190G (with extended battery)* - 18.34 oz (520 g)</p>
Display	3.0 inch Color (TFT) (320 x 320) display with backlight
Touch Panel	Analog resistive touch
Backlight	LED backlight

Table A-1 MC31XX Technical Specifications (Continued)

Item	Description
Battery	Standard: Rechargeable Lithium-Ion 2740 mAh minimum (3.7V) Extended Life: Rechargeable Lithium-Ion 4800 mAh minimum (3.7V)
Expansion Slot	User accessible SD/MMC slot up to 8 GB; approved for memory expansion only
Network Connections	High-speed USB client, full-speed USB host, Bluetooth and WiFi. USB host mode available with appropriate cables only.
Notification	Programmable LEDs; Audio notifications
Keypad Options	28-key Numeric 38-key Shifted Alpha (calculator-style integrated numeric keypad) 48-key Alpha-Numeric (calculator-style integrated numeric keypad)
Audio	Speaker, receiver, microphone, software support for full duplex capability, Bluetooth stereo.
Performance Characteristics	
CPU	Marvell PXA320 processor at 624 MHz
Operating System	Microsoft® Windows CE .NET 6.0 Professional Microsoft® Windows Mobile 6.1 or 6.5 Classic
Memory	128 MB RAM/256 MB Flash, 128 MB RAM/512 MB Flash, 256 MB RAM/512 MB Flash or 256 MB RAM/1 GB Flash
Output Power	USB: 5 VDC @ 400 mA max.
User Environment	
Operating Temperature	-20°C to 50°C (-4°F to 122°F)
Storage Temperature	-40° to 70°C (-40° to 158°F) without battery
Charging Temperature	0° C to 40° C (32°F to 104°F)
Humidity	5 - 95% non-condensing
Drop Specification	Multiple 4 ft./1.2 m drop to concrete across the operating temperature range Meets and exceeds MIL-STD 810G drop specifications.
Tumble	500 1.64 ft./0.5 m tumbles (1,000 drops) at room temperature per IEC 68-2-32 tumble specification.
Electrostatic Discharge (ESD)	+/- 15 kV air discharge +/- 8 kV direct discharge +/- 8 kV indirect discharge
Sealing	IP54 category 2; meets applicable EN 60529 sealing specifications.

Table A-1 MC31XX Technical Specifications (Continued)

Item	Description
Wireless LAN Data and Voice Communications	
Wireless Local Area Network (WLAN) radio	Tri-mode IEEE® 802.11a/b/g
Data Rates Supported	1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, and 54 Mbps
Operating Channels	Chan 1-13 (2412-2472 MHz), Chan 14 (2484 MHz) Japan only; actual operating channels/frequencies depend on regulatory rules and certification agency
Security	WPA2 (Personal or Enterprise); 802.1x; EAP-TLS; TTLS (CHAP, MS-CHAP, MS-CHAPv2, PAP or MD5); PEAP (TLS, MSCHAPv2, EAP-GTC); LEAP, EAP-FAST (TLS, MS-CHAPv2, EAP-GTC); CCXv4 certified; support for IPv6; FIPS140-2 Certified
Spreading Technique	Direct Sequence Spread Spectrum (DSSS) and Orthogonal Frequency Division Multiplexing (OFDM)
Antenna	Internal antenna w/diversity
Voice Communication	Voice-over-IP ready, Wi-Fi™-certified, IEEE 802.11a/b/g direct sequence wireless LAN, Wi-Fi Multimedia™ (WMM), Zebra Voice Quality Manager (VQM)
Wireless PAN Data and Voice Communications	
Bluetooth	Class II, v2.1 with Enhanced Data Rate (EDR); integrated antenna
Regulatory	
Electrical Safety	Certified to UL60950-1, CSA C22.2 No. 60950-1, EN60950/IEC 60950-1
Environmental	RoHS-compliant
WLAN and Bluetooth (PAN)	USA: FCC Part 15.247, 15.407 Canada: RSS-210 EU: EN 300 328, EN 301 893 Japan: ARIB STD T33, T66, T70, T71 Australia: AS/NZS 4268s
RF Exposure	USA: FCC Part 2, FCC OET Bulletin 65 Supplement C Canada: RSS-102 EU: EN 62311 Australia: Radio communications Standard 2003
EMI/RFI Radio Version	USA: FCC Part 15 Canada: RSS210 Class B EU: EN 301 489-1, 489-17

Table A-1 MC31XX Technical Specifications (Continued)

Item	Description
EMI/RFI Batch Version	USA: FCC Part 15 Canada: ICES 003 Class B EU: EN55022 Class B EN55024 Japan: CISPR 22, Class B Australia: AS3548
Laser Safety	IEC Class2/FDA Class II in accordance with IEC60825-1/EN60825-1
Data Capture Specifications	
Options	1D laser scanner 2D imager
Laser 1D Scanner (SE950) Specifications	
Range on 100% UPCA	Near: 3.8 cm (1.5 in.) Far: 60 cm (24 in.)
Optical Resolution	0.004 in. minimum element width
Roll	+/- 35° from vertical
Pitch Angle	+/- 65° from normal
Skew Tolerance	+/- 50° from normal
Ambient Light	10,000 ft. candles/107,640 lux
Scan Rate	104 (+/- 12) scans/sec (bidirectional)
Scan Angle	47° ± 3° default; configurable narrow angle: 35° ± 3°
2D Imager Engine (SE4500-SR) Specifications	
Range on 100% UPCA at 30 ft./candles	Near: 6.35 cm (2.5 in.) Far: 36.07 cm (14.2 in.)
Field of View	Horizontal - 38° Vertical - 25°
Optical Resolution	752 x 480 pixels
Roll	360°
Pitch Angle	+/- 60° from normal
Skew Tolerance	+/- 60° from normal
Ambient Light	9,000 ft. candles (96,900 Lux)
Focal Distance from Front of Engine	Near: 4 cm (1.6 in.) Far: 38 cm (15 in.)
Aiming Element (VLD)	655 nm +/- 10 nm
Illumination Element (LED)	625 nm +/- 5 nm

Table A-1 MC31XX Technical Specifications (Continued)

Item	Description
2D Imager Engine (SE4500-HD) Specifications	
Range on 100% UPCA at 30 ft./candles	Near: 6.65 cm (2.62 in.) Far: 15.49 cm (6.1 in.)
Field of View	Horizontal - 39° Vertical - 25°
Optical Resolution	752 x 480 pixels
Roll	360°
Pitch Angle	+/- 60° from normal
Skew Tolerance	+/- 60° from normal
Ambient Light	9,000 ft. candles (96,900 Lux)
Focal Distance from Front of Engine	Near: 4 cm (1.6 in.) Far: 17 cm (6.8 in.)
Aiming Element (VLD)	655 nm +/- 10 nm
Illumination Element (LED)	625 nm +/- 5 nm
Zebra Interactive Sensor Technology	
Motion-sensor	3-axis accelerometer that enables motion-sensing applications on dynamic screen orientation, power management and free-fall detects

