Turn on the value of data

Hopeland RFID reader

Demo user manual

PC Version C#

Shenzhen Hopeland Technologies co. Ltd.

V 4.38

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1.Summary

1.1 Introduction

In order to facilitate users to understand the standardized operation of our company's readers and the basic use of RFID demonstration software, we prepared this document. The operating environment of the RFID demonstration software is the Windows platform .Net Framework 4.0.
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1.2 Open demo software

The demo software is green software, or portable software, and can be used without installation. You only need to double-click the executable file RFIDReaderTool.exe in the software directory to open the initial interface of the software. As shown in Figure 1-1.

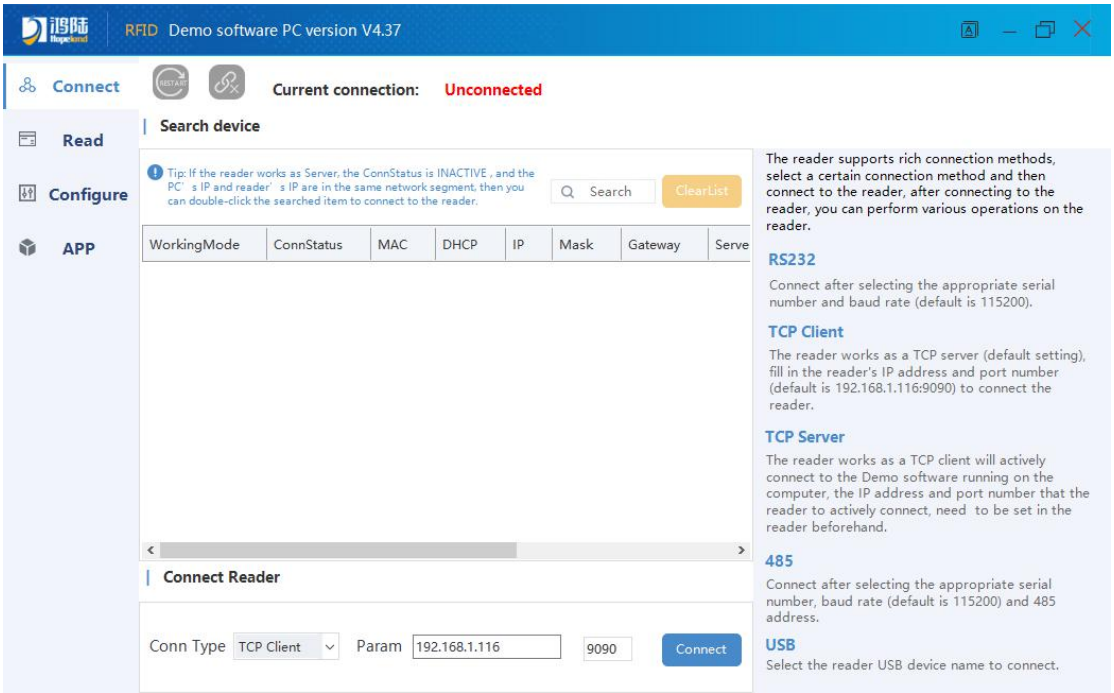


Figure 1-1

1.3 Software Language

1.3.1 Simplified Chinese

Click the icon in the upper right corner-"简体" to change the language of the RFID demo software to Chinese, the software will automatically restart, and the reader needs to be reconnected. As shown in Figure 1-2.

Figure 1-2

1.3.2 English

Click the icon-"English" in the upper right corner to change the language of the RFID demo software to English, the software will automatically restart, and the reader needs to be reconnected. As shown in Figure 1-3.

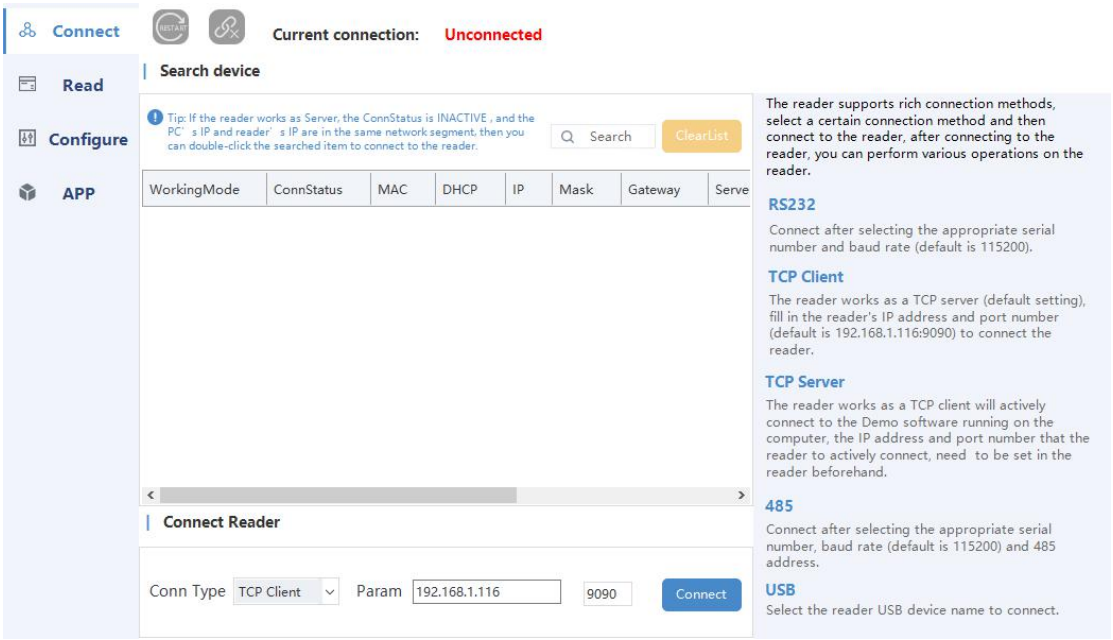


Figure 1-3

2.Connect reader

2.1 Serial Connection

Click "Connection Type"-"RS232", select the designated serial port, as shown in Figure 2-1.

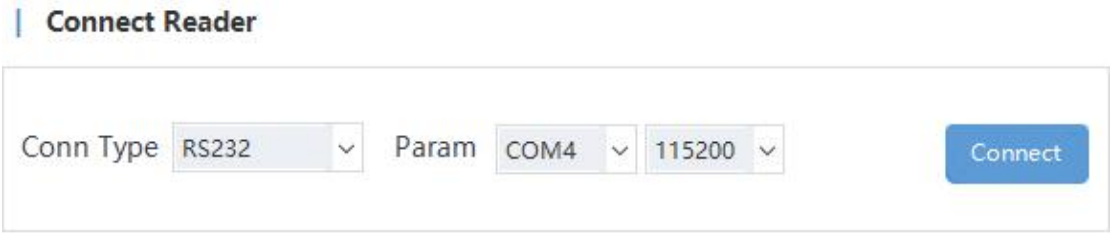


Figure 2-1

After selecting the correct serial port and baud rate, click *Connect* to connect the reader. The software will list the COM numbers of all serial devices currently connected to the host in the drop-down box. The default baud rate of the reader is 115200 bps. Once the connection is successful, the interface is shown in Figure 2-2.

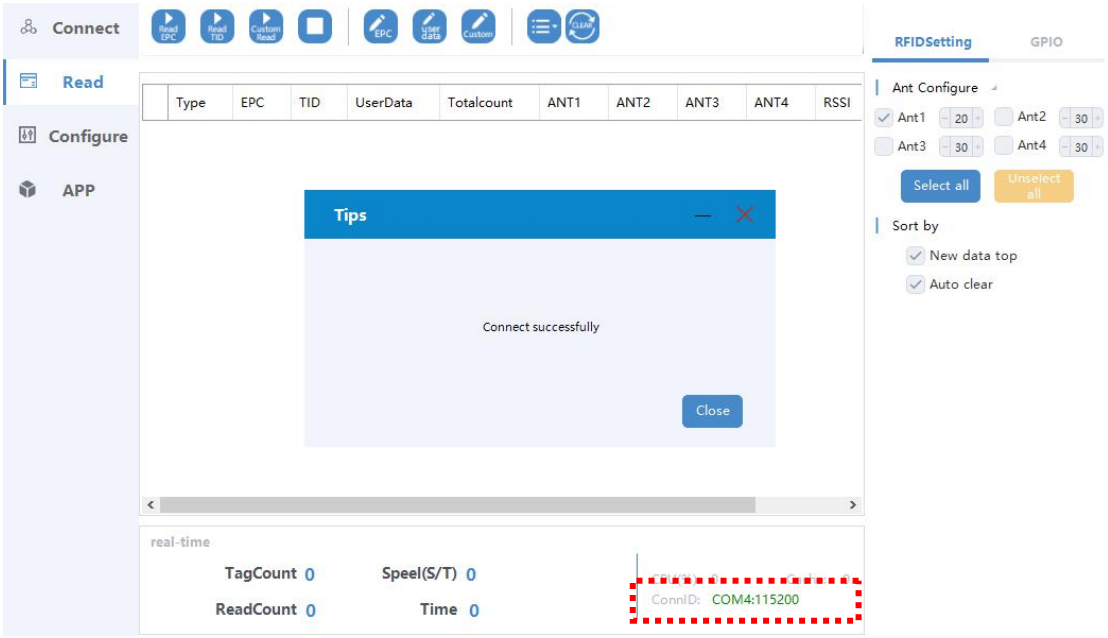


Figure 2-2

If the connection is unsuccessful, check the physical connection of the serial cable.

2.2 Network Connection

The default IP address and port number of reader is 192.168.1.116:9090, and it defaults as a TCP server, that is, we can connect to the reader through its IP address and port number. In some actual projects, we need use the reader and 4G router together to communicate with the cloud server through mobile network, there is no static public IP address be assigned for the 4G router that connected with reader, it means we cannot connect to the reader through its IP address and port number directly, generally the cloud server has static public IP address, so we can set the reader network communication mode to TCP client, let the reader actively connect to the cloud server.

2.2.1 TCP Client connection mode

If the reader's network communication mode is TCP server, the demo software should be used as a TCP client to connect to the reader.

Click "Conn Type"- "TCP Client" to open the TCP Client connection interface, as shown in Figure 2-3

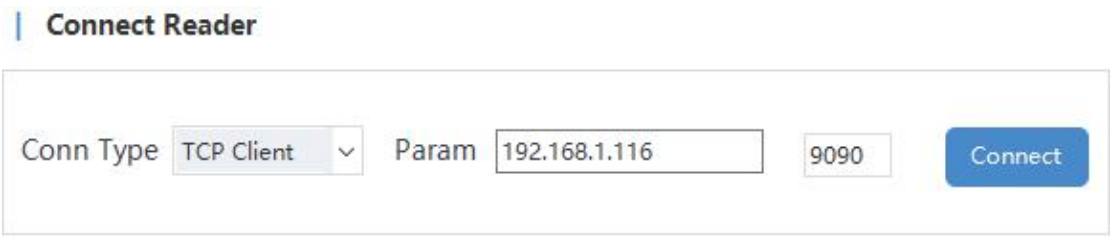


Figure 2-3

Network connection is used for long distance communication (within 80 m), connect the reader and PC to the Local Area Network, or connect the reader to the PC's LAN port directly. The default connection parameter is "IP address:port",like"192.168.1.116:9090", If the IP address and port of the reader has been changed, the connection parameter need to be filled in manually. Click *Connect* to connect the reader, as shown in Figure 2-4

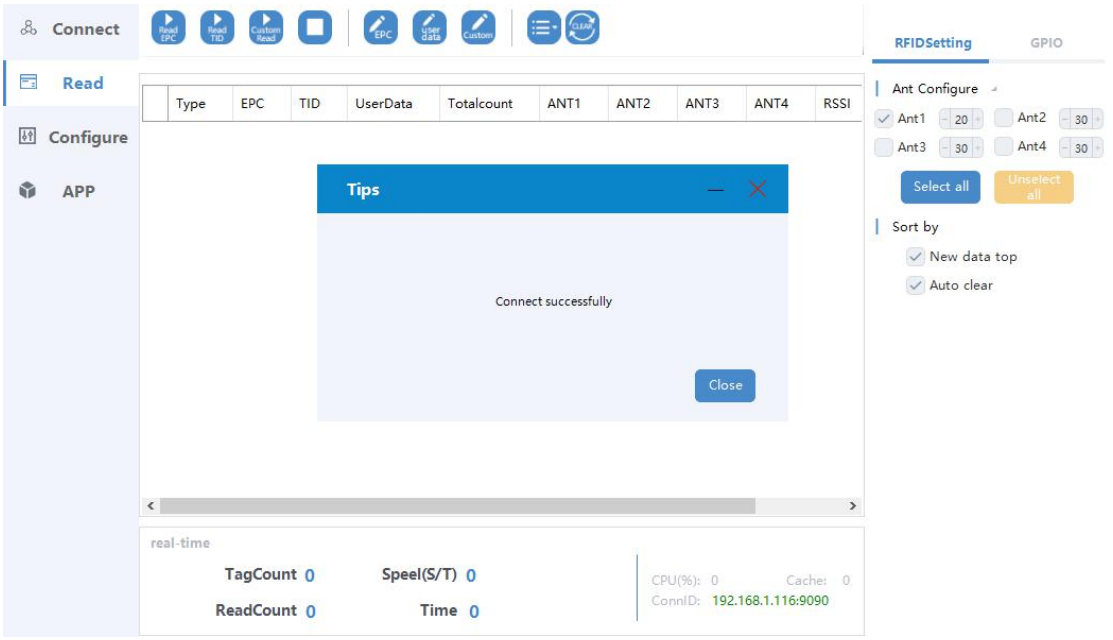


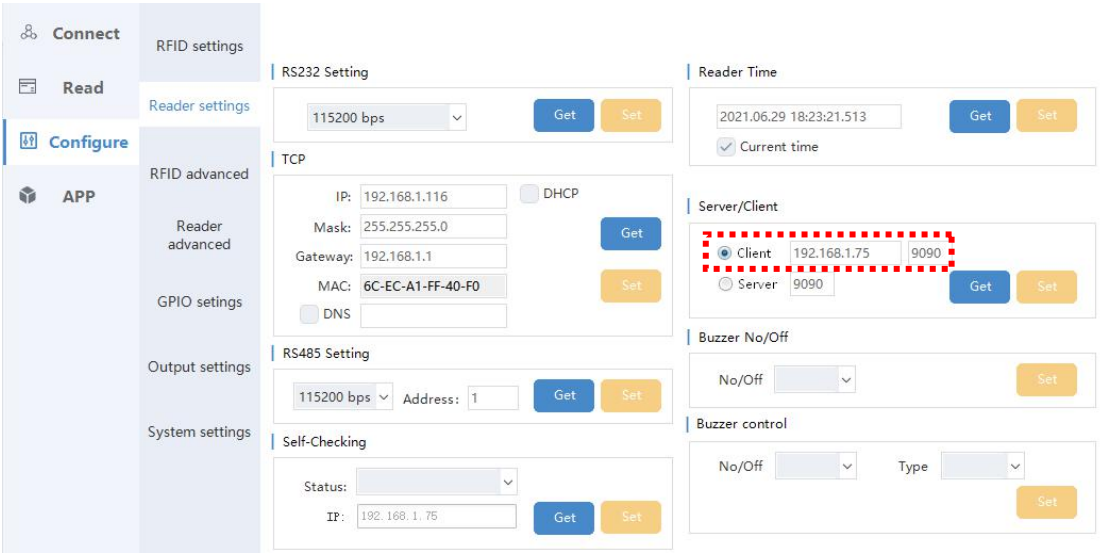
Figure 2-4

If the connection is unsuccessful, please check the network physical connection, or use the Ping command to determine whether the reader IP is in the same network segment as the host IP. Make sure that the port number is also correct, otherwise the connection will be unsuccessful.You can use the Search Device function to connect when you only know the reader IP and do not know the port number.

2.2.2 TCP Server connection mode

If we set the network communication mode of the reader to TCP client, the reader will actively connect the TCP server that be set in the reader beforehand, the demo software should be used as a TCP server to monitor the incoming TCP connection request from the reader.

The IP address and port number identified in the screenshot below is for the host, that is, the reader actively connects.



Click "Conn Type" - "TCP server" to open the "TCP server" connection interface, as shown in Figure 2-5.

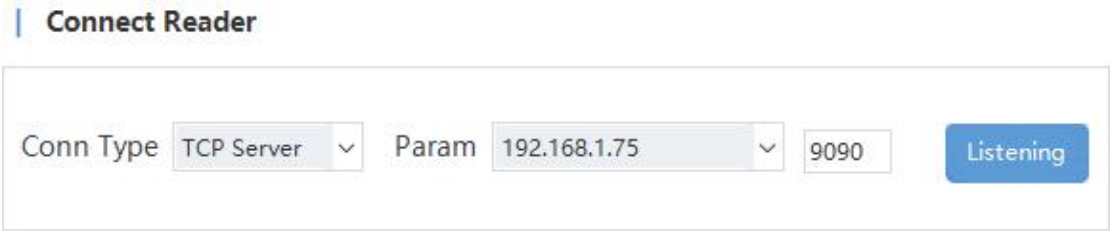


Figure 2-5

Select the local IP from the drop-down box of the local IP list and click "Listening" to listen the incoming connection of the reader, as shown in Figure 2-6.

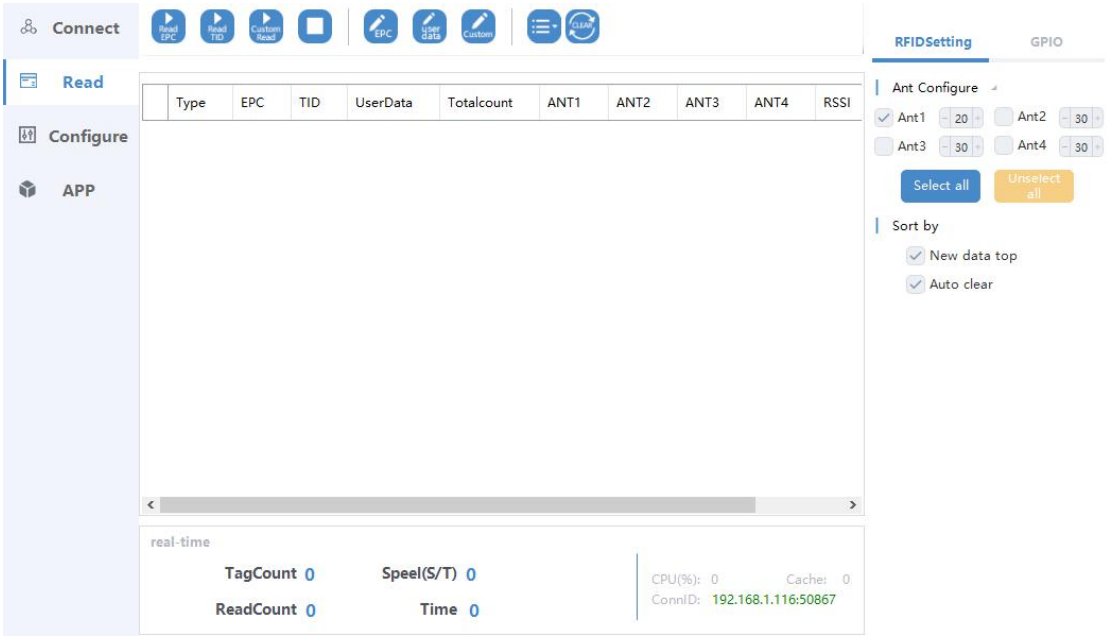


Figure 2-6

2.2.3 Search Device

After opening the software, click Search to start search device. If the network connection between reader and PC is fine, the reader is normally searched a few seconds later and displayed in the list below, as shown in Figure 2-7.

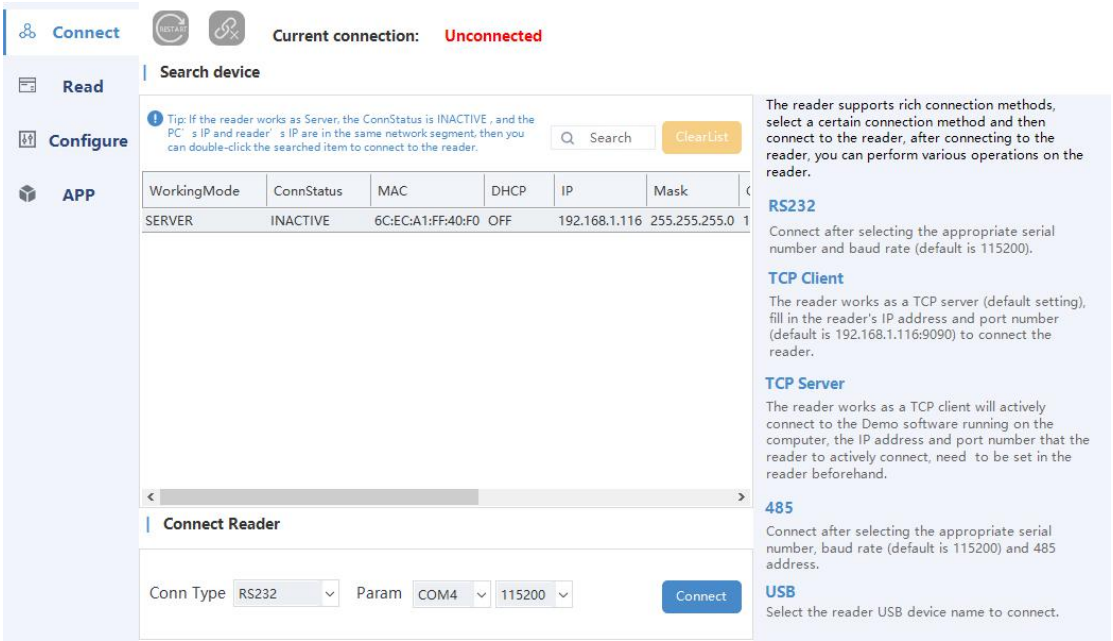


Figure 2-7

If the reader and PC are in same network segment, and the reader communication mode is TCP server, then we can double-click the row in the

list to connect directly to the selected reader.

It is important to note that the search setting is only used for network connections, the reader's default IP address is 192.168.1.116, and the default port is 9090.Host IP setting can refer to Figure 2-8

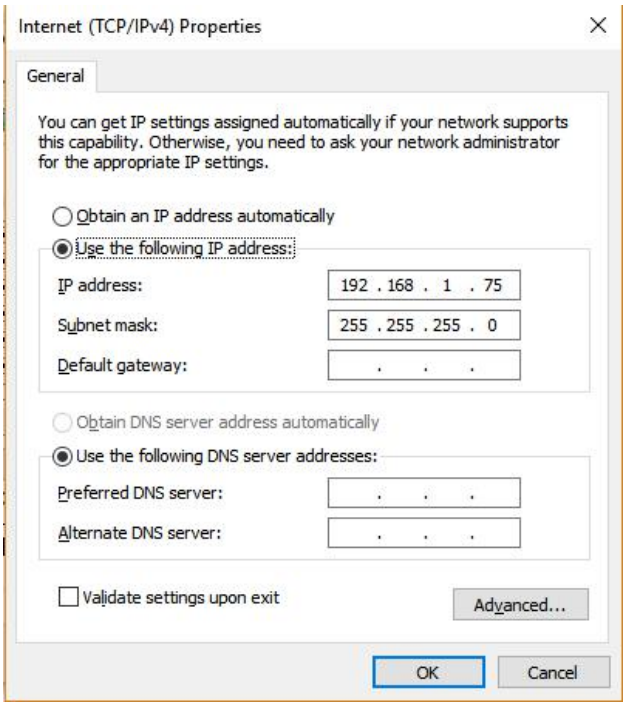


Figure 2-8

Check whether the reader IP and host IP are in the same network segment using the Ping command. "Start" - "run" - enter "CMD" - enter, and the command prompt interface pops up, as shown in Figure 2-9.

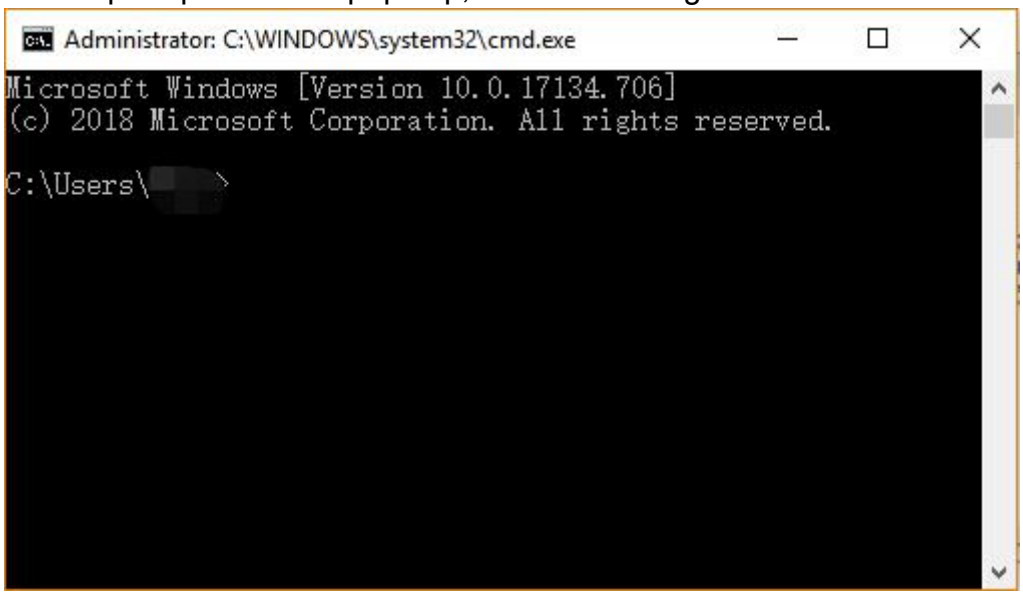


Figure 2-9

Enter the ping command, as shown in Figure2-10.

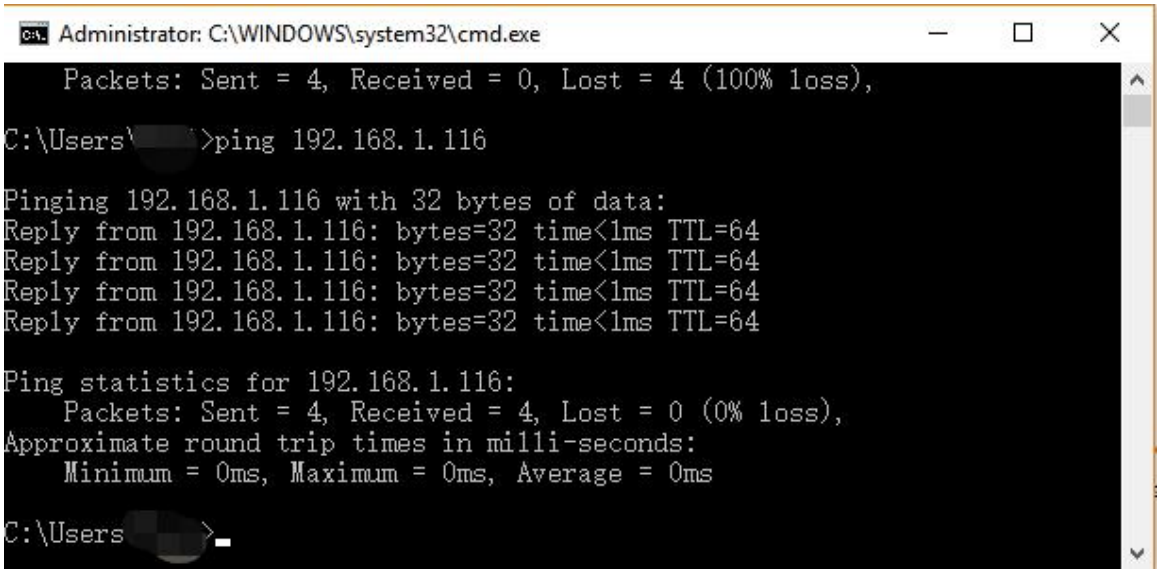


Figure 2-10

Click the ClearList button to clear the devices found in the list. This operation only clears the list. If the reader is found again, it will be displayed on the list again.

Right click the device found in the list, and the "Setting reader parameters" option will pop up, as shown in Figure 2-11.

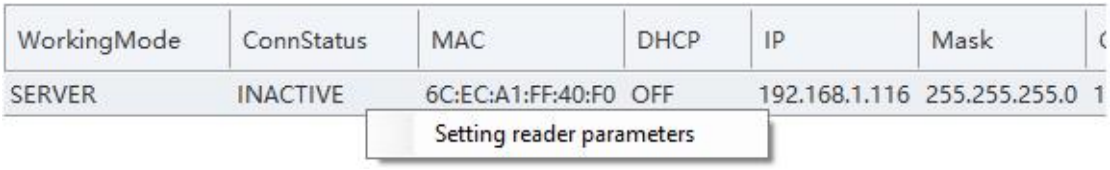


Figure2-11

Click the "Setting reader parameters" option to enter the Login interface, as shown in Figure 2-12.

Figure2-12

Need to enter the correct account password. If you need the account password, please consult our after-sales department. If the account password is wrong, an error will be prompted, as shown in Figure2-13.

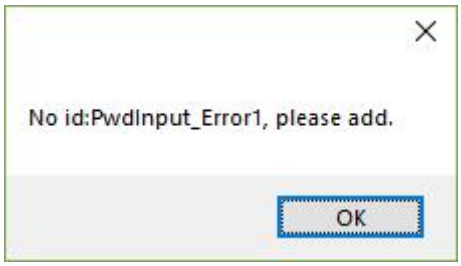


Figure2-13

If the account and password is correct, it will enter the "UDP Reader Setting" interface, as shown in Figure 2-14.

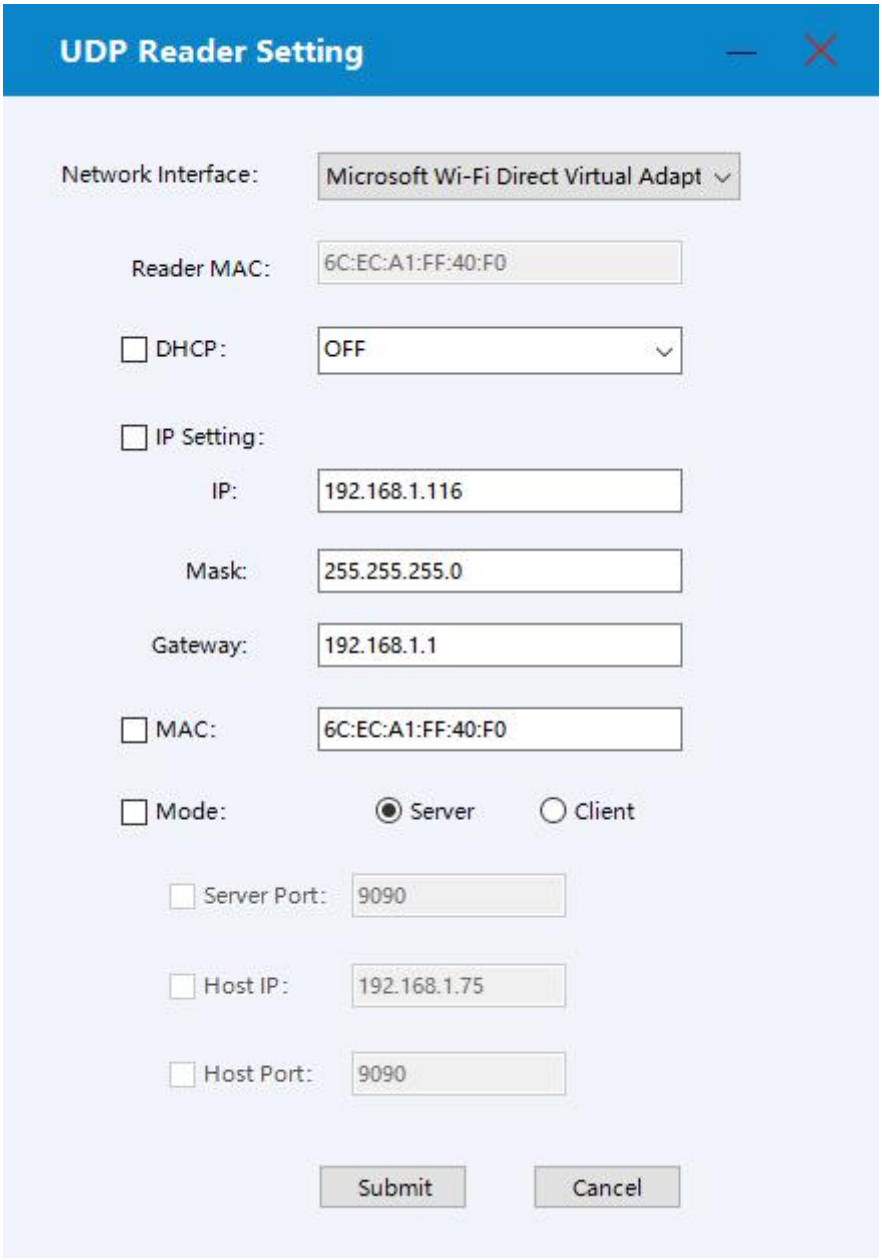


Figure2-14

Before setting the parameters, you need to select the network card that is

communicating with the reader. In addition, it should be noted that the check box in front of the parameter must be checked before setting, otherwise it will not be set by default. As shown in Figure 2-15.

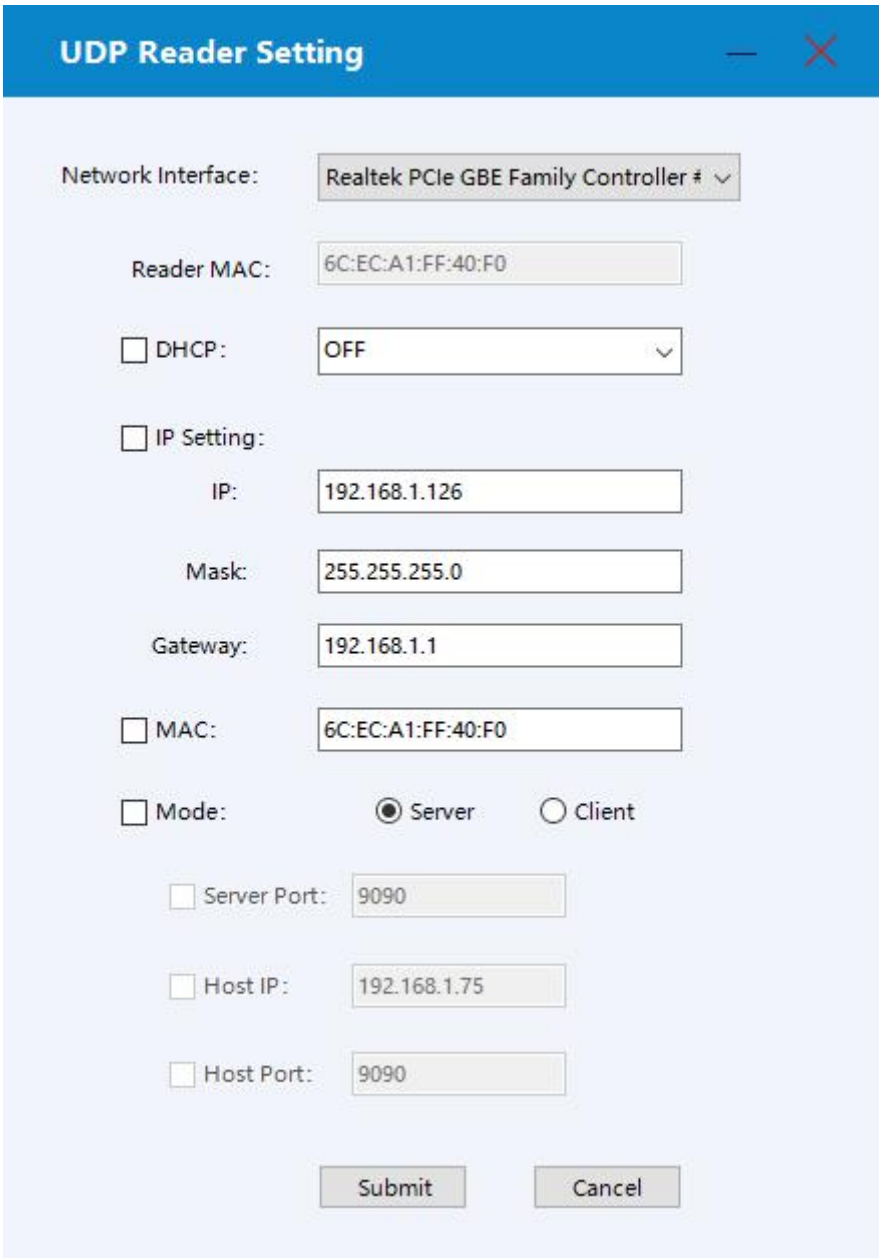


Figure2-15

Click the "Submit" button to set and wait for the prompt setting result. If it fails, just set it several times, as shown in Figure 2-16

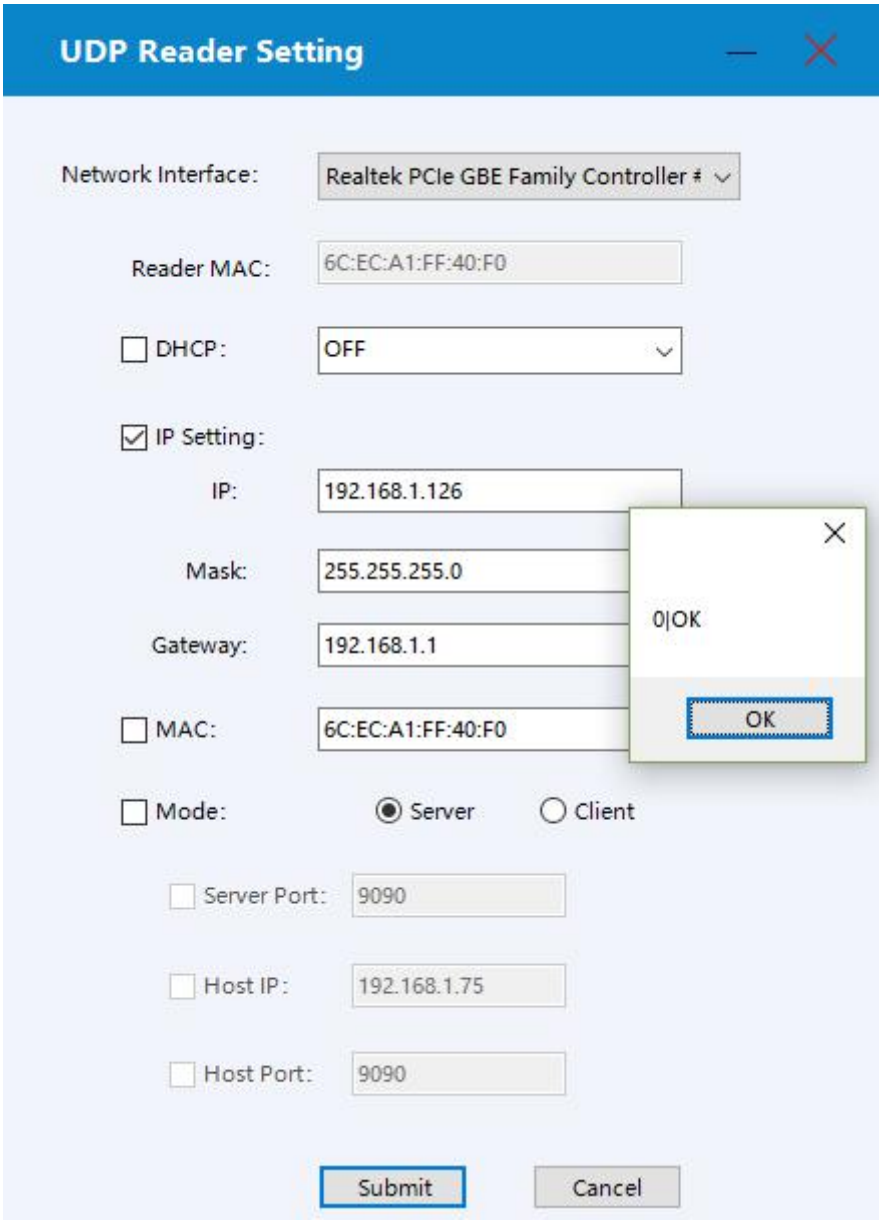


Figure2-16

Wait 2 to 6 seconds and the result will be returned regardless of success or failure.

