Focus on RFID core technology

Hopeland RFID reader PC

Demo user manual

C#

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V 2.21

Contents

1.Summary

1.1 Summary of content

This document is prepared for users to understand the normalized operation of the reader and the basic use of Demo software. The operating environment of the Demo software is .Net Framework2.0 of Windows platform.

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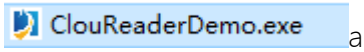
1.2 Open demo software

open the demo software folder, double-click the ClouReaderDemo.exe application program,as shown in image-1



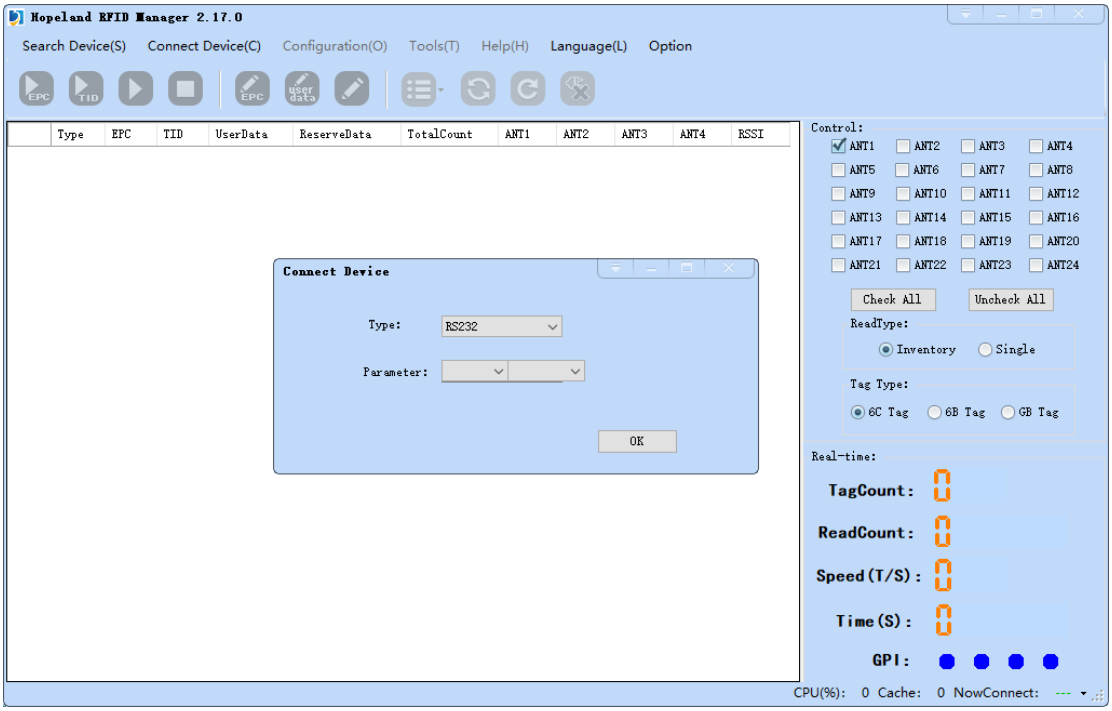


Image1-1

1.3 Software language

1.3.1 Simplified Chinese

Click tool bar Language (L) - Simplified Chinese, the Demo software language can be changed to Chinese, the software will automatically restart and the reader needs to be reconnected, as shown in image-2

Image 1-2

1.3.2 English

Click tool bar Language (L) - English, the Demo software language can be changed to English, the software will automatically restart and the reader needs to be reconnected, as shown in image-3

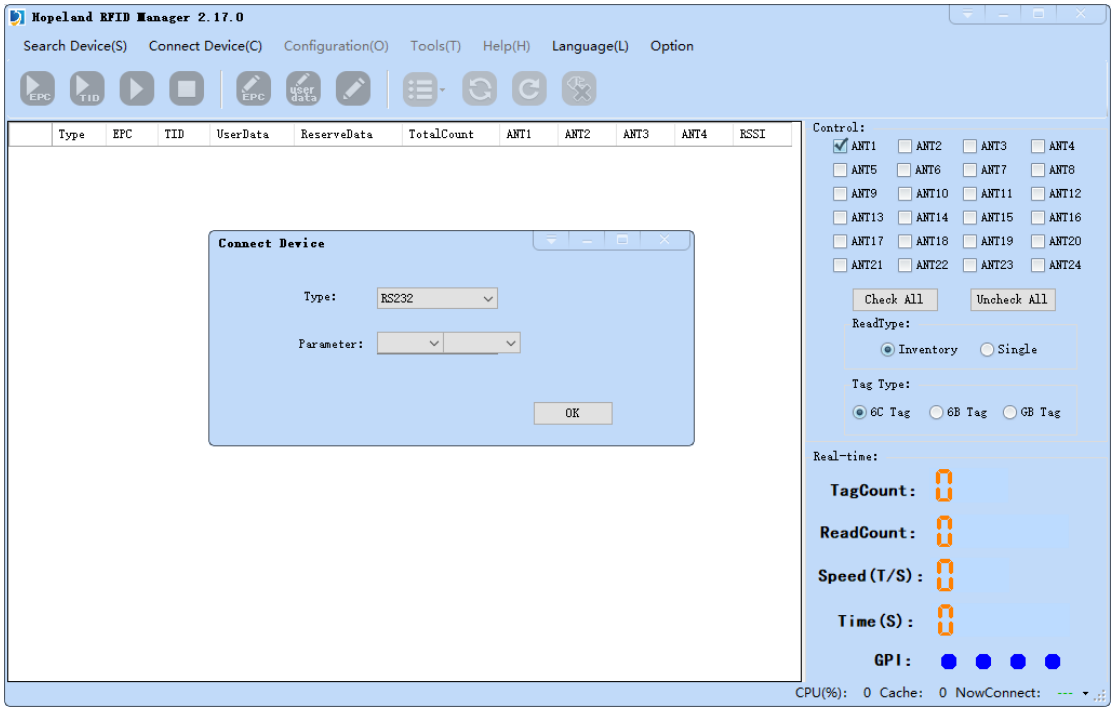


Image1-3

2.Connect reader

Connect the reader and PC through data cable, after the power supply is connected, reader makes launching sound (except B6A) and enter into initialization state, after initialization is finished, then we can connect to reader through corresponding connection method.

The following table shows the details of the regular reader communication interface:

Model	RS232 Serial port	TCP/IP	485	USB
C4/C8/C12/C24/	√	√	√	√
C9	×	√	√	×
B2	√	√	√	×
B7A / B8A	√	√	√	×
B5A	√	√	√	×
B6A	√	×	√	×

2.1 Serial communication connection

Click Connect Device(C)-RS232(S) to open the Serial communication connection interface, as shown in image2-1

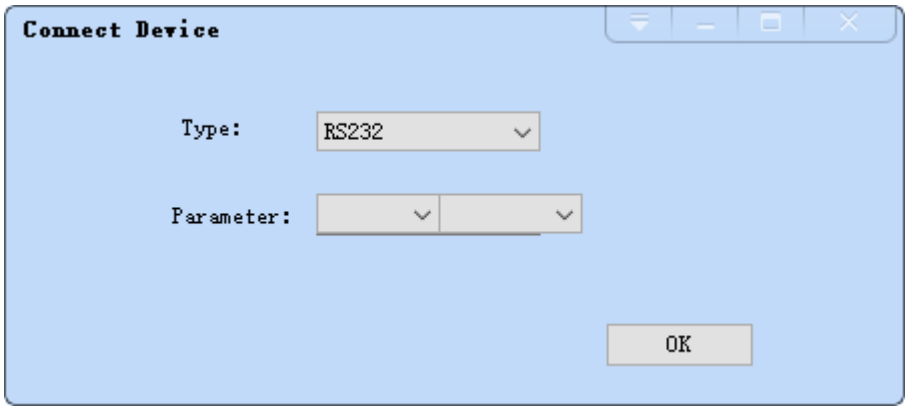


Image 2-1

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, click "OK" to connect the reader, as shown in image2-2

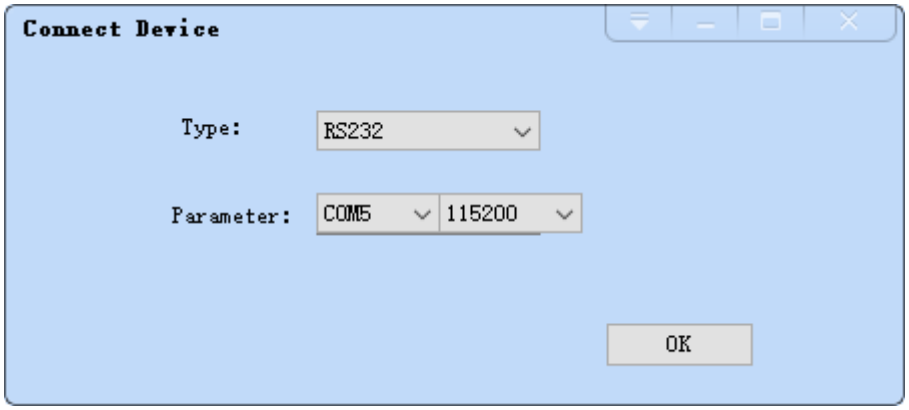


Image 2-2

If the connection is successful, all the icons in the toolbar are illuminated, as shown in image 2-3, means the serial communication connection is successful.

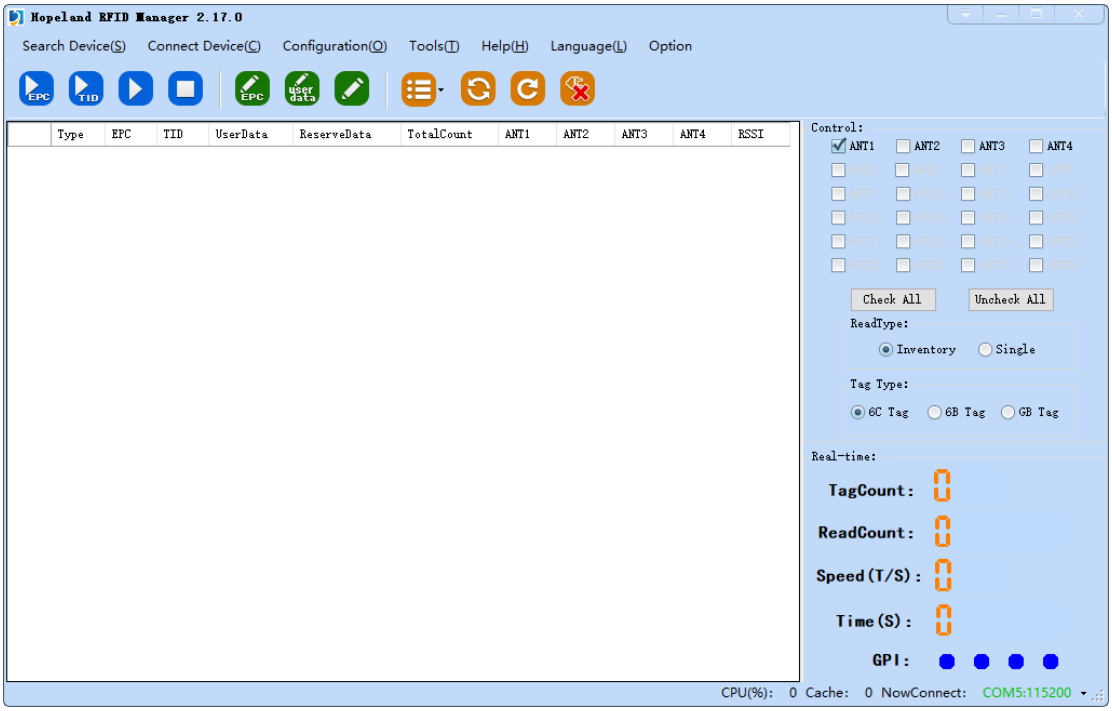


Image 2-3

If not, check the physical connection of the serial cable.

2.2 Network communication 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 Connect Device(C)-TCP(T) to open the Network communication connection interface, as shown in image 2-4

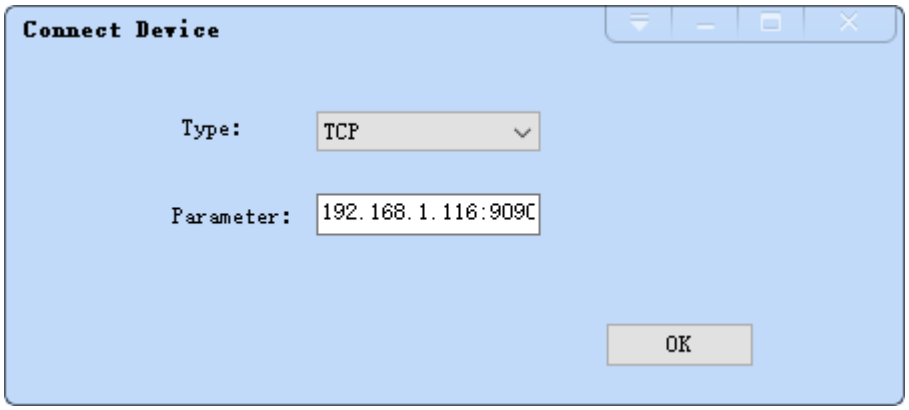


Image 2-4

Network connection used for long distance communication (within 80 m), connect to the Local Area Network through network cable and switch/router, or connected with the PC network 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 OK to connect the reader, as shown in image 2-5

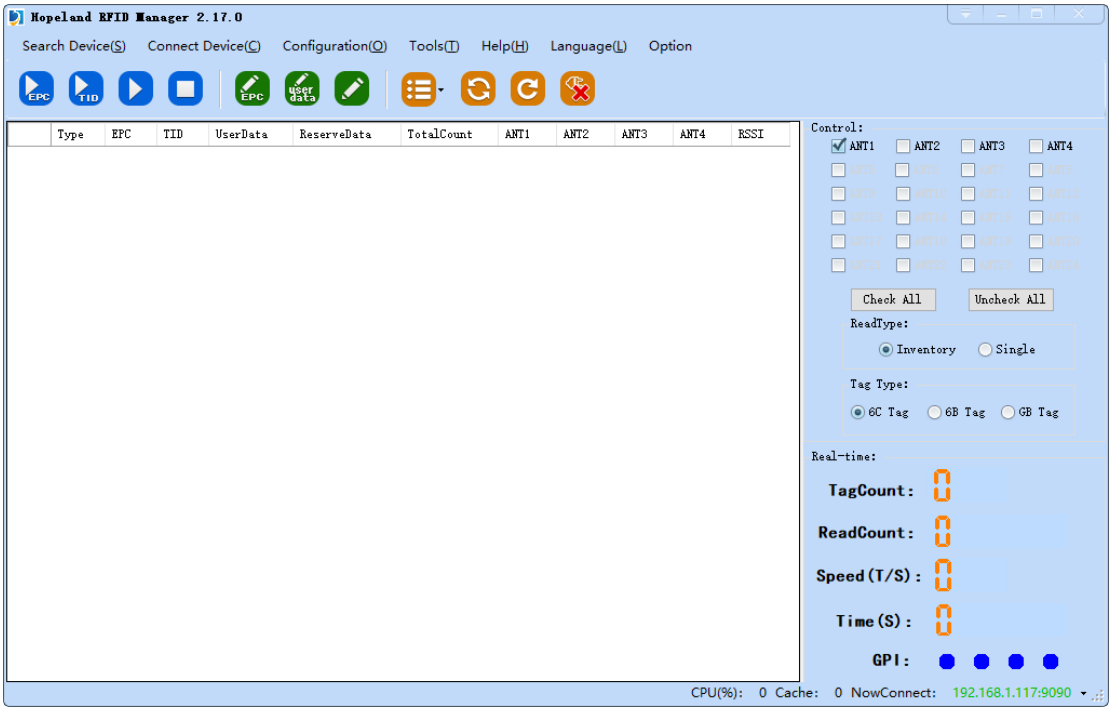


Image 2-5

If not success, please check the physical connection cable, or through the Ping command to test whether the reader IP in the host IP network segment, it is important to ensure the port number is correct, you can use Search Device function to connect reader if you don't know the reader's IP port.

