

**UHF Long-Range Reader 4/8/16CH
R-IN-UHF-LRx C
Hardware Description**

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1 Function Description

1.1 Intended Use

The R-IN-UHF-LRxC 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). The 3 different versions can operate 4, 8 or 16 antennas.

1.2 Hardware Settings

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

1.3 Status Indication

Red LED, Status Light

5 seconds after power-on, the red light will be on continuously on. This indicates that the RF part is active. If the red light is blinking, it means that the RF module is not operating correctly.

Green LED, Power Signal

Lights up, when the interface board is supplied with power.

1.4 Power Supply

The RFID device can be powered in parallel by the power connector and via PoE.

1.5 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.

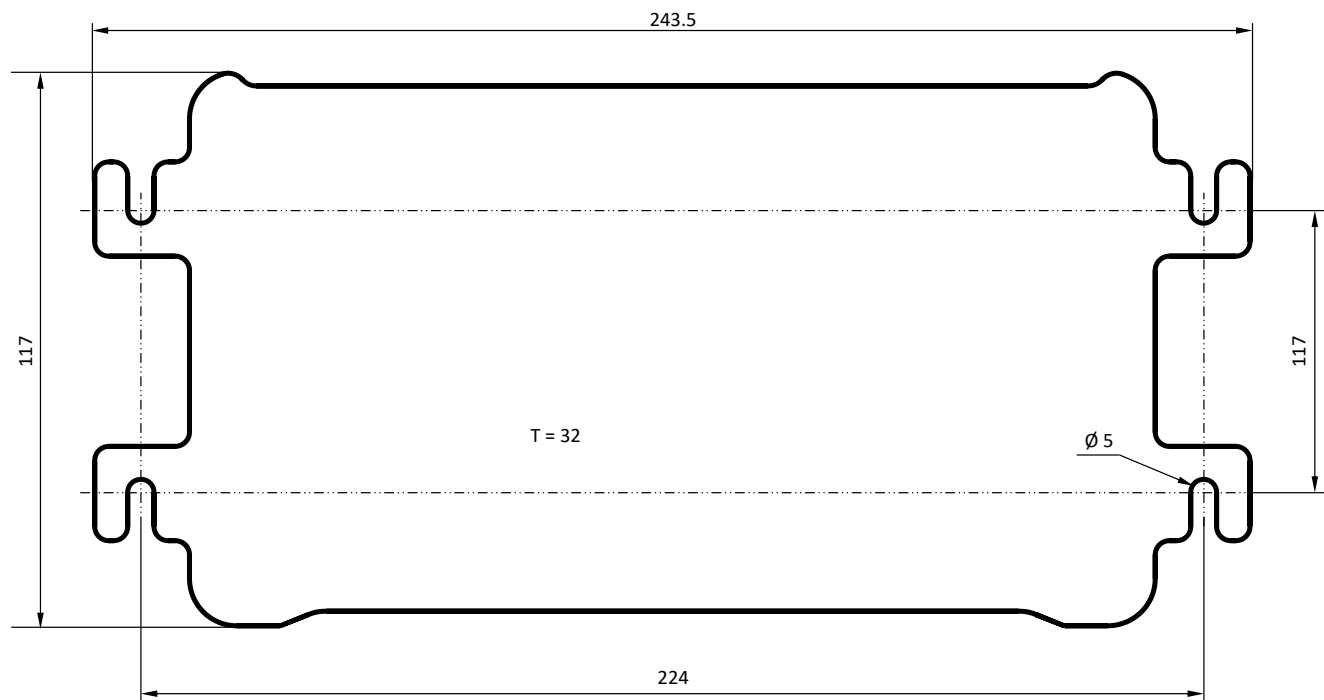
Use of the device and its installation must be in accordance with national legal requirements and local electrical codes. When working on devices the valid safety regulations must be observed.

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

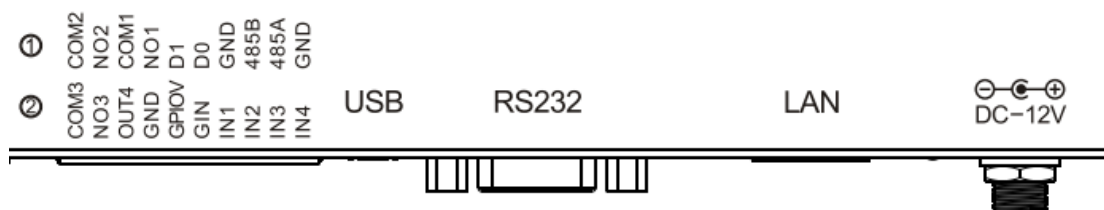
1.6 Reference Document

Communication Protocol:	UHF RFID Communication Protocol_x.y_EN.pdf
Web Interface Configuration:	UHF RFID Reader Web Interface_x.Y_EN.pdf
Reader Manager Software (complex):	UHF RFID Reader Manager Software_x.y_EN.PDF
Reader Demo Software (simple):	UHF RFID Reader Demo Software_x.y_EN.pdf

2 Mechanical Drawings



3 Electrical Installation



3.1.1 USB VCP

The USB communication of the board uses the FT232RL chip of FTDI (Future Technology Devices International Ltd.). After the driver is installed, it will be virtualized into a standard serial port.