Table A-2 Accessory Specifications

	Single Slot Serial/USB Cradle	Cables	Four Slot Charge Only and Ethernet Cradles	Four Slot Spare Battery Charger	Universal Battery Charger (UBC) Adapter
Operating Temperature	32° to 122°F (0° to +50°C)			32° to 104°F (0° to +40°C)	
Storage Temperature	-40° to 158°F (-40° to 70°C)				
Battery Charging Temperature	32° to 104° F (0° to +40° C) ambient temperature				
Humidity	5% to 95% non-condensing				
Size (L x D x H)	4.4 in x 5.7 in x 4.7 in (11.2 cm x 14.5 cm x 12 cm)	6 feet (1.83 m)	18 in x 4 in x 5 in (45.7 cm x 10.1 cm x 12 cm)	8.25 in x 6.0 in x 1.7 in (20.96 cm x 15.24 cm x 4.32 cm)	2.5 in x 6.1 in x 1.5 in (6.4 cm x 15.5 cm x 3.8 cm)

Table A-2 *Accessory Specifications (Continued)*

	Single Slot Serial/USB Cradle	Cables	Four Slot Charge Only and Ethernet Cradles	Four Slot Spare Battery Charger	Universal Battery Charger (UBC) Adapter
Weight	0.60 lbs (0.27 kg)	N/A	Charge only: 2.25 lbs (1.02 kg) Ethernet: 2.38 lbs (1.08 kg)	13.6 oz (386 g)	0.25 lbs (0.11 kg)
Power	12V, 3.3 A	5.4V, 3 A	12V, 9 A	12V, 3.3 A	15V, 1.5 A
Drop	30 inches (76.2 centimeter) to vinyl covered concrete				
Electrostatic Discharge (ESD)	+/-15 kV air discharge, +/- 8 kV direct discharge, +/- 8 kV indirect discharge				

Appendix B Keypads

Introduction

The mobile computer is available with the following keypad configurations:

- 28-key keypad
- 38-key keypad
- 48-key keypad.

✓ **NOTE** For information about using the soft keyboard input panel. For more information, see [Entering Information Using the Keyboard Input Panel on page 2-15](#).

28-Key Keypad

The 28-key keypad contains a **Power** button, application keys, scroll keys and function keys. The keypad is color-coded to indicate the alternate function key (blue) values and the alternate **ALPHA** key (orange) values. Note that keypad functions can be changed by an application so the mobile computer keypad may not function as described. See [Table B-1 on page B-2](#) for key and button descriptions and [Table B-2 on page B-4](#) for the keypad alternate functions.

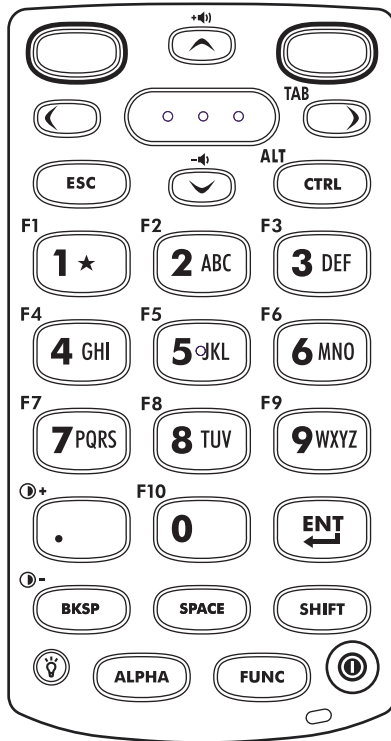


Figure B-1 28-Key Keypad

Table B-1 28-Key Descriptions




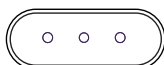
Key	Description
Power (red) 	Powers the mobile computer screen on and off (resume and suspend).
Green Circle 	Programmable application function key by default.
Red Circle 	Programmable application function key by default.
Scan (yellow) 	Used in scanning applications, press to scan a bar code. This key has the same function as activating the side mounted scan buttons.

Table B-1 28-Key Descriptions (Continued)










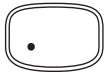


Key	Description
Scroll Up and Down 	Moves up and down from one item to another. Increases/decreases specified values. Increases and decreases volume when the blue FUNC key is activated and the up and down arrow keys are pressed.
Scroll Left and Right 	Moves left and right from one item to another. Increases/decreases specified values. Produces a TAB when the blue FUNC key is activated and the right arrow key is pressed.
ESC 	Produces the ESC function by default.
CTRL 	Press and release the CTRL key to activate the keypad alternate CTRL functions. The  icon appears on the taskbar on WinCE devices or the  icon appears at the bottom of the screen on Windows Mobile 6.1 devices. Press and release the CTRL key again to return to the default keypad functions. Press and release the blue FUNC key and then the CTRL key to activate the ALT functions. The  icon appears on the taskbar on WinCE devices or the  icon appears at the bottom of the screen on Windows Mobile 6.1 devices. Press and release the CTRL key two times to return to the default keypad functions.
Numeric/Alpha/Special Function 	Numeric, alpha or special function keys. Numeric by default. Produces a special function when the blue FUNC key is activated. Produces alpha values when the orange ALPHA key is activated. In Alpha state, produces the lower case alphabetic characters on the key. Each key press produces the next alphabetic character in sequence. For example, press and release the ALPHA key and then press the 4 key once to produce the letter 'g'; press and release the ALPHA key and then press the 4 key three times to produce the letter 'i'. When the SHIFT key is pressed in Alpha state, the upper case alphabetic characters on the key are produced. For example, press and release the ALPHA key, press and hold the SHIFT key and then press the 4 key once to produce the letter 'G'; press and release the ALPHA key, press and hold the SHIFT key and then press the 4 key three times to produce the letter 'I'.
Period/Decimal Point 	Produces a period for alpha entries and a decimal point for numeric entries by default. Increases brightness when the blue FUNC key is activated.
Enter 	Executes a selected item or function.
BKSP 	Backspace function by default. Decreases brightness when the blue FUNC key is activated.

Table B-1 28-Key Descriptions (Continued)












Key	Description
SPACE 	Space function by default.
Shift 	Press and release the SHIFT key to activate the keypad alternate SHIFT functions. The  icon appears on the taskbar on WinCE devices and the  icon appears at the bottom of the screen on Windows Mobile 6.1 devices. Press and release the SHIFT key again to return to the default keypad functions.
ALPHA (orange) 	Press the orange ALPHA key to access the alternate ALPHA characters (shown on the keypad in orange). The  icon appears on the taskbar on WinCE devices and the  icon appears at the bottom of the screen on Windows Mobile 6.1 devices. Press and release the orange ALPHA key again to return to the default keypad functions.
FUNC (blue) 	Press and release the blue FUNC key to activate the keypad alternate functions (shown on the keypad in blue). The  icon appears on the taskbar on WinCE devices or the  icon appears at the bottom of the screen on Windows Mobile 6.1 devices. Press and release the blue FUNC key again to return to the default keypad functions.
Display backlight 	Toggles the display backlight on and off.

Table B-2 28-key Keypad Input Modes

Key	Numeric Mode		Orange Key (Alpha Lowercase Mode)				Orange + Shift Keys (Alpha Uppercase Mode)			
		SHIFT + Key	1st Press	2nd Press	3rd Press	4th Press	1st Press	2nd Press	3rd Press	4th Press
1	1	!	*				*			
2	2	@	a	b	c		A	B	C	
3	3	#	d	e	f		D	E	F	
4	4	\$	g	h	i		G	H	I	
5	5	%	j	k	l		J	K	L	
6	6	^	m	n	o		M	N	O	
7	7	&	p	q	r	s	P	Q	R	S
8	8	*	t	u	v		T	U	V	

Note: An application can change the key functions. The keypad may not function exactly as described.

