iData U500

Integrated RFID Reader-writer

User manual

anaphora

This document is applicable to the following models: iData U500 reader

This manual provides information about the installation, use, and other features of the product for installation personnel and users to read and use.

The revised records are as follows:

February 6, 2024	First edition	V1.0

All descriptions and descriptions of product features and functions, as well as other information contained in this manual, are current and accurate at the time of printing. iData Company reserves the right to correct or change the information and instructions in this manual without prior notice and without any liability.

1 Product Introduction

1.1 Main Functions

iData U500 Reader (V1.0) can read and write electronic tags that comply with the EPC C1G2(ISO 18000-6C) protoco

1.2 Performance Parameters

1. Working frequency band:

CN：920-925 MHz

FCC:902-928 MHz

EU:865-868 MHz（Power：18.67dBm)

860-960MHz (customizable).

2. Reading rate: up to 750 times/second

3. Reading distance: 0~18m (related to the label)

4. Writing distance: 0~10m (related to the label)

5. Built-in antenna: 9dBi antenna,The minimum safety distance is 20cm.

6. Antenna direction angle: Hor: 70° ±5° , Ver: 62° ±5°

7. Working voltage: +12V~24V (DC)

8. Maximum working current: 0.95A@12V; 0.5A@24V

9. Communication interface: TCP/IP, RS-232

10. Serial port baud rate: 115200bps (default), 9600 bps,

19200 bps, 38400 bps, 230400bps

11. IO: 4-way photoelectric input or 2 inputs and 2 output

12. Operating temperature: -30℃～+70℃

13. Storage temperature: -40℃～+85℃

14. Operating humidity: 5%～95%RH, no condensation

1.3 Dimensions

Dimensions: 260 x 260 x 60 mm (L*W*H)

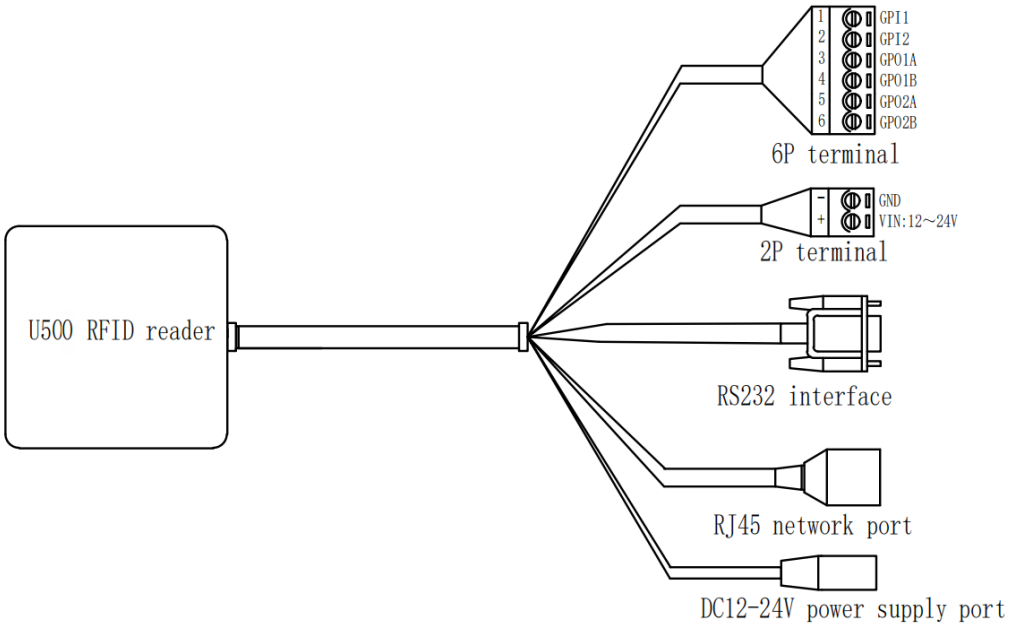
1.4 Weight

Weight is approximately: 1.25Kg

1.5 Installation

Mounting bracket

2 Reader interface description



2.1 Power Ports

DC 12~24V or POE power supply, in accordance with IEEE 802.3at standard

2.2 TCP/IP communication interface

Standard RJ45 port

2.3 RS-232 interface

Serial number	definition	Description
1	NC	
2	TXD	RS-232 send
3	RXD	RS-232 reception

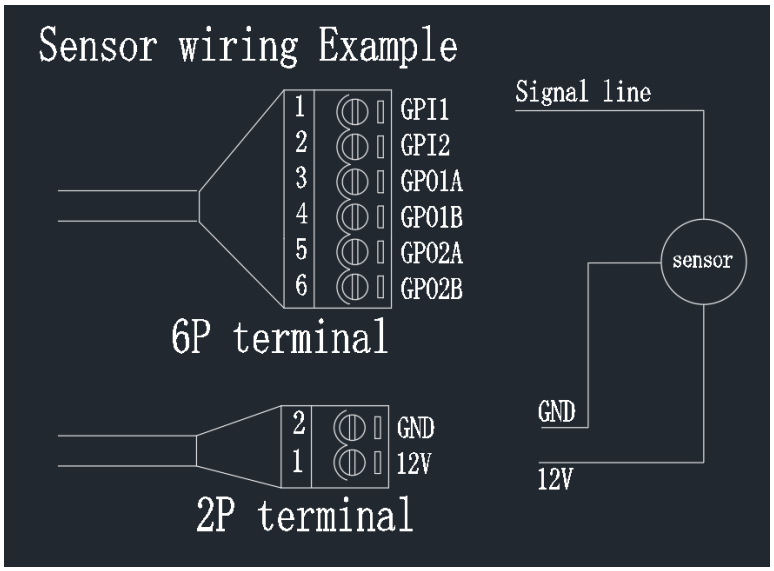
4	NC	
5	GND	signally

2.4 GPIO interface

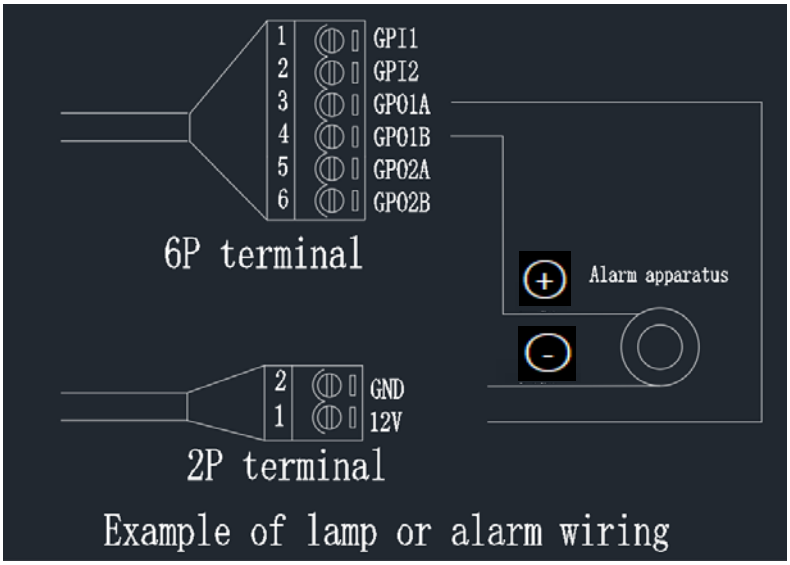
PS: 6P IO connection mode (standard)

