

4/8 Channel HF-RFID Modules and Devices With Ethernet connection Hardware Description

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Issue 0.3
– 22. April 2025 –

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Printed in Germany

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1 Function Description

1.1 Intended Use

This device is for operating RFID tags of standards ISO14443A, ISO 14443B and ISO15693 on up to 8 antennas. This electronics has the standard Firmware of the DESFire family plus an additional command to select 1 out of 8 antennas. The standard Firmware has no individual addressing to handle multiple devices on an RS485 bus. The Firmware will simply ignore all telegrams that do not start with 0x50. The RS485 bus allows long cable runs. For convenient wiring there are 2 connectors to loop-through the power supply and RS485.

1.2 Hardware Settings

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

1.3 Status Indication

A red LED indicates the supply power is present.

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 staff 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.

1.5 Reference Document

Communication Protocol: OEM-DES Devices Communication Protocol_x.yy_EN

2 Device-Specific Telegrams and Commands

2.1 Telegram Format in RS485 Protocol

For communication on the RS485 bus, the second Byte is used as address byte.

System to Reader

[illegible]

Reader to System, Success

50	WW	UU	YY	mmmmmmmmmmmmmmmmmmmmmmmmmm	ZZ
ACK	Addr.	Length	CMD	Data	XOR

The same command byte YY is returned in the answer from the reader.

Reader to System, Error

F0	WW	UU	YY	SS	ZZ
ACK	Addr.	Length	CMD	Status	XOR

Values of the Address Byte WW

00, FF = Broadcast Address

01...FE = Individual Address

If you send a telegram using a broadcast address to a device that has an individual address, it will reply to the command, but with its individual address.

2.2 Set Device Address, Command Code 0x08

#1	#2	#3	#4	#5...7	#8
50	WW	03	08	01 01 NN	ZZ
ACK	Addr.	Length	CMD	Data	XOR

WW = Current Address or use 00 or FF if it is the only device on the RS485 bus.

NN = New Address

The device confirms with a reply telegram that already has the new device address.

Example

Set device #1 to address 12: 50 00 03 08 01 01 **12** 49

Confirmation from RFID device: 50 **12** 00 08 4A

Set device #2 to address 34: 50 00 03 08 01 01 **34** 6F

Confirmation from RFID device: 50 **34** 00 08 6C

2.3 Antenna Selection, Command Code 0x0C

#1	#2	#3	#4	#5	#6
50	WW	03	08	NN	ZZ
ACK	Addr.	Length	CMD	Data	XOR

NN = Antenna Number

2.3.1 Telegram from PC/PLC to RFID Device

>> 50 00 01 0C 01 5C This switches the RFID operation to use antenna #1

The Bytes in Detail

50	Start Bytes
00 01	Number of Bytes between command code and checksum
0C	Command Code
01	Antenna Number, range from 0x01... 0x08