Table B-2 28-key Keypad Input Modes (Continued)

Key	Numeric Mode		Orange Key (Alpha Lowercase Mode)				Orange + Shift Keys (Alpha Uppercase Mode)			
		SHIFT + Key	1st Press	2nd Press	3rd Press	4th Press	1st Press	2nd Press	3rd Press	4th Press
9	9	(	w	x	y	z	W	X	Y	Z
0	0	)	0				0			
.	.	>	.				.			

Note: An application can change the key functions. The keypad may not function exactly as described.

38-Key Keypad

The 38-key keypad contains a **Power** button, application keys, scroll keys and function keys. The keypad is color-coded to indicate the alternate function key (blue) values. Note that keypad functions can be changed by an application so the mobile computer keypad may not function as described. See [Table B-3 on page B-6](#) for key and button descriptions and [Table B-4 on page B-8](#) for the keypad alternate functions.



Figure B-2 38-Key Keypad

Table B-3 38-Key Descriptions




Key	Description
Power (red) 	Powers the mobile computer screen on and off (resume and suspend).
Green Circle 	Programmable application function key by default.
Red Circle 	Programmable application function key.

Table B-3 38-Key Descriptions (Continued)



















Key	Description
Scan (yellow) 	Used in scanning applications, press to scan a bar code.
Scroll Left and Right 	Moves left and right from one item to another by default. Produces a TAB when the blue FUNC key is activated and the right arrow key is pressed.
Scroll Up and Down 	Moves up and down from one item to another by default.
ALPHA (orange) 	Press the orange ALPHA key to access the alternate ALPHA characters (shown on the keypad in orange). The ALP icon appears on the taskbar on WinCE devices and the  icon appears at the bottom of the screen on Windows Mobile 6.1 devices. Press and release the orange ALPHA key again to return to the default keypad functions.
CTRL 	Press and release the CTRL key to activate the keypad alternate CTRL functions. The  icon appears on the taskbar on WinCE devices or the  icon appears at the bottom of the screen on Windows Mobile 6.1 devices. Press and release the CTRL key again to return to the default keypad functions. Press and release the blue FUNC key and then the CTRL key to activate the ALT functions. The  icon appears on the taskbar on WinCE devices or the  icon appears at the bottom of the screen on Windows Mobile 6.1 devices. Press and release the CTRL key two times to return to the default keypad functions.
ESC 	Produces the escape function.
FUNC (blue) 	Press and release the blue FUNC key to activate the keypad alternate functions (shown on the keypad in blue). The F icon appears on the taskbar on WinCE devices or the  icon appears at the bottom of the screen on Windows Mobile 6.1 devices. Press and release the blue FUNC key again to return to the default keypad functions.
Numeric/Alpha/Special Function 	Press for the default numeric value. Produces alpha values when the orange ALPHA key is activated.
BKSP 	Backspace function by default. Produces the Space function when the orange ALPHA key is activated.
SHIFT 	Press and release the SHIFT key to activate the keypad alternate SHIFT functions. The  icon appears on the taskbar on WinCE devices and the  icon appears at the bottom of the screen on Windows Mobile 6.1 devices. Press and release the SHIFT key again to return to the default keypad functions.

Table B-3 38-Key Descriptions (Continued)






Key	Description
Enter 	Executes a selected item or function.
Period 	Produces a period for alpha entries and a decimal point for numeric entries.
Comma 	Produces a comma by default.
Special Function/Alpha 	Special function by default or when the blue FUNC key is activated.
Display backlight 	Toggles the display backlight on and off.

Table B-4 38-key Keypad Input Modes

Key	Normal	SHIFT + Key	Orange + Key	Orange + Shift + Key	Blue + Key
Right Arrow			a	A	
Up Arrow			b	B	
Down Arrow			c	C	
Left Arrow			d	D	Tab
CTRL			e	E	Ctrl
ESC			f	F	
7	7	&	g	G	-
8	8	*	h	H	=
9	9	(	i	I	/
BKSP	Backspace	Backspace	Space	Space	Backspace
4	4	\$	j	J	[
5	5	%	k	K]
6	6	^	l	L	;

Note: An application can change the key functions. The keypad may not function exactly as described.

Table B-4 38-key Keypad Input Modes (Continued)

Key	Normal	SHIFT + Key	Orange + Key	Orange + Shift + Key	Blue + Key
1	1	!	m	M	‘
2	2	@	n	N	‘
3	3	#	o	O	\
,	,	<	p	P	,
0	0	)	q	Q	0
.	.	>	r	R	.
F1			s	S	F11
F2			t	T	F12
F3			u	U	F13
F4			v	V	F14
F5			w	W	
F6			x	X	Increase Brightness
F7			y	Y	Increase Volume
F8			z	Z	
F9					Decrease Brightness
F10			*		Decrease Volume

Note: An application can change the key functions. The keypad may not function exactly as described.

48-Key Keypad

The 48-key keypad contains a **Power** button, application keys, scroll keys and function keys. The keypad is color-coded to indicate the alternate function key (blue) values. Note, that keypad functions can be changed by an application so the mobile computer keypad may not function as described. See [Table B-5 on page B-10](#) for key and button descriptions and [Table B-6 on page B-12](#) for the keypad special functions.

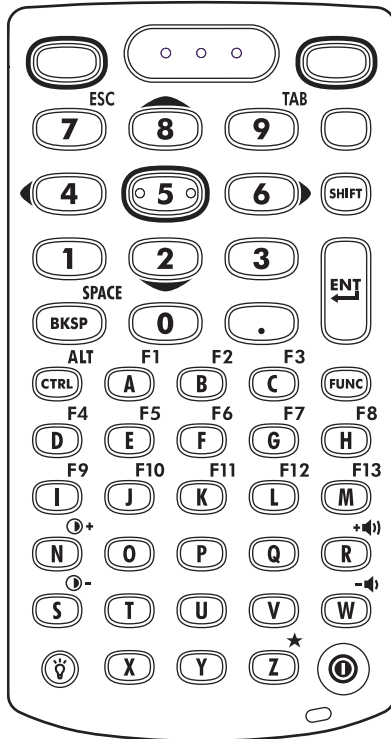


Figure B-3 48-Key Keypad

Table B-5 48-Key Descriptions

Key	Description
Power (red) Ⓚ	Powers the mobile computer screen on and off (resume and suspend).
Green Circle Ⓛ	Unassigned application function key by default.
Red Circle Ⓜ	Unassigned application function key.
Scan (yellow) Ⓝ	Scan key, used for scanning applications.

