R410 Reader User Manual

preface

This manual is applicable to the following models of products:

R410 reader/writer

This manual provides information on the installation, use, maintenance, and other features of the product, which can be read and used by installation personnel, users, and maintenance personnel.

The version number of this manual is: V1.0， The revision record is shown in the following table:

November 18, 2024	V1.0

All introductions and explanations about product features and functions, as well as other information in this manual, are the latest and valid information at that time, and all information is accurate and correct at the time of printing. Yingda Company reserves the right to correct or modify the information and explanations in this manual without prior notice or liability.

catalogue

1. Product Introduction

1.1 major function

The R410 reader/writer (V1.0) can perform read and write operations on electronic tags that comply with the EPC C1G2 (ISO 18000-6C) protocol.

1.2 performance parameter

1. Working frequency band:
   865.7MHz, 866.3MHz, 866.9MHz, 867.5MHz (customizable).
2. Reading speed: up to 750 times per second
3. Working voltage:+ 12V~24V（DC）
4. Maximum operating current:0.95A@12V； 0.5A@24V
5. Communication interface: TCP/IP、RS-232
6. Serial port baud rate: 115200bps (default)
7. IO： 4 photoelectric inputs and 3 outputs
8. Protection level: IP67
9. Working temperature:- 30℃～+70℃
10. Storage temperature:- 40℃～+85℃
11. Working humidity: 5% to 95% RH, no condensation

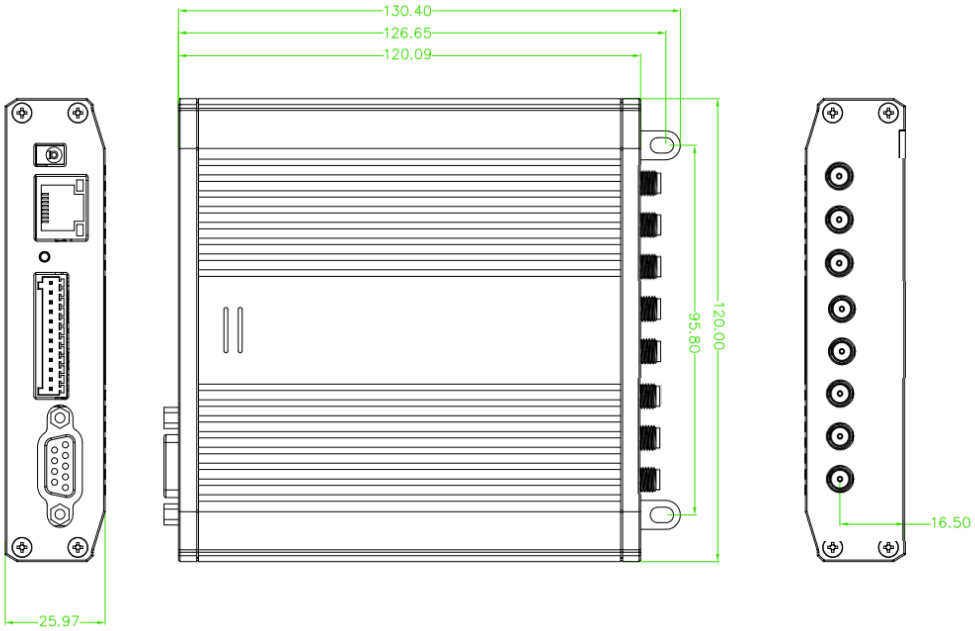
1.3 External dimensions

Dimensions: 120mm * 120mm * 26mm (L * W * H)

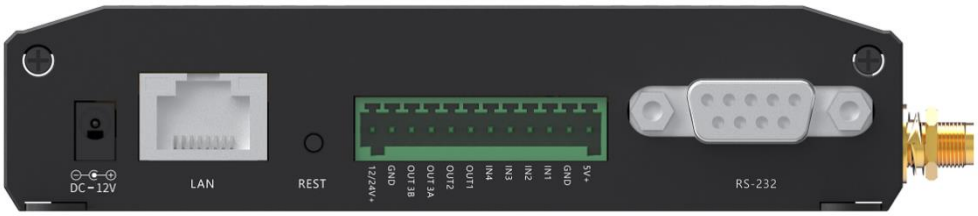
1.4 weight

The weight is approximately 410g for eight ports and 473g for eight ports

1.5 Installation size



2. Reader/Writer Interface Description



2.1 power interface

DC 12-24V or POE power supply, compliant with IEEE 802.3at standard

DC interface size: 3.5 * 1.35 * 10mm

2.2 TCP/IP interface

RJ45 interface

2.3 rs-232 interface

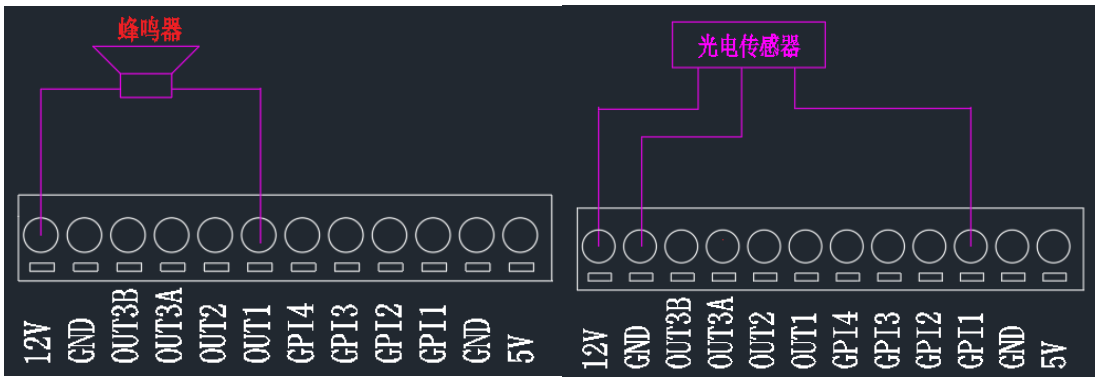
Serial Number	definition	describe
1	NC	
2	TXD	RS-232 transmission
3	RXD	RS-232 receiver
4	NC	
5	GND	signal ground

2.4 GPIO Interface

Serial Number	definition	describe
1	12/24V+	+12-24V external power supply, same voltage as adapter, limited to 500mA, POE power supply has no output
2	GND	
3	OUT3B	Relay 3 output+
4	OUT3A	Relay 3 output-
5	OUT2	OC gate output 2
6	OUT1	OC gate output 1
7	IN4	Optocoupler input 4
8	IN3	Optocoupler input 3

