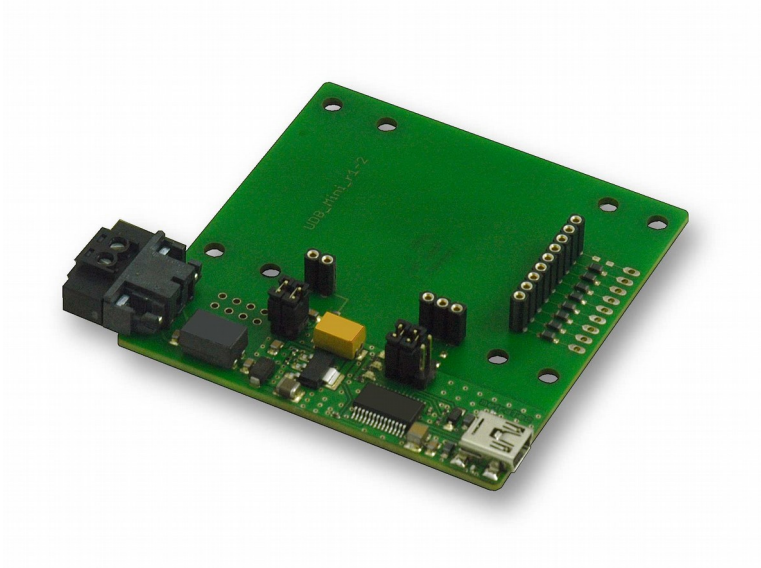


Technical Documentation

for metraTec UDB-Mini Development Board



Date: March 2017

Version: 1.4

Table of Contents

- 1 General Information / Security Advice.....[3](#)
 - 1.1 Notes on the Use of this Documentation.....[3](#)
 - 1.2 Security Advice.....[3](#)
 - 1.3 Export Restriction.....[3](#)
 - 1.4 Further Documentation.....[3](#)
- 2 Product Description.....[4](#)
 - 2.1 Intended Use.....[4](#)
 - 2.2 Technical Specification.....[4](#)
 - 2.3 System Building Blocks.....[4](#)
 - 2.4 Scope of Delivery.....[5](#)
 - 2.5 Accessories.....[5](#)
- 3 Power Supply and Power Consumption.....[6](#)
- 4 Communication.....[7](#)
- 5 Digital Inputs / Outputs (GPIOs).....[8](#)
- 6 Certification.....[9](#)
 - 6.1 CE / ETSI (EU).....[9](#)
 - 6.2 FCC (USA).....[9](#)
 - 6.3 IC (Canada).....[9](#)
- 7 Version History.....[10](#)

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.



NOTES

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 UDB-Mini Development Board was only designed for evaluation of metraTec modules. It was not designed for use in dangerous environments of any kind. 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 Restriction

The UDB-Mini Development Board 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 Documentation

This documentation explains the electrical and mechanical characteristics of the UDB-Mini Development Board. For more details on the RFID Modules by metraTec which can be connected to this board, please read the corresponding documentation of the modules.

For understanding the programming of these modules, it might be useful to also read the metraTec Protocol Guide, which explains the ASCII protocols used to control the modules in full detail. All further documents can be found on metraTec's website:

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

2 Product Description

The UDB-Mini Development Board is meant to allow easy experimentation with metraTec RFID modules such as the QR14, QR15, Dwarf14, Dwarf15 and DwarfG2 (not the DwarfG2_XR). It supplies the modules with power and converts the TTL serial outputs to USB for easy connection with a host PC. Using this connection, it also enables the user to install different firmware versions when needed.

2.1 Intended Use

The UDB-Mini Development Board is intended to evaluate the performance of metraTec RFID modules, like the QR- and Dwarf-modules as well as to design small embedded RFID applications. It is designed for use in a laboratory environment by experienced personnel with sufficient knowledge in electronics. This is not an end-user electronics board.

2.2 Technical Specification

Power Supply	7.5 – 9 V DC, up to 300 mA (current depends on module)
Communication	USB, 5 V UART (via Pin Header)
Plug-In Slot	metraTec QR Modules, Dwarf Modules with Adapter
Supported RFID Protocol	Depends on RFID module
Temperature Range	-20 °C to +70 °C
Dimensions	68 mm x 71 mm

2.3 System Building Blocks

The UDB-Mini consists of the main plug-in slot for modules in our QR form factor or Dwarf modules using an adaptor board. Besides this it has an internal regulating power supply with reverse polarity protection as well as communication interfaces for USB and 5 V UART (using pin headers).