Table B-5 48-Key Descriptions (Continued)













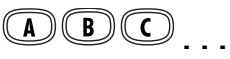



Key	Description
Orange 	Press the orange key to access the alternate navigation and selection functions. The ALP icon appears on the taskbar on WinCE devices and the  icon appears at the bottom of the screen on Windows Mobile 6.1 devices. Press and release the orange key again to return to the default keypad functions.
Numeric/Scroll/Select 	Numeric, scroll, select keys. Numeric by default. With the orange key activated, the 2 , 4 , 6 , and 8 keys produce scroll functions and the 5 key produces a select function. With the FUNC key activated, 7 produces the ESC function and 9 produces the TAB function.
Shift 	Press and release the SHIFT key to activate the keypad alternate SHIFT functions. The  icon appears on the taskbar on WinCE devices and the  icon appears at the bottom of the screen on Windows Mobile 6.1 device. Press and release the SHIFT key again to return to the default keypad functions.
Enter 	Executes a selected item or function.
BKSP/SPACE 	BKSP , backspace function by default. Produces the SPACE function when the blue FUNC key is activated.
Period/Decimal Point 	Produces a period for alpha entries and a decimal point for numeric entries.
Control 	Press and release the CTRL key to activate the keypad alternate CTRL functions. The  icon appears on the taskbar on WinCE devices or the  icon appears at the bottom of the screen on Windows Mobile 6.1 devices. Press and release the CTRL key again to return to the default keypad functions. Press and release the blue FUNC key and then the CTRL key to activate the ALT functions. The ALT icon appears on the taskbar on WinCE devices or the ALT icon appears at the bottom of the screen on Windows Mobile 6.1 devices. Press and release the CTRL key two times to return to the default keypad functions.
Alpha/Special Function 	Alpha by default. Special function by default when the blue FUNC key is activated.
FUNC (blue) 	Press and release the blue FUNC function key to activate the keypad alternate functions (shown on the keypad in blue). The F icon appears on the taskbar on WinCE devices or the  icon appears at the bottom of the screen on Windows Mobile 6.1 devices. Press and release the blue FUNC function key again to return to the default keypad functions.
Display Backlight 	Toggles the display backlight on and off.

Table B-6 48-key Keypad Input Modes

Key	Normal	Shift + Key	Blue + Key
A	a	A	F1
B	b	B	F2
C	c	C	F3
D	d	D	F4
E	e	E	F5
F	f	F	F6
G	g	G	F7
H	h	H	F8
I	i	I	F9
J	j	J	F10
K	k	K	F11
L	l	L	F12
M	m	M	F13
N	n	N	Increase Brightness
O	o	O	
P	p	P	
Q	q	Q	
R	r	R	Increase Volume
S	s	S	Decrease Brightness
T	t	T	
U	u	T	
V	v	V	
W	w	W	Decrease Volume
X	x	X	
Y	y	Y	
Z	z	Z	*
BKSP	Backspace	Backspace	Space
1	1	!	

Note: An application can change the key functions. The keypad may not function exactly as described.

Table B-6 48-key Keypad Input Modes (Continued)

Key	Normal	Shift + Key	Blue + Key
2	2	@	
3	3	#	
4	4	\$	
5	5	%	
6	6	^	
7	7	&	
8	8	*	
9	9	(
0	0)	

Note: An application can change the key functions. The keypad may not function exactly as described.

Appendix C Windows Mobile 6.5

Introduction

This chapter describes the new features in the latest version of the operating system, OEM version, with Windows Mobile 6.5. These include:

- Finger scrolling functionality
- New Home screen
- New Start menu
- New Lock screen
- RS507 support
- Battery Swapping
- USB Configuration.

Finger Scrolling

Windows Mobile 6.5 adds finger scrolling capabilities to the display. Finger scrolling can be used to scroll up and down web pages, documents, and lists such as the contacts list, file list, message list, calendar appointments list, and more.

When finger scrolling, swipe or flick your finger on the screen.

To scroll down, swipe your finger upward on the screen. To scroll up, swipe your finger downward on the screen.

To auto-scroll, flick your finger upward or downward on the screen. Touch the screen to stop scrolling.

Home Screen

The default home screen on the MC3100 is the Windows Mobile Home screen. The Home screen contains a Status Bar at the top of the screen and a Tile Bar at the bottom of the screen.

The Home screen is scrollable and contains a list of application plug-ins and an Information Status bar. The Information Status bar highlights the application plug-in that is under it and provides additional information.



Figure C-1 Windows Mobile Home Screen

Touch and hold the screen with your finger and move the Home screen up and down. As the application names move under the Information Status bar, information relevant to that application appear in the bar.



Figure C-2 Moving Home Screen

You can also touch and hold the Information Status bar and move it up and down over an application name. Remove your finger and the Information Status bar and application name center in the screen.

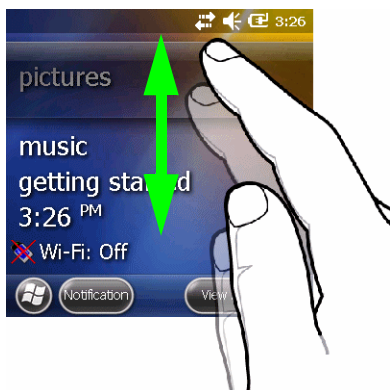


Figure C-3 Moving Information Status Bar

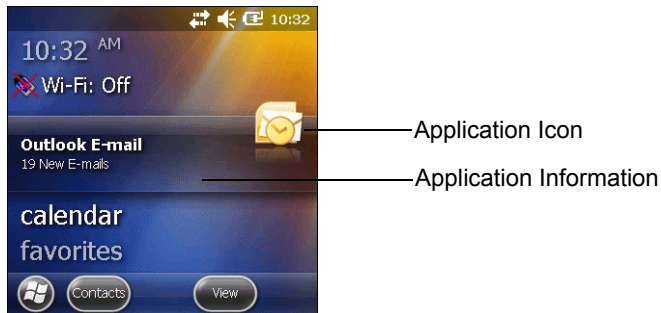


Figure C-4 Information Bar Example

To customize the Home screen, tap > **Settings** > **Home**. On the horizontal scroll, use **Appearance** to customize the background and the **Items** to change the display format.

Classic Today Screen

The user can change to the classic Today screen layout that is used in Windows Mobile 6.1.

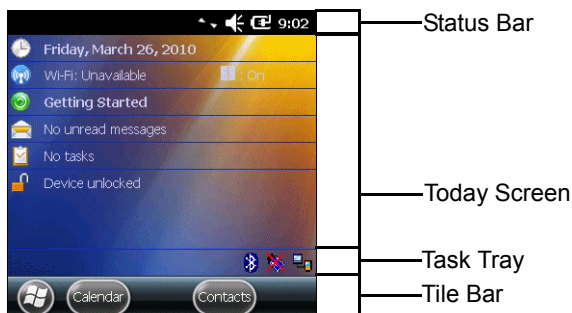


Figure C-5 Classic Today Screen

To change to the classic view tap > **Settings** > **Home** > **Items**.

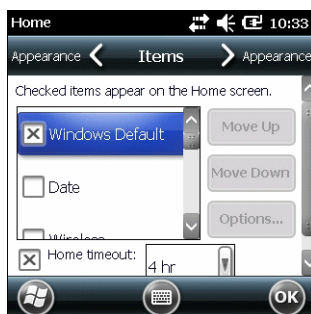








Figure C-6 Home Screen Settings

Deselect the **Windows Default** checkbox and select any of the other checkboxes.

Tap .

The task bar at the bottom of the screen can contain the task tray icons listed in [Table C-1](#).