2.3 RS485 Connection

Click “Conn Type”-”RS485” to open the RS485 communication connection interface, as shown in Figure2-17.

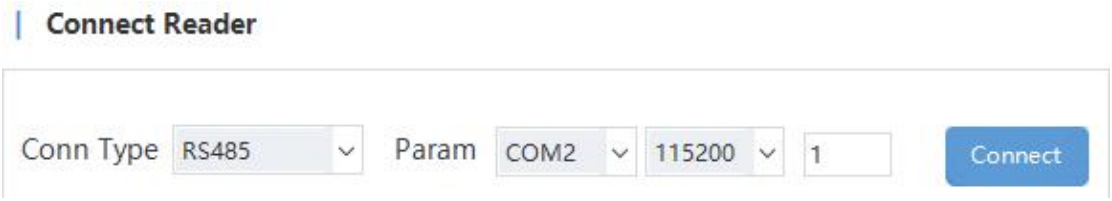


Figure2-17

Software will list all the current COM ports of the PC in the drop-down box, the default baud rate of the reader is 115200 bps, after choosing the correct serial port and baud rate, input 485 address, the default 485 address is 1, click Connect to connect the reader. After connecting successfully, as shown in Figure2-18.

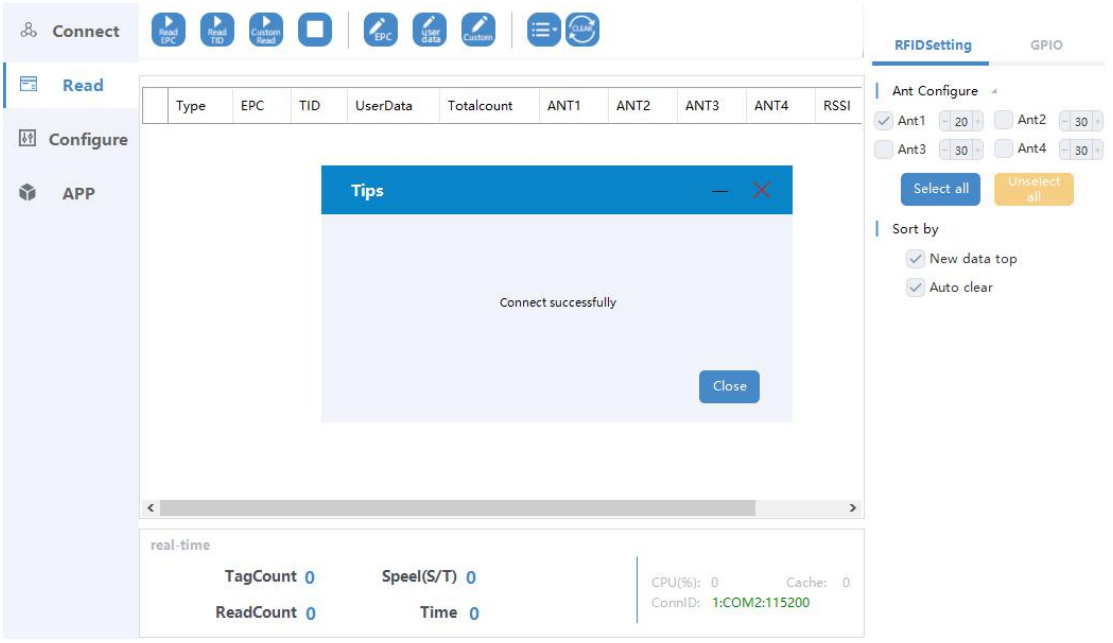


Figure2-18

If not, please check the 485 physical connection.

2.4 USB Connection

Click "Conn Type" - "USB" to open the USB connection interface, as shown in Figure2-19.

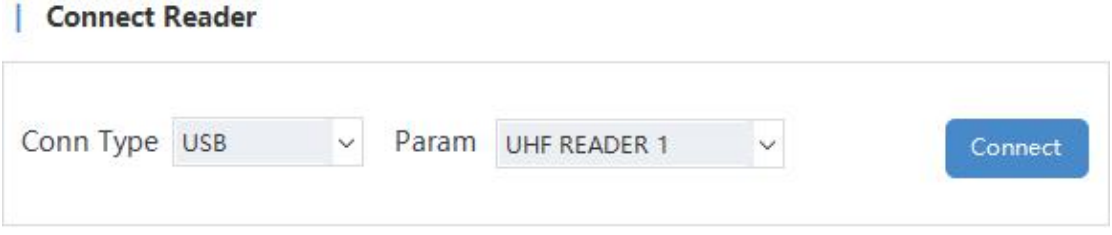


Figure2-19

After successful connection, the interface is shown in Figure2-20.

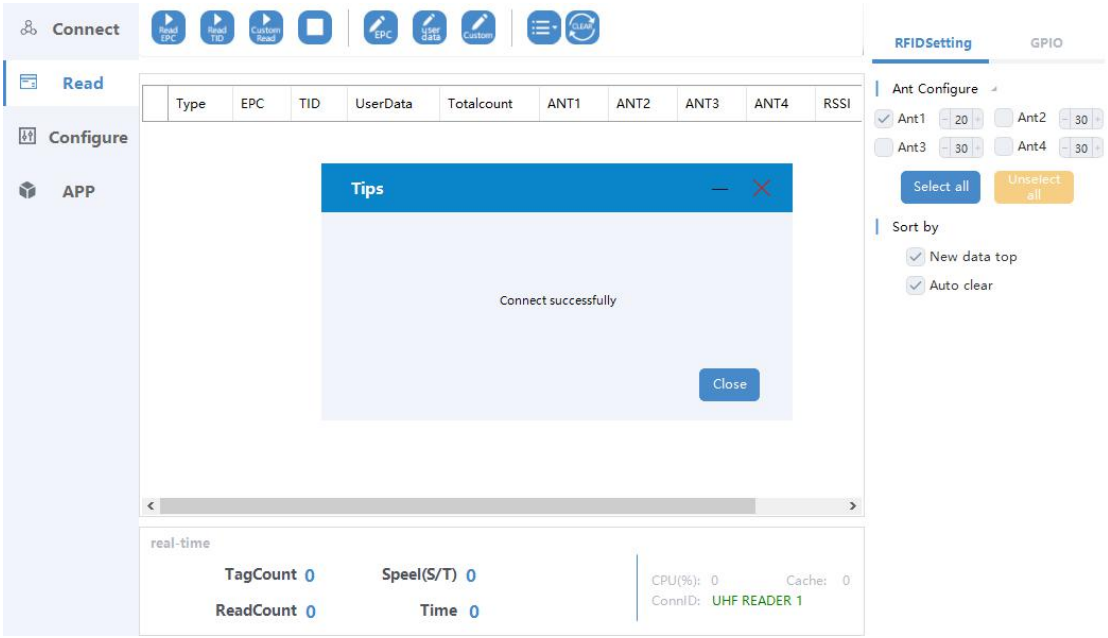


Figure2-20

If the reader has 2 USB ports, USB HOST and USB DEVICE, we need connect to USB DEVICE port. USB HOST is for communicating with external devices, like USB disk, USB WiFi module, etc. USB DEVICE is communicating with the reader.

2.5 Disconnect Connection

Click the button to disconnect the current connection. After disconnection, the button cannot be operated and the reader needs to be reconnected, as shown in Figure 2-21.

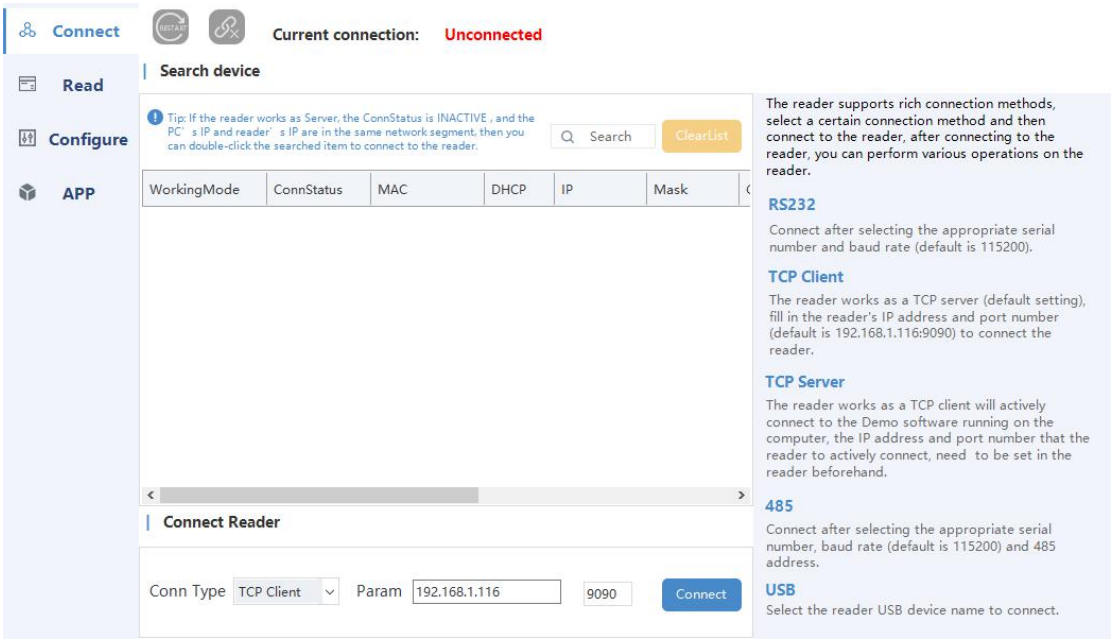


Figure2-21

3.Quick-start guide

3.1 Read and Write Function

The read-write control function is at the top right of the software main interface, as shown in Figure 3-1.

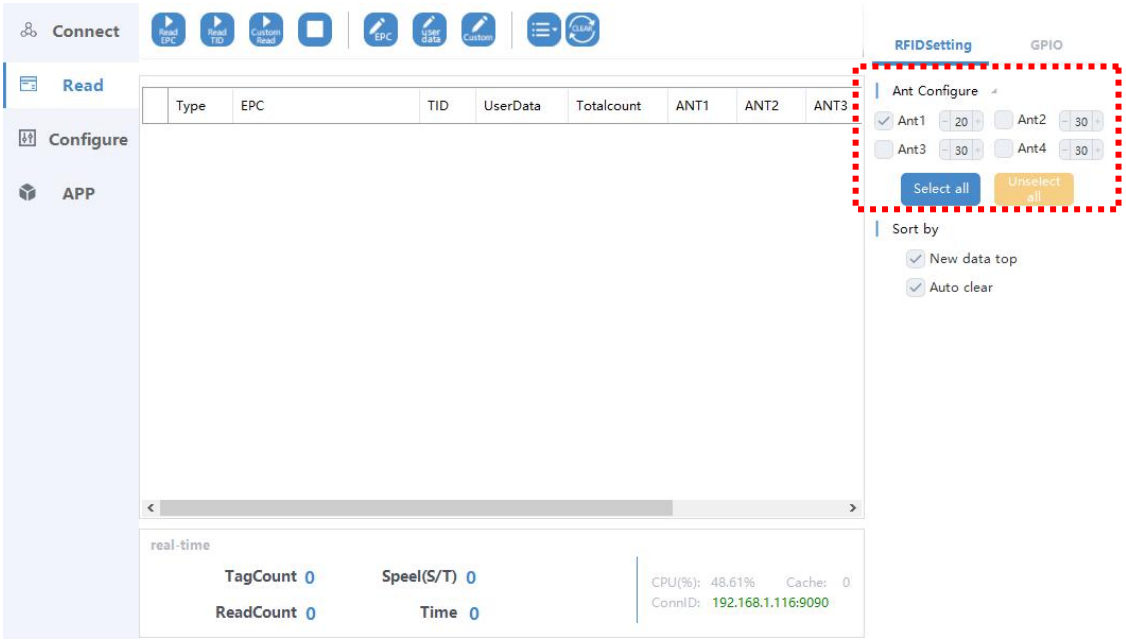


Figure3-1

Tick the check box on the left of the antenna number to control whether the reader will use this antenna during read and write operations. You can select multiple options.

You can also set the output power of the antenna port here. After setting the power, perform any tag reading operation, and the checked antenna power will be set into the reader.

At least one antenna needs to be checked. If it is not checked, an error will be prompted, as shown in Figure 3-2. Check the reader antenna according to the actual situation. Checking the antenna port that is not connected with an antenna may damage the antenna port.

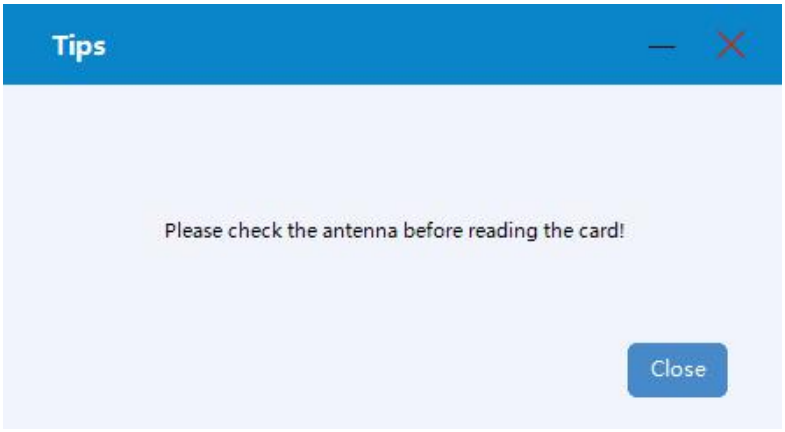


Figure3-2

The configuration interface of tag reading mode is shown in Figure 3-3.

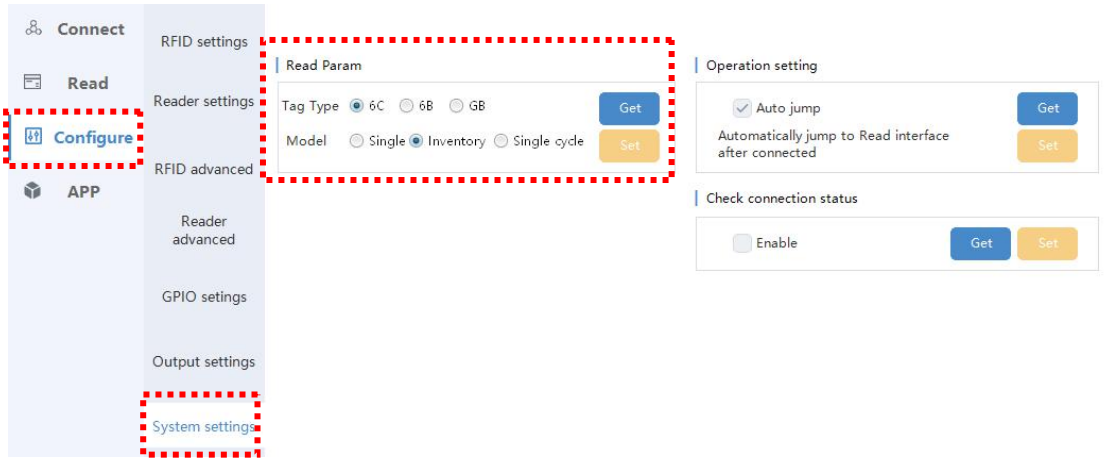


Figure3-3

The tag type represents the tag type that is set to read by the reader. Currently, Demo software supports 6C tag, 6B tag and Chinese national tag, cannot be multi-select.

In the read mode operation, the Inventory indicates that the reader will always

read the tags until the STOP instruction is received, and the real-time information in the lower right will be updated according to the read tag data before the stop reading command is received. Listed data will be updated. as shown in Figure 3-4.

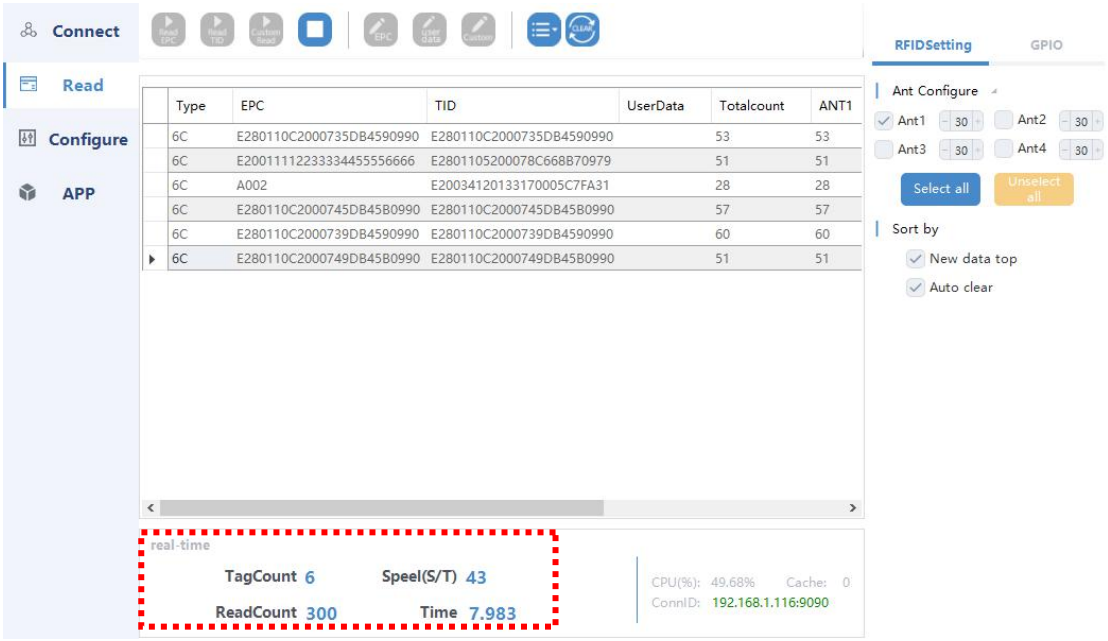


Figure3-4

Single read means that the reader only reads the tags once, and then automatically stops reading, as shown in Figure 3-5.

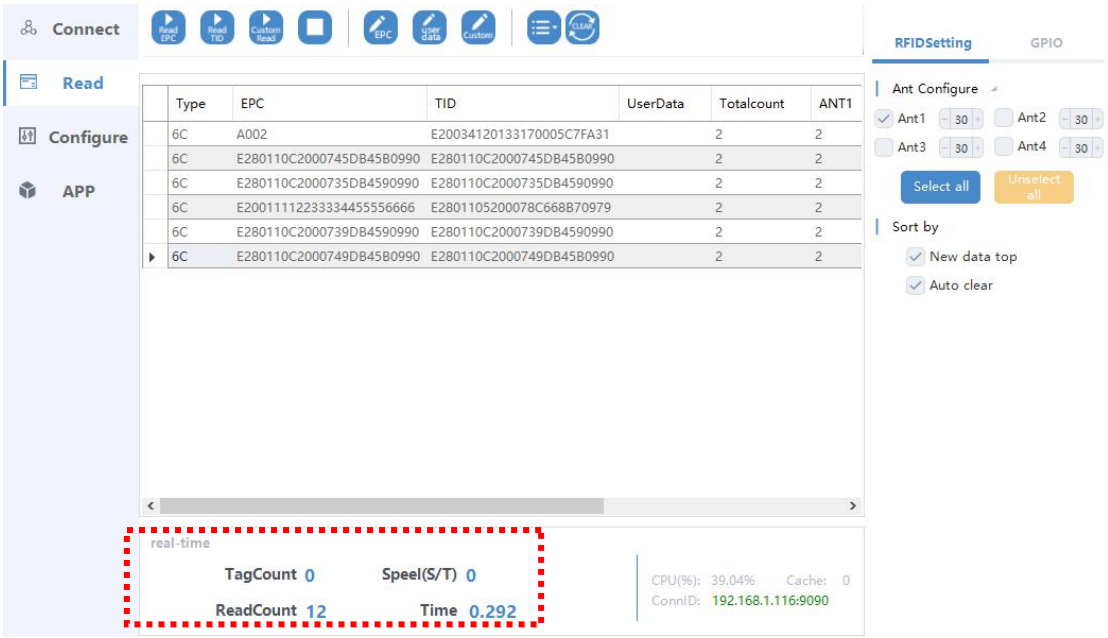


Figure3-5

After the read-write control is set, the read-write operation can be carried out.

3.2.1 Read EPC

Click the

button to read EPC. Tag data will be displayed in the middle list. Real-time information will also be updated in the lower left corner, as shown in Figure 3-6.

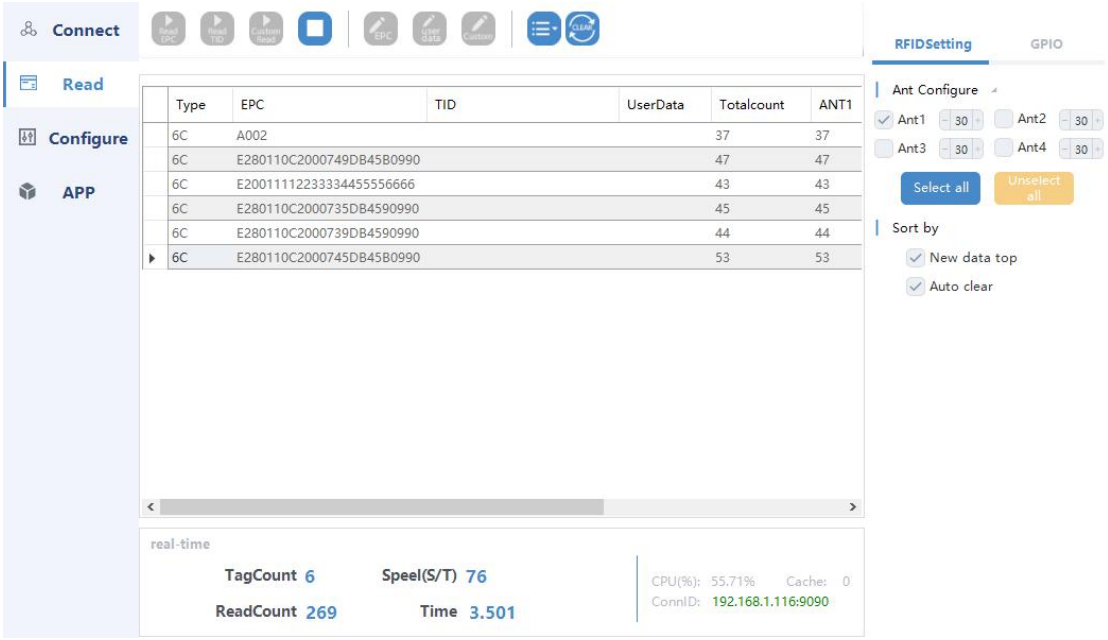


Figure3-6

3.2.2 Read TID

Click the

button to read TID. The information of TID and EPC will be displayed in the list, as shown in Figure 3-7.

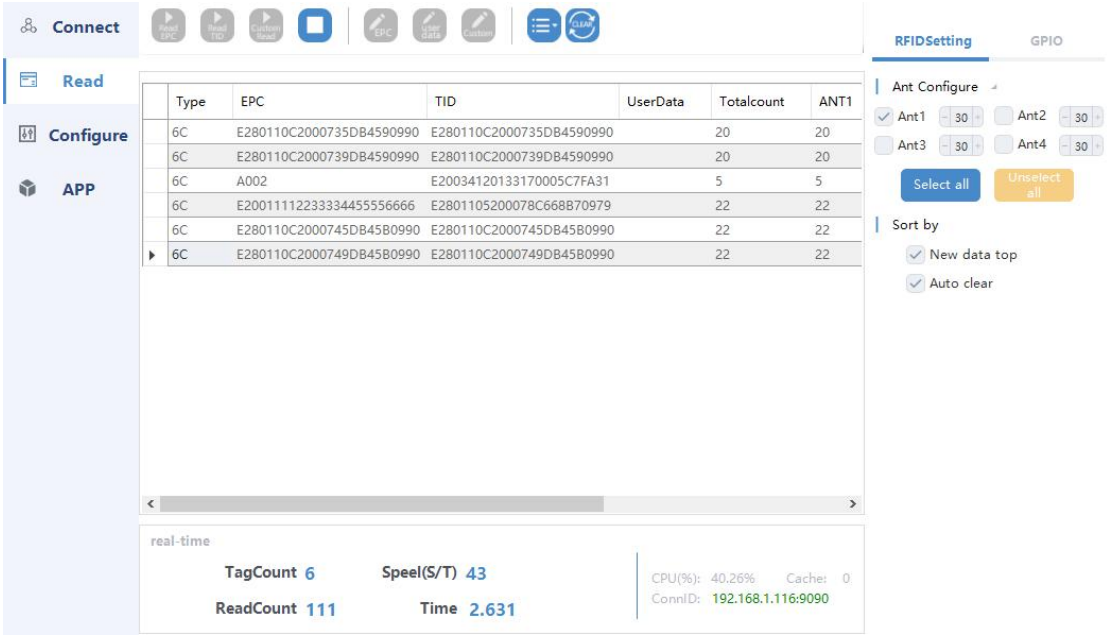


Figure3-7

3.2.3 Stop Reading

When reader is reading tags, you can click stop button to stop the reader reading, and the information list and real time information will all stop updating, as shown in Figure 3-8.

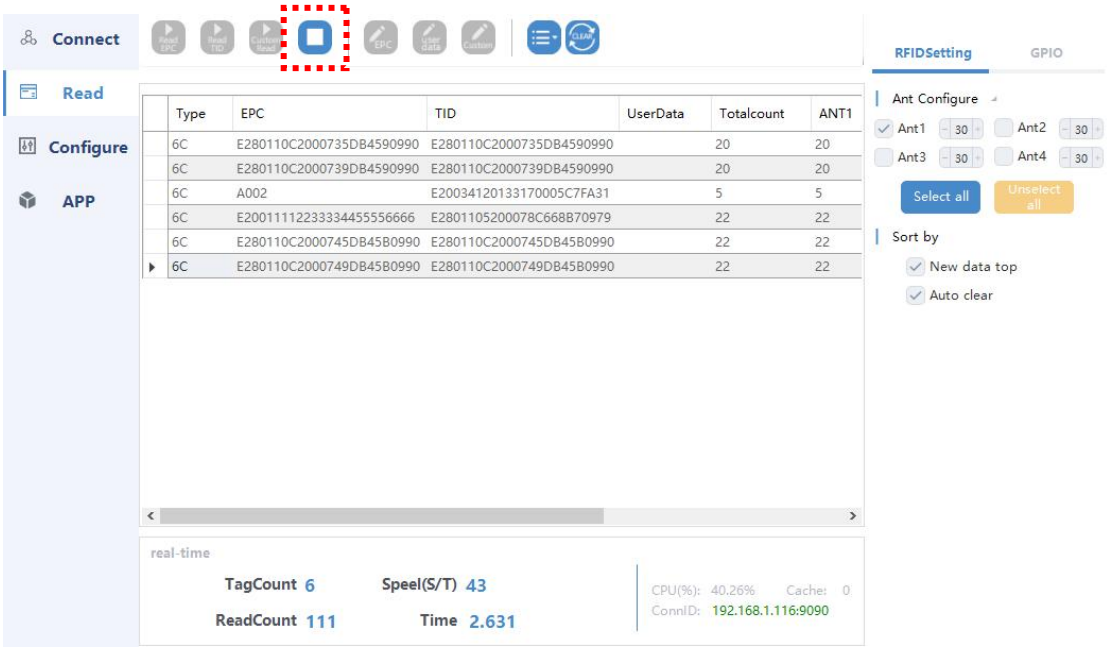


Figure3-8

3.3 Write Tag

Under the same power, the applicable distance of reading and writing tags is different. The energy required to write tags is about twice that of reading tags. In other words, being able to read tags does not necessarily mean that you can write successfully. It is recommended to write the tag as close to the antenna as possible, and read the tag by reading TID before writing the tag.

3.3.1 Write EPC

After stop reading, select a tag that need to be written in the list, click EPC to open the Write EPC Interface, as shown in Figure 3-9.

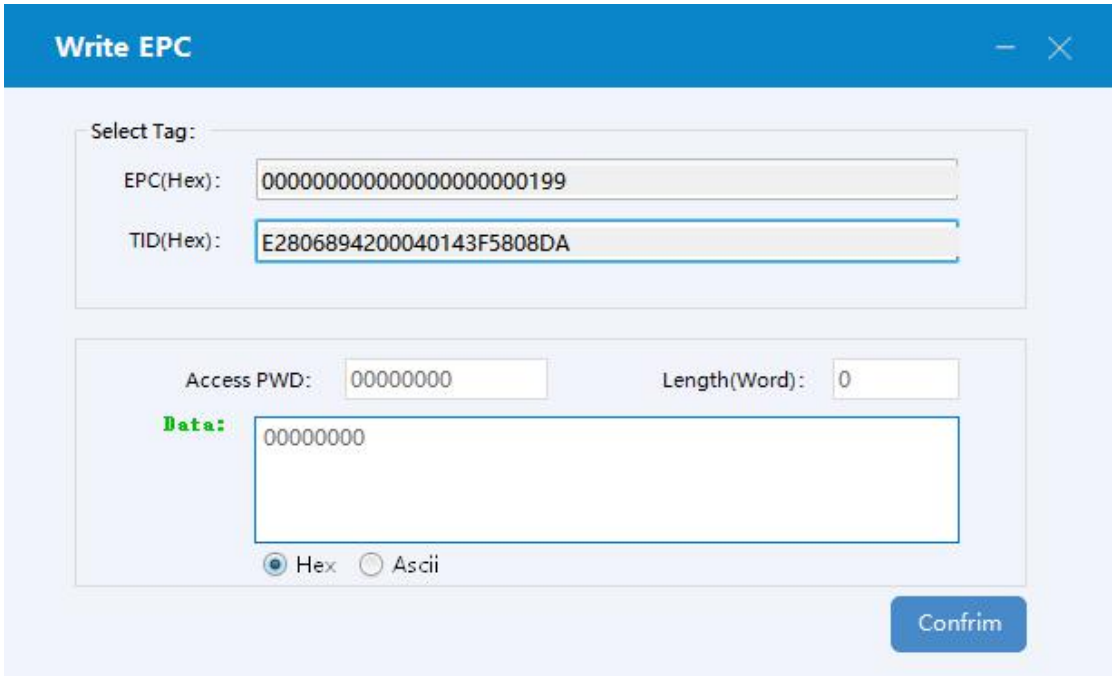


Figure3-9

Enter the data to be written in the Data (HEX) text box below. Note that the data must be hexadecimal and the length is a multiple of 4. If the tag has a password, you need to fill in the tag access password in the Access PWD input box, and then click Confirm to perform the tag writing operation, as shown in Figure 3-10.

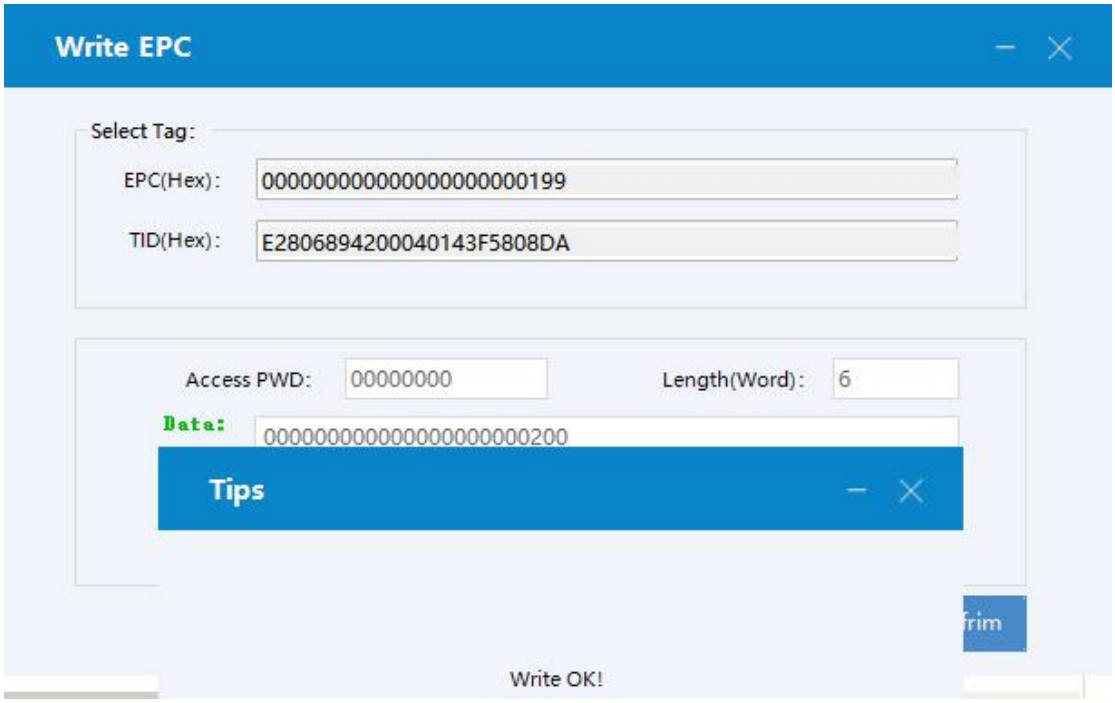


Figure3-10

If it prompts that writing fails, please follow the failure prompt to determine the next step.

3.3.2 Write Userdata

After stop reading, select a tag that need to be written in the list, click

to open the Write Userdata Interface, as shown in Figure 3-11.

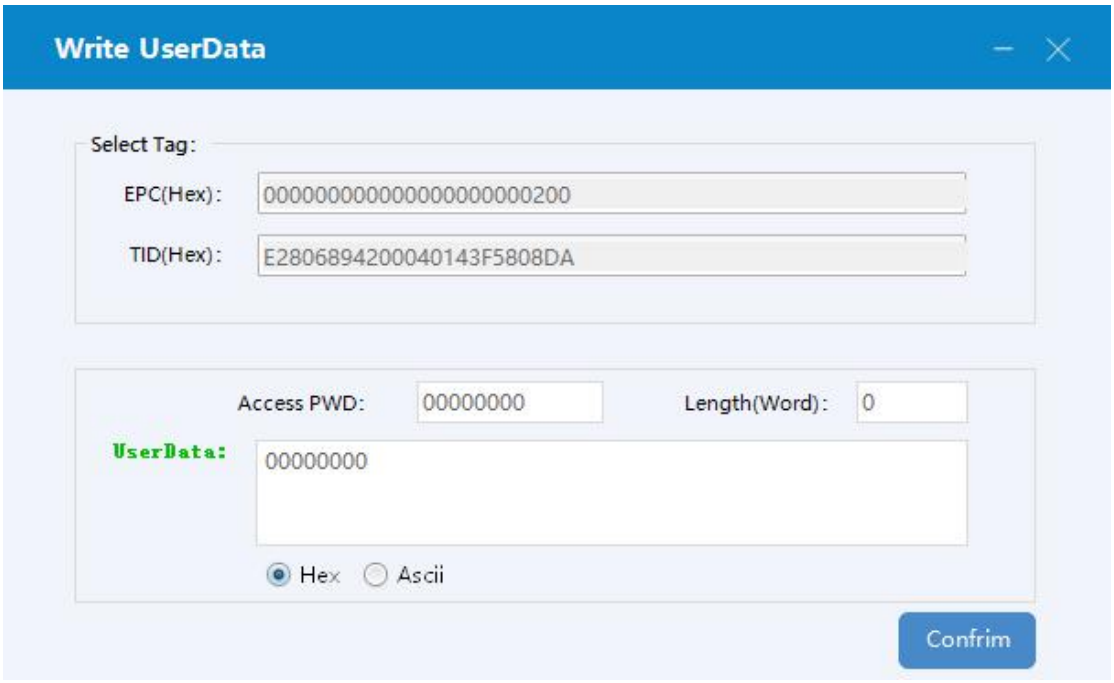


Figure3-11

Enter the data to be written in the UserData (HEX) text box below. Note that the data must be hexadecimal and the length is a multiple of 4. If the tag has a password, you need to fill in the tag access password in the Access PWD input box, and then click Confirm to perform the tag writing operation, as shown in Figure 3-12.