9	IN2	Optocoupler input 2
10	IN1	Optocoupler input 1
11	GND	
12	5V+	+5V, external output 5V, limited to 500mA

Wiring example:



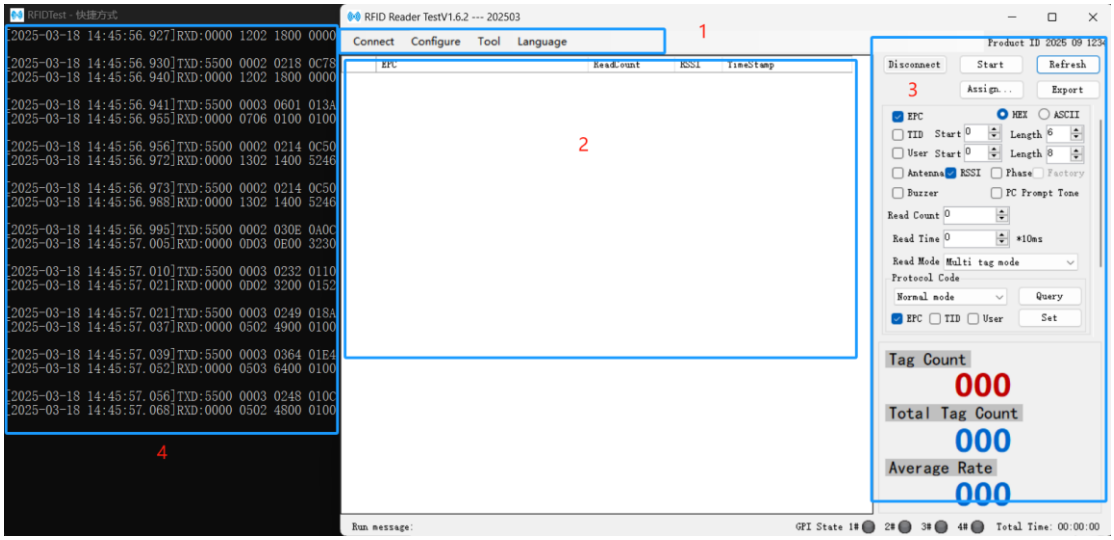
2.5 Auxiliary software

The R410 reader/writer comes with accompanying demonstration software and API interface libraries.

Demo software: UHF RFID DEMO (version: V1.6.1 and above)

API API libraries: C #, C++, Java, Android and other API dynamic link libraries.

Introduction to Software Interface 3



As shown in the above figure, the main interface consists of four parts, namely
1: Navigation bar
2: Data display area
3: Operation display area
4: Log display area

3.1 Navigation Bar

Connection: Used to select the connection method with the reader/writer, there are two connection methods: TCP and serial port.

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

Some functions require the use of shortcut keys to display

3.2 Data Display Area

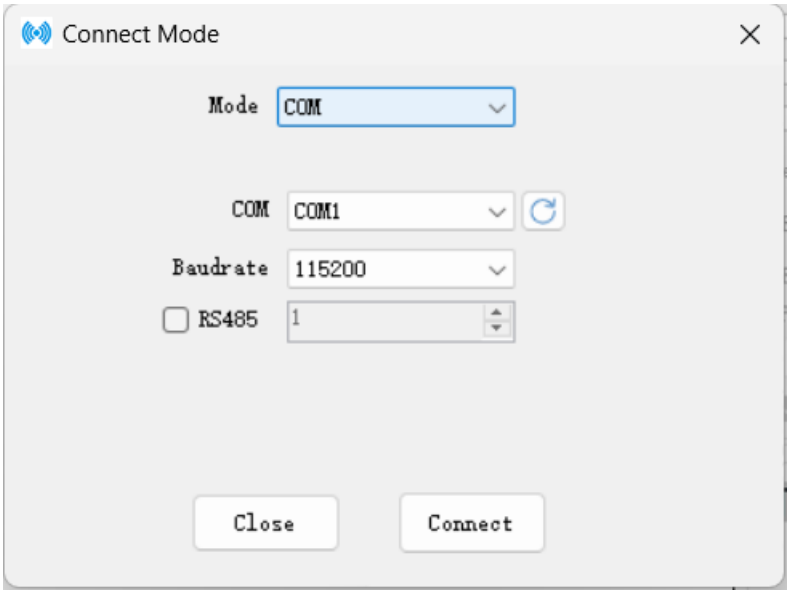
EPC： Product electronic code.
TID：Tag Identification, Tag recognition is an identification code.
UserData： User data segment, data stored in the tag user data area.
ReadCount： Statistics of the number of times a single tag has been read
RSSI： Label echo (signal) strength.
TimeStamp： Tag data reception time record, time format: hour minute second millisecond

3.3 Log display area

Demo software corresponds to the communication protocol, please refer to the communication protocol documentation for details

4 Demo Software Operation Instructions

4.1 Connecting/Disconnecting Reader/Writer - Serial Port



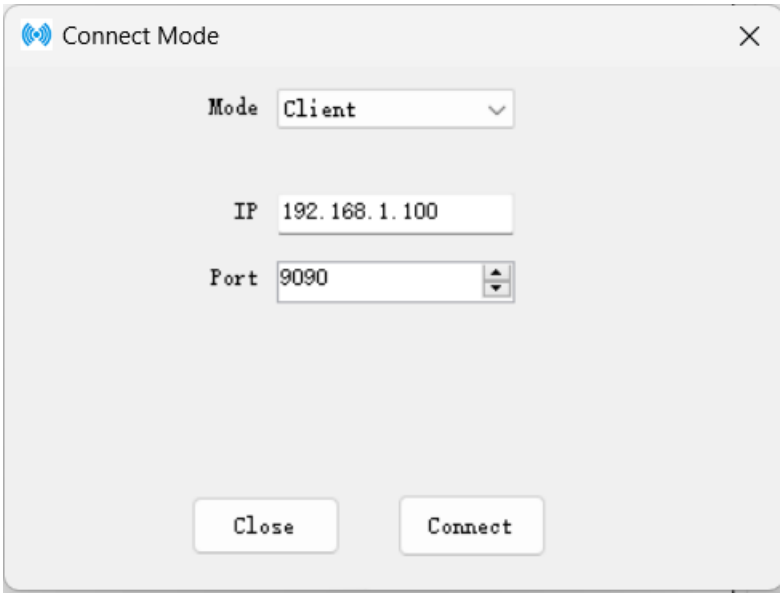
Step 1: First, connect the serial port cable. In the navigation bar, select "Connect" - "Reader/Writer Connection", and then enter the connection method selection interface;

Step 2: Select the connection method, which includes TCP_Clent (client)/TCP_Server (server)/COM (serial port)/USB (HID)

Step 3: When selecting the serial port connection method, you also need to choose the serial port number and baud rate for connecting to the computer. The default baud rate is 115200.