Table C-1 Task Tray Icons

Icon	Name	Description
	Wireless connection status	Wireless connection status icon. Indicates WLAN signal strength and opens the Wireless Applications menu.
	Bluetooth Enabled	The Bluetooth Enabled icon appears in the task tray and indicates that the Bluetooth radio is on (Displays only if the StoneStreet One Bluetooth stack is enabled).
	Bluetooth Disabled	The Bluetooth Disabled icon appears in the task tray and indicates that the Bluetooth radio is off (Displays only if the StoneStreet One Bluetooth stack is enabled).
	Bluetooth Communication	The Bluetooth Communication icon appears in the task tray and indicates that the mobile computer is communicating with another Bluetooth device (Displays only if the StoneStreet One Bluetooth stack is enabled).
	IST	Opens the IST control panel.
	ActiveSync	The ActiveSync icon appears in the task tray and indicates an active serial connection between the mobile computer and the development computer.

Status Bar

The **Status Bar** at the top of the screen displays the status icons listed in [Table C-2](#).

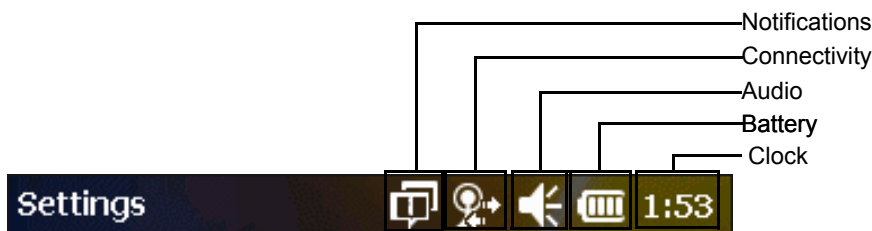


Figure C-7 Status Bar Icons

Table C-2 Status Bar Icons



















Icon	Description	Icon	Description
Notifications			
	Indicates a reminder of an upcoming calendar event.		Notification that one or more instant messages were received.
	Notification that one or more e-mail/text messages were received.		There are more notification icons than can be displayed.

Table C-2 Status Bar Icons (Continued)






Icon	Description	Icon	Description
Connectivity			
	Connection is active.		Connection is not active.
	Synchronization is occurring.		Wi-Fi available.
	Wi-Fi in use.		
Audio			
	All sounds are on.		All sounds are off.
	Vibrate is on.		
Battery			
	Battery is charging.		Battery has a full charge.
	Battery has a high charge.		Battery has a medium charge.
	Battery has a low charge.		Battery has a very low charge.

Tap the Status Bar to display an icon bar. Tap an icon to get additional notification or status information.




Figure C-8 Icon Bar

Table C-3 *Icon Bar Icons*


Icon	Name	Description
	Magnify	Enlarges the screen.
	Connectivity	Displays the Connectivity dialog box.
	Volume	Displays the Volume dialog box.
	Power	Displays the Power window.
	Clock & Alarms	Opens the Clocks & Alarms window.

Tile Bar

The **Tile Bar**, located at the bottom of the screen, contains the **Start** tile  to open the **Start Menu**. It also displays tiles that vary depending upon the open application.

**Figure C-9** *Tile Bar Examples*

Start Screen

To open the **Start** screen, tap  at the bottom left corner of the screen, or press the START key on the keypad.

Swipe upward to view more program and folder icons.

You can move often-used program and folder icons anywhere on the Start screen for easy access. Press and hold the icon that you want to move. Drag the icon to a new location and release.

[Table C-4](#) lists the default icons available on the Start screen.

Table C-4 Programs on the Start Screen























Icon	Name	Description	Icon	Name	Description
	ActiveSync	Synchronize information between the MC3100 and a host computer or the Exchange Server.		Calendar	Keep track of appointments and create meeting requests.
	Contacts	Keep track of friends and colleagues.		File Explorer	Organize and manage files on your device.
	Messenger	Use this mobile version of Windows Live Messenger.		Pictures & Videos	View and manage pictures, animated GIFs, and video files.
	E-mail	Send an Email.		Windows Media Player Mobile	Play back audio and video files.
	Getting Started	Launch the Getting Started application.		Marketplace	Purchase applications from the Marketplace.
	Internet Explorer Mobile	Browse Web and WAP sites as well as download new programs and files from the Internet.		Windows Live	Use this mobile version of Windows Live™ to find information on the web.
	Microsoft My Phone	Synchronizes the MC3100's contacts, calendar, tasks, text messages, music, photos videos and documents with a Microsoft My Phone account.		MSN Money	Keep track of your finances.
	MSN Weather	Check the local weather.		Calculator	Perform basic arithmetic and calculations, such as addition, subtraction, multiplication, and division.
	Games	Play games.		Text	Send an SMS text message.
	Notes	Create handwritten or typed notes, drawings, and voice recordings.		Home	Displays the Home screen.
	Tasks	Keep track of your tasks.		Settings	Opens the Settings folder.

Table C-4 Programs on the Start Screen















Icon	Name	Description	Icon	Name	Description
	Internet Sharing	Connect a notebook computer to the Internet using the MC3100's data connection.		Help	Access on-line Help topics.
	Task Manager	Enables viewing of memory and CPU allocations and stops running processes. Refer to the <i>Microsoft Applications for Windows Mobile 6 User Guide</i> for more information.		Wireless Companion Folder	Open the Wireless Companion folder.
	Search Phone	Search contacts, data, and other information on the MC3100. Refer to the <i>Microsoft Applications for Windows Mobile 6 User Guide</i> for more information.		AirBEAM Client	Allows specially designed software packages to be transferred between a host server and the MC3100. Refer to the <i>MC3100 Integrator Guide</i> for more information.
	BT Information	Display information about the Bluetooth radio and generate a Bluetooth address bar code.		Remote Desktop Mobile	Log onto Windows NT server type computers and use all of the programs that are available on that computer from the MC3100.
	Modem Link	Enables the MC3100 to be used as a modem.		Battery Swap	
	MSP Agent	Interacts with MSP agents to collect monitoring and asset information to enable the configuration, provisioning, monitoring and troubleshooting of the MC3100. Refer to the <i>MC3100 Integrator Guide</i> for more information.		Rapid Deployment Client	Facilitates software downloads from a Mobility Services Platform Console FTP server to the MC3100. Refer to the <i>MC3100 Integrator Guide</i> for more information.

Table C-4 Programs on the Start Screen

Icon	Name	Description	Icon	Name	Description
	Alarms	Set the device clock to the date and time of your locale or to a visiting time zone when you're traveling. Alarms can also be set at specified days and times of a week.		Office Mobile	Use the suite of Microsoft® Office applications for your mobile device; Excel Mobile, OneNote Mobile, PowerPoint Mobile and Word Mobile.
	BTScannerCtl Panel			BTEplorer	Manages StoneStreet One Bluetooth connections.
	SwitchUSB				

Speaker Icon

You can adjust the system volume using the **Speaker** icon.

1. Tap the Status Bar and then tap the **Speaker** icon. The **Volume** dialog box appears.

**Figure C-10** Volume Dialog Box

2. Tap and move the slide bar to adjust the volume.
3. Select the **On** or **Off** radio button to turn the volume on or off.