Serial number	definition	Description
1	IN1	Input 1
2	IN2	Input 2
3	GPO1A	Relay 1 output +
4	GPO1B	Relay 1 output -
5	GPO2A	Relay 2 output +
6	GPO2B	Relay 2 output -

Wiring example:



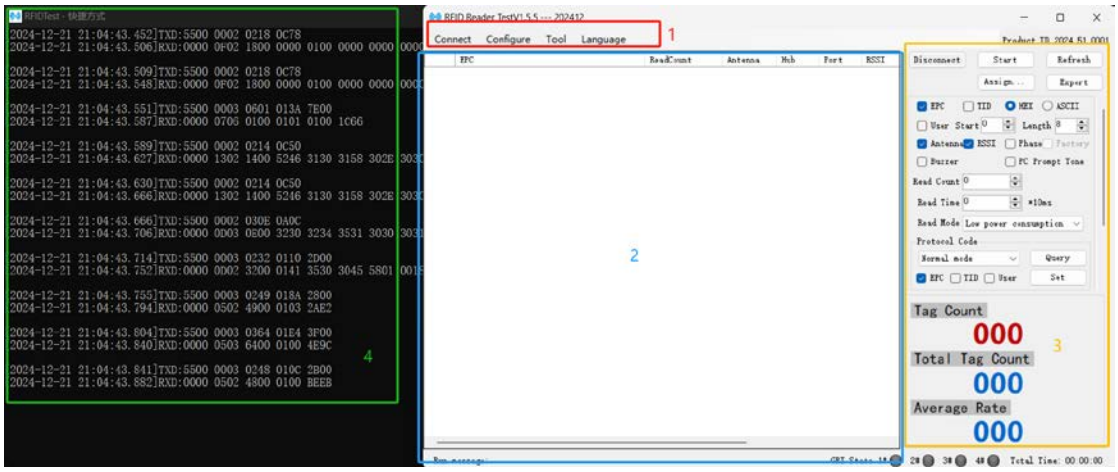
Wiring example:



2.5 Power output interface

Serial number	definition	Description
1	VCC	12~24V external power supply, 0.5A (standard);
2	GND	GND

3 Introduction to the software interface



As shown in the figure above, the main interface is divided into four parts, respectively

1: navigation bar

2: data display area

3: Operate the display area

4: log display area

3.1 navigation bar

Connection: Used to select the connection mode with the reader, there are two connection modes: TCP and serial port.

Configuration: Used to configure connection parameters and antenna channel selection parameters.

Some functions need to be displayed using shortcut keys

3.2 data display area

EPC: Product electronic code.

TID: Tag Identification.

UserData: User data segment, data stored in the label user data area.

ReadCount: indicates the count of read times of a single label

RSSI: Label echo (signal) strength.

TimeStamp: indicates the time when label data is received. The time format is time-minute-second-millisecond

3.3 log display area

Demo software corresponds to the communication protocol. For details, see communication protocol documentation

3.4 Auxiliary software

iData U500 reader provides a supporting demonstration software and API interface library.

Demo Software:

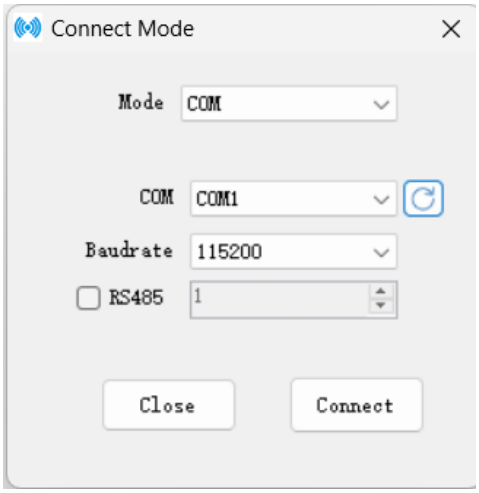
UHF RFID DEMO (version: V1.5.4 and above)

API interface library:

C#,C++,Java and other API dynamic link library.

4 demo software operation instructions

4.1 Connect/disconnect reader - Serial port



Step 1: Connect the serial cable. On the navigation bar, choose Connection > Reader Connection. The interface for selecting a connection mode is displayed.

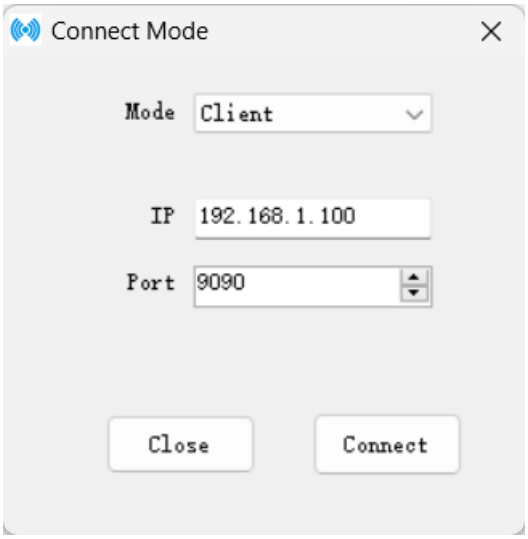
Step 2: Select the connection mode, there are four modes: TCP_Clent (client) /TCP_Server (server) /COM (serial port) /USB(HID).

Step 3: When selecting the serial port connection mode, you also need to select the serial port number and baud rate of the computer to which the serial port is connected. The default baud rate is 115200.

Step 4: After confirming the error, click "Connect" to connect the reader successfully.

Step 5: If you want to disconnect the software from the reader, click the "Disconnect" operation selection area to complete the operation and disconnect the software from the reader

4.2 Connect/disconnect reader - TCP



Step 1: In the navigation tree, choose Connection > Reader Connection. The connection mode selection screen is displayed.

Step 2: Select the connection mode. The default connection mode is TCP_Clent (client).

Step 3: When the TCP_Client connection mode is selected, the factory default IP address of the reader is 192.168.1.100, and the Port number is 9090. If the connection fails, please check whether the IP address of the computer is 192.168.1.XX.

Step 4: After confirming the error, click "Connect" to connect the reader successfully.

4.3 Start/pause label reading

Step 1: First make sure the software and reader are connected.

Step 2: Deselect the label information that needs to be displayed in the operation selection.

