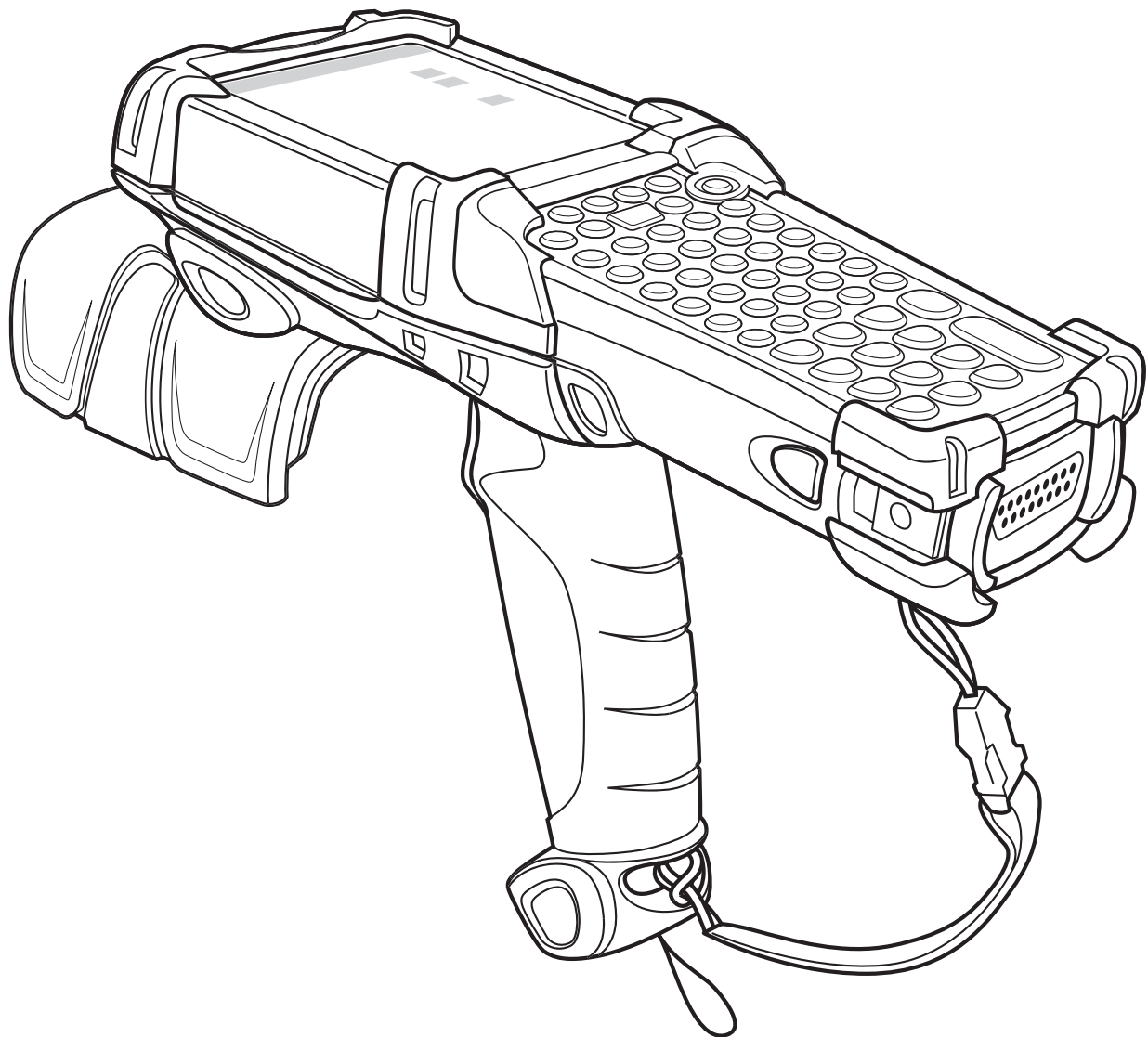




# MC9090-G RFID Mobile

## RFID Integrator Guide Supplement





***MC9090-G RFID Integrator Guide Supplement***

*72E-89963-04*

*Rev A*

*September 2008*

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## Patents

This product is covered by one or more of the patents listed on the web site: <http://www.symbol.com/patents>

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## Revision History

Changes to the original manual are listed below:

Change	Date	Description
-01 Rev A	12/2006	Initial Release
-02 Rev A	3/2008	Added Laser Scanner Updated Wireless Section Updated Applications Section
-03 Rev A	5/2008	Updated Program Tag settings Added Duty Cycle Paramameters
-04 Rev A	9/2008	Added ETSI EN302-208 Tx-Channels Window



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# About This Guide

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## Introduction

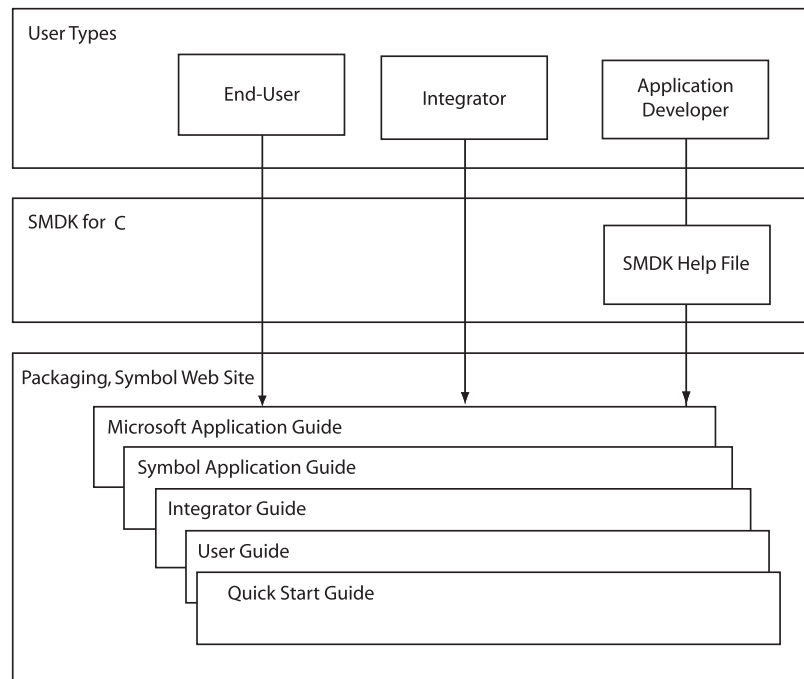
This MC9090-G RFID Integrator Guide Supplement provides the unique set up and configuration procedures for the MC9090-G RFID mobile computers and accessories. This guide is intended as a supplement to the *MC909X Integrator Guide, P/N: 72E-72216-xx*. Procedures common to the MC909X series of products are referenced to the *MC909X Integrator Guide*.

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

## Documentation Set

The documentation set for the MC9090-G RFID reader is divided into guides that provide information for specific user needs.

- **Microsoft Application Guide** - describes how to use Microsoft developed applications.
- **Symbol Application Guide** - describes how to use Motorola developed applications.
- **MC909X User Guide** - describes how to use the MC909X mobile computers.
- **MC9090-G RFID User Guide Supplement** - describes how to use the MC9090-G RFID mobile computer.
- **MC909X Integrator Guide** - describes how to set up the MC909X mobile computers and the accessories.
- **MC9090-G RFID Integrator Guide Supplement** - describes how to set up the MC9090-G RFID mobile computer and the accessories.
- **SMDK Help File** - provides API information for writing applications.



## Configurations

This guide covers the following configurations:

Configuration	Radios	Display	Memory	Data Capture	Operating System	Keypad
MC9090-G RFID	WLAN: 802.11a/b/g WPAN: Bluetooth	Color	64 MB RAM 128 MB Flash	Laser Scan Imager RFID	Windows Mobile 5.0	53-key RFID

## Chapter Descriptions

Topics covered in this guide are as follows:

- [Chapter 1, Getting Started](#), provides information on charging the RFID reader battery and resetting.
- [Chapter 2, Accessories](#), describes the accessories available for the RFID reader and how to set up power connections and battery charging capabilities, where applicable.
- [Chapter 3, Application Deployment for Mobile 5.0](#), describes features available in Windows Mobile 5.0.
- [Chapter 4, RFID Demo Application](#), describes how application developers can use the RFID Demo application.
- [Chapter 5, GeminiRFID Demo Application](#), describes how application developers can use the Gemini RFID Sample application.
- [Chapter 6, SymbolRoam](#), describes how to use the *SymbolRoam* application to change operating regions.
- [Chapter 7, Maintenance & Troubleshooting](#), includes instructions on cleaning and storing the RFID reader, and provides troubleshooting solutions for potential problems during RFID reader operation.
- [Chapter A, Technical Specifications](#), includes the technical specifications for the RFID reader.

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## Notational Conventions

The following conventions are used in this document:

- “RFID Reader”, “reader” or “mobile computer” refers to the Motorola MC9090-G RFID reader.
- *Italics* are used to highlight the following:
  - Chapters and sections in this guide
  - Related documents
- **Bold** text is used to highlight the following:
  - Dialog box, window and screen names
  - Drop-down list and list box names
  - Check box and radio button names
  - Icons on a screen
  - 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 documents provide more information about the MC9090-G RFID reader.

- *MC9090-G RFID Quick Start Guide, p/n 72-89960-xx*
- *MC9090-G RFID Windows® Mobile® 5.0 Regulatory Guide, p/n 72-89961-xx*
- *MC9090-G RFID User Guide Supplement, p/n 72E-79962-xx*
- *MC909X User Guide, p/n 72E-72215-xx*
- *MC909X Integrator Guide, p/n 72E-72216-xx*
- *Symbol Application Guide for Symbol Devices, p/n 72E-68901-xx*
- *Microsoft Applications for Mobile and WinCE 5.0 User Guide, p/n 72E-78456-xx*
- *Symbol Mobility Developer Kit (SMDK) Help File, p/n 72E-38880-03*
- *Symbol Mobility Developer Kit for .NET*, available at: <http://support.symbol.com>
- *Symbol Mobility Developer Kit for C*, available at: <http://support.symbol.com>
- ActiveSync software, available at: <http://www.microsoft.com>.

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

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## Service Information

If an equipment problem occurs, contact the appropriate regional Support Center for contact information. Before calling, locate the model number and serial number.

Call the Support Center from a phone near the scanning equipment so that the service person can try to talk through the problem. If the equipment is found to be working properly and the problem is symbol readability, the Support Center will request samples of bar codes for analysis at our plant.

If the problem cannot be solved over the phone, the equipment may need to be returned for servicing. If that is necessary, specific directions will be provided.

✓ **NOTE** Motorola 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.

## Support Information

For service information, warranty information or technical assistance contact or call the Support Center. Contact information is provided on the Motorola contact web site go to: <http://www.support.symbol.com>.

If the Motorola product was purchased from a Motorola Business Partner, contact that Business Partner for service.

# Chapter 1 Getting Started

---

## Introduction

This chapter lists the accessories for the MC9090-G RFID mobile computer and explains how to install and charge the batteries, replace the strap and start the mobile computer for the first time.

- ✓ **NOTE** This MC9090-G RFID Integrator Guide Supplement is intended as a supplement to the MC909X Integrator Guide, P/N: 72E-72216-xx. Procedures common to the MC909X series of products are referenced to the MC909X Integrator Guide.

## MC909X Integrator Guide

The MC909X Integrator Guide, P/N: 72E-72216-xx provides the following support information applicable to the MC9090-G RFID mobile computer:

- **Accessories**; describes the accessories available for the mobile computers and how to set up power connections and battery charging capabilities, where applicable.
- **ActiveSync**; provides instructions on installing ActiveSync and setting up a partnership between the mobile computer and a host computer.
- **Wireless Applications**; provides instructions using and configuring the mobile computer on a wireless network.
- **Wireless Applications**; describes how to configure the WLAN wireless connection.
- **Rapid Deployment Client**; explains how to use the Rapid Deployment Client to facilitate software downloads to the mobile computer from a Mobility Services Platform (MSP) Console FTP server.
- **AirBEAM Client**; explains how to set up the mobile computer to synchronize with a server using the AirBEAM® Client and AirBEAM Staging applications.
- **Application Deployment for Windows Mobile**; provides instructions for installing the SMDK for C and SMDK for .NET on the host computer and downloading software and files to the mobile computer.
- **Maintenance & Troubleshooting**; includes instructions on cleaning and storing the mobile computer, and provides troubleshooting solutions for potential problems during mobile computer operation.

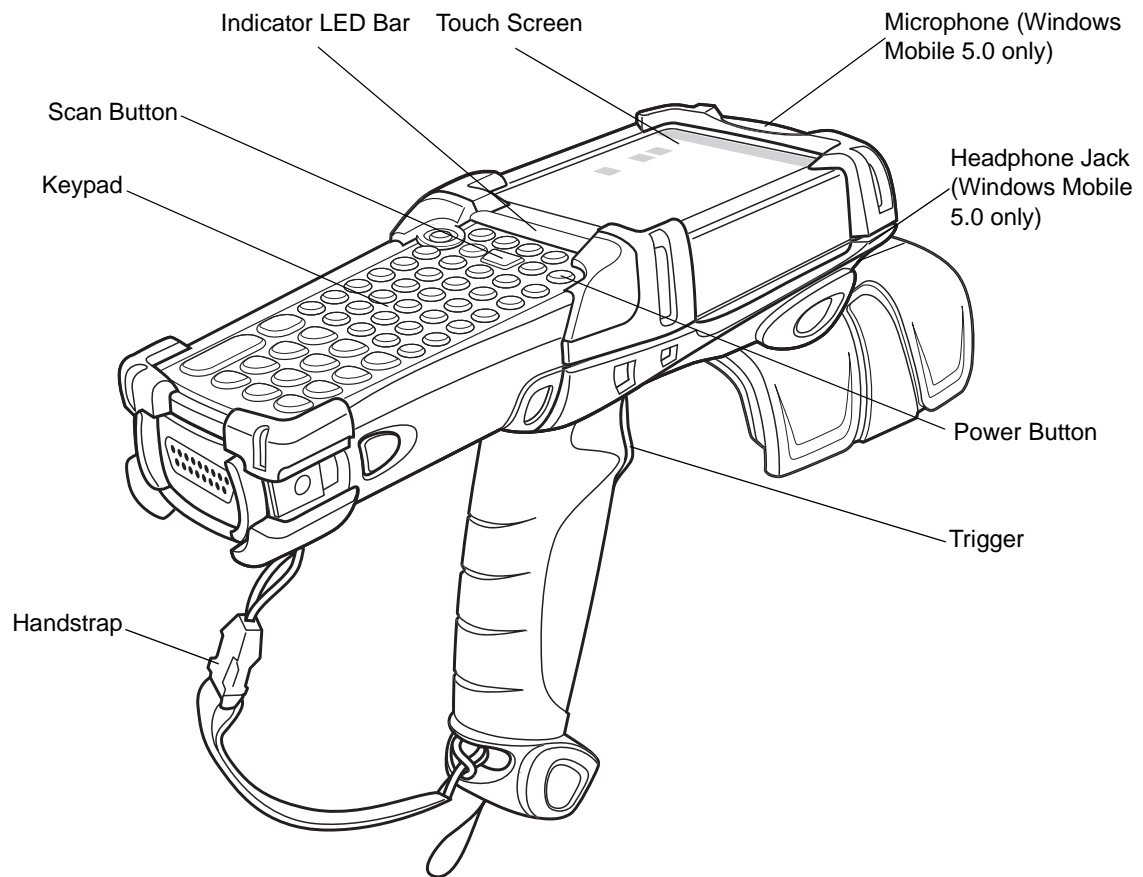
## Unpacking the Mobile Computer

Carefully remove all protective material from around the mobile computer and save the shipping container for later storage and shipping.

