Technical Documentation

for metraTec QuasarMR1 HF Mid-Range-Reader

Date: March 2017

Version: 2.3

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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 QuasarMR1 HF RFID Reader was not designed for use in dangerous environments. Using this product in applications where a failure could directly results 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 QuasarMR1 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 QuasarMR1 RFID Reader, it might be useful to also read the metraTec Protocol Guide, which explains the protocols used to control the reader in full detail.

We also offer general information about how to set up the connection of the reader to the antenna for optimum system performance in our HF Antenna Integration Guide.

All further documents can be either found at the metraTec's product web page or are listed at:

http://www.metratec.com → Support → Downloads → Documentation

2 Product Description

The QuasarMR1 is a mid range RFID reader operating at a frequency of 13.65 MHz. With RF performance of 1.5 W ± 1dB and if combined with an appropriate antenna, fitting tags can be read in a distance of up to 40 cm. All tags using protocol according ISO15693 are compatible, including a list of custom commands.

Default for data transfer with an attached computer is via USB port. Optionally, an additional Ethernet connection can be included. Both can be addressed via a virtual COM port or directly via DLL. Additionally, the reader comes with 8 GPIO-Pins (General Purpose Input Output Pins) controllable by the reader software, e.g. to control external devices like multiplexer or alarms.

2.1 Intended Use

RFID Reader/Writer for wireless communication with RFID transponders according to ISO 15693.

2.2 Technical Specification

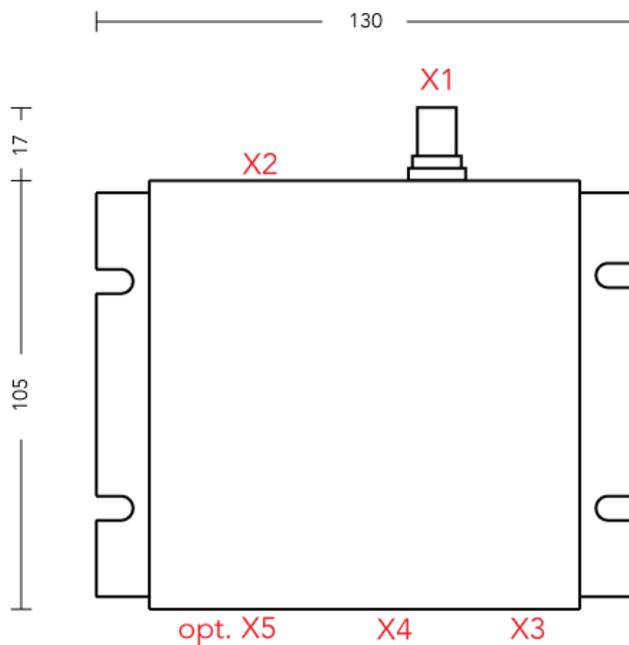|	
Operating Voltage	6.5 – 9 V DC
Digital Inputs/Outputs	8 x 5 V DC
Operating Frequency	13.56 MHz
System Impedance	50 Ohm
RF Output	1.5 W +-1 dB
Power Consumption	650 mA (without Ethernet) / 800 mA (with Ethernet)
Operating Temperature	-20°C to +70°C
Dimensions	130 x 105 x 44 mm
Protection	IP 40 (Other on Request)
Conformity	CE, e.g. EN 60950-1

2.3 Product Drawing

Fig. 1: Dimensions of QuasarMR1 RFID Reader (in mm)

2.4 Scope of Delivery

The QuasarMR1 RFID Reader comes with the following parts:

- QuasarMR1 RFID Reader
- 7.5 V DC power supply
- Documentation, Drivers and Demo Software are available via download from metraTec's website (http://www.metratec.com → Support → Downloads)

2.5 Accessories

The following accessories and modules are available to extend and evaluate the functionality of the QuasarMR1 HF RFID Module:

- Multiplexer (4x, 8x and 16x)
- Various HF-Antennas
- Coaxial cable

3 Power Supply and Electrical Specification

The QuasarMR1 is powered using 6.5 – 9 V DC (7.5 V DC recommended) which are connected at the front of the device (X3). If you do not use a power supply supplied by metraTec, please make sure that your own PSU provides a supply voltage of sufficiently high quality.

