M210 Mobile Reader



RF Code™
discover. track. monitor.

User Manual

Contents

Preface 3
- Trademarks 3
- FCC Compliance 3
- Copyright Statement 4

M210 Mobile Reader 5
- Introduction 5
- Features 5
- Contents 5
- Hardware 6
  - LED Indicators 6
  - Data Connection 6
  - Antennas 6
  - Environmental Limits 6
- Getting Started 7
  - Configure Settings 7
  - Update Firmware 8

Warranty & Service 10
- Limited Standard Warranty Terms 10
- Standard Warranty Limitations 10
- Obtaining Service & Support 10
- RF Code Customer Support 10

Trademarks

RF Code™ and the RF Code logo are trademarks of RF Code, Inc. Windows is a registered trademark of Microsoft Corporation in the United States and other countries. All other product names are copyright and registered trademarks or trade names of their respective owners.

RF Code reserves the right to make changes without further notice to any products herein. RF Code makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does RF Code assume any liability arising out of the application or use of any product, and specifically disclaims any and all liability, including without limitation consequential or incidental damages.

The user of this system is cautioned that any changes or modifications to this system, not expressly approved by RF Code, Inc., could void the warranty.

FCC Compliance

Changes or modifications to this equipment, not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee against interference to radio or television reception, which may be determined by turning the equipment off and on; the user must try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.
- Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

The 433 MHz System has two major components which are independently certified and comply with Federal Communications Commission (FCC) rules, part 15.

This M210 Mobile Reader complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The system operates by using RFID Tags - 433 MHz which have been certified or are in the certification process. These devices comply with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) these devices may not cause harmful interference, and (2) these devices must accept any interference received, including interference that may cause undesired operation.

- FCC ID: P6F2005433 for beacon intervals greater than, or equal to 10 seconds.
- FCC ID: P6F433MHZ for the security tag with beacon intervals less than 10 seconds.

Copyright Statement

Copyright © 2007 RF Code, Inc. All Rights Reserved.

This document, as well as the hardware and firmware described therein, is furnished under license and may only be used or copied in accordance with the terms of such license. The information in these pages are furnished for informational use only, are subject to change without notice, and should not be construed as a commitment by RF Code, Inc. RF Code assumes no responsibility or liability for any errors or inaccuracies that may appear in these pages.

Every effort has been made to supply complete and accurate information. However, RF Code assumes no responsibility for its use, or for any infringements of patents or other rights of third parties, which would result.

RF Code, Inc.
9229 Waterford Centre Blvd.
Suite 500
Austin, TX 78758
www.rfcode.com

Introduction

The M210 Mobile Reader by RF Code is a full featured small footprint RFID monitoring system designed to report tags within defined reader operating ranges. The system utilizes Active RFID tags that beacon periodically reporting their presence with an encoded radio transmission. Tag transmissions can be processed in real-time to quickly locate and identify tagged assets. Mobile Readers provide an economical solution to a wide variety of asset tracking problems. RF Code's patented communication protocols allow for very high tag densities. Large populations of tags can be inventoried using a single reader. The M210 Mobile Reader is a Single Channel Radio Receiver tuned to the RF Code Tag's FCC assigned transmission frequency of 433.92 MHz.

The purpose of this manual is to provide the user with the information necessary to understand the proper installation, care and optimization of the M210 Mobile Reader.

Operational instructions for the M210 Mobile Reader System using the MobileTrak® Lite software by RF Code are found in the MobileTrak Lite User Manual on the RF Code Reader Utilities and SDK CD.

Features

- PC Card Interface for Laptop and PDA Deployment
- Mobile Inventory and Search Functions
- High Throughput Performance Supports Large Tag Populations
- Patented Anti-Collision Technology to Manage High RF Densities
- Software Configurable Range Control Settings
- Optional Antenna Configurations
- Direct API Interface Available

Contents

The M210 Mobile Reader System package contents are:

- M210 Mobile Reader (Type II PCMCIA card)
- Tethered dual-dipole antenna (with belt-clip)
- RF Code Reader Utilities and SDK CD
- Printed M210 Mobile Reader User Manual

Hardware

The M210 Mobile Reader is housed in a Type II PCMCIA card. Reader status is provided by LEDs on the front edge of the card. Power requirements are 3.3 or 5 volts at 100mA.

LED Indicators

Two LEDs are mounted on the front edge of the M210 Mobile Reader.

1. Tag Activity LED – This yellow LED is used for two purposes:
   - **Reader Status** – The yellow LED flashes at a distinctive rate indicating that the Reader is in standby mode.
   - **Tag Detection** – The yellow LED flashes at random indicating that the Reader has read one or more tags for each flash. Because the Reader can decode tags faster than the light can be turned on and off, a single flash may indicate more than one tag being decoded.
2. On-Ready LED – This green LED illuminated, indicates that the PC Card is being powered by the PCMCIA host (e.g. Handheld, Pocket PC or Laptop).