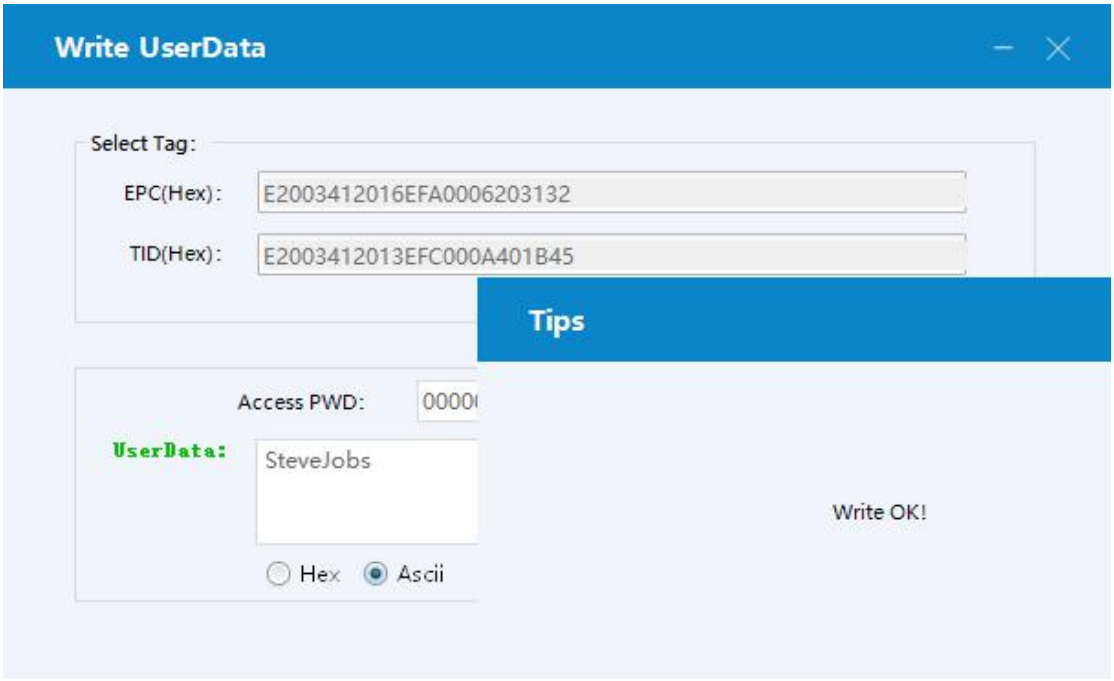


Figure3-12

If it prompts that writing fails, please follow the failure prompt to determine the next step.

3.4 Information display

Click the button to select and display the options in the list, as shown in Figure 3-13.

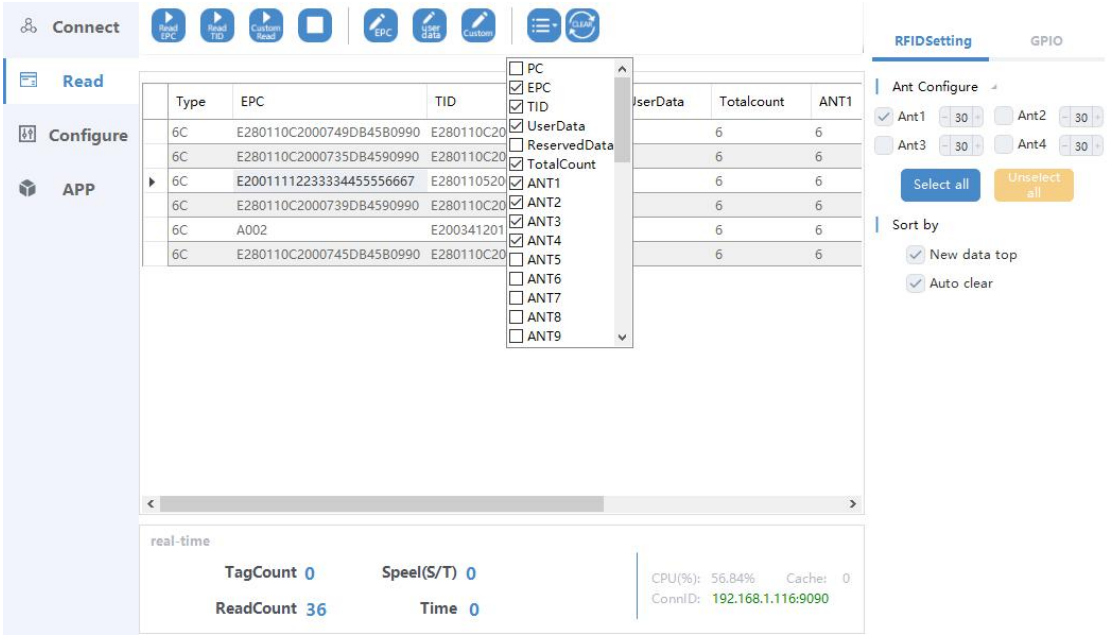


Figure3-13

Select or deselect an option to change the display of the option in the list.

Click to clear tag information in the current list, as shown in Figure 3-14.

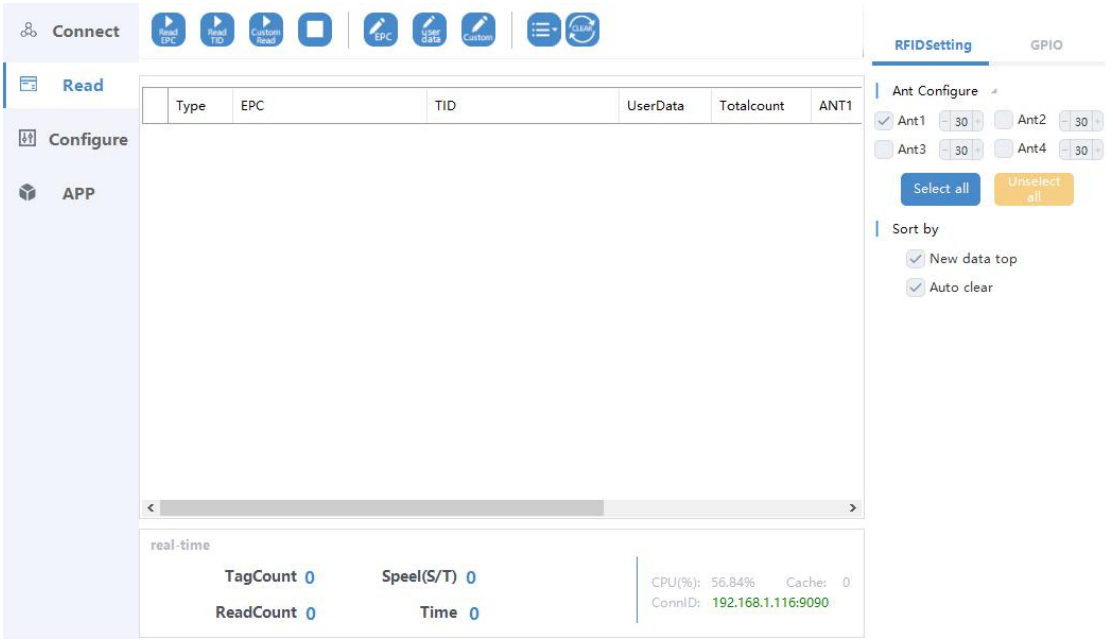


Figure3-14

3.5 Restart Reader

Switch to the connection interface, and click the button

to restart the reader. Click OK in the pop-up prompt box. A few seconds later, when you hear the "Di" sound of the reader, it means that the reader has been successfully restarted. After that, you can connect again.

3.6 Reader Information

After connecting the reader successfully, the reader information will be displayed on the top right of the connection interface, as shown in Figure 3-15.

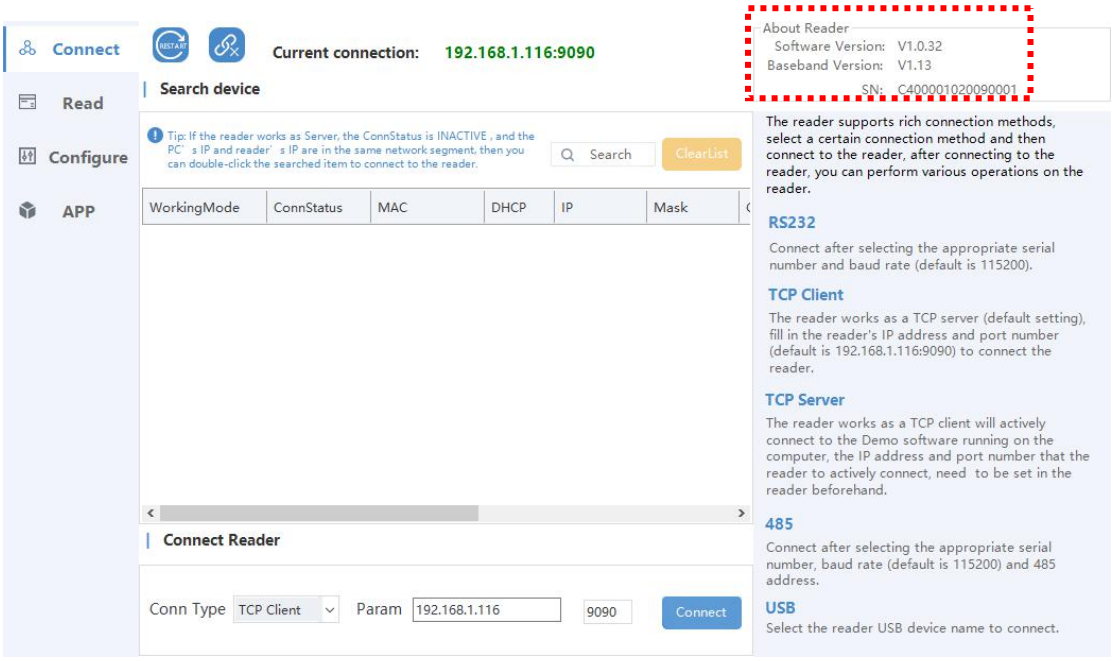


Figure3-15

4.Configuration

4.1 RFID configuration

4.1.1 Antenna Power Configuration

The position of Antenna power configuration is shown in Figure 4-1.

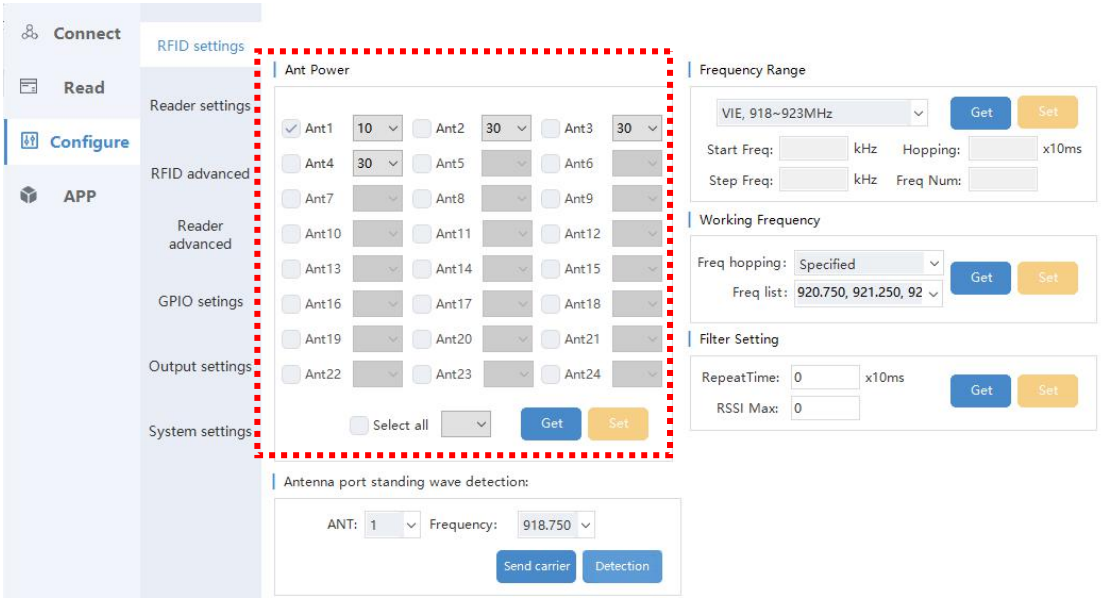


Figure4-1

After changing the power value through the drop-down box, be sure to check

the check box in front of the antenna number before clicking Set, otherwise the power setting for the antenna will not be successful. You can choose more than one.

4.1.2 Configure Frequency Range and Working Frequency

Configure frequency range and working frequency of the reader as shown in Figure 4-2.

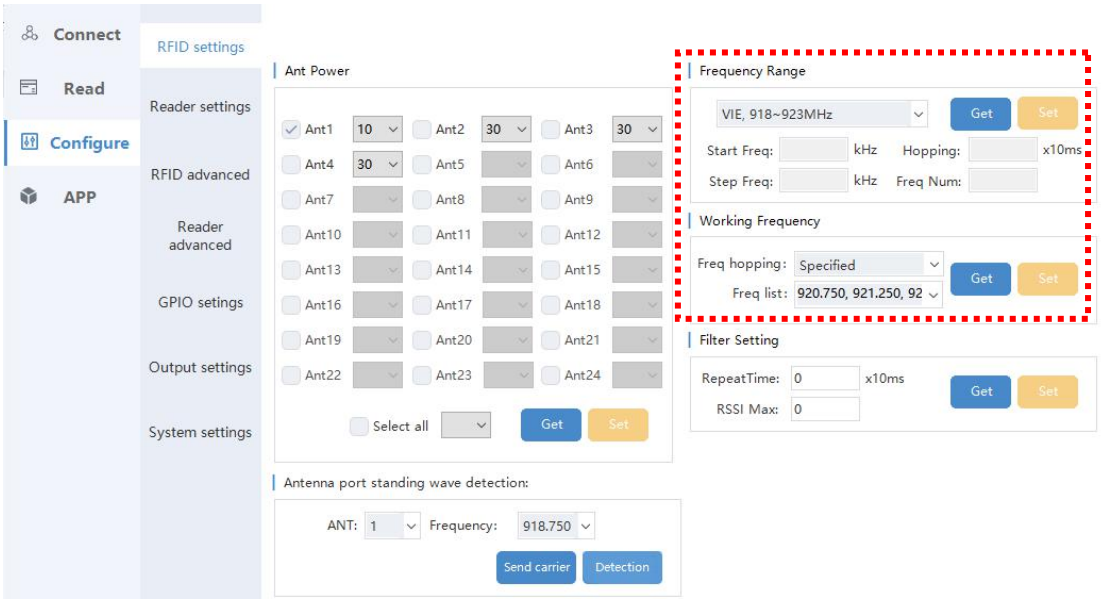


Figure4-2

Select the Frequency Range to be configured and click Set. The Working Frequency will be automatically switched to the frequency in the Frequency Range, and the frequency hopping mode is automatic by default.
If you need to manually configure the specified frequency points, you need to switch the frequency hopping mode to Specified, and then check the frequency set to be specified.

4.1.3 Tag Filter

Click "Configure-"RFID Settings" in the left navigation bar to enter the Filter Setting interface, as shown in Figure 4-3.

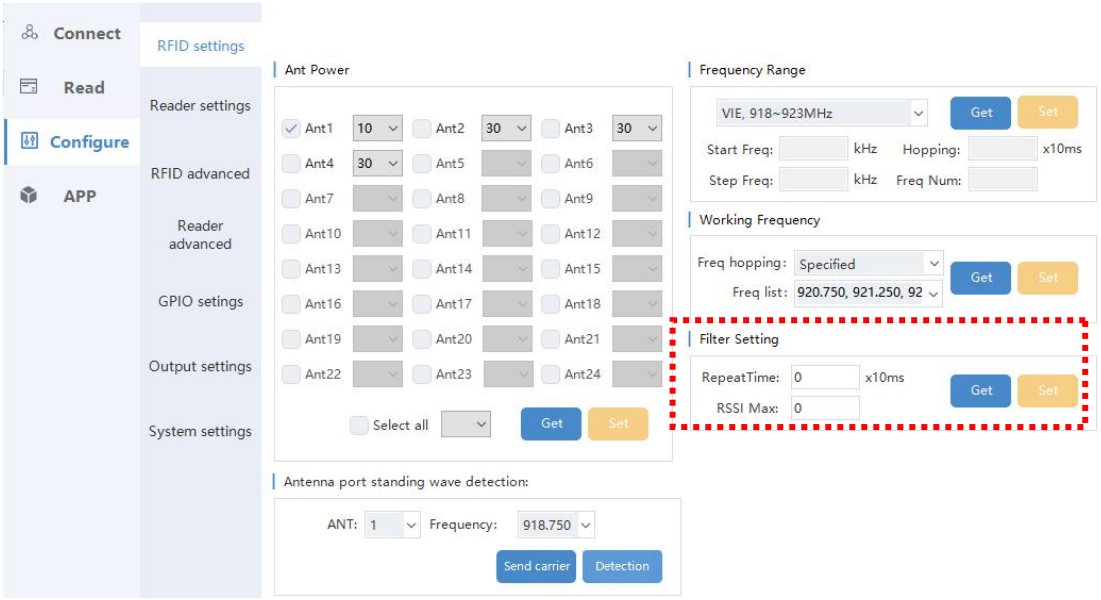


Figure4-3

Click the “Get” to get the current tag filter setting information, change the filter time and signal threshold parameters, then click “Set” to confirm, Setting up success and failure will be prompted. The filter time range is 0-65535 and the RSSI threshold is 0-255.

Repeat Time: The same tag data is uploaded only once within the specified filtering time.

RSSI threshold: When the RSSI value returned by the tag is lower than the threshold, the tag data will not be uploaded and discarded.

4.1.4 Standing Wave Detection

Click "Configure-"RFID Settings" in the left navigation bar to enter the standing wave detection interface, as shown in Figure 4-4.

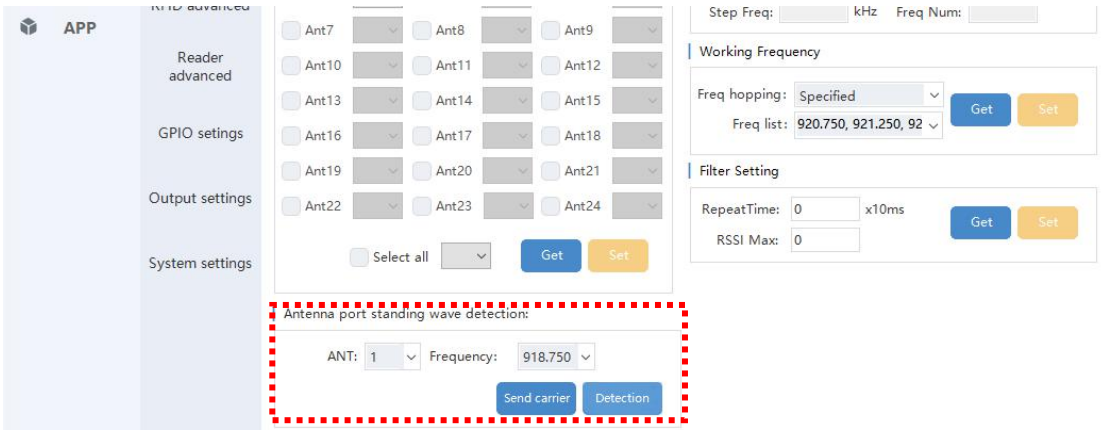


Figure4-4

First select the antenna number and frequency point to be detected, then click the Send carrier button to transmit the carrier signal, and then click the Detection button to display the standing wave information, as shown in Figure 4-5

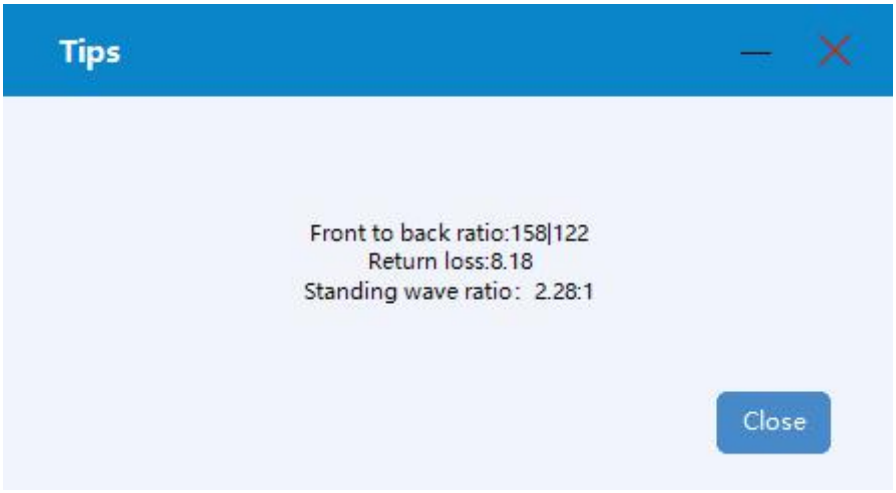


Figure 4-5

The larger the return loss is, the better the impedance matching is.

4.2 RFID Advanced Configuration

4.2.1 EPC Baseband Configuration

Click "Configure" - "RFID Advanced" in the left navigation bar to open the main panel of RFID advanced configuration. The location of EPC Baseband Setting is shown in Figure 4-6.

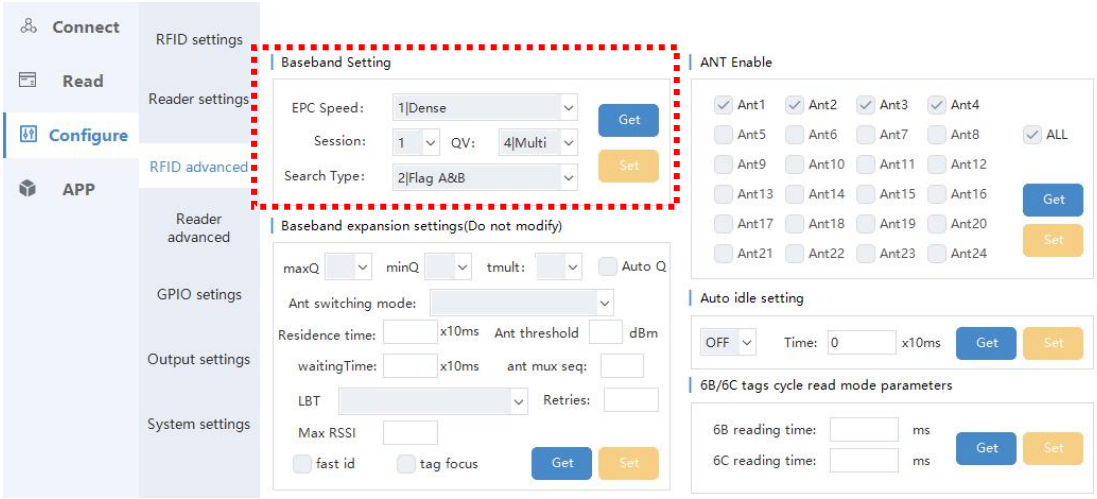


Figure 4-6

EPC baseband rate refers to the modulation, Encoding, and Data Rates

between Reader - Tag Physical and Link Layers.

Generally, we suggest using dense mode or auto mode, other baseband rates can be used according to project conditions.

Q value setting should be associated with the field tag quantity, it is approximately equal to 2 ^ Q. Q values range from 0 to 15

0 for single tag read 2^0 = 1

4 for multi tag read 2^4 =16

The default setting is:

EPC Speed: 255|AUTO

Session: 1

QV:4|Multi

Search Type: 2|Flag A&B

The session and tag search type be explained as follows:

Session Inventory Flags

Each EPC GEN 2 compliant tag has two states: 'A' and 'B'. The 'A' state is default when the tag powers up (or after 'B' state times out – more on that later).

Sessions

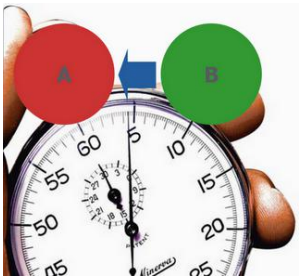
The EPC GEN 2 standard allows for up to four sessions; these sessions serve two purposes:

- Determines how often a tag will respond to a query from the reader
- Allows for multiple readers to conduct independent inventories

The RFID reader will select which session is to be used, each session's inventory flag can be independently set to 'A' or 'B' as shown below.

Session 0	A B
Session 1	A B
Session 2	A B
Session 3	A B

Persistence

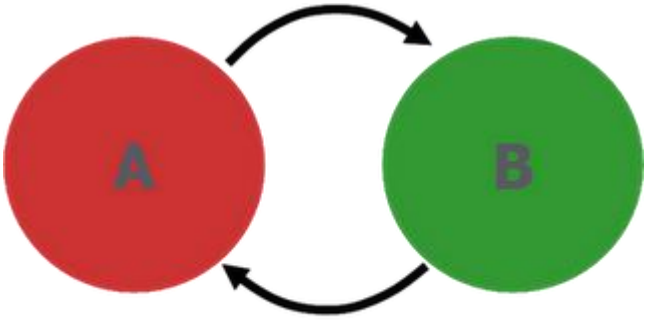


Once the RFID reader inventories the tag, the flag state is changed from ‘A’ to ‘B’ – how long the tag stays in the ‘B’ state before reverting back to the ‘A’ state is called “persistence”. It is important to realize that exact persistence times cannot be set by the user; they can only be approximated according to the Search Mode and Session – more on this later.

Next let’s look at Search Modes and how they work with the Session setting to establish the persistence.

Search Modes

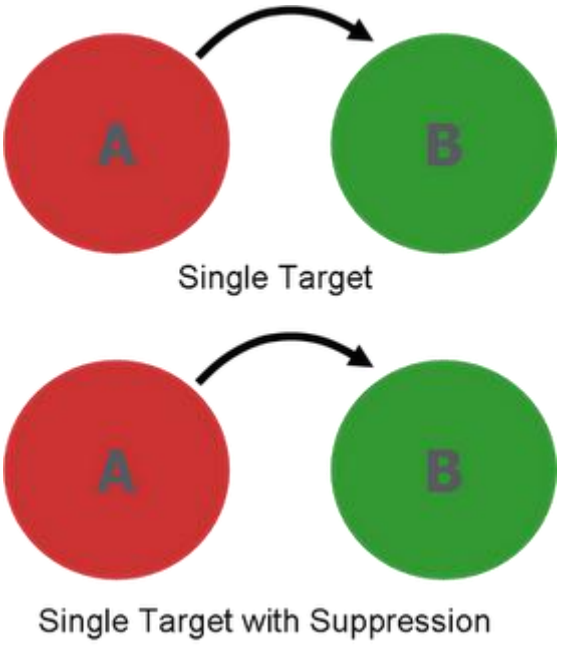
There are three search modes available on the Impinj Revolution reader: Dual Target, Single Target and Single Target with Suppression. “Target” in this case is referring to whether the reader will singulate (select) only tags that are in the ‘A’ state (Single Target) or if it will singulate tags in both ‘A’ and ‘B’ state (Dual Target).



Dual Target

In Dual Target, the reader reads all ‘A’ tags then moves all ‘A’ tags into ‘B’. Reader then reads all ‘B’ tags then moves all ‘B’ tags into ‘A’ and so on…. Additionally, in Dual Target, session has no influence as the reader will immediately ‘push’ tags back into ‘A’ state.

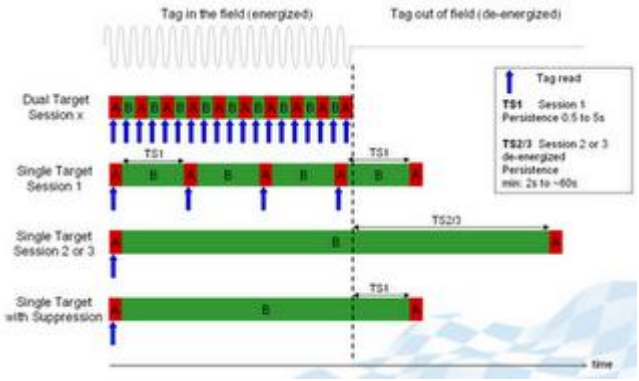
This search mode generates many reads and is good for small populations or static environments (i.e.smart shelf).



In Single Target, the reader reads all ‘A’ tags then moves all ‘A’ tags into ‘B’ and allows tags to stay quiet once they are inventoried. This mode is good for high population, dynamic environments (i.e. dock door portal).

Putting It All Together

So far we’ve discussed Sessions, Persistence and Search Modes; now let’s put it all together to see the effect these settings have.



The image above illustrates what happens when a tag enters the read field according to the Search Mode and Session.

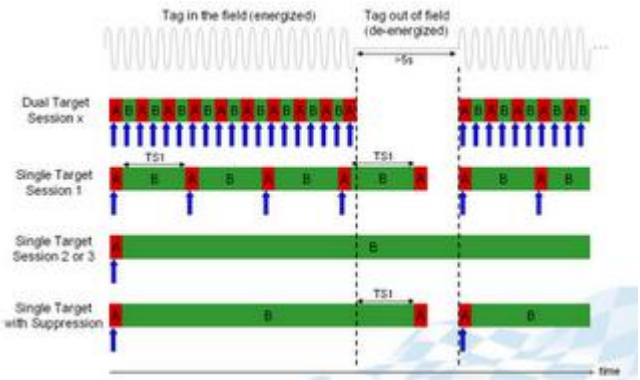
In Dual Target, the tag will be read continuously regardless of tag state ‘A’ or ‘B’; the Session setting has no influence.

In Single Target with Session set to ‘1’ the tag will be read and then moved to the ‘B’ state. After some period of time (TS1) it will revert back to the ‘A’ state and be read again. This TS1 value is defined in the EPC GEN 2 standard as being between 500ms and 5 seconds; again it cannot be expressly set, only approximated. The TS1 value will vary depending tag IC manufacturer and even specific tag IC model. For example, the Impinj Monza 3 S1 persistence is approximately 1 second whereas the Monza 4 is closer to 500ms. So, if we set the reader for Single Target, Session 1, we will see a Monza 3 tag being read about every second.

If the reader Search Mode is set to Single Target and the Session to either ‘2’ or ‘3’ then the tag will be read once then switch to ‘B’ state and remain quiet the entire time it is in the read field.

Once the tag leaves the read field, it will have a persistence (stay in the ‘B’ state) for a time period of TS2/3. This persistence time is only required by the EPC GEN 2 standard to be a minimum of 2 seconds with no maximum defined; it tends to be around 60 seconds but can be on the order of hundreds of seconds. Remember that during this time, the tag will not respond to a query from any reader using Single Target and the same Session.

Using Single Target with Suppression provides the advantage of Sessions 2 and 3 in that it will remain quiet while in the read field once inventoried thus allowing other tags which may be “quieter” (not reflecting as much power) to be read. It also provides the advantage of Session 1 in that it will revert almost immediately back to the ‘A’ state and be available for a reader query upon leaving the read field.



Examples

Let’s look at some example scenarios:

Scenario 1: There are a number of tagged items being continuously inventoried on a RFID-enabled “smart shelf”. Selecting Dual Target for the search mode will allow for the fastest update of tag status and be able to provide an update alert should a tagged item be put on, or taken off, the shelf.

Scenario 2: A fixed reader portal is performing an inventory on incoming items as they come off the delivery truck using Single Target, Session 2. Now, let’s say you want to do a quick inventory sweep with a handheld reader (perhaps to encode the storage location). If the handheld reader uses the same session, it might miss some of the tags, or have a slow tag read rate, due to the fact that the tags were ‘pushed’ into the ‘B’ state by the fixed reader and have not yet flipped back to the ‘A’ state. Setting the handheld reader to a different Search Mode (i.e. Dual Target or Single Target w/ Suppression) or to Session 3, will allow the tagged items to be inventoried.

Another option would be to use Single Target with Suppression (assuming use of Impinj Monza tags) so that the large population of tags can be quickly inventoried with high probability of 100% count and still allow the tags to be re-inventoried almost immediately after leaving the portal read zone.

Scenario 3: Two readers want to simultaneously inventory a population of tags and then confirm they have the same count as a way of reducing missed tags. In this case, setting one reader to Single Target, Session 2 and the other to Single Target, Session 3 will allow this to happen.

4.2.2 Baseband Expansion Settings

Click Configure->RFID Advanced under the left navigation to enter the Baseband Expansion Settings page, as shown in Figure 4-7.

In the Baseband Expansion Settings page, antenna switching mode, dynamic Q algorithm, and special tag inventory can be configured.

- ✧ TagFocus: Use TagFocus technology to read tags, and the tags need to support TagFocus technology
- ✧ FastID: FastID technology is used to read tags (TID can be read directly when reading EPC), the tags need to support FastID technology
- ✧ minQ: Minimum Q value of dynamic Q algorithm
- ✧ maxQ: Maximum Q value of dynamic Q algorithm
- ✧ tmult: Dynamic Q algorithm coefficient
- ✧ Antenna mode: The antenna switching mode can be configured to switch immediately without tag or use up the residence time
- ✧ Residence time: Set an antenna residence time, set to 0 for the default residence time.
- ✧ Waiting time: Set the waiting time between antenna switching.
- ✧ Retries: Number of retries without reading any tags, a reference option for antenna switching

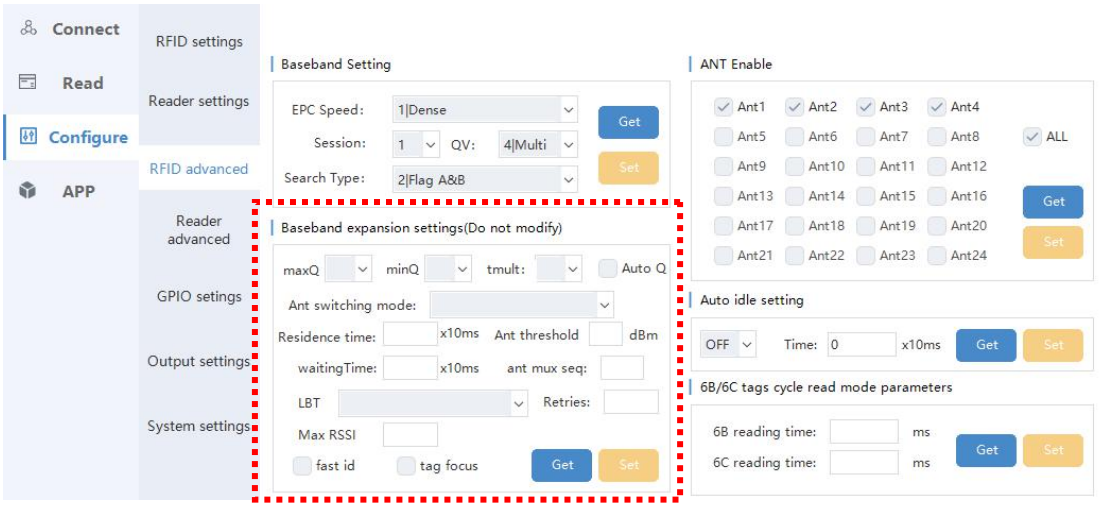


Figure4-7

4.2.3 Antenna Enable

The Position of Antenna Enable is shown in Figure 4-8.

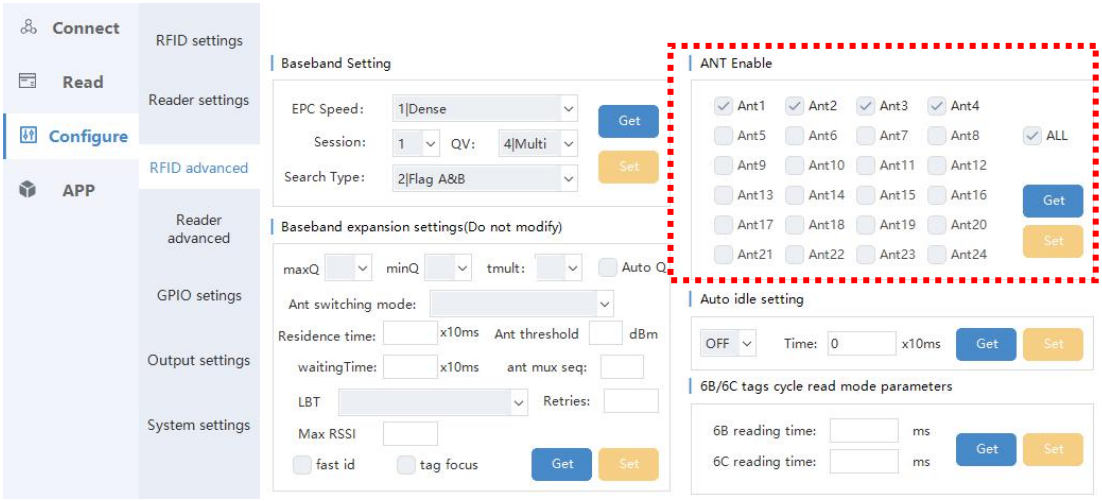


Figure4-8

The antenna enable setting is used to control whether the antenna can be used in read and write operations. Enable the antenna by checking the check box beside the antenna number, click the "Get" button to query which antenna has been checked. Please note the difference of “Antenna enable” and “Antenna power”, the “Antenna enable” indicates whether the antenna is available while the “Antenna power”indicates the range of antenna power. If the “Antenna enable” does not turn on, it is not available even the antenna power setting is large.

4.2.4 Automatic Idle

Click "Configure" - "RFID Advanced" in the left navigation bar to enter the automatic idle setting interface, as shown in Figure 4-9.

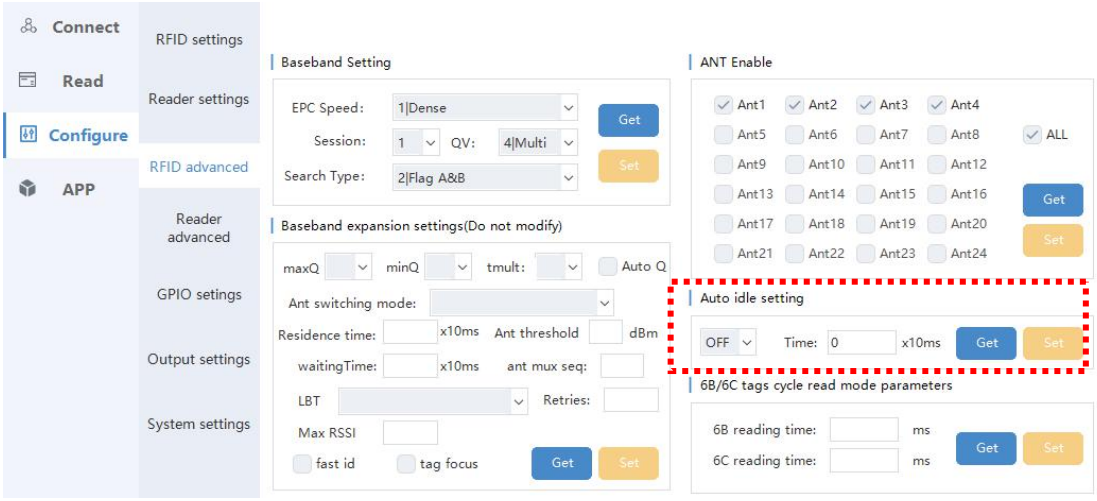


Figure 4-9

Click the “Get” button to get the current automatic idle setting information, manually change the automatically idle switch and idle time parameters, then click Set to confirm, Setting up success and failure will be prompted. Assuming that the automatic idle time is set to 10 * 10ms, the reader will automatically enter a rest state for a period of time, that is, a rest time of 100ms, when the reader does not recognize the tag during continuous reading, so as to save power consumption. After the rest time, the reader will automatically re-enter the tag reading state.

4.3 Reader Configuration

4.3.1 Serial Connection

Click the left tab "Configure" - "Reader Settings" to enter the RS232 setting interface, as shown in Figure 4-10.