Step 3: Click "Start" to enter the label reading state. When the label enters the reading range of the reader, it will be read by the reader, and the label information will be displayed in the data display area.

Step 3: "Refresh" can clear the data display data,

Step 4: If you want to stop reading label data, click "Stop" to complete the operation.

4.4 This section describes the functions of the operation selection area

- Connect/Disconnect: "Connect" or "disconnect" operation PC connect/disconnect communication with reader.
- Start/Stop: "Start" or "stop" controls the reader to start/stop reading label information.
- Refresh: Refresh the data in the data display area (clear the data in the display area).
- Check the options: "EPC", "TID", "User", "RSSI" antenna, select the label information displayed in the data display area
- Start: Display start bit of User data. This parameter is valid only after User is selected.
- Length: Display length of User data. This parameter is valid

only after User is selected.

- Read count: Set the number of times the reader reads the label. The value ranges from 1 to 65,535, 0: indicates that the label is not set and the label is read indefinitely.

- Read time: Set the time for the reader to read the label. The value ranges from 0 to 65535(unit: 10ms).

- Read mode:

  Set the mode in which the reader reads labels, including single label mode, multi-label mode, intensive read mode, and low power mode.

  Read mode: Set the label reading mode of the reader, including fast read mode, multi-label mode, low power mode, and intensive read mode:

  Fast read mode: This mode applies to scenarios where labels need to be read quickly, such as conveyors and vehicle access, where fewer than 50 labels need to be read at a time.

  Multi-label mode: This mode applies to the scenario where more than 50 labels are read during the movement, such as in and out of the warehouse.

  Low power mode: suitable for UHF RFID handheld or UHF RFID tablet computer powered by the battery, the need to extend the battery life of the scene;

Intensive reading mode: suitable for multiple antennas, the number of labels is greater than 200, in a static environment, need to read all the labels in a few seconds, such as RFID file cabinet, RFID bookcase, RFID consumable cabinet and other applications;

- **Working mode:**

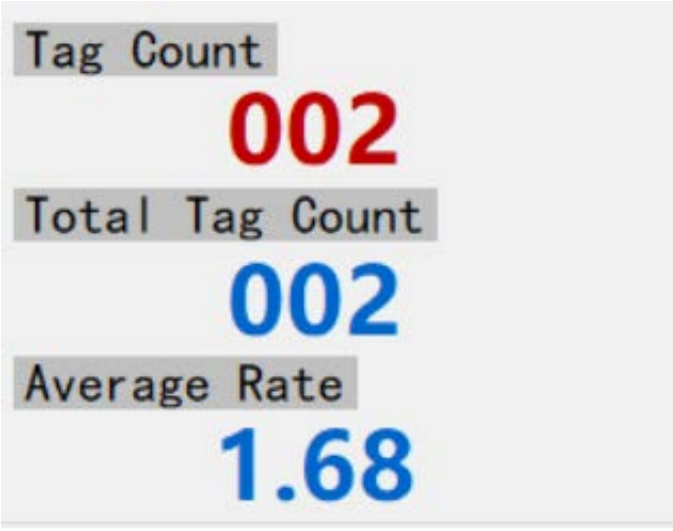
Set the working mode of the reader, including normal mode, aging mode, and automatic card reading mode.

Normal mode: The power-on enters the waiting state

Automatic card reading mode, power-on automatically read the label status, can choose to read EPC, TID and USER;

Label cache: Queries the number of cache labels, obtains cache data, and clears cache data.

- **Label data receiving analysis**



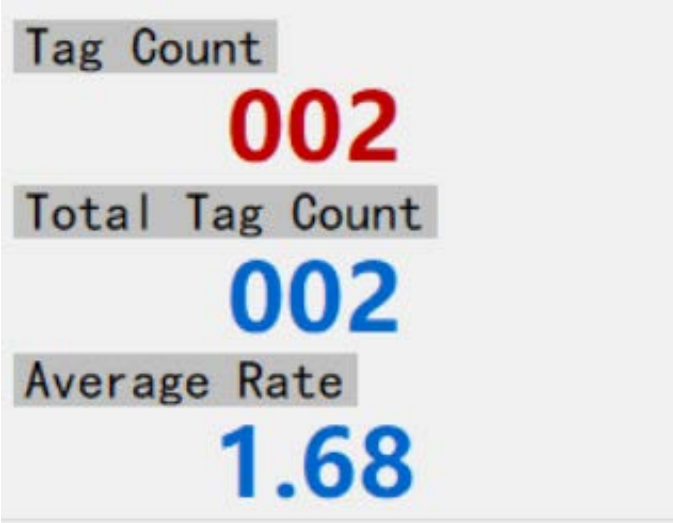
Total number of labels: Analyzes the total number of labels

currently read. If the total number of labels shown in the right figure is 002, there are two labels currently read.

Total number of labels: indicates the total number of successfully read label data. As shown in the right figure, the total number of labels is 002, indicating that the reader has successfully read labels twice.

PS: A single label data can be read multiple times in a row, so the total number of labels must be greater than or equal to the total number of labels.

Average rate (T/S) : Average number of label data reads per second.