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 is marked as below screenshot is the PC's, which the reader will actively connect to.

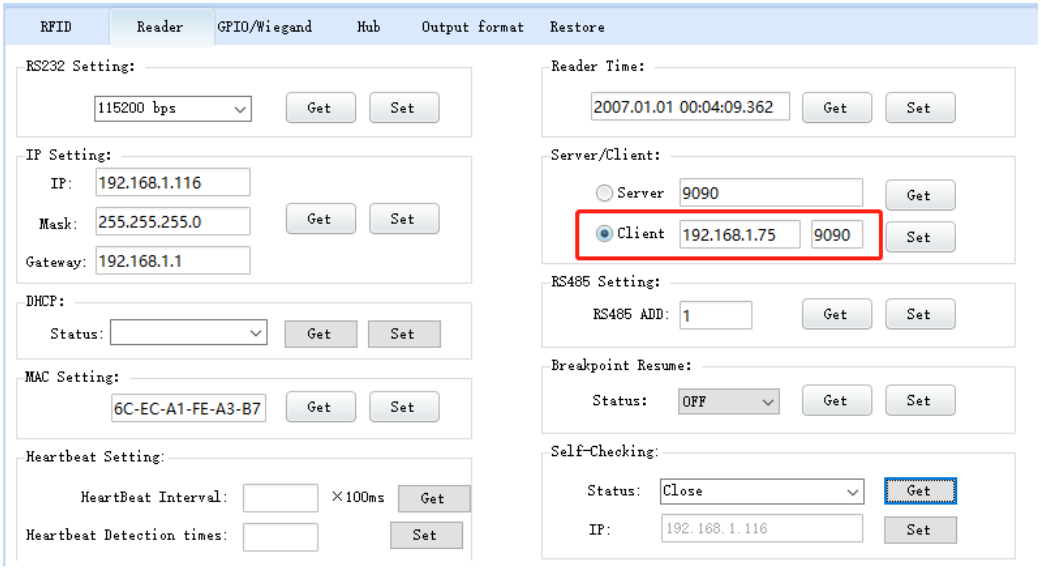


Image2-6 reader parameters

Click "Connect Device(C)" - "TCP server F5" to open the "TCP server" connection interface, as shown in image 2-7.

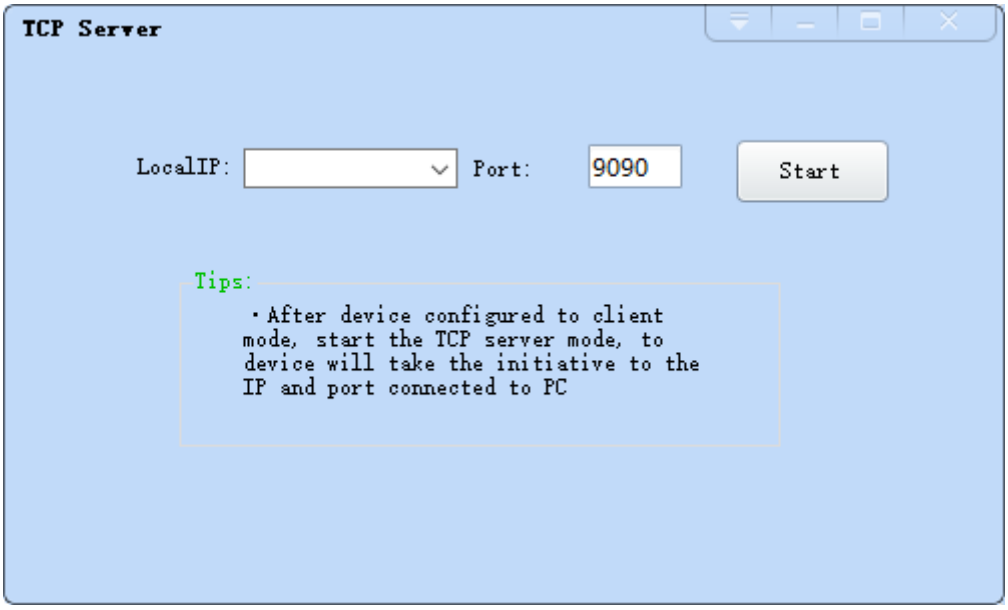


Image2-7

Select the local IP from the drop-down box of the local IP list and click "start" to listen the incoming connection of the reader, as shown in image 2-8.

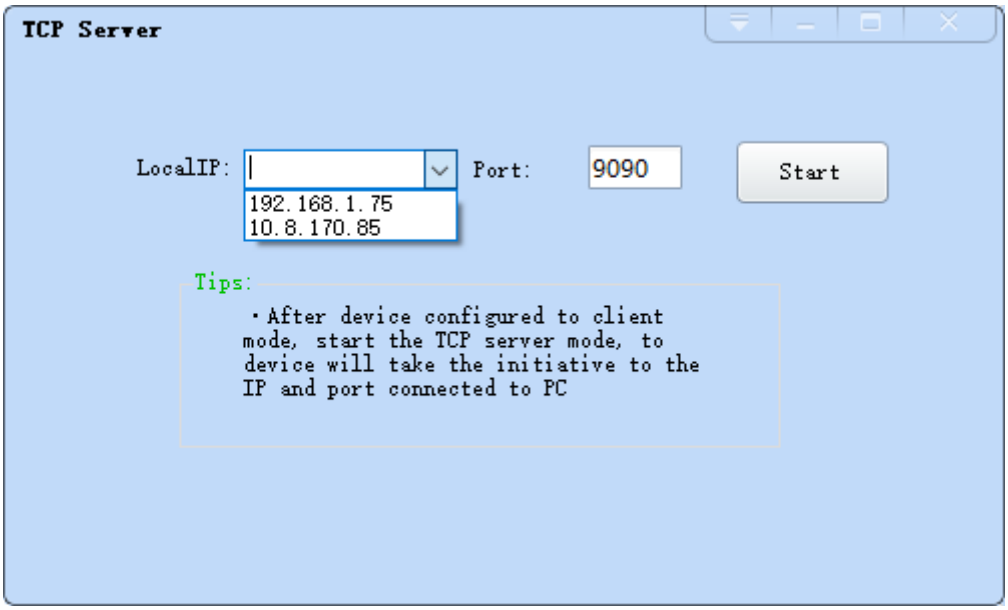


Image2-8

2.2.3 Search Device

After opening the software, click the "search device" on the toolbar to open the search device interface, as shown in image 2-9.

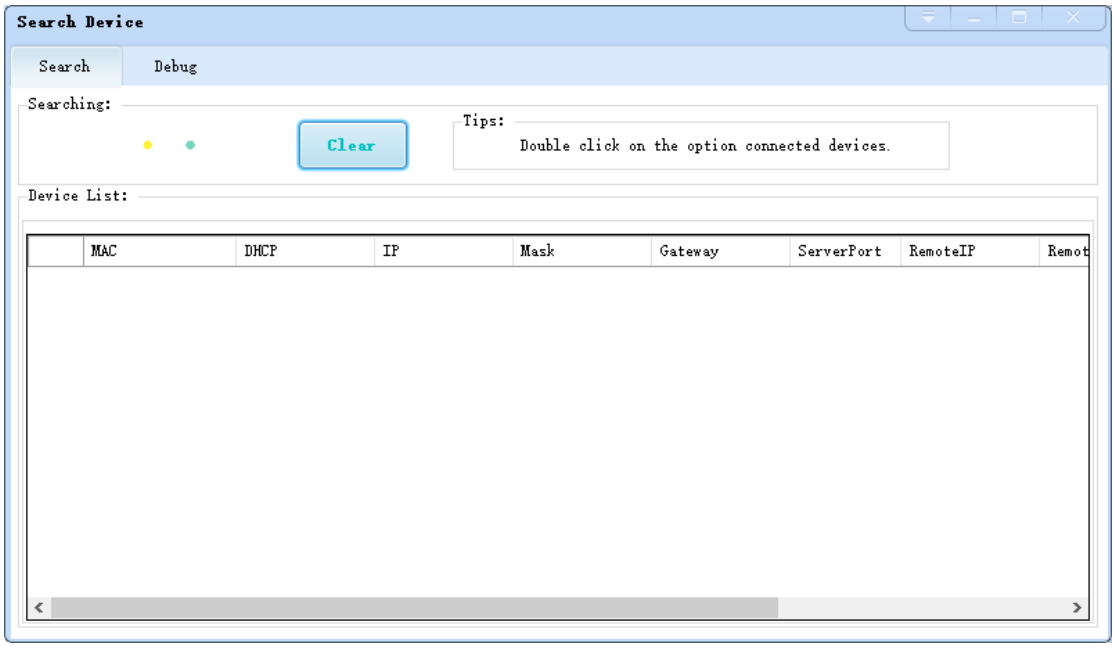


Image2-9

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 image 2-10.

Image2-10

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. After successful connection, the main interface of the software will be opened directly.

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.The host IP modification can be referred to image 2-11.

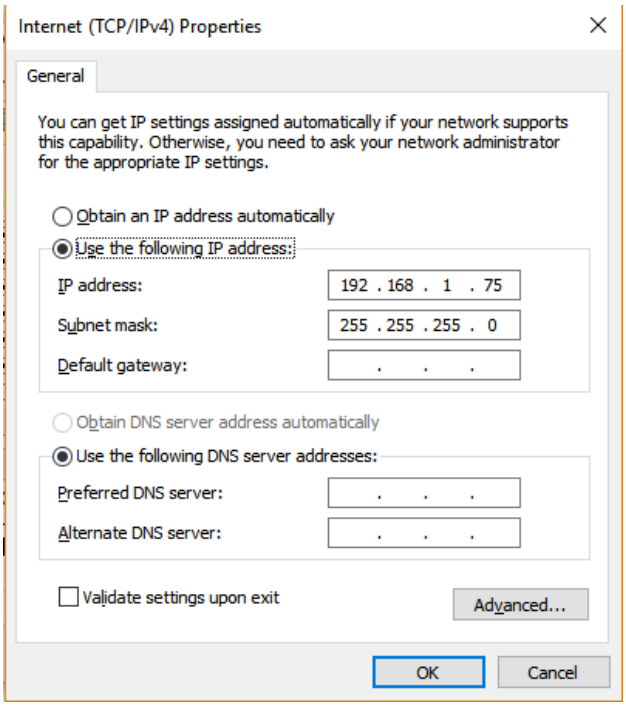


Image2-11

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 image 2-12.

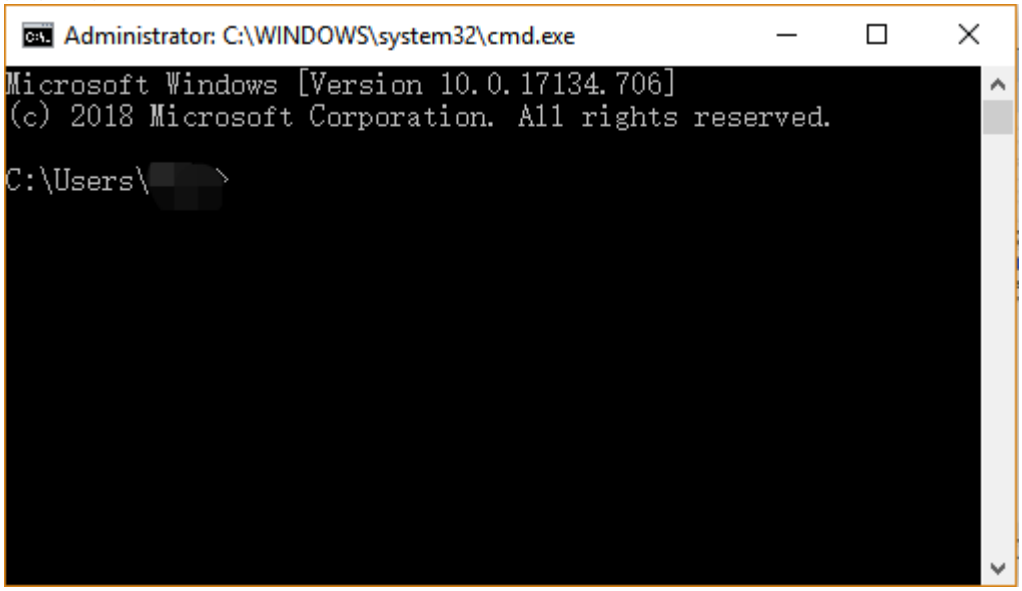


Image2-12

Enter the ping command, as shown in image 2-13.

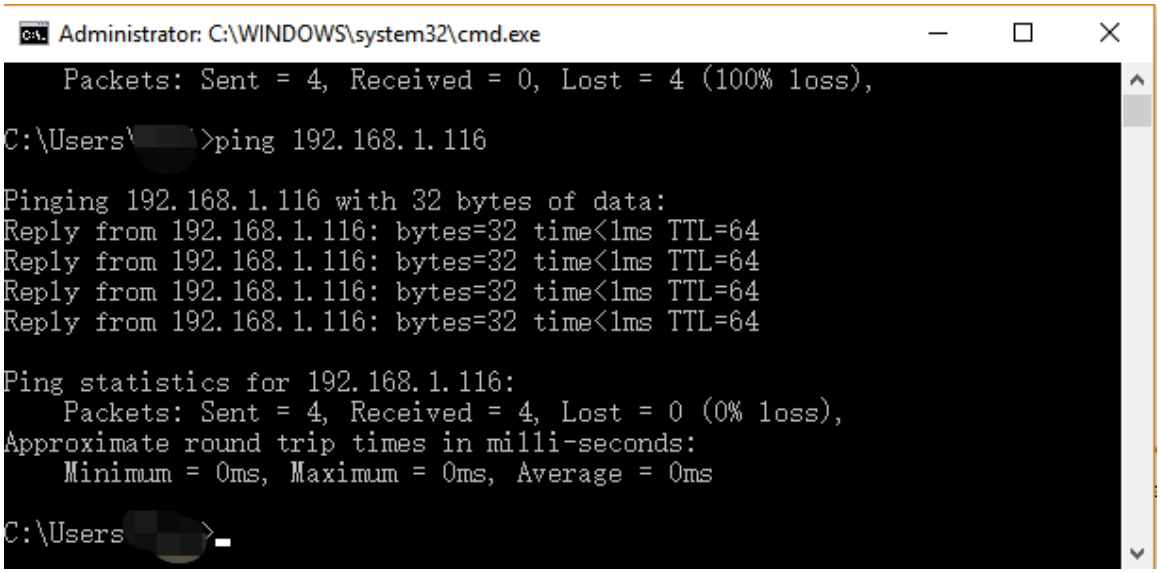


Image 2-13

Click the 

button to delete the devices that are searched in the list. This operation just clears the list. If the reader is in the same IP network segment as the PC, it will be searched again and displayed on the list.