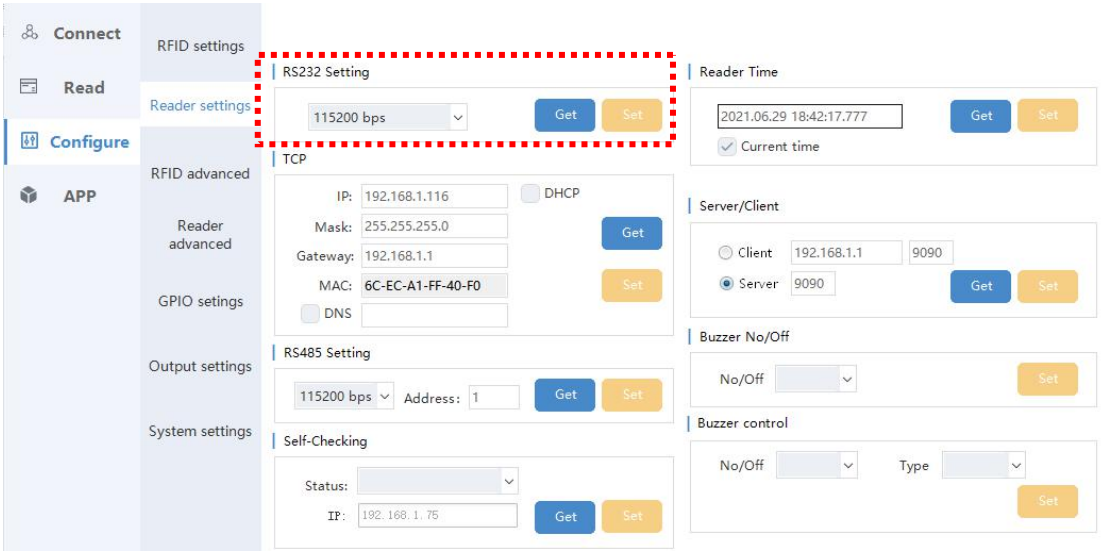


Figure 4-10

Click the “Get” button to get the current serial baud rate, through the drop-down box to change the baud rate and then click the “Set” button to submit, Setting up success or failure will be prompted .

Note：If the reader is connected through serial port, baud rate changed, you need to use the new baud rate to re-connect, and otherwise the reader cannot continue to operate.

4.2.2 Network Configuration

Click the left tab "Configure" - "Reader Settings" to enter the TCP network setting interface, as shown in Figure 4-11.

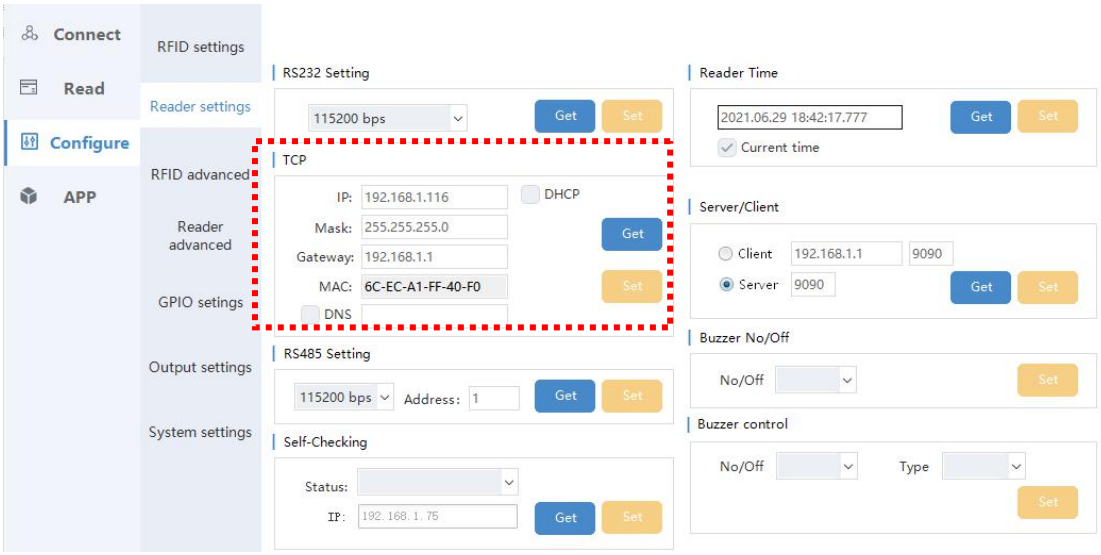


Figure 4-11

Click the “Get” button to get the current network setting information. You can set the parameters by manually changing the IP, Mask, Gateway, then clicking the “Set” button to submit, Setting up success and failure will be prompted .

Note：After the setup succeeded, if the reader is connected through network，you need to use the new IP to reconnect when IP address changed, otherwise the reader cannot continue to operate .

4.3.3 485 Configuration

Click the left tab "Configure" - "Reader Settings" to enter the 485 setting interface, as shown in Figure 4-12.

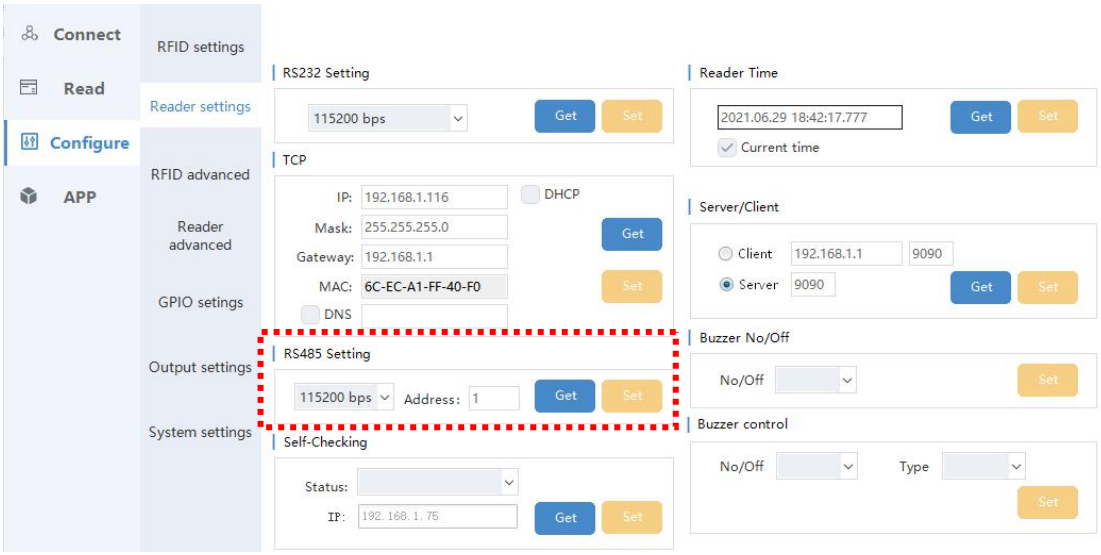


Figure 4-12

Click the “Get” button to get the current 485 setting, you can set the 485 serial address and Baud Rate by manually change the parameters, then click the“Set” button to submit. Setting up success and failure will be prompted.

Note：After the setup succeeded, if the reader is connected through RS485，you need to use the new address and BaudRate to reconnect when 485 address and BaudRate changed ,otherwise the reader cannot continue to operate . Address range of 485 is 1-254.

4.3.4 Network self-checking

Click the left tab "Configure" - "Reader Settings" to open the configuration main panel. The location of network self check is shown in Figure 4-13.

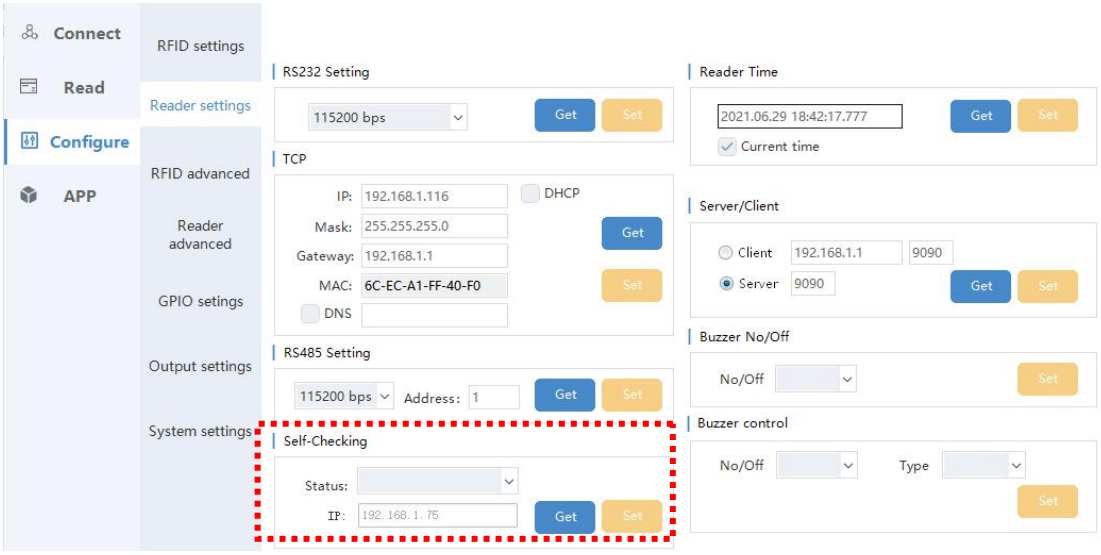


Figure 4-13

Self-checking indicates that whether to turn on the network connection status checking function, if it's open it will send the heart beat package to specific IP address to confirm connection status, only limited to network connection, and this function requires reader including this function.

4.3.5 Reader Time Setting

Click the left tab "Configure"-"Reader Settings" to open the main configuration panel. The position of the Reader Time is shown in Figure 4-14.

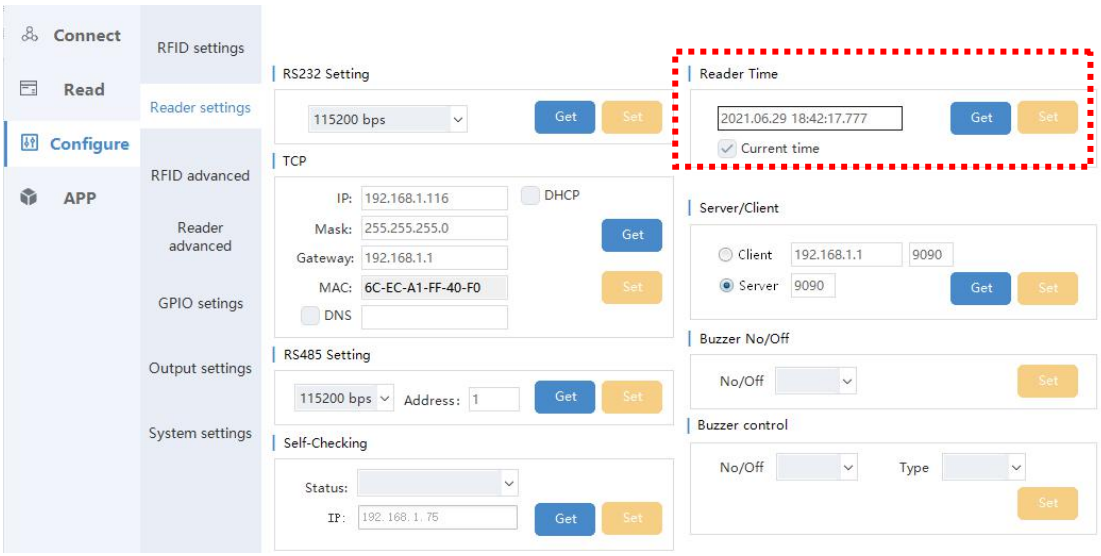


Figure 4-14

Click Get to query the current built-in time of the reader.You can manually set the new time into the reader.

4.3.6 TCP server/client mode

Click the left tab "Configure" - "Reader Settings" to enter the TCP server / client mode setting interface, as shown in Figure 4-15.

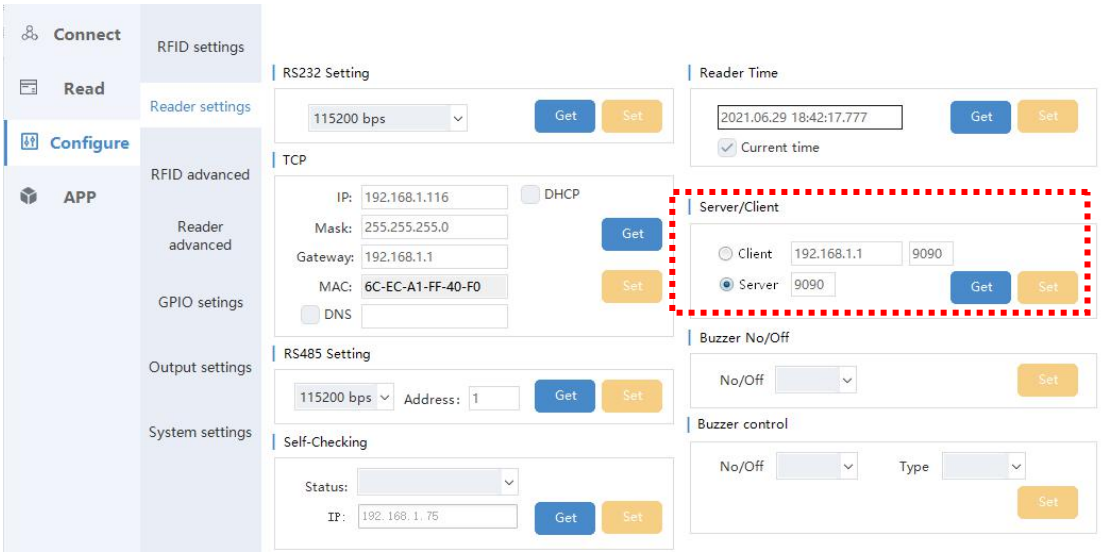


Figure 4-15

Click the “Get” button to get the current TCP server / client mode setting information, manually changing the reader's service mode, IP address and port, then click the “Set” button to submit, Setting up success and failure will be prompted

Server mode means host search reader for connection. Client mode means reader actively search host for connection.

4.3.7 Buzzer Setting

Click the left tab "Configure"-"Reader Settings" to enter the buzzer switch setting interface, as shown in Figure 4-16.

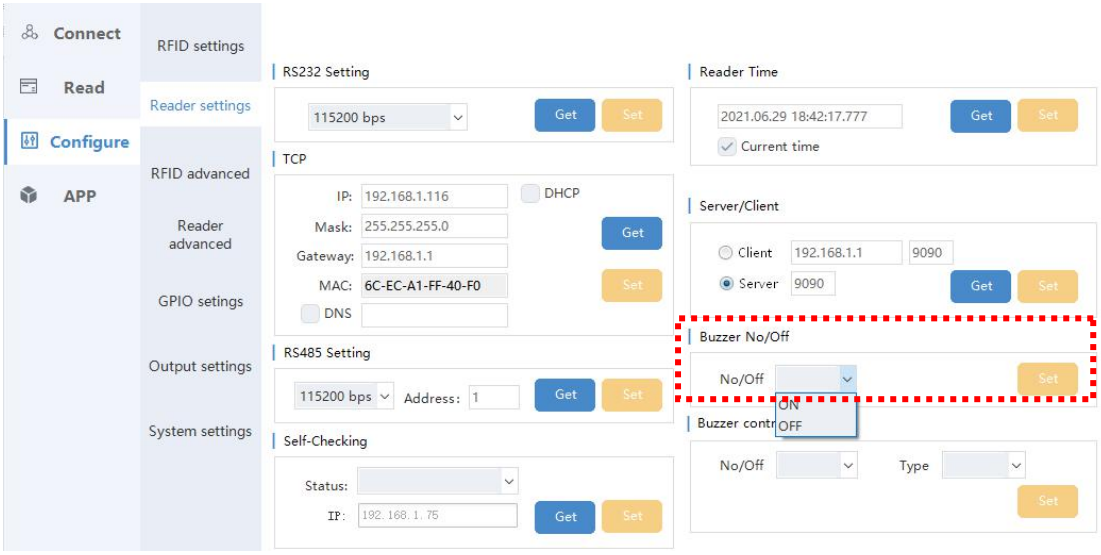


Figure 4-16

If the buzzer is set to on, the built-in buzzer will sound when the reader reads the tags. If the buzzer is set to off, the tag reading prompt sound of the built-in buzzer will be turned off.

4.4 Reader Advanced Configuration

4.4.1 Breakpoint resume

Click the left tab "Configure"-"Reader Advanced" to open the main configuration panel, and the position of the Breakpoint Resume is shown in Figure 4-17.

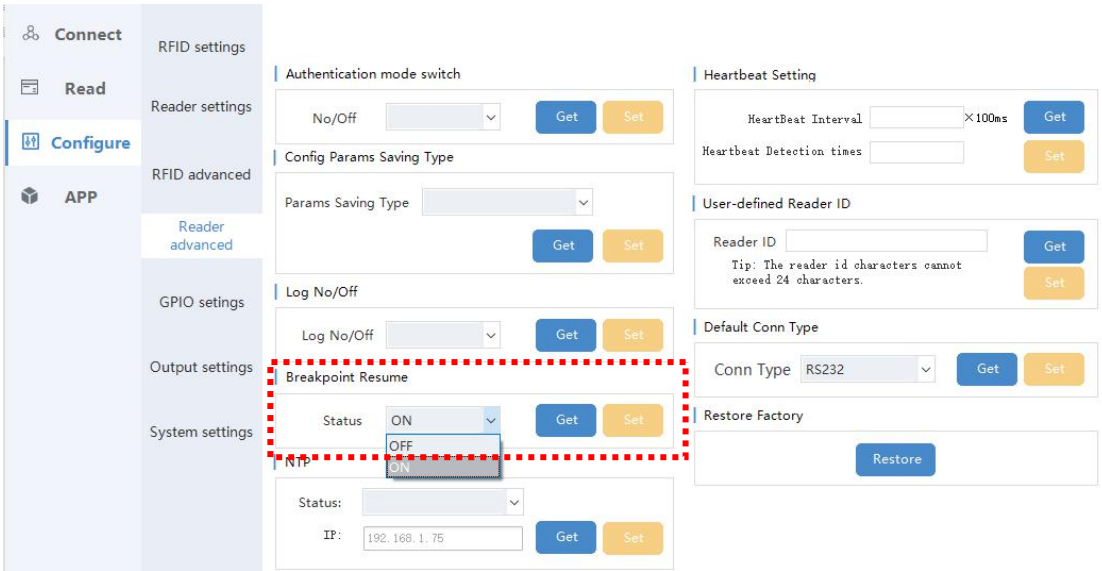


Figure 4-17

Breakpoint Resume means setting whether to store the tag data read in the

offline state to the reader flash after the connection between the reader and the host computer software is suddenly disconnected during the process of reading tags. After the connection is restored, we can retrieve the offline tag data from the reader flash again.
After this function is turned on, the tag data read will have a time stamp. Right-click on the Read interface will pop up a shortcut menu, click "Get Cache" to retrieve the offline tag data, and click "Clear Cache" to clear the cache data stored in the reader. Figure 4-18

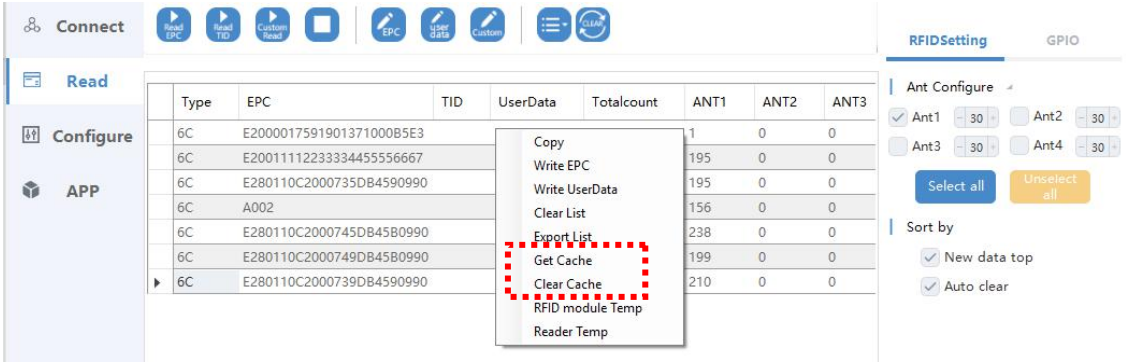


Figure 4-18

4.4.2 Restore Factory Settings

Click "Configure" - "Reader Advanced" on the left tab, and then click the Restore button. a prompt box will pop up to indicate whether to restore factory settings, as shown in Figure 4-19.

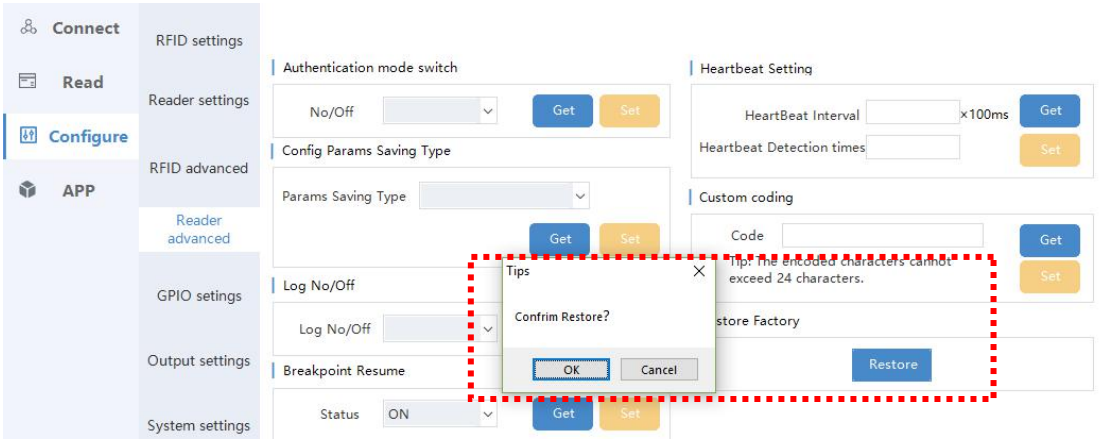


Figure 4-19

Restoring factory settings means that all the other configurations are changed to factory settings except that the MAC address of the reader remains unchanged.

4.4.3 Log Switch setting

Click the left tab "Configure"-"Reader Advanced" setting interface as shown in

Figure 4-20.

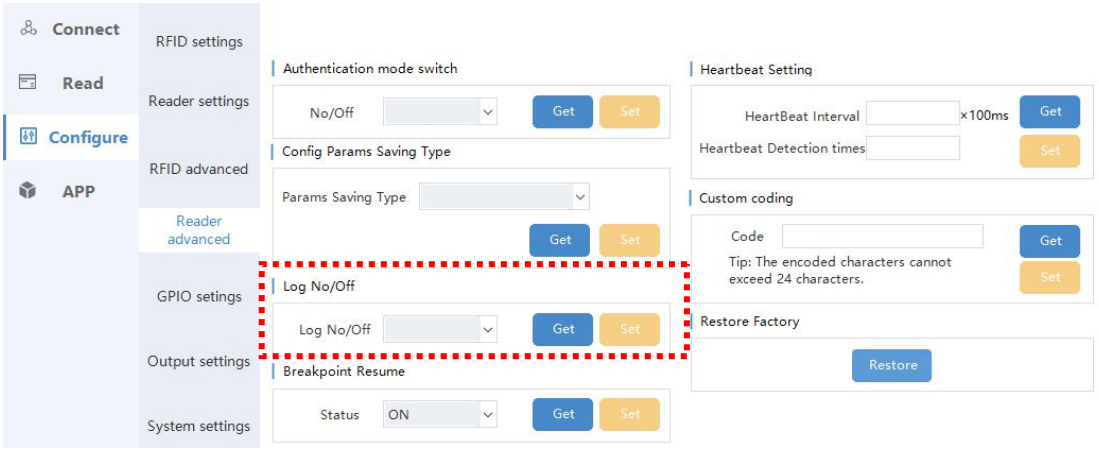


Figure 4-20

Set the internal log of the reader to turn on or off

4.4.4 Heartbeat Package Setting

Click the left tab "Configure" - "Reader Advanced", and the heartbeat package setting interface is shown in Figure 4-21.

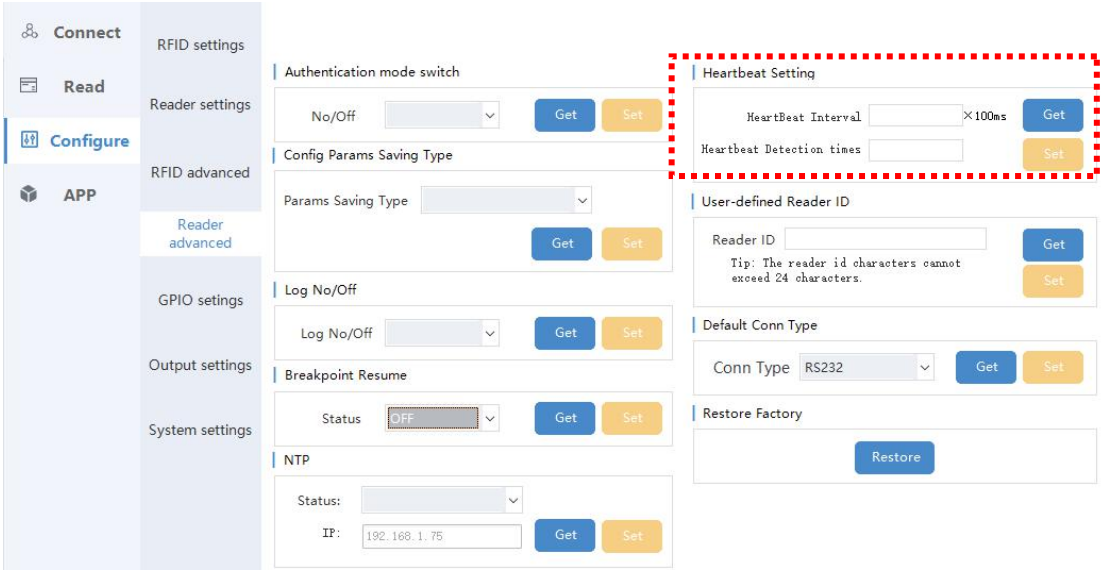


Figure 4-21

Set the number of heartbeat packets and the time interval between the reader and the PC.

4.5 GPIO Configuration

4.5.1 GPI Configuration

Click the left tab "Configure" - "GPIO settings" to enter the GPI configuration

interface, as shown in Figure 4-22.

GPI: Optocoupler input, DC 0~24V, higher than 1V is high level, lower than 1V is low level.

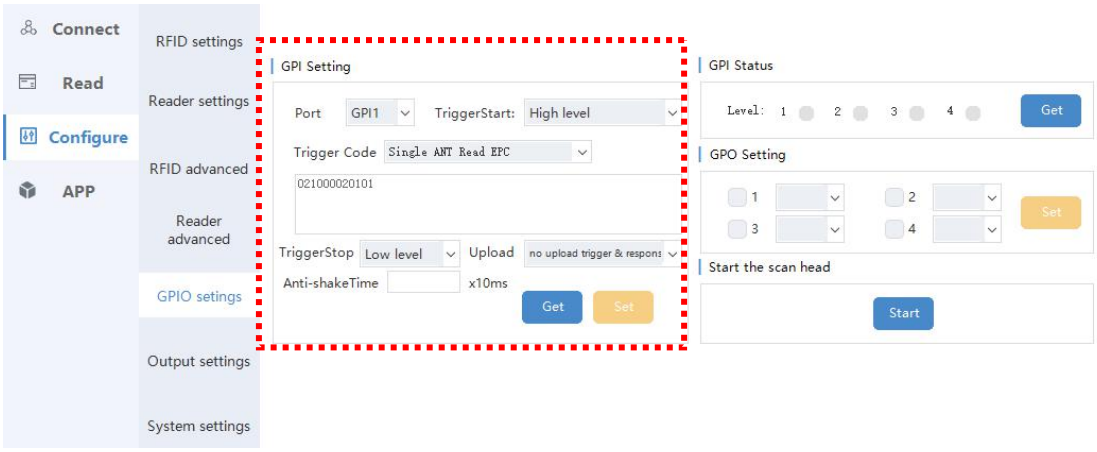


Figure 4-22

After selecting a GPI port number, click Get to obtain the configuration information of the current GPI port. After manually changing the GPI parameters, click Set to configure. There will be a prompt for successful or failed setting.

A sample usage scenario of GPI:

Infrared sensor model selection : Select PNP NO type, this type indicates that the sensor is at low level under normal conditions. When the object is detected, the signal wire will output a positive voltage signal.

GPI settings of reader:

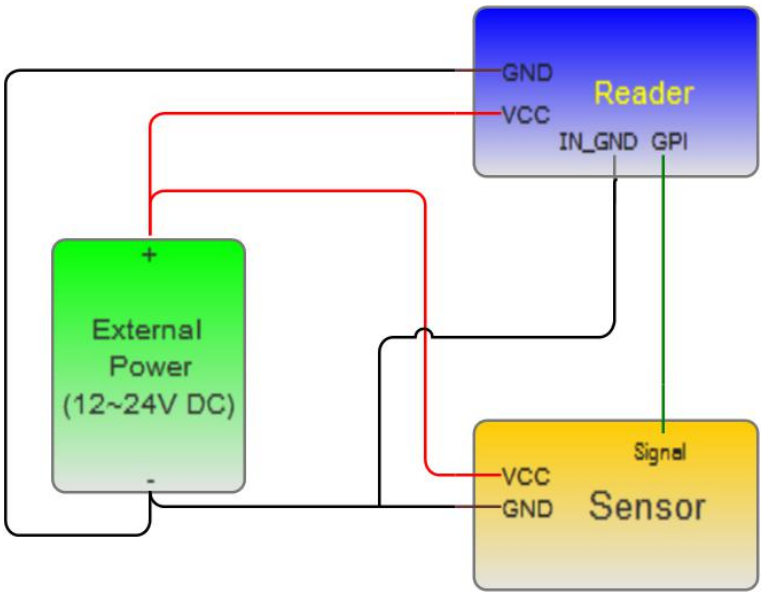
Port: GPI1

Trigger Start: High level

Trigger Command: Single ANT Read EPC

Trigger Stop: Low level

Connection diagram:



4.5.2 GPI Status Query

Click the left tab "Configure" - "GPIO settings" to enter the GPI status query interface, as shown in Figure 4-23.

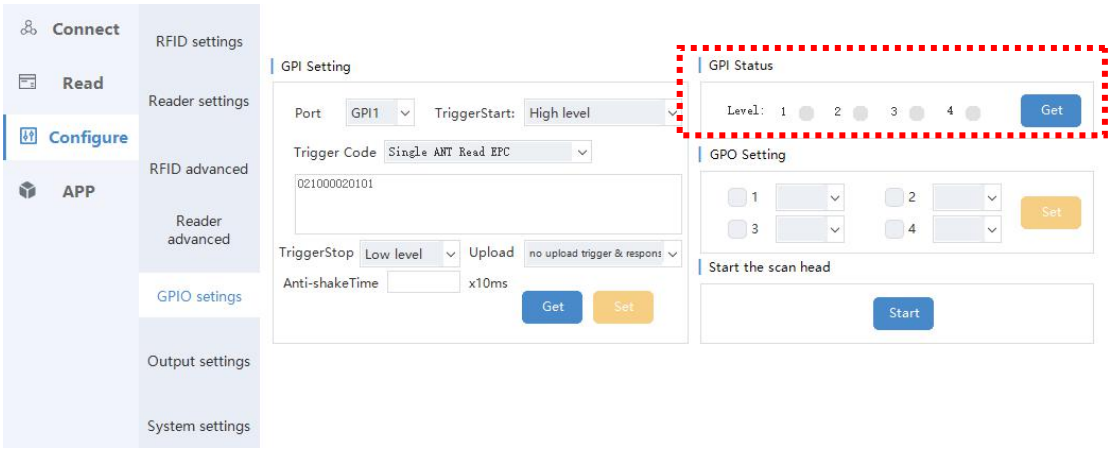


Figure 4-23

Click the “Get” button to get the Status of GPI， red means “High level”, gray means “Low level”.

4.5.3 GPO configuration

Click "Configure" - "GPIO settings" in the left navigation bar to enter the GPO configuration interface, as shown in Figure 4-24.

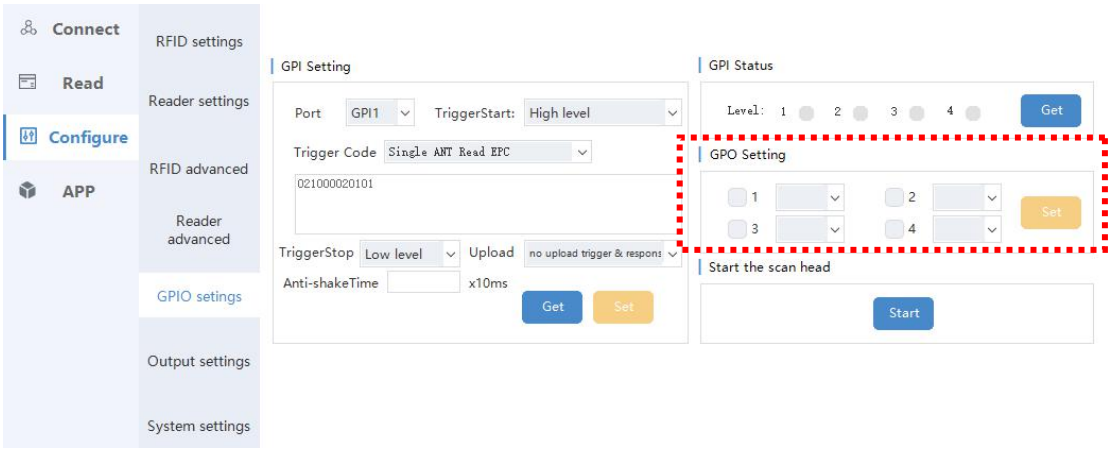


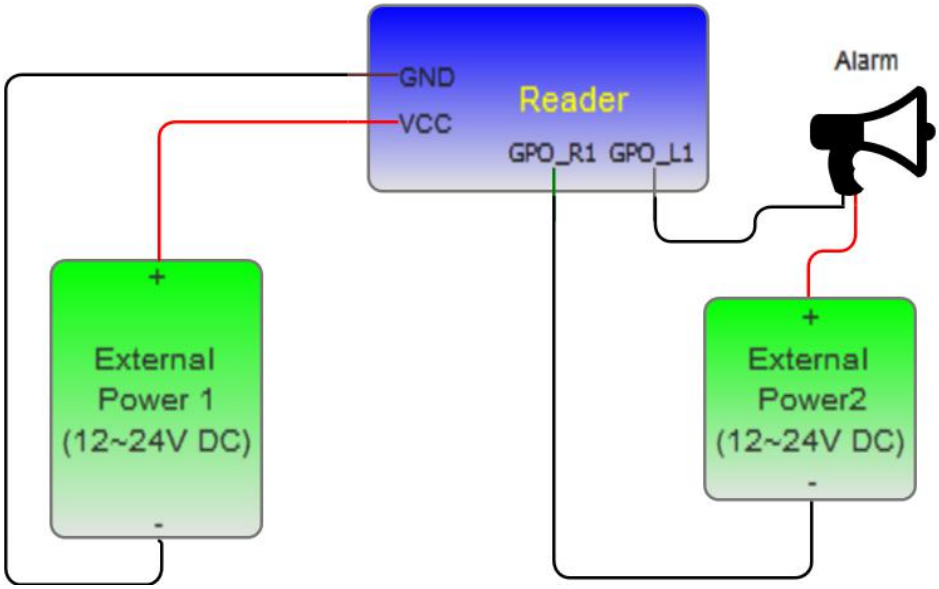
Figure 4-24

After manually changing the GPO status, click Set to configure. There will be a prompt for successful or failed setting.

A sample usage scenario of GPO:

Relay type GPO: This type GPO is like a switch, low level means open, high level means close, the default status is open. We can connect alarm, led etc. to the GPO.

GPO relay specification: DC_MAX: 30V,2A; AC_MAX: 125V,0.3A

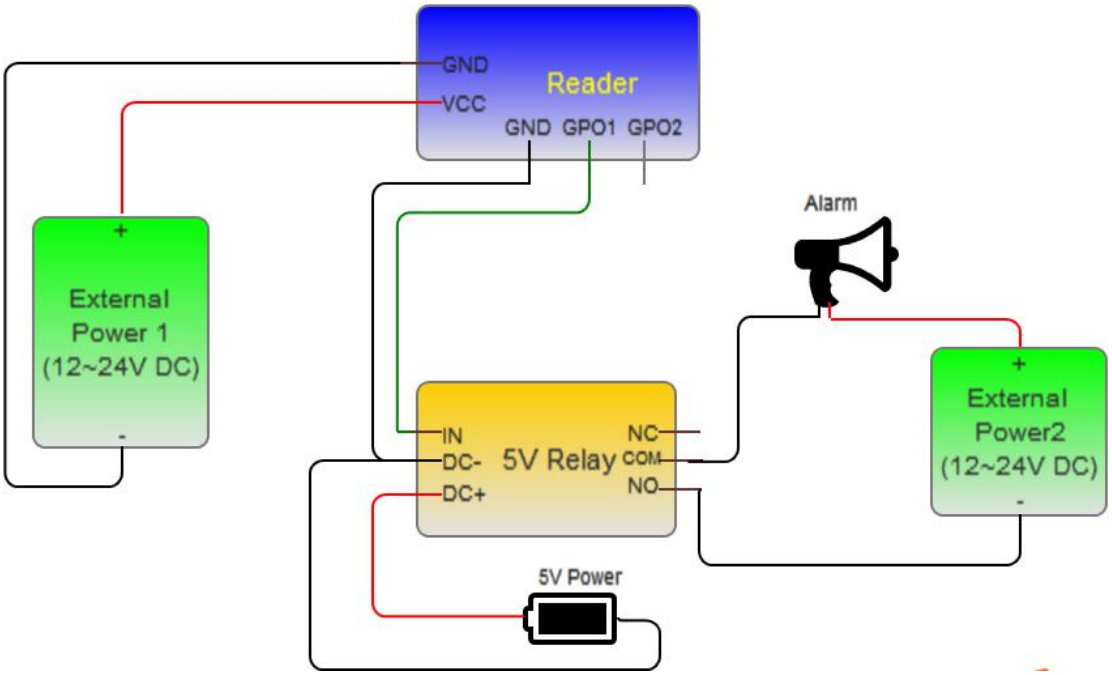


5V GPO that shared with wiegand: In this case, the GPO is not a switch. When the GPO is set to high level, the GPO will output a 5V high level and the electric current is 10mA

Each GPO needs to work with GND.

No.	Color	Definition
1	Black	GND
2	Brown	GND
3	Red	24V
4	Orange	GPO2/wiegand 1
5	Yellow	GPO1/ wiegand 0
6	Green	GPI

The high level signal of the GPO can be used to drive the external relay to work.



4.5.4 Start Barcode Scanning

Click "Configure" - "GPIO settings" in the left navigation bar to enter the Start The Scan Head interface, as shown in Figure 4-25.