Normally the USB drivers are automatically installed with Windows operating systems.

If this does not work, you can download the latest drivers here: <https://ftdichip.com/drivers/vcp-drivers/>

3.1.2 RS232 Communication

If serial communication is used, the host computer and the interface board can be connected through a male-female serial port straight-through extension cable.

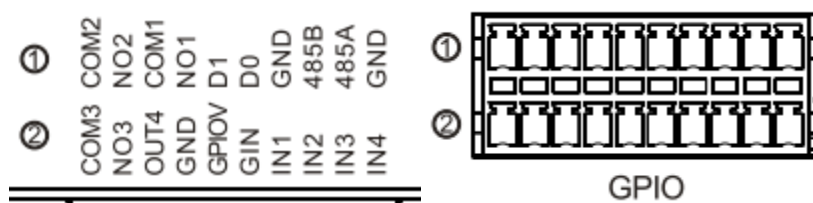
Pin	Signal Name	Description
1	DCD, CD, RLSD	Data Carrier Detect
2	RxD	Receive Data
3	TxD	Transmit Data
4	DTR	Data Terminal Ready
5	GND	Ground
6	DSR	Data Set Ready
7	RTR	Ready to Receive
8	CTS	Clear to Send
9	RI	Ring Indicator

3.1.3 TCP/IP Communication on Ethernet

In the network port connection, the default address of the reader is 192.168.1.100, the default gateway is 192.168.1.254, and the subnet mask is 255.255.255.0. The IP address of the computer connected to the reader must be in the same network segment.

3.1.4 TCP/IP Communication on WLAN

3.1.5 GPIO Ports and RS485 Host Interface

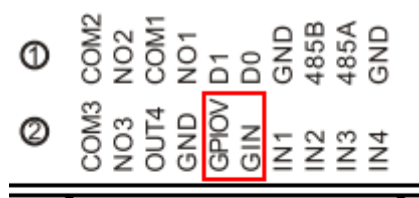


Upper Row (1)

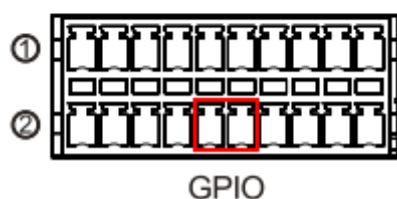
Pin	Signal Name	Description
1	COM2	Relay 2 common port
2	NO2	Relay 2 normal open port
3	COM1	Relay 1 common port
4	NO1	Relay 1 normal open port
5	D1	Wiegand 26/34 D1 or CAN-H
6	D0	Wiegand 26/34 D0 or CAN-L
7	GND	Ground
8	485/A	RS485 interface A port
9	485/B	RS485 interface B port
10	GND	Ground

Lower Row (2)

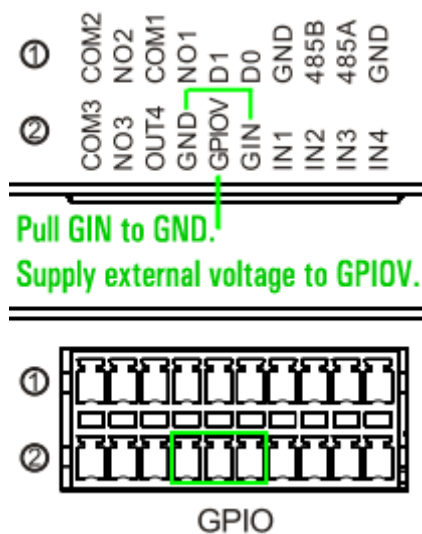
Pin	Signal Name	Description
1	COM3	Relay 3 common port
2	NO3	Relay 3 normal open port
3	OUT4	GPIO output, output voltage range: 0 to (VGPIO-0.3V) Current-drawing capability: <ul style="list-style-type: none"> when internally powered, a total amount of 1 A can be drawn from all channels (e.g. 250 mA per channel) when externally powered, each channel can bear a load of 1 A Device logic 0 output high level (VGPIO-0.3V) Device logic 1 output low level (0-0.3V, internal 3K resistor pull down)
4	GND	Ground
5	GPIOV	GPIOV, GPIO power supply positive
6	GIN	GND_GPIO, GPIO power supply ground, connect to GND when internal power supply is required
7	IN1	GPIO inputs, the input voltage range is (0-24V) Input high voltage (5-24V) judged as logic 0 Input low voltage (0-0.7V) judged as logic 1
8	IN2	
9	IN3	
10	IN4	

3.1.6 Using internal Power Supply for GPIOs

Do NOT connect these two pins GPIOV and GIN.



