TEXAS INSTRUMENTS

Reader Series 4000

S4100 Multi-Function Reader Module RF-MGR-MNMN

Download Tool Reference Guide

11-06-24-700 October 2003

First Edition - October 2003

This is the first edition of this manual. It describes the **TI Series 4000 Reader.**

It contains a description of the following reader module:

S4100 Multi-Function Reader Module P/N: **RF-MGR-MNMN-N0**

Texas Instruments (TI) reserves the right to make changes to its products or services or to discontinue any product or service at any time without notice. TI provides customer assistance in various technical areas, but does not have full access to data concerning the use and applications of customer's products

Therefore, TI assumes no liability and is not responsible for customer applications or product or software design or performance relating to systems or applications incorporating TI products. In addition, TI assumes no liability and is not responsible for infringement of patents and/or any other intellectual or industrial property rights of third parties, which may result from assistance provided by TI.

TI products are not designed, intended, authorized or warranted to be suitable for life support applications or any other life critical applications which could involve potential risk of death, personal injury or severe property or environmental damage.

Read This First

About This Manual

This reference guide for the Series 4000 Multi-Function (13.56 MHz & 134.2 KHz) Reader is designed for use by TI customers who are engineers experienced with RFID Systems and Radio Frequency Identification Devices (RFID).

Device Name	Boot Loader Firmware Version
RF-MGR-MNMN-N0	1.02

The Regulatory, safety and warranty notices that must be followed are provided in Chapter 2.

Conventions

The following pictograms and designations are used in the operating instructions:

WARNING:

A WARNING IS USED WHERE CARE MUST BE TAKEN, OR A CERTAIN PROCEDURE MUST BE FOLLOWED, IN ORDER TO PREVENT INJURY OR HARM TO YOUR HEALTH.

CAUTION:

This indicates information on conditions, which must be met, or a procedure, which must be followed, which if not needed could cause permanent damage to the system.

Note:

Indicates conditions, which must be met, or procedures which must be followed, to ensure proper functioning.

Information:

Indicates conditions or procedures that should be followed to ensure proper functioning of the system.

If You Need Assistance

Application Centers are located in Europe, North and South America, the Far East and Australia to provide direct engineering support.

For more information, please contact your nearest TIRIS Sales and Application Center. The contact addresses can be found on our home page: http://www.tirfid.com.

Numerical Representations

Unless otherwise noted, numbers are represented as decimal.

Hexadecimal numbers are represented with the suffix $_{16}$, e.g. $A5F1_{16}$

Binary numbers are represented with the suffix $_2$, e.g. 1011_2

Byte representations: the least significant bit (lsb) is bit 0 and the most significant bit (msb) is bit 7.

Document Overview

Chapter 1

Download Tool

Topic Page

1.1 Introduction

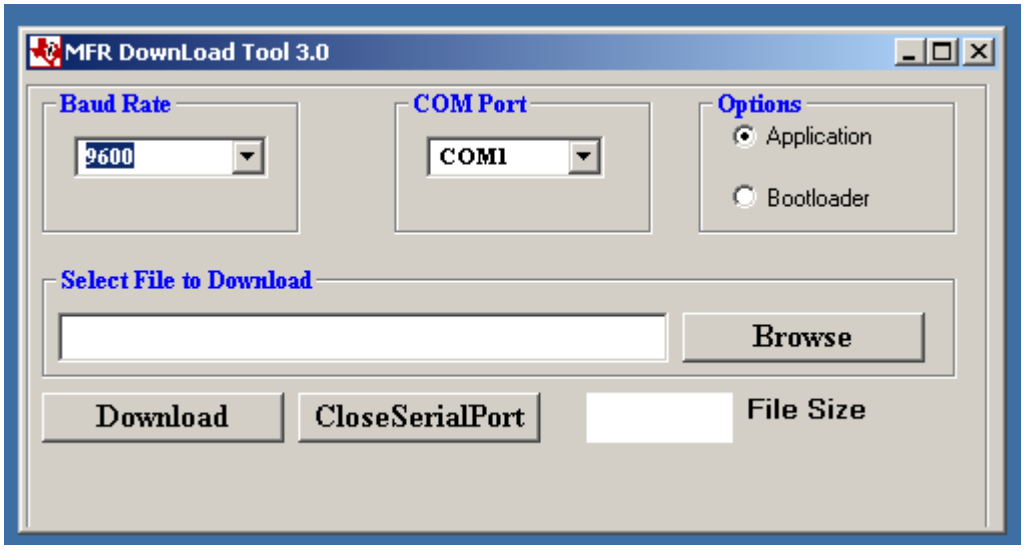
This document describes the MFR Download Tool Installation and User's Guide for installing application firmware into the reader, but does not describe the Boot loader or its command set. For information about the Boot loader refer to the Boot Loader Reference Guide. For MFR protocol information refer to the Base Application Reference Guide.