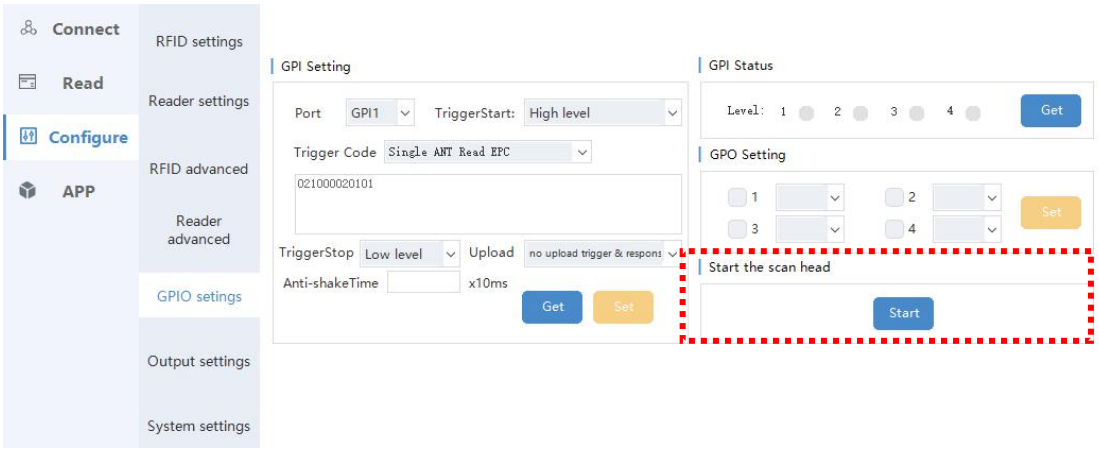


Figure 4-25

Click the Start button to start the scanning function of some reader devices that support 1D/2D scanner.

4.6 Advanced Output Settings

4.6.1 Wiegand configuration

Click "Configure"-"Output Settings" in the left navigation bar to enter the Wiegand Setting interface, as shown in Figure 4-26.

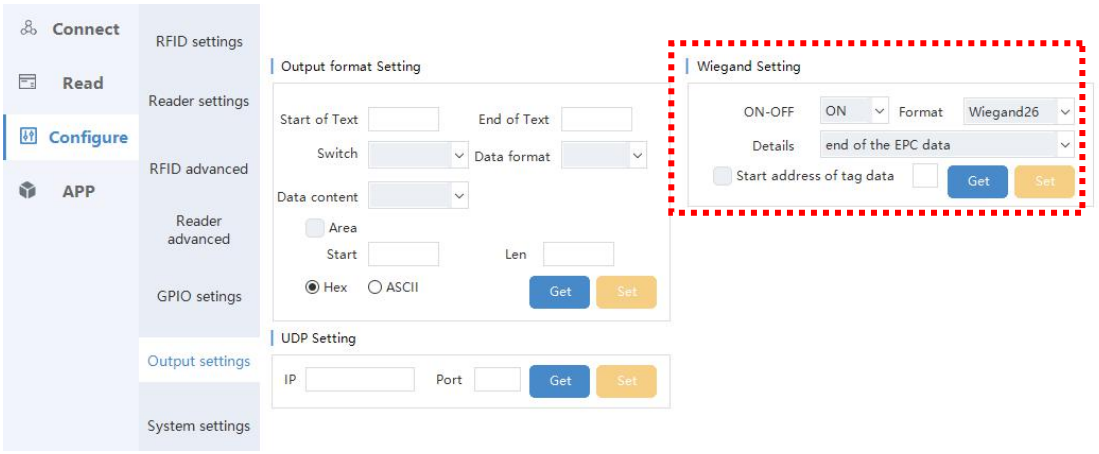


Figure 4-26

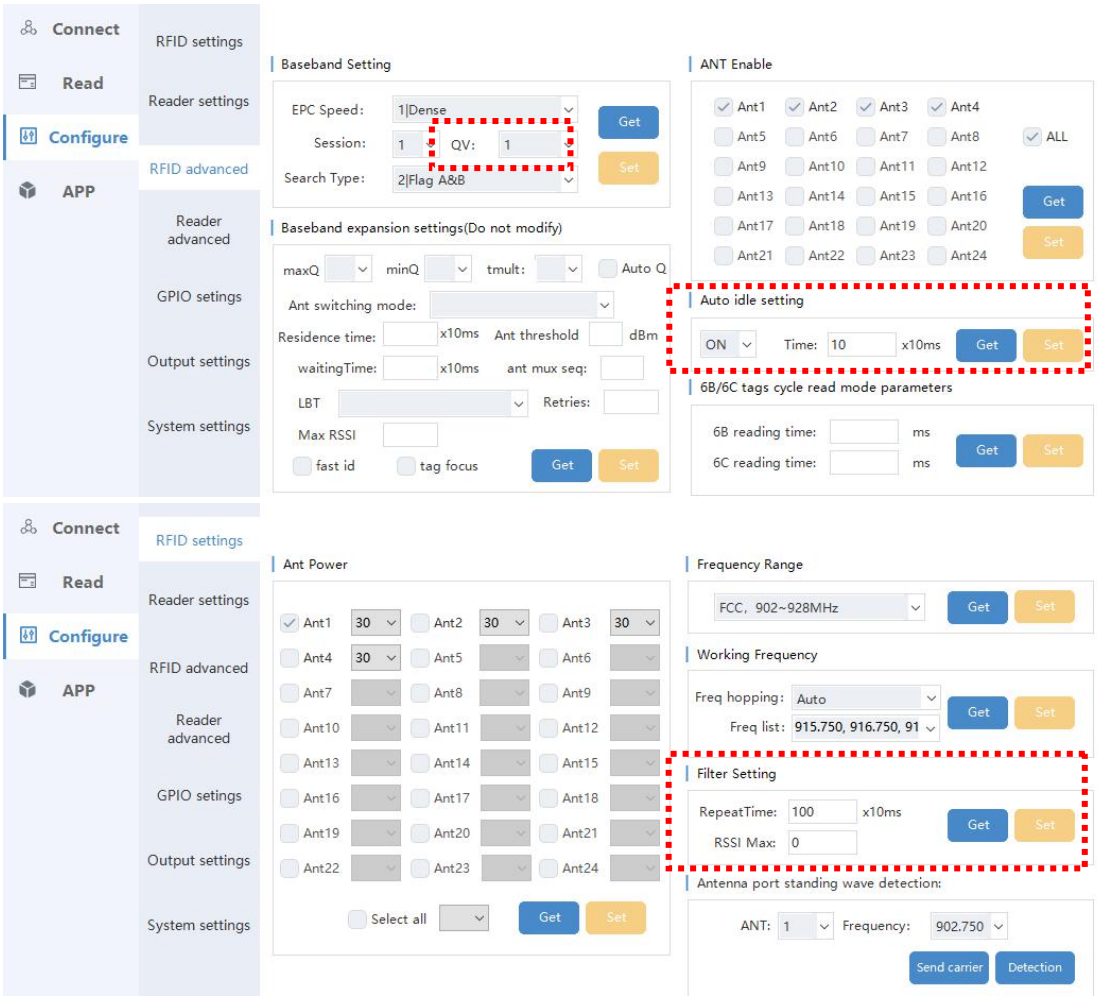
Click Get to get the current Wiegand configuration information. After manually changing Wiegand parameters, click Set to configure. There will be prompts for success and failure.

The general steps to use the reader to work together with the wiegand controller as below:

a) Connect to the reader via network, serial port or USB, do the following settings:

1. QV (Q value), set to 1,

2. Filter setting, reduce the repetitive tag data, set RepeatTime to 100 x 10ms, means the same tag be read several times in 1 second, but the reader only send 1 time to the controller.
3. Auto idle setting, set ON, time 10*10ms, means if we turn on the function and set the time to 10*10ms,when the reader doesn't detect any tag in 3 round inventories (about 20ms), it will rest 10*10=100ms, then back to read tag again.



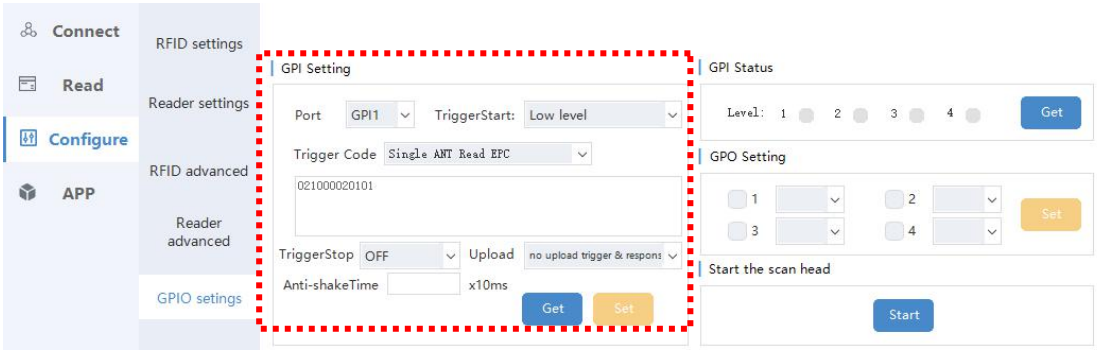
b) Set the GPI to implement the auto read when power on, low level is a special design for the trigger start option to implement auto read when power on without any external sensor. The following parameters mean that after the reader is powered on, it executes the tag reading instruction corresponding to the trigger code and does not stop reading. **The parameters related to automatic tag reading take effect after restarting the reader.**

1. Port: GPI1
2. Triggerstart: Low level
3. Trigger code: 021000020101 (Assign antenna 1 to read EPC). Or

021000050101020006 (Assign antenna 1 to read EPC and TID).

4. Triggerstop: OFF

5. Upload: OFF(This parameter does not affect the tag reading effect)



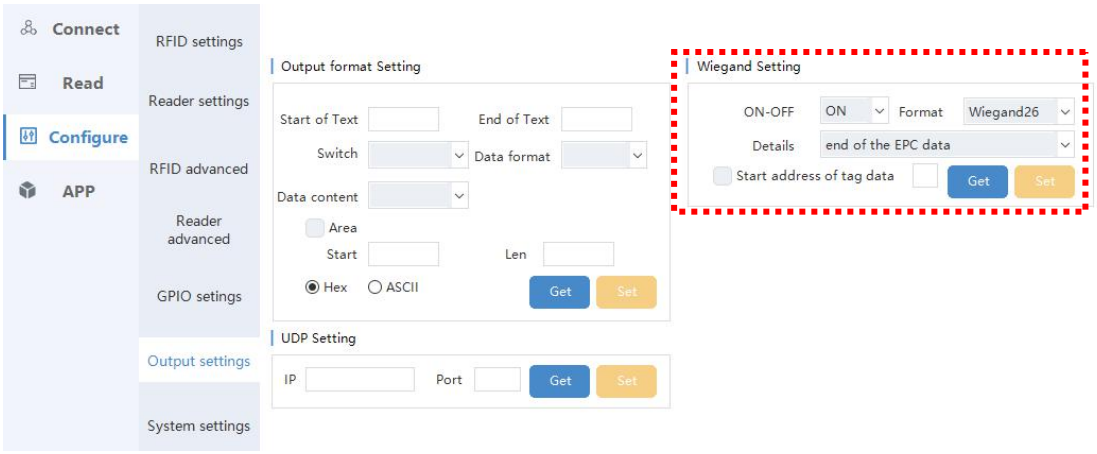
c) Wiegand Setting

1. ON-OFF: ON

2. Format: Wiegand26 or 34 or 66. (Wiegand format should be same as Controller)

3. Details: end of EPC data or end of TID data (It needs to be consistent with the trigger code)

4. Start address of tag data: If you do not want to output the end data of EPC or TID, you can check this option to customize the starting position of output EPC or TID data. The unit is byte.



d). Connect the reader Wiegand 0 to the controller Wiegand 0, the reader Wiegand 1 to the controller Wiegand 1, and the reader GND to the Wiegand controller GND

4.6.2 Output Format Setting

Click "Configure" - "Output Settings"in the left navigation bar to enter the output format configuration interface, as shown in Figure 4-27.

In this interface, you can customize the data output format, specify the UDP host address and port number.

The output switch has three options, OFF, Open, and UDP Output, select the Open if you want to receive custom tag data over the serial port, or select the UDP Output option if you want to receive custom tag data over the network.

Selecting either Open or UDP Output means that the custom output data function is enabled.

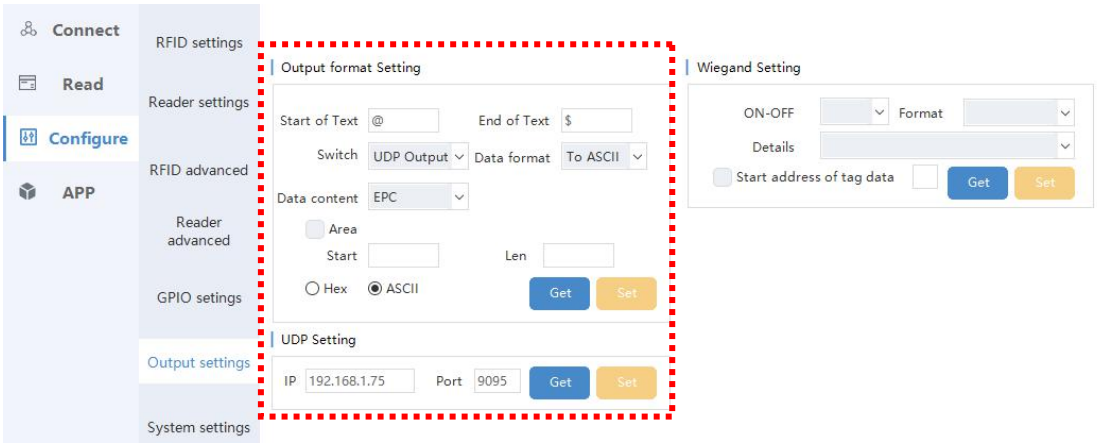


Figure 4-27

Assuming the tag EPC is ABCDED123515D4BB5E580000, then the format of the data output is:

	Head	Tag ID	End
ASCII chars	@	ABCDED123515D4BB5E580000	$
Hex numbers	40	41 42 43 44 45 44 31 32 33 35 31 35 44 34 42 42 35 45 35 38 30 30 30 30	24

Note: If the custom output data function is turned on, you will not see any tag data when you use the demo software to read tags, because the tag data at this time is no longer a standard data format, if you want to use the demo software to test the tag reading function, please turn off the custom output data function first.

4.7 System Settings

4.7.1 Tag Reading Parameter Settings

Click "Configure"-"System Settings" in the left navigation bar to enter the Tag Reader Parameter Settings interface, as shown in Figure 4-28.

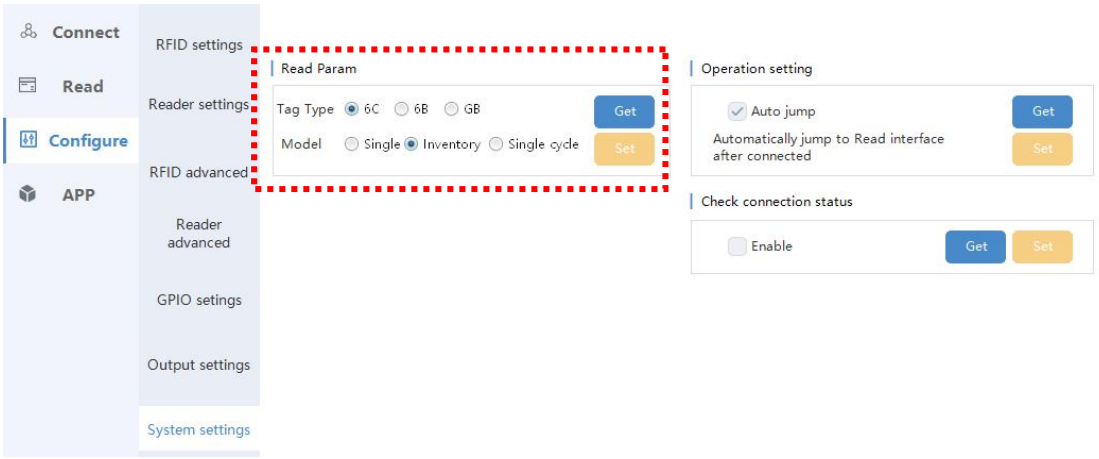


Figure 4-28

Click Get to get the current tag reading mode and the type of tag to read. Click Set to take effect immediately.

Tag Type indicates the tag type read by the reader. Currently, demo software supports 6C tag, 6b tag and GB tag, but does not support multiple selection.

In tag reading mode, Inventory means that the reader will keep reading tags until it receives the stop command. Single means that the reader automatically stops reading tags after reading tags once.

4.7.2 Operation Setting

Click "Configure"-"System Settings" in the left navigation bar to enter the operation setting interface, as shown in Figure 4-29.

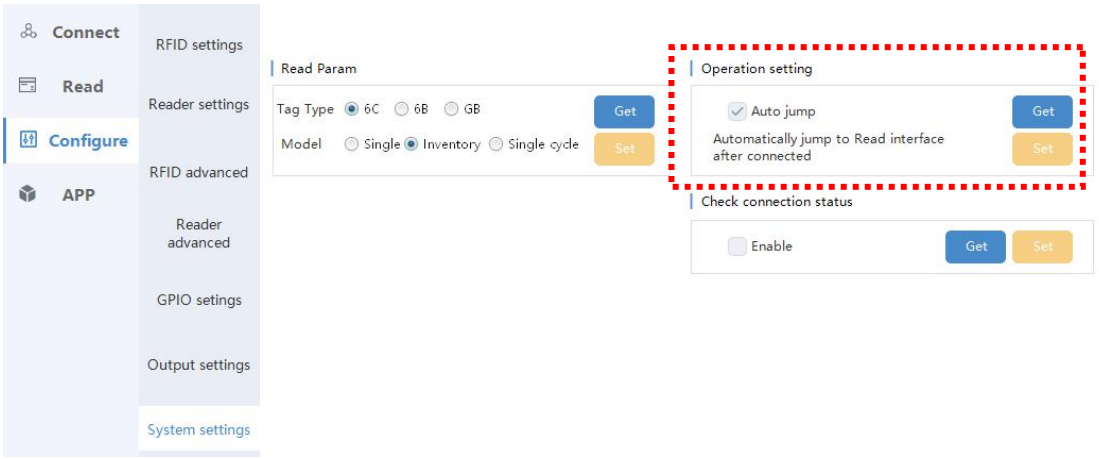


Figure 4-29

After selecting, when the Demo is connected to the reader, it will automatically jump to the Read interface.

If it is not checked, it will stay in the Connect interface.

4.7.3 Connection Status Detection Setting

Click "Configure"-"System Settings" in the left navigation bar to enter the connection detection interface, as shown in Figure 4-30.

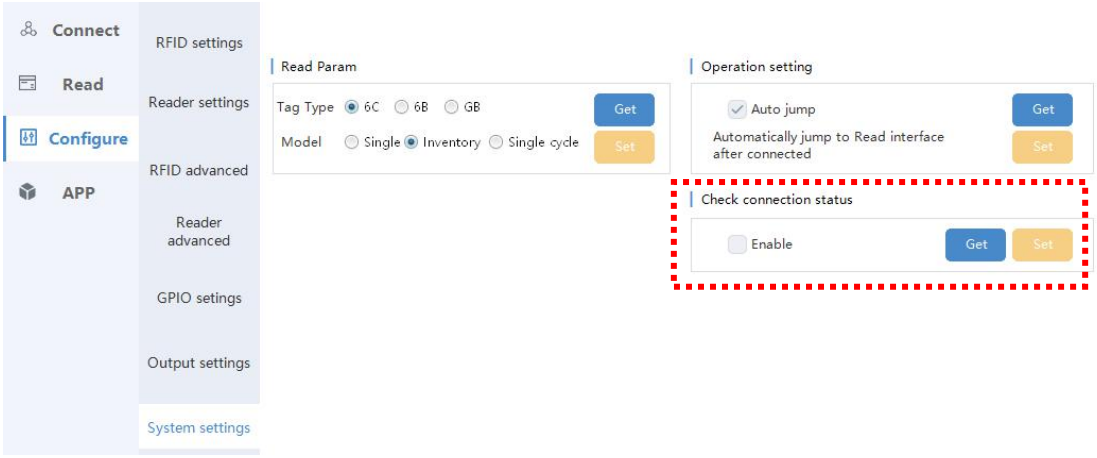


Figure 4-30

After selecting, when the Demo is connected to the reader, it will automatically send heartbeat packets to communicate with the reader (except 485 connection).

If it is not checked, the heartbeat packet will not be sent for connection confirmation.

5.Advanced Operation

5.1 Custom read

If you need to read the data in different data areas of tags at the same time, you need to use the custom read operation. You can freely control the read area by using the custom read. Click the button

to set the custom read interface, as shown in Figure 5-1.

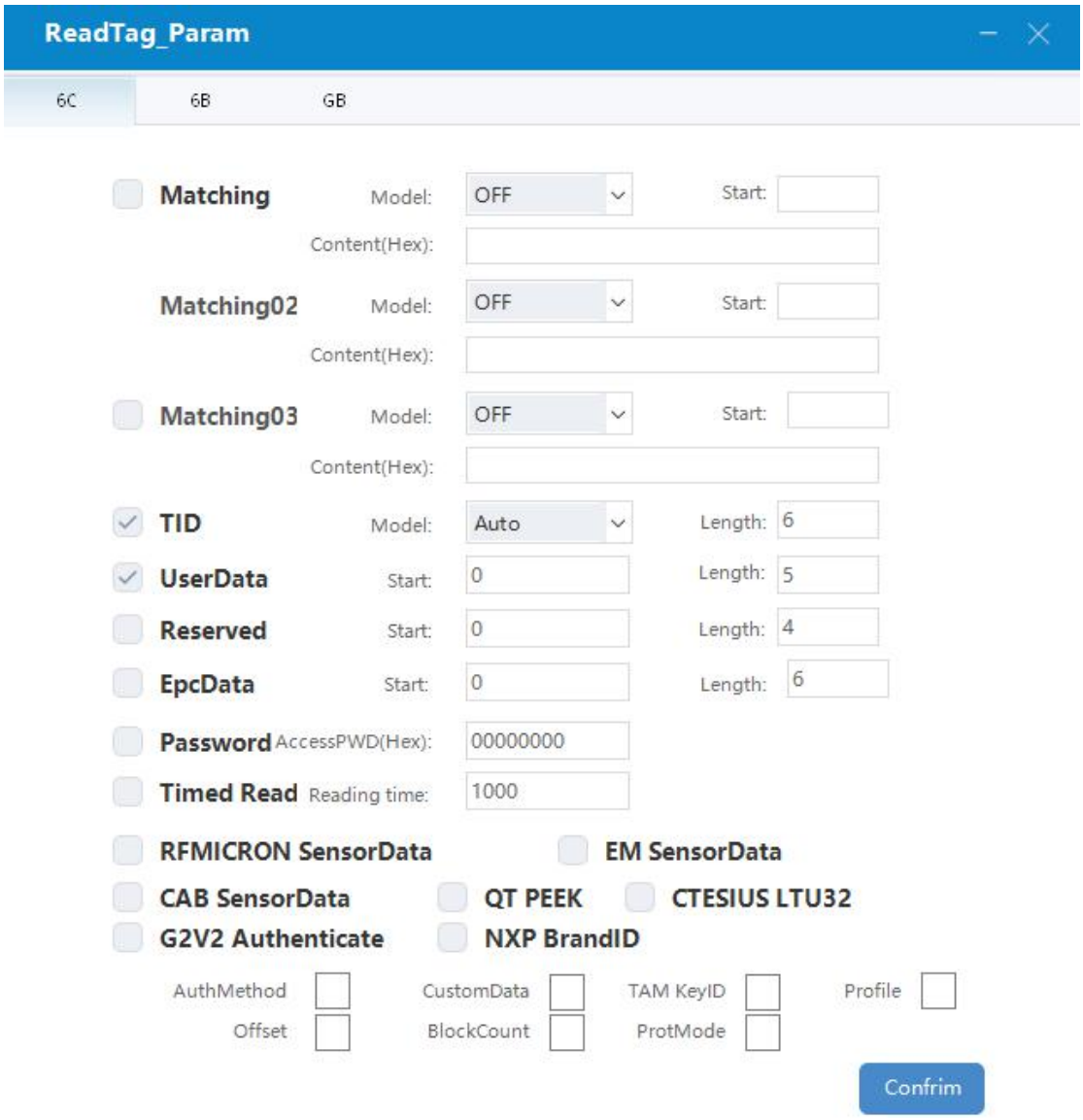


Figure 5-1

You need to check the front check box of each tag area to decide which area to read, fill in and select the read parameters, length unit is word, and content is hex data, after clicking confirm, the reader will read according to the configuration, if there is any tag match the configuration, the tag data in the Read interface will be updated in real time.

Matching read function includes 3 arguments:

1. The bank of tag memory need to be matched
2. The start address of bank of tag memory that need to be matched, unit is bit, one hexadecimal number takes up 4bits. EPC bank data takes 32 as the starting address and TID bank data takes 0 as the starting address.
3. Data to be matched.

Note: All readers support matching condition (01), but may not support matching condition 02 and matching condition 03. The matching condition 01 and the matching condition 02 are in a logical AND relationship, and the matching condition 01/02 and the matching condition 03 are in a logical OR relationship.

For example, there is tag, EPC is 111122223333444455556666, and TID is E20034120132FA000093C04F

If the reader is allowed to read only the tags that match the rule, the rule is defined in accordance with the EPC bank of the tag memory. The four digits starting from the 9th digit of the EPC, that is 3333, will be read. Otherwise, does not be read.

Then the arguments should be filled as:

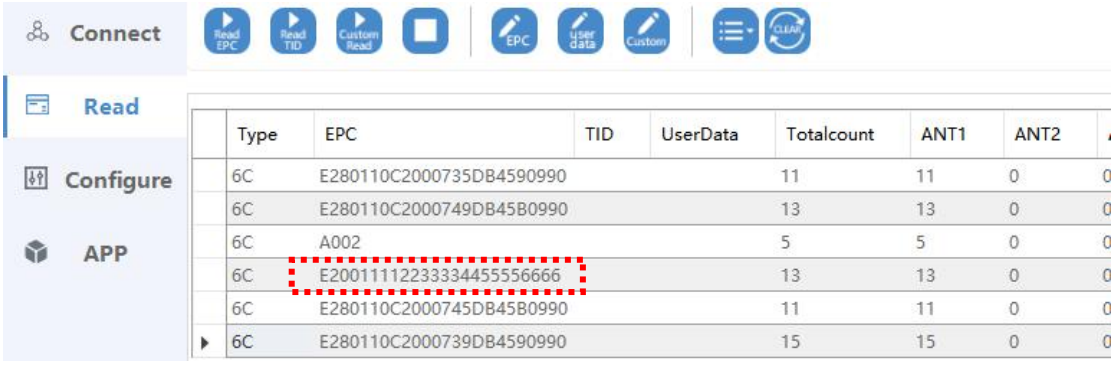
1. Bank : EPC
2. Staring address: 32 + 8*4 = 64
3. Data: 3333

If the reader is allowed to read only the tags that match the rule, the rule is defined in accordance with the TID bank of the tag memory. The 12 digits starting from the 13th digit of the TID, that is FA000093C04F, will be read. Otherwise, does not be read.

Then the arguments should be filled as:

1. Bank: TID
2. Staring address: 12*4 = 48
3. Data: FA000093C04F

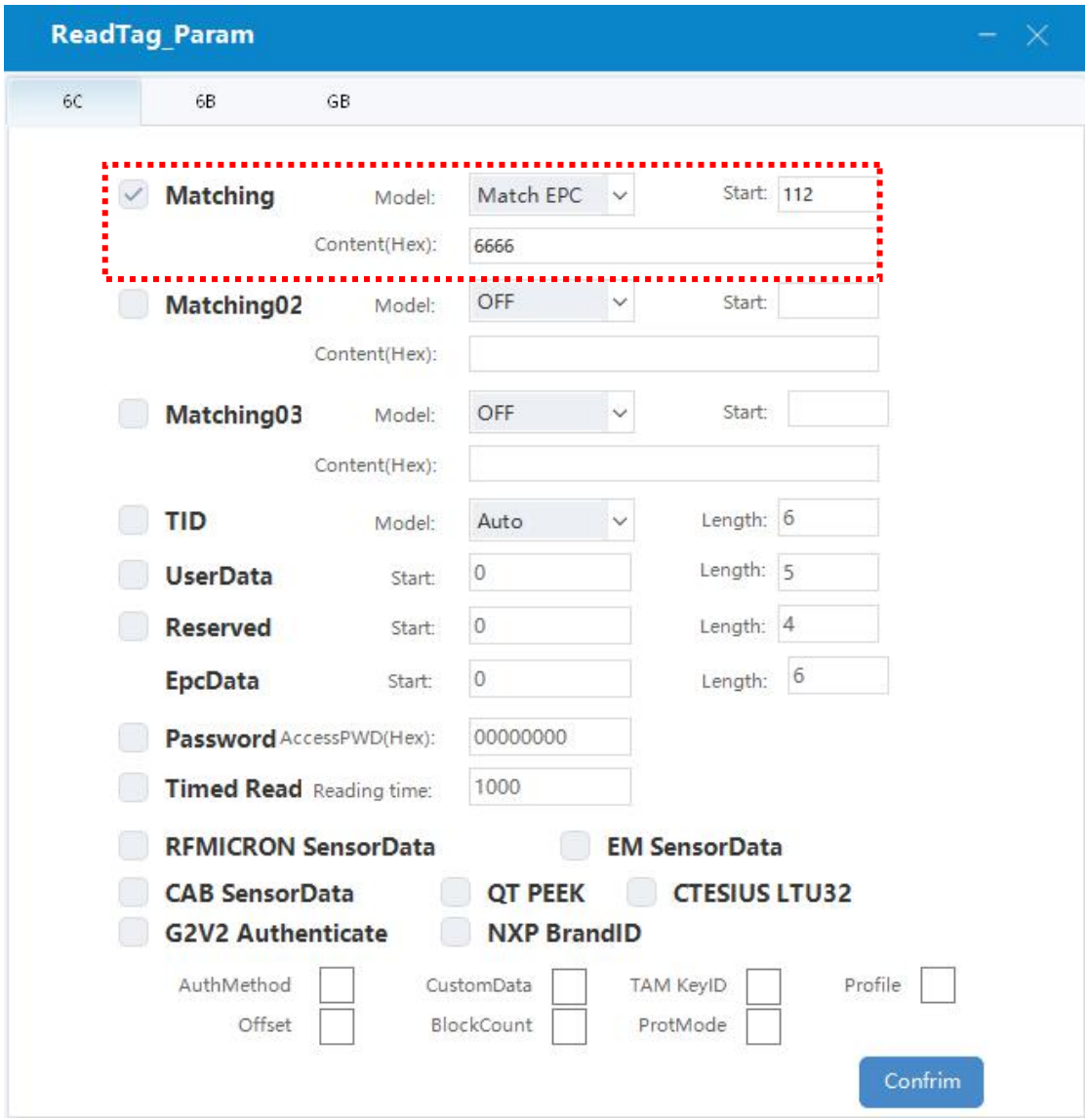
For example, there are 5 tags, Take EPC as the matching condition, if we want the reader only to read the tags whose EPC with 0A22 as the last 4 digits



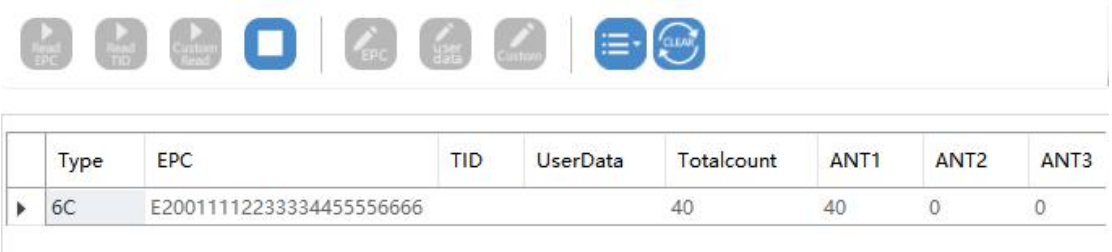
After clicking custom read button , the custom read setting interface will pop up. In the

custom read setting interface, check Matching, select Match EPC for model option, inputs 112 to the start textbox, inputs 6666 to the Content (Hex) textbox

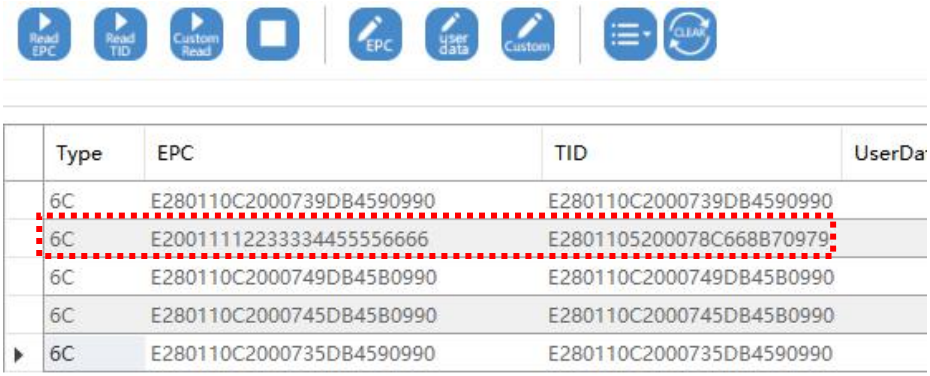
Remark: The unit of Start address is bit, one hexadecimal number takes up 4 bits, there are 20 hexadecimal numbers on the left side of the data that to be matched, add the 32bits content at the front of EPC bank that we cannot read, so start address is 32 + 4 *20 = 112



The custom read result is shown as below screenshot



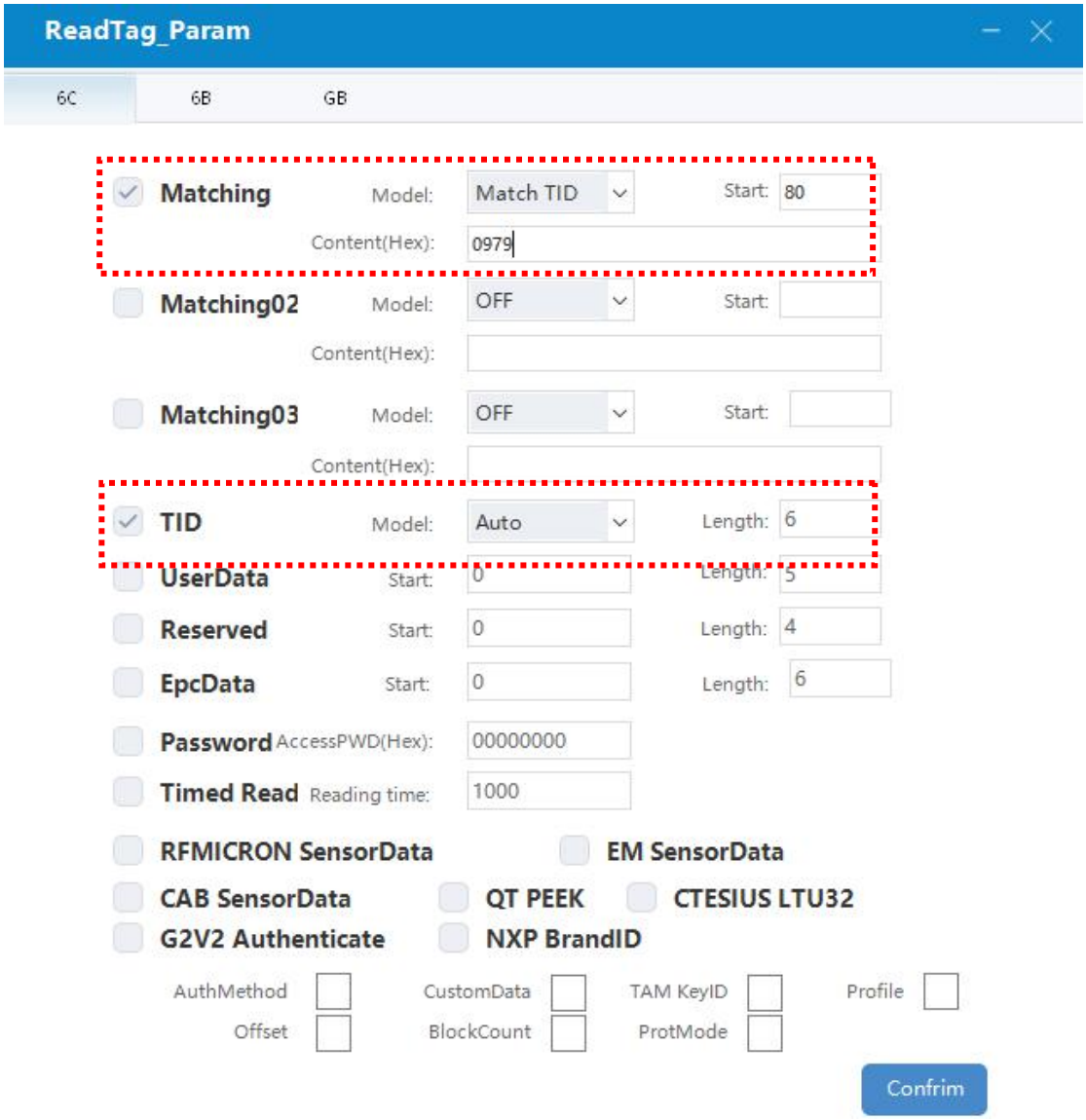
Take TID as the matching condition, if we want the reader only to read the tags whose TID with 0979 as the last 4 digits



	Type	EPC	TID	UserDa
	6C	E280110C2000739DB4590990	E280110C2000739DB4590990	
	6C	E2001111223333445555666 6	E2801105200078C668B70979	
	6C	E280110C2000749DB45B0990	E280110C2000749DB45B0990	
	6C	E280110C2000745DB45B0990	E280110C2000745DB45B0990	
▶	6C	E280110C2000735DB4590990	E280110C2000735DB4590990	

In the custom read interface, check Matching, select Match TID for model option, inputs 80 to the start textbox, inputs 0979 to the Content (Hex) textbox

Remark: There are 20 hexadecimal numbers on the left side of the data that to be matched, so start address is 4 *20 = 80



The custom read result is as below screenshot

	Type	EPC	TID	UserData	Totalcount	ANT1
▶	6C	E20011112233334455556666	E2801105200078C668B70979		48	48

5.2 Custom Write

After stop reading TID tag, chose the tag for modify in the list, click the button

to open Custom Write interface, as shown in Figure 5-2.