Verify that all equipment listed below was received:

- Mobile computer
- Lithium-ion battery
- Strap, attached to the mobile computer
- Stylus, in the stylus silo
- Regulatory Guide
- Quick Start Guide (poster)

Inspect the equipment for damage. If any equipment is missing or damaged, contact the Symbol Technologies Support Center immediately. See [page xii](#) for contact information.



**Figure 1-1** MC9090-G RFID Mobile Computer



## Accessories

[Table 1-1](#) lists the accessories available for the MC9090-G RFID.

**Table 1-1** MC9090-G RFID Accessories

Accessory	Description
Cable Adapter Module (CAM)	Snap-on required to connect the following cables to the mobile computer. <ul style="list-style-type: none"> <li>• AC line cord (country-specific) and power supply, charges the mobile computer.</li> <li>• Auto charge cable, charges the mobile computer using a vehicle's cigarette lighter.</li> <li>• DEX cable, connects the mobile computer to a vending machine.</li> <li>• Serial cable, adds serial communication capabilities.</li> <li>• USB cable, adds USB communication capabilities.</li> <li>• Printer cable, adds printer communication capabilities.</li> </ul>
Four Slot Charge Only Cradle	Charges the mobile computer main battery.
Four Slot Ethernet Cradle	Charges the mobile computer main battery and synchronizes the mobile computer with a host computer through an Ethernet connection.
Four Slot Spare Battery Charger	Charges up to four mobile computer spare batteries.
Magnetic Stripe Reader (MSR)	Snaps on to the mobile computer and adds magstripe read capabilities.
Modem Module	Enables data communication between the mobile computer and a host computer, remotely through the phone lines, and synchronizes information between the mobile computer and a host computer.
Multimedia Card (MMC)	Provides secondary non-volatile storage.
Single Slot Serial/USB Cradle	Charges the mobile computer main battery and a spare battery. It also synchronizes the mobile computer with a host computer through either a serial or a USB connection.
Software	<i>Symbol Mobility Developer Kits</i> available at: <a href="http://support.symbol.com">http://support.symbol.com</a> .
Spare lithium-ion battery	Replacement battery.
Stylus	Performs pen functions.
Universal Battery Charger Adapter	Adapts the UBC for use with the Series 9000 batteries.
Wall Mounting Bracket and Shelf Slide	Use for wall mounting applications.

---

## Getting Started

In order to start using the mobile computer for the first time:

- Install the main battery
- Charge the main battery and backup battery
- Start the mobile computer
- Configure the mobile computer

The main battery can be charged before or after it is installed. 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 installed in the mobile computer.

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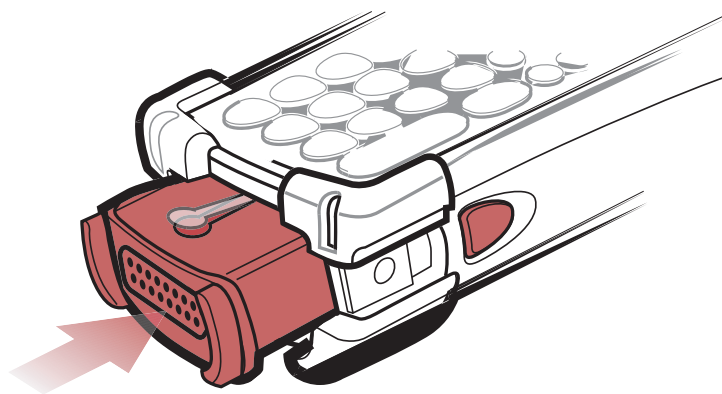
## Installing and Removing the Main Battery

### Installing the Main Battery

Before using the mobile computer, install a lithium-ion battery by sliding the battery into the mobile computer as shown in [Figure 1-2](#).

- ✓ **NOTE** Ensure the battery is fully inserted. Two audible clicks can be heard as the battery is fully inserted. A partially inserted battery may result in unintentional data loss.

When a battery is fully inserted in a mobile computer for the first time, upon the mobile computer's first power up, the device boots and powers on automatically.



**Figure 1-2** *Installing the Main Battery*

---

## Charging the Battery

### Charging the Main Battery and Memory Backup Battery

Before using the mobile computer for the first time, charge the main battery until the amber charge indicator light remains lit (see [Table 1-2 on page 1-6](#) for charge status indications). Charge time is less than four hours. The mobile computer can be charged using a cradle, the CAM with a charging cable, or the MSR with the appropriate power supply.

The mobile computer is equipped with a memory backup battery which automatically charges from the fully-charged main battery. When the mobile computer is used for the first time, the backup battery requires approximately 15 hours to fully charge. This is also true any time the backup battery is discharged, which occurs when the main battery is removed for several hours. The backup battery retains data in memory for at least 30 minutes when the mobile computer's main battery is removed. When the mobile computer 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.

Use the following to charge batteries:

- Cradles: The mobile computer slips into the cradles for charging the battery in the mobile computer (and spare batteries, where applicable).
  - Single Slot Serial/USB Cradle.
  - Four Slot Ethernet Cradle and Four Slot Charge Only Cradles.
- Accessories: The mobile computer's snap-on accessories provide charging capability, when used with one of the accessory charging cables.
  - CAM
  - MSR.
- Chargers: The mobile computer's spare battery charging accessories are used to charge batteries that are removed from the mobile computer.
  - Single Slot Serial/USB Cradle
  - Four Slot Spare Battery Charger
  - Universal Battery Charger (UBC).

✓ **NOTE** To achieve the best battery life in mobile computers with multiple radios, turn off the radios that are not being used. This can be accomplished via the SetDevicePower() API (refer to the SMDK Help File for Symbol Mobile Computers) or via the Control Panel application (tap **Start > 9000 Demo > Ctl Panel** icon).

## Charging the Main Battery

Charge the main battery in the mobile computer using a cradle, the CAM with a charging cable, or the MSR with the appropriate power supply.

1. Ensure the accessory used to charge the main battery is connected to the appropriate power source (see [Chapter 2, Accessories](#) for setup information).
2. Insert the mobile computer into a cradle or attach the appropriate snap-on module.
3. The mobile computer starts to charge automatically. The amber charge LED, in the Indicator LED Bar, lights to show the charge status. See [Table 1-2](#) for charging indications.

The main battery usually fully charges in less than four hours.

**Table 1-2** *Mobile Computer LED Charge Indicators*

LED	Indication
Off	Mobile computer not in cradle or the mobile computer is not attached to the CAM or MSR. Mobile computer not placed 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.

---

## Charging Spare Batteries

Use the following three accessories to charge spare batteries:

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

To charge a spare battery:

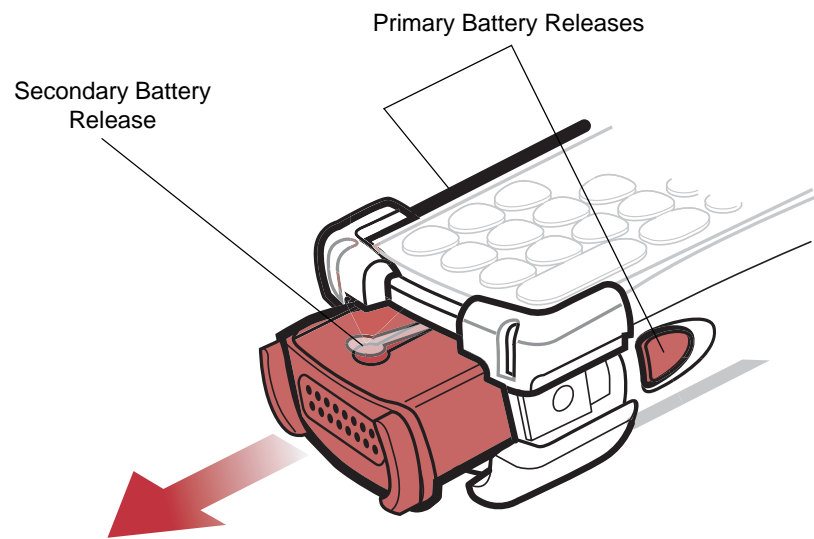
1. Ensure the accessory used to charge the spare battery is connected to the appropriate power source (see [Chapter 2, Accessories](#) for setup information).
2. Insert the spare battery into the accessory's spare battery charging slot with the charging contacts facing down (over the charging pins) and gently press down on the battery to ensure proper contact.
3. The battery starts to charge automatically. The amber charge LED on the accessory lights to show the charge status. See [Chapter 2, Accessories](#) for charging indications for the accessory.

The battery usually fully charges in less than four hours.

## Removing the Main Battery

To remove the main battery:

1. Prior to removing the battery, press the red **Power** button to place the mobile computer in the suspend mode.
2. Simultaneously press both primary battery releases. The battery partially ejects from the mobile computer.
3. Pause 3-4 seconds while the mobile computer performs battery removal shutdown.
4. Press the secondary battery release, on top of the battery, and slide the battery out of the mobile computer.



**Figure 1-3** Removing the Main Battery

---

## Starting the Mobile Computer

Press the red **Power** button to turn on the mobile computer. If the mobile computer does not power on, perform a cold boot. See [Performing a Cold Boot on page 1-9](#).

- ✓ **NOTE** When a battery is fully inserted in a mobile computer for the first time, upon the first power up, the device boots and powers on automatically.

When the mobile computer is powered on for the first time, it initializes its system. The *Symbol* splash screen ([Figure 1-4](#)) appears for a short period of time.



Figure 1-4 *Symbol Splash Window*

---

## Calibrating the Screen

To calibrate the screen so the cursor on the touch screen aligns with the tip of the stylus:

1. Using the stylus carefully press and briefly hold the tip of stylus on the center of each target that appears on the screen.

- ✓ **NOTE** To re-calibrate the screen at anytime, press the blue **FUNC** and **ESC** keys on the mobile computer to launch the calibration screen application.

2. Repeat as the target moves around the screen or press **ESC** to cancel.

---

## Checking Battery Status

To check whether the main battery or backup battery in the mobile computer is charged, tap *Start - Settings - System Tab - Power* icon to display the *Battery Status* window.

To save battery power, set the mobile computer to turn off after a specified number of minutes.

---

## Configuring the Mobile Computer

- To customize the mobile computer settings, refer to the *Microsoft Applications for Symbol Devices User Guide*.
- To set up ActiveSync to synchronize the mobile computer with the host computer, see the MC909X Integrator Guide, P/N: 72E-72216-xx.
- To configure the mobile computer for WLAN network, see the MC909X Integrator Guide, P/N: 72E-72216-xx.
- To configure the mobile computer using the Rapid Deployment Client, see the MC909X Integrator Guide, P/N: 72E-72216-xx.
- To set up AirBEAM to synchronize the mobile computer with the host server, see the MC909X Integrator Guide, P/N: 72E-72216-xx.
- To install development software on the development PC, see [Chapter 3, Application Deployment for Mobile 5.0](#) and see the MC909X Integrator Guide, P/N: 72E-72216-xx.

---

## Resetting the Mobile Computer

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.

A cold boot also restarts the mobile computer, but erases all stored records and entries in RAM. Data saved in flash memory or a memory card is not lost. In addition it returns formats, preferences and other settings to the factory default settings.

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

Hold down the **Power** button for approximately five seconds. As soon as the mobile computer starts to perform a warm boot release the **Power** button.

### Performing a Cold Boot

A cold boot restarts the mobile computer and erases all user stored records and entries that are not saved in flash memory (Application and Platform folders) or a memory card. *Never perform a cold boot unless a warm boot does not solve the problem.*



**CAUTION** Do not hold down any key, button or the trigger, other than the **Power** button during a reset. Performing a cold boot restores formats, preferences and other settings to the default settings.



**NOTE** Any data previously synchronized with a computer can be restored during the next ActiveSync operation.

**Perform a Cold Boot:**

1. Press the primary battery release on the mobile computer to partially eject the battery from the mobile computer.
2. On an MC9090-G, while the battery is partially released, simultaneously press and release the trigger and the **Power** button.
3. Push the battery to fully re-insert it in the mobile computer. One audible click can be heard as the battery is fully inserted.
4. The mobile computer initializes.

**Performing a Clean Boot**

**CAUTION** A clean boot should only be performed by an authorized system administrator.

The mobile computer must be connected to AC power during a clean boot. Removing AC power from the mobile computer during a clean boot may render the mobile computer inoperable.

A clean boot resets the mobile computer to the factory default settings. All data in the **Application** folder is retained. The Clean Boot Package file must be downloaded from the Symbol Support Central and installed on the mobile computer before performing a clean boot.

To perform a clean boot:

1. Download the Clean Boot Package from the Symbol Support Central. Follow the instructions included in the package for installing the package onto the mobile computer.
2. Press the primary battery release on the mobile computer to partially eject the battery from the mobile computer.
3. While the battery is partially released, simultaneously press and release the trigger and the **Power** button.



**NOTE** After the battery is inserted, the trigger or left scan button must be pressed within two seconds.

4. Push the battery to fully insert it in the mobile computer. One audible click can be heard as the battery is fully inserted.
5. Press and hold the trigger.
6. Connect the mobile computer to AC power using the CAM or insert the mobile computer into a powered cradle.
7. The mobile computer updates and then re-boots.
8. The calibration screen appears.



---

## Battery Management

### Battery Saving Tips

- Leave the mobile computer connected to AC power at all times when not in use.
- Set the mobile computer to turn off after a short period of non-use.
- Set the display and keyboard backlight to turn off after a short period of non-use.
- Turn off all wireless radio activity when not in use.
- Power off the mobile computer when charging to charge at a faster rate.

---

## Changing the Power Settings

To set the mobile computer to turn off after a short period of non-use:

1. On devices with Windows Mobile 5.0, tap **Start > Settings > System tab > Power icon > Advanced tab**.
2. Select the **On battery power: Turn off device if not used for:** check box and select a value from the drop-down list box.
3. Tap **OK**.

---

## Changing the Display Backlight Settings

To change the display backlight settings in order to conserve more battery power:

1. On devices with Windows Mobile 5.0, tap **Start > Settings > System tab > Backlight icon > Battery Power tab**.
2. Select the **On battery power: Disable backlight if not used for:** check box and select a value from the drop-down list box.
3. Tap the **Brightness tab**.
4. Tap the **Disable backlight** check box to completely turn off the display backlight.
5. Use the slider to set the brightness of the backlight. Set it to a low value to save battery power.
6. Tap **OK**.

---

## Changing the Keypad Backlight Settings

To change the keypad backlight settings in order to conserve more battery power:

1. On devices with Windows Mobile 5.0, tap **Start** > **Settings** > **System** tab > **Keylight** icon > **Battery Power** tab.
2. Select the **On battery power: Disable keylight if not used for:** check box and select a value from the drop-down list box.
3. Tap the **Advanced** tab.
4. Tap the **Disable keylight** check box to completely turn off the display backlight.
5. Tap **OK**.

---

## Turning the Radios Off

### WLAN Radio on Windows Mobile 5.0

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



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



The *MC909X Integrator Guide, P/N: 72E-72216-xx* provides the wireless applications support information applicable to the MC9090-G RFID mobile computer.

### Bluetooth and WAN Radios on Windows Mobile 5.0

✓ **NOTE** The Flight Mode feature only turns off the WAN and Bluetooth radios. The WLAN radio must be turned off separately.

To turn off the Bluetooth and WAN radios:

Tap the **Connectivity** icon  (on non-WAN devices) or the **Antenna/Signal** icon  (on WAN devices) and select **Turn On Flight Mode**.

To turn off the Bluetooth and WAN radios, tap the **Connectivity** icon  (on non-WAN devices) or the **Antenna/Signal** icon  (on WAN devices) and select **Turn On Flight Mode**.

The *MC909X User Guide, P/N: 72E-72215-xx* provides the Bluetooth support information applicable to the MC9090-G RFID mobile computer.

