HF-mPCIe
RFID Reader Documentation
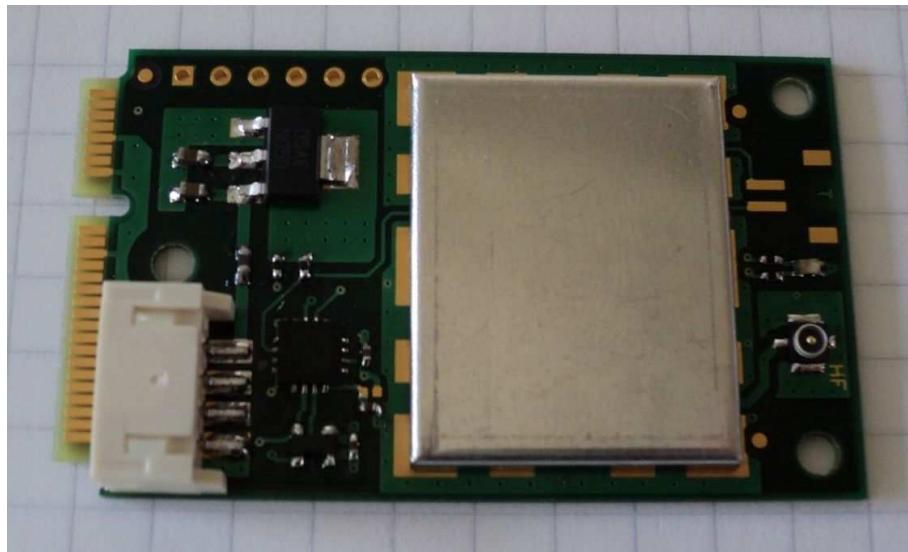
Contents

1 General description

The HF-mPCIe RFID reader is a customer specific adopted RFID reader based on Pondi reader technology. It is designed for the use in an industrial-panel-pc-system.

1.1 Supported RFID chips

Standard ISO 15693 Transponders are supported by the HF-mPCIe RFID reader.

1.2 Functional description
At the detection process the RFID reader reads/writes the data of the transponder.
The data is send via an USB comport emulation to host system.
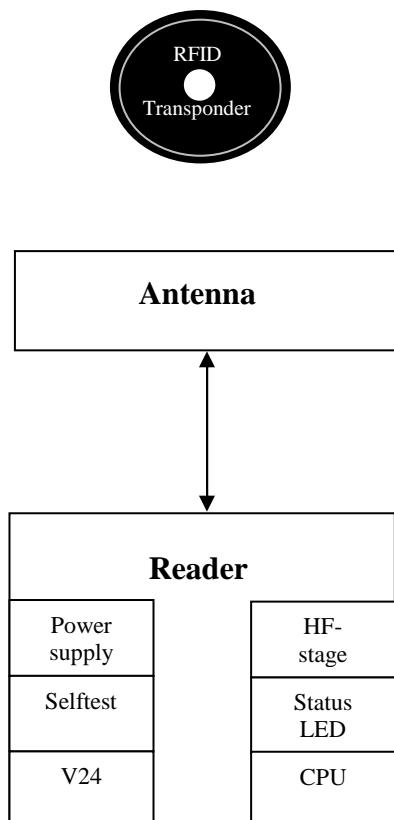
Drawing 1: Block diagram of HF-mPCIe RFID reader

1.3 Model, Manufacturer

The HF-mPCIe RFID reader can be ordered at maxsol at the following order code:
"HF RFID module, HF-mPCIe".

The RFID antenna can be ordered at maxsol at the following order code:

"RFID Antenna_KEU"

"RFID Antenna_KM1356"

Only this antennas may be used for the reader module.
All other antennas are not allowed.

The reader electronic unit consists of a RFID reader main board, with external antenna.
The electronic unit is not assembled into a housing.
The whole production of the HF-mPCIe RFID reader, the Antenna_KEU and the Antenna_KM1356unit will be done under the responsibility of maxsol and a certified EMS partner.

1.4 Labelling

On module:

```
HF RFID module
maxsol GmbH
Model:      HF-mPCIe
FCC ID:    WY6-HFMPCIE
IC:          8094A-HFMPCIE
```

Sticker is placed on shield of device

On rear side of device in which this module is mounted

```
Device contains HF RFID module
Model:      HF-mPCIe
FCC ID:    WY6-HFMPCIE
IC:          8094A-HFMPCIE
```

2 Applied standards and regulations

The HF-mPCIe RFID reader is conformal to the following radio regulations and standards:

STATEMENTS

FCC 15.19/RSS Gen Issue 4 Sect. 8.4:
This device complies with Part 15 of the FCC Rules and with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

FCC Part 15.21

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Remark:
This device is authorized only for use in business, industrial and commercial environments and must not be used in residential environments.

