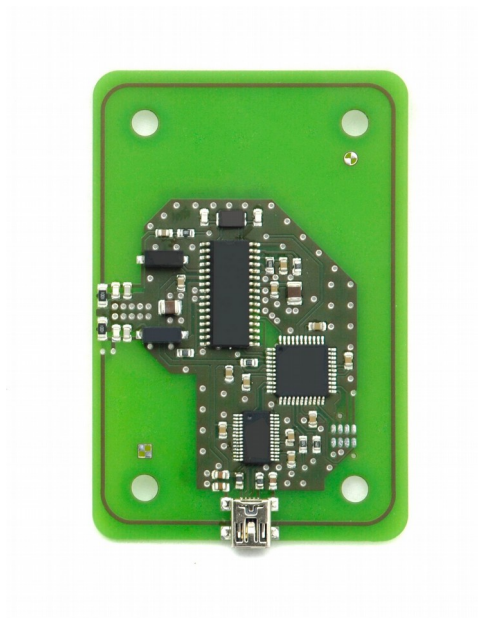# Technical Documentation

for metraTec UM14 USB Module

Date: November 2016

Version: 1.5

Table of Contents

1 General Information / Security Advice

1.1 Notes on the use of this documentation

This user manual and integration guide uses different symbols to point out potentially dangerous situations. The following signs and symbols are used throughout the document.

ATTENTION

Declares a potentially hazardous situation. If this is not avoided, the product or something in its surrounding could be damaged.

NOTE

Declares notes for the user as well as other useful information, where no harmful or dangerous situations can be expected.

1.2 Security Advice

The UM14 USB Module was not designed for use in dangerous environments. Using this product in applications where a failure could directly result in severe injuries or death ("high risk activities") is not permitted. This includes but is not limited to applications in nuclear facilities, flight control systems, life support systems or weapon systems. The manufacturer denies the suitability of this device for such scenarios.

1.3 Export Restrictions

The UM14 USB Module contains components that underlie US Export restrictions. It is therefore forbidden to export the product to countries that are on the US trade embargo list. The same applies to any countries that are on the EU embargo list.

1.4 Further Documents

While this documentation explains the electrical and mechanical characteristics of the UM14 USB Module, it might be useful to also read the metraTec Protocol Description for metraTec Readers using MIFARE® Technology, which explains the protocols used to control the module in full detail.

All further documents can be either found at the metraTec's product web page or are listed at: http://www.metratec.com/en/support/downloads/documentation.html.

2 Product Description

The UM14 USB Module is a versatile RFID module which can be integrated directly into your own devices and machines via USB, making it possible to equip your own products and projects with RFID functionality with little time and effort. The module comes with fast and well tested firmware ready for reading and writing RFID tags. The easy to use ASCI protocol enables a quick start into controlling the module. For testing purposes, a free demo program is available. With the integrated antenna, reading ranges up to 70 mm are possible depending on the size of the tags used and the power mode chosen.

2.1 Intended Use

The UM14 USB Module reads RFID transponders at short distances according to MIFARE® protocols using MIFARE Classic, MIFARE Ultralight®, and MIFARE Plus® (on request available via firmware update) technology by NXP B. V.

For tags communicating according to ISO 15693 please refer e.g. to our UM15 HF USB Module.

2.2 Technical Specification

Operating Voltage	5 V DC +-10% (via USB)
Power Consumption	HF on: 180 mA (full reading range) HF on (reduced power): 100 mA (reduced range) Idle, HF off: 80 mA Stand by: 60 mA Hibernate (via USB Suspend): 7 mA
Reading Range	10-70 mm (depending on Power Mode)
Communication	USB 2.0
Digital Inputs/Outputs	None
Antenna Port	Internal antenna
Operating Frequency	13.56 MHz
RF Output	Full power: 350 mW Reduced power: 100 mW (selectable via firmware, influences reading range)
Protocols	MIFARE (MIFARE Classic and MIFARE Ultralight; MIFARE Plus possible)
Operating Temperature	-20°C bis +70°C
Dimensions	60 x 90 mm

2.3 Scope of Delivery

The UM14 USB Module comes with the following parts:

- UM14 USB Module

- Documentation, Drivers and Demo Software are available via download from metraTec's website (http://www.metratec.com → Support → Downloads)

3 Power Supply and Electrical Specification

The module is powered directly via the USB Bus. Eventual fluctuations of the USB voltage supply will be balanced by an internal power supply.

