

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

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1 Function Description

This document is valid for the electronics and devices:

- OEM-DES-M980-ETH-4CH
- OEM-DES-M980-ETH-8CH
- R-PROF-DES-ET-4CH
- R-PROF-DES-ET-9CH

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.

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
Test/Demo Software:	OEM-DESfire Device Family, Demo Software Manual_x.y_EN

1.6 Test and Configuration Software

To Configure Ethernet:	S2E ConfigTool_V1.4.exe
Test RFID Functions:	HF Demo 5.1 (install "COMM_Setup.msi")
To convert to virtual com port:	HW Group - Virtual Serial Port (v3.1.2).exe

2 Device-Specific Telegrams and Commands

2.1 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

2.1.1 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

2.1.2 Reply from RFID Device to PC/PLC

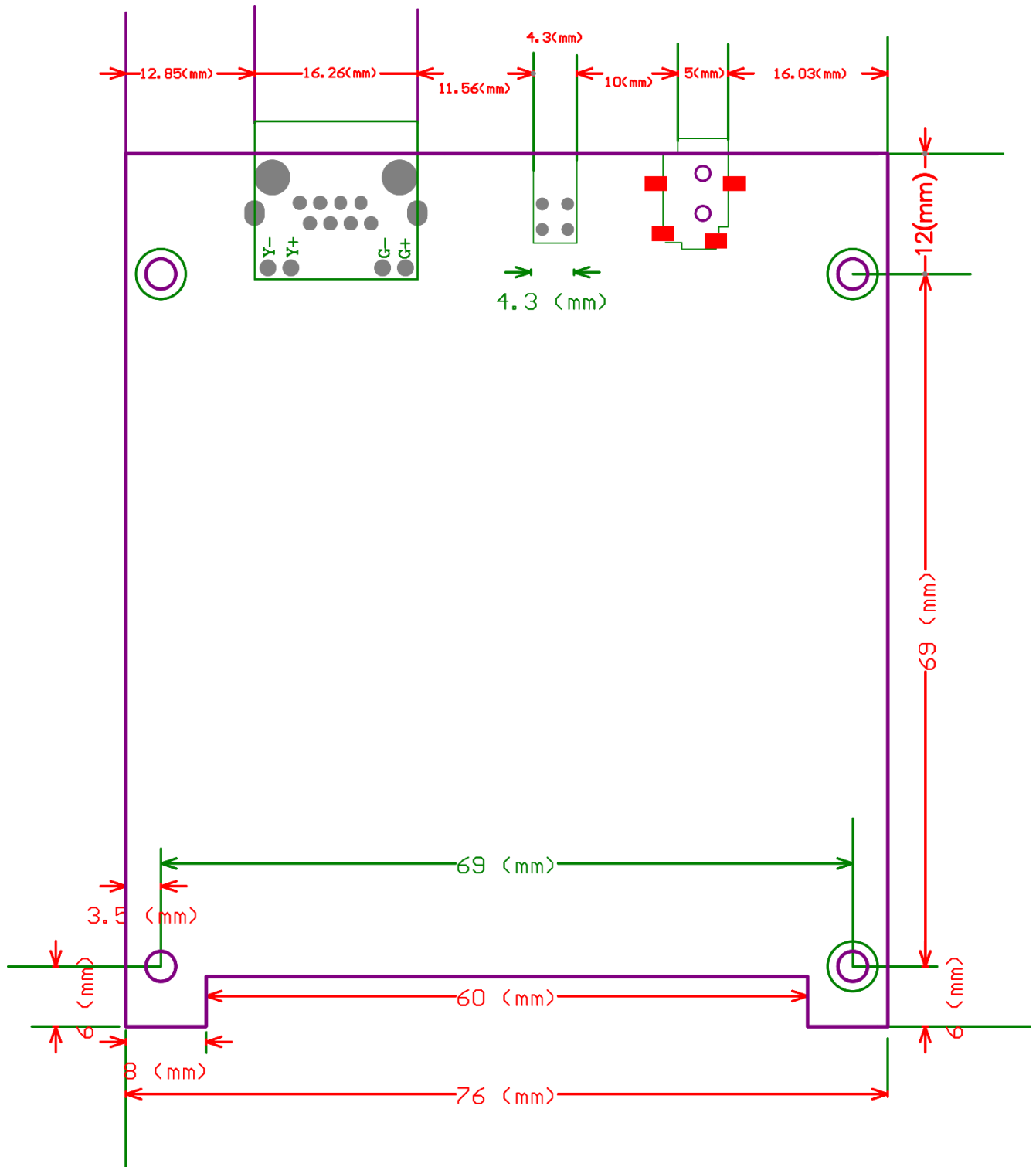
<< 50 00 00 0C 5C

2.1.3 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 OEM-DES-M980-ETH



3.2 Electrical Connection

The Ethernet connection allows data transfer and power supply with PoE.

The other power supply is a round socket with $\varnothing 3.5 / 1.35$ mm. Positive voltage inside. GND on outer ring.

3.3 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.

3.4 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 Configuration

Only the Ethernet interface needs to be configured.

4.1 Using “S2E ConfigTool_V1.4”

Tab “Basic Settings”

S2E ConfigTool (V1.4)

192.168.10.99 1 Search 2 Apply Settings Upload Firmware Reset Exit

Serial to Ethernet

IP: 192.168.10.61 Name: FS100S 3

Basic Settings Port1

Product Information

Device Type: FS100S

Serial Number: 20200721-EC9F0D400B58

Firmware Version: V1.3

Firmware Status: Normal

Network Settings

4 ☐ Use the Follow IP Address

☒ Get IP Address from DHCP Server

IP Address: 192.168.10.61

Subnet Mask: 255.255.255.0

Gateway: 192.168.10.10

DNS Server: 217.151.144.10

Other Settings