Connector	Description
X3.1 (on the right)	GND
X3.2 (on the left)	6.5 – 9 V DC

Tab. 1: Description of Power Connector

Operating Voltage	7.5 V DC
Power Consumption, RF on	650 mA (without Ethernet) / 800 mA (with Ethernet)
Power Consumption, RF off	50 mA (without Ethernet) / 250 mA (with Ethernet)
Voltage Inputs/Outputs	5 V TTL (-0.3 – 5.5 V DC)

Tab. 2: Maximum Rating and Electrical Limits

4 Communication

The QuasarMR1 offers two main options as a host interface – USB and optionally an Ethernet connection. Additionally, versions with WLAN and ZigBee are available on special request.

4.1 USB Driver Installation

The basic option for connecting the QuasarMR1 with your host PC is using the USB connection every reader has.

1. Connect the reader with a 7.5 V DC power source as described before
2. Connect the reader with a PC using a USB cable (X4).
3. Install the USB driver. metraTec offers the needed driver including Installation Guides for Windows XP and Windows 7 (as downloads from metraTec's website).

5 Antenna Connection

To send and receive data to and from the tags an appropriate HF RFID antenna (13.56 MHz, 50 Ohm) has to be connected to the reader. This is done via the BNC connector on the reader (X1).

ATTENTION

To avoid overheating and also destruction of the antenna it has to be designed for RF power of at least 2 W.

Since the design of HF antennas can be a task requiring expert knowledge, metraTec RFID Solutions offers a range of standard antenna types for HF applications which are compatible to the QuasarMR1. Further, we offer an antenna design service for custom designs. Most antennas come equipped with standard BNC connectors which can be directly connected to the QuasarMR1. In cases in which a different antenna geometry or connector is needed please contact support@metratec.com.

To connect the antenna to the reader or multiplexer the devices are equipped with BNC jacks and the cables are equipped with BNC plugs at both ends. When connecting antennas with multiplexers or readers please keep in mind that the cable has a signal dampening effect reducing the HF power reaching the antenna. If long cables are to be used in connection with one or more multiplexers the reading range can be reduced measurably. Using higher quality cables can reduce the power loss in cases in which this is important. Recommended cables with different lengths can be ordered from metraTec as accessories.

ATTENTION

Always connect an 50 Ohm antenna as described above first, before powering the device. Powering the reader without an appropriate 50 Ohm load for a longer time could damage the reader permanently.

6 Digital Input/Outputs

The QuasarMR1 has 8 digital input and output pins (X2) which can be be read or set by firmware commands via the reader. They are 5V TTL pins directly connected to the reader's internal micro controller.

ATTENTION

Make sure the pins are not charged with a power exceeding 5V DC. Some automation devices have an internal power of 24V (e.g. SPC, photoelectric barrier, etc.). If 24V is connected to the pins of the QuasarMR1 without appropriate protection measures, the device will be permanently damaged.

Connector	Description
X2.1	GND
X2.2	Not Connected
X2.3	Input/Output 0
X2.4	Input/Output 1
X2.5	Input/Output 2
X2.6	Input/Output 3
X2.7	Input/Output 4
X2.8	Input/Output 5
X2.9	Input/Output 6
X2.10	Input/Output 7

Tab. 3: Pin Description for digital IOs

7 Further Notes

7.1 Environmental

Electronic devices like the QuasarMR1 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.

7.2 Declaration of Conformity

The QuasarMR1 complies with all directives and regulations applicable in the European Union for this kind of device. This especially includes all laws regarding use of spectrum and EMC. The product therefore bears the CE sign, as required by Directive 1999/5/EC (Radio & Telecommunication Terminal Equipment Directive).

The product is currently not registered for use in the US or Canada. However, metraTec is registered as a manufacturer of electronics at the FCC and IC. A certification of this product is therefore possible, if required. Please ask us or your system integrator for further information.

8 Version Control

Version	Change	by	Date
2.0	Created in new design	KD	07.12.2009
2.1	English translation	CS	25.02.2015
2.2	HF Antenna Integration Guide mentioned, minor changes	CS	21.04.2015
2.3	update address	KS	08.03.2017

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