✓ **NOTE** Use can also adjust the system volume using the **Sounds & Notifications** window or by using the keypad.

Battery Icons

The **Battery** icon in the Status Bar indicates the battery power level. To view or change power settings, tap the Status Bar. Tap the BAattery icon to display the **Power** window.

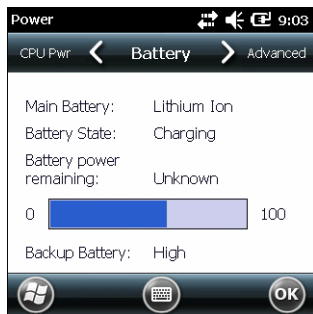


Figure C-11 Power Window

Connectivity Icon

The **Connectivity** icon indicates the communication status of the terminal when it's connecting to the internet or host computer. Tap the Status Bar and then tap the **Connectivity** icon.

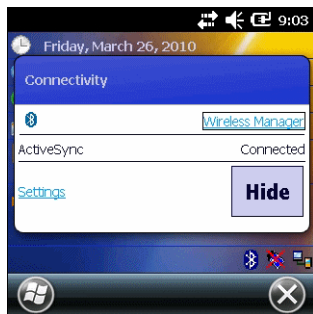


Figure C-12 Connectivity Dialog Box

Clock Icon

The **Clock** icon displays the current time. To change the current time, tap the Status Bar and then tap the **Clock** icon.

Locking the MC3100

You can lock the MC3100 by disabling key presses and screen tap or by requiring a password or finger swipe. There are two types of locking features available; the standard Microsoft lock and the Zebra lock.

✓ **NOTE** You can make emergency calls even when the MC3100 is locked.

Microsoft Locking

Locking the MC3100 turns off keyboard and touch screen functionality. This is helpful when the MC3100 is turned on and you want to prevent accidental key presses.

To lock the device, tap  > .

The lock screen appears.

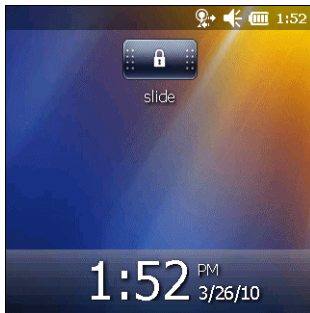



Figure C-13 Lock Screen

Drag  to either the right or left side of the screen.

If a password is set up, enter the password and then tap  to unlock and display the Home screen, tap  to unlock and display the Contacts window, tap  to unlock and display the Messaging window.

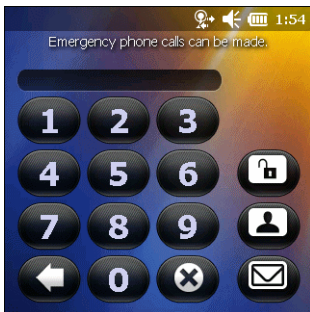


Figure C-14 Password Window

Password Locking

Use the **Password** window to set a password to disable unauthorized access to the MC3100.

- ✓ **NOTE** If the device is configured to connect to a network, use a strong (difficult to figure out) password to help protect network security. Password cracking tools continue to improve and the computers used to crack passwords are more powerful than ever.

1. Tap  > **Settings** > **Lock** > **Password**.

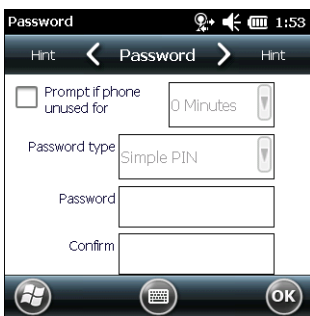





Figure C-15 Password Window

2. Select **Prompt if device unused for** check box to enable password protection.
3. From the drop-down list, select a time value for the protection to take affect after non-use.

4. From the **Password type:** drop-down list, select either **Simple PIN** or **Strong alphanumeric**.
5. For a simple password, enter a four-digit password in the **Password** field.
For a stronger password:
 - a. Enter a seven character password in the **Password:** field. A strong password must contain at least seven characters and contain at least three of the following: uppercase and lowercase letters, numerals, and punctuation.
 - b. Re-enter the password in the **Confirm:** field.
6. Tap .
7. In the horizontal scroll, select **Hint**. Enter a hint to remember the password if you forget it.
8. Tap .
9. In the text box, enter a hint for a password reminder.
10. Tap .

When the MC3100 is not used for a period of time and the user tries to access the device, the Lock window appears.

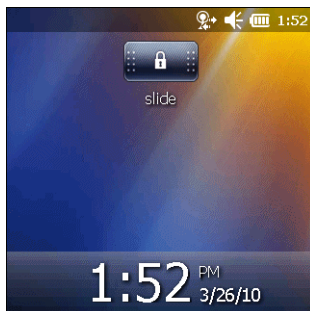


Figure C-16 Lock Window

1. Slide the Lock button to the left or right.
2. Enter the password to un-lock the device.

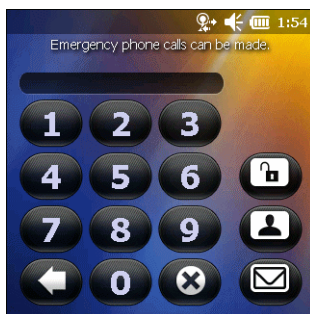


Figure C-17 Enter Password Window

3. Tap the **Unlock** icon.

Using the RS507 Hands-free Imager

An RS507 Hands-free Imager can be used with the MC3100 to capture bar code data.

To set up the RS507:

1. Tap **Start > Programs > BTScannerCtlPanel** icon.
2. If required, select the **BT Scanner** checkbox and then select the appropriate Com port from the drop-down list.
3. Tap **Save and Exit**.
4. Tap **Start > Programs > BD Address** icon. A bar code displays.
5. Point the RS507 to the bar code. The RS507 reads the bar code and begins pairing with the MC55.

Refer to the *RS507 Hands-free Imager Product Reference Guide* for more information.

Removing the Battery

The OEM version XXXXX provides an application that assists when suspending the MC3100 or when removing the battery.

Battery Removal

To remove the battery:

1. If the MC3100 is in suspend mode, press the red Power button to wake the device.
2. Press the red Power button to suspend the MC3100. The **Power Key Action** screen appears.

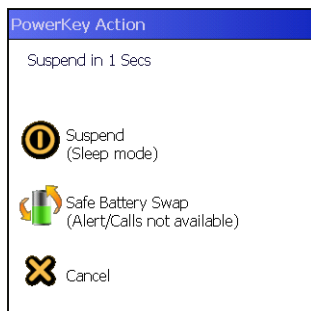


Figure C-18 *PowerKey Action Window*

3. Tap **Safe Battery Swap** icon.
4. Wait for the red decode LEDs to turn on and then turn off.
5. Remove the battery.

Suspend Mode

To place the MC3100 in suspend mode:

1. Press the red Power button to suspend the MC3100. The **Power Key Action** screen appears.



Figure C-19 *PowerKey Action Window*


2. Tap **Suspend** icon.
3. The MC3100 goes into suspend mode.

USB Configuration

The MC3100 can be placed into any of the following USB modes:

- USB Client
- USB Host
- USB On-the-Go.