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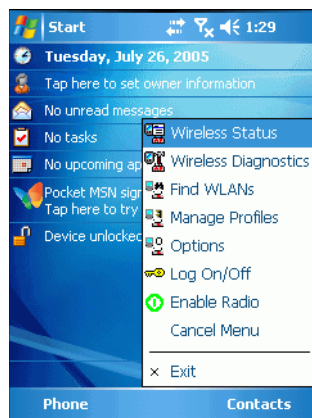
## Wireless Applications

Wireless Local Area Networks (WLANs) allow mobile computers to communicate wirelessly and send captured data to a host device in real time. Before using the mobile computer on a WLAN, the facility must be set up with the required hardware to run the wireless LAN and the mobile computer must be configured. Refer to the documentation provided with the access points (APs) for instructions on setting up the hardware.

To configure the mobile computer, a set of wireless applications provide the tools to configure and test the wireless radio in the mobile computer. The **Wireless Application** menu on the task tray provides the following wireless applications:

- Wireless Status
- Wireless Diagnostics
- Find WLANs
- Manage Profiles
- Options
- Enable/Disable Radio
- Log On/Off

Tap the **Signal Strength** icon to display the **Wireless Applications** menu.



**Figure 1-5** *Wireless Applications Menu*

The *MC909X Integrator Guide, P/N: 72E-72216-xx* provides the wireless applications support information applicable to the MC9090-G RFID mobile computer.

---

## ActiveSync

To communicate with various host devices, install Microsoft ActiveSync (version 4.1 or higher) on the host computer. Use ActiveSync to synchronize information on the mobile computer with information on the host computer. Changes made on the mobile computer or host computer appear in both places after synchronization.

ActiveSync software:

- Allows working with mobile computer-compatible host applications on the host computer. ActiveSync replicates data from the mobile computer so the host application can view, enter, and modify data on the mobile computer.
- Synchronizes files between the mobile computer and host computer, converting the files to the correct format.
- Backs up the data stored on the mobile computer. Synchronization is a one-step procedure that ensures the data is always safe and up-to-date.
- Copies (rather than synchronizes) files between the mobile computer and host computer.
- Controls when synchronization occurs by selecting a synchronization mode, e.g., set to synchronize continually while the mobile computer is connected to the host computer, or set to only synchronize on command.
- Selects the types of information to synchronize and control how much data is synchronized.

The *MC909X Integrator Guide*, P/N: 72E-72216-xx provides the ActiveSync support information applicable to the MC9090-G RFID mobile computer.

# Chapter 2 Accessories

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## Introduction

The series 9000 accessories provide a wide variety of product support capabilities. Accessories include cradles, keypads, Magnetic Stripe Reader (MSR) and Cable Adapter Module (CAM) snap-on, four slot spare battery charger, headphone, Multimedia Card (MMC), Secure Device (SD) card, Universal Battery Charger (UBC) adapter, wall mounting bracket and shelf slide.

## Keypads

The mobile computer has interchangeable modular keypads. However, only the *53-Key RFID* keypad can be used with the MC9090-G RFID mobile computer. The modular keypad can be changed in the field as necessary. The *MC909X Integrator Guide, P/N: 72E-72216-xx* provides the keypad support information applicable to the MC9090-G RFID mobile computer:

- 53-key RFID keypad

## Cradles

The *MC909X Integrator Guide, P/N: 72E-72216-xx* provides the cradle support information applicable to the MC9090-G RFID mobile computer:

- Single Slot Serial/USB cradle charges the mobile computer main battery and a spare battery. It also synchronizes the mobile computer with a host computer through either a serial or a USB connection.
- Four Slot Charge Only cradle charges the mobile computer main battery.
- Four Slot Ethernet cradle charges the mobile computer main battery and synchronizes the mobile computer with a host computer through an Ethernet connection.

## Miscellaneous

The *MC909X Integrator Guide, P/N: 72E-72216-xx* provides the miscellaneous support information applicable to the MC9090-G RFID mobile computer:

- Four Slot Spare Battery Charger charges up to four mobile computer spare batteries.
- Headphone can be used in noisy environments.
- Modem Module enables data communication between the mobile computer and a host computer, remotely through the phone lines, and synchronizes information between the mobile computer and a host computer.
- Multimedia Card (MMC) provides secondary non-volatile storage. (An SD card may also be used.)
- UBC adapter adapts the UBC for use with the MC9000 batteries.
- Wall Mounting Bracket and Shelf Slide can be used for wall mounting applications.

## Snap-on Modules

The *MC909X Integrator Guide, P/N: 72E-72216-xx* provides the snap-on module support information applicable to the MC9090-G RFID mobile computer:

- MSR connects on to the mobile computer and adds magstripe read capabilities.
- CAM connects on to the mobile computer and is used to connect cables to the mobile computer.

Both of the snap-on modules use the cables listed below:

- AC line cord (country-specific) and power supply, charges the mobile computer.
- Auto charge cable, charges the mobile computer using a vehicle cigarette lighter.
- DEX cable, connects the mobile computer to a vending machine.
- Serial cable, adds serial communication capabilities.
- USB cable, adds USB communication capabilities.
- Printer cable, adds printer communication capabilities.

---

## Keypad

The mobile computer has a modular keypad. The modular keypad can be removed in the field as necessary. Keypad removal is required to replace the MMC card.

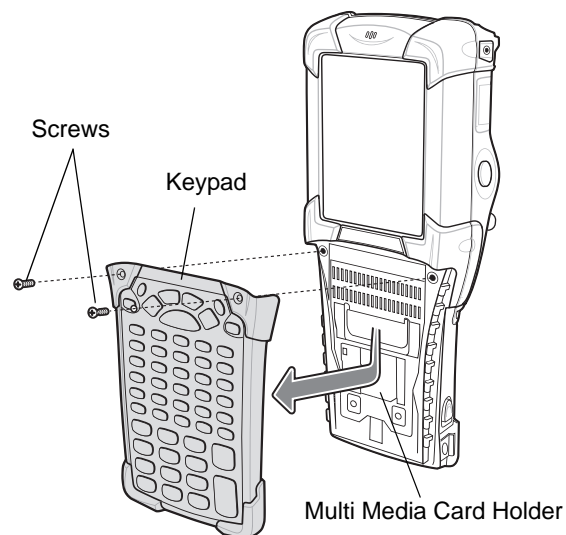


**CAUTION** Do not remove the keypad while the mobile computer is on and do not operate the mobile computer with the keypad detached. Follow proper Electro-Static Discharge (ESD) precautions to avoid damaging the MMC and SD card. Proper ESD precautions include, but are not limited to, working on an ESD mat and ensuring that the operator is properly grounded.

MC909X keypads are not interchangeable with MC9090-G RFID keypad.

### Keypad Removal

1. Press the **Power** button to suspend the mobile computer.
2. Remove the two keypad screws. Slide the keypad down and lift up.

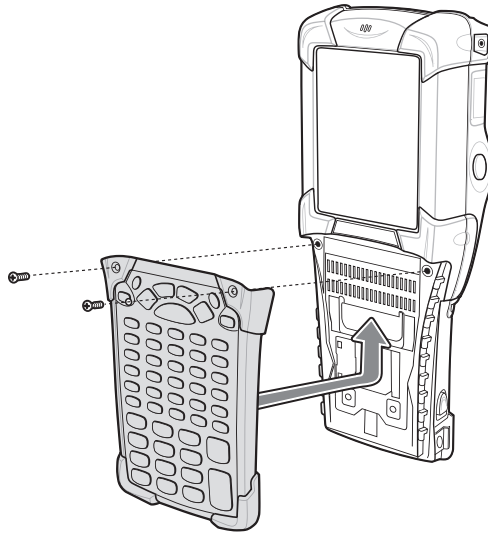


**Figure 2-1** *Removing the Keypad*



**CAUTION** Do not apply more than 4 in-lbs of torque when tightening the keypad screws.

3. Replace the keypad and re-attach using the two screws.



**Figure 2-2** *Installing the Keypad*

4. Perform a cold boot (see [Performing a Cold Boot on page 1-9](#)).

---

## Multi Media Card (MMC) / Secure Device (SD) Card

The MMC provides secondary non-volatile storage. The MMC is located under the keypad (see [Figure 2-1 on page 2-3](#)).



**NOTE** SD cards are inter-operable with MMC cards and can also be used in MC9090-G RFID mobile computers.

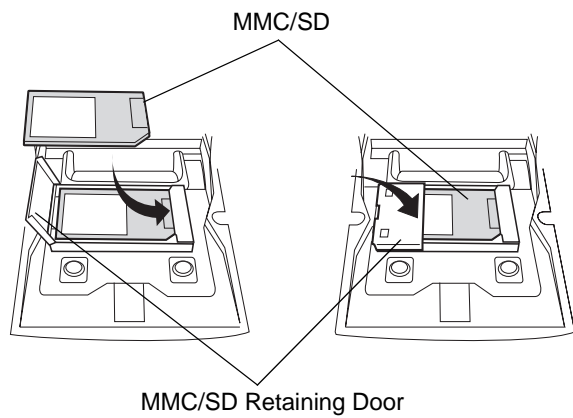


**CAUTION** Do not remove the keypad while the mobile computer is on and do not operate the mobile computer with the keypad detached. Follow proper ESD precautions to avoid damaging the MMC/SD. Proper ESD precautions include, but are not limited to, working on an ESD mat and ensuring that the operator is properly grounded.

To insert the MMC/SD card:

1. Press the **Power** button to suspend the mobile computer.
2. Remove the two keypad screws and slide the keypad down and lift off (see [Figure 2-1 on page 2-3](#)).
3. Lift the MMC/SD retaining door.
4. Position the MMC/SD card, with the contacts down, into the MMC/SD holder. The MMC/SD card corner notch fits into the holder only one way.
5. Snap the retaining door closed.





**Figure 2-3** *Inserting the MMC/SD*



**CAUTION** Do not apply more than 4 in-lbs of torque when tightening the keypad screws.

6. Replace the keypad and re-attach using the two screws (see [Figure 2-2 on page 2-4](#)).



# Chapter 3 Application Deployment for Mobile 5.0

---

## Introduction

This chapter describes features available in Windows Mobile 5.0 including new security features, how to package applications, and procedures for deploying applications onto the mobile computer. The *MC909X Integrator Guide, P/N: 72E-72216-xx* provides the detailed information on these topics.

---

## Security

The mobile computers implement a set of security policies that determine whether an application is allowed to run and, if allowed, with what level of trust. The security configuration of the device must be available to develop an application, as well as the ability to sign an application with the appropriate certificate to allow the application to run (and to run with the needed level of trust). The *MC909X Integrator Guide, P/N: 72E-72216-xx* provides the security support information applicable to the MC9090-G RFID mobile computer. Information on the following topics is provided:

- Application Security
- Digital Signatures
- Device Management Security
- Remote API Security

---

## Packaging

Packaging combines an application executable files into a single file, called a package. This makes it easier to deploy and install an application to the mobile computer. Package new applications and updates, such as new DLL files, as CAB files, then deploy them to Windows Mobile 5.0 devices. Refer to the *Microsoft Windows Mobile 5.0 Help* file for information on CAB files.

---

## Deployment

To install applications onto the mobile computer, developers package the application and all required files into a CAB file, then load the file onto the mobile computer using one of the following options:

- Microsoft ActiveSync 4.1 or greater
- Storage Card
- AirBEAM
- Image Update (for updating the operating system).

Refer to the *Microsoft Windows Mobile 5.0 Help* file for information on CAB files.

The *MC909X Integrator Guide, P/N: 72E-72216-xx* provides the deployment support information applicable to the MC9090-G RFID mobile computer. Information on the following topics is provided:

- Installation Using ActiveSync
- Installation Using Storage Card
- Installation Using AirBEAM
- Image Update
- Creating a Splash Screen

---

## XML Provisioning

To configure the settings on a mobile computer XML provisioning should be used. To install an XML provisioning file on the mobile computer, create a Cabinet Provisioning File (CPF) file. A CPF file is similar to a CAB file and contains just one file: `_setup.xml`. Like a CAB file, the CPF extension is associated with `WCELoad.EXE`. Opening a CPF extracts the XML code and uses it to provision and configure the mobile computer. The user receives an e-mail notification indicating success or failure.

XML Provisioning provides the ability to configure various features of the mobile computer (i.e., registry and file system). However, some settings require security privileges. To change registry settings via a CPF file, certain privileges (roles) are required. Some registry keys require only an *Authenticated User*, while other registry keys require a *Manager*. Refer to the Windows Mobile 5.0 Help file, *Metabase Settings for Registry Configuration Service Provider* section, for the default role settings in Windows Mobile 5.0.

For those registry settings that require the *Manager* role, the CPF file must be signed with a privileged certificate installed on the device. Refer to the *Microsoft Windows Mobile 5.0 Help* file and the *Windows Mobile 5.0 SDK* for instructions and sample test certificates.

The *MC909X Integrator Guide, P/N: 72E-72216-xx* provides the XML Provisioning support information applicable to the MC9090-G RFID mobile computer. Information on the following topics is provided:

- Creating an XML Provisioning File
- XML Provisioning vs. RegMerge and CopyFiles

---

## Storage

The *MC909X Integrator Guide, P/N: 72E-72216-xx* provides the support information applicable to the MC9090-G RFID mobile computer for the three types of file Windows Mobile 5.0 file storage. Information on the following topics is provided:

- Random Access Memory (RAM)
- Persistent Storage
- Application folder.

---

## System Configuration Manager

The System Configuration Manager (SCM) is a utility that runs on the development computer and is used to create configuration files. These files, when deployed to an mobile computer, set configuration parameters for that device. The configurable options for a mobile computer are defined in an XML file that is available on the Symbol OSS for that mobile computer. SCM is also available on Symbol OSS.

SCM eliminates the potential user errors that occur when manually editing registry settings. The *MC909X Integrator Guide, P/N: 72E-72216-xx* provides the SCM support information applicable to the MC9090-G RFID mobile computer. Information on the following topics is provided:

- File Types
- User Interface
- File Deployment

---

## Rapid Deployment Client

The Rapid Deployment (RD) Client facilitates software downloads to a mobile computer from a Mobility Services Platform (MSP) Console FTP server. The MSP Console is a web-based interface to the wireless infrastructure monitoring and management tools provided by the MSP Lite or MSP Enterprise server.

When software packages are transferred to the FTP server, the mobile computer on the wireless network can download them. The location of software packages are encoded in RD bar codes. When the mobile computer scans a bar code(s), the software package(s) is downloaded from the FTP server to the mobile computer. Multiple mobile computers can scan a single RD bar code. The *MC909X Integrator Guide, P/N: 72E-72216-xx* provides the RD support information applicable to the MC9090-G RFID mobile computer. Information on the following topics is provided:

- Rapid Deployment Window
- Scanning RD Bar Codes

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## AirBEAM Smart

The AirBEAM Smart product allows specially designed software packages to be transferred between a host server and Symbol wireless handheld devices. Before transfer, AirBEAM Smart checks and compares package versions, so that only updated packages are loaded.

AirBEAM Smart resides on radio-equipped client devices and allows them to request, download, and install software, as well as to upload files and status data. A single communications session performs both file download and upload. The ability to transfer software over a radio network can greatly reduce the logistical efforts of client software management. The *MC909X Integrator Guide, P/N: 72E-72216-xx* provides the AirBEAM Smart support information applicable to the MC9090-G RFID mobile computer. Information on the following topics is provided:

- AirBEAM Package Builder
- AirBEAM Smart Client
- Synchronizing with the Server
- AirBEAM Staging

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## Symbol Mobility Developer Kits

The Symbol Mobility Developer Kit (SMDK) family of products supports developing applications that take advantage of the capture, move and manage capabilities of the mobile computers. Go to the Symbol OSS to download the appropriate developer kit.