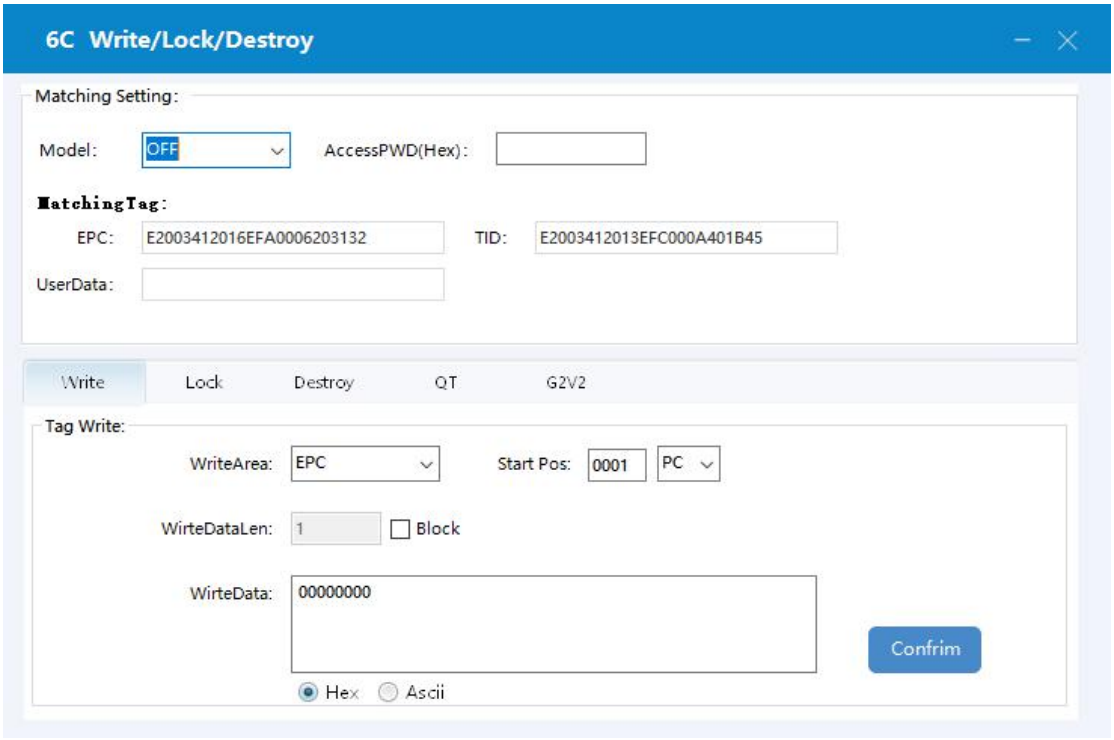


Figure 5-2

Under the Custom Write interface, you can choose to write, lock, and destroy the selected tag, as shown in Figure 5-3, Figure 5-4, and Figure 5-5.

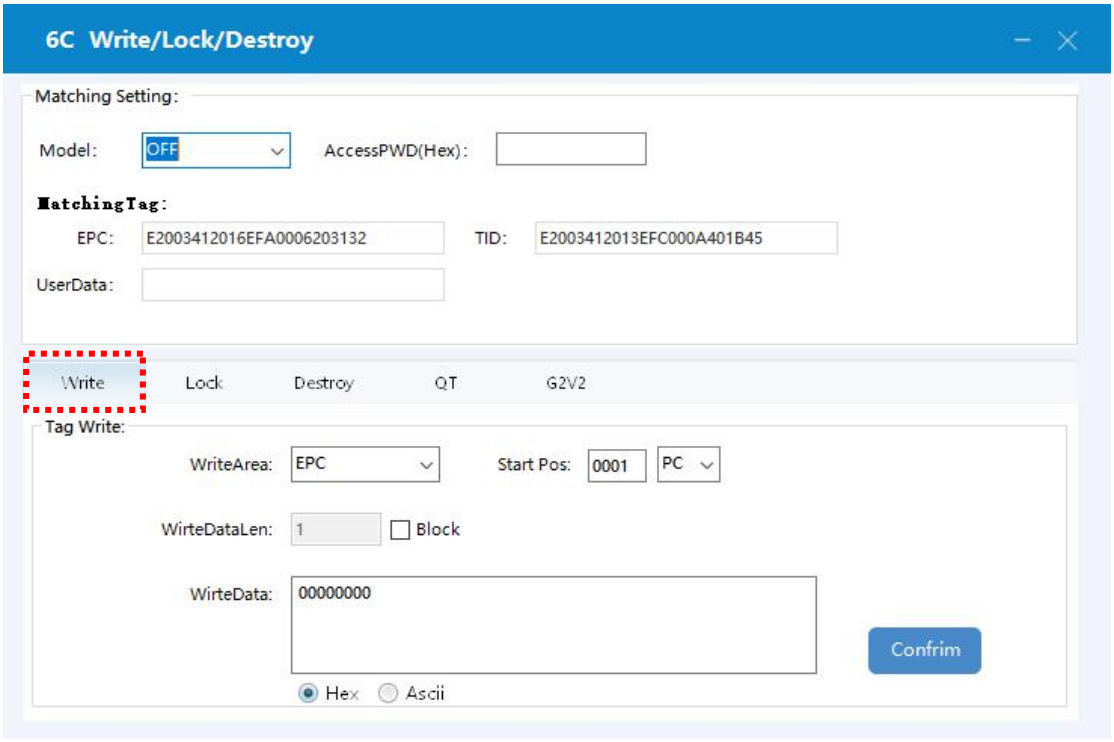


Figure 5-3

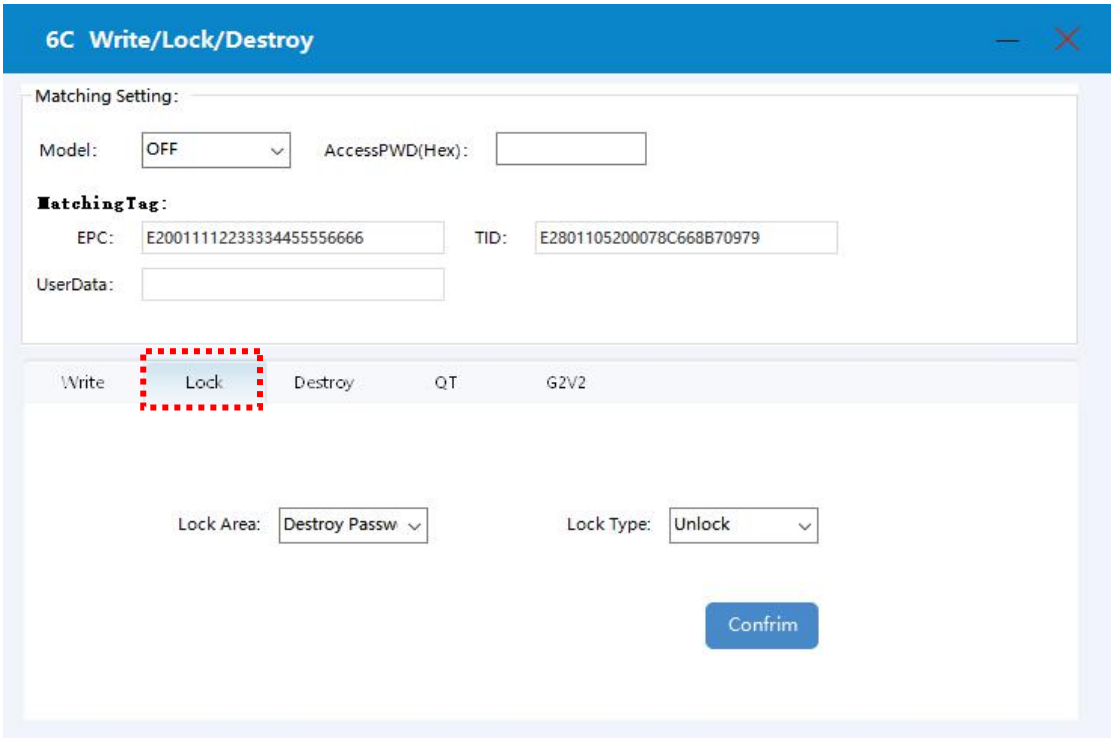


Figure 5-4

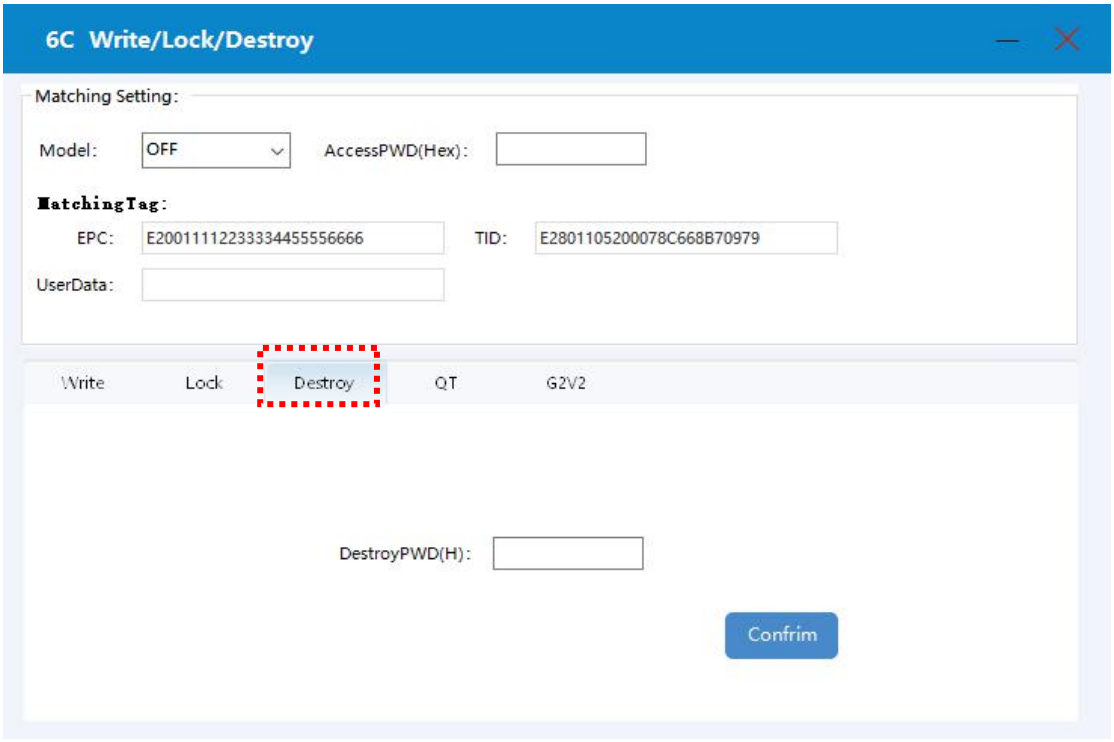


Figure 5-5

The unit of address length is word, and the content is hexadecimal data. After modifying the parameters, click the Confirm button at the bottom right to operate.

Configure the g2v2 untraceable parameter in the following interface, as shown in Figure 5-6. If the tag has set the password, you need to enter the access password before setting it successfully.

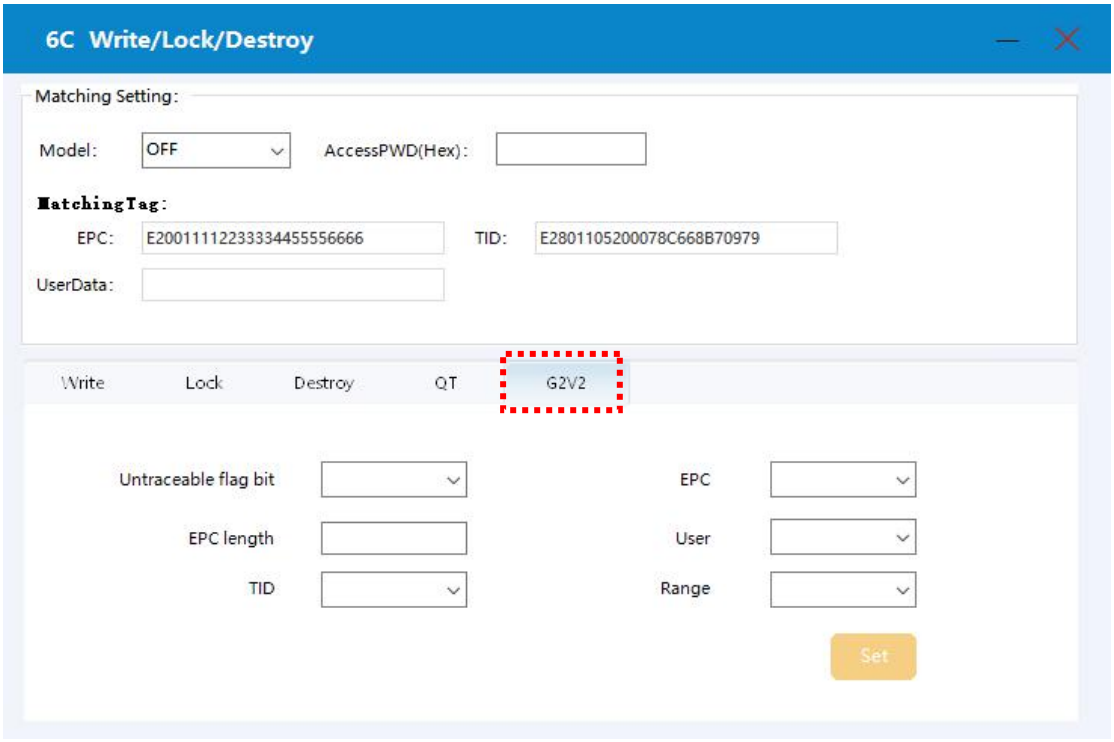
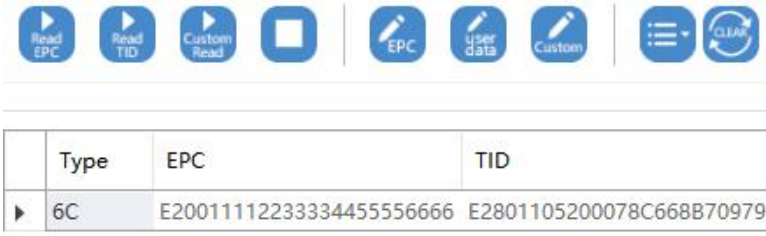


Figure 5-6

Custom Write example description:

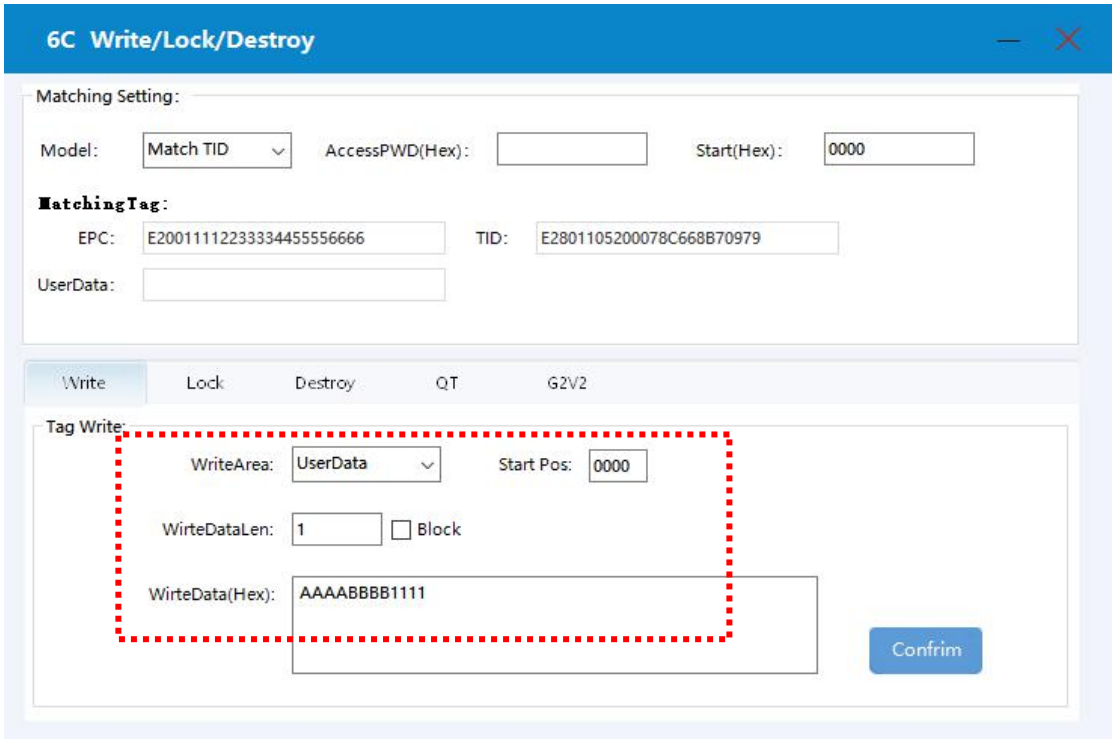
Write the user area, and protect the user area by using the access password. The operation steps are as follows:

1. Click or to read out the tag to be operated first

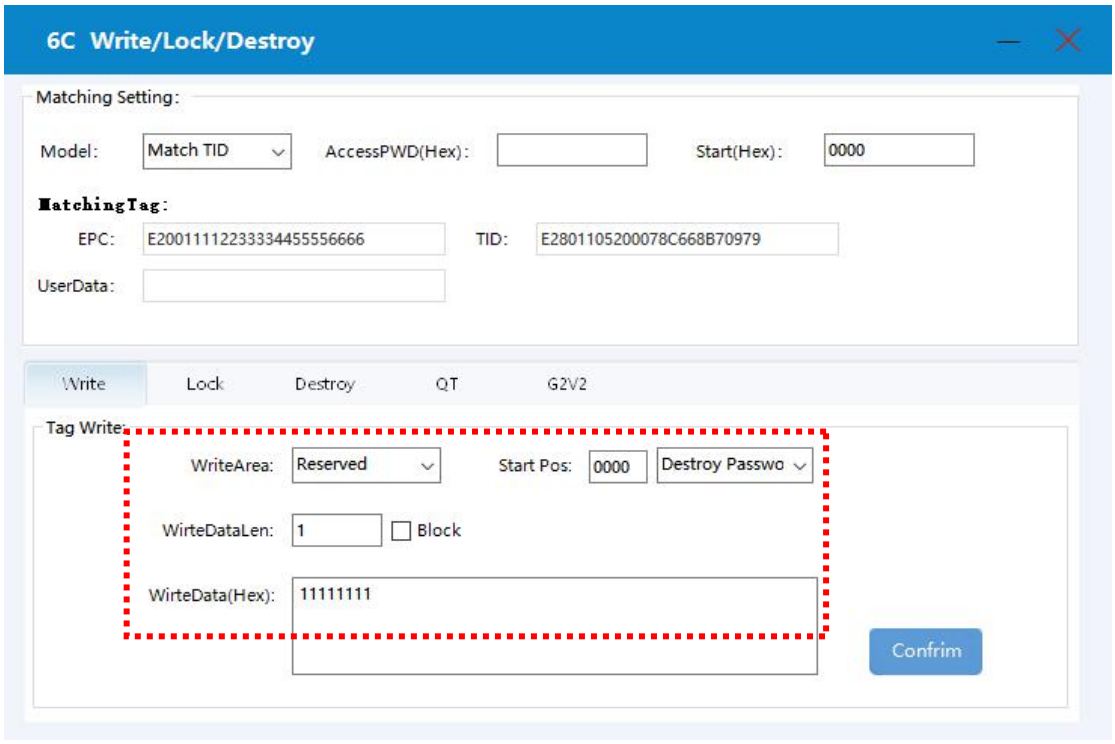


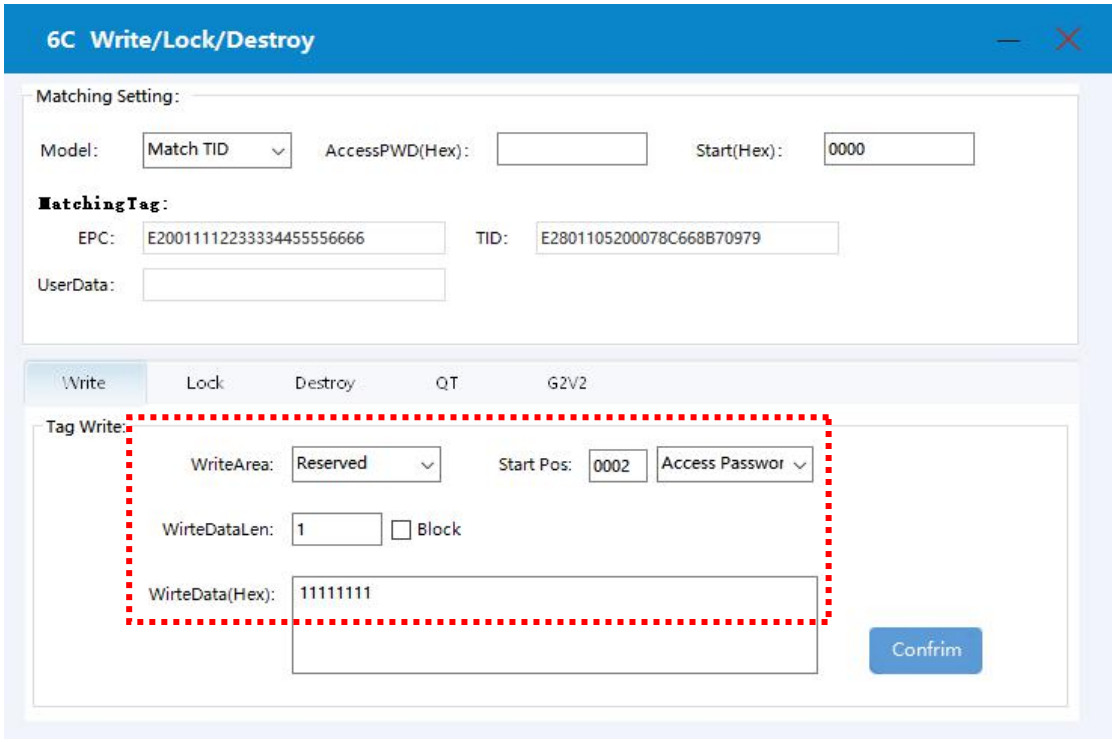
	Type	EPC	TID	UserData
▶	6C	E200111122333344455556666	E2801105200078C668B70979	

2. After selecting this tag, click the custom write icon to enter the custom write interface, select the user data area for the write area, enter the content start address and write content (Hex), and click Confirm to write the user area data.

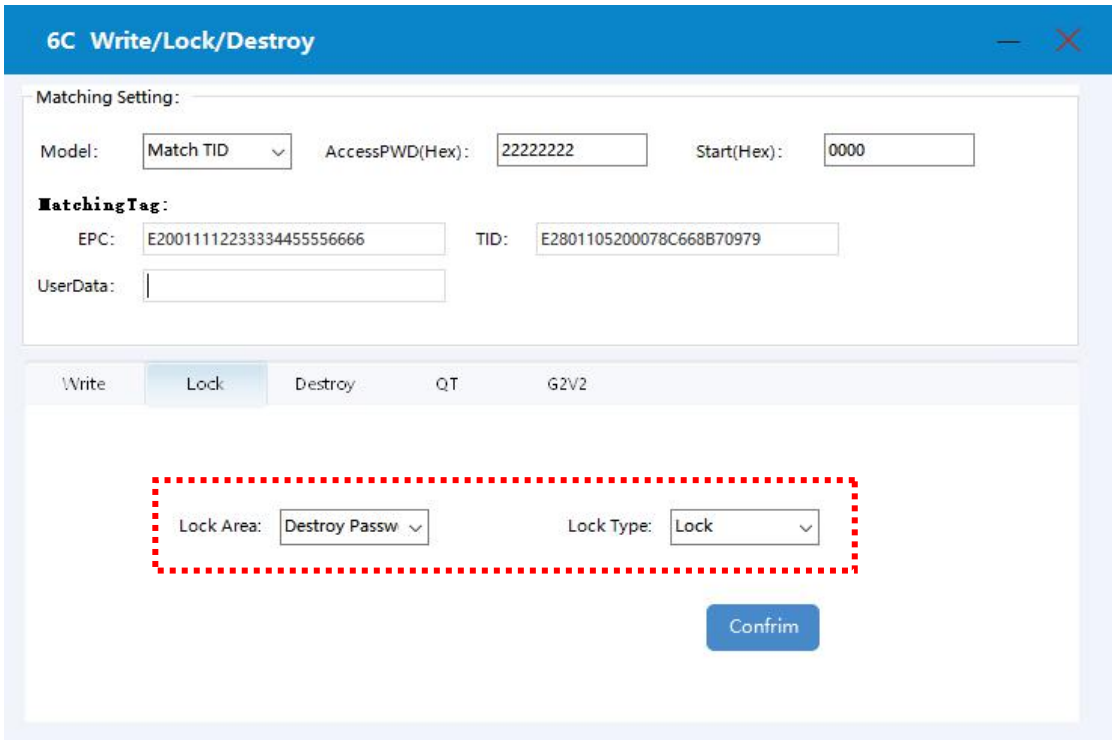


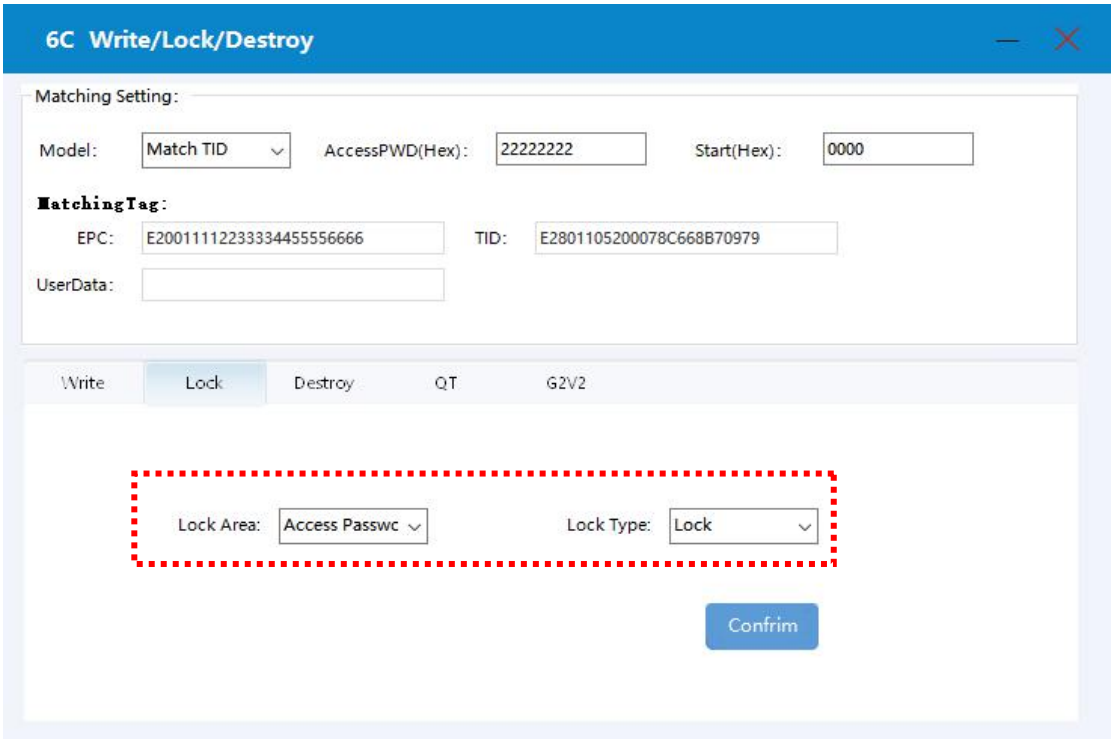
3. Rewrite the destroy password and access password

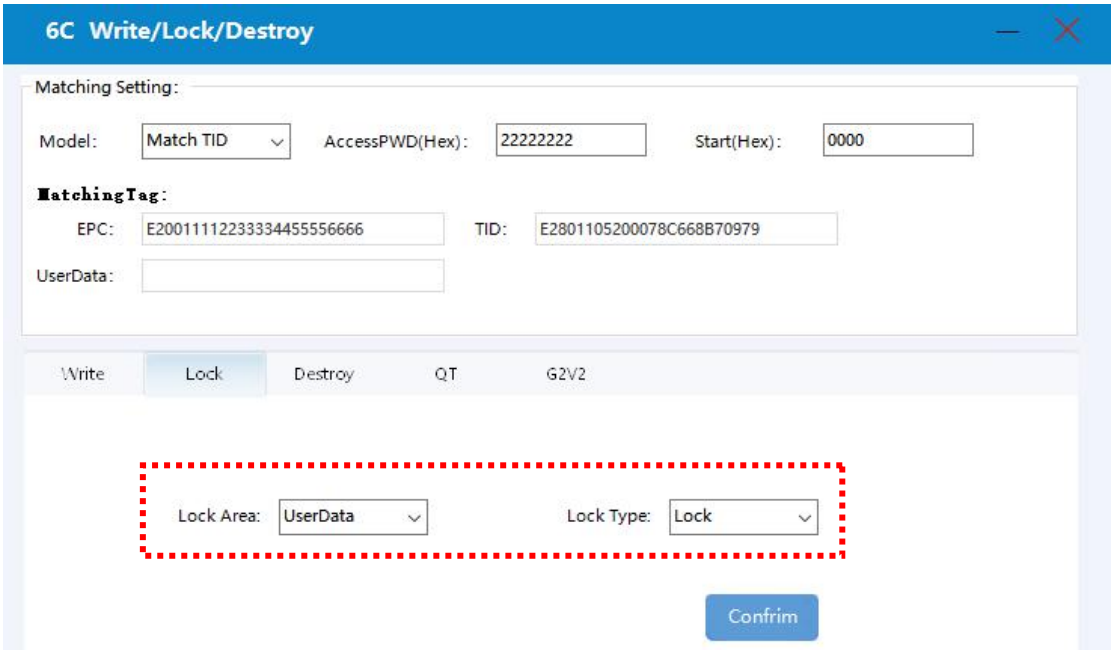




4. Lock the destroy password, access password and user area separately



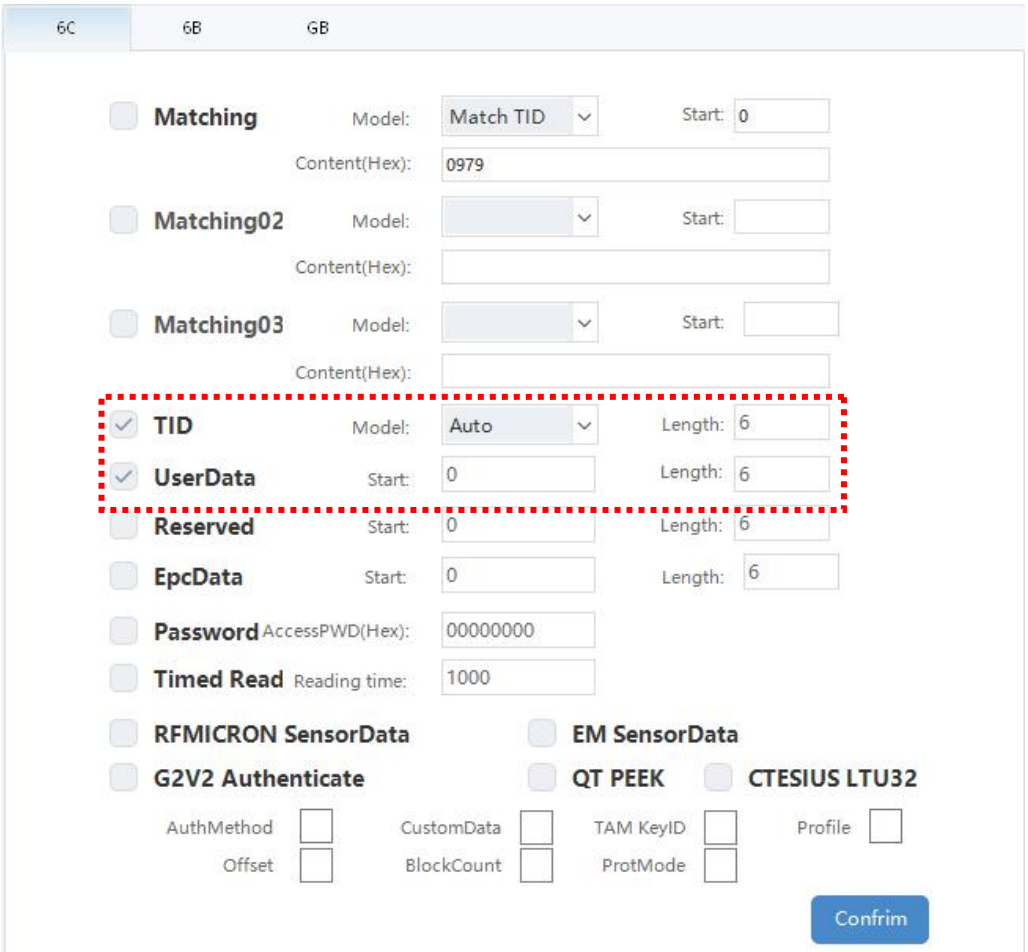




5. Verification

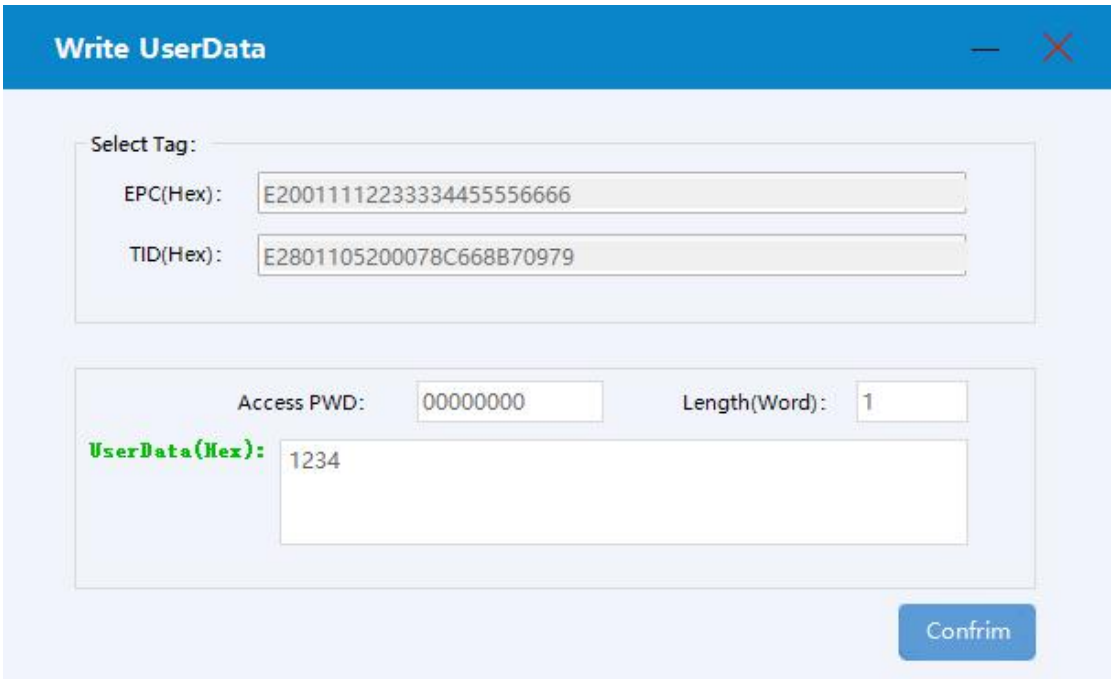
After clicking the custom read icon

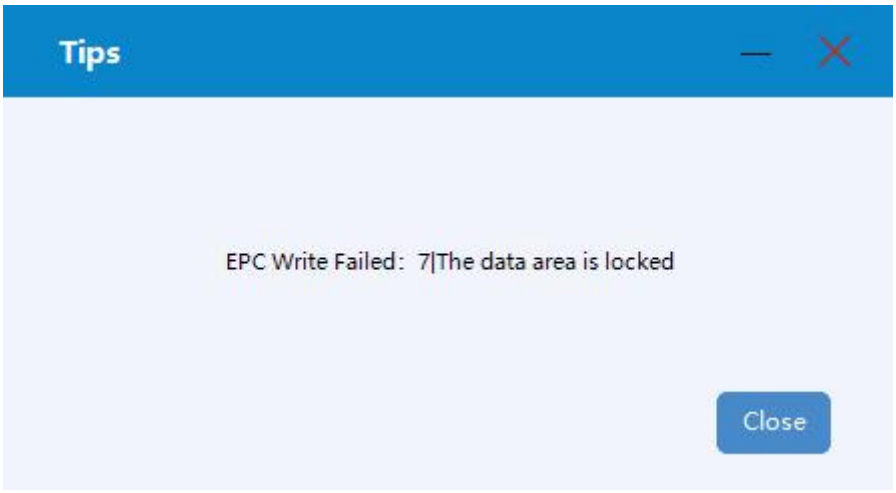
, the custom read interface pops up, check the read TID and read user area and enter the starting address and length of the corresponding data area (in words), click Confirm to read out the EPC, TID and user area data



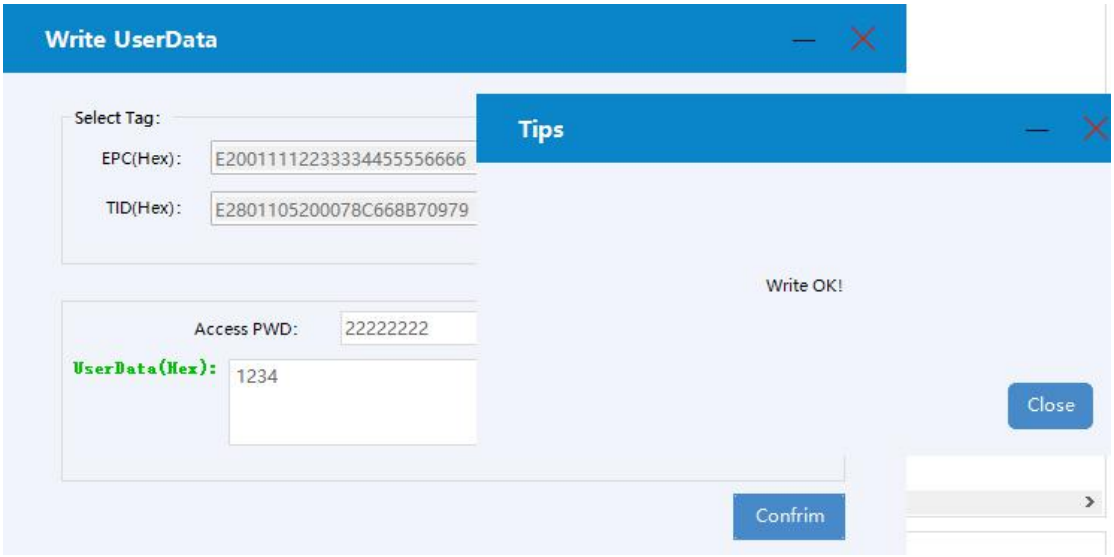
The content read as follow

Try to use the default access password 00000000 to rewrite the user area data, write failure, prompt "The data area is locked"





After using the correct access password, the user area data can be rewritten



5.3 Debug Switch

Press the key combination Ctrl + Shift + D to open the debug interface.It is mainly used to display the hexadecimal instructions sent and received between demo and reader, you can also directly send protocol commands to the reader in the debug interface, as shown in Figure 5-7.