To place the MC3100 into one of these modes:

1. Tap **Start > Settings > System > USBConfig**.
2. Select one of the radio buttons.
3. Tap .

Glossary

Numeric

802.11/802.11abg. A radio protocol that may be used by the WLAN radio card.

A

Access Point. Access Point (AP) refers to Zebra's Ethernet Access Point. It is a piece of communications equipment that manages communications between the host computer system and one or more wireless terminals. An AP connects to a wired Ethernet LAN and acts as a bridge between the Ethernet wired network and IEEE 802.11 interoperable radio-equipped mobile units, such as a mobile computer. The AP allows a mobile user to roam freely through a facility while maintaining a seamless connection to the wired network.

AirBEAM® Manager. AirBEAM® Manager is a comprehensive wireless network management system that provides essential functions that are required to configure, monitor, upgrade and troubleshoot the wireless network and its components (including networked mobile computers). Some features include event notification, access point configuration, diagnostics, statistical reports, auto-discovery, wireless proxy agents and monitoring of access points and mobile units.

AirBEAM® Smart Client. AirBEAM® Smart Client is part of Zebra's AirBEAM® suite, which also includes AirBEAM® Safe and AirBEAM® Manager. The AirBEAM® Smart Client system uses the network accessible host server to store software files that are to be downloaded to the mobile computers. The AirBEAM® Smart Client provides the mobile computers with the "smarts" to request software from the host. It allows them to request, download and install software, as well as to upload files and status data. The AirBEAM® Smart Client uses the industry standard FTP or TFTP file transfer protocols to check the host system for updates, and if necessary, to transfer updated software. Most often, AirBEAM® Smart Client is used with wireless networks, but any TCP/IP connection can be used. For more information, refer to the AirBEAM® Smart Windows® CE Client Product Reference Guide (p/n 72-63060-xx).

AP. See **Access Point**.

Aperture. The opening in an optical system defined by a lens or baffle that establishes the field of view.

ASCII. American Standard Code for Information Interchange. A 7 bit-plus-parity code representing 128 letters, numerals, punctuation marks and control characters. It is a standard data transmission code in the U.S.

B

Bar Code. A pattern of variable-width bars and spaces which represents numeric or alphanumeric data in machine-readable form. The general format of a bar code symbol consists of a leading margin, start character, data or message character, check character (if any), stop character, and trailing margin. Within this framework, each recognizable symbology uses its own unique format. See **Symbology**.

Bar Code Density. The number of characters represented per unit of measurement (e.g., characters per inch).

Bar Height. The dimension of a bar measured perpendicular to the bar width.

Bar Width. Thickness of a bar measured from the edge closest to the symbol start character to the trailing edge of the same bar.

Bit. Binary digit. One bit is the basic unit of binary information. Generally, eight consecutive bits compose one byte of data. The pattern of 0 and 1 values within the byte determines its meaning.

Bits per Second (bps). Bits transmitted or received.

bps. See **Bits Per Second**.

Byte. On an addressable boundary, eight adjacent binary digits (0 and 1) combined in a pattern to represent a specific character or numeric value. Bits are numbered from the right, 0 through 7, with bit 0 the low-order bit. One byte in memory is used to store one ASCII character.

boot or boot-up. The process a computer goes through when it starts. During boot-up, the computer can run self-diagnostic tests and configure hardware and software.

C

CDRH. Center for Devices and Radiological Health. A federal agency responsible for regulating laser product safety. This agency specifies various laser operation classes based on power output during operation.

CDRH Class 1. This is the lowest power CDRH laser classification. This class is considered intrinsically safe, even if all laser output were directed into the eye's pupil. There are no special operating procedures for this class.

CDRH Class 2. No additional software mechanisms are needed to conform to this limit. Laser operation in this class poses no danger for unintentional direct human exposure.

Character. A pattern of bars and spaces which either directly represents data or indicates a control function, such as a number, letter, punctuation mark, or communications control contained in a message.

Character Set. Those characters available for encoding in a particular bar code symbology.

Check Digit. A digit used to verify a correct symbol decode. The scanner inserts the decoded data into an arithmetic formula and checks that the resulting number matches the encoded check digit. Check digits are required for UPC but are optional for other symbologies. Using check digits decreases the chance of substitution errors when a symbol is decoded.

Codabar. A discrete self-checking code with a character set consisting of digits 0 to 9 and six additional characters: (“-”, “\$”, “.”, “/”, “,”, and “+”).

Code 128. A high density symbology which allows the controller to encode all 128 ASCII characters without adding extra symbol elements.

Code 3 of 9 (Code 39). A versatile and widely used alphanumeric bar code symbology with a set of 43 character types, including all uppercase letters, numerals from 0 to 9 and 7 special characters (“-”, “.”, “/”, “+”, “%”, “\$” and space). The code name is derived from the fact that 3 of 9 elements representing a character are wide, while the remaining 6 are narrow.

Code 93. An industrial symbology compatible with Code 39 but offering a full character ASCII set and a higher coding density than Code 39.

Cold Boot. A cold boot restarts the mobile computer and erases all user stored records and entries.

COM port. Communication port; ports are identified by number, e.g., COM1, COM2.

Cradle. A cradle is used for charging the terminal battery and for communicating with a host computer, and provides a storage place for the terminal when not in use.

D

Dead Zone. An area within a scanner's field of view, in which specular reflection may prevent a successful decode.

Decode. To recognize a bar code symbology (e.g., UPC/EAN) and then analyze the content of the specific bar code scanned.

Decode Algorithm. A decoding scheme that converts pulse widths into data representation of the letters or numbers encoded within a bar code symbol.

Decryption. Decryption is the decoding and unscrambling of received encrypted data. Also see, **Encryption** and **Key**.

Depth of Field. The range between minimum and maximum distances at which a scanner can read a symbol with a certain minimum element width.

Discrete 2 of 5. A binary bar code symbology representing each character by a group of five bars, two of which are wide. The location of wide bars in the group determines which character is encoded; spaces are insignificant. Only numeric characters (0 to 9) and START/STOP characters may be encoded.

E

EAN. European Article Number. This European/International version of the UPC provides its own coding format and symbology standards. Element dimensions are specified metrically. EAN is used primarily in retail.

EMDK. Enterprise Mobility Developer's Kit.

ESD. Electro-Static Discharge

ESN. Electronic Serial Number. The unique hardware number associated with a cellular device, which is transmitted to the system when the device communicates with the cellular system.

Ethernet. Ethernet communication port. Allows a wired interface to a radio network.

F

Flash Memory. Flash memory is responsible for storing the system firmware and is non-volatile. If the system power is interrupted the data is not be lost.

FTP. See **File Transfer Protocol**.

G

Gateway Address. An IP address for a network gateway or router. A mobile computer may be part of a subnet as specified by its IP address and Netmask. It can send packets directly to any node on the same subnet. If the destination node is on a different subnet, then the terminal sends the packet to the gateway first. The gateway determines how to route the packet to the destination subnet. This field is an option used by networks that require gateways.

H

Hard Reset. See **Cold Boot**.

Hz. Hertz; A unit of frequency equal to one cycle per second.

Host Computer. A computer that serves other terminals in a network, providing such services as computation, database access, supervisory programs and network control.

I

IEC. International Electrotechnical Commission. This international agency regulates laser safety by specifying various laser operation classes based on power output during operation.