5 MAC Address: EC:9F:0D:40:0B:58

Device Name: FS100S

User Name: admin

Password: *****

HTTP Port: 80

☐ Echo In AT Mode

☐ Show Debug Messages

©ConfigTool

- 1: Select the desired network interface of your PC from the drop-down menu.
- 2: Click on [Search], now the device you want to set should be listed.
- 3: Select the desired device to set.
- 4: Leave the device set to DHCP or set the desired Ethernet parameters of the device.
- 5: Device Name: Here you can give the device a name that is helpful to you.
User Name/Password: this is the user name and password for access via the web interface. You can use this to block access. In addition, you can disguise access to the web interface with an HTTP port that differs from the standard.
- 6: Please do not forget to save changed settings with [Apply Settings].

Tab "Port 1"

S2E ConfigTool (V1.4)

192.168.10.99 Search Apply Settings Upload Firmware Reset Exit

Serial to Ethernet

IP: 192.168.10.61 Name: FS100S

Basic Settings Port1

Baud Rate: 115200

Data/Stop/Parity: 8 1 NONE

Flow Control: NONE

Socket Type: TCP Server

Modbus TCP to : NONE

Remote Host: 192.168.10.201

Remote Port: 8234

Local Port: 8898

Data Packing Time: 50 ms (0~60000)

Data Packing Size: 0 byte (0~2048)

Inactivity Time: 60000 ms (0~60000)

Reconnection Time: 0 ms (0~60000)

Keep Alive Time: 0 5s (0~255)

Connect TCP Server when 0. Power On

Auto Message (The First Data Packet from Device): 0. No message

☐ Request Admin Password

☒ Clear Data Buffer when TCP Connected

© ConfigTool

The screenshot shows factory settings. Normally you should not need to change anything here.

In case you need to change settings, please do not forget to save changed settings with [Apply Settings].

Important Note!

Please do not change the values "Baud Rate", "Data/Stop/Parity", "Flow Control", "Socket Type", "Modbus TCP to".

4.2 Using the Web Interface

Die Weboberfläche ist unter der gleichen IP-Adresse erreichbar, wie sie im „S2E ConfigTool_V1.4“ sichtbar ist.