Right-click the device you find in the list and the "setting reader parameter" option pops

up, as shown in image 2-14.

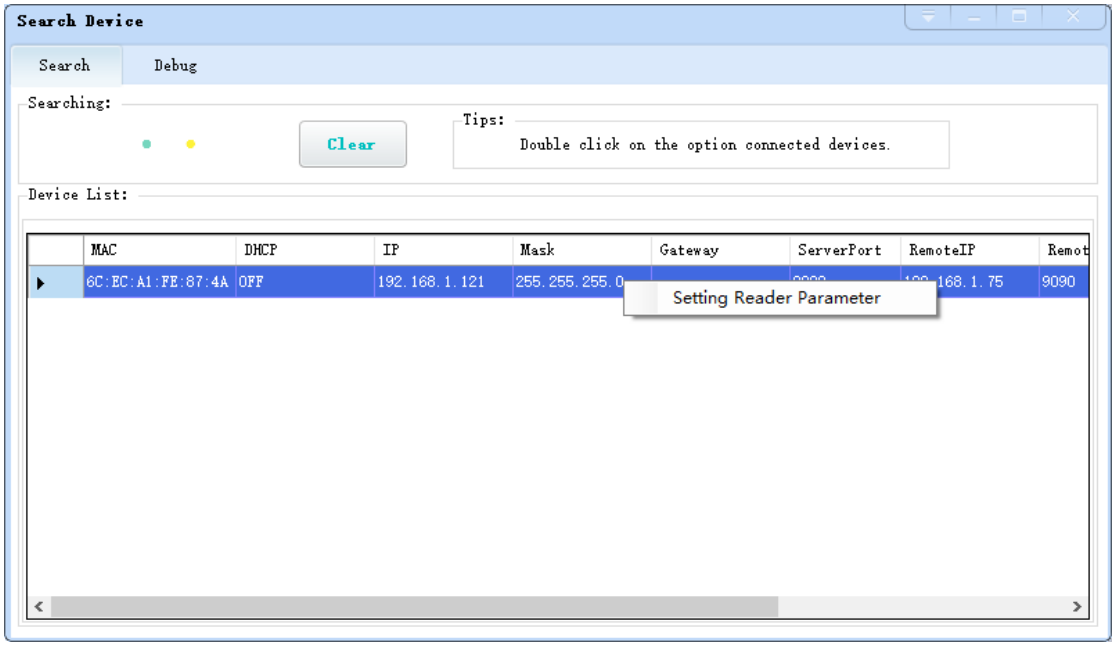


Image2-14

Click the "setting reader parameter" option to enter the password input interface, as shown in image 2-15.

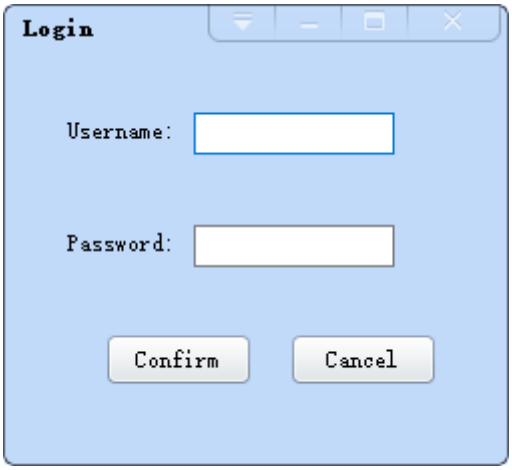


Image2-15

You 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 image 2-16.

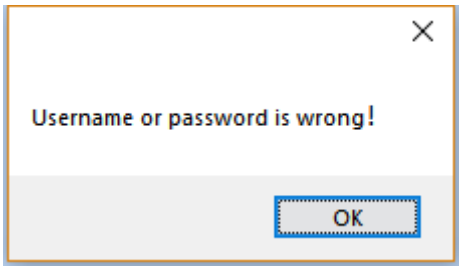


Image2-16

If the account and password is correct, it will enter the "UDP reader setting" interface, as shown in image 2-17.

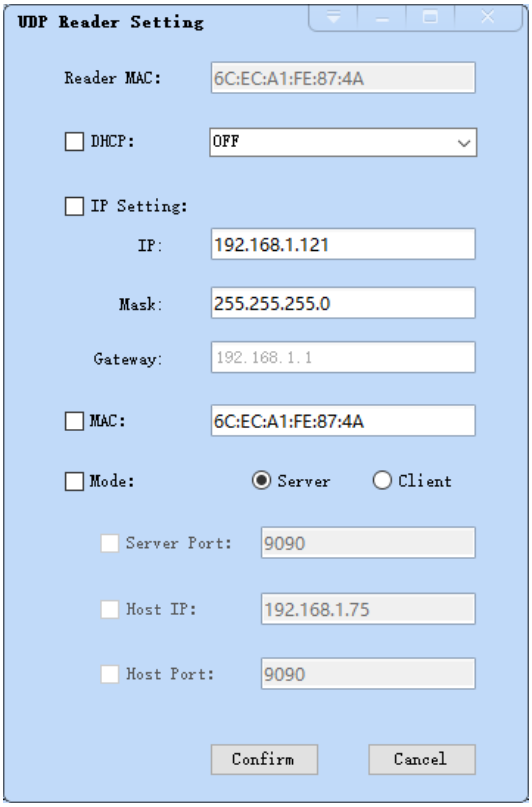


Image2-17

The parameters of the reader can be set in this interface. It is important to note that the Settings must be checked by the check box in front of the parameters before setting them. Otherwise, no Settings will be set by default. As shown in image 2-18.

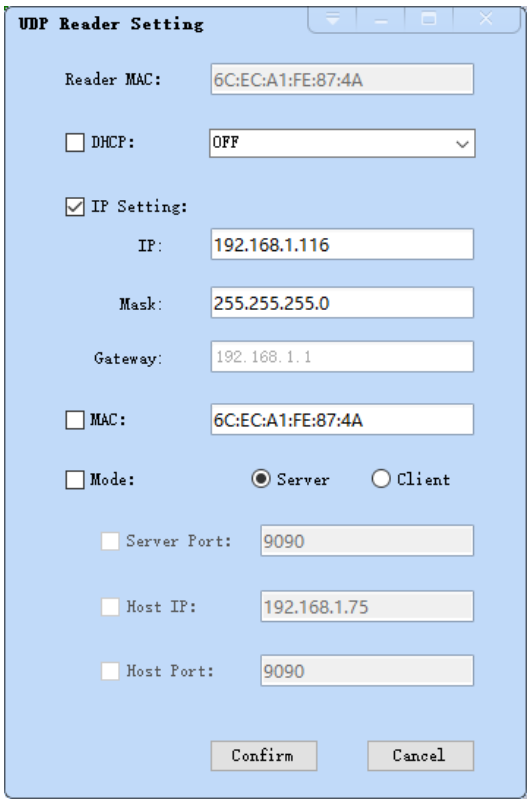


Image2-18

Click the "Confirm" button to submit and wait for the result prompt. If fail, set it a few more times, as shown in image 2-19.

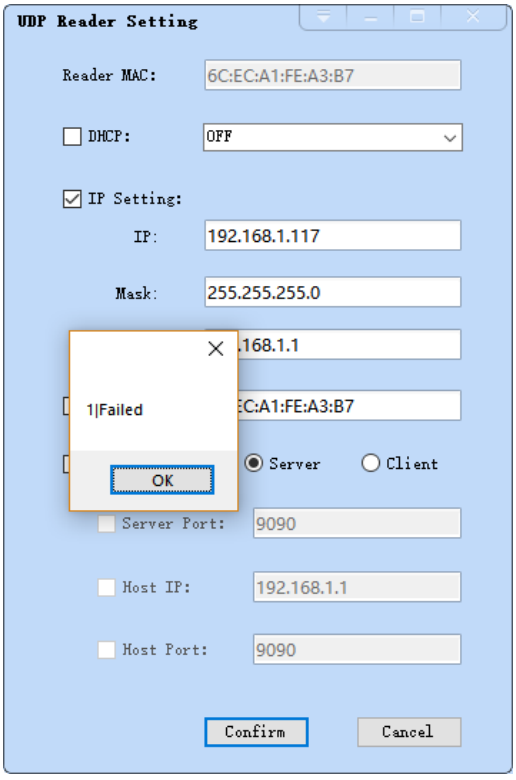


Image2-19

Set successfully, return successful prompt, as shown in image 2-20.

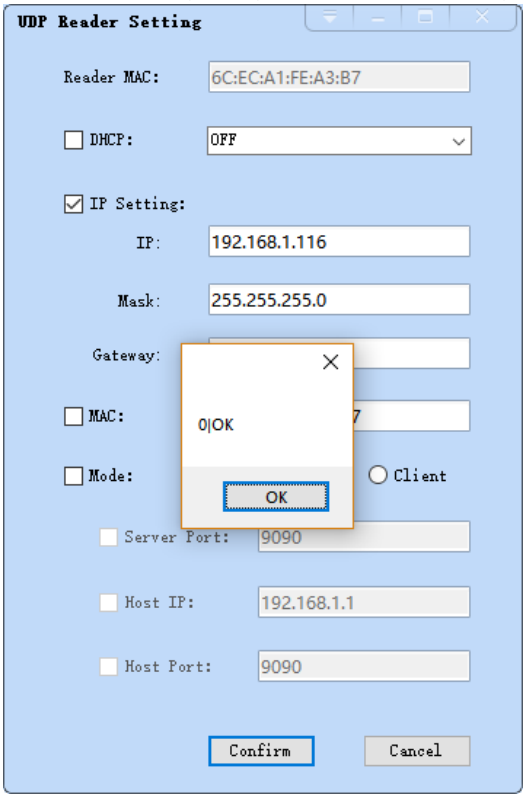


Image2-20

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

2.3 RS485 communication connection

Click Connect Device(C)-RS485(R) to open the RS485 communication connection interface, as shown in image 2-21

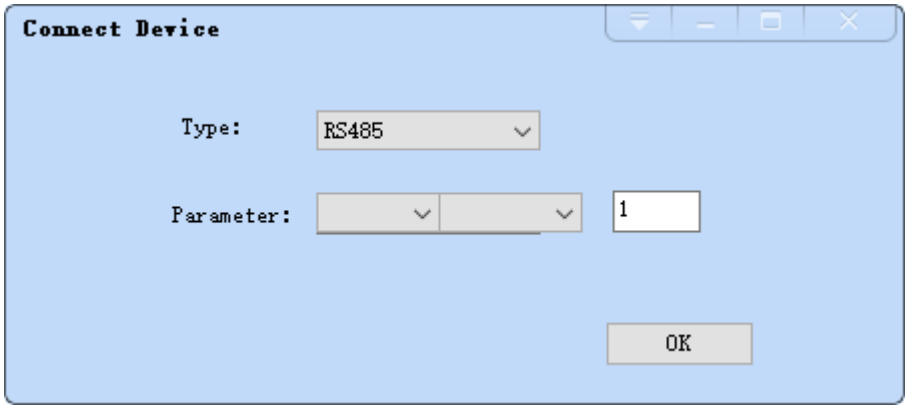


Image 2-21

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 "OK" to connect the

reader.as shown in image2-22

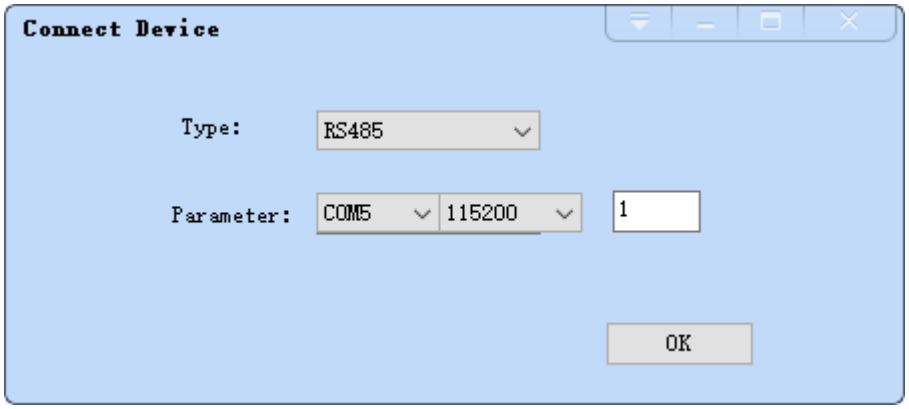


Image 2-22

After connecting successfully, as shown in image 2-23

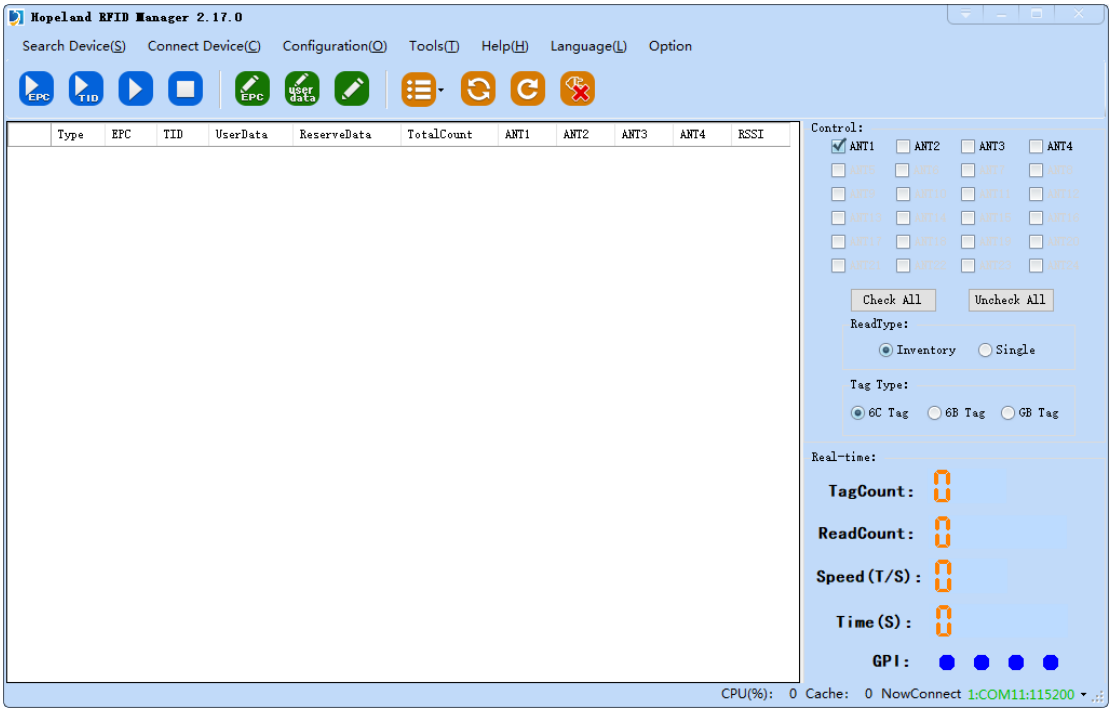


Image 2-23

If not, please check the physical connection of 485 cables.