IEC (825) Class 1. This is the lowest power IEC laser classification. Conformity is ensured through a software restriction of 120 seconds of laser operation within any 1000 second window and an automatic laser shutdown if the scanner's oscillating mirror fails.

Interleaved 2 of 5. A binary bar code symbology representing character pairs in groups of five bars and five interleaved spaces. Interleaving provides for greater information density. The location of wide elements (bar/spaces) within each group determines which characters are encoded. This continuous code type uses no intercharacter spaces. Only numeric (0 to 9) and START/STOP characters may be encoded.

imaging scanning . Mobile computers with an integrated imager use digital camera technology to take a digital picture of a bar code, store the resulting image in memory and execute state-of-the-art software decoding algorithms to extract the data from the image.

Intercharacter Gap. The space between two adjacent bar code characters in a discrete code.

Interleaved Bar Code. A bar code in which characters are paired together, using bars to represent the first character and the intervening spaces to represent the second.

Interleaved 2 of 5. A binary bar code symbology representing character pairs in groups of five bars and five interleaved spaces. Interleaving provides for greater information density. The location of wide elements (bar/spaces) within each group determines which characters are encoded. This continuous code type uses no intercharacter spaces. Only numeric (0 to 9) and START/STOP characters may be encoded.

IP. Internet Protocol. The IP part of the TCP/IP communications protocol. IP implements the network layer (layer 3) of the protocol, which contains a network address and is used to route a message to a different network or subnetwork. IP accepts “packets” from the layer 4 transport protocol (TCP or UDP), adds its own header to it and delivers a “datagram” to the layer 2 data link protocol. It may also break the packet into fragments to support the maximum transmission unit (MTU) of the network.

IP Address. (Internet Protocol address) The address of a computer attached to an IP network. Every client and server station must have a unique IP address. A 32-bit address used by a computer on a IP network. Client workstations have either a permanent address or one that is dynamically assigned to them each session. IP addresses are written as four sets of numbers separated by periods; for example, 204.171.64.2.

L

LAN. Local area network. A radio network that supports data communication within a local area, such as within a warehouse of building.

laser scanner. A type of bar code reader that uses a beam of laser light.

LASER. Light Amplification by Stimulated Emission of Radiation. The laser is an intense light source. Light from a laser is all the same frequency, unlike the output of an incandescent bulb. Laser light is typically coherent and has a high energy density.

Laser Diode. A gallium-arsenide semiconductor type of laser connected to a power source to generate a laser beam. This laser type is a compact source of coherent light.

LED Indicator. A semiconductor diode (LED - Light Emitting Diode) used as an indicator, often in digital displays. The semiconductor uses applied voltage to produce light of a certain frequency determined by the semiconductor's particular chemical composition.

M

MC. Mobile Computer.

MIL. 1 mil = 1 thousandth of an inch.

MIN. Mobile Identification Number. The unique account number associated with a cellular device. It is broadcast by the cellular device when accessing the cellular system.

Mobile Computer. In this text, mobile computer refers to the Zebra handheld computer. It can be set up to run as a stand-alone device, or it can be set up to communicate with a network, using wireless radio technology.

N

Nominal. The exact (or ideal) intended value for a specified parameter. Tolerances are specified as positive and negative deviations from this value.

Nominal Size. Standard size for a bar code symbol. Most UPC/EAN codes are used over a range of magnifications (e.g., from 0.80 to 2.00 of nominal).

P

Parameter. A variable that can have different values assigned to it.

Percent Decode. The average probability that a single scan of a bar code would result in a successful decode. In a well-designed bar code scanning system, that probability should approach near 100%.

Q

Quiet Zone. A clear space, containing no dark marks, which precedes the start character of a bar code symbol and follows the stop character.

R

RAM. Random Access Memory. Data in RAM can be accessed in random order, and quickly written and read.

Reflectance. Amount of light returned from an illuminated surface.

Resolution. The narrowest element dimension which is distinguished by a particular reading device or printed with a particular device or method.

RF. Radio Frequency.

ROM. Read-Only Memory. Data stored in ROM cannot be changed or removed.

Router. A device that connects networks and supports the required protocols for packet filtering. Routers are typically used to extend the range of cabling and to organize the topology of a network into subnets. See **Subnet**.

RS232. An Electronic Industries Association (EIA) standard that defines the connector, connector pins, and signals used to transfer data serially from one device to another.

S

Scan Area. Area intended to contain a symbol.

Scanner. An electronic device used to scan bar code symbols and produce a digitized pattern that corresponds to the bars and spaces of the symbol. Its three main components are:

1. Light source (laser or photoelectric cell) - illuminates a bar code.
2. Photodetector - registers the difference in reflected light (more light reflected from spaces).
3. Signal conditioning circuit - transforms optical detector output into a digitized bar pattern.

Scanning Mode. The scanner is energized, programmed and ready to read a bar code.

Scanning Sequence. A method of programming or configuring parameters for a bar code reading system by scanning bar code menus.

SDK. Software Development Kit

Shared Key. Shared Key authentication is an algorithm where both the AP and the MU share an authentication key.

SID. System Identification code. An identifier issued by the FCC for each market. It is also broadcast by the cellular carriers to allow cellular devices to distinguish between the home and roaming service.

Soft Reset. See **Warm Boot**.

Space. The lighter element of a bar code formed by the background between bars.

Specular Reflection. The mirror-like direct reflection of light from a surface, which can cause difficulty decoding a bar code.

Start/Stop Character. A pattern of bars and spaces that provides the scanner with start and stop reading instructions and scanning direction. The start and stop characters are normally to the left and right margins of a horizontal code.

Subnet. A subset of nodes on a network that are serviced by the same router. See **Router**.

Subnet Mask. A 32-bit number used to separate the network and host sections of an IP address. A custom subnet mask subdivides an IP network into smaller subsections. The mask is a binary pattern that is matched up with the IP address to turn part of the host ID address field into a field for subnets. Default is often 255.255.255.0.

Substrate. A foundation material on which a substance or image is placed.

Symbol. A scannable unit that encodes data within the conventions of a certain symbology, usually including start/stop characters, quiet zones, data characters and check characters.

Symbol Aspect Ratio. The ratio of symbol height to symbol width.

Symbol Height. The distance between the outside edges of the quiet zones of the first row and the last row.

Symbol Length. Length of symbol measured from the beginning of the quiet zone (margin) adjacent to the start character to the end of the quiet zone (margin) adjacent to a stop character.

Symbology. The structural rules and conventions for representing data within a particular bar code type (e.g. UPC/EAN, Code 39, PDF417, etc.).

T

Tolerance. Allowable deviation from the nominal bar or space width.

U

UPC. Universal Product Code. A relatively complex numeric symbology. Each character consists of two bars and two spaces, each of which is any of four widths. The standard symbology for retail food packages in the United States.

V

Visible Laser Diode (VLD). A solid state device which produces visible laser light.

W

WAN. Wide-Area Network. A radio network that supports data communication beyond a local area. That is, information can be sent across a city, state, or even nationwide.

Warm Boot. A warm boot restarts the mobile computer by closing all running programs. All data that is not saved to flash memory is lost.

Wireless Local Area Network (WLAN). See LAN.

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