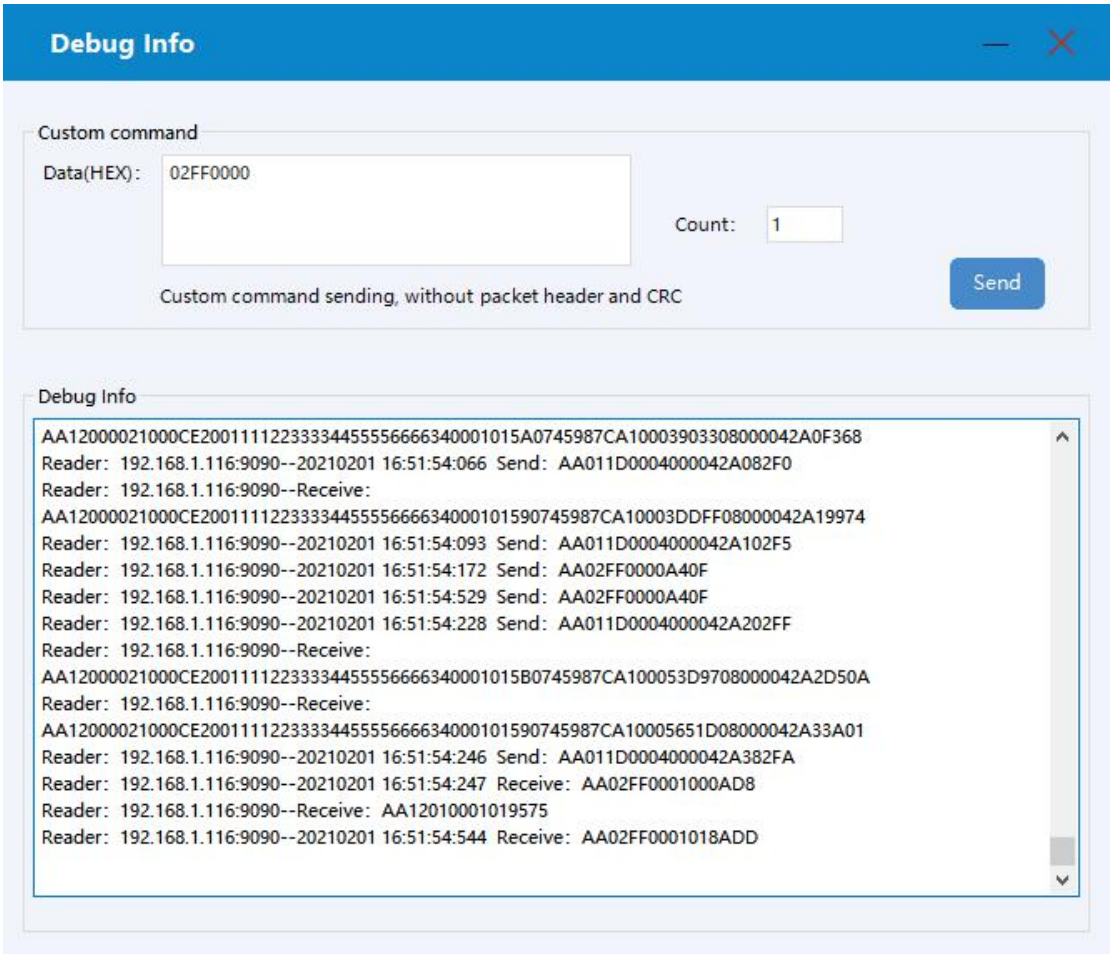


Figure 5-7

5.4 Data Export

After reading tag in the Read interface, right-click to pop up a shortcut menu, click Export List to export the tag information in the list to a file, which can be saved as a .xlsx file, as shown in Figure 5-8, Figure 5-9, and Figure 5. -10.

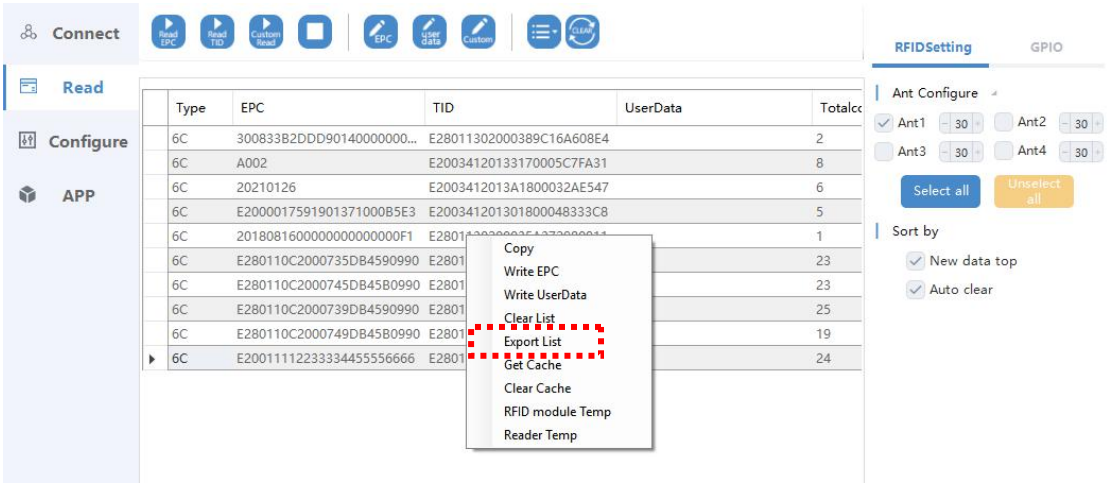


Figure 5-8

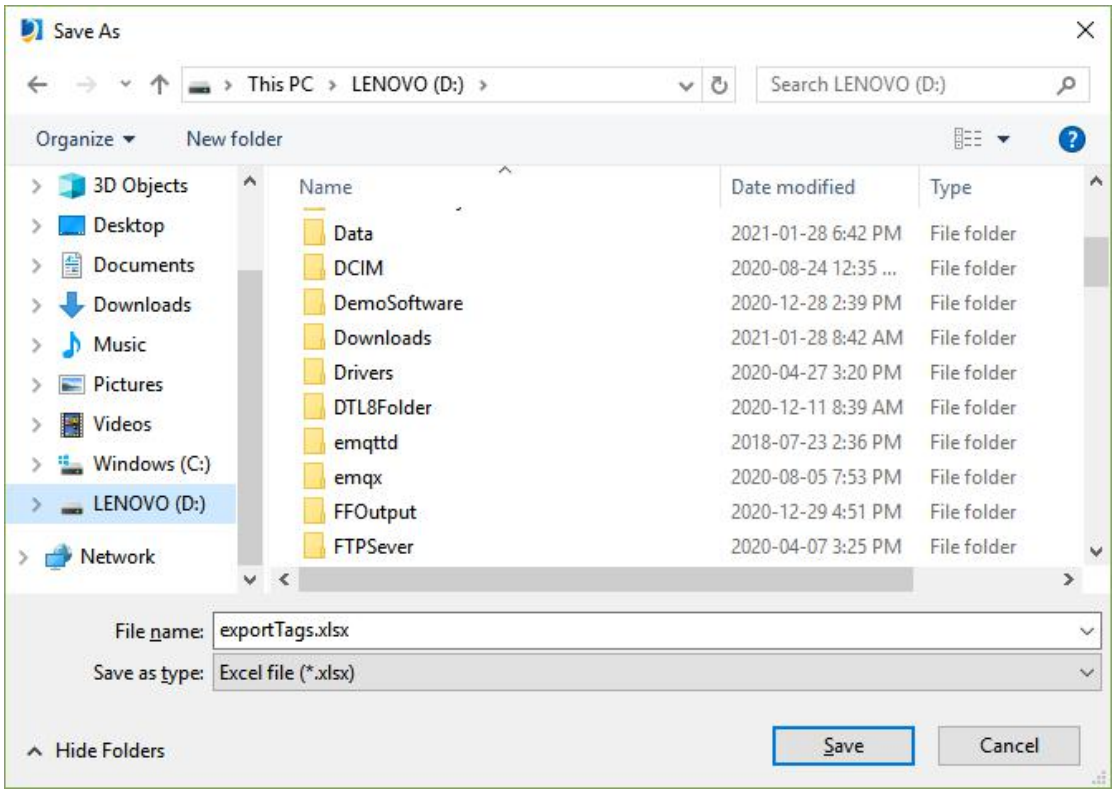
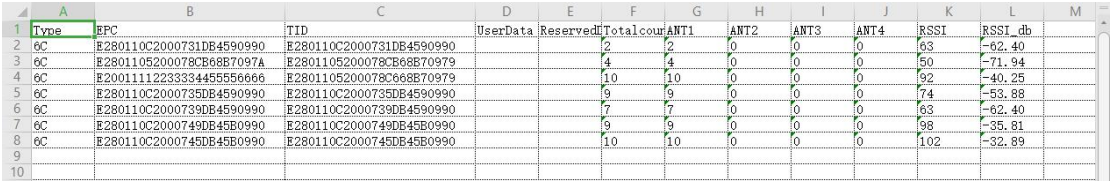


Figure5-9



	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Type	EPC	TID	UserData	ReservedD	Totalcour	ANT1	ANT2	ANT3	ANT4	RSSI	RSSI_db	
2	6C	E280110C2000731DB4590990	E280110C2000731DB4590990			2	2	0	0	0	63	-62.40	
3	6C	E2801105200078CB68B7097A	E2801105200078CB68B70979			4	4	0	0	0	50	-71.94	
4	6C	E200111122333344555556666	E2801105200078C668B70979			10	10	0	0	0	92	-40.25	
5	6C	E280110C2000735DB4590990	E280110C2000735DB4590990			9	9	0	0	0	74	-53.88	
6	6C	E280110C2000739DB4590990	E280110C2000739DB4590990			7	7	0	0	0	63	-62.40	
7	6C	E280110C2000749DB45B0990	E280110C2000749DB45B0990			9	9	0	0	0	98	-35.81	
8	6C	E280110C2000745DB45B0990	E280110C2000745DB45B0990			10	10	0	0	0	102	-32.89	
9													
10													

Figure5-10

6.APP

6.1 Embedded Software Upgrade

6.1.1 Application Software Upgrade

Click "APP" - "APP/Baseband upgrade" in the left navigation bar to enter the Application or Baseband upgrade interface, as shown in Figure 6-1.

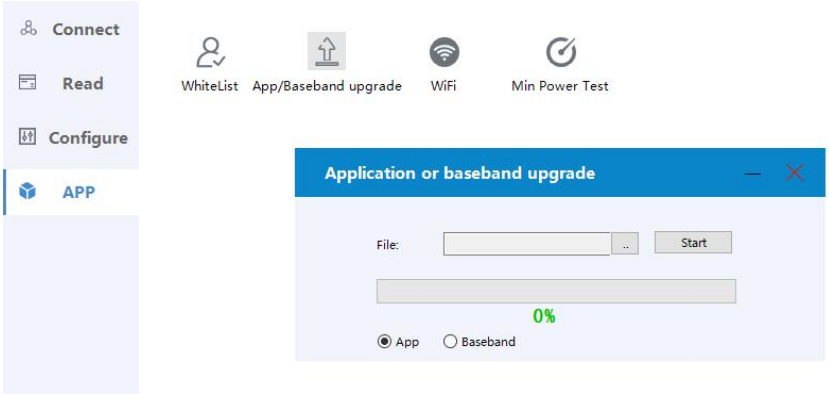


Figure 6-1

Click the radio button App ,click the button .. to pop up the file selection box and select the embedded application software file, as shown in Figure 6-2.

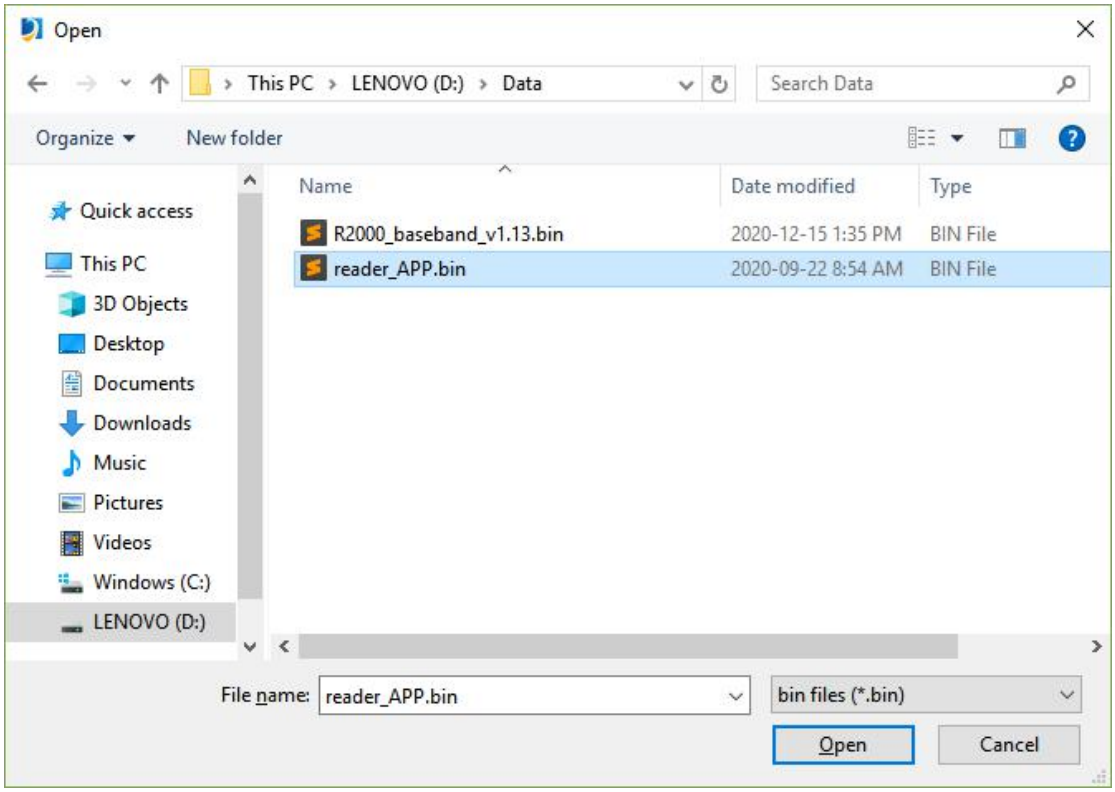


Figure 6-2

After confirming that the selected file is correct, you can perform the upgrade operation, as shown in Figure 6-3 and Figure 6-4.

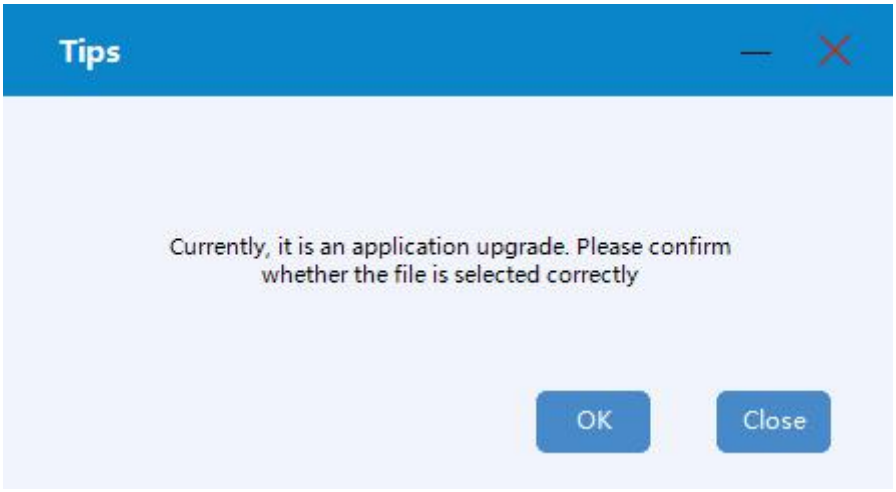


Figure 6-3

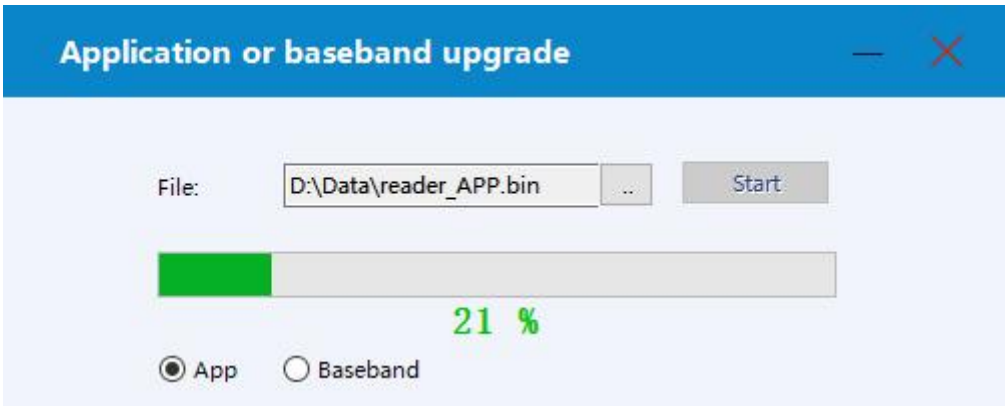


Figure 6-4

It will prompt after the upgrade is successful, as shown in Figure 6-5.

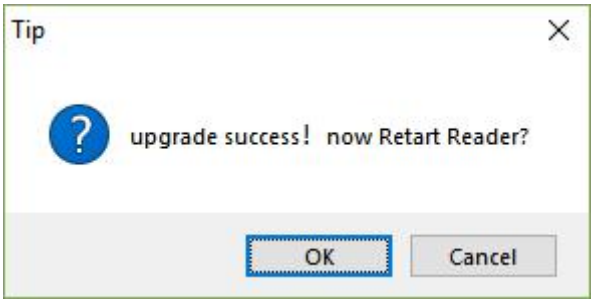


Figure 6-5

Click OK to restart the reader for the upgrade to take effect. If it fails, please proceed to the next step according to the failure prompt and upgrade again.

6.1.2 Baseband Software Upgrade

Click "APP"-"App/Baseband Upgrade" in the left navigation bar to enter the software upgrade interface, as shown in Figure 6-6.

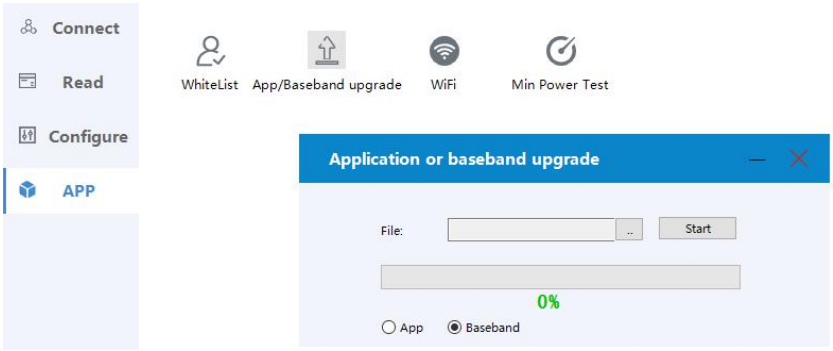
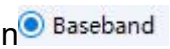


Figure6-6

Click the radio button  ,click the button to pop up the file selection box and select the embedded baseband software file, as shown in Figure 6-7.

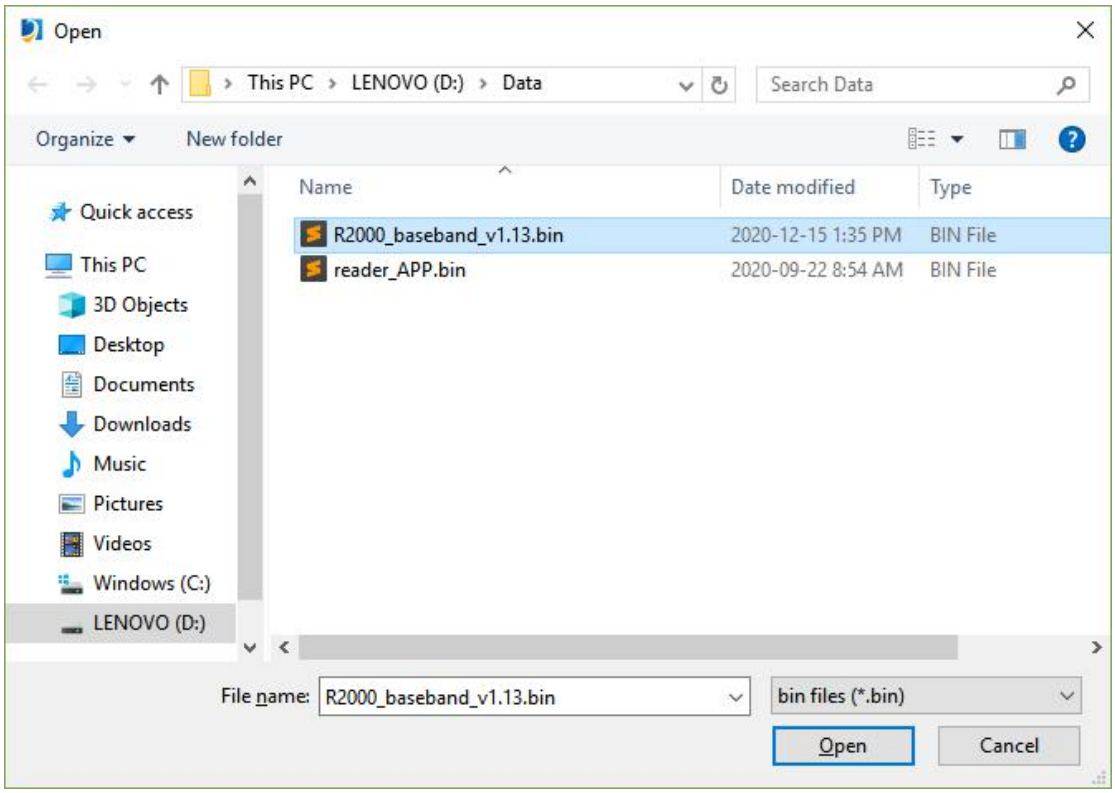


Figure 6-7

After confirming that the selected file is correct, you can perform the upgrade operation, as shown in Figure 6-8 and Figure 6-9.

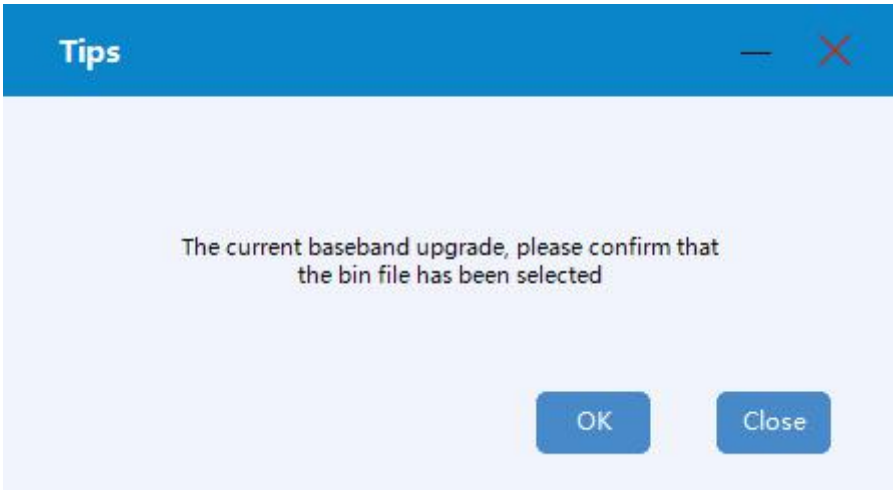


Figure 6-8

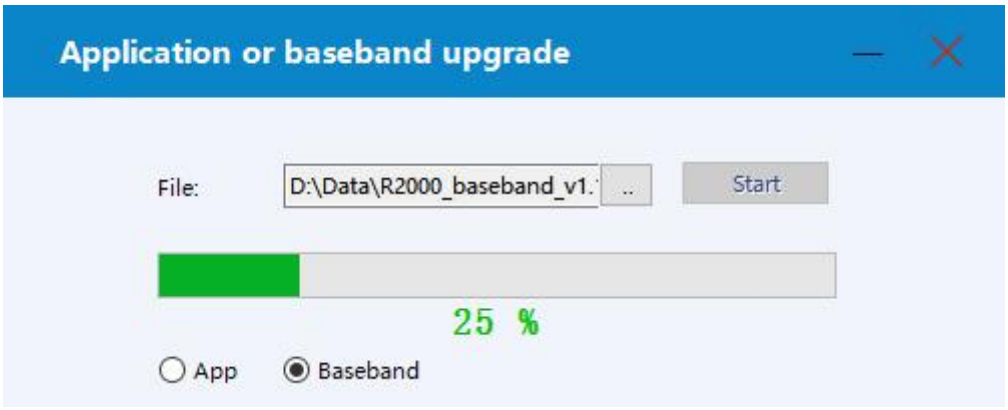


Figure 6-9

It will prompt after the upgrade is successful, as shown in Figure 6-10.

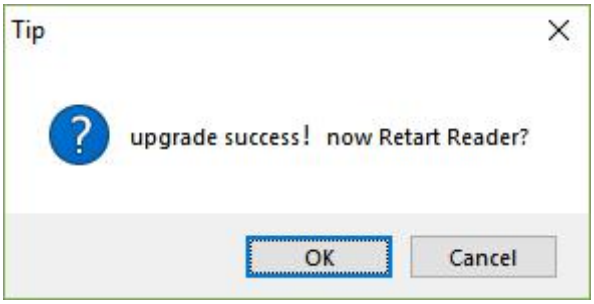


Figure 6-10

Click OK to restart the reader for the upgrade to take effect. If it fails, please proceed to the next step according to the failure prompt and upgrade again.

6.2 Whitelist

The whitelist function can be applied to scenarios with access control requirements, such as vehicle management. When a vehicle with an electronic

tag passes through a barrier, after the reader reads the electronic tag ID, it will be compared with the whitelist stored in the reader beforehand. If the electronic tag ID is in the whitelist of the reader, the barrier will be opened and the vehicle can pass, otherwise it will not pass.

Specifically, the whitelist function of the reader means that the user can permanently store the electronic tag ID in the reader. We call the electronic tag ID stored in the reader whitelist.When the tag belonging to the whitelist is read, the GPO of the reader will output (if it is a relay type GPO, the relay is closed, if it is a 5V type GPO, it will output a high level. For the GPO instructions, please refer to the content of chapter 4.5.3).GPO output duration can also be set.

The reader can store more than 10000 whitelist tag IDs and work offline without a computer.

Click "APP"-"Whitelist" in the left navigation bar to enter the whitelist management interface, as shown in Figure 6-11 and Figure 6-12.

Note: Only readers with this function can be used.

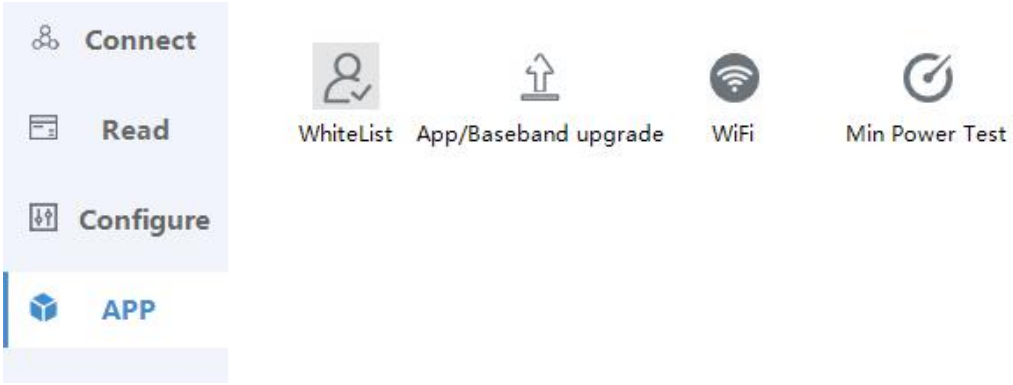


Figure 6-11

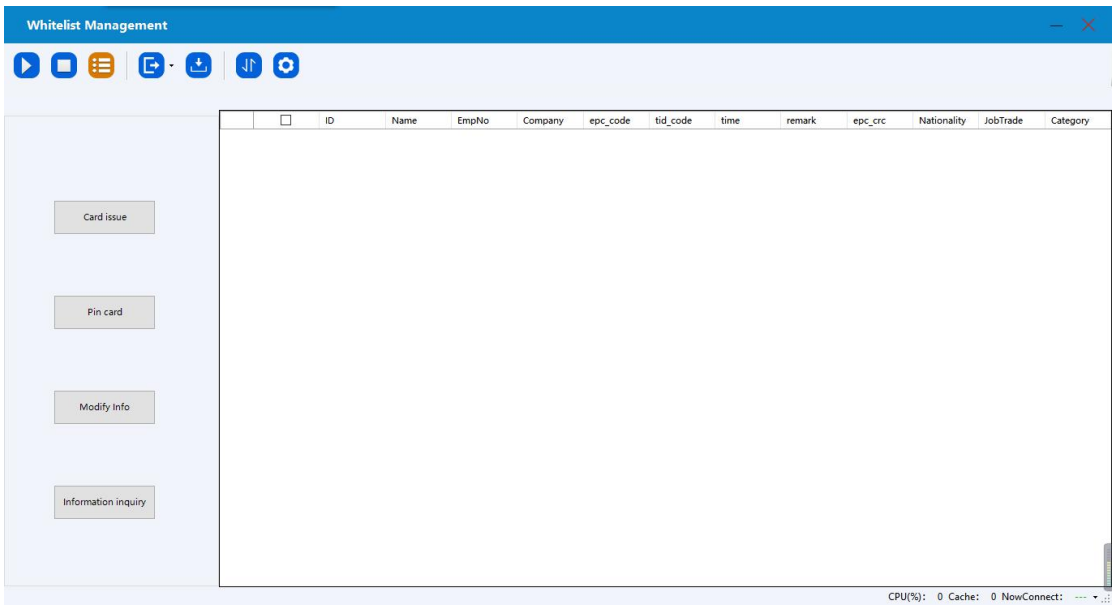
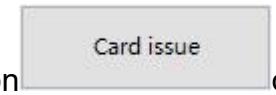


Figure 6-12

6.2.1 Issue Card

Issue Card is to add the electronic tag ID to the whitelist of the reader. Click the icon in the toolbar or the button 

on the left side of the window to enter the following interface, as shown in Figure 6-13:

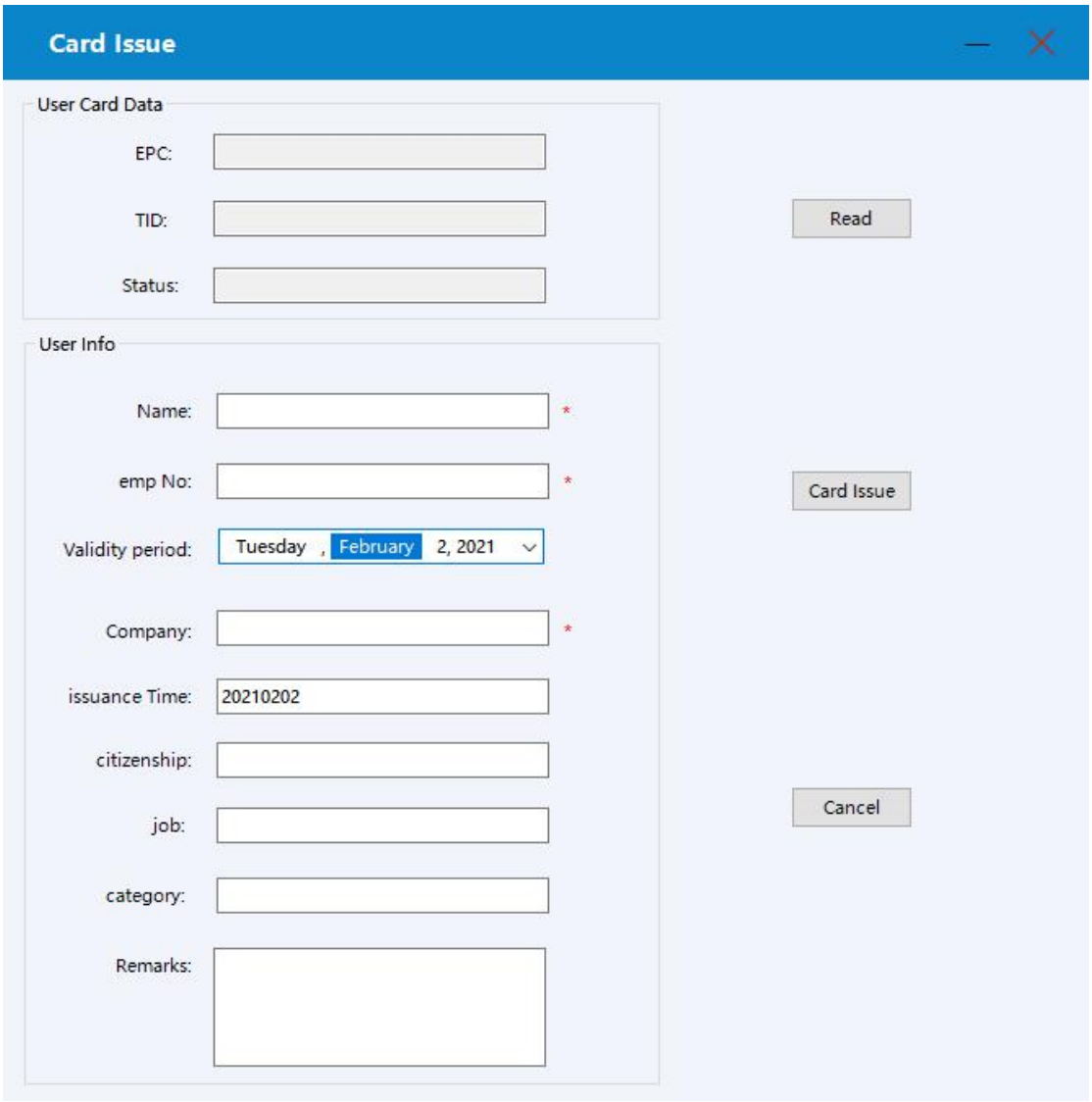


Figure 6-13

After placing the electronic tag near the antenna of the reader, click Read, the EPC and TID of the electronic tag will be read into the interface, after filling in other information, click Card Issue , you can record the tag ID to the local database file inside the Demo software folder. If the tag has been issued, the information corresponding to the tag will be displayed directly after reading. As shown in Figure 6-14.

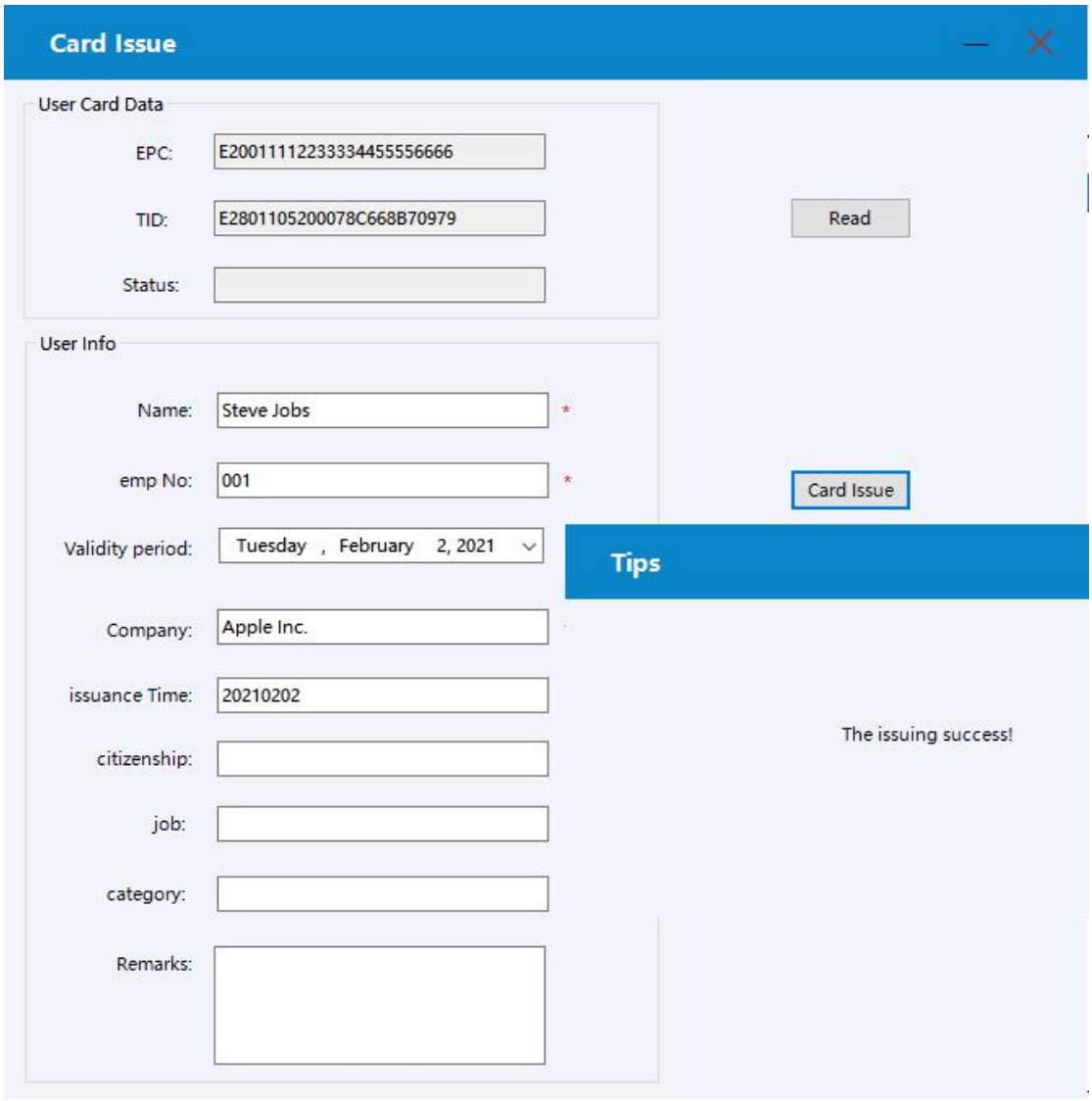


Figure 6-14

After that, you need to click the icon to synchronize the whitelist data to the reader. After synchronization, there will be a restart prompt box. Click OK to restart the reader. The new whitelist data will take effect. As shown in Figure 6-15.