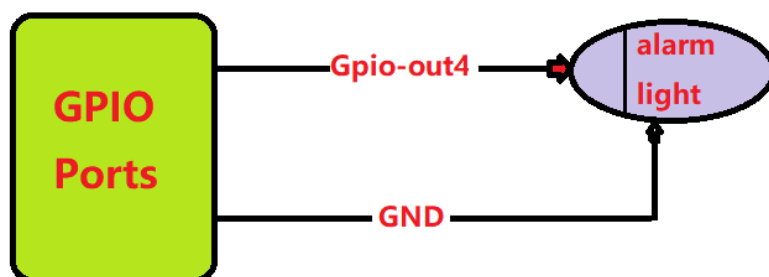
3.1.7 Using external Power Supply for GPIOs



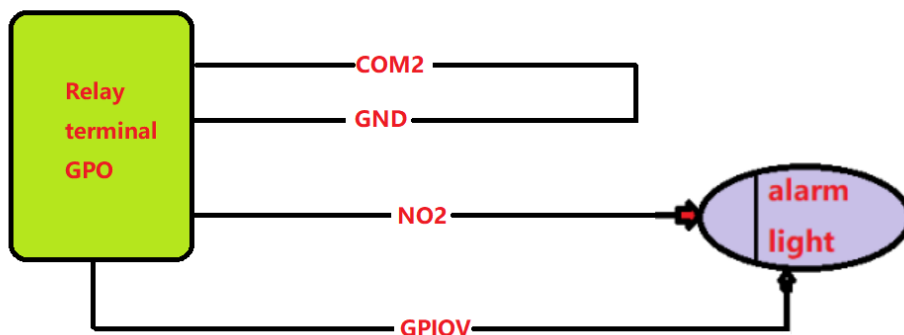
3.2 Wiring Instructions

First select internal power supply or external power supply according to the actual situation.

Use the GPIOs as shown in the figures below:



GPIO Output 4 drives an Alarm Light



Using the Relays for an Alarm Light, the connection to GND is switched by the relay.

Signal Name	Description
IN1...IN4	4 GPIO inputs, the input voltage range is (0-24V) Input high voltage (5-24V) judged as logic 0 Input low voltage (0-0.7V) judged as logic 1
ING	Input Ground. If you want to use the VCC to drive inputs, connect ING to GND.
O2...O4	GPIO output, output voltage range: 0 to Vcc (typ. 12 Vdc) Current pulling capacity: single channel maximum 0.3 A, internal pull-down resistor of 3 kOhms Note: Output 1 (O1) are the normally open relay contacts A and B
A, B (O1)	Normally open relay contacts A and B Drive performance: 3 A/50 Vac, 3 A/30 Vdc Response time: < 10 ms Relay life time: 100 thousand times This relay is output 1
VCC	Supply 12 Vdc power in reader internal, max. current 0.3A
GND	Ground to VCC
ET, ER	Debug interface, RS232, ET: Debug Tx/D, ER: Debug Rx/D

3.3 Antenna Connectors



3.4 IP-Reset Button

There is a reset IP button on the left side of the network port of the interface board. When you forget the set IP, you can press and hold the reset button for 3 s in the power-on state to reset the IP. The reset IP is 192.168.1.100

4 Installation Notes

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.

Radio Specifications	
Operating Frequency	840...960 MHz, Configurations for USA: 902...928 MHz (FCC), EU: 865...868 MHz (ETSI), CN: 920...925 MHz
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 13 meters* with 8dbi aluminum board antenna, write distance is half of the reading distance
RF impedance	50 Ω
Antenna	4 reverse TNC connectors for external antennas

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

Hardware Information	
CPU	ARM9, Main frequency 454MHz
SDRAM	64 MB
NAND Flash	128 MB
Extended storage	16 GB TF card (class 4)
RFID IC	Impinj E710

Electrical Specifications	
Power Supply	9...24 Vdc, standard adaptor 12V/3A POE power supply 802.3af or 802.3at
Power Consumption	Standby 1.68 W, Working 10.32 W
Power Consumption PoE	Up to 100 meters of Category 5e network cable, there are deviations in different models of POE switches. Use 803.af do power supply, max. Load 13.8W Use 803.at do power supply, max. Load 17.5W
Power Connector	Round Plug
Communication Interface	RS232 + Ethernet
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	4 Inputs TTL Levels: Logic low: < 0.8 V, minimum 0V Logic high: > 2 V, maximum 3.3 V 3 Outputs TTL Levels: Logic low: maximum 0.4 V Logic high: minimum 2.9V, maximum 3.3V 1 Output via relay: 3 A/50 Vac, 3 A/30 Vdc, Response time: <10ms Relay life time: > 100.000 switching operations IO The maximum output current of the port is 5mA
OS Information	Linux core 2.6.35x

Mechanical Specifications	
Dimensions	183.4 × 174.4 × 25 mm
Weight	1.2 kg
Material	Aluminium

Environmental Conditions

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

ESD Protection

Power Supply Adaptor	Air discharge: 8 kV Touch discharge: 6 kV Surge Immunity: 4 kV EFT: 2 kV
Reader	Touch discharge: 6 kV EFT: 2 kV

SDK Information

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

* Reading distance depends on tag, antenna and environmental conditions

Other functions and details to be continued and upgraded.

7 **Revision History**

Version	Date	Notes
0.1	2025-02-27	Initial User’s Guide Version