4.2.1 Login Information

By factory default user and password is: admin

4.2.2 Menu “Device View”

This gives an overview of the current settings. The settings cannot be changed here.

Firmwar Version: 1.4		
Device View	Product Information	Help
Basic Settings	Device Name: DES-R845-SMP-V2	<ul style="list-style-type: none"> • Run time: run time means the minutes since latest reboot. • TX/RX Count: TX/RX count give us a calculation of the total byte we have been.
Advanced Options	Device Type: FS100S	
Management	Serial Number: 20210125-EC9F0D4018B1	
	Run Time: 180 seconds	
	Serial Rx: 0	
	Serial Tx: 0	
	Network Information	
	DHCP: ON	
	IP Address: 192.168.10.102	
	Subnet Mask: 255.255.255.0	
	Gateway: 192.168.10.10	
	DNS Server: 217.151.144.10	
	Socket Information	
	Mode: TCP Server	
	Local Port: 8898	
	Remote Host: 192.168.1.201	
	Remote Port: 8234	
	UART Information	
	Baud Rate: 115200	
	Date Bit: 8	
	Parity: NONE	
	Stop Bit: 1	
	Flow Control: NONE	

4.2.3 Menu “Basic Settings”

Firmwar Version: 1.4		
Device View	Network Setting	Help
Basic Settings	MAC Address: EC:9F:0D:40:18:B1 1 Use DHCP: <input checked="" type="checkbox"/>	<ul style="list-style-type: none"> • RIP type: StaticIP or DHCP. • IP Address: Module's IP. • Subnet Mask: Usually 255.255.255.0 • Gateway: Usually router's ip address • Load Port: 1~65535. when TCP Client, set this to 0 means use random local port. • Remote Port: 1~65535
Advanced Options	IP Address: 192.168.10.102 Subnet Mask: 255.255.255.0 Gateway: 192.168.10.10 DNS Server: 217.151.144.10	
Management	Socket Setting Socket Type: TCP Server Remote Host: 192.168.1.201 Remote Port: 8234 2 Local Port: 8898 Modbus TCP to: NONE	
	UART Setting Baud Rate: 115200 Date Bit: 8 Parity: NONE Stop Bit: 1 Flow Control: NONE	
	3 Save Settings Reset	

Note

The factory settings are framed in green. Normally you should not need to change anything here.

- 1: Keep DHCP or set the desired IP address for the device.
- 2: Set „Local Port“ to the desired listening port number.
- 3: Make sure to press [Save Settings] to save the settings permanently.

Important hint!

Do not change the settings „Socket Type“, „Modbus TCP to“ in section „Socket Setting“.
Do not change the settings in section „UART Setting“.

4.2.4 Menu “Advanced Options”

Firmwar Version: 1.4		
Device View	Parameter Setting	Help
Basic Settings	<div>1</div> <div>Device Name: <input type="text" value="DES-R845-SMP-V2"/></div> <div>User Name: <input type="text" value="admin"/></div> <div>HTTP Port: <input type="text" value="80"/></div> <div>2</div>	<ul style="list-style-type: none"> • Device Name: max length is 15 char. • User Name: max length is 5 char. • HTTP Port: Default 80. • Reset: Click to make your config take effect.
Advanced Options	<div>Data Packing Size(byte): <input type="text" value="0"/></div> <div>Data Packing Time(ms): <input type="text" value="50"/></div> <div>Reconnection Time(ms): <input type="text" value="0"/></div> <div>Inactivity Time(ms): <input type="text" value="60000"/></div> <div>Keep Alive Time(5s): <input type="text" value="0"/></div>	<ul style="list-style-type: none"> • Data packing size Default 0(0~2048). • Data packing time Default 0(0~60000). • Reconnection time: Default 0 (0~60000). • Inactivity time: Default 0 (0~60000).
Management	<div>Verify the Connection: <input type="text" value="No"/></div> <div>Send Hello Message: <input type="text" value="None"/></div> <div>Connection Condition: <input type="text" value="Connect Socket after Power On"/></div> <div>Clear Buffer if Connect: <input checked="" type="checkbox"/></div> <div>Debug Message Enable: <input type="checkbox"/></div> <div>AT Echo Enable: <input type="checkbox"/></div> <div>3</div> <div>Save Settings</div> <div>Reset</div>	

Note

The factory settings are framed in green. Normally you should not need to change anything here.