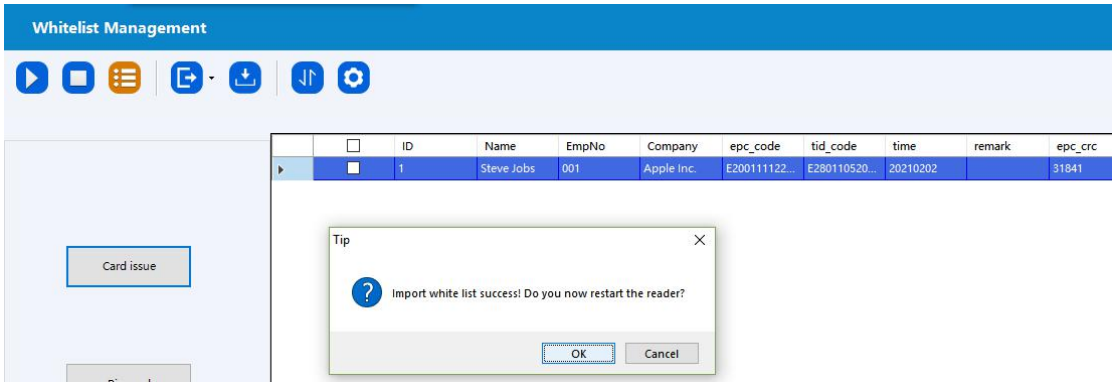
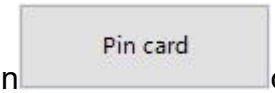


Figure 6-15

6.2.2 Pin Card

Pin Card is to delete the electronic tag ID from the whitelist of the reader. If you have an electronic tag in your hand and need to pin the tag, click the icon in the toolbar or the button 

on the left side of the window to enter the following interface.As shown in Figure 6-16.

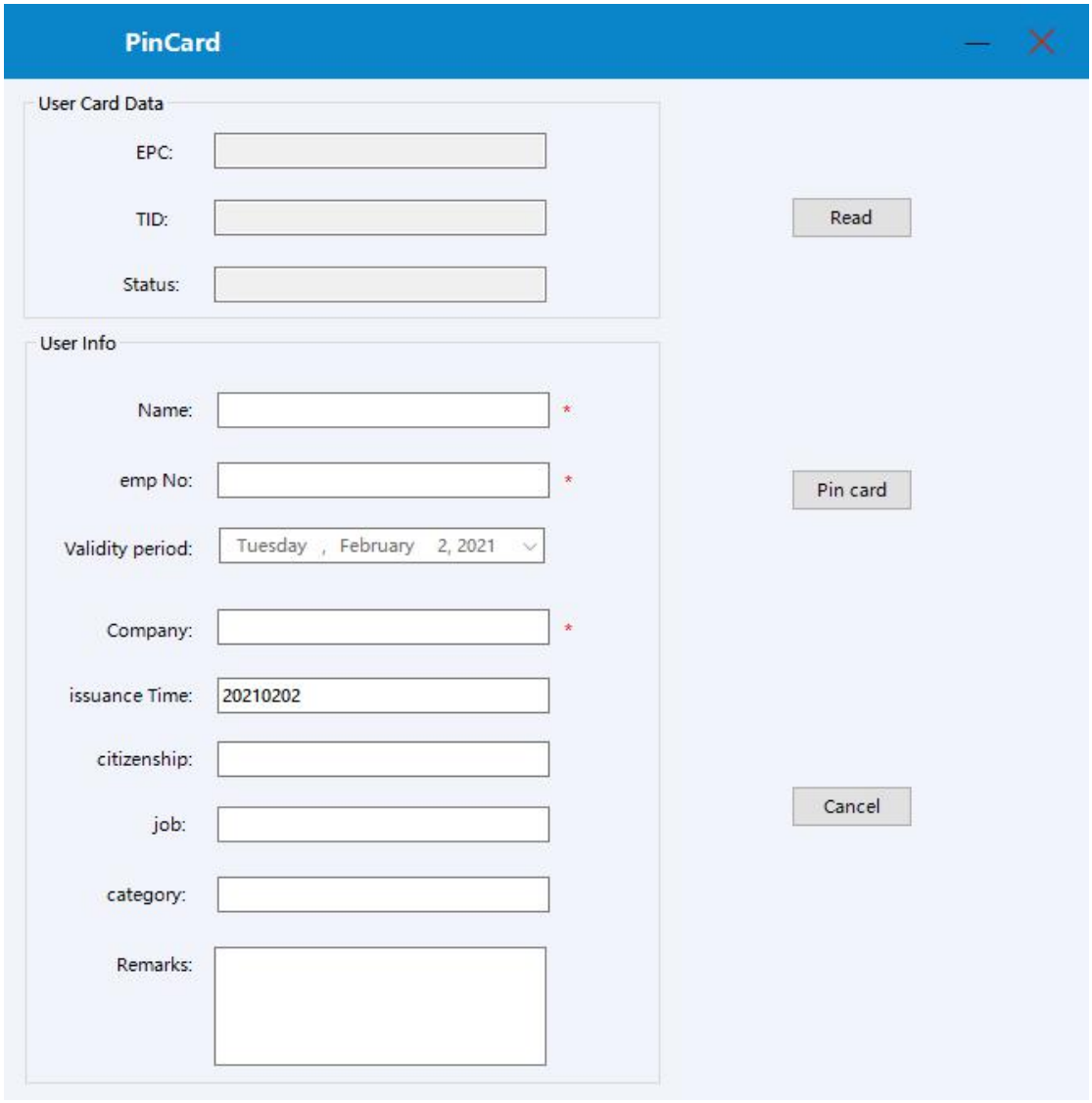


Figure 6-16

After placing the electronic tag near the antenna of the reader, click Read, the EPC and TID of the electronic tag and other related information will be read into the interface, and then click Pin Card, the tag ID will be deleted from the local database file inside the Demo software folder.

If the electronic tag that needs to be pinned is not in hand, you can select the

electronic tag ID that needs to be pinned, right-click, and select Pin Card to delete.As shown in Figure 6-17.

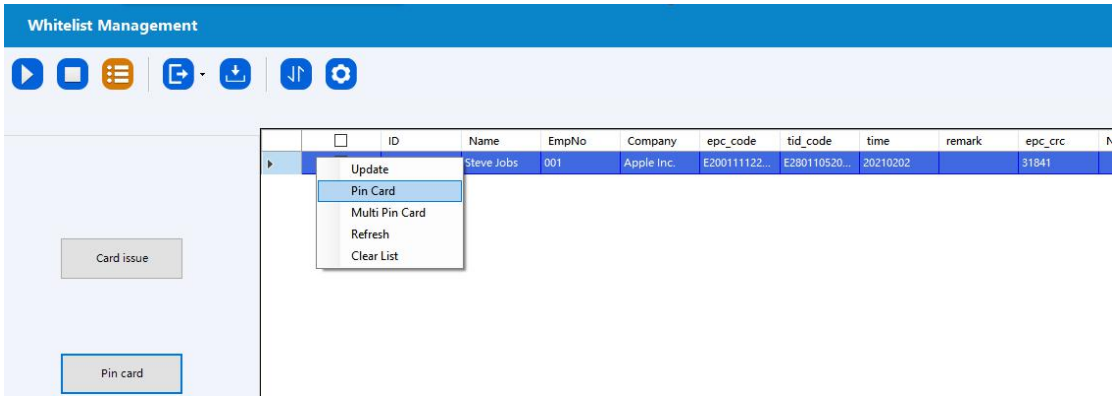


Figure 6-17

After that, you need to click the icon to synchronize the whitelist data to the reader. After synchronization, there will be a restart prompt box. Click OK to restart the reader. The new whitelist data will take effect. As shown in Figure 6-18.

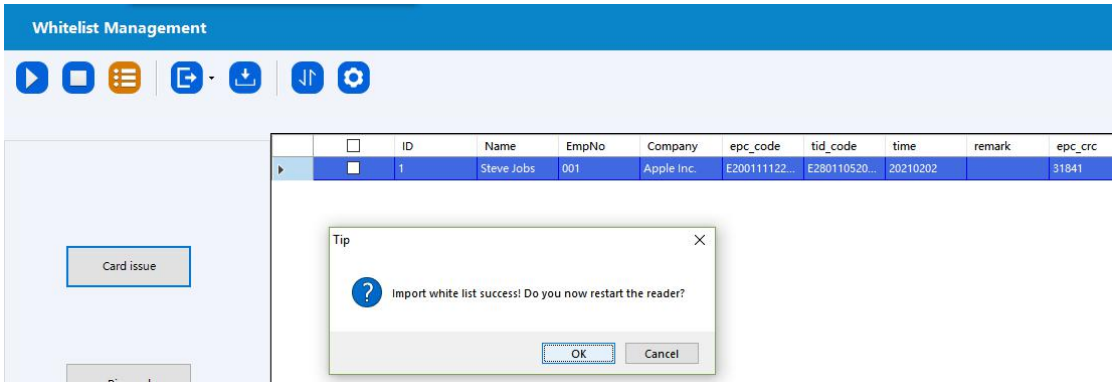


Figure 6-18

6.2.3 Modify Info

Modify Info is to modify the existing whitelist information. If you have an electronic tag and need to modify the information, click the button

on the left side of the window to enter the following interface, as shown in Figure 6-19:

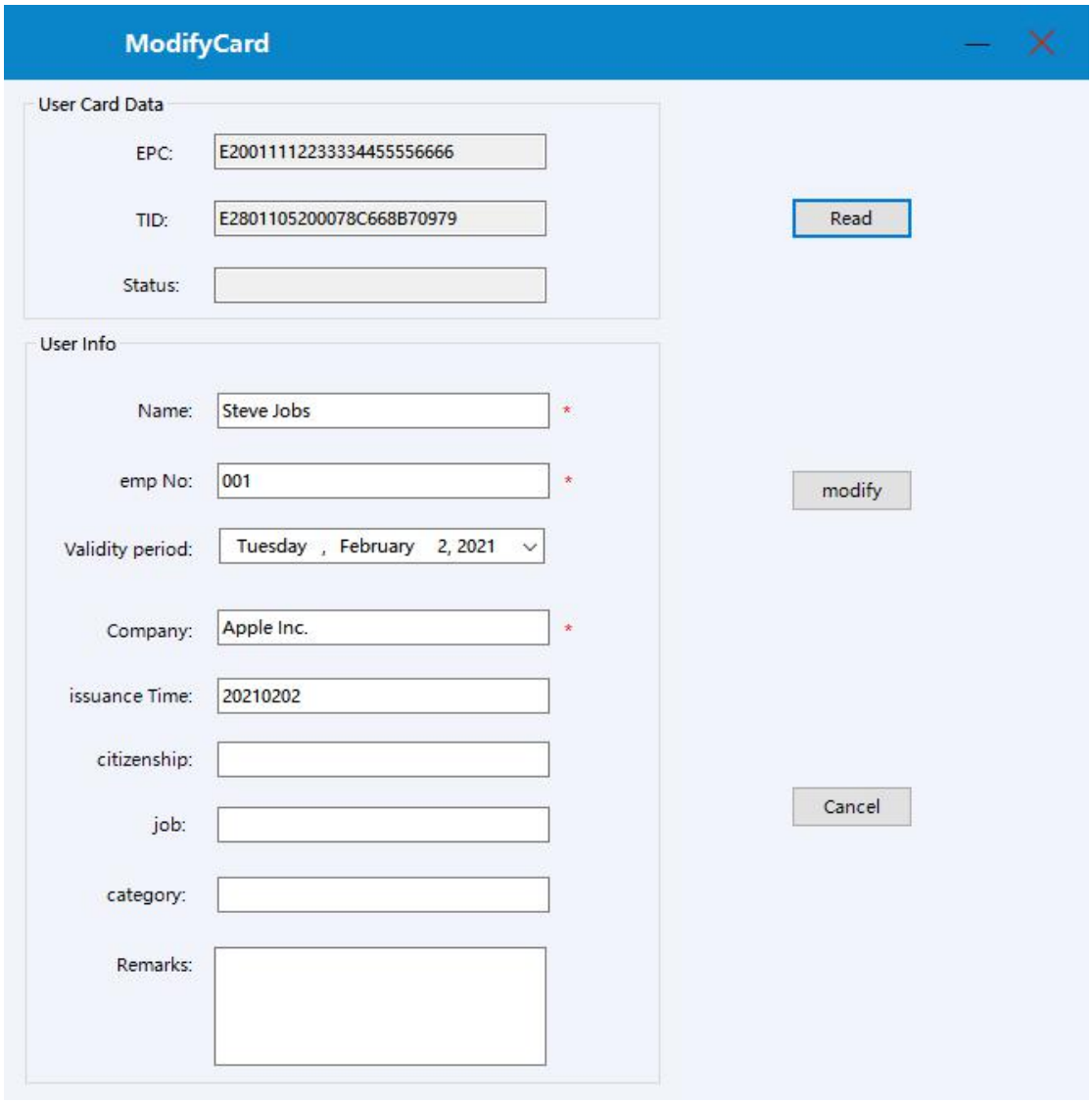


Figure 6-19

After placing the electronic tag near the antenna of the reader, click Read, the EPC and TID of the electronic tag and other related information will be read into the interface. After modifying the relevant information, click Modify.

If the electronic tag that needs to be modified is not in hand, you can select the electronic tag ID that needs to modify, right-click, and select Update to modify the information. As shown in Figure 6-20.

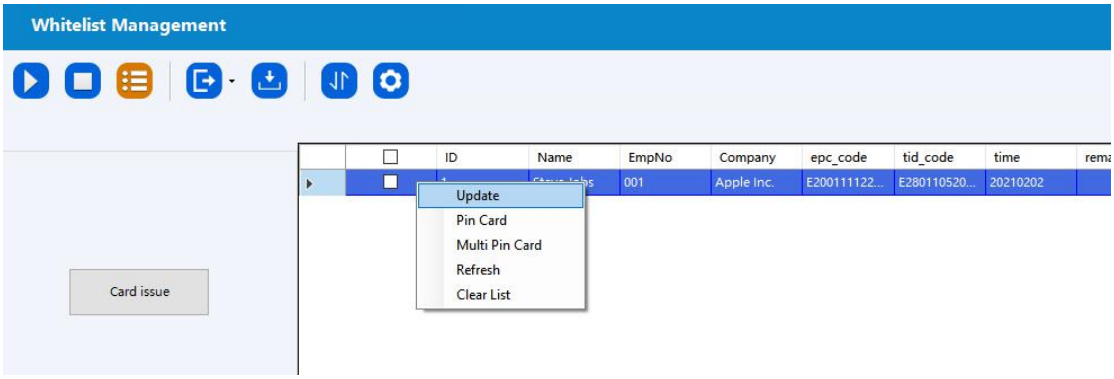


Figure 6-20

6.2.4 Whitelist Data Sync

After each Issue Card and Pin Card, you need to transfer the updated whitelist database file stored locally in the Demo software folder to the reader. After the transfer is over, there will be a restart prompt box. Click OK to restart the reader. The new whitelist data will take effect. As shown in Figure 6-21.

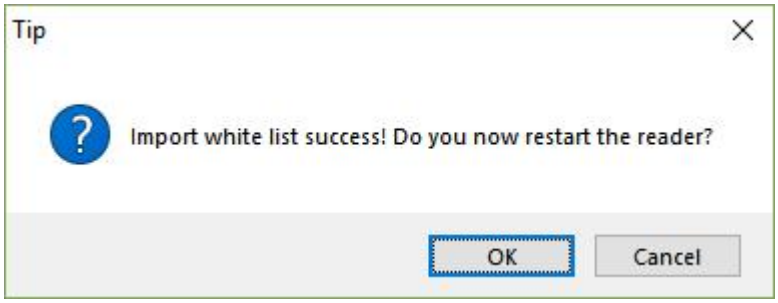


Figure 6-21

6.2.5 Import Excel Whitelist File

You can edit the whitelist data in advance according to the template, and then import it at one time. Excel files are supported. The suffix of the Excel file is .xlsx.

The template format is as follows, as shown in Figure 6-22:

ID	Name	EmpNo	Company	epc_code	tid_code	time	remark	epc_crc	Nationality	JobTrade	Category
1	test01	001	001	2020082700000001	E2801105200078C368B70979	20200929					
2	test02	002	002	E2019CF00000000000003775	E280110520007ACE38F20987	20200929					
3	test03	003	003	3456	E28068902000000 1874ED1B4	20200929					
4	test04	004	004	E200001D46010045126014CE	E2003412013202000B3ABC48	20200929					
5	test05	005	005	105023AA287566F246455443	E2003412012BFB0005FD9553	20200929					
6	test06	006	006	E200001D4601003612300D1A	E2003412013002000B3AB494	20200929					
7	test07	007	007	B011100000000000503112377	E2801105200079430F3009DB	20200929					
8	test08	008	008	30361F861825D3AE1737517C	E2003412013302000B3AF551	20200929					
9	test09	009	009	ABCDEF0123515D4BB5B580000	E280110C20007B5A670C09CE	20200929					

Figure 6-22

Click the icon in the toolbar to enter the following interface, as shown in Figure 6-23:

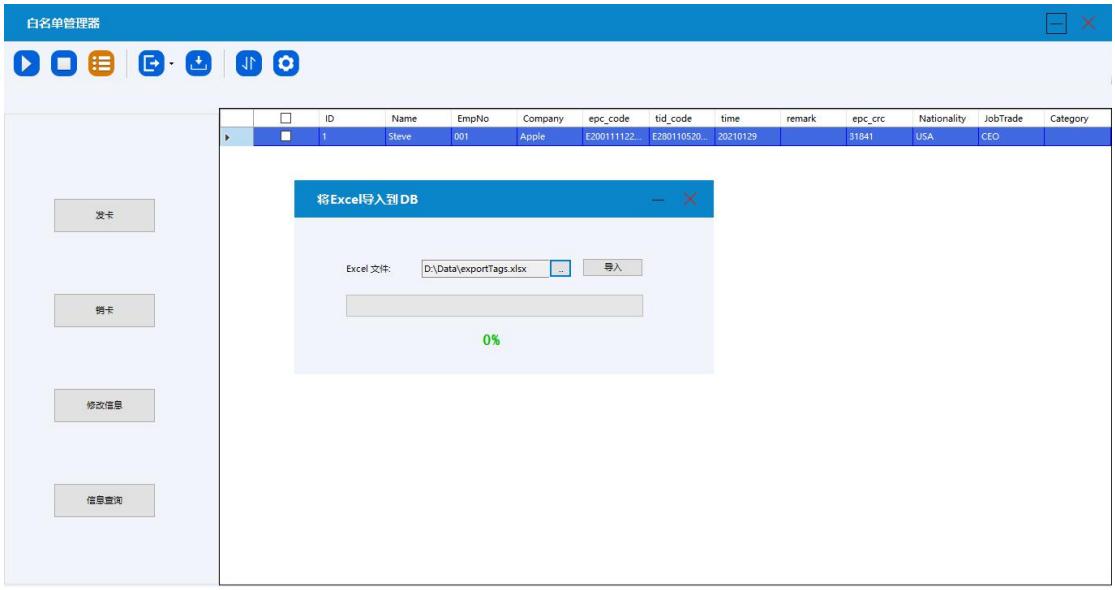


Figure 6-23

Select the edited Excel file, import it, and then synchronize the whitelist to the reader.

6.2.6 Whitelist Action Parameter Settings

Click the icon in the toolbar to enter the following whitelist action settings interface, as shown in Figure 6-24:

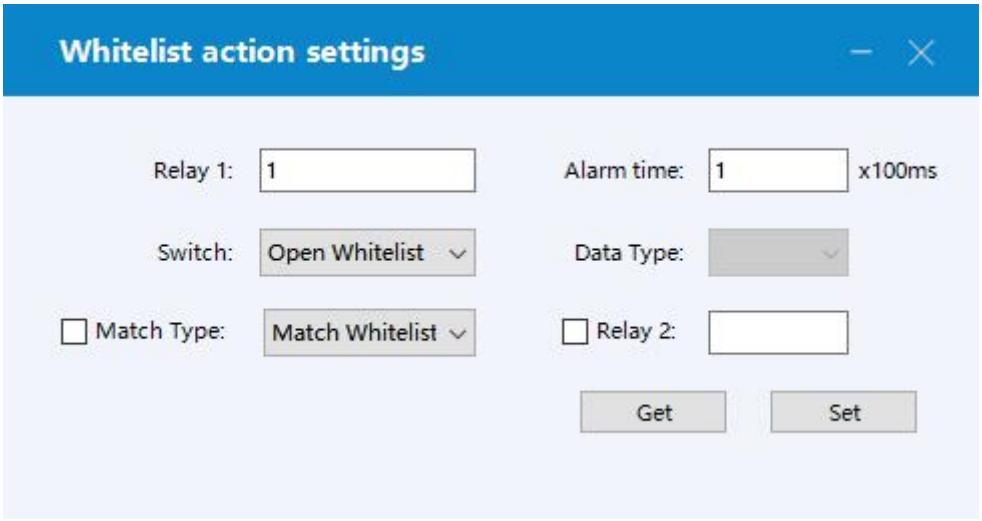


Figure 6-24

Parameter Description

Relay 1: it is the port number of the GPO.

Alarm Time: if it is a relay type GPO, then it is the duration of the relay closing; if it is a 5V type GPO, that is the duration of the GPO maintaining high level output.

Whitelist Output function switch:

- Close - Close the whitelist function,
- Open Whitelist - After setting, GPO will output only after reading the tag in the whitelist
- Open Buzzer - It means that the built-in buzzer of the reader will give a prompt tone after reading any tag
- Open Anti-theft - It means reading any tag, including whitelist and non-whitelist, GPO will output
- Open Anti-theft and Buzzer - It means that after reading any tag, the reader's built-in buzzer will give a prompt sound, and GPO will also output

Data Type: The EPC or TID is used as the unique identifier of the tag.

Optional parameters:

Match Type:

- Match Whitelist - That is, the blacklist is invalid, and control relay 1 output
- Match Blacklist - That is, the whitelist is invalid, and control relay 1 output
- Match Both - Match the black and white lists at the same time, that is, the black and white lists are valid at the same time, the whitelist controls the output of relay 1, and the blacklist controls the output of relay 2.

Relay 2: it is the port number of the GPO.

6.3 WiFi

Note: WIFI function requires reader support.
For some readers with USB port, in order to expand the wireless WiFi function, it is necessary to plug the USB WiFi module into the USB host port of the reader.

Click "APP" - "WiFi" in the left navigation bar to enter the WiFi management interface, as shown in Figure 6-25. The WiFi module is turned off by default.

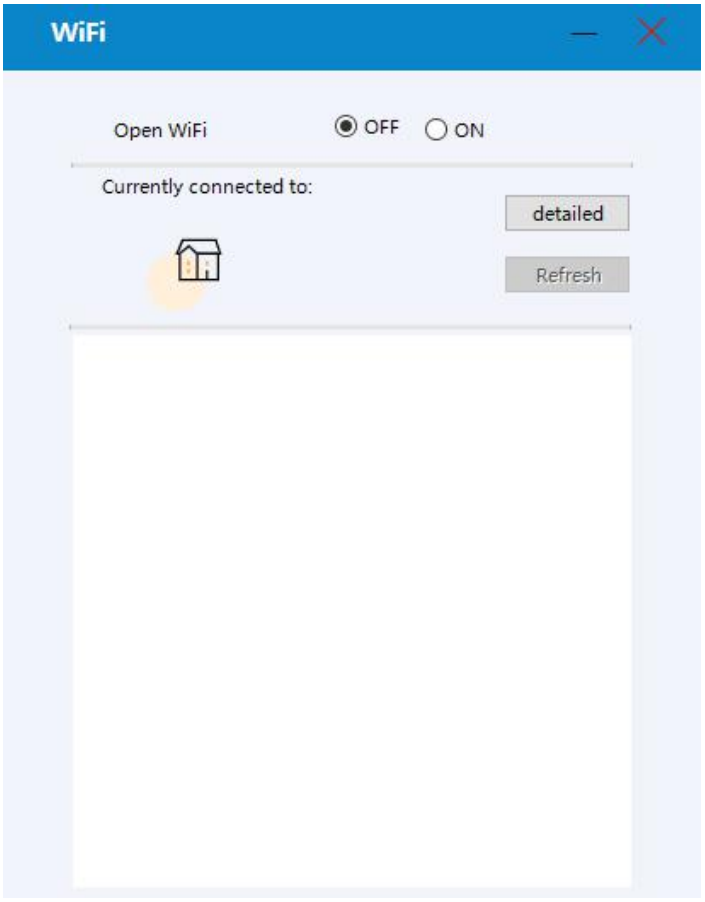


Figure 6-25

6.3.1 Setting Fixed IP for WiFi Module

First, you need to set an IP address in the same network segment as the hotspot to be accessed for the reader WIFI module. Click Detailed in the WiFi interface to set the IP address of the WiFi module. Assuming that the hotspot network to be accessed is: network segment: 192.168.43.*, mask: 255.255.255.0, gateway: 192.168.43.1, set an unused IP address for the reader WIFI module, assuming 192.168.43.140, as shown in Figure 6-26.

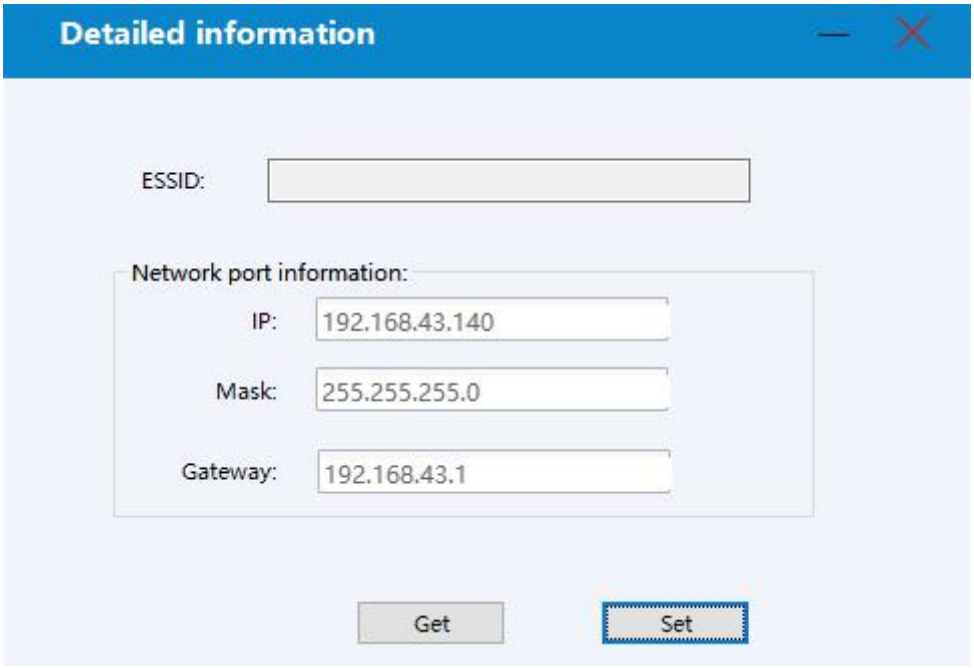


Figure 6-26

6.3.2 Turn on WiFi Module

Click ○ ON at the WiFi interface to turn on the WIFI module. After turning on, the WIFI module will automatically search for connectable hotspot information, as shown in Figure 6-27 and 6-28.

Figure 6-27

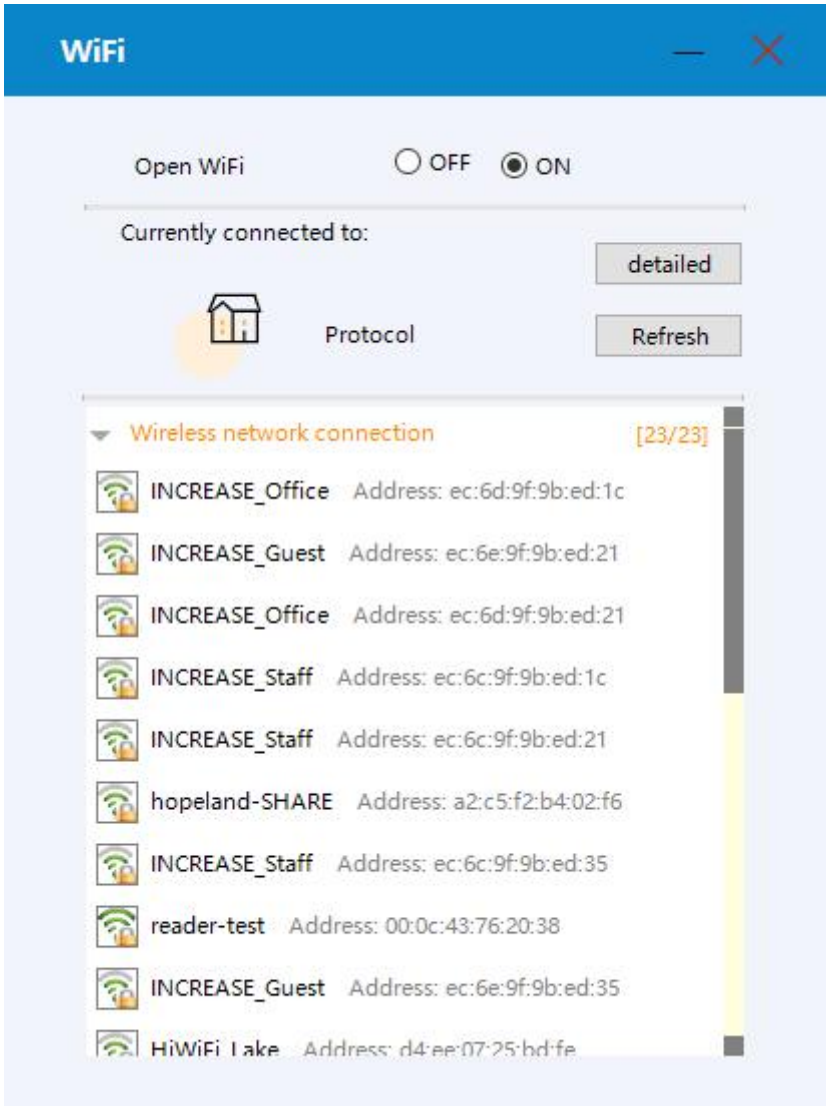


Figure 6-28

6.3.3 Connect WIFI hotspot

In the hotspot display list of the WiFi interface, double-click the WiFi hotspot to be accessed. If the hotspot is open, it will be connected directly; if the hotspot is secured, an interface for entering the security key will pop up. After entering the password, you can connect to the hotspot. As shown in Figure 6-29 and 6-30.

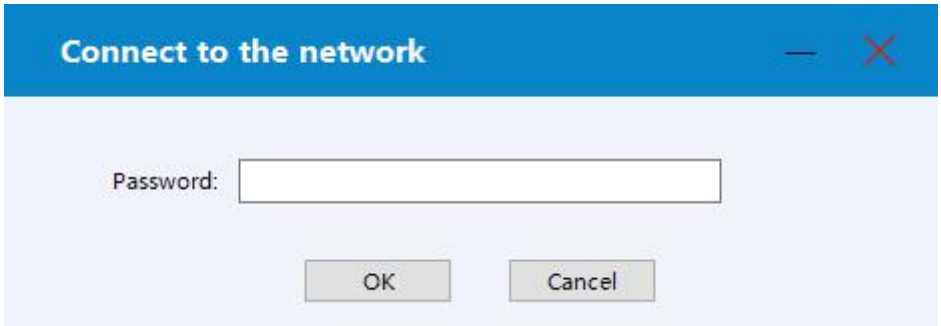


Figure 6-29

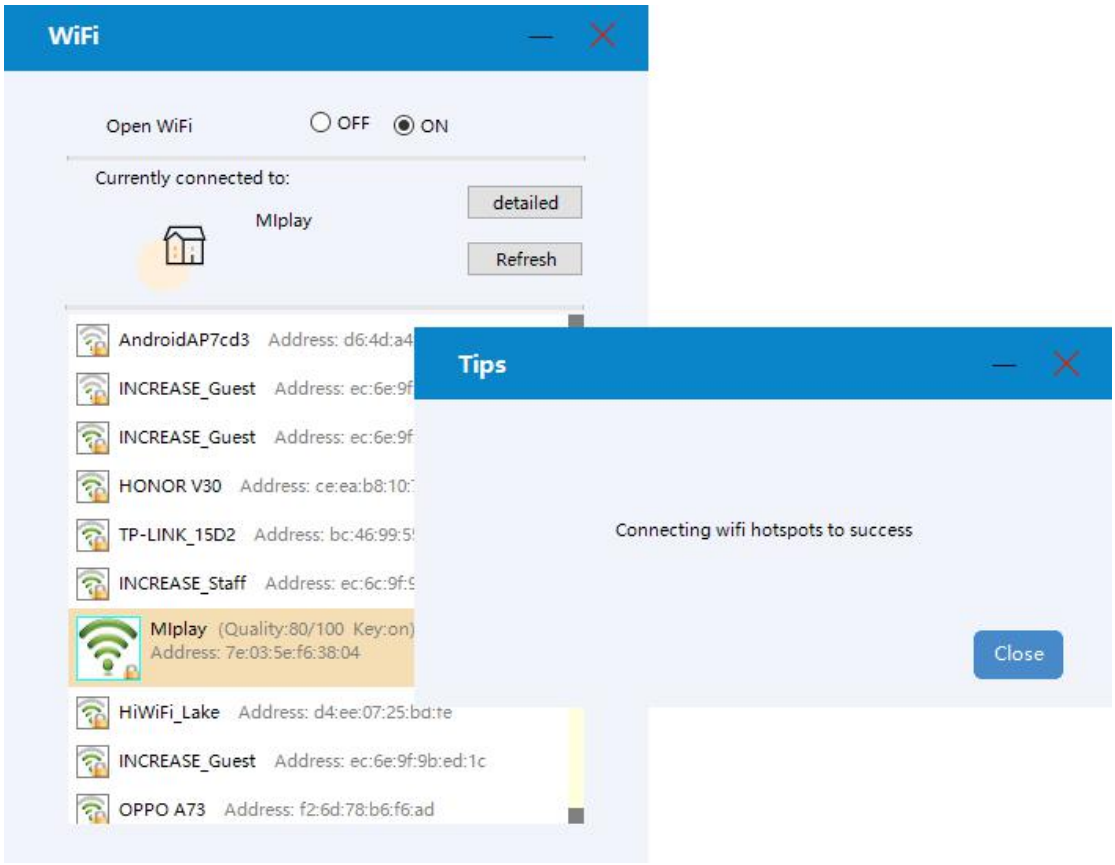


Figure 6-30

After the hotspot is successfully connected, the "Currently connected to:" will display the currently connected WIFI hotspot name, See image 5-26

Note: After connecting WiFi successfully, the original RJ45 network port of the reader will be disabled, that is, only one network card can work at the same time.

6.4 Min Power Test

The Min Power Test tool can determine the lowest power to activate the tag and help determine the quality of the tag's performance. This activation power level helps determine the reading range in different environments, and for vehicle body identification system (AVI) applications, it also helps to determine the "reading area" or antenna signal coverage. The tool first configures the reader to read the tag at the starting power, and then gradually increases the output power in steps until the tag response is observed. Then stop reading and report the minimum power value of the active tag under the given antenna and distance.

Click "APP"-"Min Power Test" in the left navigation bar to enter the minimum power test interface, as shown in Figure 6-31.

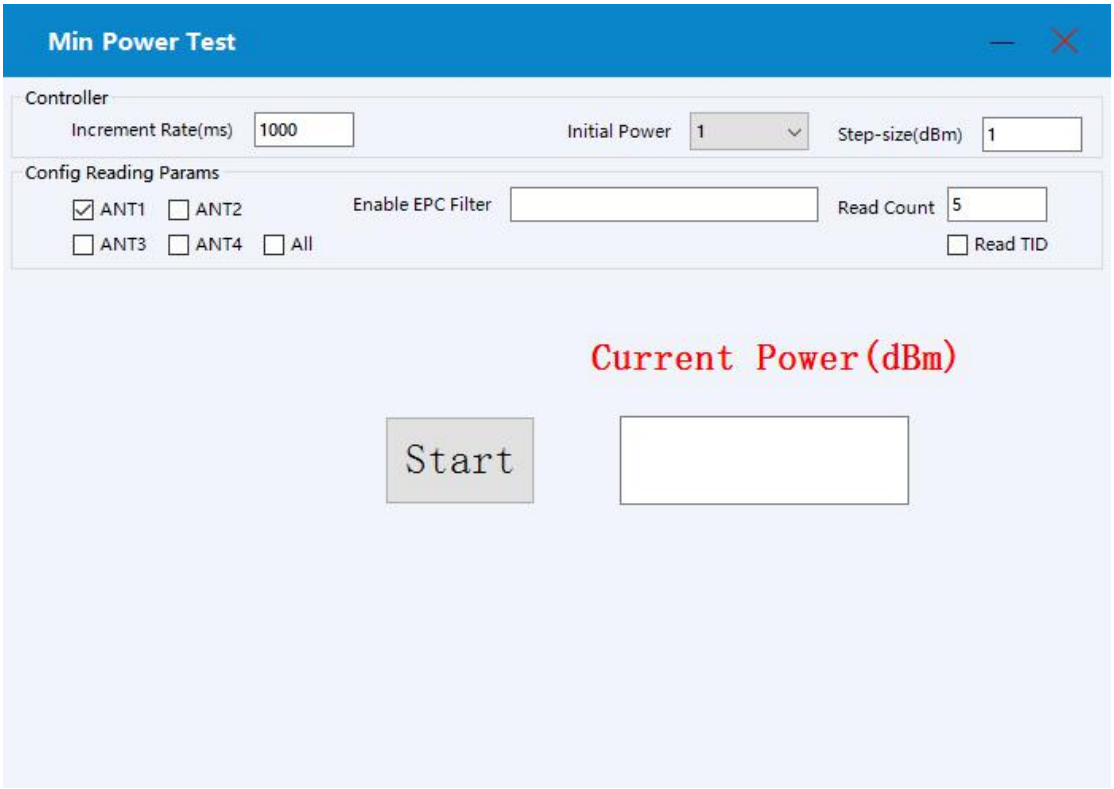


Figure 6-31

It contains the following parameters:

Increment Rate(ms): The time to stay at a certain power before increasing to the next power level.

Initial power (dBm): Starting reading power.

Step-size (dBm): The step size of each increase in power.

Config Reading Params:

Antenna: Select which antenna to test

Match EPC Filter: Find only specific tags

Read Count: The number of tag reads retried under current power

Read TID: Whether to read the TID of the electronic tag at the same time.