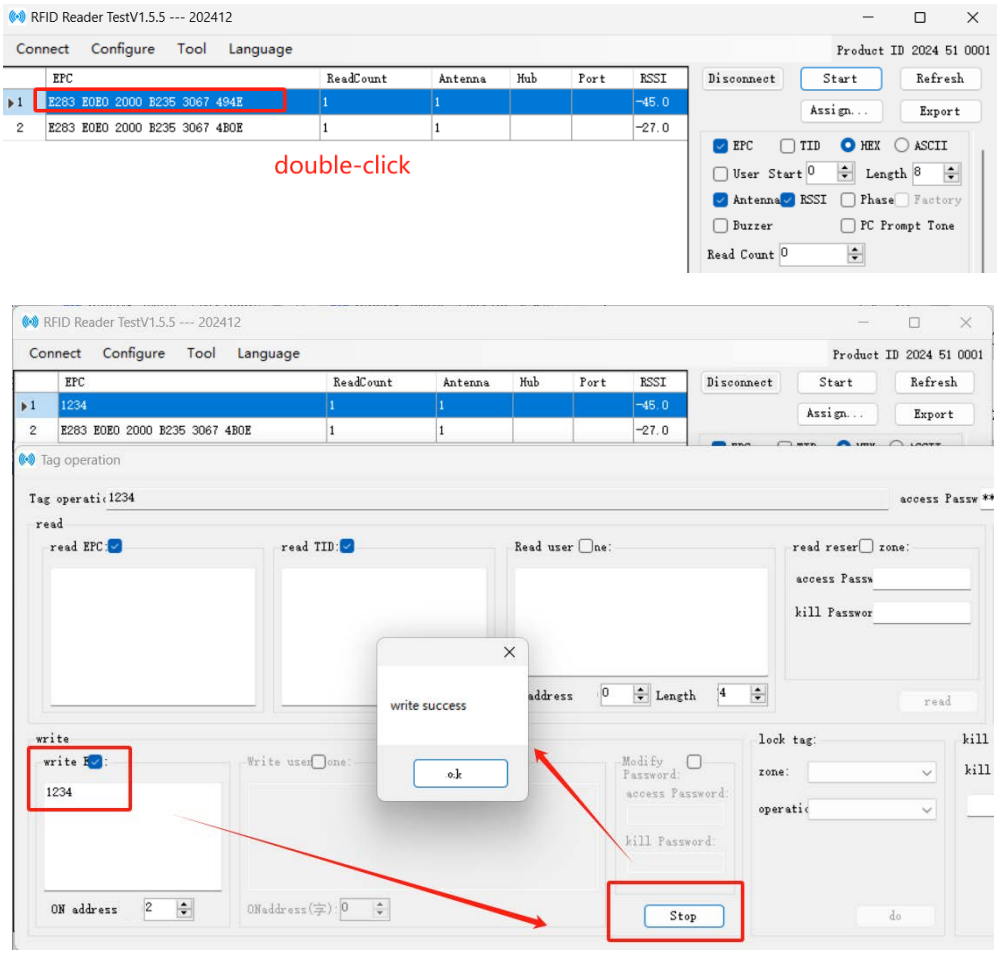


4.5 Write EPC/ user area

1. Click "Start" to read the label, and then click "Stop" to stop reading the label.

2. Find the label of the EPC/ user area to be modified, double-click it, find the "Write operation", select "Write EPC"/" Write user area ", and write the content to be modified in the box.

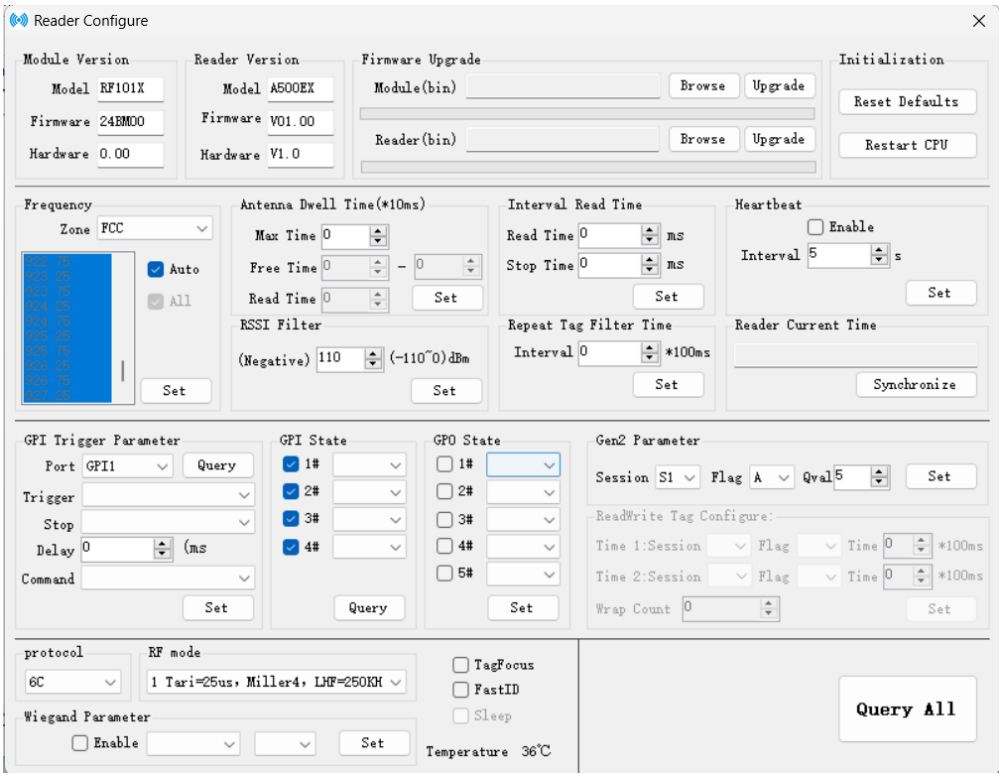
3. Click the Write button. The Write Success dialog box is displayed, indicating that the write succeeds



4.6 Overview of the Read/write module configuration page

Click "Configuration" - "Read-write Module Configuration" in the navigation bar, and then open the read-write module test form, as

shown in the following figure.