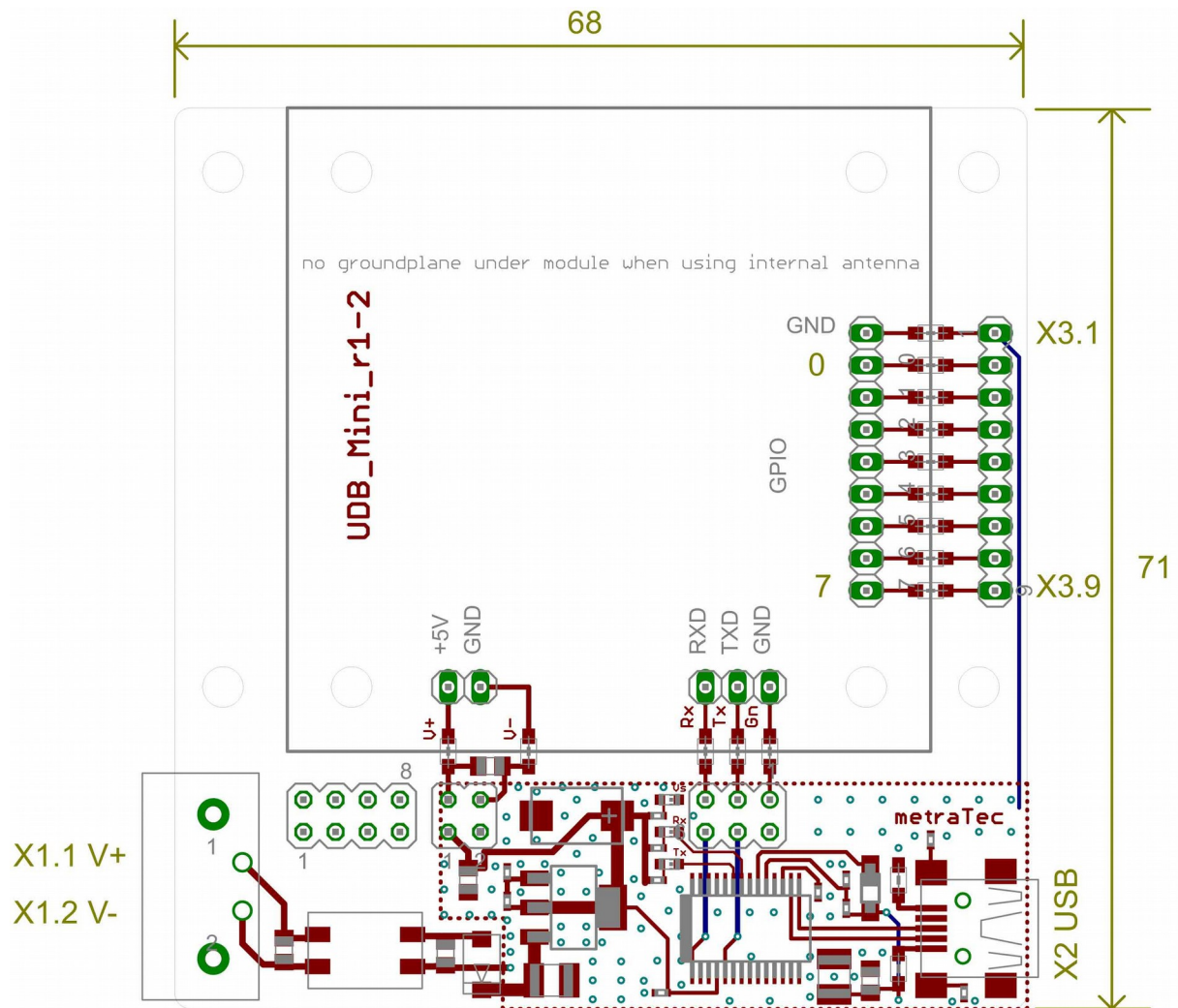


Fig. 1: UDB-Mini Top View

2.4 Scope of Delivery

The UDB-Mini usually comes as part of an Embedded RFID Starter-Kit. The content of this kit may vary according to the version you purchased.