- 1: When useful put a „Device Name“ for your own interest.
- 2: „User Name“ is the user name for the web interface.
The password settings are done in the site „Management“.
You can change the web server port to any other port.
- 3: Make sure to press [Save Settings] to save the settings permanently.

Important hint!

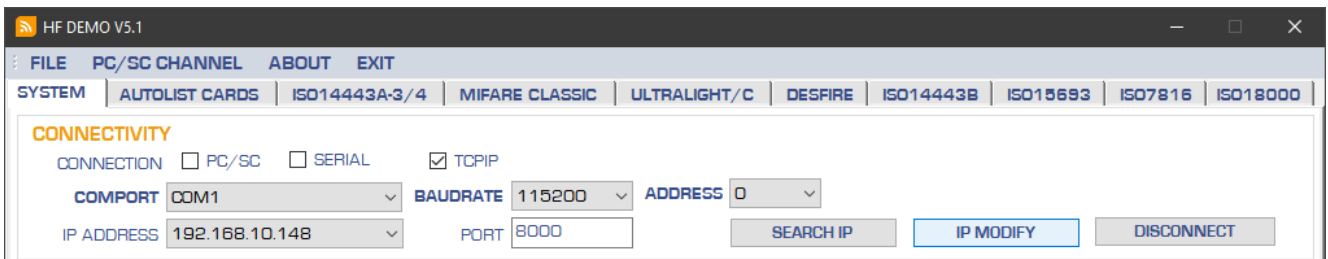
Do not change any other settings here.

4.2.5 Menu “Management”

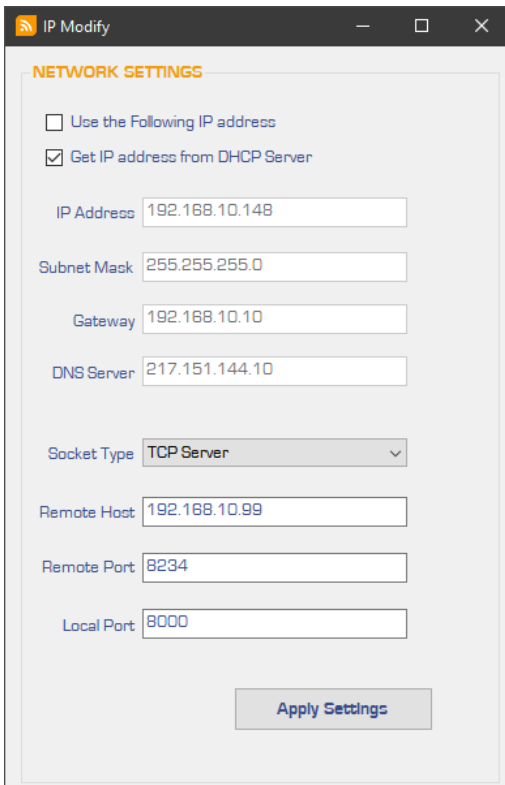
Firmwar Version: 1.4		
Device View	Password Setting Old Password: <input type="text"/>	Help <ul style="list-style-type: none"> • Password: Max length is 5 char. • Logout: Click to make quit the web page. • Reset: Click to make restart the module. • Default: Click to make module restore factory setting.
Basic Settings	New Password: <input type="text"/>	
Advanced Options	Confirm Password: <input type="text"/> <input type="button" value="Set"/>	
Management	Management Logout: <input type="button" value="Logout"/>	
	Reset Device: <input type="button" value="Reset"/>	
	Factory Default: <input type="button" value="Default"/>	

- 1: You can change the current password to a new password. The factory default password is „admin“. To change the password type in your current password in „Old Password“ and type in the new password in „New Password“. Confirm the new password in the field „Confirm Password“. Make sure to press [Save Settings] to save the new password permanently.
- 2: For security reasons you should logout after changing the password by pressing [Logout].