2.4 USB communication connection

Click "Connect Device(C)" - "USB(U)" to open the USB connection interface, as shown in image 2-24.

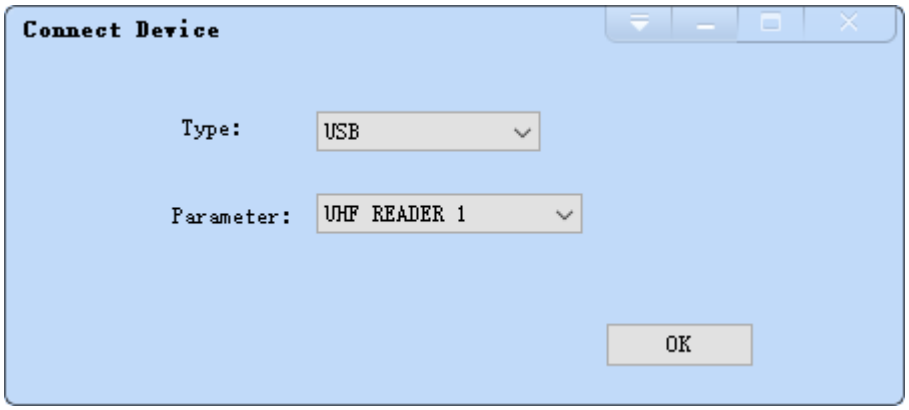


Image2-24

After successful connection, the interface is shown in image 2-25

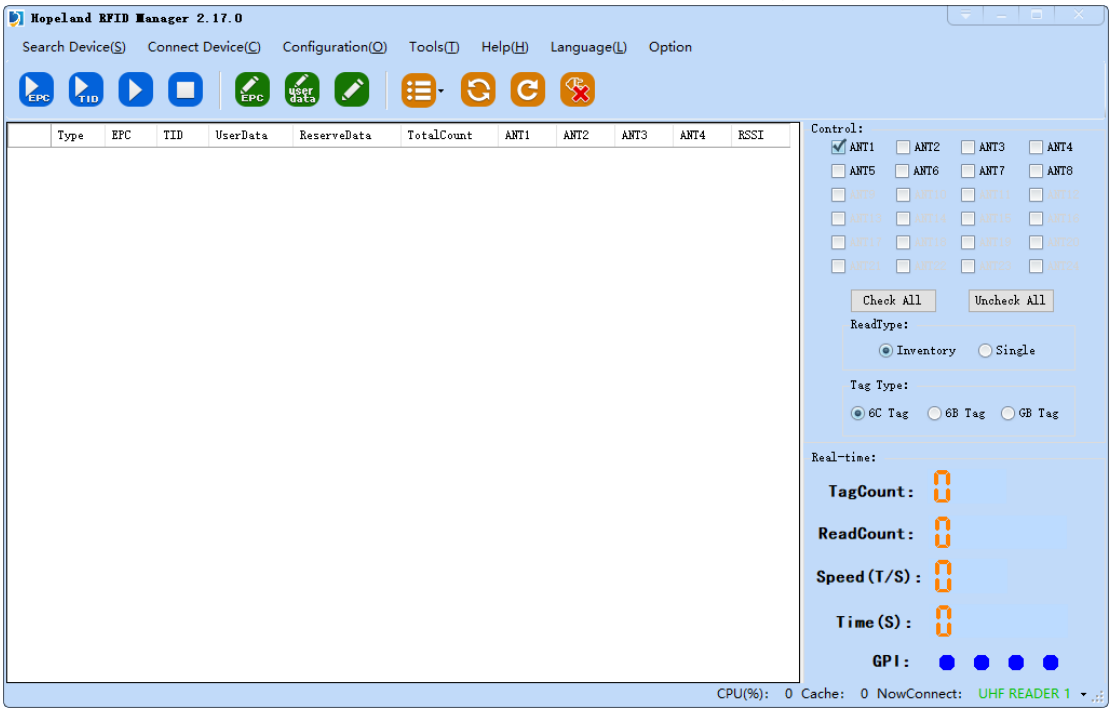


Image 2-25

If not, please check the USB physical connection. 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 HOST is communicating with the reader.

2.5 Disconnect reader

Click the  button to disconnect the current connection, and all the buttons will not available after it is disconnected. You need to reconnect the reader, as shown in image 2-26.

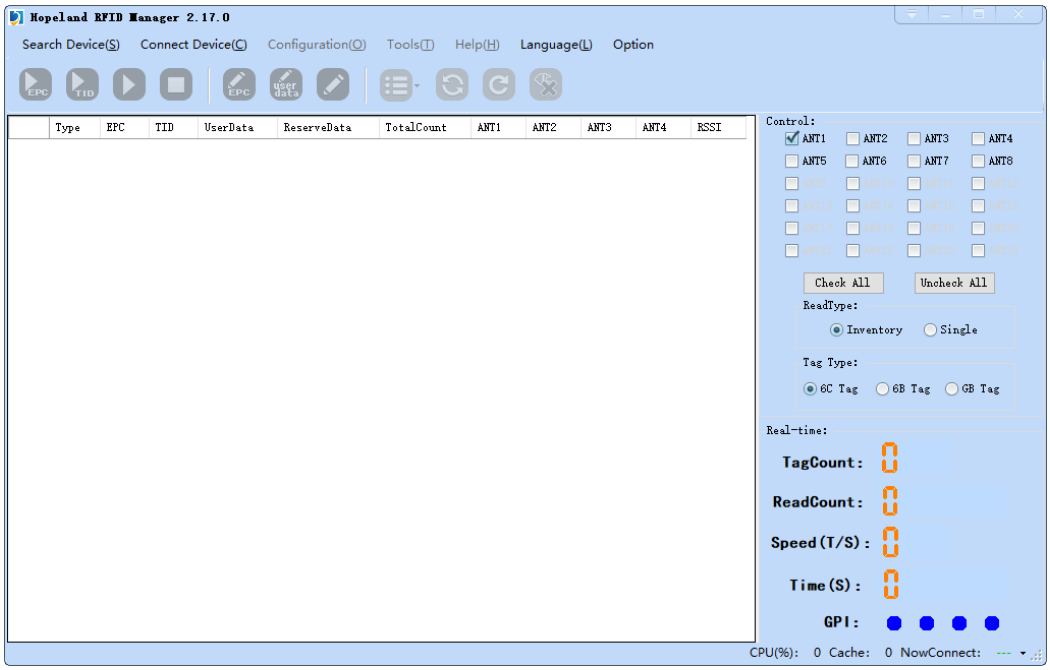


Image2-26

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 image 3-1.

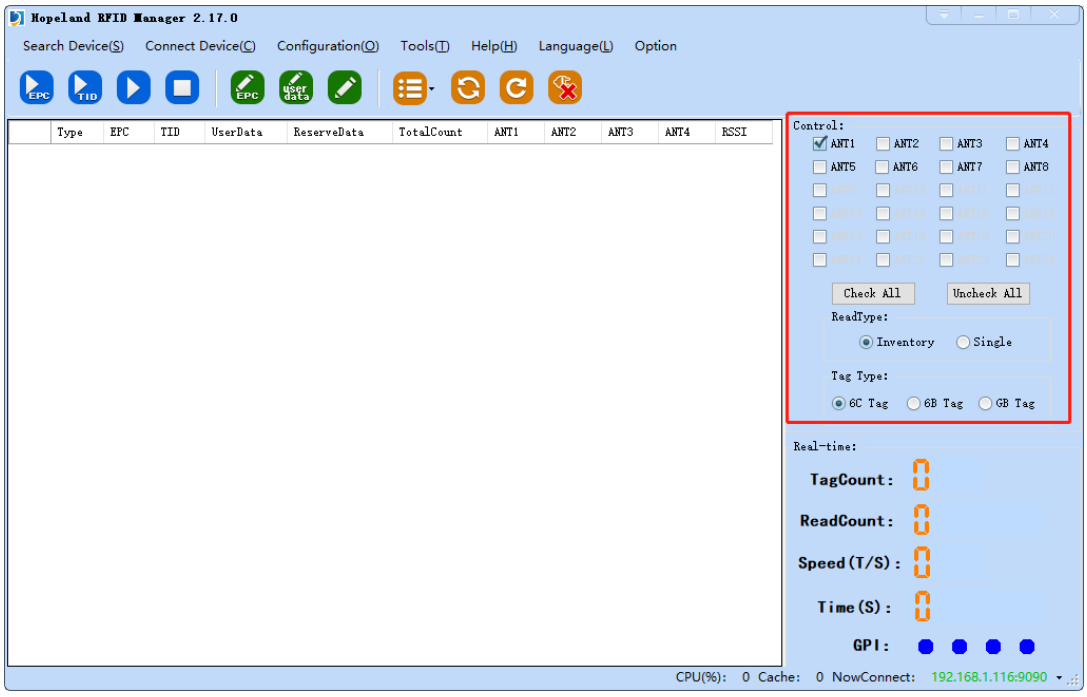


Image3-1

Checking the check box before the antenna number indicates that the reader will use the checked antenna for reading. You can select more than one antenna depending on the actual situation, if we use the antenna port which checked but not connected with antenna, it may cause the antenna port to be damaged.

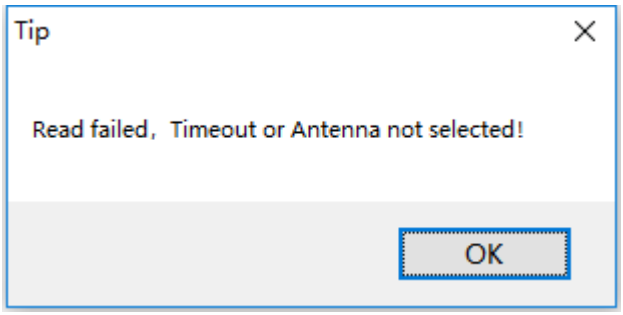


Image3-2

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 image 3-3.

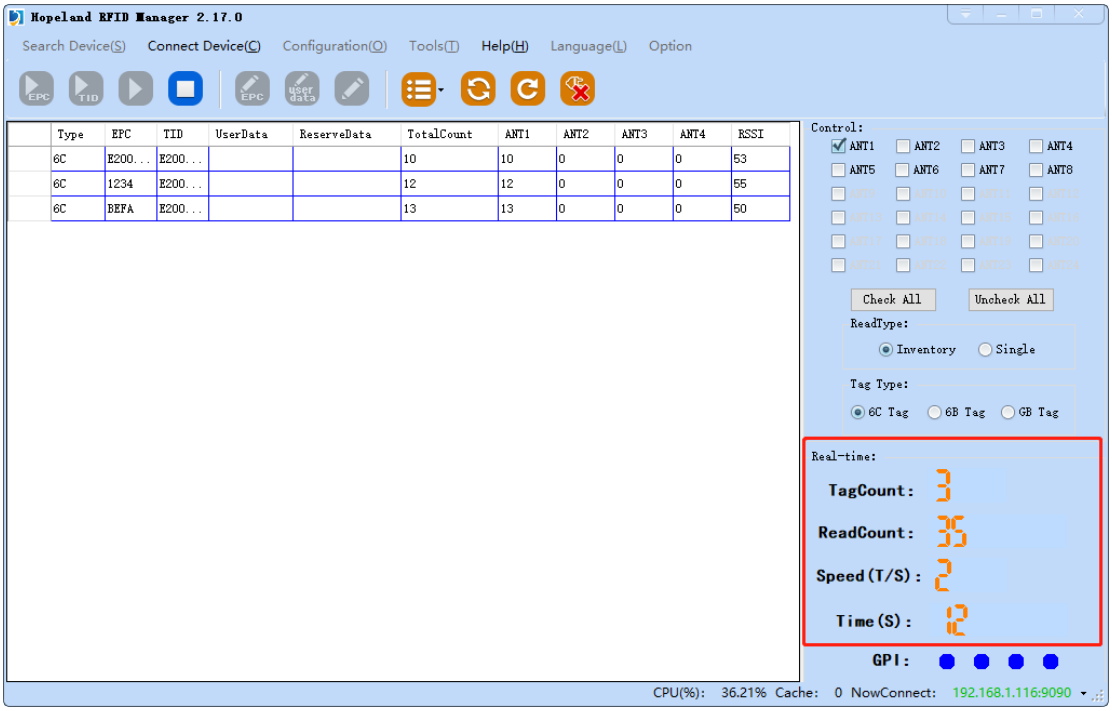


Image3-3

A single read that the reader read all the tags only read once, after reading once, the information is no longer updated, as shown in image 3-4.

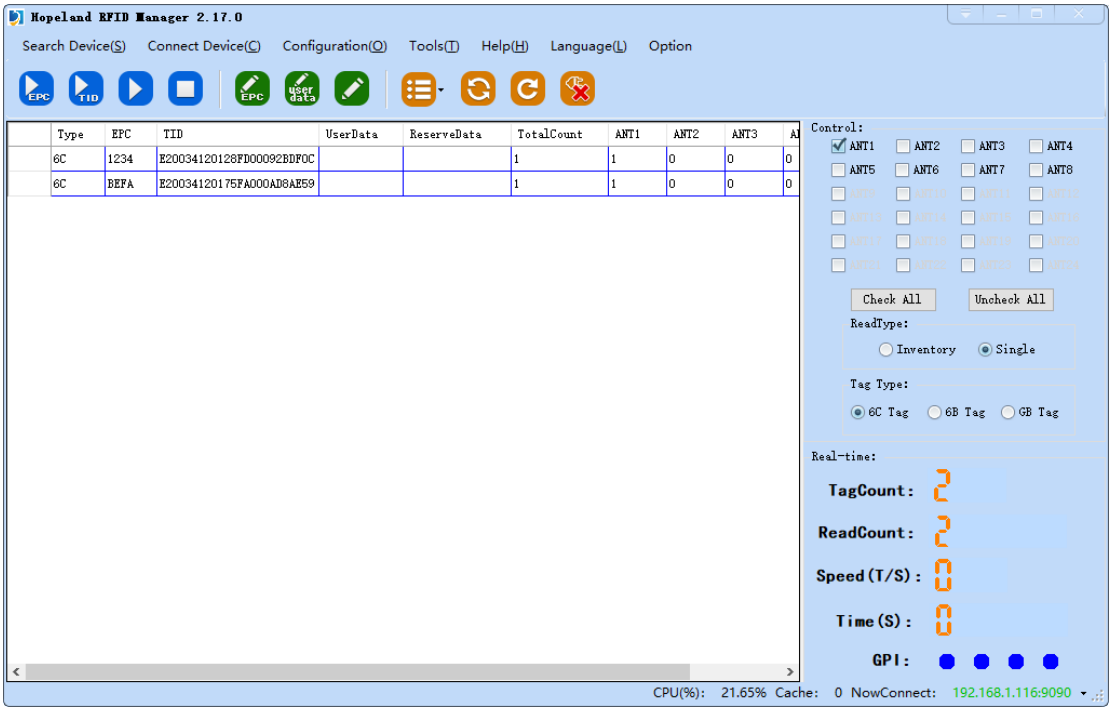


Image3-4

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.