# Chapter 4 RFID Demo Application

---

## Introduction

Application developers can use the [RFID Demo Application on page 4-2](#) for an overview of how the application works and to assist in application development.



**NOTE** The screens and windows are provided for illustration purposes only and may differ from actual screens. The applications described may not be available on (or applicable to) all devices.

Procedures are not device specific and are intended to provide a functional overview.

The *RFID Demo* application is provided for the purpose of demonstration and are not designed for production environments.

The reader has the capability to program, erase and write; Gen2 tags. The current *RFID Demo* application only provides an example for programming tags.

The *RFID Demo* is not provided with source code. However, a sample, named RFID sample, is provided in the SDK for C.

---

## RFIDDemo Application

The *RFIDDemo* application is provided as a demo application to be used by developers in developing customized production applications. The application is viewed on a host computer using a remote viewing application (not provided). The *RFIDDemo* application is provided for the purpose of demonstration and is intended to be used as-is.

Gen2 tags can be read, programmed, erased, written locked and killed. Each tag contains the EPC number (64 or 96 bits), CRC and kill code. In addition, data can be collected by decoding in-range EPC Gen2 RFID tags.



**NOTE** The reader is optimized to read only Gen 2 tags and the default setting on the *RFIDDemo* application are set to read and write only Gen2 tags.

The reader has the capability to read, program, erase, write lock and kill; Gen2 tags. The current *RFIDDemo* application only provides an example for programming tags.

When the read command is initiated, the reader interrogates all of the RFID tags within the radio frequency (RF) field of view. The reader captures data from each new tag found and adds it to the list box in the main *Tags* window. When the read command is stopped, the reader stops interrogating tags.

Perform the following procedures to setup and use the *RFIDDemo* application:

- Setup the local host computer display.  
Setup a host computer to view the MC9090-G RFID menus.
- Setup the LAN host.  
The LAN host computer must be setup to receive the tag data.
- Setup the wireless connection.  
See the MC909X Integrator Guide, P/N: 72E-72216-xx for information on setting up the wireless connection.
- Launch the *RFIDDemo* application.

## Using RFIDDemo to Read Tags From a Remote Reader

The *RFIDDemo* can reside on many CE4.2/CE5.0 and Mobile based devices including Motorola's RD5000, MC90xx readers, WIN CE based VRCs, and XR Series products.

On devices that have integrated RFID reading, the *RFIDDemo* automatically finds and connects to the integrated RFID reader. These readers include RD5000, MC90xx, and XR Series.

On devices that do not have an integrated RFID reading capability, the *RFIDDemo* must be configured to connect to the remote RFID reader using the reader IP address and port number 3000.

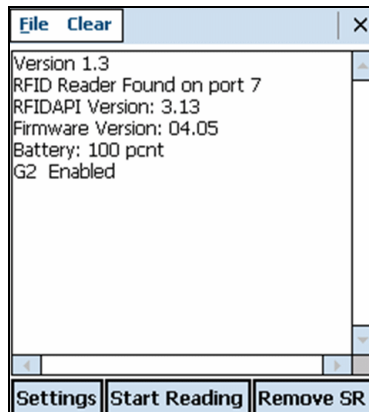
The settings screen is described in [Device Settings on page 4-5](#).



## Launching the RFIDDemo Application

From the *Main Window* double-tap the *RFIDDemo* application icon to start the *RFIDDemo* application. It also displays battery status and the air protocols supported by the device.

When the *RFIDDemo* application is launched, the *RFIDDemo Load* window displays. It displays version of RFID API, reader firmware, the air protocols and the RFID demo application.



**Figure 4-1** *RFIDDemo Load Window*

Tap the **File** button to select the file menu options. See [File Menu Options on page 4-4](#) for more information.

Tap the **Settings** button to modify the *RFIDDemo* application settings. See [Device Settings on page 4-5](#) for detailed settings information.

Tap the **Start Reading** button to initiate the tag read. See [Read Tags on page 4-16](#) for detailed information.

Tap the **Remove SR** button to remove the select record from the list. See [Tag Access Parameters on page 4-10](#) for detailed information.

## File Menu Options

The *RFIDDemo* File Menu Options include:

- About
- Device Settings
- Tag Access Parameters
- Program Tag
- Exit

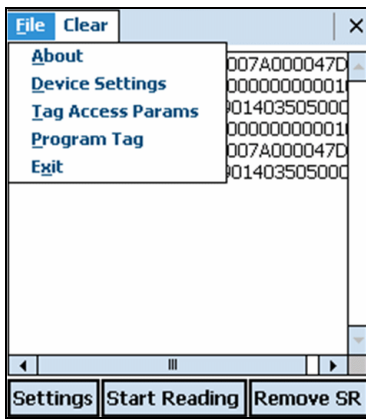


Figure 4-2 *File Menu Options Window*

## About

The About window displays the demo application version information

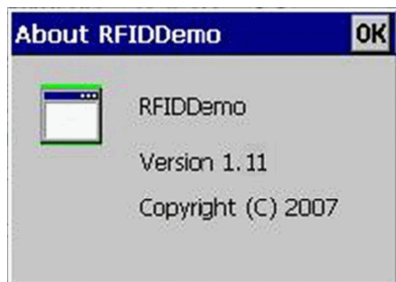
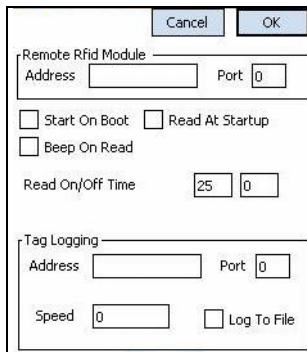


Figure 4-3 *About Window*

## Device Settings

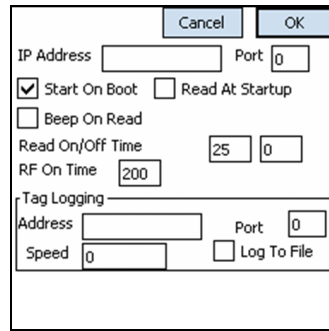
The *RFIDDemo* behavior is configurable. Tap on Settings from the *RFIDDemo Load Window on page 4-3* or from *File->Device Settings*, RFID- Settings window appears. These settings are persistent and will be restored on a device cold boot (see *Performing a Cold Boot on page 1-9*). Once the settings have been modified, exit and relaunch application to enable new settings.



The Standard Settings Window contains the following fields and options:

- Remote Rfid Module: Address [ ] Port [0]
- Start On Boot  Read At Startup
- Beep On Read
- Read On/Off Time: [25] [0]
- Tag Logging: Address [ ] Port [0]
- Speed: [0]  Log To File

Standard Settings Window



The EU Settings Window contains the following fields and options:

- IP Address [ ] Port [0]
- Start On Boot  Read At Startup
- Beep On Read
- Read On/Off Time: [25] [0]
- RF On Time: [200]
- Tag Logging: Address [ ] Port [0]
- Speed [0]  Log To File

EU Settings Window

Figure 4-4 Settings Window

### Reader Device Settings:

- **IP Address:**  
By default, the demo attempts to find a reader on the local COM ports. If the *RFIDDemo* application needs to find a reader at a specific IP Address, enter the address in the text box. It can be an IP address by name, or number (i.e. 192.168.1.1, or www.deviceaddress.com).
- **Port:**  
If the IP address is configured, configure the port as well. The default port setting is 3000.
- **Start On Boot:**  
Check to launch the *RFIDDemo* application on a warm or cold boot. When used with *Read At Startup*, the application will start on boot and read.
- **Read At Startup:**  
Check this box to have the application start reading as soon as the application is launched.
- **Beep On Read:**  
Check this box to have the device beep on every tag read.
- **Read On Time / OffTime:**  
When reading starts, it will read for *On Time* (in seconds), then pause reading for *Off Time* (in seconds).

✓ **NOTE** The *RF On Time* setting is available only on the EU configuration. It is used to comply with the EU regulatory specifications. Per the EU standards, duty cycle is set to 10%.

- RF On Time represents the RF power continuously on time, before the unit is shut down in order to meet duty cycle limit.

Range: 1 - 255; Units = 5 milliseconds.

The minimum *On* time is 5 msec and max *On* time is 1275 msec.

## Tag Logging

If Tag Logging is configured, all tags will be forwarded to the serial port, or to an IP address/port.

- *Address:*  
This can be an IP address, or COM port. If it is a COMPORT, enter "COM1:", etc... (a Bluetooth COM port can be configured here as well).
- *Port:*  
The IP Port number or the COMPORT (i.e. if Address is COM1:, put 1 here).
- *Speed:*  
This is only used for the COM port. Can be up to 115200.
- *Log To File:*  
Check this box to save all logging to a file. If an external location is not specified the log file is saved in a file named *Taglog.txt* on the reader root directory.

✓ **NOTE** The comport is currently configured for 8 bits, no parity, 1 stop bit.

## Registry Settings Description

The *RFIDDemo* registry file restores the demo settings after a cold boot (see [Performing a Cold Boot on page 1-9](#)). If this file is edited, the settings will not be implemented until a cold boot occurs. Alternatively, on some Motorola devices, the registry file can be launched. When this is done, a prompt appears asking the user to choose whether to merge these settings into the registry. The next time the demo is launched, it will use the settings in this file. Do not perform this function while the demo is running. The *Gemini\_RFID.exe* demo also uses many of these registry settings and can be used to registry settings. Do not launch the *Gemini\_RFID.exe* demo while the *RFIDDemo* is running. [Table 4-1 on page 4-7](#) provides the *RFIDDemo* registry file example.

✓ **NOTE** All DWORD values must be in hex notation.

**Table 4-1 Registry File Example**

```

. *****
;
; RFIDDemo Registry File. This file will restore the demo settings after a cold boot.
; If you edit this file, the settings will not take affect until a cold boot occurs. Alternatively,
; on some Symbol Terminals, the registry file can be launched. When this is done, you will be
; prompted whether or not you want to merge these settings into the registry. The next time the demo is
; launched, it will use the settings in this file. (Make sure you are not running the demo when you do this!!!)
; The Gemini_RFID.exe demo also uses many of these registry settings, and in fact, can be used to registry settings
; (Also, make sure RFIDDemo is not running when launching the Gemini_RFID.exe demo.)
;
;
; NOTE: ALL DWORD VALUES NEED TO BE IN HEX NOTATION.
;
. *****

[HKEY_LOCAL_MACHINE\SOFTWARE\SYMBOL\RFIDDemo]

; If 1, then beep on all tag reads. If 0, do not beep.
"RFIDDEMO_BEEPER_ENABLED"=dword:1

; If 0, the demo will read continuously.
"RFIDEMO_AUTONOMOUS_MODE_ONTIME"=dword:000061A8

; If 0, the demo will read continuously. Otherwise, it will stop for this many ms.
"RFIDEMO_AUTONOMOUS_MODE_OFFTIME"=dword:00000000

; If 1, the demo will start reading automatically after finding a RFID reader.
"RFIDEMO_READ_TAGS_ON_LAUNCH"=dword:0

; If 1, the demo will start automatically upon the next warm or cold boot of the device.
"RFIDEMO_START_APP_ON_BOOT"=dword:0

; Any number less than 16 is a com port number. Greater than 16 is a TCP/IP port number.
"RFIDEMO_LOGGING_PORT_NUMBER"=dword:00000000

; Com Port baud rate for logging tags. Not used for TCP/IP connections.
; Common baud rates are:(USE HEX) (9600 = hex 2580) (38400 = hex 9600) (115200 = hex 1C200).
"RFIDEMO_LOGGING_PORT_BAUDRATE"=dword:00000000

; Name of port where logging will occur. For COM ports, use COM1: COM2:, etc...
; For TCP/IP Ports, use valid IP address, i.e. 192.168.1.1 localhost www.mysitename.com...
"RFIDEMO_LOGGING_PORT_NAME"=""
"RFIDEMO_LOGGING_TO_FILE"="1"

; If this is set, then the demo will attempt to contact an RFID reader at this port. (3000 is BB8 in hex)
"RFIDDEMO_READER_IP_PORT"=dword:00000000

; RF OnTime
"RFIDDEMO_READER_RF_ONTIME"=dword:0000003C

```

**Table 4-1 Registry File Example (Continued)**

```

; If this is set, then the demo will attempt to contact an RFID reader at this address.
"RFIDDEMO_READER_IP_ADDRESS"=""

; Attenuation level for reading tags. 0 is full power, 255 is low power. (Use hex values 00 - FF)
"RFID_READCAP_RF_ATTENUATION"=dword:00000000

"RFID_READCAP_RF_ATTENUATION2"=dword:00000000

; Order in which to issue read commands. Antenna 0, Antenna 1, etc ...
"RFID_DEVCAP_ANTENNA_SEQUENCE"=hex:00

; Enabled types of tag to read: a 0 means disabled, 1 means enabled.
; Each byte is as follows:    C0  C1 G2
"RFID_TAGCAP_ENABLED_TYPES"=hex:00,00,00,00,01,00

; The RFIDAPI allows duty cycle control on a micro level during tag reading.
; The on time is in ms. The off time is as a percent of the total on time.
"RFID_READCAP_DUTYCYCLE_ONTIME"=dword:00000000
"RFID_READCAP_DUTYCYCLE_OFFTIME_PCNT"=dword:00000000
"RFIDDEMO_MPS_MOTION_ENABLED"=dword:00000000
"RFIDDEMO_MPS_MOTION_X_THRESHOLD"=dword:0000015E
"RFIDDEMO_MPS_MOTION_Y_THRESHOLD"=dword:0000015E
"RFIDDEMO_MPS_MOTION_Z_THRESHOLD"=dword:0000015E
"RFIDDEMO_MPS_PROX_ENABLED"=dword:00000001
"RFIDDEMO_MPS_PROX_EVENT_MASK"=dword:0000FE7F
"RFIDDEMO_MPS_PROX_POLL_TIME_MS"=dword:00000064
"RFIDDEMO_MPS_PROX_READ_THRESHOLD"=dword:00000000
"RFIDDEMO_MPS_VEL_MIN_DET_X_THRESHOLD"=dword:00000014
"RFIDDEMO_MPS_VEL_MIN_DET_Y_THRESHOLD"=dword:00000014
"RFIDDEMO_MPS_VEL_MIN_DET_Z_THRESHOLD"=dword:00000014
"RFIDDEMO_MPS_VEL_MIN_START_X_THRESHOLD"=dword:0000004B
"RFIDDEMO_MPS_VEL_MIN_START_Y_THRESHOLD"=dword:00000032
"RFIDDEMO_MPS_VEL_MIN_START_Z_THRESHOLD"=dword:00000064
"RFIDDEMO_MPS_VEL_RECAL_X_THRESHOLD"=dword:0000012C
"RFIDDEMO_MPS_VEL_RECAL_Y_THRESHOLD"=dword:0000012C
"RFIDDEMO_MPS_VEL_RECAL_Z_THRESHOLD"=dword:00000BB8
"RFIDDEMO_MPS_VEL_MISC_X_THRESHOLD"=dword:000000FA
"RFIDDEMO_MPS_VEL_MISC_Y_THRESHOLD"=dword:000007D0
"RFIDDEMO_MPS_VEL_MISC_Z_THRESHOLD"=dword:00000005
; Word Length of the tag to be read
"RFID_READCAP_WORD_LENGTH"=dword:2

; Mem Bank of the tag to be read
"RFID_DEVCAP_MEM_BANK"=dword:1

; Word offset from where to start reading.
"RFID_DEVCAP_WORD_OFFSET"=dword:1

; Attenuation level for writing tags. 0 is full power, 255 is low power. (Use hex values 00 - FF)
"RFID_WRITECAP_RF_ATTENUATION"=dword:00000000

; Order in which to issue write commands. Antenna 0, Antenna 1, etc ...
"RFID_WRITECAP_ANTENNA_SEQUENCE"=hex:00