1.2 Installation

In order for the Application Download Tool to function properly it must first be installed. As the files that the installation extracts cannot be copied directly, proper installation requires that the three necessary files be saved within the same directory: **"ApplicationDownload.CAB", "setup.exe",** and **"setup.LST."** To install the Application Download Tool, simply click on the **"setup.exe"** file and follow the onscreen instructions. The installation program will allow you to choose a directory to install the program in, but it will not let you pick the source directory of the setup files.

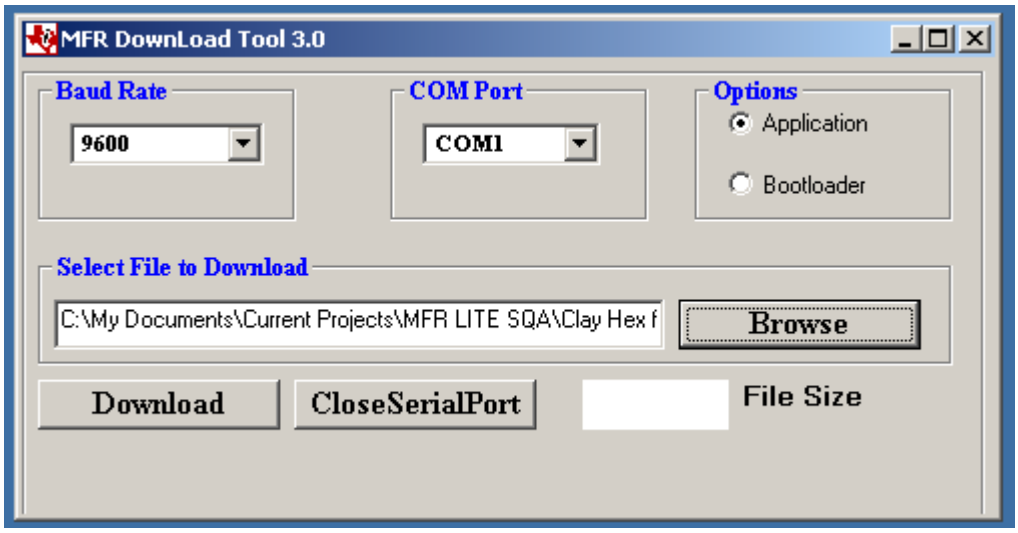
1.3 Download Tool Operation

To begin, please ensure that MFR module is first running within in a Target Application. Set up the MFR PC Download Tool. The first step is to open the Serial Port. This will require the user to select the correct Com Port and Baud Rate. For this example COM 1 will be selected and the communications will be at 9600 baud. Note that the Target Application currently supports only 9600 baud, and the Boot loader Application always initializes communications to 9600 baud. The baud rate will always be 9600 baud until after the Boot loader Application has cleared the current Target Application and has received the Initialize Request Packet. The new baud rate will apply until the download is complete or an error has been detected. At that point the baud rate will go back to 9600 baud.