3.2 Read tag

Once the read/write control is set up, 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 right corner, as shown in image 3-5.

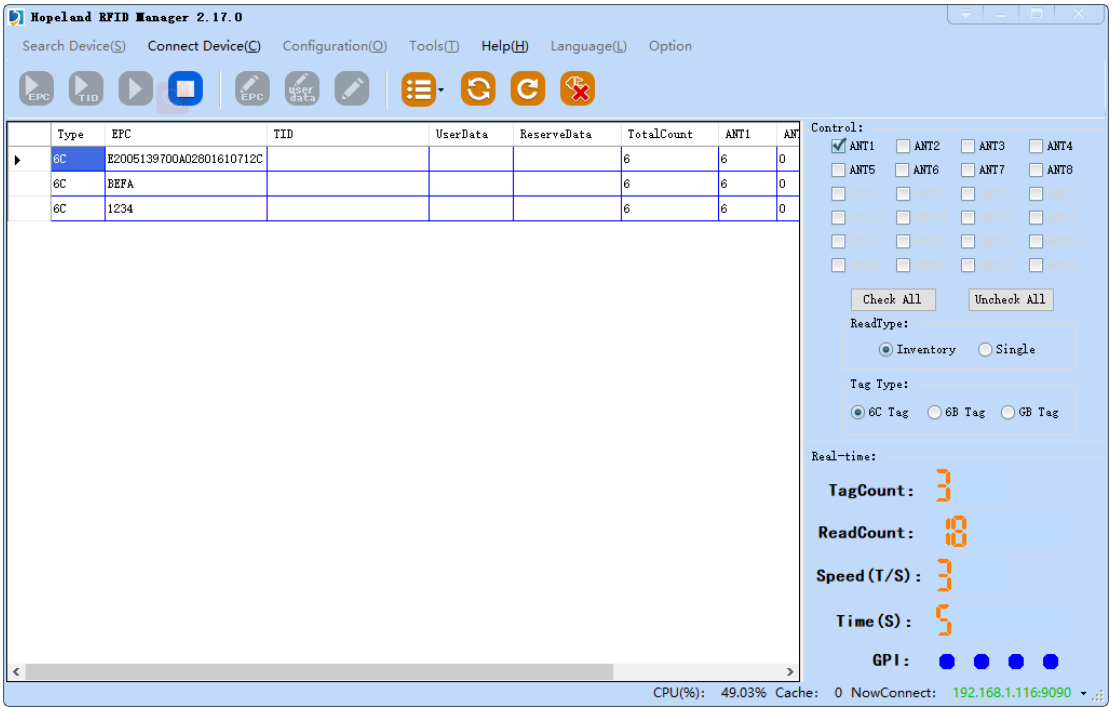


Image3-5

3.2.2 Read TID

Click the  button to read the TID. The information of TID and EPC will be displayed in the list, as shown in image 3-6.

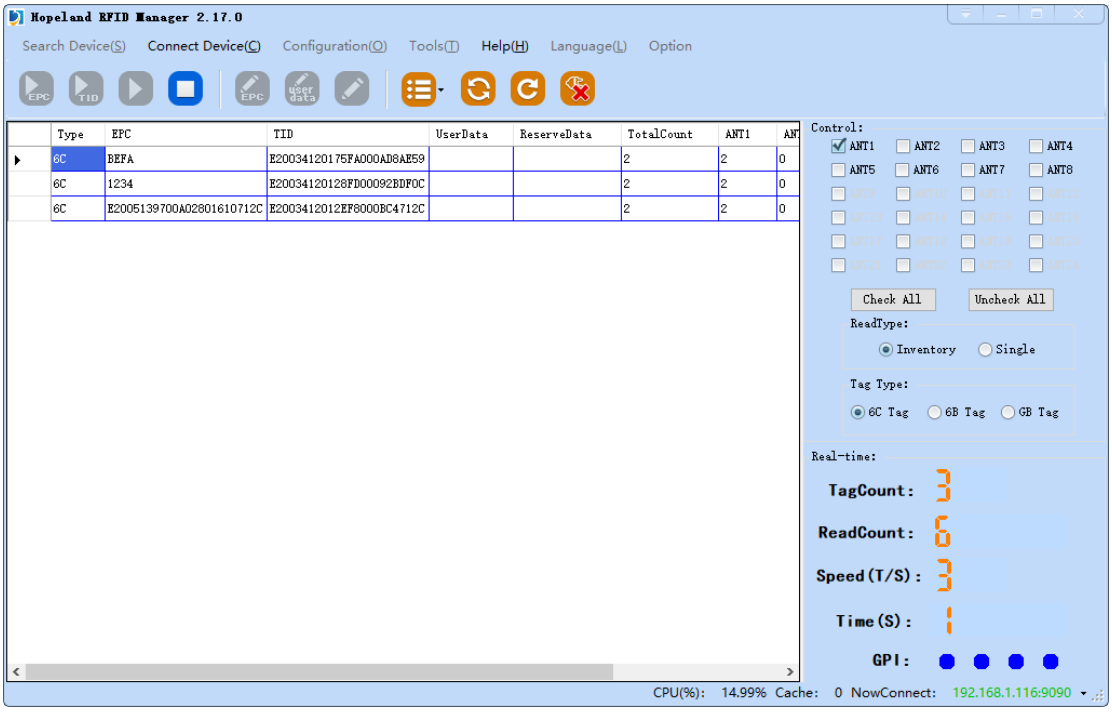


Image3-6

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 image 3-7.

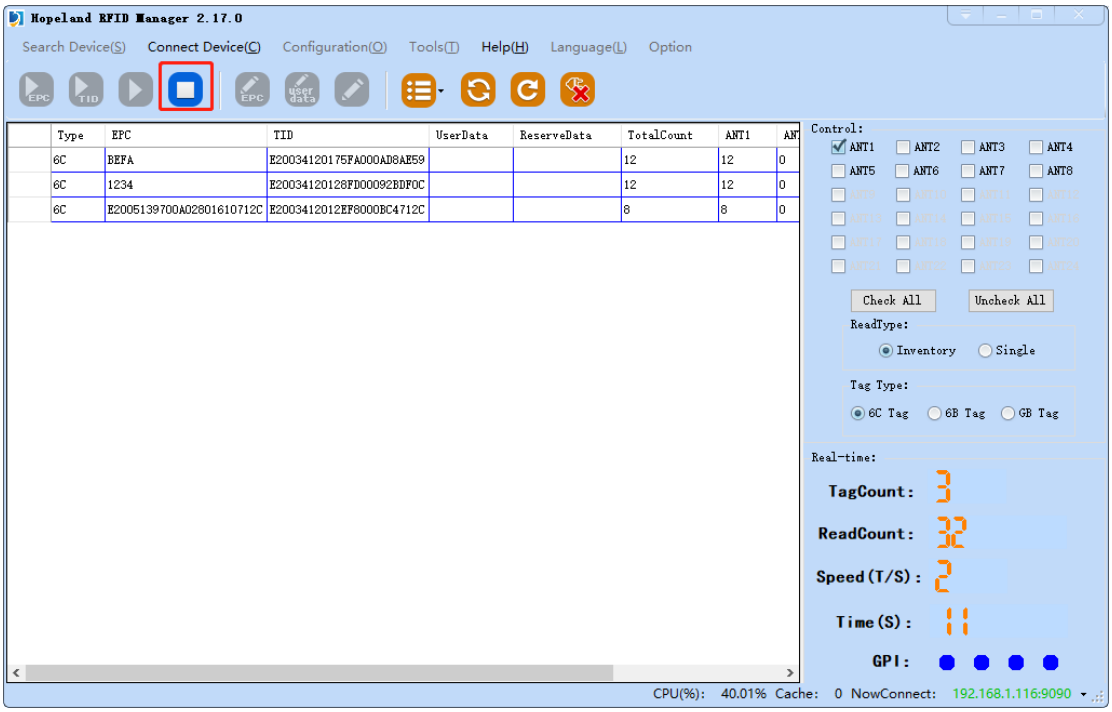


Image3-7

3.3 Write tag

At the same power, there are differences in the applicable distance between reading and writing the tags. It is recommended to write the tag as close as possible to the antenna. Before you write the tag, you should read the tag by reading TID.

3.3.1 Write EPC

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

to open the Write EPC Interface, as shown in image 3-8.

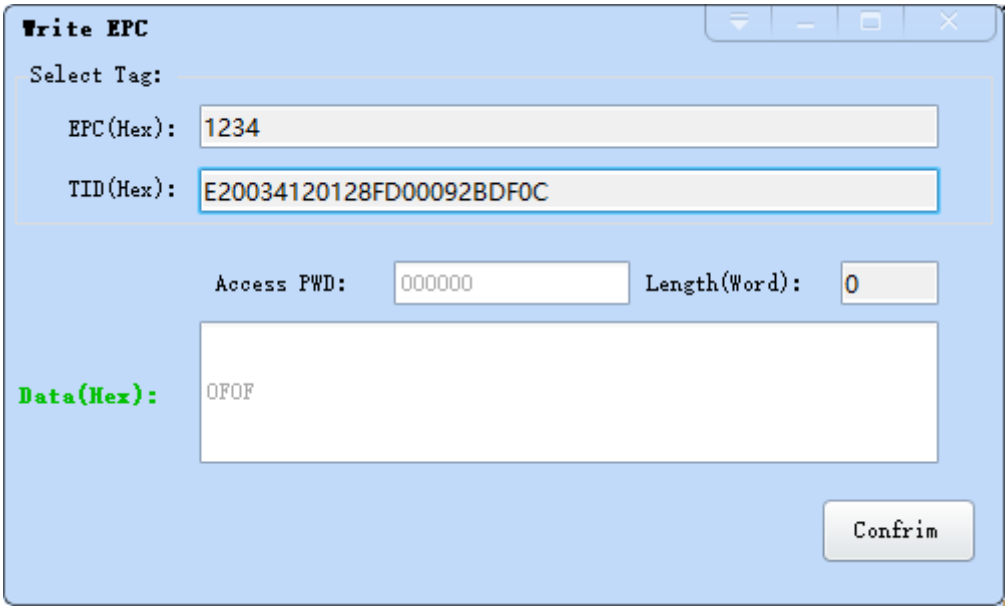


Image3-8

When you input the EPC data(Hex) to below Data(Hex) input box, pay attention to ensure the digits are hexadecimal numbers, if the tag is set with password, you also need to input access password in Access PWD input box , then click Confirm, it will return the result of writing EPC, as shown in image 3-9.

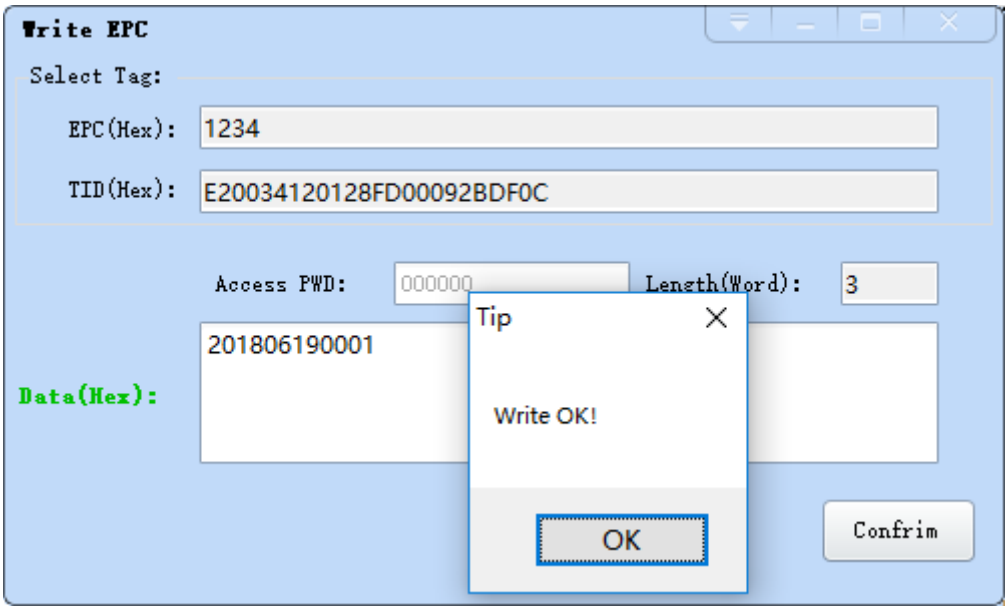


Image3-9

If the prompt shows failure, determine the next step based on the failure prompt.

3.3.2 Write Userdata

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

to

open the Write Userdata Interface, as shown in image 3-10.

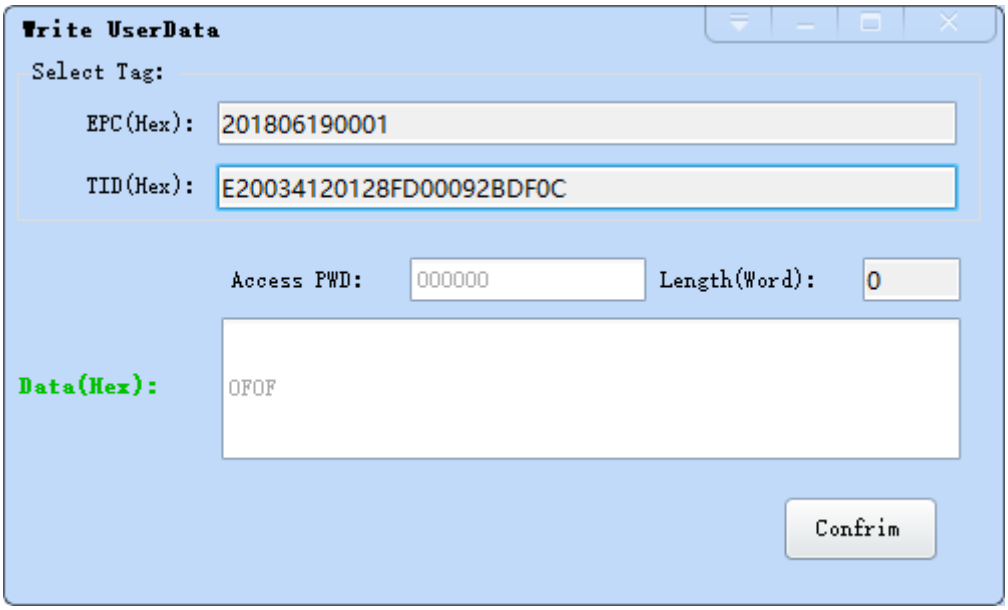


Image3-10

When you input the User data(Hex) to below Data(Hex) input box, pay attention to ensure the digits are hexadecimal numbers, if the tag is set with password, you also need to input access password in Access PWD input box , then click Confirm, it will return the result of writing User data, as shown in image 3 -11.