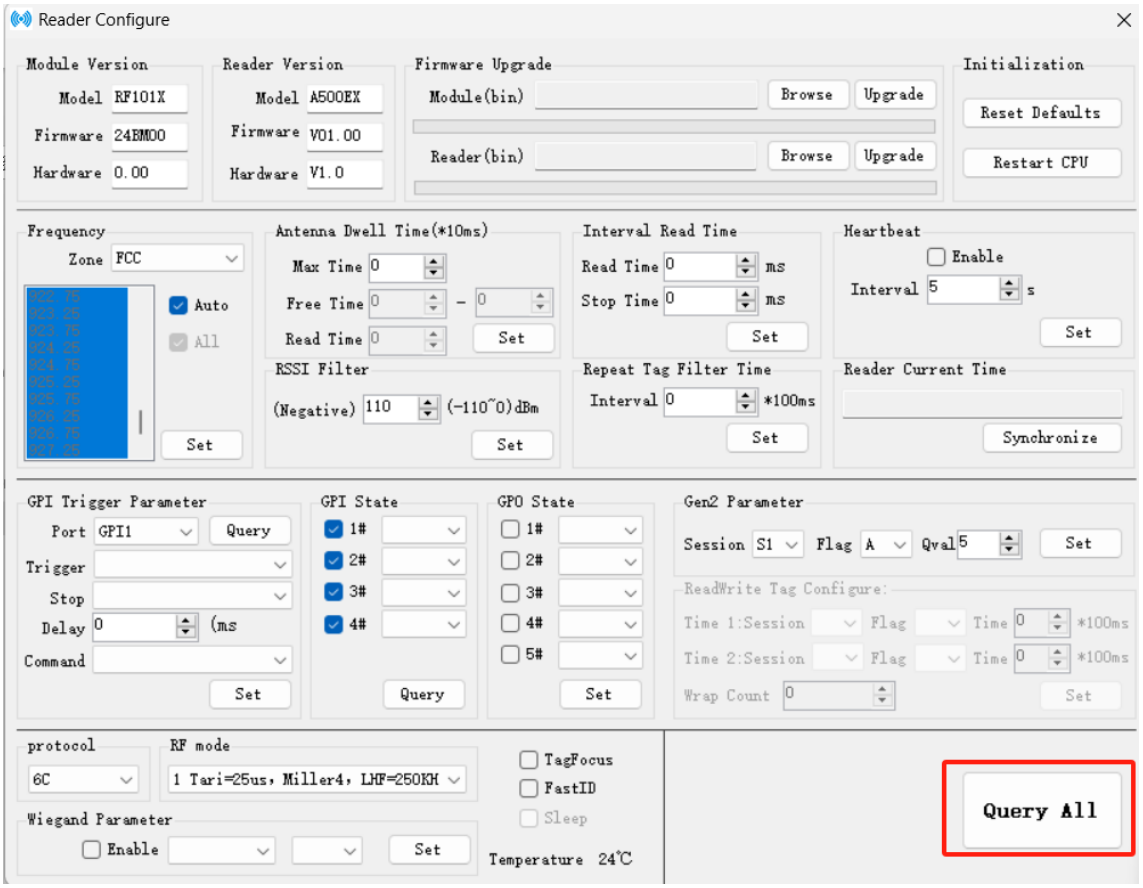


As shown in the figure above, window modules in the read/write module test form can be subdivided into: Firmware upgrade, application firmware upgrade, module model and software version query, application processor software and hardware version query, I/O input, I/O output, I/O trigger, interval label reading time, frequency band frequency, air interface protocol, read parameter Settings, Repeat label filtering time, UTC time restore factory Settings, RSSI filter threshold, and antenna port residence Time configuration, communication mode, and read/write label configuration parameters. The window for querying module product models and software and hardware versions, application processor software and hardware versions, frequency band and I/O input window provides only query

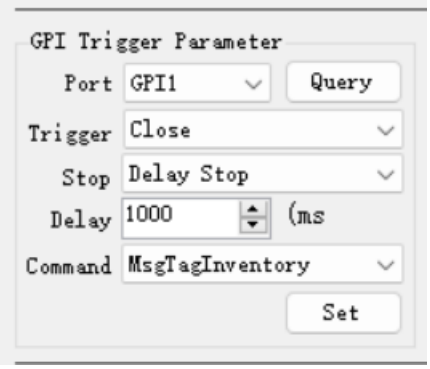
functions

4.6.1 Batch query

Function: Batch query RFID-related configuration parameters of readers.



4.6.2 Set or query the I/O trigger



Function: Set the triggering mode, triggering condition, and triggering function of the I/O port.

Step 1: According to the steps of setting/Querying GPIO Input and Output in 3.2, set the IO port that needs to set the trigger mode to the input mode, and then find the definition of the query GPIO interface, as shown in the figure.

Step 2: Click "Port" to select the trigger port that needs to be defined;

Step 3: Click "Trigger" and select trigger conditions. The current trigger conditions include high level trigger, low level trigger, and off trigger.

Step 4: Click "State reversal" and select the stop trigger mode. Currently, there are two modes: state reversal and delayed stop

Step 5: If Delay Stop is selected as the trigger mode, you need to set the delay time (unit: ms), ranging from 1 to 65535

Step 6: Click "Command" to select the type of instruction; The current instruction types include MsgTagInvento, MsgTagRead, MsgPowerOff, MsgHubAntennaConfig and null instruction.

Step 7: Click "Settings", the pop-up operation success window, you can complete the setting.

Step 8: Click "Query" to query the setting status of the current IO trigger.

- PS1: : Trigger condition

The status reversal mode means that when the input power level of the I/O port is triggered, the I/O port keeps the triggered mode until the input level of the I/O port is reversed.

Delay stop is the moment when the input level of the IO port meets the trigger conditions, the countdown starts, and when the countdown is 0, the trigger mode is withdrawn, and the next input level can be triggered when the trigger conditions are met again.

- PS2: indicates the instruction type

Empty instruction: No instruction binding

MsgTagInventory: Read EPC directive default

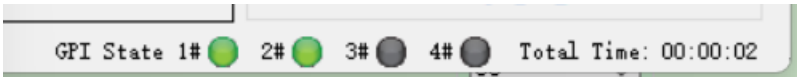
MsgTagRead: general read instruction

MsgPowerOff: Turn off the power amplifier

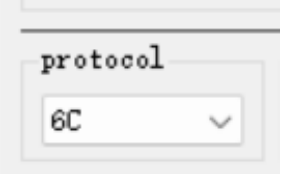
MsgHubAntennaConfig: Configure an antenna branch

- Ps3: indicates the GPI status

After I/O triggering is configured, you can view the GPI triggering status at the bottom of the main page



4.6.3 Set the air interface protocol

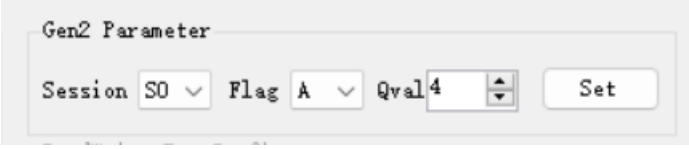


Step 1: Click "Configuration" - "Read-write Module Configuration" in the navigation bar to enter the read-write module test form, and then find the air interface protocol window, as shown in the right picture;

Step 2: Select the air interface protocol standard. The default value is 6C

Air interface protocol: EPC C1 G2 (6C) /ISO 18000-B (6B) /6B+6C; Only 6C is currently supported.

4.6.4 Set Q value, session, and inventory parameters



Function: Set Q value, Session and inventory location.

Step 1: Click "Configuration" - "Read and Write module Configuration" in the navigation bar to enter the read and write module test form, and then find the read parameter setting window, as shown in the figure;

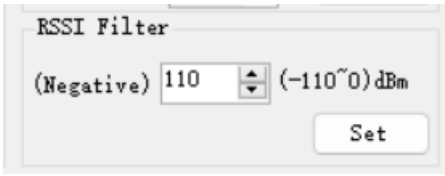
Step 2: Set Q, Session, and Flag parameters

Step 3: Click "Setting", wait for the pop-up operation success

window, you can complete the setting;

Note: The interface needs to use shortcut keys to display: Shift +YBT

4.6.5 Set the RSSI filtering threshold



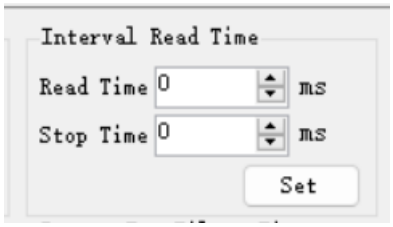
Function: Set the filter threshold of label data signal strength;

Step 1: Click "Configuration" - "Read-write Module Configuration" in the navigation bar to enter the read-write module test form, and then find the RSSI filtering threshold, as shown in the figure.

Step 2: Set the parameters of the RSSI filter threshold, which ranges from -110 to 0 dB.