Operating Voltage	5 V DC via USB
Power Consumption, RF on (max output)	180 mA
Power Consumption, RF on (reduced output)	100 mA
Power Consumption, RF off (idle)	80 mA
Power Consumption, Stand by	60 mA
Power Consumption, Hibernate (USB Suspend)	7 mA

Tab. 1: Maximum Rating and Electrical Limits

The UM14 USB Module comes with a low power consuming Hibernation Mode. Power consumption is reduced to only 7 mA by completely deactivating the module's internal power supply, only leaving the USB chip active. The Hibernate Mode cannot be accessed by a mere firmware command but comes as a function of the USB chip. How to use this feature is explained in a separate document which we will gladly provide if requested.

4 Communication

The UM14 USB Module communicates with its host via a USB 2.0 connection, using a USB chip from the company FTDI. Drivers for many operating systems are available for this chip, covering e.g. Windows 2000, XP, Vista, Win7, Win8, Win10, Windows CE 4.2 – 6.0, MacOS, and Linux. Some of the newer versions of the operating systems already have the necessary drivers installed or will automatically load them from the internet when the device is connected for the first time – this might take a moment, however. Some drivers for older operating systems are available from the metraTec website.

Source: www.metratec.com --> Support --> Downloads --> Drivers/Libraries

For others please send a request directly to our support at support@metratec.com.

For the commands needed to control the UM14 module please refer to the appropriate metraTec Protocol Guide for metraTec readers using MIFARE technology. It lists all commands, possible answers, as well as examples how to use them. The Protocol Guide is valid for all metraTec readers using MIFARE technology and therefore distributed separately.

Source: www.metratec.com --> Support --> Downloads --> Documentation

5 Certification

ATTENTION

Changes or modifications to the module not expressly approved by metraTec could void the user's authority to operate the equipment.

5.1 CE / ETSI (EU)

The UM14 USB Module complies with ETSI Rule EN 300 330. Nonetheless, the integrator of the module has to make sure that all requirements are met by the final product. It is his obligation to declare product conformity. We recommend to assign this task to a qualified third-party test lab specialized on EMC measurements.

5.2 FCC (USA)

The UM14 USB Module complies with Part 15 of the FCC Rules. Since the module has no internal power supply regulation as well as no RF shielding the device has no modular approval according to FCC Rules (see FCC document DA 00-1407).

To fulfill all FCC requirements the integrator must test the final product to comply with FCC regulations regarding intentional and unintentional radiators before declaring FCC compliance of his own product.

5.3 IC (Canada)

Certification requirements for Industry Canada (IC) are similar to those of the FCC. Limits of ICES-003 for radiated emissions are similar to the formats specified in FCC Part 15 and CISPR 22. Industry Canada accepts FCC test reports or CISPR 22 test reports for compliance with ICES-003. The integrator is responsible for its product to comply with all relevant IC rules.

6 Further Notes

Electronic devices like the UM14 USB Module are covered by the (German) ElektroG (electronic waste law) as well as the European WEEE directive and as such may not be disposed of by way of the normal household trash. Instead they have to be recycled properly. For you as our customer this is no additional burden, however, as you can send the device back to us for proper recycling. We assure you that the devices received back will be recycled properly and in an environmentally friendly way. Our WEEE Registration ID is DE 56060482.

When selecting electronic components we additionally made sure that all components are free of heavy metals and other harmful substances as required by the RoHS Directive for many industries. Hence, our products are produced in the most environmentally friendly way possible.

7 Version Control

Version	Change	by	Date
1.0	created	KD	16.12.2009
1.1	Hibernate Mode added	KD	04.01.2010
1.2	Corrected use of Label MIFARE®	CS	20.01.2014
1.3	Correction of protocols used	CS	02.07.2014
1.4	links corrected, minor changes, Chapter Certification and Further Notes added	CS	22.12.2015
1.5	update address	KS	30.11.2016

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