```

**Table 4-1 Registry File Example (Continued)**

```
; SL bit of the tag to be accessed
"RFID_DEVCAP_SEL"=dword:00000000

; Session to be used for tag access
"RFID_DEVCAP_SESSION"=dword:00000000

; Starting Q for tag access operation
"RFID_DEVCAP_STARTING_Q"=dword:00000006

; Target Inventory for tag access operation
"RFID_DEVCAP_TARGET_INVENTORY"=dword:00000000

; Write options
"RFID_DEVCAP_WRITE_OPTIONS"=dword:00000001

; Action to be performed on add select record
"RFID_DEVCAP_SEL_ACTION"=dword:00000000

; Select Session to change inventory bit
"RFID_DEVCAP_SEL_TARGET"=dword:00000004

; Select index of Select record to be removed
"RFID_DEVCAP_SEL_INDEX"=dword:00000000

; Mem bank to be locked
"RFID_DEVCAP_LOCK_MEM_BANK"=dword:00000001

; Lock options
"RFID_DEVCAP_LOCK_OPTIONS"=dword:00000003

; Tag Mask Memory
"RFID_DEVCAP_TAG_MASK_MEM"=dword:00000001

; Tag Mask
"RFID_DEVCAP_TAG_MASK"=dword:0002CD10

; Tag Mask header nInit
"RFID_DEVCAP_TAG_MASK_HEADER_NINIT"=dword:00000417

; Tag Mask header StructureFormat
"RFID_DEVCAP_TAG_MASK_HEADER_STRUCTURE_FORMAT"=dword:00000000

; Tag Mask header StructureSize
"RFID_DEVCAP_TAG_MASK_HEADER_STRUCTURE_SIZE"=dword:000000A4

; EPC Mask Bit Length
"RFID_DEVCAP_EPC_MASK_BIT_LEN"=dword:00000000

; Tag Mask Bit Len
"RFID_DEVCAP_TAG_MASK_BIT_LEN"=dword:00000000

; Tag Mask Offset
"RFID_DEVCAP_TAG_MASK_OFFSET"=dword:00000010
```

---

## Tag Access Parameters

The *RFIDDemo* behavior is configurable. Tap on Settings from the *RFIDDemo Load Window on page 4-3* or from *File->Tag Access Params*, RFID- Tag Access Params window appears.

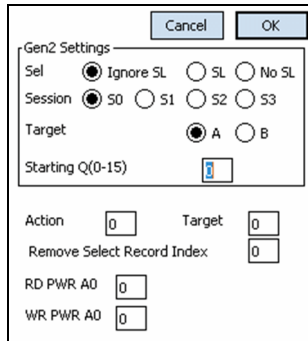


Figure 4-5 Settings Window

### Reader Tag Access Parameters Settings:

- **Sel:**
  - Ignore SL:* All tags can be inventoried; ignore the tag SL (select flag).
  - SL:* Only inventory tags with SL is set.
  - No SL:* Only inventory tags with SL flag is not SET.
- **Session:**
  - S0: Use session S0 for inventory.
  - S1: Use session S1 for inventory.
  - S2: Use session S2 for inventory.
  - S3: Use session S3 for inventory.
- **Target:**
  - A: Only inventory Tags with inventoried bit set to A for Session.
  - B: Only inventory Tags with inventoried bit set to B for Session.
- **Starting Q(0-15):**

Sets the number of slots ( $=2^Q$ ) in the first Inventory Round of the Inventory Algorithm. A larger starting Q should be selected for a larger expected number of tags ( $Q = 4$  is the recommended starting point). The RFID engine firmware will dynamically adjust the Q value as needed.

Table 4-2 Select Record Settings

Action	Matching	Non-Matching
0x00	assert SL; inventoried->A	deassert SL; inventoried->B
0x01	assert SL; inventoried->A	do nothing
0x02	do nothing	deassert SL; inventoried->B
0x03	negate SL; A->B, B->A	assert SL; inventoried->A
0x04	deassert SL; inventoried->B	assert SL; inventoried->A
0x05	deassert SL; inventoried->B	do nothing
0x06	do nothing	assert SL; inventoried->A
0x07	do nothing	negate SL; A->B, B->A



- Target
  - 0x00: Modify Session S0 inventoried flag.
  - 0x01: Modify Session S1 inventoried flag.
  - 0x02: Modify Session S2 inventoried flag.
  - 0x03: Modify Session S3 inventoried flag.
  - 0x04: Modify SL flag.
- Remove Select Record Index
  - Index of the select record to be removed from the list. This value is taken when remove select record command is given from the main page.
- RD PWR A0
  - Antenna power for read operation.

18	252
19	231
20	210
21	189
22	168
23	147
24	126
25	105
26	84
27	63
28	42
29	21
30	0
- WR PWR A
  - Antenna power for write operation. Above table used for conversion.

## Program Tag

Tap *File->Program Tag*, RFID- Program Tag window appears.

The screenshot shows the 'Program Tag' window with the following elements:

- Radio buttons for memory bank selection:  Tag ID,  TID,  User,  Reserved.
- Check box for PC:  PC.
- Input fields for 'User Offset' (value 0) and 'Length' (value 0).
- A 'Data' input field.
- 'Lock' and 'Kill' buttons, each with an adjacent input field.
- 'Lock Options', 'Write', and 'Read' buttons.
- 'EPC Mask' input field.
- 'Tag Mask' and 'Mask Offset' input fields.
- 'Mask bank' dropdown menu (value 1) and 'Mask Offset' input field (value 0).
- 'Cancel' and 'OK' buttons.

Figure 4-6 Program Tag Window

### Reader Program Tag Settings:

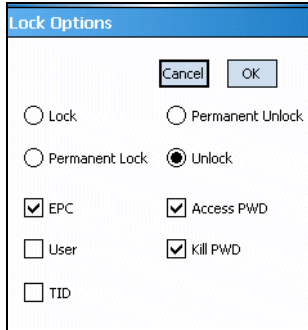
- *Reserved*: Reserved memory bank access operation
- *EPC*: EPC memory bank access operation
- *TID*: TID memory bank access operation
- *PC*: Select the check box to display the PC field data along with Tag ID
- *User*: User memory bank access operation
- *User Offset*:  
A16-bit word address at which to start reading/writing. Does not hold good for EPC read as EPC read always returns contents of the complete memory bank.
- *Length*: Number of 16-bit words to read.
- *Data*: Tag Write data is provided.
- *Lock*:  
Tap **Lock** to send the lock command to the tag. If a valid (non zeros) access password is stored in the tag, then the access password is required to lock the tag.
- *Kill*:  
Tap **Kill** to permanently kill the tag. To kill a tag, a valid kill code has to be stored in the tag and kill code is required to kill the tag
- *Read*:  
Tap **Read** to send the read command to the tag. If the tag is locked with valid (non zeros) access password stored in the tag, then password access is required to read the reserved memory bank. Other memory banks can be read without supplying access password.
- *Write button*:  
Tap **Write** to send the write command to the tag. If the tag is locked with valid (non zeros) access password, then password access is required to write to the tag.
- *EPC Mask*:

If bits of EPC ID are given in this field and Mask bank is selected as 1 i.e EPC, then select record is added for the tag with EPC ID given in the Mask field with the Select Record Settings in the *Tag Access Params* Dialog.

- ✓ **NOTE** When the read tag in the list box is selected, it automatically appears in the Mask field.
- *Tag Mask:*  
If select record is to be added to a memory bank other than EPC, then the memory bank bits for which select record is being added are provided here.
  - *Mask bank:*  
Mask bank The bank for which select record is to be added  
0x01: EPC  
0x02: TID  
0x03: User
- ✓ **NOTE** Select Records added remains valid if the user goes from this window to the main window. After that if the Select record settings are changed from the "Tag Access Params", select record command is sent with the new settings before any access command. If the user gives "Start Reading" command from the main page before coming to the program page or tag access page, add select record command is sent with the previous values of Action and Target and tag mask length as 0, where 0 implies all tags match.
- *Mask Offset*  
The Mask Offset is the memory word address used for adding select record.

## Lock Options

To select Lock Options tap *File->Lock Options*. The RFID- Lock Options window appears.



**Figure 4-7** *Lock Options Window*

The Lock Options provide the option of locking/unlocking all or individual memory banks. In the reserved memory bank, access password and kill password can be locked or unlocked separately.

In lock command there are various options which can be selected in this dialog box.

### Reader Lock Option Settings:

- *Lock*  
Tag is locked and tag access requires a valid access password.
- *Unlock*  
Tag is unlocked and tag access requires a valid access password. A tag locked by the Lock option can be unlocked by this unlock command.
- *Permanent Unlock*  
The tag is permanently unlocked. It can never be locked again. All other access operations are possible.
- *Permanent Lock*  
The tag is permanently locked. It can never be unlocked again. Tag write is not possible on this tag.

## Tag Locking

Tag locking is a two step process:

- Write the tag access password (see [Figure on page 4-12](#))
- Lock the tag (see [Figure on page 4-14](#))

### To write the access password first enter the access password of the tag:

1. Read the tag.
2. Click on the tag, it appear in the *EPC Mask* field.The tag is now selected for operations.
3. Write the access password for the tag:
  - Select the *Reserved* memory bank as the target memory bank.
  - In the *Data* field write 32 bits of access password (e.g.: 22222222 in the *Data field*.)
  - Select *User Offset* as 2 (this is in words) of access password.
4. The following entries should be on the screen:
  - *Reserved* memory bank should be selected
  - *User Offset* field
  - *Data field*, this is the access password
  - *EPC Mask* field, the tag to write to
5. Click on *Write*.
6. Once the user has been successfully able write Access password on the tag, the tag can be locked.

### To Lock the tag

1. Read the tag.
2. Click on the tag, it appear in the *EPC Mask* field.The tag is now selected for operations
3. Enter the access password values as programmed (in the case of this example 22222222) in the field next to *Lock*.
4. Select the *EPC* memory bank as the target memory bank to lock the EPC ID field.
5. Select the *Lock options*, e.g.: EPC bank and Lock or permanently lock.
6. The following entries should be on the screen:
  - *EPC* memory bank should be selected
  - *EPC Mask* field, has the tag to write to
  - *Lock*, this has the Lock password
  - *Lock Options* have been configured
7. Click on *Lock*
8. Tag is now locked.

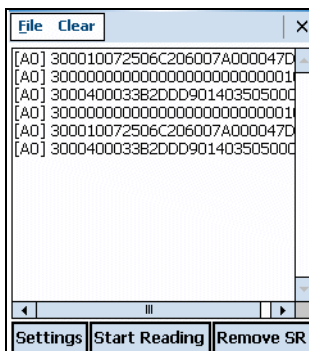
**To write to a locked tag**

1. Read the tag.
2. Click on the tag, it appears in *EPC Mask* field. The tag is now selected for operations.
3. Select the *EPC* memory bank as the target memory bank (since the EPC ID field is locked in this example).
4. In the *Data* field write the new 96 bit EPC ID.
5. Select *User Offset* as 2 (in words) *EPC* memory bank.
6. Enter the access password (in the case of this example 22222222) in the field next to *Lock*.
7. The following should be entered on the screen:
  - *EPC* memory bank is selected.
  - *EPC Mask* field, the tag to write to
  - *Lock*, this has the Lock password
  - *User Offset* field
  - *Data field*, this is the new tag ID
8. Click on *Write*

**Read Tags**

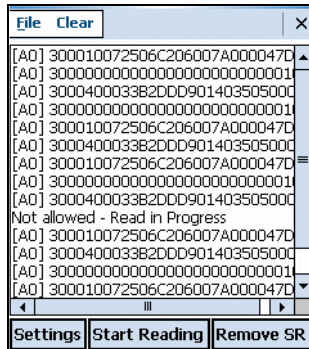
Tap the **Start Reading** button, the unit starts to read tags. As the tags are read the values are displayed on the *RFID - Read Window*.

- ✓ **NOTE** If the PC check box is selected (see [Figure 4-6 on page 4-12](#)) then the tag data is displayed along with PC field.



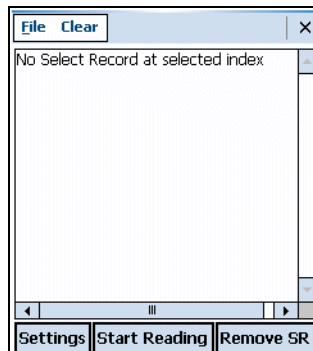
**Figure 4-8** *RFID - Read Window*

Tap the **Remove SR** button and the select record is removed from the list. This command is not accepted when read is going on. If command is given while read is in progress the following message appears in the *RFID - Read Window*. or the record is removed, success is displayed in the *RFID - Read Window*.



**Figure 4-9** *RFID - Read Window*

If no select record is found at the given index, then following error message is displayed in the *RFID - Read Window*. The Index to remove select record is provided in the tag access page.



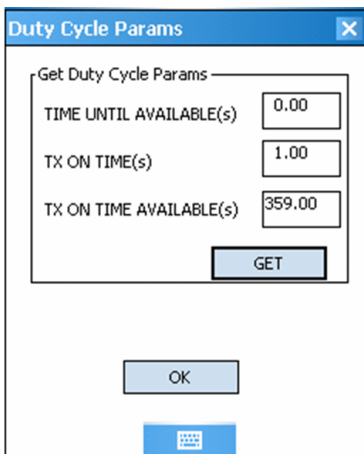
**Figure 4-10** *RFID - Read Window*

## Duty Cycle Paramameters

- ✓ **NOTE** Only the European versions of the MC9090-G RFID, working on specification EN300.220 have the *Duty Cycle Params* window. Per the ETSI regulations a reader that operating in compliance with this specification will not transmit more than 10% of the duty cycle.

The Duty Cycle Interval is set to one hour. The Duty Cycle Params window displays the current duty cycle parameter statistics that are calculated using the one hour Duty Cycle Interval.

Tap *File->Duty Cycle Params*, the Duty Cycle Params window appears.



**Figure 4-11** *Duty Cycle Params Window*

### Duty Cycle Paramameters:

- **TIME UNTIL AVAILABLE**  
Displays the wait (in seconds) until the reader can be used again. The value is zero when the reader is available.
- **TX ON TIME**  
The amount of time (in seconds) the reader has transmitted within the duty cycle interval.
- **TX ON TIME AVAILABLE**  
The amount of time (in seconds) the reader can transmit before the duty cycle will be reached.

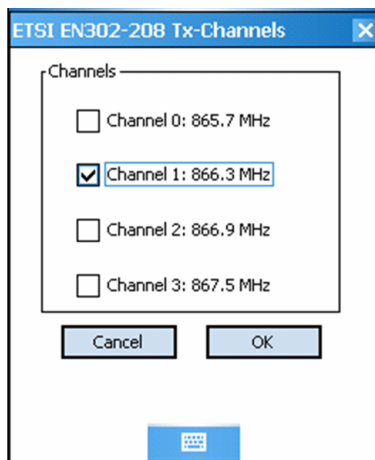


---

## ETSI EN 302-208 Tx-Channel Selection

The *ETSI EN302-208 Tx-Channels* window is only available on MC9090 EU specification EN302.208 products. A reader operating within the specification parameters may operate on any (or all) of the four available channels. By default all 4 channels will be selected. To select channel(s) select the check box as shown in [Figure 4-12](#).

Tap *File->ETSI EN302-208 Tx-Channels*, the ETSI EN302-208 Tx-Channels selection window appears.