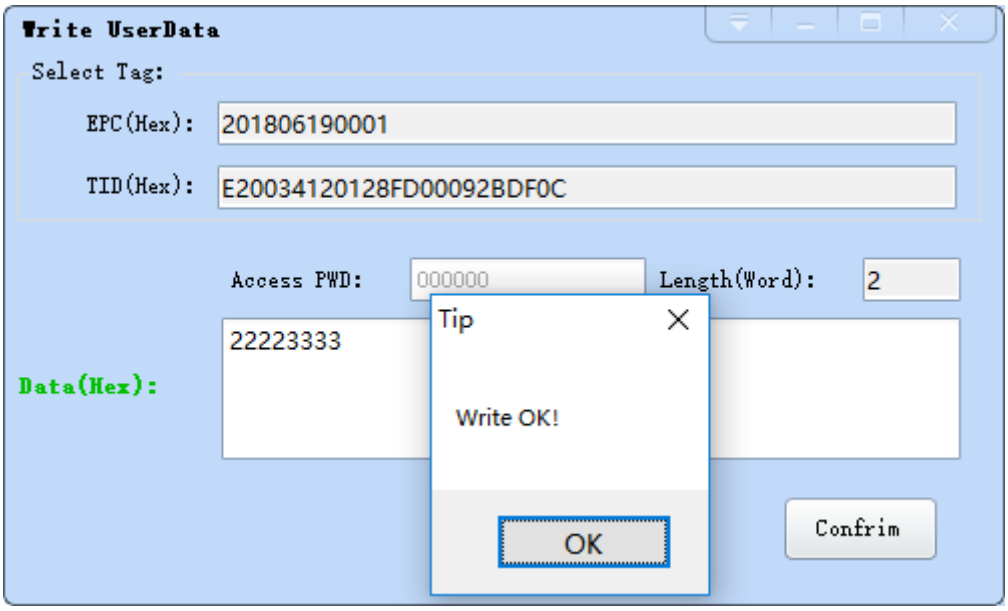


Image3-11

If the prompt shows failure, determine the next step based on the failure prompt.

3.4 Information display

Click  , and you can select and display options in the list, as shown in image 3-12.

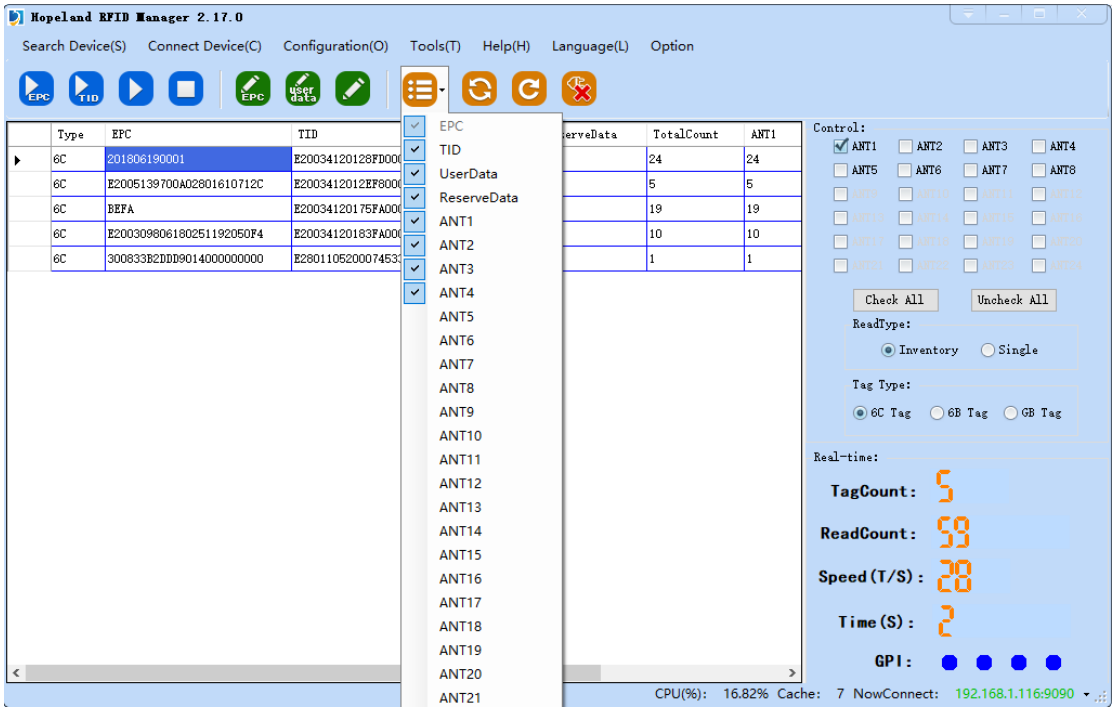


Image3-12

You select an option, or cancel the option to change whether it will be displayed in the list.

Click  to clear tag information in the current list, as shown in image 3-13.

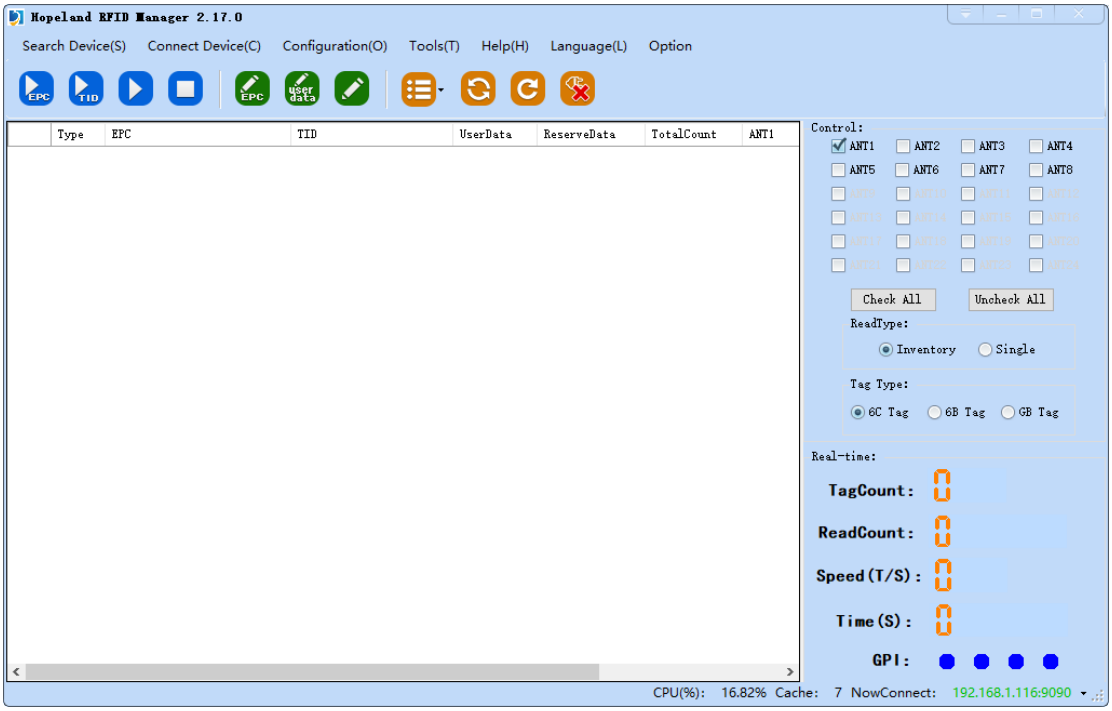


Image3-13

3.5 Restart reader

Click  to restart the reader. After click, you will hear the reader 'beep' (except B6A), which indicates that the reader has restarted successfully. Then reconnect.

3.6 Reader information

Click on the Toolbar "help" - "Reader Info" to query information from the connected reader. The information includes reader application version, reader name, and the time that the reader has been running after powering on, as shown in image 3-14.

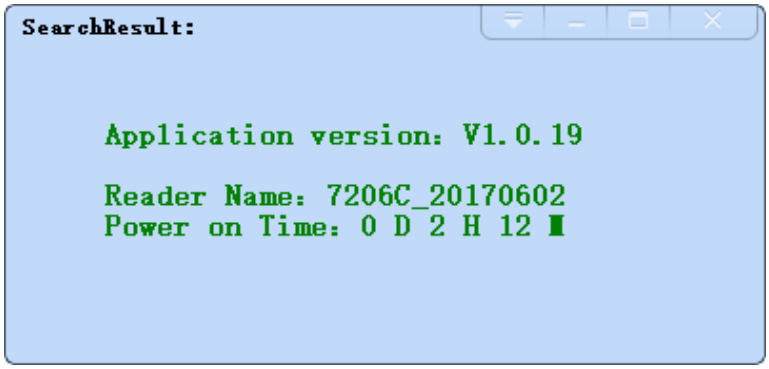


Image3-14

3.7 Baseband information

Click on the Toolbar "Help" - "Baseband Version" to query the baseband information of the connected reader, as shown in image 3-15.

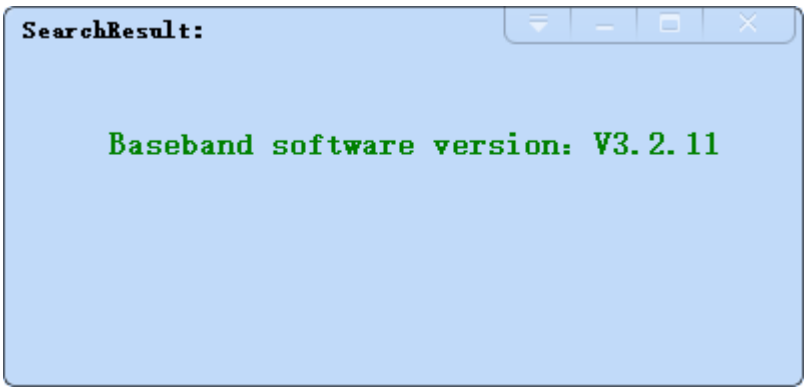
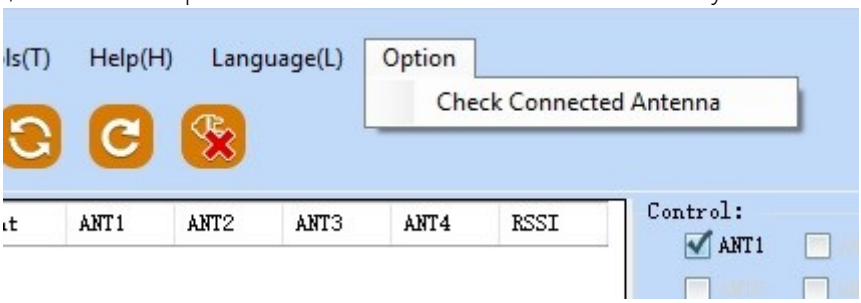


Image3-15

3.8 Check connected antenna

Click “Option” – “Check Connected Antenna” on the menu bar to cancel or check the option “Check Connected Antenna”, if checked, the demo software will detect whether the antenna port of reader connected antenna, the background of the antenna number on demo software which normally connected antenna will be green, the background of the antenna number which doesn’t connect antenna will be mauve, as shown in image3-16, the antenna port connection status is for reference only.



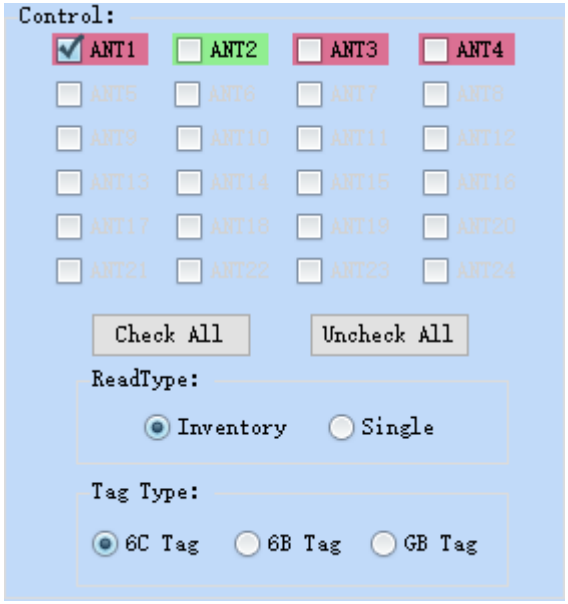


Image3-16

4.Configuration

4.1 Common configuration

4.1.1 Antenna power configuration

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

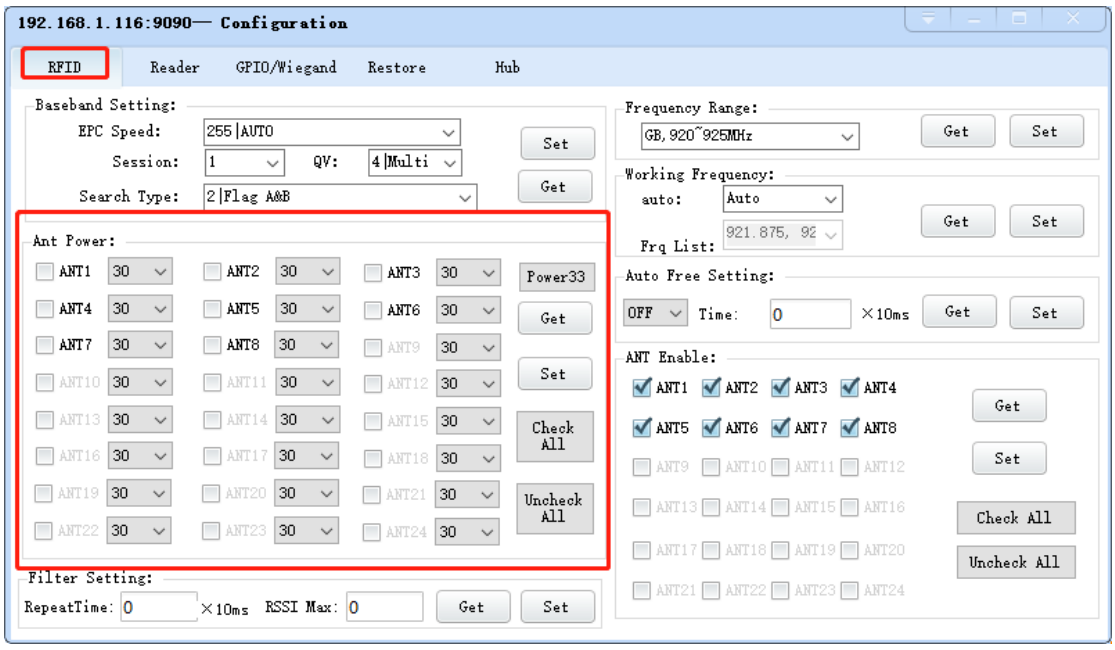


Image4-1

Note that the power can be changed by the drop-down box, then you must select the ANT No. before click the Set button, or the power set on the antenna is not successful. Multiple choices is available

4.1.2 Antenna enable

The Position of Antenna Enable is shown in image 4-2.