2.3.2 Reply from RFID Device to PC/PLC

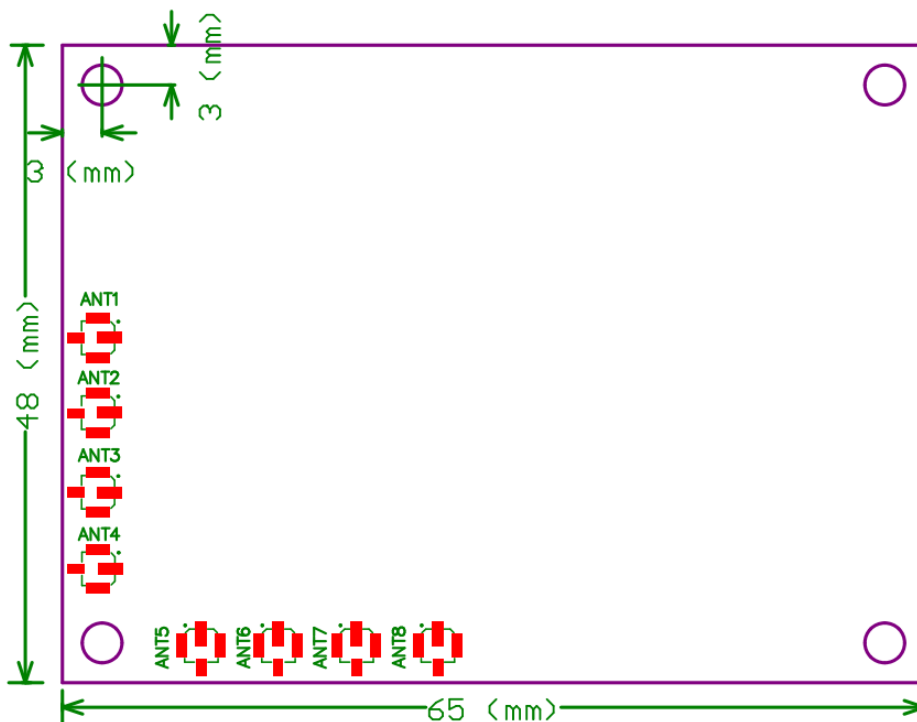
<< 50 00 00 0C 5C

2.3.3 Commands to Use

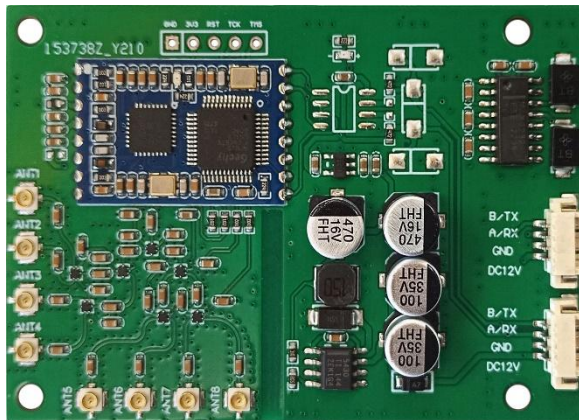
50 00 01 0C 01 5C	→ Antenna #1
50 00 01 0C 02 5F	→ Antenna #2
50 00 01 0C 03 5E	→ Antenna #3
50 00 01 0C 04 59	→ Antenna #4
50 00 01 0C 05 58	→ Antenna #5
50 00 01 0C 06 5B	→ Antenna #6
50 00 01 0C 07 5A	→ Antenna #7
50 00 01 0C 08 55	→ Antenna #8

3 Installation

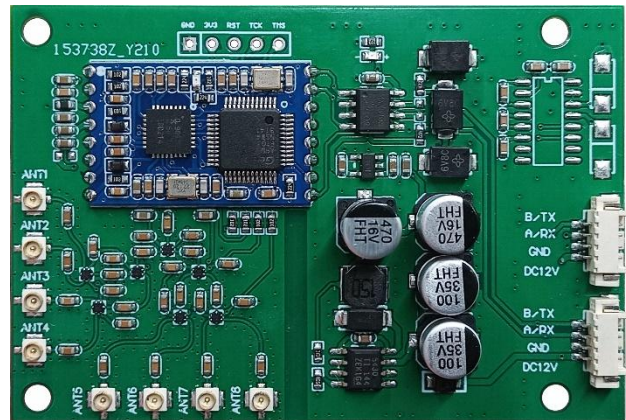
3.1 Mechanics



3.2 Interface Version Identification



RS232



RS485

3.3 Electrical Installation RS485 and RS232

signal Name	Colour	Description
DC12V	Red	Positive Power Supply 9...24 Vdc
GND	Black	Negative Power Supply, Ground
A/RxD	Yellow	RS485+, A wire / RS232 Receive Data
B/TxD	Green	RS485-, B wire / RS232 Transmit Data

The RS485 bus is internally biased with 4.7 kOhm resistors: A wire to +5 Vdc, B wire to GND

4 Installation

4.1 General Instructions

- 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.

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.

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: helpdesk@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	13.56 MHz
RFID IC	NXP CLRC663
RF TX Power	+20 dBm
Antenna Connectors	8 × UF.L
Electrical Specifications	
Power Supply	7...24 Vdc
Power Consumption	< 150 mA
Connectors	Molex PicoBlade 53261 (PCB conn.), 51021 (cable conn.)
Communication Interface	RS485 for long cable runs or RS232
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
Mechanical Specifications	
Dimensions	65 × 48 × 10 mm
Weight	50 g
Material	FR4, green
Environmental Conditions	
Operating Temperature	-20 °C ... +80 °C
Storage Temperature	-40 °C ... +85 °C
Humidity	up to 95 %, non-condensing
Supported Standards / Tags	
ISO 14443 A and compatible	Read/write: MIFARE® Classic Mini / 1K /4K, MIFARE Ultralight®, MIFARE Ultralight® C, MIFARE® DESFire®EV1, MIFARE® Smart MX, MIFARE® Plus S / X, MIFARE® Pro X, NTAG 21x Read UID only of all other ISO14443A RFID tags
ISO 14443 B and compatible	SRI4K, SRIX4K, AT88RF020, 66CL160S, SR176
ISO 15693 and compatible	EM4135, EM4043, EM4x33, EM4x35, I-Code SLI / SLIX, M24LR16/64, TI Tag-it HF-I, SRF55Vxx (my-d vicinity)
SDK Information	
Supported OS	Windows, C#
Communication	Binary command protocol
Demo Software	Windows

Other functions and details to be continued and upgraded.

7 Revision History

Version	Date	Notes
0.1	2023-10-11	Initial User's Guide Version
0.2	2023-11-02	New hardware with PicoBlade connectors
0.3	2024-09-25	RS232 version added