2.5 Accessories

The following modules are available to extend the functionality of the UDB-Mini:

- QR15 RFID Module for ISO15693
- QR14 RFID Module for MIFARE® Classic and MIFARE Ultralight® Protocol
- Dwarf15 RFID SMD-Module for ISO15693
- Dwarf14 RFID SMD-Module for MIFARE Classic and MIFARE Ultralight Protocol
- DwarfG2 RFID SMD-Module for EPC Gen 2 (UHF)

3 Power Supply and Power Consumption

The development board features a power supply and reverse polarity protection.

By removing jumpers J1 and J2 it is also possible to connect the module directly with an external power supply. Please keep in mind that the modules themselves do not have reverse polarity protection. When bypassing the power supply of the development board it is the task of the user to supply a well filtered 5 V DC, correctly polarized supply in order to achieve an optimum RFID performance.

Via	Via Function
X1.1	7,5-9 V DC
X1.2	GND

Tab. 1: Power Supply Pins

As RFID systems require a very high quality power supply, the development board uses a linear regulator with high precision and high control speed.

When connecting your own power supply to the module directly and using a switching power supply please make sure the switching speed is above 500 kHz and use an EMC optimized layout as well as shielded inductors.

4 Communication

The RFID modules communicate with their host using a 5 V UART connection. The UDB-Mini makes this connection available directly via pin headers or offers the data stream converted to USB. This enables direct connection to different hosts. The communication details of the serial interface are 115.200 Baud, 8 Databits, 1 Stopbit, no Parity, no Handshake / Flow control.

The UART commands used to control the modules are described in different metraTec protocol guides depending on the module used.

5 Digital Inputs / Outputs (GPIOs)

The modules typically have eight freely configurable input / output pins which can be set and read via the respective module. To use these GPIOs just connect your signals to the corresponding vias (X3). All signals are 5 V DC signals.



ATTENTION

Please make sure that you only connect 5 V level devices to the GPIOs or use the right level shifter if connecting other devices. Some devices use 12 V or even 24 V DC inputs / outputs. If you connect these without proper protection, this will most likely destroy the module currently plugged in.

Pin	Pin Function
X3.1	GND
X3.2	Input / Output 0
X3.3	Input / Output 1
X3.4	Input / Output 2
X3.5	Input / Output 3
X3.6	Input / Output 4
X3.7	Input / Output 5
X3.8	Input / Output 6
X3.9	Input / Output 7

Tab. 2: Overview of digital input / output pins

6 Certification

The UDB-Mini is an evaluation board intended for use for ENGINEERING DEVELOPMENT, DEMONSTRATION, OR EVALUATION PURPOSES ONLY and is not considered by metraTec to be a finished end product fit for general consumer use. Persons handling the product(s) must have electronics training and observe good engineering practice standards.

6.1 CE / ETSI (EU)

The UDB-Mini Development Board and all original parts of the Embedded RFID Starter-Kit comply with applicable EN / ISO standards. Nonetheless, the person handling the module(s) has to make sure that all requirements are met during customized use and especially 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.

6.2 FCC (USA)

The UDB-Mini Development Board and all original parts of the Embedded RFID Starter-Kit comply with Part 15 of the FCC Rules. The person handling the module(s) has to make sure that all requirements are met during customized use.

To fulfill all FCC requirements the person handling the module(s) must test the final product to comply with FCC regulations regarding intentional and unintentional radiators before declaring FCC compliance of his own product.

6.3 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.

7 Version History

<i>Version</i>	<i>Change</i>	<i>Changed by</i>	<i>Date</i>
1.0	Created	FS	06.03.2014
1.1	Corrected use of label MIFARE®	CS	20.01.2015
1.2	Chapter 6 Certification inserted, minor changes	CS	07.05.2015
1.3	minor changes chapter certification	CS	16.06.2015
1.4	update address	KS	09.03.2017

Contact

metraTec GmbH
Niels-Bohr-Str. 5
D-39106 Magdeburg, Germany

Tel.: +49 (0)391 251906-00

Fax: +49 (0)391 251906-01

Email: support@metratec.com

Web: <http://www.metratec.com>

Copyright

© 2017 metraTec GmbH

Reprint or reproduction of this documentation for other than internal purposes is only allowed with written permission by metraTec GmbH.

All trademarks are the property of their respective owners. All right reserved.

We are constantly improving our products.

MIFARE® Classic, MIFARE Ultralight®, and MIFARE Plus® are registered Trademarks of NXP B. V. and are used under license.

Changes in function, form, features can happen without prior notice.