Step 4: After confirming that there are no errors, click connect to successfully connect the reader/writer.

4.2 Connect/Disconnect Reader - TCP



Step 1: In the navigation bar, select "Connection" - "Reader Connection", and then enter the connection method selection interface;

Step 2: Select the connection method, which includes TCP_Clent (client) connection method;

Step 3: When selecting the TCP_Client connection method, the default IP address of the reader is 192.168.1.100 and the port number is 9090. If the connection cannot be made, please check if the computer's IP address is 192.168.1.XX. If you forget the IP address of the reader/writer, press and hold the REST button for 3 seconds while powered on to restore the default IP address of the reader/writer

Step 4: After confirming that there are no errors, click connect to successfully connect the reader/writer.

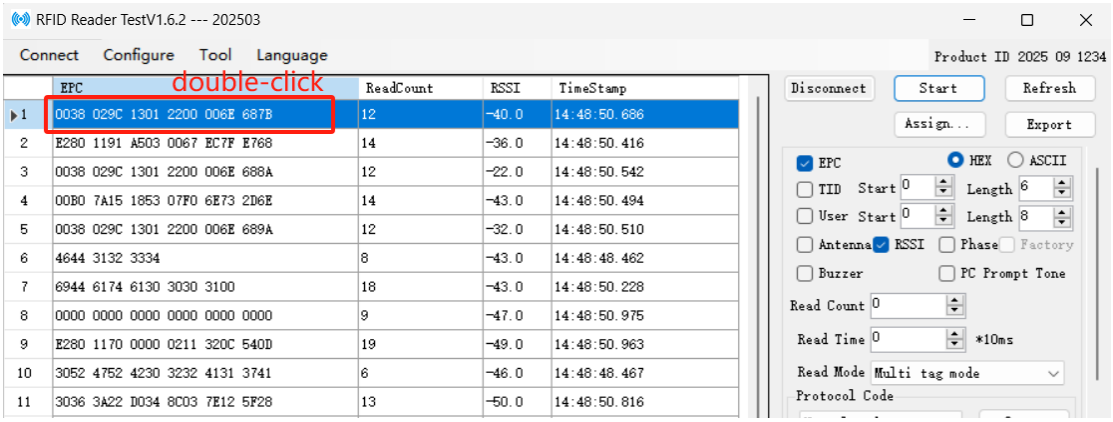
4.3 Introduction to the Function of Operation Selection Area

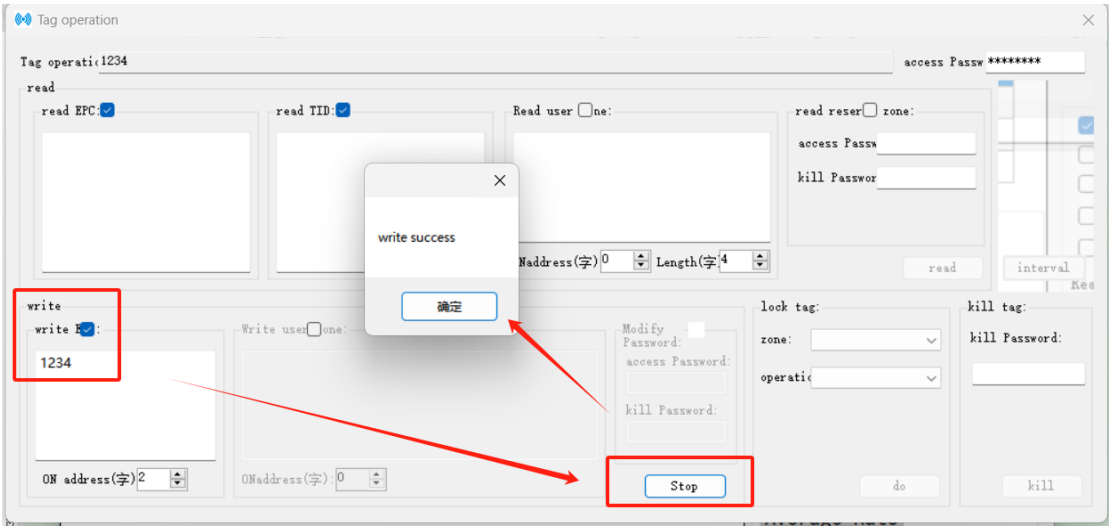
- Read frequency: Set the number of times the reader/writer reads the label, ranging from 1-65535. 0: indicates no setting, unlimited reads.
- Read time: Set the time for the reader to read the label, ranging from 0-65535 (unit: 10ms).
- Reading mode: Set the mode for the reader to read tags, including single tag mode, multi tag mode, dense read mode, and low-power mode.
  - Reading mode: Set the reading mode of the reader/writer to read tags, including fast reading mode, multi tag mode, low-power mode, and dense reading mode
  - Fast reading mode: suitable for application scenarios where tags need to be read quickly, such as conveyor belts, vehicle entry and exit, etc., where the number of tags to be read at once is less than 50;
  - Multi label mode: suitable for scenarios where more than 50 labels are read during the movement process, such as inbound and outbound storage;

- Low power mode: suitable for scenarios where UHF RFID handheld devices or UHF RFID tablets are powered by batteries and require extended battery life;
- Intensive reading mode: suitable for applications with multiple antennas and more than 200 tags. In a static environment, it is necessary to read all tags within a few seconds, such as RFID filing cabinets, RFID book cabinets, RFID consumables cabinets, etc;
- Working mode: Set the working mode of the reader/writer, including normal mode, aging mode, and automatic card reading mode.
- Normal mode, enters the waiting instruction state when powered on, default state
- Automatic card reading mode, automatically reading label status when powered on, with the option to read EPC, TID, and USER;

