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USB RFID Reader Setup Guide

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USB RFID Reader Setup Guide

Introduction

The ThingMagic USB RFID Reader allows solutions developers to support applications that require desktop reading and writing of EPC Global Gen2 tags. Based on the best-in-class M5e-Compact UHF RFID module, the USB RFID Reader is controlled by, and powered from, a host PC or laptop through a USB interface. The ThingMagic USB RFID Reader is compatible with ThingMagic's application development tools, including the cross-product MercuryAPI, permitting rapid creation of solutions to support a wide range of applications.

The MercuryAPI supports Java, .NET and C programming environments. The MercuryAPI Software Development Kit (SDK) contains sample applications and source code to help developers get started demoing and developing functionality. For more information on the MercuryAPI see the MercuryAPI Programmers Guide and the MercuryAPI SDK, available on the ThingMagic website.

A demo application which supports reading and writing is provided in the MercuryAPI SDK package. The source code for this example is included in the MercuryAPI SDK package under /cs/samples/exe/Universal-Reader-Assistant.exe.

See the Readme.txt in /cs/samples/Universal-Reader-Assistant/Universal-Reader-Assistant for usage details.

See the *MercuryAPI Programming Guide* for details on using the MercuryAPI.

Included Components

With the USB RFID Reader, you will receive the following components:

- ThingMagic USB RFID Reader
- USB cable
- Documentation and software development kit packages can be found at http://rfid.thingmagic.com/devkit

Setting up the USB RFID Reader

When setting up the USB RFID Reader, use the following procedures. Please read the full setup procedures before beginning.

1. Installing the USB Driver
2. Connecting the USB Reader
3. Reading Tags

Installing the USB Driver

The drivers and installation guides for installing the necessary device drivers to allow Windows to recognize the USB RFID Reader can be found at

http://www.ftdichip.com/Drivers/VCP.htm

The driver files should be extracted to a known location before moving on to Connecting the USB Reader. Once the reader is plugged in you will be prompted for the driver installation.

Connecting the USB Reader

1. Plug the mini-USB connector into the USB Reader.
2. Plug the **BLACK** communications USB connector into your PC.
3. If necessary, plug the **RED** Auxiliary Power USB connector into your PC for additional power.

   Note

   The USB Reader draws 570 mA max and most USB ports are specified to only supply 500 mA. Since most multi-port devices supply a pool of power for all USB devices it does not matter if one device draws a bit more power and only the main USB connector is required. However, some laptops dolimit the current per USB port to 500 mA. If the reader is used with such a laptop then the second connection should be connected to a second USB port to supply the additional power.

4. You will be prompted for driver installation if they are not already installed. If prompted follow the Installing the USB Driver instructions.

Reading Tags

The following procedure explains how to install and activate the Reader Assistant on your PC.

Start the Universal Reader Assistant

1. Get ***Universal-Reader-Assistant*** from the ThingMagic website, its part of the MercuryAPI SDK package under /cs/samples/exe/Universal-Reader-Assistant.exe, and insall it on the computer that is connected to the USB Reader (http://rfid.thingmagic.com/devkit).
2. Set up the computer to the USB Reader as described in Setting up the USB RFID Reader
3. Start the Universal Reader Assistant by double-clicking the executable file Universal-Reader-Assistant.exe.
4. Select the appropriate COM port for Reader URI.

   The Universal Reader Assistant senses the COM ports that are located on your system. USB devices are typically assigned higer value COM ports. If many COM ports are listed in the menu and you aren't sure which is for the USB Reader you can find the assigned value using the Windows Device Manager:

   a. Open the Device Manager (located in *Control Panel* | *System*)

   b. Select the *Hardware* tab and click Device *Manger*"

   c. Select *View* l *Devices by Type* | *Ports (COM & LPT)*

   The device appears as *USB Serial Port (COM#)*. The USB Reader COM port value is in parentheses.
5. Follow the Readme.txt in /cs/samples/Universal-Reader-Assistant for steps to read and write tags.

Buttons and LEDs

To get the values of the USB Reader buttons and turn on/off the LEDs use the **GPIO** controls under the *Advanced Configuration* | *Advanced Reader Settings* of the *Options* menu. See the Button/LED to GPIO Line Mapping below for mapping.

- Buttons are "High" when not pressed, "Low" when pressed

- LEDs are “High” when on, “Low” when off.