Step 3: Click "Setting", wait for the pop-up operation success window, you can complete the setting;

4.6.6 Set the interval for reading labels



Application scenario: Closed metal cavities such as cabinets and tunnel machines

Function: Set the interval label read function. The reader reads labels intermittently for a period of time (label read duration), and then stops reading labels for a period of time (label read duration), and then reads labels for a period of time.

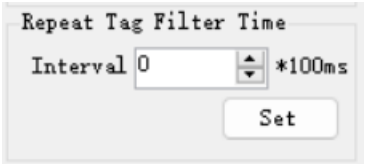
Step 1: Click "Configuration" - "Read and Write module Test" in the navigation bar to enter the read and write module test form, and then find the interval label reading time, as shown in the figure;

Step 2: Select the read time and set the read time

Step 3: Select the stop time and set the stop time

Step 4: Click "Settings", wait for the pop-up operation success window, you can complete the setting.

4.6.7 The filtering time for duplicate labels is set



Function: Set within a certain time range, the data of the same label can be read only once, and the label data that is read more than the second time is filtered out. This parameter is used to filter duplicate label data received by the reader during cyclic card reading at a specified time.

Step 1: Click "Configuration" - "Read-write Module Configuration" in the navigation bar to enter the read-write module test form, and then find the repeat label filtering time, as shown in the figure;

Step 2: Set the filtering time parameter, unit: 100ms;

Step 3: Click "Setting", wait for the pop-up operation success window, you can complete the setting;

4.6.8 Firmware upgrade

PS: The Module upgrade corresponds to the target bin file at the beginning of RFID

The Reader file corresponds to the target bin file that starts with Reader

Function: This function is used to upgrade the underlying firmware of the product.

Step 1: Click "Configuration" in the navigation bar - enter the Read and write module test form, then find the firmware upgrade window, and select the firmware upgrade window according to the upgrade target;

Step 2: Click "Browse", select a folder, and select the target bin file that needs to be upgraded

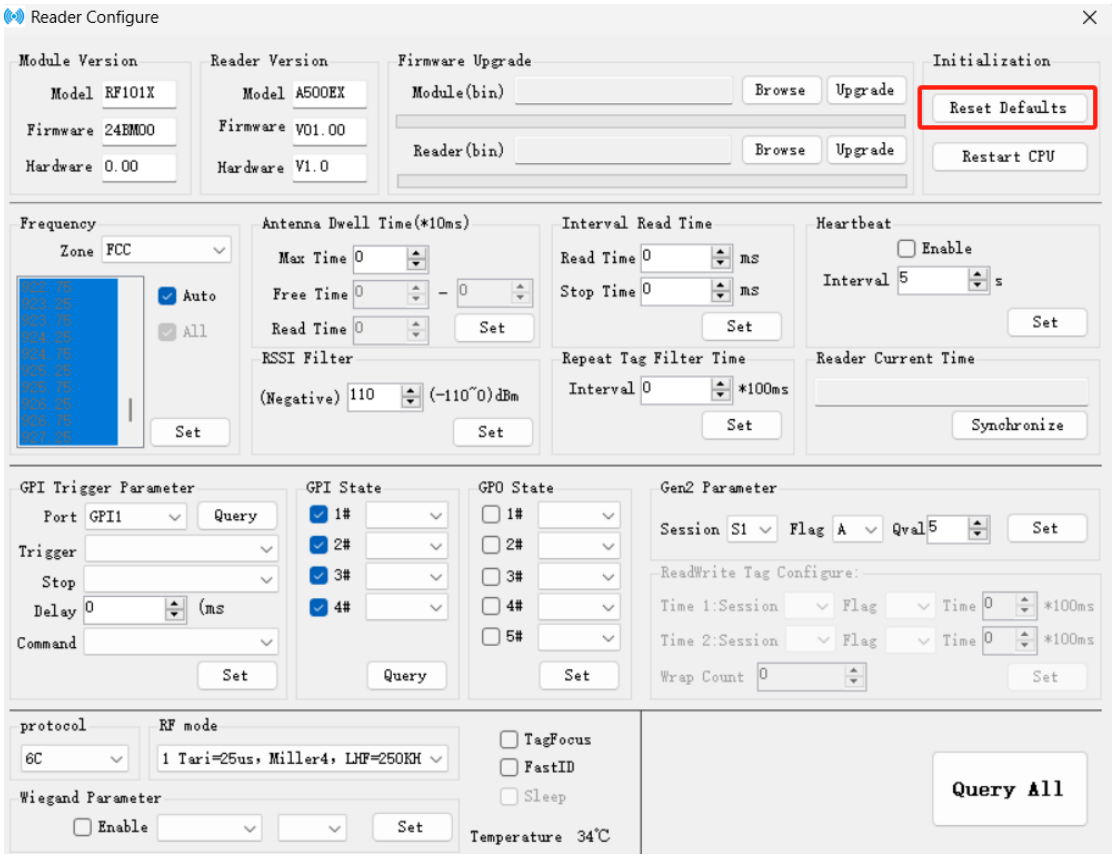
Step 3: Click Upgrade to start the firmware upgrade. During the upgrade, keep the PC connected to the reader until the upgrade success window is displayed.

Step 4: Reconnect the reader at this time, open the read and write module test form, you can check in the query version window that the software version number has been updated to the version number just written.

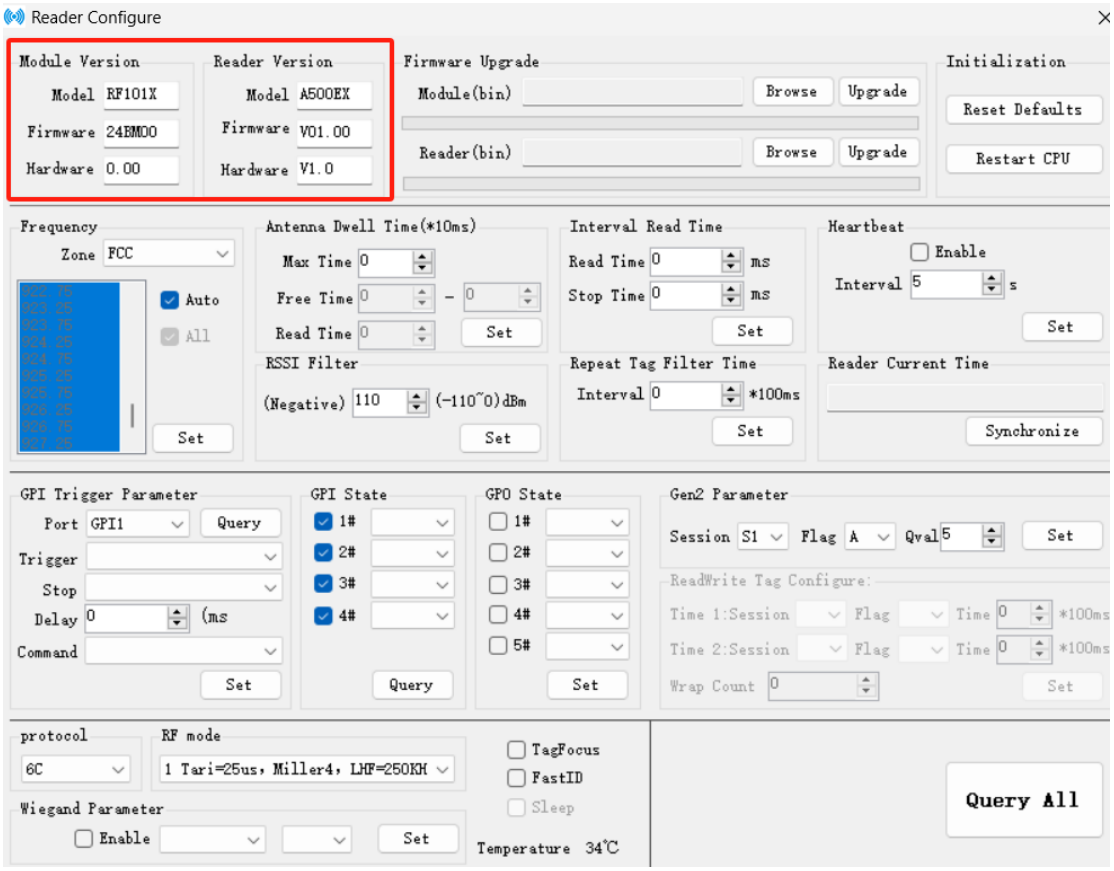
Step 5: After the upgrade, restore factory Settings