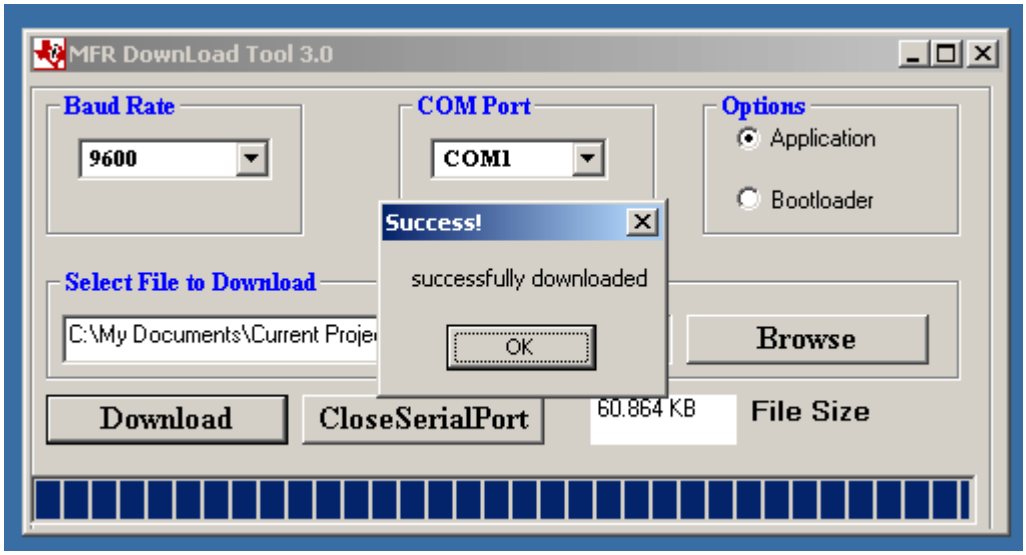


Notice that the text on the Serial Port button will change from "**OpenSerialPort**" to "**CloseSerialPort**" as soon as the communications port has been successfully opened. The next step is to browse to and select the Intel Hex file to download. Once the file is selected, choose one of the buttons in "options" box. Choose "Application" if you are trying to load new firmware to a hardware that already has application firmware. Choose "Boot loader" if you are downloading the application firmware for the first time after installing the boot loader.

Note that while the tool defaults to file type*.HEX files, the user can select the *.* option if the desired Target Application does not follow the .hex extension. Note that this tool will verify that it is a valid Intel Hex file before attempting to load it.



As soon as the port has been opened and the file has been selected, the user will select the “Download” button. The tool will display a status bar when the Target Application Page data is being sent to the module, not that the status bar is an exact representation of percentage of application that has been loaded. The module will be displaying the LED ‘Heartbeat’ pattern to indicate it is running the Boot loader Application. Note that the pattern will be intermittent while the packets are being loaded into the FLASH memory.