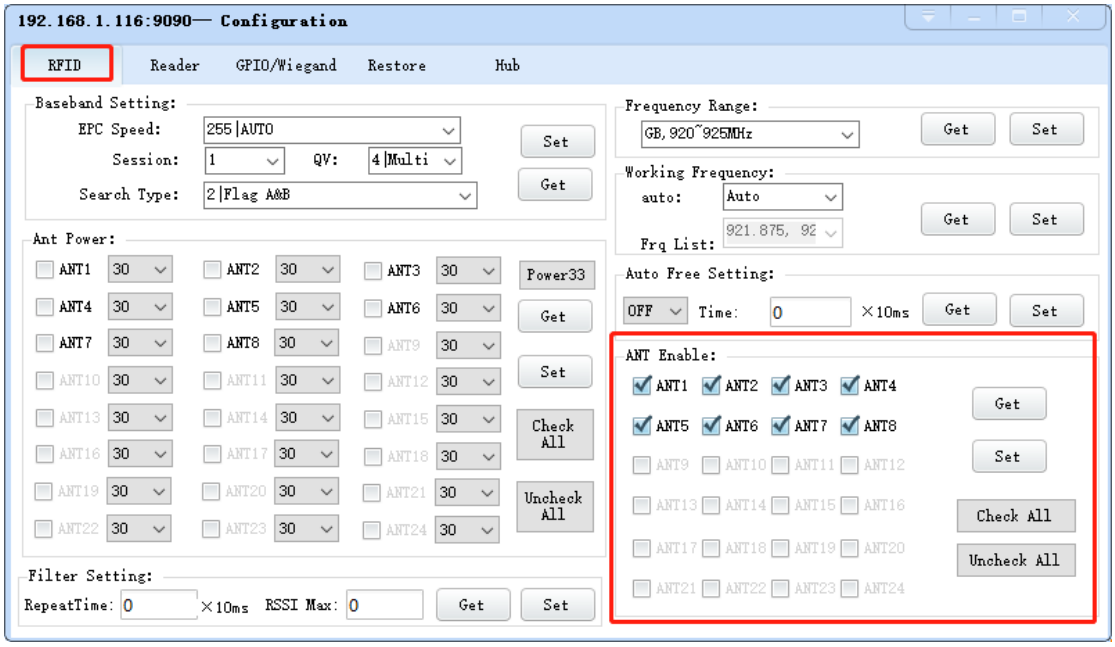


Image4-2

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.

4.1.3 Serial port configuration

Click the toolbar "Configuration" - "Reader" - "RS232" to enter the interface of serial port setting, as shown in image 4-3.

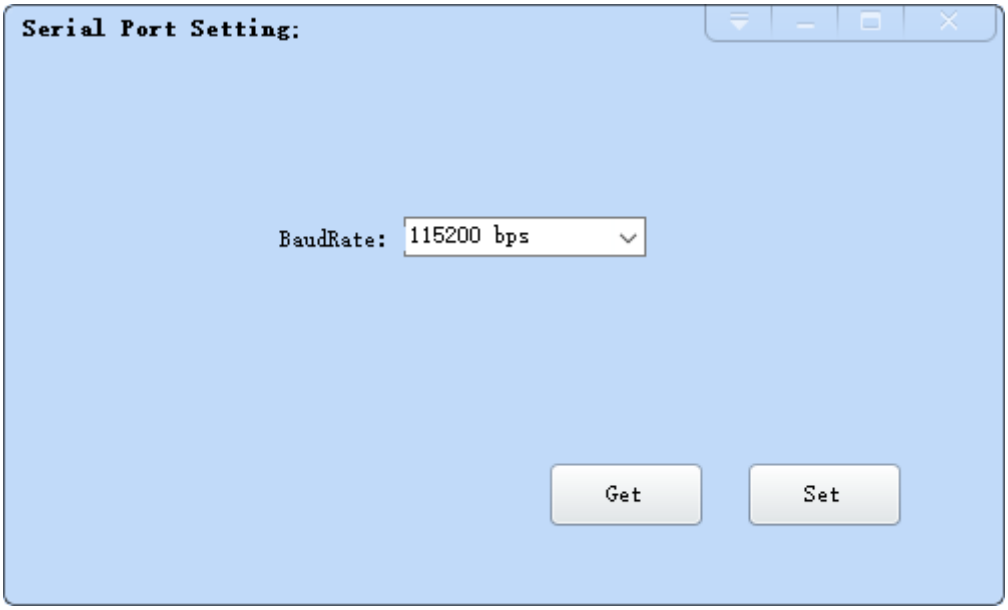


Image4-3

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.

4.1.4 Network configuration

Click the toolbar "Configuration" - "Reader" - "RJ45" to enter the interface of network adapter setting, as shown in image 4-4.

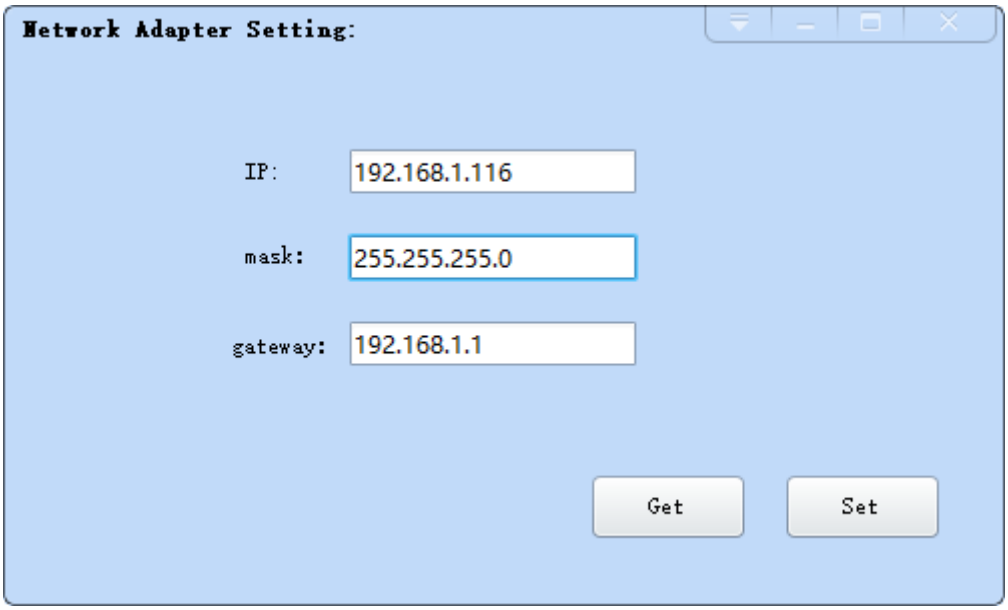


Image4-4

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 .

4.1.5 485 configuration

Click the toolbar "Configuration" - "Reader" - "RS485" to enter the 485 setup interface, as shown in image 4-5.

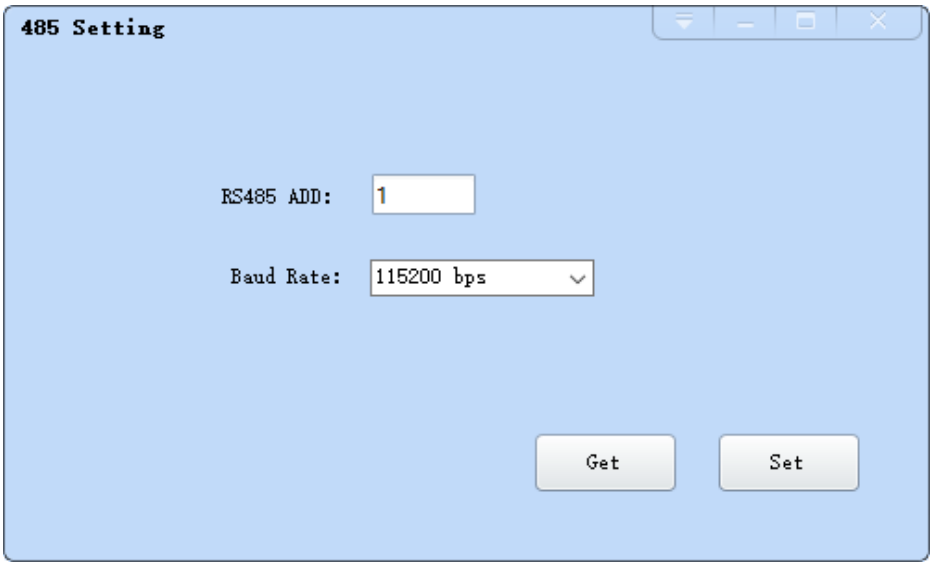


Image4-5

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.

4.1.6 GPI configuration

The following table shows the details of the regular reader GPI configuration:

Model	GPI	GPO
C4/C8/C12/C24/C9	4 inputs, optically isolated	4 relay outputs
B2	2 inputs, optically isolated	2 relay outputs
B7A B8A	1 input, optically isolated	1 relay outputs
B5A / B6A	1 input, optically isolated	1 pair 5V output or wiegand output

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

Click the toolbar "Configuration" - "GPI/O" - "GPI" to enter the GPI configuration interface, as shown in image 4-6.

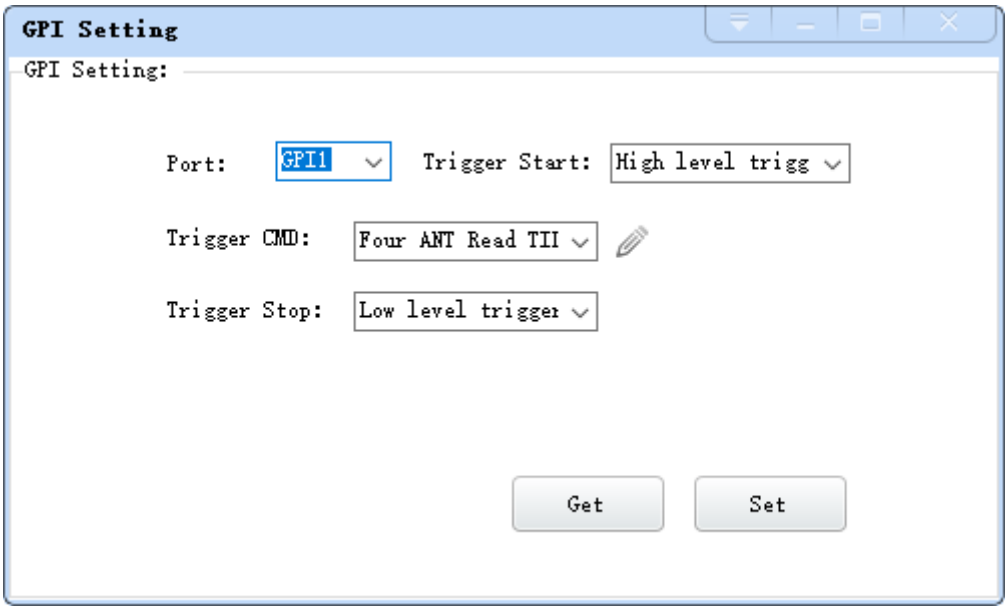


Image4-6

Click the "Get" button to get the GPI setting, you can set the GPI by manually change the parameters, then click the"Set" button to submit . Setting up success and failure will be prompted.

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:

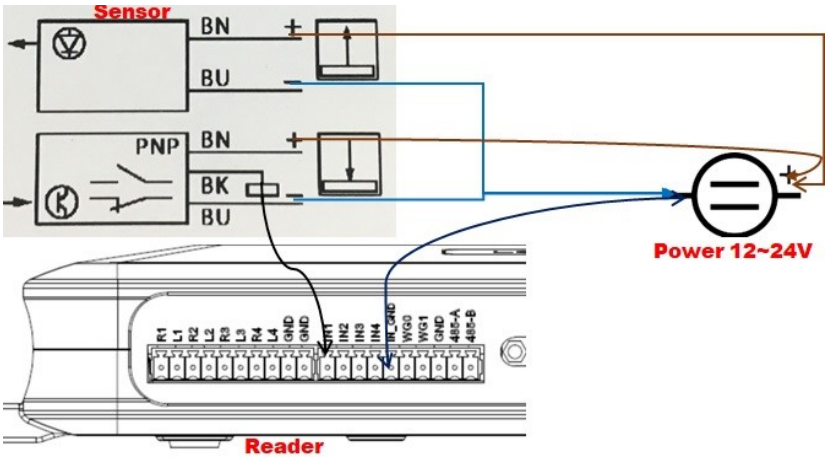
Port: GPI1

Trigger Start: High level

Trigger Command: Single ANT Read EPC

Trigger Stop: Low level

Connection diagram:



4.1.7 GPI status query

Click the toolbar "Configuration" - "GPI/O" - "GPI state" to enter the GPI status query interface, as shown in image 4-7.

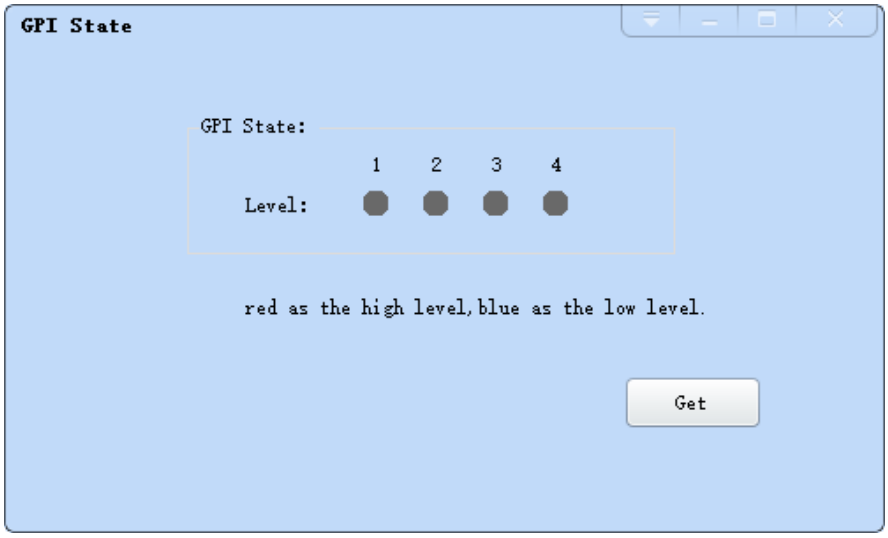


Image4-7

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

4.1.8 GPO configuration

The following table shows the details of the regular reader GPO configuration:

Model	GPI	GPO
C4/C8/C12/C24/C9	4 inputs	4 relay outputs
B2	2 inputs	2 relay outputs
B7A B8A	1 input	1 relay outputs
B5A / B6A	1 input	1 pair 5V output or wiegand output

Click the toolbar "Configuration" - "GPI/O" - "GPO" to enter the GPO configuration interface, as shown in image 4-8.