3 Specification

3.1 Power supply

The circuitry is operates with an internally stabilized voltage for optimum and stable operation.

Value Symbol Unit

Value	Symbol		Ûnit
Supply voltage (at external USB connector)	V	5 +/-10%	V_{DC}
Supply voltage (at mPCIe connector)	V	3.3 +/-5%	V_{DC}
Max. ripple on supply voltage	Vss	150	mV_{pp}
Current consumption, standby	$I_{standby}$	<100	mA
Max. current consumption	I_{max}	<200	mA

3.2 RFID data

Value Symbol Unit

Value	Symbol		Ûnit
RFID Frequency (typical)	f	13,56	MHz
RFID Output power @ 50 Ohm termination	P_{HF}	<100	mW
Read distance	d_{Peak}	0 - 20	mm

The transponder is readable over the whole operation distance between reader antenna and the specified maximum read distance

3.3 Environmental conditions

Value Symbol Unit

| Value	Symbol		Ûnit
Operation temperature range	$T_{Operation}$	-10 - +85	°C
Storage temperature range	$T_{Storage}$	-20 - +85	°C
Requested Relative humidity for storage and operation (not condensing)		5 - 95	%

3.4 Dimensions

3.4.1 HF-mPCIe RFID Reader
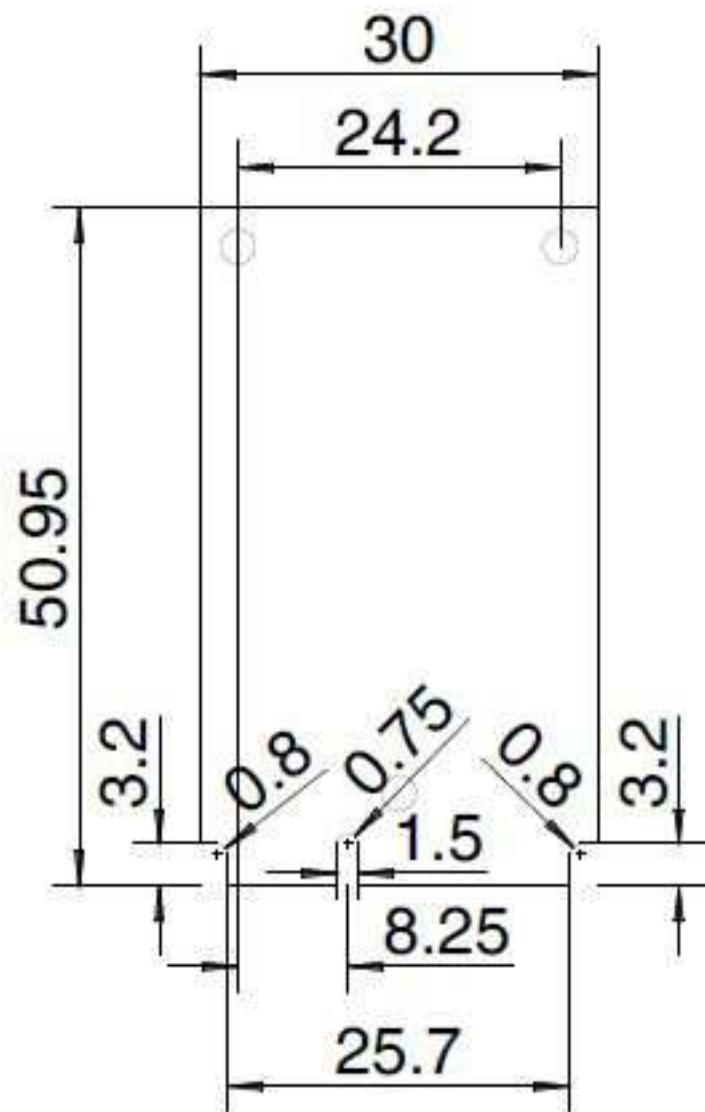
3.4.2 Antenna_KEU
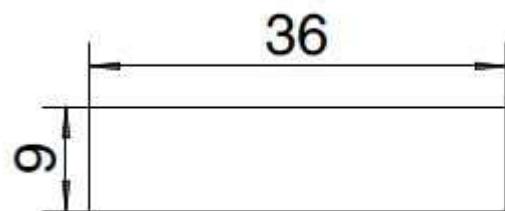
3.4.3 Antenna_KM1356
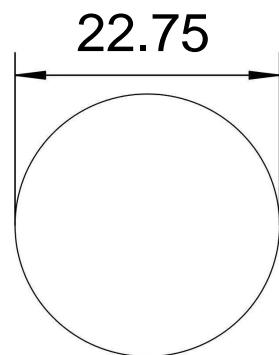
3.5 Dimensions of transponder

Form and dimension t.b.d. by customer.