4.3 Using the Test/Demo Software “HF DEMO V5.1”

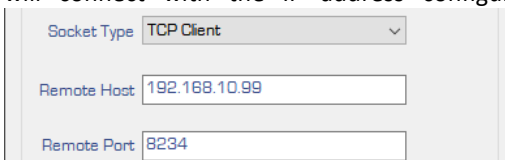


After the connection is established, click on [IP MODIFY]. This will open a dialog box to configure the Ethernet interface.



The standard setting of the socket type is TCP Server. This means that a control software connects with the RFID device. The connection is made with the Local Port.

If the reader automatically reads data from a tag, you can configure the RFID device as TCP Client. After reading the data, it will connect with the IP address configured in remote host and use the remote port so deliver the data.



You can also configure the Ethernet interface via the web interface or with the software “S2E ConfigTool_V1.4.exe”.

5 Test Operation

5.1 Establishing Connection (Ethernet)

HF DEMO V5.1

FILE PC/SC CHANNEL ABOUT EXIT

SYSTEM AUTOLIST CARDS ISO14443A-3/4 MIFARE CLASSIC ULTRALIGHT/C DESFIRE ISO14443B ISO15693 ISO7816 ISO18000

CONNECTIVITY

CONNECTION ☐ PC/SC ☐ SERIAL ☒ TOPIP

COMPORT COM1 BAUDRATE 115200 ADDRESS 0

IP ADDRESS 192.168.10.147 PORT 8000

SEARCH IP IP MODIFY CONNECT

SYSTEM

GET FIRMWARE VERSION 4F 45 4D 2D 44 45 53 2D 4D 38 39 30 2D 54 54 4C 20 32 30 32 31 30 34 30 32 20 31 31 3A 34 32 20 41

GET HW SERIAL NUMBER A3 39 6E 05 D2 D4 6B 19

BAUDRATE 9600 BPS

LED LIGHTING TIME 3 x50MS NO. OF TIMES 4

BUZZER BEEPING TIME 3 x50MS NO. OF TIMES 4

NOTE: EACH CYCLE TIME IS FIXED TO 500MS!

ANT PORT 5 NOTE: DEFAULT ANTENNA STATUS IS OPENED!

SET BAUDRATE LIGHTING BEEPING SET ANT

PROTOCOL SCREEN

Connect success

>> 50 00 00 04 54

<< 50 00 22 04 4F 45 4D 2D 44 45 53 2D 4D 38 39 30 2D 54 54 4C 20 32 30 32 31 30 34 30 32 20 31 31 3A 34 32 20 41 4D 69 —success

>> 50 00 00 05 55

<< 50 00 08 05 A3 39 6E 05 D2 D4 6B 19 08 —success

>> 50 00 01 0C 05 58

<< 50 00 00 0C 5C —success

CLEAR

Step 6 is to check the function of the connection.

5.2 Antenna Selection

This will only work with devices that operate several antennas.

ANT PORT 1 NOTE: DEFAULT ANTENNA STATUS IS OPENED! SET ANT

After a cold boot, the antenna #1 will be selected with multi-antenna devices.

6 Maintenance, Repair and Disposal

6.1 Maintenance

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

6.2 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

6.3 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.

7 Technical Data

Radio Specifications	
Operating Frequency	13.56 MHz
RFID IC	NXP CLRC663
RF TX Power	+20 dBm
Antenna Connectors	4 or 8 × UF.L
Electrical Specifications	
Power Supply	7...24 Vdc or PoE IEEE802.3af-2003
Power Consumption	< 150 mA
Connector Power Supply	Round plug Ø 3.5 / 1.35 mm
Communication Interface	Ethernet with PoE IEEE802.3af-2003
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 family 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.

8 **Revision History**

Version	Date	Notes
0.1	2024-11-14	Initial User’s Guide Version