4.6.9 factory data reset

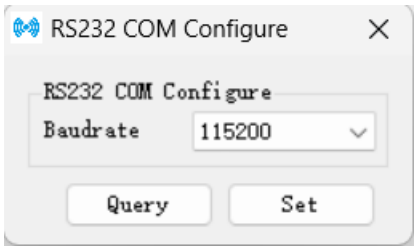
Function: The function of restoring factory Settings is to change the RFID configuration parameters of the device to default parameters. The picture is as follows:



4.6.10 Version number query



4.7 RS232 Configures the baud rate

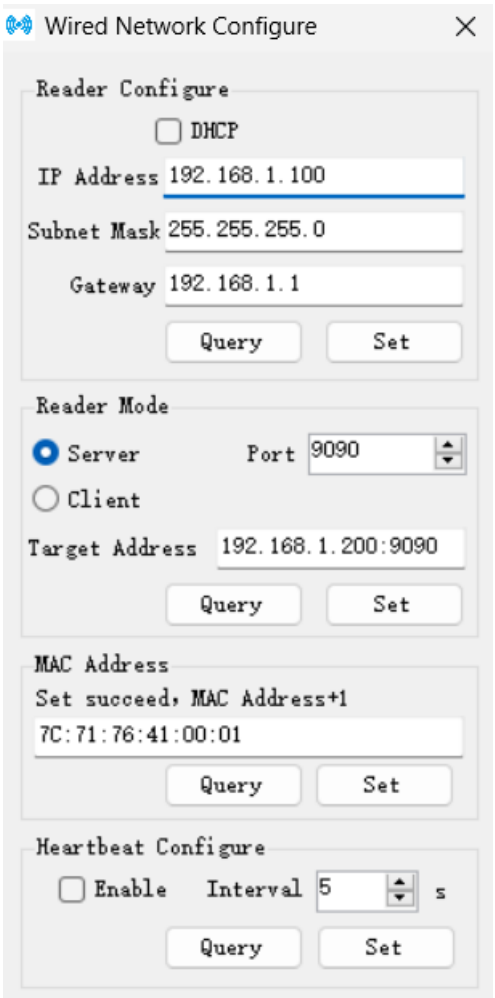


Click "Configuration" - "Connection Configuration" - "RS232" in the navigation bar, and then open the RS232 serial port configuration, as shown in the figure.

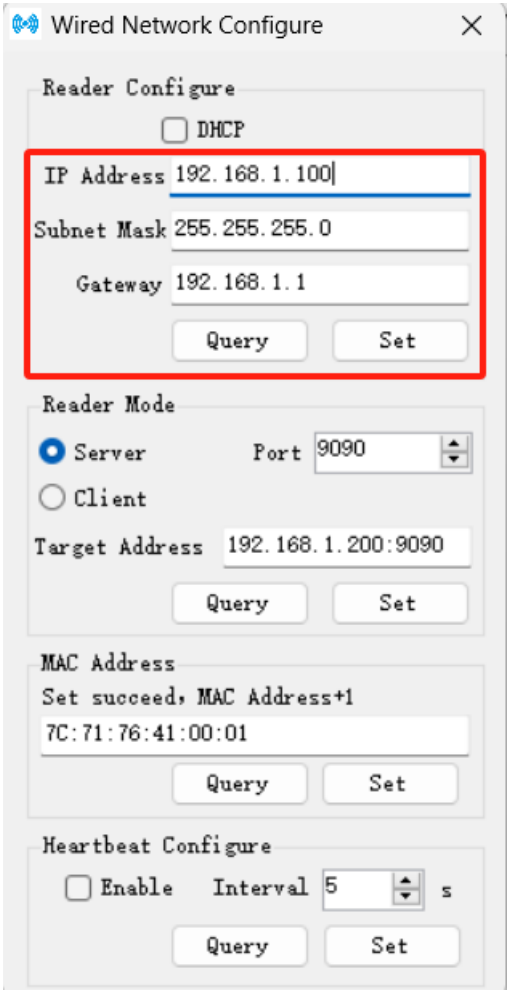
4.8 Configure the IP address of the wired network

Click "Configuration" - "Connection Configuration" - "Wired Network" in the navigation bar, and then open the wired network configuration, as shown in the following picture.

As shown in the figure, the window module in wired network configuration can be subdivided into reader Settings, reader server/client mode, MAC address, and heartbeat instruction configuration according to functional requirements.



4.8.1 Set the IP address of the reader



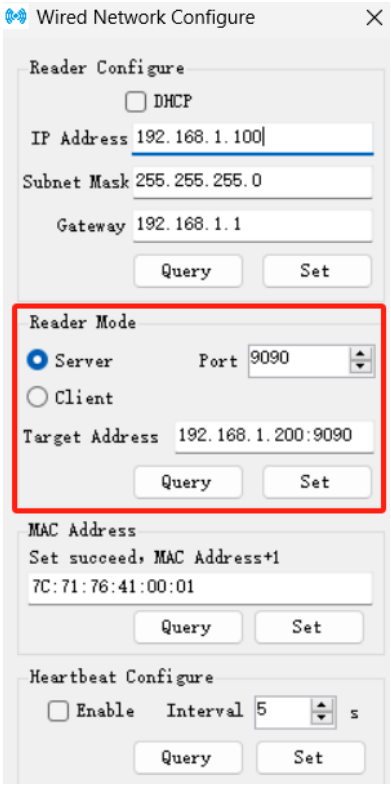
Step 1: Click "Configuration" - "Connection Configuration" - "Wired Network" in the navigation bar, enter the wired network configuration, and then find the reader Settings, as shown in the figure;

Step 2: In this window, write the IP address, subnet mask, gateway address, factory default IP: 192.168.1.100; Subnet mask: 255.255.255.0; Gateway: 192.168.1.1

Step 3: Click "Setting", wait for the pop-up operation success window, that is, the setting is complete;

PS: When using a network connection, ensure that the IP address of the reader and PC are on the same network segment.