This has impact on the reading distance.

3.6 Connector

**Power/Communication:**

3.6.1 HF-mPCIe RFID reader

J1 mPCIe standard

J2 Pin assignment:		
	1	+ 5V
	2	D-
	3	D+
	4	GND

Connector type: WR-WTB SMT Male Horizontal Shrouded Header 2.00mm
WE 620104131822, 4 pol.

J5 HF-connector
Connector type: Microwave Coaxial Connectors
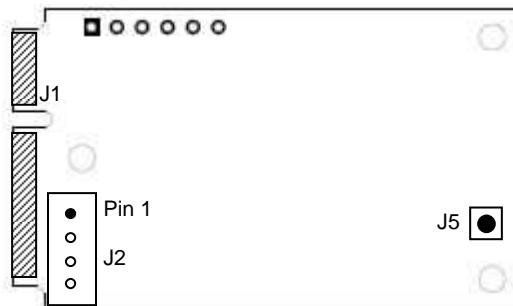
### 3.6.2 Antenna KEU

J1 HF-connector
Connector type: Microwave Coaxial Connectors
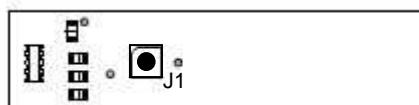
3.6.3 Antenna KM1356

J1 HF-connector
Connector type: Cable Terminator for Printed Circuits
Telegaertner H01000A0027
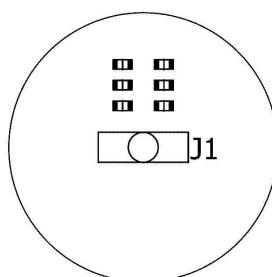
3.7 Serial interface parameters

The data between the HF-mPCIe RFID reader and a host system are transmitted via a USB comport emulation.

Interface parameters:
Baud rate 19.200
No of Bits 8
Stop bit 1; Parity N
No hardware or software handshake

3.8 Host communication protocol

The communication protocol between a host system and the HF-mPCIe RFID reader is defined in the document "P2 Interface Protocol"

3.9 Life time

No MTBF calculation.

3.10 Design-FMEA

No

3.11 Production-FMEA

No

4 Packaging

4.1 Reader packaging

Every reader is packed into an ESD proof bag.

Every antenna is packed into an ESD proof bag.

4.2 User manual

One documentation is delivered to customer in paper and pdf.

5 Embargoed countries

In customer responsibility.

6 Installation notes

Special ESD prevention is required to assemble the HF-mPCIe RFID reader.
It is recommend to use a ESD wristband when you unpack the reader and connect it to the host system.
The system power has to be switched off prior to the assembly.
Be aware of the following possible environmental effects when your are installing the HFmPCIe RFID reader into a device.

Also the transponders might be effected by:

· Nearby existing metal objects like housings, shielding and also PCB-boards with large ground plates.

· EMC effects from cables

· EMC effects from magnetic fields.

Metal surface in direct vicinity of the active antenna will detune the antenna and thus have a direct influence to the operating distance. Increase the distance between the antenna and the metal layer to the possible maximum for least influence.

Communication between the reader and a transponder can never pass through a metal layer.

7 Product warranty

maxsol 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, maxsol assumes no liability and is not responsible for customer applications or product or software design or performance relating to systems or applications incorporating maxsol products.
maxsol 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 maxsol. maxsol is not liable for infringements of patents and/or any other intellectual or industrial property rights of third parties resulting
out of the usage in the customers industrial system.
maxsol 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. A critical component is a component used in a life-supporting device or system whose failure can reasonably be expected to cause the failure of that life-support device or system, or to affect its safety or effectiveness of that device or system. Life support devices or systems are intended (a) to be implanted in the human body, or (b) to support and/or maintain and sustain human life. If they fail, it is reasonable to assume that the health of the user may be endangered.

The product warranty is defined by governmental law and in maxsol's "General Conditions for the supply of products and services".

8 Document revisions

Datum	Version	Status
30.01.2017	2.0	draft