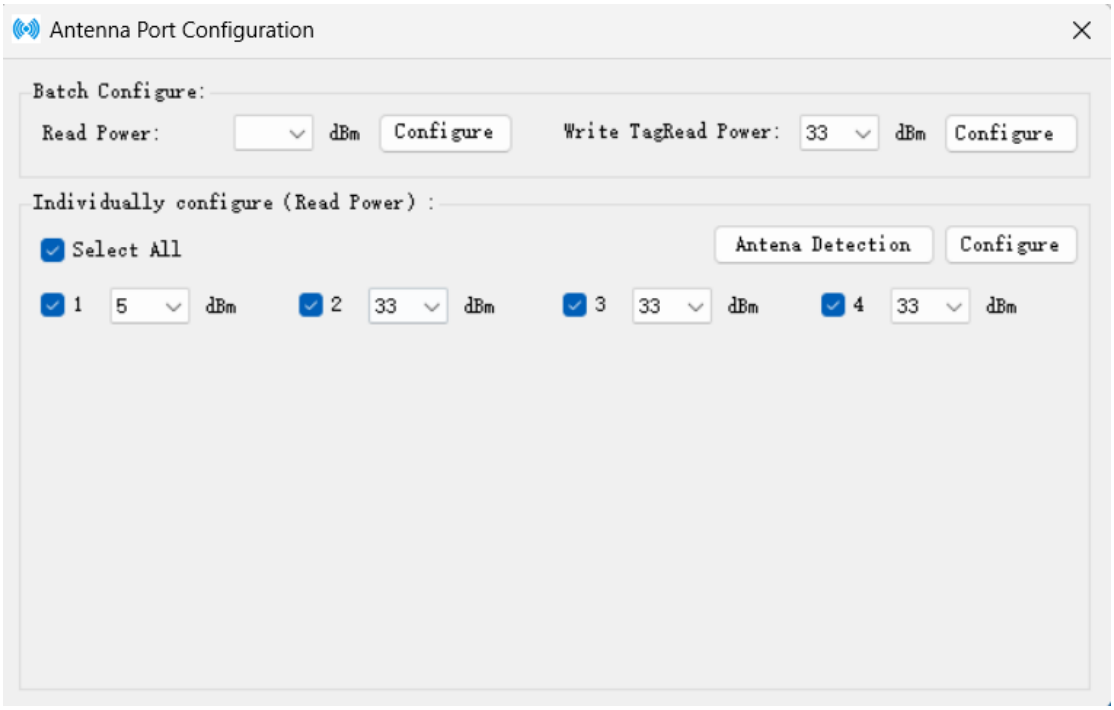
4.4 Writing EPC/User Area

1. First click "Start" to read the label, then click "Stop" to stop reading the label,
2. Find the tag that needs to be modified in the EPC/user area, double-click to enter, find "Write Operation", select "Write EPC"/"Write User Area", and write the content that needs to be modified in the box,
3. After clicking the "Write" button, a "Write Successful" dialog box will pop up, indicating successful writing





4.4 Antenna Port Power Configuration



Function: The function of configuring antenna ports is to change the strength value of wireless signals received and transmitted. The higher the power value, the greater the RF power and the wider the communication range.

Step 1: Ensure that the PC end of the reader/writer is connected, click on "Configuration" - "Antenna Port Configuration" in the navigation bar, and enter the antenna port configuration window.

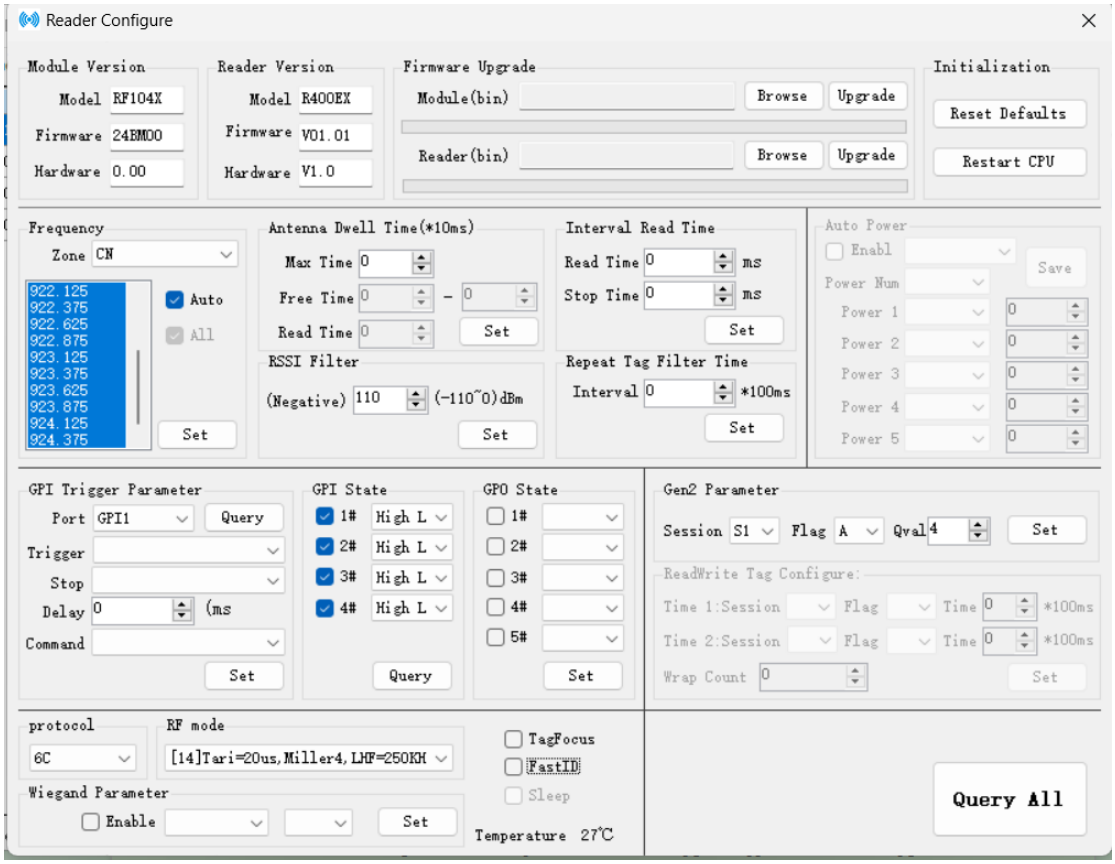
Step 2: In the antenna configuration window, there are two antenna configuration methods: batch configuration and single configuration; Batch configuration refers to configuring the RF power of multiple antennas at once, while single configuration refers to gradually configuring the RF power of antenna channels one by one.