Table 1: Button/LED to GPIO Line Mapping

Button/LED	GPIO Line
Button 1 (Yellow)	Input 1
Button 2 (Red)	Input 2
LED 1 (Yellow)	Output 1
LED 2 (Red)	Output 2

Note

In the first shipment of USB Desktop Readers the Button/LED to GPIO line mappings were reversed. Button1=Input2, Button2=Input1, LED1=Output2 and LED2=Output1. If the Thingmagic logo is at the top of the label you have the old label and need to following the old mapping.

Note

The buttons are level sensed and not edge sensed, that is, there is no memory of the button having been pushed. If a button is pushed momentarily during a time the application is not checking the state of the Input GPIO lines, the button press will not be detected. For that reason, it is recommended applications require the user to push a button until the software senses it and illuminates one of the LEDs. This ensure that the press has been detected.

USB RFID Reader Specifications

Power

DC Power Required

DC Voltage: 5 VDC (Powered by USB interface)
DC Power: 2.9 W (570mA) max

Supplied interface cable terminates in two type-A plugs: one for power and signal, the second for additional power, if necessary.

Idle Power Consumption

1.7 W max at idle

Power management modes can be used to reduce this to as little as 0.1W

Environment

Operating Temp

-20 C to +60 C

Storage Temp

-40C to +85C

Regulatory Standards

FCC 47 CFR Ch. 1 Part 15
Industrie Canada RSS-21 0

ETSI EN 302 208
ETSI EN 300 220

Architecture

RFID ASIC

Intel R1000

User-accessible Flash Memory

16 kB

Tag Buffer

200 tags

Performance

Tag Read Rate

Over 190 tags/second

Tag Read Distance

Up to 12 inches (31 cm) depending on tag sensitivity and orientation.

Tag / Transponder Protocols

RFID Protocol Support

EPCglobal Gen 2 (ISO 18000-6C) with Anti-Collision and DRM.

RF Interface

Antenna Connector

Internal ceramic antenna with an average gain of -2.6 dBi from 860 to 960 MHz.

RF Power Output

Separate read and write levels (into the antenna), command-adjustable from 10 dBm to 23 dBm (200 mW),
+/-1.0 dBm accuracy*

Note

Maximum power may have to be reduced to meet regulatory limits, which specify the combined effect of the module, antenna, cable and enclosure shielding.

Frequencies

Pre-configured for the following regions:
FCC (NA, SA) 902-928 MHz
ETSI (EU) 865.6 - 867.6 MHz, 869.85 MHz
KCC (KR) 910 - 914 MHz
SRRC-MII (P.R. China) 920 - 925 MHz
Open (Custom) 860 - 960 MHz

Data/Control Interface

Physical

USB mini-B connector, with 2 foot (61 cm) cable terminated in A-type plug.

Signaling

Asynchronous serial interface with 3.3/5V logic levels
Baud rates from 9600 to 921,600 bps

GPIO Sensors and Indicators

Two I/O command controlled LEDs
Two I/O command queried switches

Physical

Dimensions

3.1 in L x 2.4 in W x 1.0 in H
(97 mm L x 61 mm W x 25 mm H)

Compliance Information

FCC COMPLIANCE

This equipment complies with Part 15 of the FCC rules for intentional radiators and Class A digital devices when installed and used in accordance with the instruction manual.

Following these rules provides reasonable protection against harmful interference from equipment operated in a commercial area.

This equipment should not be installed in a residential area as it can radiate radio frequency energy that could interfere with radio communications, a situation the user would have to fix at their own expense.

This device has been designed to operate with the antennas provided with it (MTI MT-262024) and having a maximum gain of 7dBic. Antennas not listed here or having a gain greater than 7dBic are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

To reduce radio interference to other users, the antenna type and its gain is chosen such that the equivalent isotropically radiated power (EIRP) is not more than permitted for successful communication.

EQUIPMENT MODIFICATION CAUTION

Equipment changes or modifications not expressly approved by ThingMagic, Inc., the party responsible for FCC compliance, could void the user's authority to operate the equipment and could create a hazardous condition.

IMPORTANT USER INFORMATION

In order to comply with FCC and IC requirements for RF exposure safety, a separation distance of at least 20 cm (7.9 in) needs to be maintained between the radiating elements of the antenna and the bodies of nearby persons.