**Figure 4-12** *ETSI EN302-208 Tx-Channels Window*

## RFIDFlash Utility (Radio Firmware Update Utility)

The *RFIDFlash* utility is the radio firmware update utility, used to update the RFID radio module firmware. To update the radio firmware, access the *RFIDFlash* utility; Tap *Start - File Explorer* to access the *File Explorer* application.



Figure 4-13 Main Windows

From main Explorer window (see [Figure 4-13](#)) click *Application - RFIDFLASH* to access the *RFIDFlash* utility. The *RFIDFlash* loader window appears (see [Figure 4-15](#)).

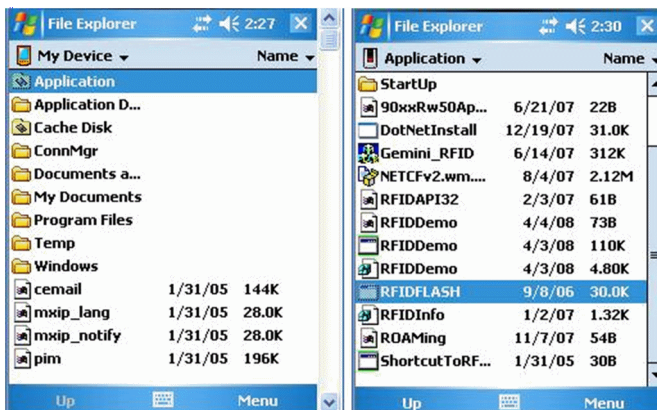
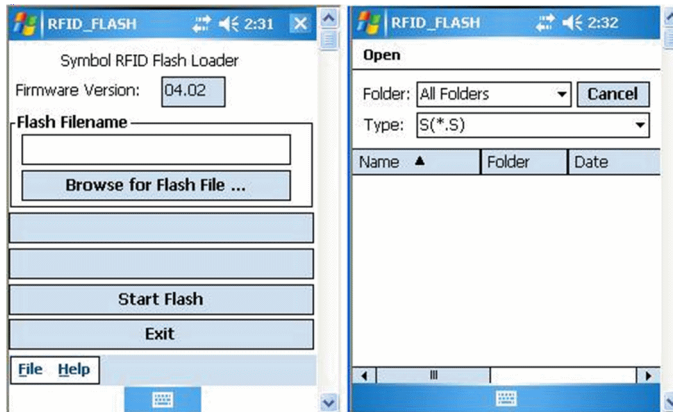


Figure 4-14 Explorer Windows

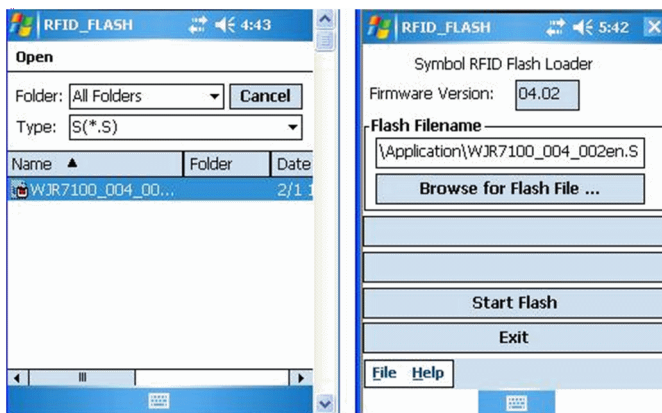
Click **Browse for Flash File** and the Select Files window appears.



**Figure 4-15** RFIDFlash Loader Windows

Scroll to the flash file and click to select, click **OK**.

The Select Files window appears



**Figure 4-16** RFIDFlash Loader Windows

Click **Start Flash** to download the flash update file.



# Chapter 5 GeminiRFID Demo Application

---

## Introduction

Application developers can use the [Launching the GeminiRFID Demo Application on page 5-3](#) for an overview of how the application works and to assist in application development.

Integrators can use the MC909X Integrator Guide, P/N: 72E-72216-xx for product settings and as an aid in the product integration. Use the utilities to change and/or set the device parameters and to test applications.

- ✓ **NOTE** The screens and windows are provided for illustration purposes only and may differ from actual screens. The applications described may not be available on (or applicable to) all devices.

Procedures are not device specific and are intended to provide a functional overview.

The *GeminiRFID Demo* application is provided for the purpose of demonstration and are not designed for production environments.

The reader has the capability to program, erase and write; Gen2 tags. The current *GeminiRFID Demo* application only provides an example for programming tags.

The *GeminiRFID Demo* is not provided with source code. However, a sample, is provided in the SMDK for C.

---

## Host Computer Display Setup

To view the system menus on a local PC use an application such as Microsoft's *Remote Display Control for Pocket PC*. For more information and the *Remote Display Control for Pocket PC* download go to <http://www.microsoft.com/downloads/> and search for *Remote Display Control for Pocket PC*. Download the application and follow the provided installation and setup procedures.

After the remote display application has been installed on the host computer, set up an ActiveSync connection between the host computer and the MC9090-G RFID reader (see the MC909X Integrator Guide, P/N: 72E-72216-xx).

Start the remote display application to access the MC9090-G RFID reader application.

---

## Using GeminiRFID Demo to Read Tags From a Remote Reader

The *GeminiRFID Demo* can reside on many CE4.2/CE5.0 and Mobile based devices including Motorola's MC909x handhelds, RD5000, WIN CE based VRCs, and XR Series products.

On devices that have integrated RFID reading, the *GeminiRFID Demo* automatically finds and connects to the integrated RFID reader. These readers include RD5000, MC90xx, and XR Series.

On devices that do not have an integrated RFID reading capability, the *GeminiRFID Demo* must be configured to connect to the remote RFID reader using the reader IP address and port number 3000.

The settings screen is described in [Settings on page 5-8](#).

---

## Using GeminiRFID Demo to Forward/Log Tags to Remote Device

By default, the *GeminiRFID Demo* will not display or log tags. The *GeminiRFID Demo* beeps each time a tag is read however. The *GeminiRFID Demo* can be configured to log tags using the following mechanisms:

Log tag reads to a file.

Writes tags to TagLog.txt

Data format:

10-04-2006, 07:29:51.63646 (000141ms), [A0] 0220064806042978260000A5

Log tag reads to the screen

Log tag reads to a either a TCP/IP address/port or serial port

TCP/IP logging

Data format:

<TAG>[A0] 0220064806042978260000A5</TAG>

Buffers up to 1024 tags when no connection available

Works with sample win32 application RFIDServer.exe on port 3535

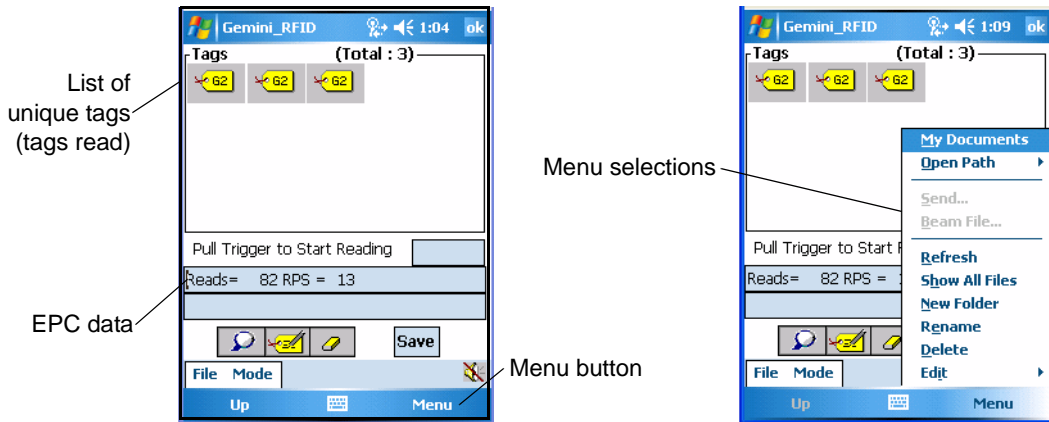
Serial port logging. (Local, or Bluetooth)

Data format:

[A0] 0220064806042978260000A5

## Launching the GeminiRFID Demo Application

To launch the GeminiRFID Demo application, tap *Start - File Explorer - Application - Gemini\_RFID* icon. When the GeminiRFID Demo application is launched, the main *Tags* window displays.



**Figure 5-1** RFID - Main Tags Window

Tap on the *File->Settings menu* option to modify the Gemini application settings. See [Settings on page 5-8](#) for detailed settings information.

**Table 5-1** Main Tags Window and Settings Window, Icons

Icon	Description
	Launches the <i>Locate Tag</i> window (see <a href="#">Locate Tag on page 5-10</a> ).
	Launches the <i>Program Tag</i> window (see <a href="#">Program Tag on page 5-11</a> ).
	Clears the tag list (see <a href="#">Clearing the Display on page 5-5</a> ).
	Saves the complete list of tags (see <a href="#">Saving Tag Data on page 5-6</a> ).
	<i>Previous</i> and <i>Next</i> buttons appear on the menu when read tags exceed the amount of tags that can fit in the tag list display. Tap  to display the previous page. Tap  to display the next page.
	<i>File</i> and <i>Mode</i> menus (see <a href="#">File Menu on page 5-6</a> and <a href="#">Mode Menu on page 5-10</a> ).
	Tap to disable/enable the sound when a tag is read.
	The <i>RFID Module Power On</i> icon (displayed next to the <i>Speaker</i> icon) indicates that the RFID radio module is powered on and attempting to read tags.
	Use the <i>Attenuation Slide Bar</i> (see <a href="#">Figure 5-5 on page 5-8</a> ) to set the power range from 0 (full power) to 255 (low power). Drag the <i>Attenuation Slide Bar</i> to optimize tag reading and to minimize interference. For closer tag use a lower setting and for further away tag use a higher setting.

## Reading Tags

When the mobile computer trigger is pressed, the mobile computer interrogates all of the tags within the radio frequency (RF) field of view. For each new tag found, the mobile computer beeps once and displays a tag icon in the main RFID *Tag* window. If the same tag is found again, the mobile computer does not beep.

When the trigger is released, the mobile computer stops interrogating tags. The total number of unique tags found displays in the *Tag* window.

To read tags:

1. Tap *Start - File Explorer - Application - Gemini\_RFID*.
2. Ensure that the mobile computer is within the RF field of view.
3. Set the RFID signal power. Use the *Attenuation* slide bar (see [Figure 5-5 on page 5-8](#)) to set a value in a range between 0 (full power) and 255 (low power).
4. Press and hold the mobile computer's trigger.
5. For each new tag found, a beep sounds one time, the Indicator LED flashes green, and a tag icon displays in the *Tag* window.

Each tag is identified by class. For example, a Gen2 tag displays in the window labeled G2.

6. Release the trigger.

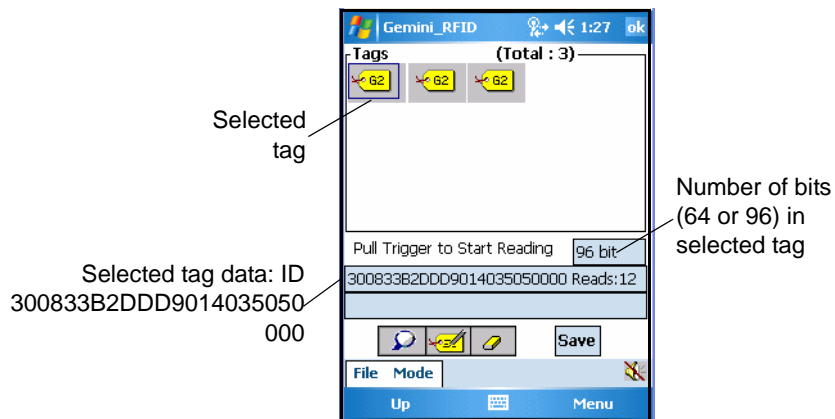


## Selecting Tags

The *Tag* window can display up to 20 tags. If more than 20 tags are found, the application allows the user to page forward and backward through the list of icons representing the tags found.


To select a tag to view the tag data:

1. Tap *Start - File Explorer - Application - Gemini\_RFID* icon.
2. Read a tag (see [Reading Tags on page 5-4](#)).
3. Select a tag icon in the *Tags* window.
4. The data contained in the tag, along with a count of how many times the selected tag was read, displays in the *Tags* window.



**Figure 5-2** RFID - Main Tags Window / Selected Tag

## Clearing the Display

To clear the tag list in the mobile computer's display, tap .

## Saving Tag Data

A list of read tags can be saved on the mobile computer. The application saves the tag list to the "My Documents" folder and names the file RFIDTaglist.csv.

The file is a .csv format (comma separated text file). This file format can be read by MS Excel, or other applications that support .csv. The sample file contains the following information.

### Time Stamp, Tag ID, Tag Type, Read Count:

2005-04-17T15:34:53-05:00,H22EEDDAEBFCCDEEE,C1,10

2005-04-17T15:34:53-05:00,H8000800428254006,C1,10

2005-04-17T15:34:57-05:00,H8000800428254124,C1,15

### The Time Stamp format is:

Year-month-dateTHour:Minute:seconds-TimezoneHourDifferential(GMT):TimezoneMinutesDifferential

### The Tag ID format is:

HTagData (H indicates the data is in hex)


### The Tag Type format is:

CX, where X is the tag class. Currently the application supports Gen2, tags.

The file can not be displayed on the mobile computer (with the factory supplied software). The file is intended to be downloaded to a host and displayed using an application that can read comma delimited fields, such as an Excel spreadsheet.

The file contains a one line header and one line for each unique tag found. The header line contains a comma separated list of field text descriptions. The tag lines contain the Tag ID starting with 'H' for hex, and a number indicating how many times the tag was read.

To save tag data:

1. Tap *Start - File Explorer - Application - Gemini\_RFID*.
2. Read a tag(s). See [Reading Tags on page 5-4](#).
3. Tap .
4. Tap **OK** to save using the default name and directory, or enter a custom name /directory and then tap **OK**.

## File Menu

Tap the *File* menu on the *Main Tags* window to view version information about RFID, log information, reboot, adjust settings, or exit the application.

## About

Tap *File - About* to view the application version number, the RFID DLL version number, the RFID reader module firmware version number, date code, and serial and port information.

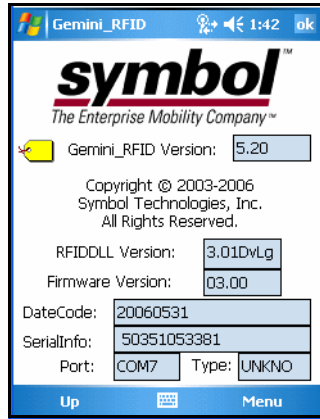


Figure 5-3 RFID - About Window

## Log

Tap *File - Log* to display the *Log* menu.

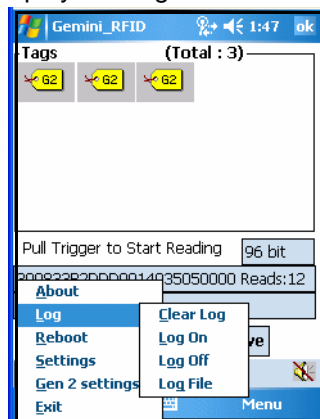


Figure 5-4 RFID - Log Menu

From the *Log* menu, tap:

- *Clear Log* to clear logged data.
- *Log On* turns on the log feature. With this feature is turned on, the display splits into two sections: upper and lower. The lower section displays all communication to the RFID radio module, including tag data.
- *Log Off* to turn off the log feature. *Log Off* is the default.
- *Log File* to create and save a log file. The log file is saved in the root directory on the mobile computer to a file named RXTXLog.txt. This file can be used to track errors reading RFID tags.

