

UHF-M650-TTL
4 CH UHF RFID Module
Hardware Description

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1 Function Description

1.1 Intended Use

The UHF-M650 hereinafter named RFID device, is a high-performance RFID communication device to read data from and write data to RFID tags of the standard ISO18000-63. For this purpose, it can produce an RX power of up to +33 dBm (2 W).

1.2 Hardware Settings

There are no hardware settings to be done. All configuration is done using the configuration software.

1.3 Status Indication

The module has a red LED close to the FPC connector. This indicates the power supply.

1.4 Safety Notes

The device may only be used for the intended purpose designed by the manufacturer. The operation manual should be conveniently always kept available for each user.

Unauthorized changes and the use of spare parts and additional devices that have not been sold or recommended by the manufacturer may cause fire, electric shocks, or injuries. Such unauthorized measures shall exclude any liability by the manufacturer.

The liability-prescriptions of the manufacturer in the issue valid at the time of purchase are valid for the device. The manufacturer shall not be held legally responsible for inaccuracies, errors, or omissions in the manual or automatically set parameters for a device or for an incorrect application of a device.

Repairs may be executed by the manufacturer only.

Only qualified personnel should carry out installation, operation, and maintenance procedures.

Use of the device and its installation must be in accordance with national legal requirements and local electrical codes.

When working on devices the valid safety regulations must be observed.

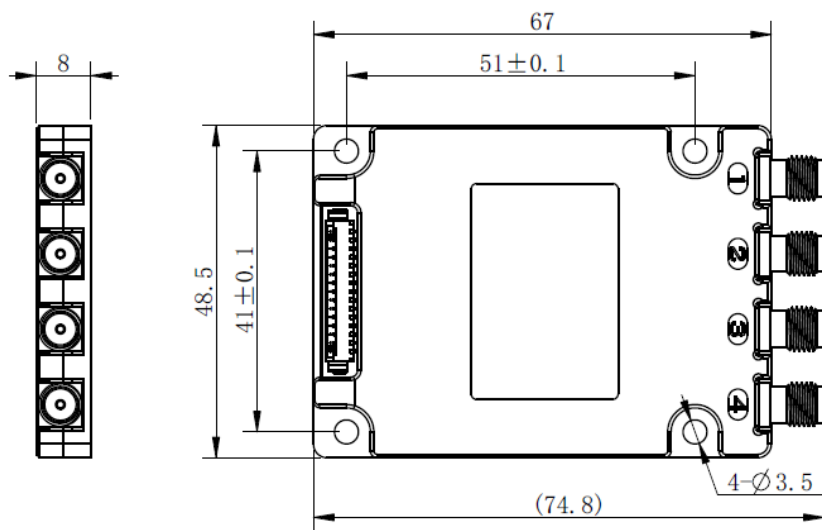
Do not operate the RFID device without antenna or another 50 Ohms load capable of consuming +33 dBm (2 W) RF power.

1.5 Reference Document

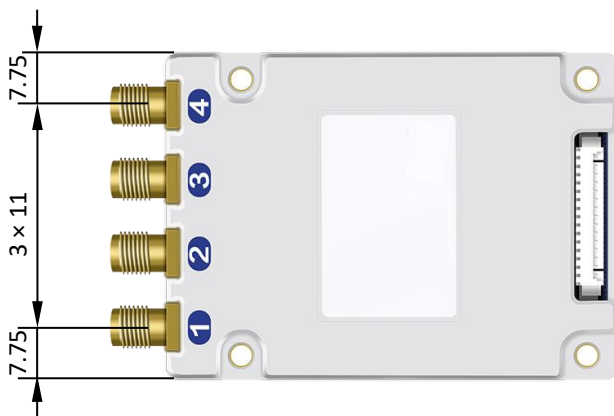
Communication Protocol: UHF Communication Protocol 1.0_EN.pdf

2 Mechanical Drawings

Overall Dimensions



Position of Ports



3 Electrical Installation

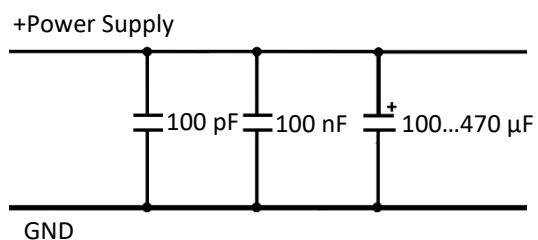


3.1 Connector Pinout

Pin	Signal Name	Description
1	GND	Negative Power Supply
2	GND	Negative Power Supply
3	VCC	Positive Power Supply 5 Vdc $\pm 5\%$
4	VCC	Positive Power Supply 5 Vdc $\pm 5\%$
5	GPIO Out 1	Digital Output 1, TTL Level
6	GPIO Out 2	Digital Output 2, TTL Level
7	GPIO In 1	Digital Input 1, TTL Level
8	GPIO In 2	Digital Input 2, TTL Level
9	RxD	Data Input, TTL Level
10	TxD	Data Output, TTL Level
11	—	NC
12	—	NC
13	—	NC
14	SHUTDOWN	Low level enable, high level power off, high level should be greater than VCC-0.3V
15	/RST	Reset, low-active