Step 3: Click to select the antenna channel that needs to be activated, and then set its RF power. Multiple options can be selected;

Step 4: Click on Configuration until a successful setting window pops up, indicating successful setting

4.7 Introduction to the configuration interface of the read-write module

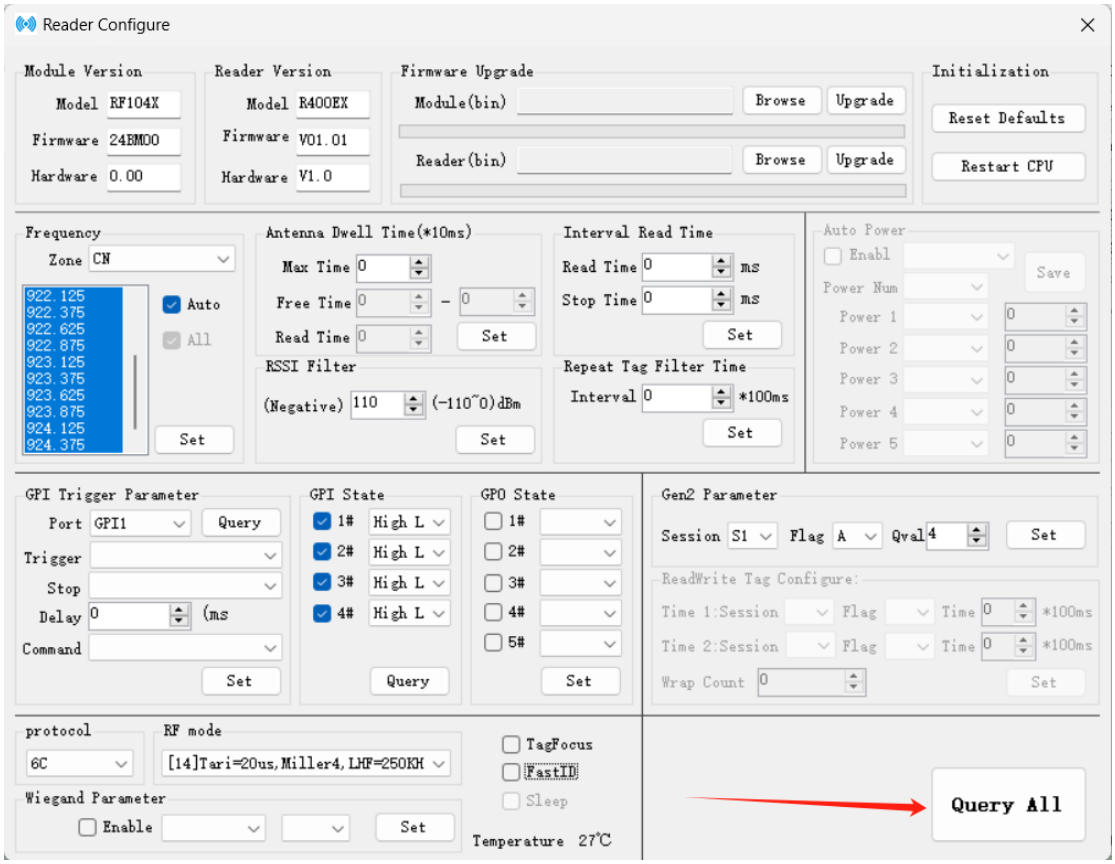
Click on "Configuration" - "Read/Write Module Configuration" in the navigation bar, and then open the Read/Write Module Test form, as shown in the following figure.



As shown in the above figure, the window modules in the read-write module test form can be subdivided according to functional requirements: firmware upgrade, application firmware upgrade, query module product model and software/hardware version, query application processor software and hardware version, IO input, IO output, IO trigger, interval tag reading time, frequency band, air interface protocol, read parameter settings, duplicate tag filtering time, UTC time, factory reset, RSSI filtering threshold, antenna port dwell time configuration, communication mode, read-write tag configuration parameters. Query module product model and software/hardware version window, query application processor software/hardware version query, frequency band query, IO input window only has query function

4.7.1 Batch Query

Function: Batch query RFID related configuration parameters of readers.



4.7.2 Setting/querying IO triggers

Function: Set the triggering mode, triggering conditions, and triggering functions of the IO port.

Step 1: Follow the setup/query GPIO input/output setup steps in 3.2 to set the IO port that needs to be set to trigger mode to input mode, and then find the query GPIO interface definition, as shown in the figure on the right;

Step 2: Select the trigger port that needs to be defined;

Step 3: Select the triggering conditions. The current triggering conditions include high-level triggering, low-level triggering, and off triggering.

Step 4: Select the stop triggering method, which currently has two options: state reversal and delayed stop

Step 5: If the triggering method is selected as "Delay Stop", the delay time needs to be set in

milliseconds with a range of 1-65535

Step 6: Select the instruction type; Default: MsgTagInventory

Step 7: Click on Settings to complete

PS1：: Trigger condition

State reversal mode refers to the situation where when the input trigger level of the IO port is triggered, the IO port remains in trigger mode until the input level of the IO port flips before it can stop triggering;

Delay stop starts counting down from the moment the input level of the IO port meets the triggering condition. When the countdown reaches 0, the trigger mode is exited until the next input level meets the triggering condition again before triggering.

PS2： instruction type

Empty instruction: No instruction binding

MsgTagInventory： Read EPC instructions by default

MsgTagRead： Universal read instruction

MsgPowerOff： Turn off amplifier command

MsgHubAntennaConfig： Configure antenna splitter

Ps3: GPI status

If the IO trigger configuration is completed, the GPI trigger status can be viewed in the status bar of the main interface

4.7.3 Setting Air Interface Protocol

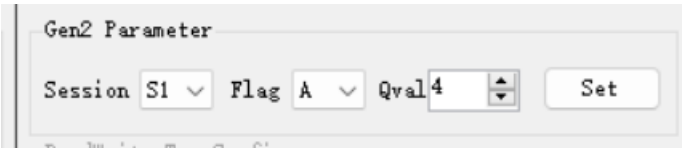
Function: Select the data type standard for the reader/writer

Step 1: Click on "Configuration" in the navigation bar - "Read/Write Module Configuration", enter the Read/Write Module Test window, and then find the Air Interface Protocol window, as shown in the figure on the right;

Step 2: Select the air interface protocol standard, default to 6C, and set it after selection

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

4.7.4 Setting Q value, session, and inventory parameters



Function: Set the starting value of Q value, session, and inventory location.