Data Connection

The M210 Mobile Reader contains a Serial Interface (PCMCIA). This can be used with a standard Windows® driver, or with RF Code supplied drivers. The serial interface is set at 38400 (bits per second), N (no parity), 8 (data bits), 1 (stop bits) with hardware handshaking.

Antenna

Each M210 Mobile Reader comes with a tethered dual-dipole antenna (with belt-clip). This antenna provides a tag read range of approximately 100 meters. The reader's maximum sensitivity (maximum range) depends upon the operating environment. The operating read range is software configurable and can be adjusted for near- and long-range searches. Operating time in a notebook computer or handheld device will depend on the unit's battery capacity; the M210 Mobile Reader is not equipped with an on-board power supply.

The RF connector is type MMCX female. The read range can be significantly improved by moving the antenna away from the PCMCIA host platform, since these tend to generate radio noise at the tag frequency. Other antennas (e.g. helical, whip, omnidirectional, Yagi, etc.) with differing characteristics can be purchased from your RF Code authorized distributor.



Low loss SMA coaxial extension cables may be used to separate the antennas from the Reader.

Environmental Limits

The M210 Mobile Reader is tested to operate effectively, and is approved for use, within the temperature ranges set forth below.

- **Operating Temperature**: -20 to +70 degrees Celsius.
- **Storage Temperature**: -40 to +80 degrees Celsius.

Getting Started

Install the Reader by inserting it label side-up into the PC card slot of you mobile device. You should be able to tell that the reader is connected when the green On-Ready LED light is illuminated.

Once you have installed the Reader you can perform updates using the Reader Configuration Utility that is available on the RF Code Reader Utilities and SDK CD. Once you have updated the firmware on your Reader you can utilize the MobileTrak Lite or Tag Collection Utility software also available on the RF Code Reader Utilities and SDK CD.

Configure Settings

1. To access the Reader to configure your hardware settings, open your Device Manager by browsing to **Start > Settings > Control Panel > System > Hardware > Device Manager.** In the Device Manager extend the Ports (COM & LPT) list and double click on the Communications Ports to determine which COM port your Reader is installed as.

2. Open a telnet session using HyperTermnial by accessing the **Start > Programs > Accessories > Communications > HyperTerminal**.

3. Specify a name for the connection and Click OK to continue (Figure 1).

Figure 1 Connection Description



4. Connect to the Reader COM Port (Figure 2).

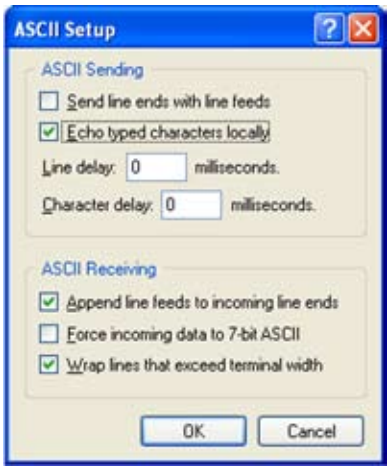
Figure 2 Connect to COM Port



5. Click on the Properties icon to launch the properties window and click on the **Settings** tab.

6. Click on the ASCII and ensure that the "Echo typed characters locally", "Append line feeds to incoming line ends" and "Wrap lines that exceed terminal width" boxes are checked (Figure 3).

Figure 3 ASCII Setup



You are now connected to your M210 Mobile Reader using the correct Settings.

Update Firmware

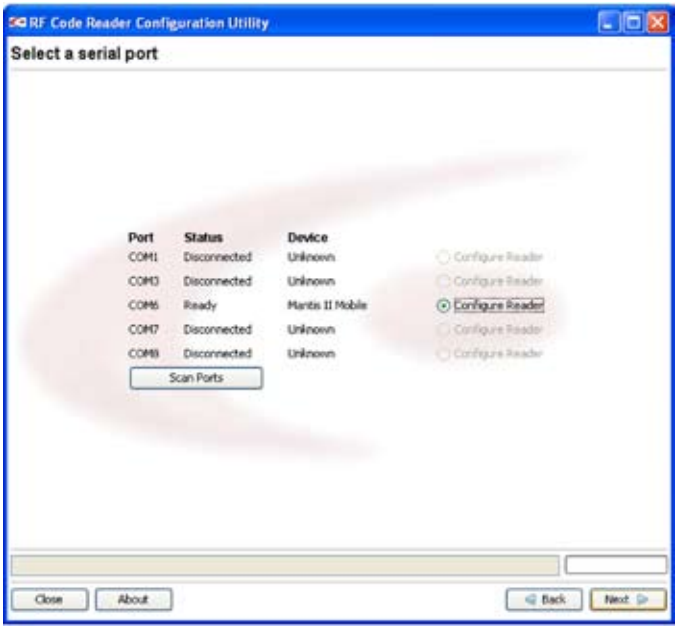
To update the firmware of the M210 Mobile Reader, perform the following steps:

1. Launch the Reader Configuration Utility (software is available for installation on the RF Code Reader Utilities and SDK CD). Please refer to the RF Code Reader Utilities and SDK User Manual for instructions on installation if you have not already done so.