3.2 Power Supply Filtering

Filter and stabilize the power supply lines with a combination of 3 capacitors:



4 Installation

4.1 General Instructions

- Before soldering the device add a thin layer of thermal compound the heat dissipation zones on the underside.
- Install the device using the solder strips.
- Keep the device away from direct sunlight, high humidity, extreme temperatures, and sources of electromagnetic interference. Any combination of these conditions might degrade performance or shorten the life of the device.
- Connect the device as defined in electrical connections section.
- Power the device as defined in electrical connections section. The boot sequence begins in either case when power is supplied to the device. After the boot sequence finishes, the device accepts commands, not before.
- Use an external LED to control the presence of power in the electronics.

4.2 Avoiding Interference

The device usually operates without any interference caused by radio communication if it is

- used as intended and,
- correctly installed.

This is an RFID device. It is part of its normal functions to emit radio waves. The operation free of radio disturbance cannot be guaranteed for each application.

If the device causes radio disturbance in an application, the following instructions will help:

- Realign the antenna.
- Change the position of the antenna.
- Increase the distance between the device and the antenna.
- Change the power supply of the device.
- Contact the support of the manufacturer.

4.3 Emitted Frequencies During Normal Operation

Region	Frequencies
Europe (ETSI)	865.7, 866.3, 866.9, 867.5 MHz
USA (FCC)	The FCC specifies frequency hopping between 902.75–927.25 MHz in 500 kHz steps. This specification states that no listen-before-talk is performed. The maximum continuous transmit time on a channel is 0.4 seconds.

According to ETSI EN 302208-1 only channels 4, 7, 10 and 13 (internal numerated as 1, 4, 7 and 10) could be used at high power! Other RF channels are present only for test purposes and should not be used in normal operation!

5 Maintenance, Repair and Disposal

5.1 Maintenance

The electronics are maintenance-free. Protect it against dirt and liquids.

5.2 Repair

There are no user-serviceable parts. Do not attempt repairs. Do not allow any unauthorized service centre or personnel to repair or modify the product.

In the event your electronics fails, contact iDTRONIC GmbH via the service e-mail address: support@idtronic.de

5.3 Disposal

After use dispose of the device in an environmentally friendly way in accordance with the applicable national regulations.

Do not dispose of this device in normal household waste. Contact your local council for information on disposal options for electronic devices in your area.

6 Technical Data

Radio Specifications

Operating Frequency	840...960 MHz, Configurations for USA: 902...928 MHz (FCC), EU: 865...868 MHz (ETSI), CN: 920...925 MHz
RFID IC	Impinj E710
RF TX Power	+5...33 dBm, adjustable in steps of 1 dB
RF Sensitivity	-87 dBm
RF Channel Isolation	32 dB
Reading Range	Up to 12 meters*
RF impedance	50 Ω
Antenna	4 SMA female connectors for external antennas

Electrical Specifications

Electrical Specifications			
Power Supply	3.6...5 Vdc		
Power Consumption	1600 mA @ +33 dBm TX Power 120 mA Standby 40 mA enabling Mode		
Connectors	15 pin FPC socket		
Communication Interface	UART TTL port		
Communication Parameters	Baud rate: 9600...921600 bit/s, 115200 bits/s factory default 1 start bit, 8 data bits, 1 stop bit, no parity bit		
GPIO	2 Inputs TTL Levels: Logic low: < 0.8 V, minimum 0V Logic high: > 2 V, maximum 3.3 V 2 Outputs TTL Levels: Logic low: maximum 0.4 V Logic high: minimum 2.9V, maximum 3.3V IO The maximum output current of the port is 5mA		

Mechanical Specifications

Dimensions	74.8 × 48.5 × 8 mm
Weight	56 g
Material	Aluminium

Environmental Conditions

Operating Temperature	-25 °C ... +55 °C
Storage Temperature	-40 °C ... +85 °C
Humidity	up to 95 %, non-condensing

Supported Standards / Tags

ISO Standard	ISO 168000-63 (EPC Class 1 Generation 2)
Read Rate	≥ 900 tags/s
Tag Cache	≥ 1000 Tags @ 12 Bytes EPC size

SDK Information

Supported OS	Windows, Linux, Android
Supported Languages	C, C#/.NET, Java
Demo Software	Windows

Other functions and details to be continued and upgraded.

7 Revision History

Version	Date	Notes
0.1	2023-01-06	Initial User's Guide Version
0.2	2023-02-09	Chapter 4 enhanced.
0.3	2023-03-15	Serial Communication Parameters added to Technical Data