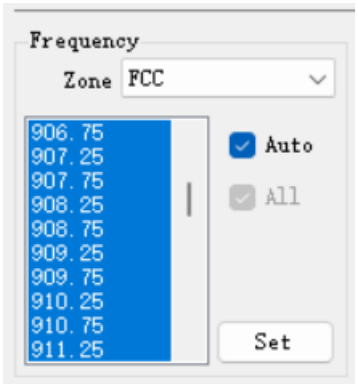
Step 1: Click on "Configuration" in the navigation bar - "Read/Write Module Configuration", enter the Read/Write Module Test window, and then find the Read Parameter Settings window, as shown in the figure on the right;

Step 2: Set the parameters for Q value, Session, and Flag

Step 3: Click and wait for a successful operation window to pop up to complete the setup;

Note: To read the parameter settings interface, a shortcut key display is required on the main interface: Shift key+YBT

4.7.5 Setting Frequency Bands



Function: Set the operating frequency band and specific frequency point of the reader/writer.

Step 1: Click on "Configuration" - "Read/Write Module Configuration" in the navigation bar to enter the Read/Write Module Test Form, as shown in the figure;

Step 2: Select the frequency band, default to FCC and automatic frequency selection,

Step 3: Remove the automatic selection option and manually select the frequency point that needs to be set.

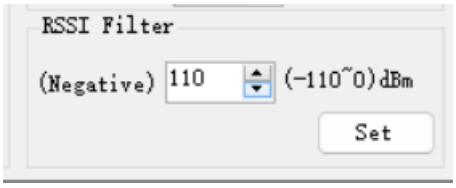
Step 4: Click on Settings and wait for a successful operation window to pop up to complete the settings.

National standard frequency band CN: 920MHz~925MHz

North American frequency band FCC: 902MHz~928MHz

EU frequency band: 865 MHz~868 MHz

4.7.6 Setting RSSI filtering threshold



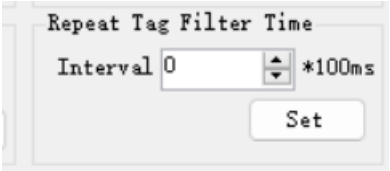
Function: Set the filtering threshold for the signal strength of tag data;

Step 1: Click on "Configuration" in the navigation bar - "Read/Write Module Configuration", as shown in the figure;

Step 2: Set the parameters for RSSI filtering threshold within the range of -110~0 dB;

Step 3: Click on Settings and wait for a successful operation window to pop up to complete the settings;

4.7.7 Setting Duplicate Label Filtering Time



Function: Set within a certain time range, the data of the same tag can only be read once. If the tag data is read more than twice, it will be filtered and ignored. Used to filter duplicate tag data received by the reader/writer during card reading cycles at a specified time, reducing redundant data uploads and minimizing the overhead of data processing on the upper computer.

Step 1: Click on "Configuration" in the navigation bar - "Read/Write Module Configuration", as shown in the figure;

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

Step 3: Click on Settings and wait for a successful operation window to pop up to complete the settings;

4.7.9 Firmware Upgrade

Function: This feature is used to upgrade the underlying firmware of the product. As shown in the picture:

Step 1: Click on "Configuration" - "Read/Write Module Configuration" in the navigation bar to enter the Read/Write Module Configuration interface

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

Step 3: Click Upgrade to start the firmware upgrade. During this process, please keep the PC and reader connected until the upgrade success window pops up, indicating that the upgrade is successful.

Step 4: At this point, reconnect the reader and open the read-write configuration interface to view the latest written version number of the reader,

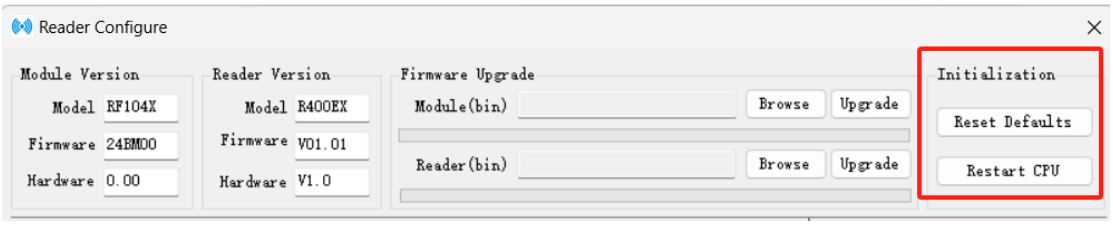
Step 5: After upgrading, it is necessary to restore the factory settings