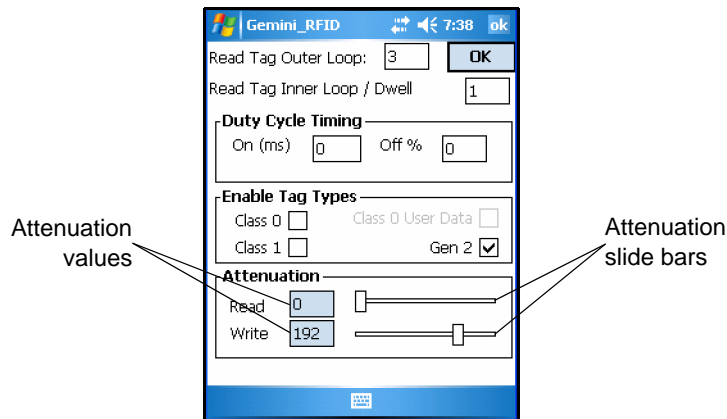
## Reboot

Tap *File - Reboot* to issue a (warm) reboot command to the RFID radio module.

✓ **NOTE** Reboot the RFID radio module only if tags are not being read.

## Settings

The *Settings* window is used to set the number of iterations to read tags. To set the class type(s) to read (Gen2 is on by default). The settings window is also used to set and test read/write power. Tap *File - Settings* to display the Settings window.



**Figure 5-5** RFID - Settings Window

To establish settings:

- Enter a number in the *Read Tag Outer Loop*: text box to set the number of outer inventory loops (iterations to read tags). Up to 255 loops are allowed. The default *Read Tag Outer Loop* setting is 5.
  - Enter a number in the *Read Tag Inner Loop / Dwell* text box to set the number of inner inventory loops (iterations to read tags). Up to 255 loops are allowed. The default *Read Tag Inner Loop* setting is 3.
- ✓ **NOTE** *Read Tag Outer Loop* and *Read Tag Inner Loop* settings attempt to read a tag for a period of time based on the parameters entered in these fields. For more information, refer to the SMDK Help file.
- Select the *Enable Gen2 Tag Reads* (default setting is to read Gen2 tags) check box to enable the mobile computer to read Gen2 tags.
  - In the Attenuation area:
    - Set the read strength by moving the *Read* attenuation slide bar to a value in a range between 0 (full read power) and 255 (low read power/off).
    - Set the write strength by moving the *Write* attenuation slide bar to a value in a range between 0 (full write power) and 255 (low write power/off).
  - Tap **OK** to exit *Settings*.
  - Tap **Read Toggle** to test the attenuation settings. When tapped, **Read Toggle** acts like the mobile computer's trigger and can be used to test tag read and write strength.

### Gen2 Operational Settings

The *Gen2 Operational Settings* window is used to configure the Gen2 tag operational parameters. Tap *File - Gen2 Settings* to display the Gen2 Operational Settings window.

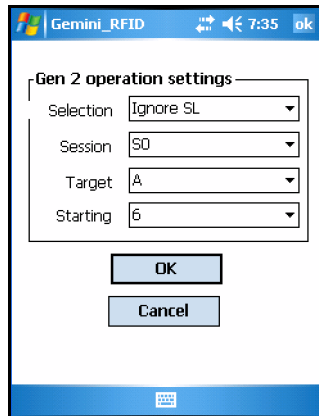


Figure 5-6 Gen2 Operational Settings Window

Table 5-2 Gen2 Operational Settings

Setting	Parameter	Description
Selection	Specifies the expected selected flag setting in the target tag population.	
	Ignore SL	Ignore the selected flag.
	SL not set	Select tags without the selected flag set.
	SL set	Select tags with the selected flag set.
Session	Specify the session used in the communication with the target tag population.	
	S0	Use session S0
	S1	Use session S1
	S2	Use session S2
	S3	Use session S3
Target	Specify the expected inventoried flag setting in the target tag population.	
	A	Select tags with the inventoried flag set to A.
	B	Select tags with the inventoried flag set to B.
Starting	Sets the number of slots in the first inventory round of the inventory algorithm.	
	0 - 15	Set the number of slots in the first inventory round of the inventory algorithm from 1 to 15.

### Exit

Tap *File - Exit* to exit the GeminiRFID Demo application.

## Mode Menu


Tap the *Mode* menu to use the Inventory method to read tags, locate a tag, program a tag, scan a bar code, or write a tag. *Mode* menu options offer all of the operations available by tapping an icon on the main *Tags* window menu bar.

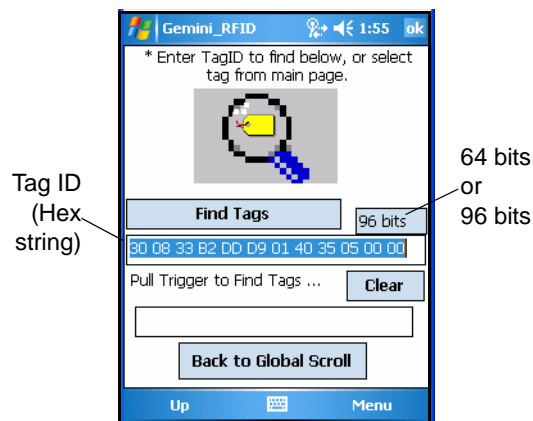
### Inventory

Tap *Mode - Inventory* to start reading tags using the *Inventory* method. Using this method, the application performs as if the trigger is pulled. Tag read attempts continue until the *Inventory* menu option is tapped again.

### Locate Tag


This option is used to find a specific tag.

1. Tap  in the main *Tags* window or tap *Mode - Locate Tag*.



**Figure 5-7** RFID - Locate Tag Window

2. Enter a valid *Tag ID* in the text box below the magnifying glass:
  - An 8-byte hex string for 64 bits
  - A 12-byte hex string for 96 bits.

✓ **NOTE** To pre-fill the text box with a valid *Tag ID*, select a tag in the main *Tags* window and tap .

3. Pull the trigger to locate the tag. The mobile computer beeps when the tag is found. The faster the beep, the closer the mobile computer is to the located tag.

*Figure 5-7* shows tag ID 80 00 80 04 23 23 84 33 was read 83 times.

4. Tap **Back to Global Scroll** to return to the main *Tags* window.


## Program Tag

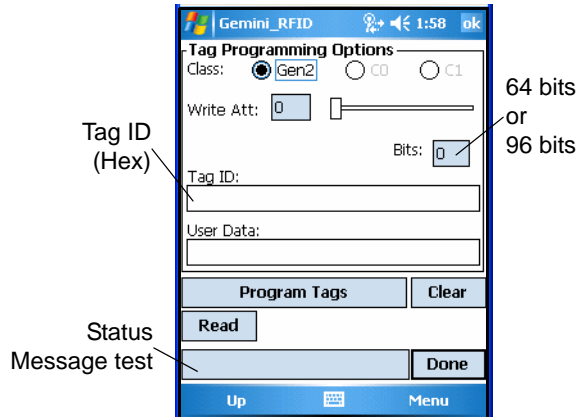
This option can be used to program Gen2 RFID tags.

Gen2 tags can be programmed, erased, locked and killed. Each tag contains 88 or 120 bits, which includes the EPC number (64 or 96 bits), CRC, and Kill Code. Locking, and killing tags requires a Kill Code which is 1 byte (8 bits) long. Since a tag has a very small Kill Code and can be thwarted with many lock/kill attempts, it shuts down after a failed attempt for an extended amount of time (possibly up to 10 hours). In addition, data can be collected by decoding in-range EPC RFID tags that beam back to the mobile computer the information they contain.

✓ **NOTE** For detailed information about programming tags, refer to the SMDK Help file.

To program RFID tags:

1. Tap  in the main *Tags* window or tap *Mode - Program Tag*.



**Figure 5-8** RFID - Tag Programming Window

2. Select the *Class: 1* radio button to program tags.
3. In the *Tag ID (Hex string)* text box below *Class:*, enter an 8-byte (64 bits) or 12-byte (96 bits) hex string to be programmed into the tag. This string can contain any number from 0-9, and a letter from A-F. Each byte must consist of 2 characters. Each byte should be separated by a space character.  
For example, if the tag should contain 80012390AAFD3617, type 80 01 23 90 AA FD 36 17 as shown in [Figure 5-8](#).
4. Set the write strength by moving the *Write Att: (attenuation)* slide bar to a value in a range between 0 (full write power) and 255 (low write power/off).
5. A password is required to lock a tag and kill a tag. In the *0x: Lock/Kill Code* text box, enter a hex lock/kill password code.

✓ **NOTE** Remember the lock/kill code. Once a tag is locked, it cannot be killed without the lock/kill code.

6. Tap **Program Tags**. It might take more than one attempt to program the tag.
7. When a tag is successfully programmed, a status message displays in the *Status Message* text box.
8. Tap **Read** to read a newly programmed tag.

✓ **NOTE** For a successful tag read, the allowable read distance from the front of the mobile computer scan exit window to the tag is 0.2 ft - 10 ft (0.061 m to 3.1 m).

9. Tap **Erase** to erase an unlocked tag.

10. Tap **Lock** to lock a tag so that it cannot be changed. A lock/kill code is required to lock a tag. See [Program Tag on page 5-11](#).

11. Tap **Kill** to make a tag unreadable. A lock/kill code is required to kill a tag. (See [Program Tag on page 5-11](#).)

12. Tap **Back to Global Scroll** to return to the main *Tags* window.

✓ **NOTE** To successfully write data to a tag, the tag must be no less than 1 ft (.31 m) from the antenna and no greater than 2 ft (.61 m) from the antenna.



# Chapter 6 SymbolRoam

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## Introduction

The *SymbolRoam* application is provided to allow users change operating regions.

- ✓ **NOTE** The *SymbolRoam* application is not provided on the EU configuration. The EU configuration is pre-set to comply with the EU regulatory specifications.

The *SymbolRoam* application is run on boot-up each time the unit is re-started.

To run the application manually, run *SymbolROAM.exe* from the path *Application\ROAM* on the device.'

- ✓ **NOTE** The screens and windows are provided for illustration purposes only and may differ from actual screens. The applications described may not be available on (or applicable to) all devices.  
Procedures are not device specific and are intended to provide a functional overview.

## SymbolRoam, Region Change

The first time the application is run the *SymbolRoam* window displays. The warning *WARN: Registry region undefined* displays the first time *SymbolRoam* is used and default region is not changed. This indicates that the regions have not been changed from the default *US/Canada*.

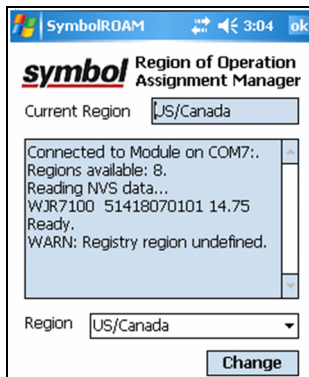


Figure 6-1 *SymbolRoam Window*

## Country Drop Down List

The list of selectable countries is provided on the *Country Drop Down List* window (see [Figure 6-2](#)). Select a country and click on **Change** button to set the desired country.

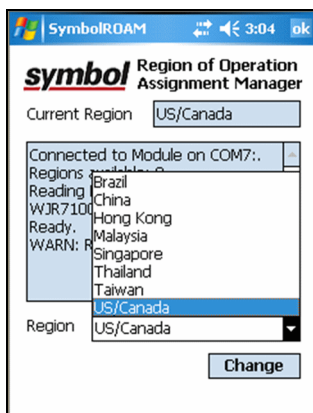


Figure 6-2 *Country Drop Down List Window*

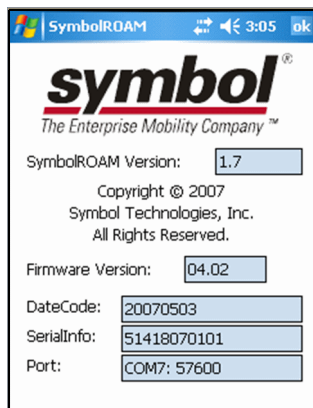


**NOTE** Applications developers can set the country setting in the registry file. Example:  
`[HKEY_LOCAL_MACHINE\Software\Symbol\RFID\SymbolROAM] "Region"="US/Canada"`  
 This registry example shows country set as US/Canada.

## SymbolRoam Version

To display the *SymbolRoam* version, tap the *Symbol* logo (see [Figure 6-3](#)).

The currently installed *SymbolRoam* version information is displayed.



**Figure 6-3** *SymbolRoam* Version Window



**NOTE** If the device is cold booted, .NET 2.0 (required to run *SymbolRoam*) will be re-installed.



# Chapter 7 Maintenance & Troubleshooting

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## Introduction

This chapter includes instructions on cleaning and storing the RFID reader, and provides troubleshooting solutions for potential problems during RFID reader operating.

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## Maintaining the RFID reader

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

- Take care not to scratch the screen of the RFID reader. When working with the RFID reader, use the supplied stylus or plastic-tipped pens intended for use with a touch-sensitive screen. Never use a pen or pencil or other sharp object on the surface of the RFID reader screen.
- Although the RFID reader is water and dust resistant, it is good practice not to expose it to rain or moisture for an extended period of time.
- The battery must be changed in a clean dry area.
- Protect the RFID reader from temperature extremes. Keep it away from heat sources.
- Do not store or use the RFID reader in any location that is extremely dusty, damp or wet.
- Use a soft cloth to clean the RFID reader. If the surface of the RFID reader becomes soiled, clean it with a soft cloth moistened with a diluted window-cleaning solution.

✓ **NOTE** This MC9090-G RFID Integrator Guide Supplement is configured to provides only the unique set up and configuration procedures for the MC9090-G RFID mobile computers and accessories. The accessory troubleshooting is provided in the *MC909X Integrator Guide, P/N: 72E-72216-xx*.

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## Accessories

The *MC909X Integrator Guide, P/N: 72E-72216-xx* provides the troubleshooting information applicable to the following MC9090-G RFID mobile computer accessories:

- Bluetooth Connection
- Four Slot Charge Only Cradle
- Four Slot Ethernet Cradle
- Four Slot Spare Battery Charger
- Single Slot Serial/USB Cradle
- Cable Adapter Module
- Magnetic Stripe Reader
- Modem Module

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## Battery Safety Guidelines

- 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.
- Do not use incompatible batteries and chargers. For any questions about the compatibility of a battery or a charger, contact Motorola Enterprise Mobility support. See [Service Information on page i-xii](#) for contact information.
- Do not crush, puncture, or place a high degree of pressure on the battery.
- Severe impact from dropping any battery-operated device on a hard surface could cause the battery to overheat.
- 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.
- Do not dispose of batteries in fire.
- If battery or equipment is suspected, call Motorola Enterprise Mobility support to arrange for inspection. See [Service Information on page i-xii](#) for contact information.

## Troubleshooting

### RFID Reader

**Table 7-1** *Troubleshooting the RFID reader*

Problem	Cause	Solution
RFID reader does not turn on.	Lithium-ion battery not charged.	Charge or replace the lithium-ion battery in the RFID reader.
	Lithium-ion battery not installed properly.	Ensure battery is installed properly. See <a href="#">Installing the Main Battery on page 1-4</a> .
	System crash.	Perform a warm boot. If the RFID reader still does not turn on, perform a cold boot. See <a href="#">Resetting the Mobile Computer on page 1-9</a> .
Rechargeable lithium-ion battery did not charge.	Battery failed.	Replace battery. If the RFID reader still does not operate, try a warm boot, then a cold boot. See <a href="#">Resetting the Mobile Computer on page 1-9</a> .
	RFID reader removed from cradle while battery was charging.	Insert RFID reader in cradle and begin charging. The lithium-ion battery requires less than four hours to recharge fully.
Cannot see characters on display.	RFID reader not powered on.	Press the <b>Power</b> button.
During data communication, no data was transmitted, or transmitted data was incomplete.	RFID reader removed from cradle or unplugged from host computer during communication.	Replace the RFID reader in the cradle, or reattach the Synchronization cable and re-transmit.
	Incorrect cable configuration.	See the System Administrator.
	Communication software was incorrectly installed or configured.	Perform setup. See <a href="#">Chapter 2, Accessories</a> for details. Ensure that Microsoft ActiveSync 4.1 or greater is installed on the host computer.
No sound is audible.	Volume setting is low or turned off.	Unit may be a beeper only unit or incorrect Config Block is programmed into device.