4.8.2 Set or query the server/client mode of the reader



Function: The Ethernet communication provided by the reader (based on the TCP/IP protocol and only supports IPV4) includes the reader as a server mode (also known as passive mode) and the reader as a client mode (also known as active mode), and the reader can only be in one of these two modes at any time. The server mode of a reader refers to the TCP connection initiated by an external device (such as a PC) to the reader. The client mode of the reader refers to the TCP connection initiated by the reader to an external device. This window is used to set the working mode of the reader in the mode of network port

communication.

Step 1: Click "Test" - "Application Module Test" in the navigation bar to enter the application test form, and then find the network port server/client mode, as shown in the figure;

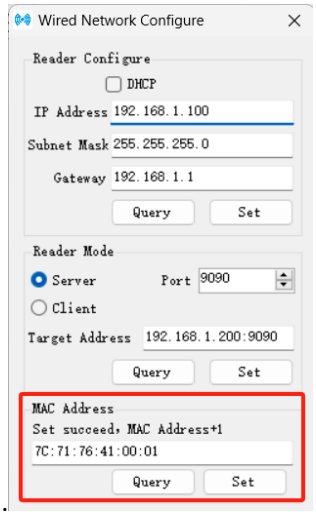
Step 2: Click "Server" or "client" to determine the working mode of the application side of the reader to be set. The factory default is server mode.

Step 3: Click "Setting", wait for the pop-up operation success window, that is, the setting is complete;

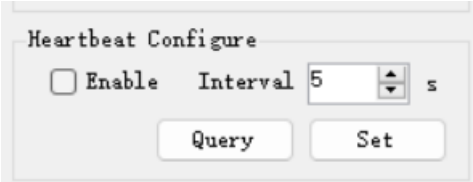
Step 4: If you need to query the current working mode, click "Query" to view the window.

4.8.3 Querying MAC Addresses

Query the MAC address, as shown in the following figure



4.8.4 Set or query heartbeat commands



Function: Set or query the configuration parameters of the heartbeat command. After the heartbeat command is enabled, the reader sends a heartbeat packet upward at a certain interval to determine whether the PC and the reader are still connected

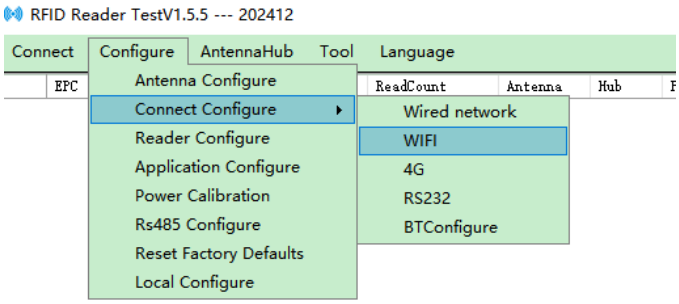
Step 1: If the heartbeat configuration is enabled, select Enable. If it is not enabled, do not select it.

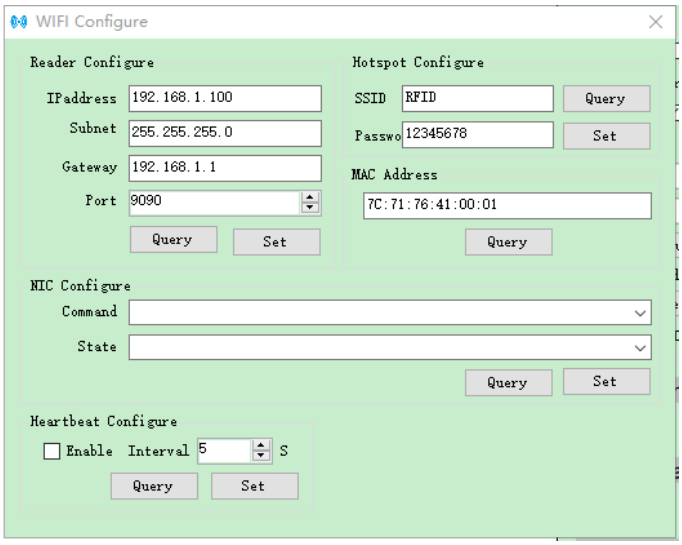
Step 3: To enable the heartbeat command, you need to set the heartbeat interval, in seconds. The interval ranges from 0 to 65535

Step 4: Click "Setting", wait for the pop-up operation success window, you can complete the setting;

4.9 WIFI Network configuration

Click "Configuration" - "Connection Configuration" - "WIFI Network" in the navigation bar, and then open the WIFI network configuration, as shown in the following picture. The window module in WIFI network configuration can be subdivided into: WIFI hotspot parameters, reader IP Settings, MAC addresses, WIFI network status, and heartbeat command configuration according to functional requirements.





Set or query WIFI parameters

Step 1: Click "Configuration" - "Connection Configuration" - "WIFI Network" in the navigation bar, enter the WIFI network configuration, and then find the WIFI hotspot parameters, as shown in the right picture;

Step 2: Enter the name of WIFI in the SSID input field of the window (English case and regular symbols only);

Step 3: Set the WiFi hotspot password; (Compatible with WiFi6 and below networks)

Step 3: Click "Setting", wait for the pop-up operation success

window, that is, the setting is complete;

Step 4: Configure the IP address of the reader. The configuration succeeds. (Ensure that the IP address is not used by other devices.)

Step 5: Wait until the parameter configuration page is displayed. Restart the reader CPU or power off the device.

Step 6: Confirm that the configured WiFi can be pinged through the computer.

Step 7: Use the configured WiFi IP and port to connect to the reader using TCP_Client

5 After-sales service

When users encounter problems that cannot be solved while using this device, please contact the customer service center of the company.

FCC Compliance Notice

This device complies with part 15 of the FCC Rules. 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.

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

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment .

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This equipment should be installed and operated with minimum distance 20cm between the radiator& your body.

This guide is a guide to the use of the products provided by Wuxi iData Technology Co., Ltd., based on the available information, we do not guarantee that the content of the guide is fully up to date, so we reserve the right to modify at any time without notice.

If you have any questions about the device, you can email them to idata@idatachina.com

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