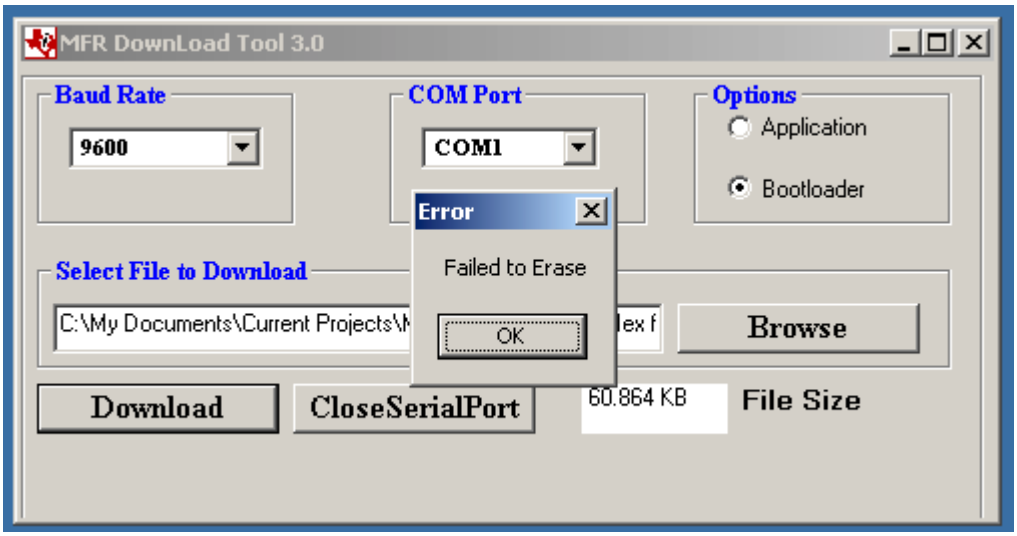
The tool should display a message box that indicates that the download was successful. At this point the module will exit the Boot loader Application and start the new Target Application. Also notice that the tool displays the size of the file it just finished downloading.

Error Data

A Download Error will occur when no application is present. When there is an attempt to download an application (select “Application” in options box) while there is currently no application present in the Flash ROM, the Download tool pauses for a while before starting to download the file. This pause is due to the fact that the download tool is trying to talk to

application layer. It tries three times before it stops querying the application layer and starts sending packets to the boot loader.

Likewise, if you select “Bootload” when there is an application in MFR reader already, an error message stating, “Failed to Erase” will be displayed. This message gives the impression that the download was unsuccessful, when in fact the only problem is the Application Download Tool is sending a command to the application layer to tell it to switch to the boot loader, when there is no application present to carry out such a command. This doesn’t present any real problem. You need to select “bootloader” and start over again.



Chapter 2

Regulatory and Warranty Notices

Topic **Page**

2.1 FCC Conformity

The Series 4000 Multi-Function Reader is an intentional radiator. The transmitter portion operates at 13.56 MHz and is subject to FCC Part 15, Subpart C, “Intentional Radiator,” paragraph 15.225 (13.553-13.567MHz). Radiated emissions from the device are subject to the limits in Section 15.209 of the Rules outside of the 13.56 +/- 0.007 MHz band.

Note:

Any device or system incorporating the Series 4000 reader, in full or in part, needs to obtain FCC certification as part of the system within which this reader unit resides. A system containing this product may be operated only under an experimental license or final approval issued by the relevant approval authority. Before any such device or system can be marketed, an equipment authorization must be obtained form the relevant approval authority.

2.2 ETSI Conformity

Any device or system incorporating the Series 4000 reader, in full or in part, may need to comply with European Standard EN300330. It is the responsibility of each system integrator to have their complete system tested and to obtain approvals as required from the local authorities before operating or selling this system.

2.3 CE Conformity

Any device or system incorporating the Series 4000 reader, in full or in part, may need to have a CE Declaration of Conformity stating that it meets European EMC directive 99/5/EC. This must be issued by the system integrator or user of such a system prior to marketing or operating it in the European community.

2.4 Warranty and Liability

The "General Conditions of Sale and Delivery" of Texas Instruments Incorporated or a TI subsidiary apply. Warranty and liability claims for defect products, injuries to persons and property damages are void if they are the result of one or more of the following causes:

- Improper use of the reader module.
- Unauthorized assembly, operation and maintenance of the reader module.
- Operation of the reader modules with defective and/or non-functioning safety and protective equipment.
- Failure to observe the instructions during transport, storage, assembly, operation, maintenance and setting up of the reader modules.
- Unauthorized changes to the reader modules.
- Insufficient monitoring of the reader modules' operation or environmental conditions.
- Improperly conducted repairs.
- Catastrophes caused by foreign bodies and acts of God.