PS： The module upgrade corresponds to the target bin file starting with RFID

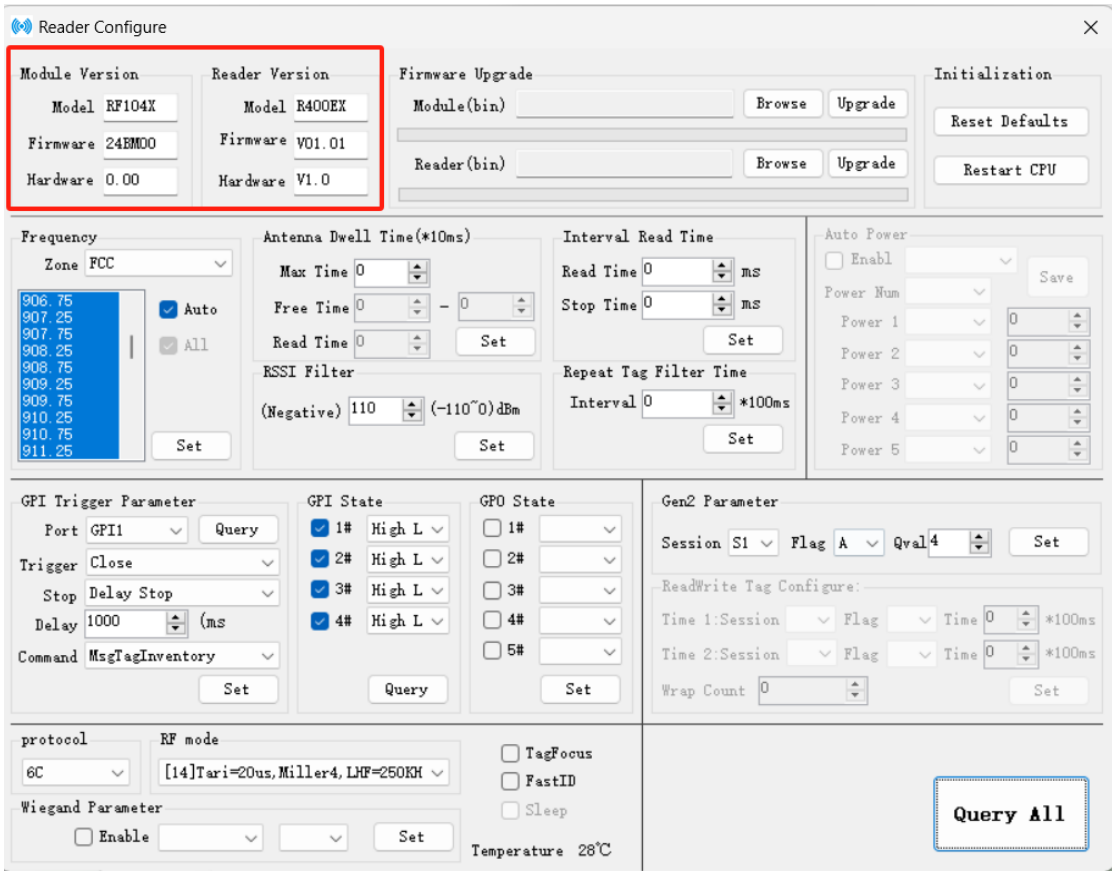
The upgrade file for the reader/writer corresponds to the target bin file starting with Reader

4.7.10 Factory reset

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

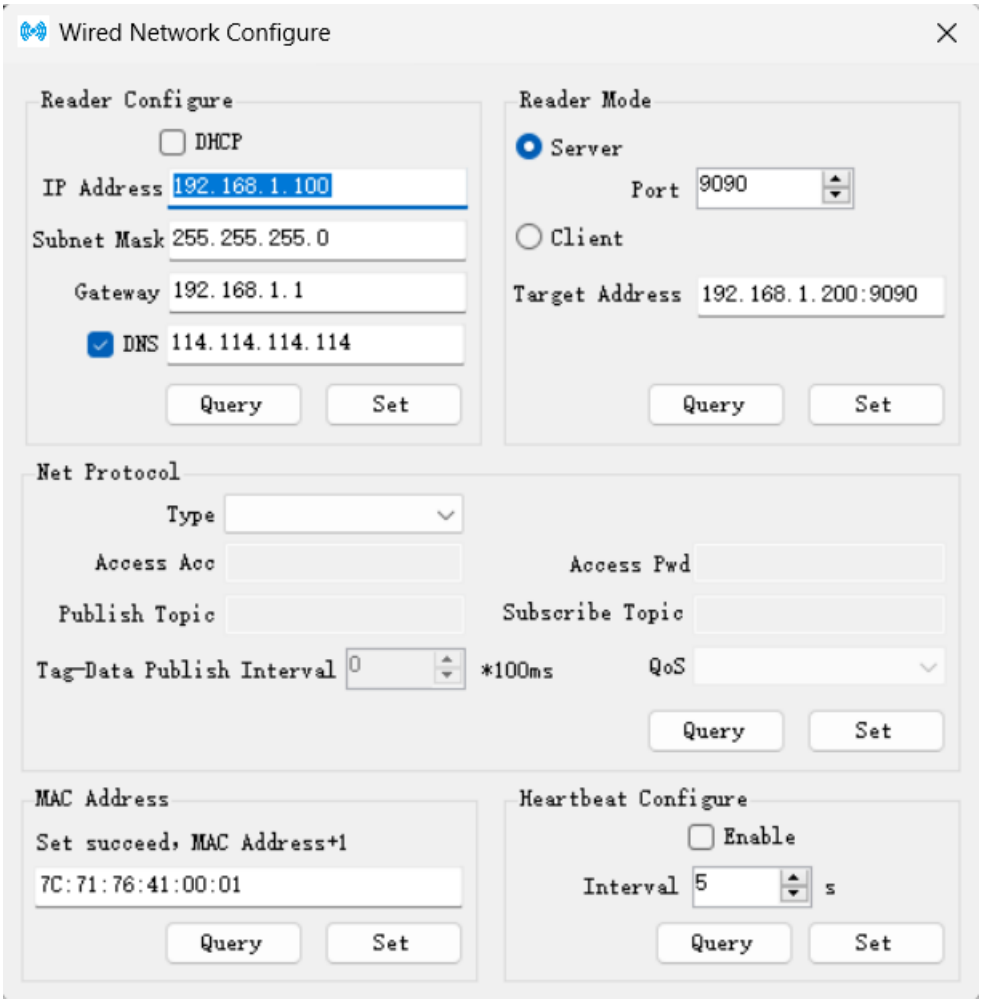

Reader Configure
Module Version
Model RF104X
Firmware 24BM00
Hardware 0.00
Reader Version
Model R400EX
Firmware V01.01
Hardware V1.0
Firmware Upgrade
Module(bin)
Browse
Upgrade
Reader(bin)
Browse
Upgrade
Initialization
Reset Defaults
Restart CPU

Version 4.7.11 Query



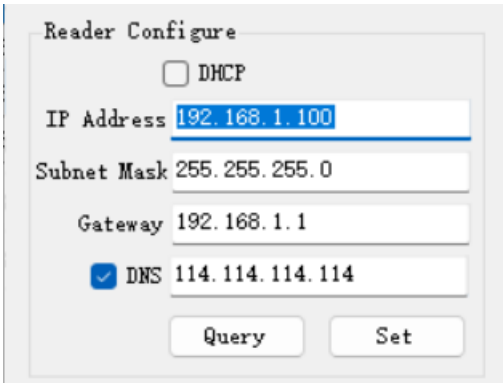
4.9 Wired Network IP Configuration

Click on "Configuration" - "Connection Configuration" - "Wired Network" in the navigation bar to open the wired network configuration, as shown in the following figure.



As shown in the above figure, the window module in wired network configuration can be subdivided according to functional requirements into: reader IP settings, reader server/client mode, MAC address, heartbeat command configuration, and network port protocol.