2. The main screen will launch and will prompt you to choose a connections type. Select the local connection.

3. The Reader Configuration Utility will automatically scan your COM ports and identify any RF Code Readers that are connected. Click "Configure Reader" for the M210 Mobile Reader as seen in Figure 4.

Figure 4 Select Serial Port for Reader Configuration



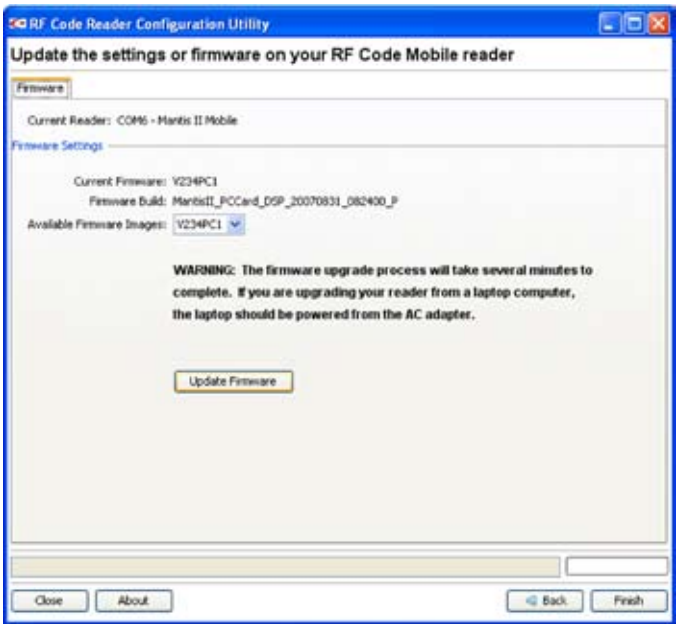
4. Select the firmware you wish to upgrade to and click "Update Firmware" (Figure 5).

Note

Readers can not downgrade to previous versions of firmware. Readers can use existing firmware or greater.

If you are upgrading the reader from a laptop, it is recommended to use the laptop's AC adapter instead of laptop batteries.

Figure 5 Upgrade Firmware



Limited Standard Warranty Terms

RF Code warrants its products to be free from defects in materials and workmanship for a period of 1 year (12 months) for hardware and software from the date of purchase from RF Code. Its obligation under this warranty is limited to repairing or replacing, at its own sole option, any such defective products. This warranty does not apply to equipment that has been damaged by accident, negligence, or misapplication or has been altered or modified in any way. This warranty applies only to the original purchaser (end-user) and is not transferable.

Standard Warranty Limitations

Except as provided herein, the entire liability of RF Code and its suppliers under this limited warranty will be that RF Code will use reasonable efforts to repair or replace, without charge, all defective Products returned to RF Code by Customer, all as more particularly described in the End User Warranty. Except for the express warranties STATED HEREIN, RF Code makes no other representations or warranties and RF Code hereby disclaims, all other warranties, express, implied, statutory, or otherwise, including without limitation, any warranty of merchantability, non-infringement of third party intellectual property rights, fitness for a particular purpose, performance, satisfactory quality, or arising from a course of dealing, usage or trade practice.

Obtaining Service & Support

For in-warranty service, customers have several options. Customers having difficulty with RF Code products should attempt to solve those problems through RF Code's Technical Support Problem Escalation Process:

First, contact the RF Code representative or other distributor from whom the RF Code product was purchased for information on how to obtain local support.
Second, contact the RF Code Customer Support via e-mail.
Third, contact the RF Code Customer Support via the Support Line.

For product returns, the support engineer will give you a return material authorization (RMA) number. No returns will be accepted without an RMA number. If the warranty expired, there is a charge for repair or replacement per RF Code's out-of-warranty policy. For full details of the RF Code RMA policy, please review the "RF Code Warranty, RMA, and Extended Warranty Policy" document.

RF Code Customer Support

RF Code Customer Support gives entitled customers and partners the ability to contact RF Code about installation and usage-related questions as well as make defect inquiries about eligible products that are covered under RF Code warranty agreements. A team of technical specialists can be contacted electronically or via phone.

The Support Line is available to provide General Support during normal business hours: Monday through Friday, 8:00am to 5:00pm Central time, excluding national holidays.

E-mail: **support@rfcode.com**
Support form: **http://www.rfcode.com**
Voice: **512.439.2244** or toll-free at **866.830.4578**