**Table 7-1** Troubleshooting the RFID reader (Continued)

Problem	Cause	Solution
RFID reader turns itself off.	RFID reader is inactive.	The RFID reader turns off after a period of inactivity. If the RFID reader is running on battery power, this period can be set to 30 sec., 1, 2, 3, 4, 5 or 6 minutes. If the RFID reader is running on external power, this period can be set to 1, 2, 3, 5, 10, 15 and 30 minutes. For Mobile 5.0 devices, Check the power settings by tapping <b>Start &gt; Settings &gt; System tab &gt; Power icon &gt; Advanced tab</b> . Change the setting if a longer delay is required before the automatic shutoff feature activates.
	Battery is depleted.	Replace the battery.
	Battery is not inserted properly.	Insert the battery properly (see <a href="#">Installing the Main Battery on page 1-4</a> ).
Tapping the window buttons or icons does not activate the corresponding feature.	LCD screen not aligned correctly.	Re-calibrate the screen.
	Battery is not inserted properly.	Insert the battery properly (see <a href="#">Installing the Main Battery on page 1-4</a> ).
A message appears stating that the mobile computer memory is full.	Too many files stored on the RFID reader.	Delete unused memos and records. Save these records on the host computer.
	Too many applications installed on the RFID reader.	If additional applications have been installed on the RFID reader, remove them to recover memory. For Windows Mobile 5.0 devices, tap <b>Start &gt; Settings &gt; System tab &gt; Remove Programs icon</b> . For Win Mobile 5.0 devices, tap <b>Start &gt; Settings &gt; Control Panel &gt; Remove Programs icon</b> . Select the unused program and tap <b>Remove</b> .
The RFID reader does not read a tag.	Read application is not loaded.	Verify that the unit is loaded with a read application. See the System Administrator.
	Unreadable tag.	Ensure the tag is not defective.
	Distance between the reader and the tag is incorrect.	Ensure RFID reader is within proper read range.
	RFID reader is not programmed for the tag type.	Ensure the RFID reader is programmed to accept the tag type being read.
	Battery is low.	If the reader stops reading check the battery level. When the battery is low, the reader shuts off. Note: If the reader is still not reading, contact the distributor or Motorola.



**Table 7-1** *Troubleshooting the RFID reader (Continued)*

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
The RFID reader does not accept scan input.	Scanning application is not loaded.	Verify that the unit is loaded with a scanning application. See the System Administrator.
	Unreadable bar code.	Ensure the symbol is not defaced.
	Distance between exit window and bar code is incorrect.	Ensure RFID reader is within proper scanning range.
	Mobile computer is not programmed for the bar code.	Ensure the RFID reader is programmed to accept the type of bar code being 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.	If the scanner stops emitting a laser beam when the trigger is pressed, check the battery level. When the battery is low, the scanner shuts off before the mobile computer low battery condition notification. Note: If the scanner is still not reading symbols, contact the distributor or Symbol Technologies.



# Appendix A Technical Specifications

## Technical Specifications

The following tables summarize the RFID reader intended operating environment and general technical hardware specifications.

### RFID Reader

The following table summarizes the reader technical specifications.

**Table A-1** *Technical Specifications*

Item	MC9090-G RFID
<b>Physical and Environmental Characteristics</b>	
Dimensions	9.1 in. L x 3.6 in. W x 7.6 in. H 23.1 cm L x 9.1 cm H x 19.3 cm H
Weight	25 oz.(includes battery, scanner and radio)
Keyboard	28-key; 43-key; 53-key Terminal Emulation (5250, 3270, VT)
Display	3.8 in. 1/4 VGA Color
Battery	Removable, rechargeable 7.2 volt Lithium Ion 2200 mAh battery pack, 15.8 watt hours
<b>Performance Characteristics</b>	
CPU	Intel® XScale® Bulverde PXA270 processor at 624MHz
Operating System	Microsoft Windows Mobile 5.0 Premium Edition
Memory (RAM/ROM)	Windows Mobile: 64MB/128MB
Expansion	SD/MMC Card
Application Development	SMDKs available through the Support Web Site

**Table A-1** *Technical Specifications (Continued)*

Item	MC9090-G RFID																																						
Data Capture Options	Omni-directional 1D and 2D imaging engine reads symbologies and captures grayscale images and signatures with intuitive laser aiming.  Gen2 tags																																						
Laser Decode Capability	<table border="0" style="width: 100%;"> <tr> <td style="width: 33%;">Code 39</td> <td style="width: 33%;">Code 128</td> <td style="width: 33%;">Code 93</td> </tr> <tr> <td>Codabar</td> <td>Code 11</td> <td>Discrete 2 of 5</td> </tr> <tr> <td>Interleaved 2 of 5</td> <td>EAN-8</td> <td>EAN-13</td> </tr> <tr> <td>MSI</td> <td>UPCA</td> <td>UPCE</td> </tr> <tr> <td>UPC/EAN supplementals</td> <td>Coupon Code</td> <td>Trioptic 39</td> </tr> <tr> <td>Webcode</td> <td>RSS-14</td> <td>RSS Limited</td> </tr> <tr> <td>RSS Expanded</td> <td></td> <td></td> </tr> </table> MC909X with Windows Mobile 5.0 and OEM Version 01.39.0001			Code 39	Code 128	Code 93	Codabar	Code 11	Discrete 2 of 5	Interleaved 2 of 5	EAN-8	EAN-13	MSI	UPCA	UPCE	UPC/EAN supplementals	Coupon Code	Trioptic 39	Webcode	RSS-14	RSS Limited	RSS Expanded																	
Code 39	Code 128	Code 93																																					
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Webcode	RSS-14	RSS Limited																																					
RSS Expanded																																							
Imaging Decode Capability	<table border="0" style="width: 100%;"> <tr> <td style="width: 33%;">Code 39</td> <td style="width: 33%;">Code 128</td> <td style="width: 33%;">Code 93</td> </tr> <tr> <td>Codabar</td> <td>Code 11</td> <td>Interleaved 2 of 5</td> </tr> <tr> <td>Discrete 2 of 5</td> <td>MSI</td> <td>EAN-8</td> </tr> <tr> <td>EAN-13</td> <td>UPCA</td> <td>UPCE</td> </tr> <tr> <td>UPC/EAN supplementals</td> <td>Coupon Code</td> <td>Trioptic 39</td> </tr> <tr> <td>Webcode</td> <td>TLC39</td> <td>Composite AB</td> </tr> <tr> <td>Composite C</td> <td>Micro PDF-417</td> <td>PDF-417</td> </tr> <tr> <td>Macro PDF-417</td> <td>(Macro) Micro PDF-417</td> <td>QR Code</td> </tr> <tr> <td>RSS Expanded</td> <td>RSS Limited</td> <td>RSS-14</td> </tr> <tr> <td>Data Matrix</td> <td>Maxi Code</td> <td>US Postnet</td> </tr> <tr> <td>US Planet</td> <td>UK 4-state</td> <td>Australian 4-state</td> </tr> <tr> <td>Canadian 4-state</td> <td>Japanese 4-state</td> <td>Dutch Kix</td> </tr> </table> MC909X with Windows Mobile 5.0 and OEM Version 01.39.0001			Code 39	Code 128	Code 93	Codabar	Code 11	Interleaved 2 of 5	Discrete 2 of 5	MSI	EAN-8	EAN-13	UPCA	UPCE	UPC/EAN supplementals	Coupon Code	Trioptic 39	Webcode	TLC39	Composite AB	Composite C	Micro PDF-417	PDF-417	Macro PDF-417	(Macro) Micro PDF-417	QR Code	RSS Expanded	RSS Limited	RSS-14	Data Matrix	Maxi Code	US Postnet	US Planet	UK 4-state	Australian 4-state	Canadian 4-state	Japanese 4-state	Dutch Kix
Code 39	Code 128	Code 93																																					
Codabar	Code 11	Interleaved 2 of 5																																					
Discrete 2 of 5	MSI	EAN-8																																					
EAN-13	UPCA	UPCE																																					
UPC/EAN supplementals	Coupon Code	Trioptic 39																																					
Webcode	TLC39	Composite AB																																					
Composite C	Micro PDF-417	PDF-417																																					
Macro PDF-417	(Macro) Micro PDF-417	QR Code																																					
RSS Expanded	RSS Limited	RSS-14																																					
Data Matrix	Maxi Code	US Postnet																																					
US Planet	UK 4-state	Australian 4-state																																					
Canadian 4-state	Japanese 4-state	Dutch Kix																																					
<b>User Environment</b>																																							
Operating Temperature	-4°F to 122°F (-20°C to 50°C)																																						
Battery Charging Temperature	32° to 104° F / 0° to 40° C ambient temperature range																																						
Storage Temperature	-25°F to 160°F (-40°C to 70°C)																																						
Humidity	5% to 95% non condensing																																						
Drop Specification	Multiple 6 ft.(1.8m) drops to concrete across operating temperature range																																						
Tumble	2,000 one-meter tumbles at room temperature (4,000 hits)																																						
Environmental Sealing	IP64																																						
ESD	+/-15kVdc air discharge +/-8kVdc direct discharge +/-8kVdc indirect discharge																																						
<b>RFID</b>																																							
Standards Supported	EPC Generation 2 UHF																																						

**Table A-1** *Technical Specifications (Continued)*

Item	MC9090-G RFID
Nominal read range <sup>1</sup>	10 ft./3.04 m with the RFX6000 4x4 tag optimally oriented.
Field	Half read range beam width: +/- 80 degrees (with tags optimally oriented).
Antenna	Integrated, circularly polarized, 1.5 dB effective linear gain per axis (nominal); Antenna port for future support of optional external antenna.
Frequency Range	902-928 MHz
Output power	1W conducted (1.4W EIRP with integrated antenna)
<b>Wireless Data Communications</b>	
WLAN	802.11a/b/g
Output Power	100mW U.S. and International
Data Rate	802.11a: 54Mb per second 802.11b: 11Mb per second 802.11g: 54Mb per second
Antenna	Internal
Frequency Range:	802.11a: 5 GHz; country-dependent 802.11b: 2.4 GHz; country-dependent 802.11g: 2.4 GHz; country-dependent
Bluetooth	Bluetooth <sup>®</sup> Version 1.2 with BTEplorer <sup>™</sup> (manager) included
<b>Peripherals and Accessories</b>	
Cradles	Single-slot and 4-slot cradles available
Printers	Supports extensive line of Symbol approved printers, cables and accessories
Charger	4-Slot universal battery charger
Other Accessories	Cable Adapter Module; Magnetic Stripe Reader; Modem; Full set of holsters In accordance with the SymbolPlus partner program

**Table A-1** *Technical Specifications (Continued)*

Item	MC9090-G RFID		
<b>Regulatory</b>			
Electrical Safety	Certified to UL60950-1, CSA C22.2 No. 60950-1, EN60950-1, IEC 60950-1.		
WLAN and Bluetooth®	USA — FCC Part 15.247, 15.407; Canada — RSS-210.		
RF Exposure	USA — FCC Part 2, FCC OET Bulletin 65 Supplement C; Canada — RSS-102.		
RFID	USA — FCC Part 15.247, 15.205, 15.209; Canada — RSS-210.		
EMI/RFI	USA — FCC Part 15; Canada — ICES 0003 Class B.		
Imaging Decode Capability	Code 39 Codabar Discrete 2 of 5 EAN-13 UPC/EAN supplementals Webcode Composite C Macro PDF-417 RSS Expanded Data Matrix US Planet Canadian 4-state	Code 128 Code 11 MSI UPCA Coupon Code TLC39 Micro PDF-417 (Macro) Micro PDF-417 RSS Limited Maxi Code UK 4-state Japanese 4-state	Code 93 Interleaved 2 of 5 EAN-8 UPCE Trioptic 39 Composite AB PDF-417 QR Code RSS-14 US Postnet* Australian 4-state Dutch Kix
*To be supported at a later date. Go to <a href="http://software.symbol.com/">http://software.symbol.com/</a> for a list of the latest supported symbologies.			

## Modem Module

**Table A-2** Environmental Parameters and Technical Hardware Specifications

Item	Description
Asynchronous character format	Up to 10 bits, including data, start, stop, and parity bits
Asynchronous data rates	Transmission rate fallback through 300 bps
Chipset	Conexant SCM
Compatible public switched network jacks	RJ11
Dialing capability	Tone and rotary pulse
Line requirements	Public switched telephone network (PSTN) including international connections
Operating environment	Altitude: up to 20,000 ft. Humidity: 10% to 90% non-condensing
Operating temperature	Operating: 32° to 122°F / 0° to 50°C Storage: -4° to 149°F / -20° to 65°C
Operating modes	Asynchronous, full duplex, automatic and manual call originate
Performance	Line speed up to 33,600 bps HHC to modem speed (DTE speed) up to 57,600 bps V.42bis data compression V.42 LAPM error correction
Current consumption	100 mA active <10 mA sleep
Pulse dialing rate (except where prohibited under TBR-21 rules)	10 pulses per second Pulse dialing duty cycle: 39/61% (US) make-to-break ratio
Ringer equivalence	0.1 dBm
Standards & protocols	Bell 103, Bell 212A, Hayes AT command set, and ITU Vs. 17, 21, 22 A & B, 22bis, 23, 25bis, 27 ter, 29, 32, 32bis, 42bis
Tone detected	Dial, busy, ring back, modem answer tones. Blind dialing based on time-out periods available for incompatible tones.
AC Adapter	9V, 2 amp regulated AC/DC adapter allows unlimited modem use. Do NOT substitute an AC adapter; using an incorrect AC power supply causes electrical damage to the mobile computer and voids warranty.

## Mobile Computer Pin-Outs

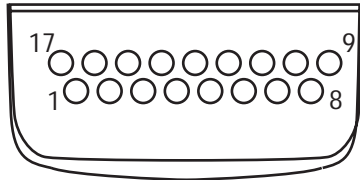


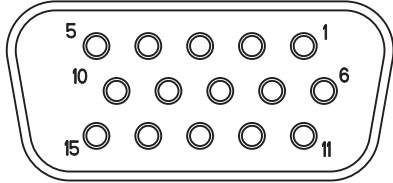
Figure A-1 Pin Locations

Table A-3 Pin-Outs

PIN Number	Signal Name	Function
1	USB_GND	USB
2	USB_D_PLUS	USB
3	TXD	RS232C
4	RXD	RS232C
5	DCD	RS232C
6	RTS	RS232C
7	DSR	RS232C
8	GND	Ground, 2.5A max.
9	RI	RS232C
10	CRADLE_DET	Grounded by cradle when in cradle
11	DTR	RS232C
12	Not connected	Not connected
13	POWER_IN	12V, 2.5A max
14	CTS	RS232C
15	USB_5V_DET	USB
16	USB_D_MINUS	USB
17	EXT_PWR_OUT	3.3V @500mA



## Accessory CAM and MSR Pin-Outs



**Figure A-2** CAM and MSR Serial Connector

**Table A-4** CAM and MSR Serial Connector Pin-outs

Pin	Signal
1	USB_5V_DET
2	USB_D_MINUS
3	USB_D_PLUS
4	GND
5	GND
6	PWR_EXT_OUT
7	CRADLE_DET*
8	DSR
9	DCD
10	TXD
11	CTS
12	DTR
13	RI
14	RTS
15	RXD



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