4.9.1 Reader IP Settings



Step 1: Click on "Configuration" - "Connection Configuration" - "Wired Network" in the navigation bar to enter the wired network configuration, as shown in the figure;

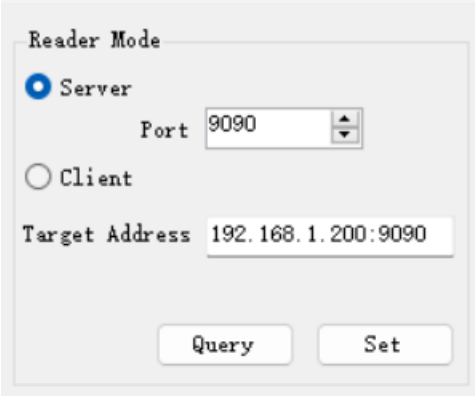
Step 2: Enter the IP address, subnet mask, and gateway address. The factory default IP is

192.168.1.100; Subnet mask: 255.255.255.0; Gateway: 192.168.1.1 and DNS.

Step 3: Click on Settings to complete the configuration;

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

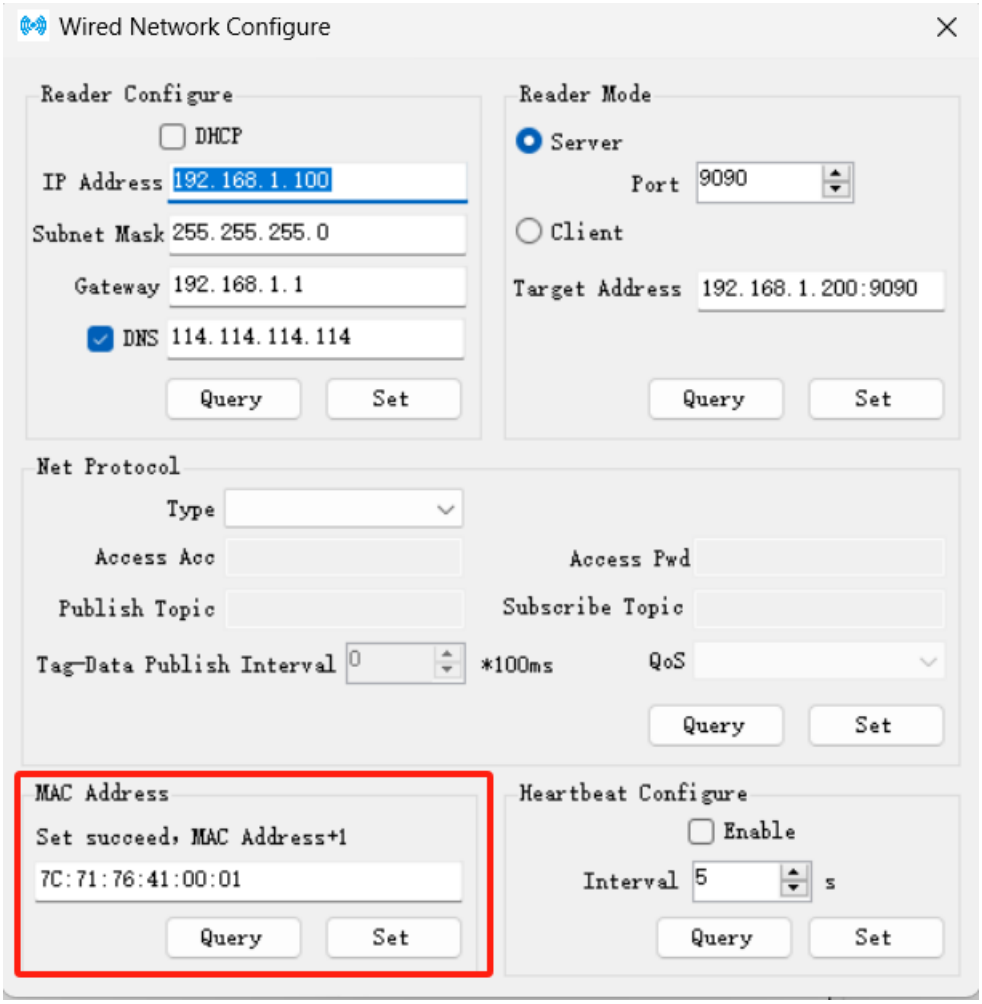
4.9.2 Setting/Querying Reader Server/Client Mode



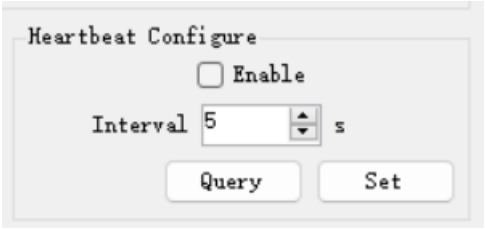
Function: The Ethernet communication provided by the reader/writer (based on TCP/IP protocol, only supports IPV4) includes two modes: the reader/writer as a server mode (also known as passive mode) and the reader/writer as a client mode (also known as active mode). At any time, the reader/writer can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

Determine the operating mode of the reader/writer application that needs to be set, with the factory default configuration being server mode;

4.9.3 Querying MAC Address



4.9.4 Setting/Querying Heartbeat Command Configuration



Function: Set/query the configuration parameters of the heartbeat command. After enabling it, the reader/writer will send a "heartbeat packet" to the upper end at certain intervals to determine whether the PC and reader/writer are still connected

5. After sales service

When users encounter unresolved issues while using this reader/writer device, please contact our customer service center.

This guide is a usage guide for the products provided by Wuxi Yingda Technology Co., Ltd. Based on existing information, we do not guarantee that the content of this guide fully complies with the latest situation. Therefore, we reserve the right to modify it at any time without notice.

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

CE Maintenance

1.Adapter shall be installed near the equipment and shall be easily accessible.

2.EUT Operating temperature range: -40° C to 65° C .

3.Adapter：

The plug considered as disconnect device of adapter

Model: TPQ-228F120200VW01

Input: 100-240V~ 50/60Hz 0.8A

Output:12.0VDC 2.0A 24.0W

4.The device complies with RF specifications when the device used at 20cm from your body.

Declaration of Conformity

Wuxi iData Technology Co., Ltd. hereby declares that this Desktop RFID Reader-writer is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU. In accordance with Article 10(2) and Article 10(10), This product is allowed to be used in all EU member states.

FCC Caution.

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.

Note: 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.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

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