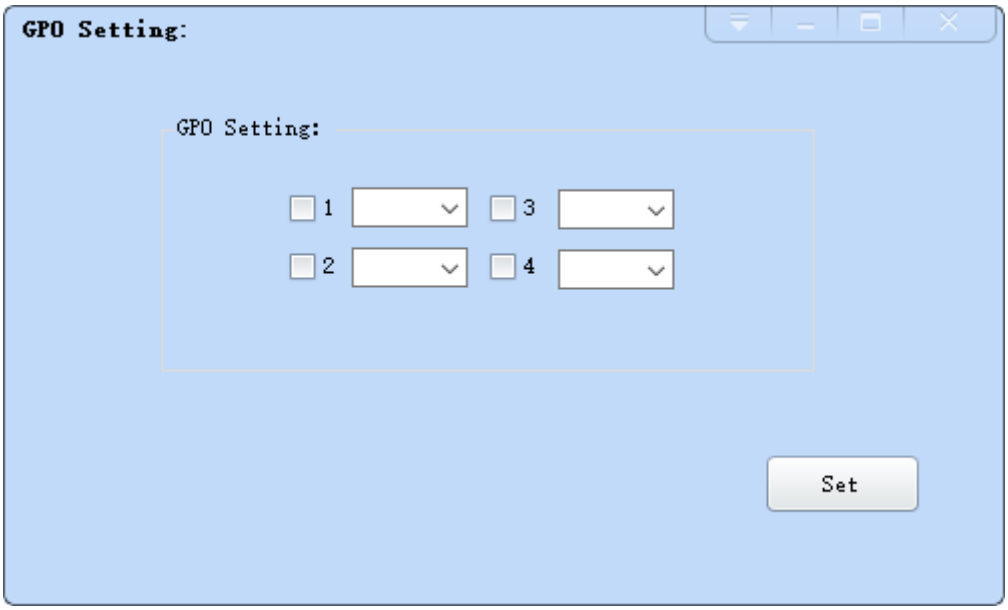


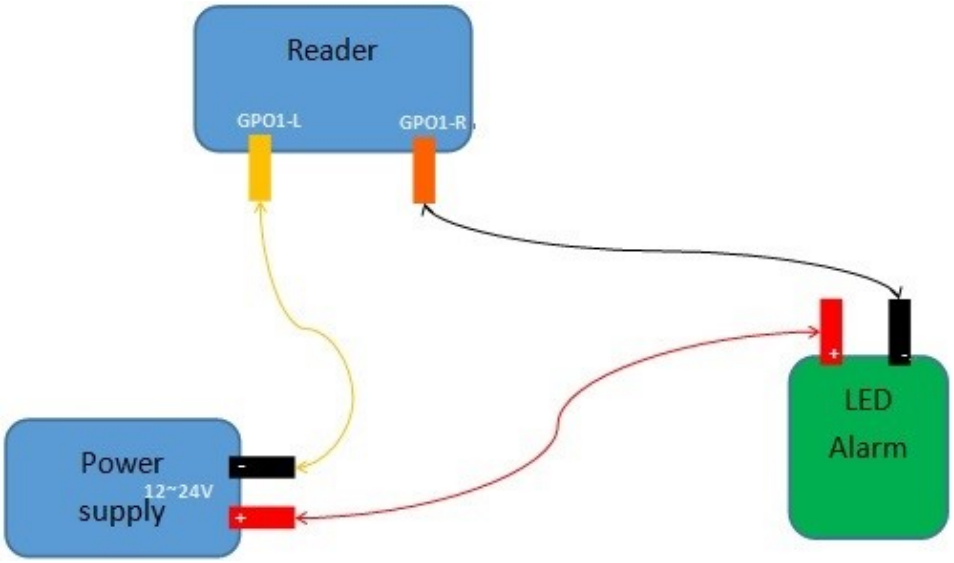
Image4-8

You can set the GPO by manually change the parameters, then click the"Set"button to submit. Setting up success and failure will be prompted.

Sample usage 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

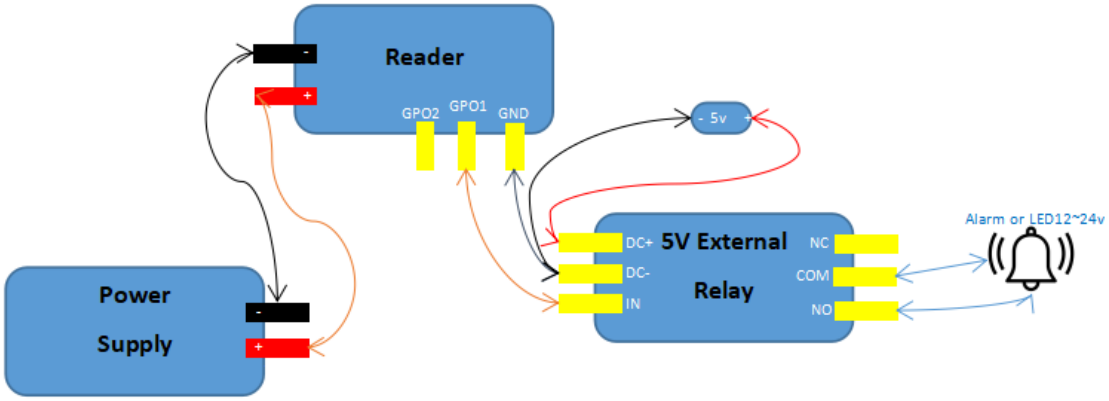


5V GPO that shared with wiegand: In this case, the GPO is not a switch. When the GPO is set to 1, the GPO will output a high level of 5V and the electric current is 10mA

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

We can use this GPO to trigger the external relay to work together with the reader.



4.2 Advanced configuration

4.2.1 TCP server/client mode

Click the toolbar "Configuration" - "Reader" - "TCP client/server" to enter the TCP server/client mode setup interface, as shown in image 4-9.

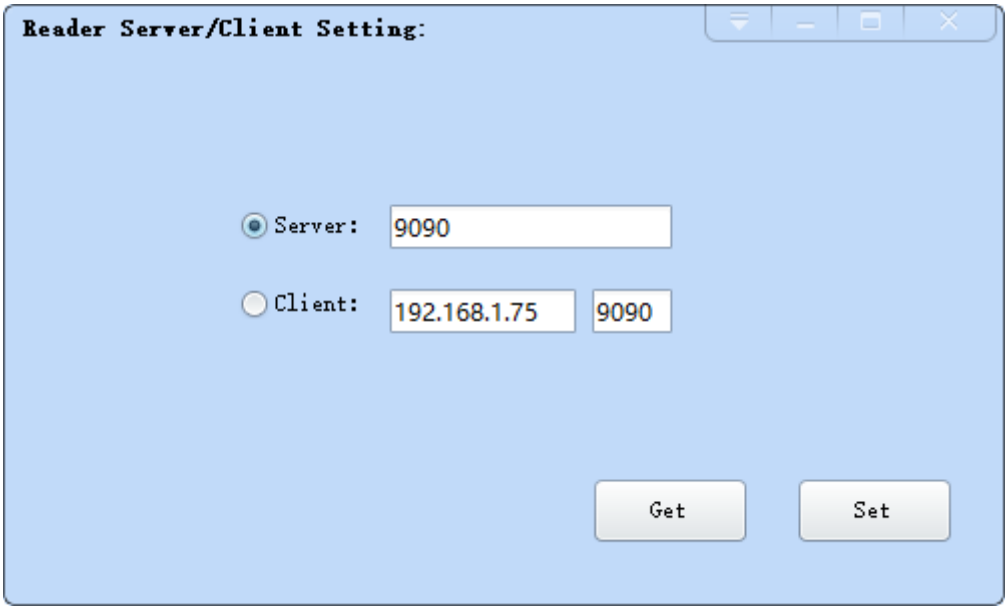


Image4-9

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.

4.2.2 Frequency hopping configuration

Click the toolbar "Configuration" - "RFID" - "Frequency Hopping" to enter the frequency hopping management setting interface, as shown in image 4-10.

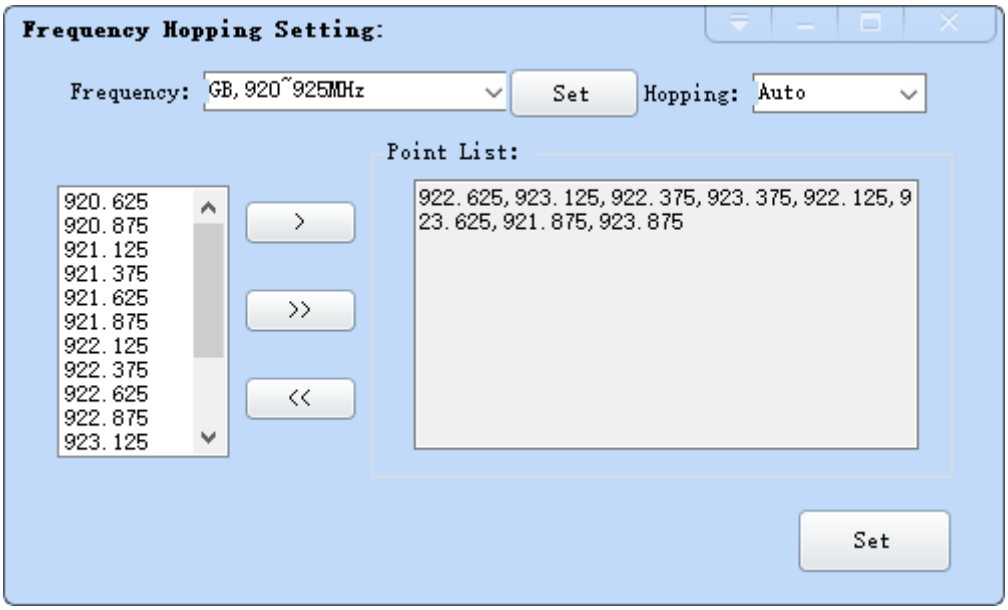


Image4-10

You can change the working frequency range of the reader in the drop-down box of Frequency and clicking "Set" to confirm, as shown in image 4-11.

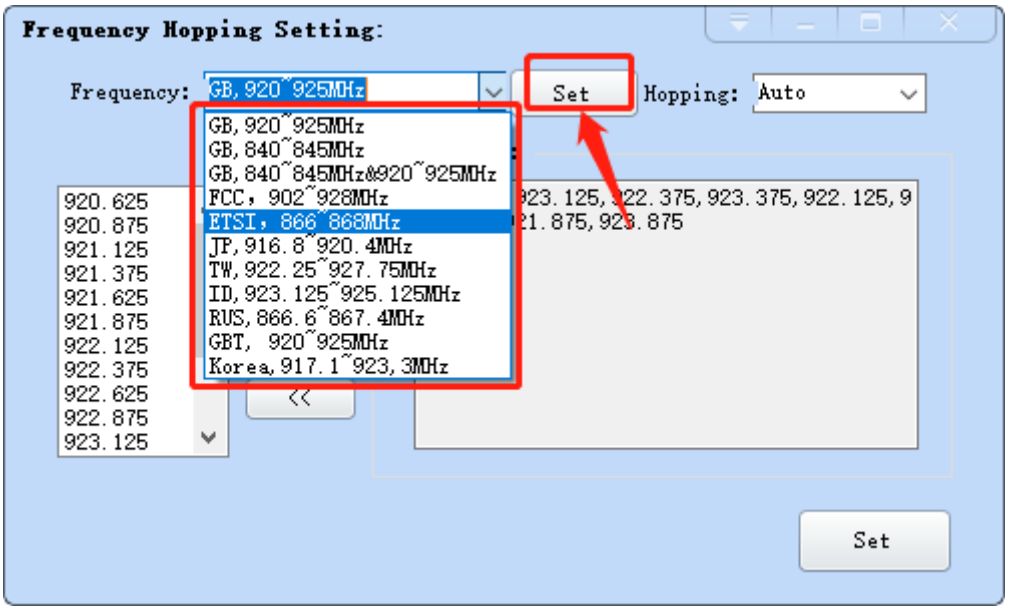


Image4-11

Modify the range by the middle three buttons to add or delete the frequency points, as shown in image 4-12.

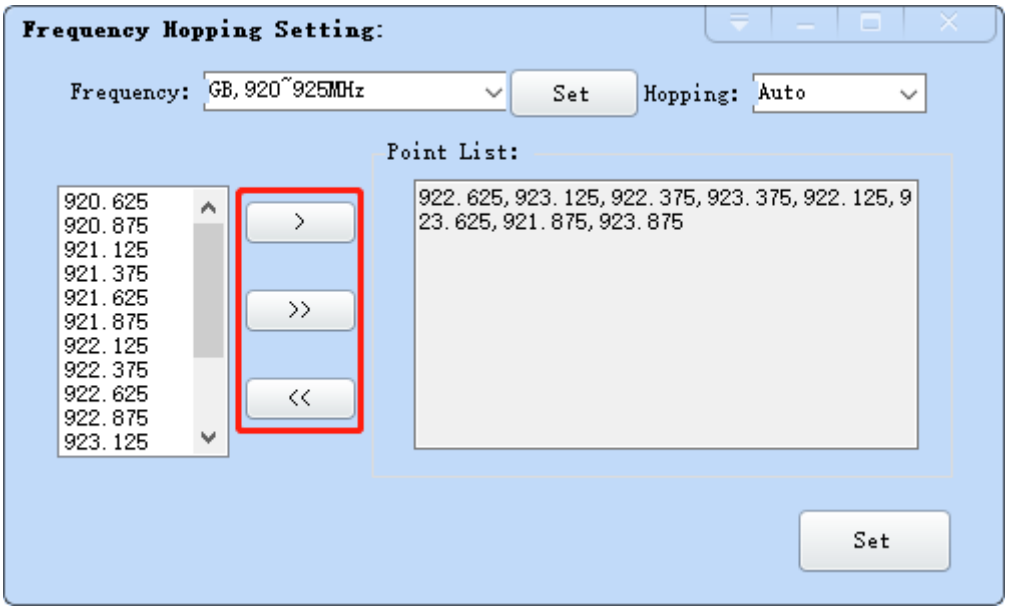


Image4-12

After the modification is complete, click on the "Set" button below to confirm the frequency range of the connected reader, Setting up success and failure will be prompted

4.2.3 Tag filter

Click the toolbar "Configuration" - "RFID" - "Tag Filter" to enter the tag filter setting interface, as shown in image 4-13.

Image4-13

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.

4.2.4 Automatic idle

Click the toolbar "Configuration" - "RFID" - "Auto Free" to enter the automatic idle setting interface, as shown in image 4-14.

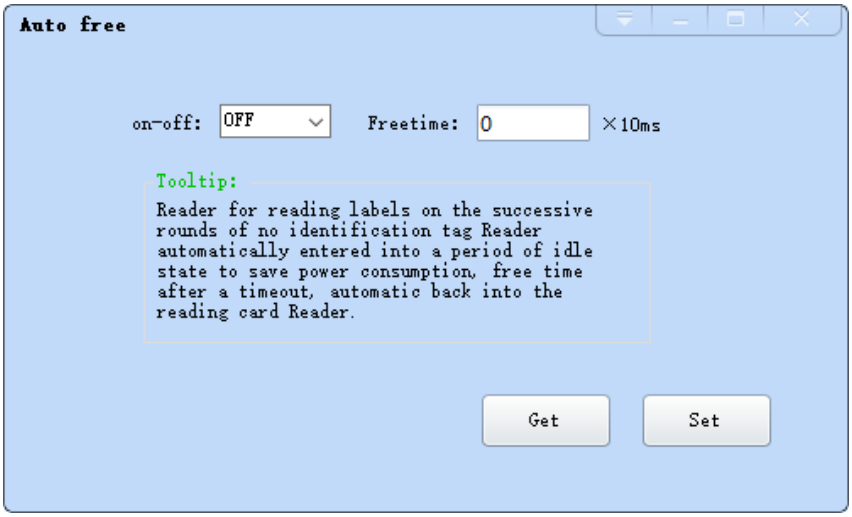


Image4-14

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.

4.2.5 Wiegand configuration

Click the toolbar "Configuration" - "GPI/O" - "Wiegand" to enter the wiegand configuration interface, as shown in image 4-15.

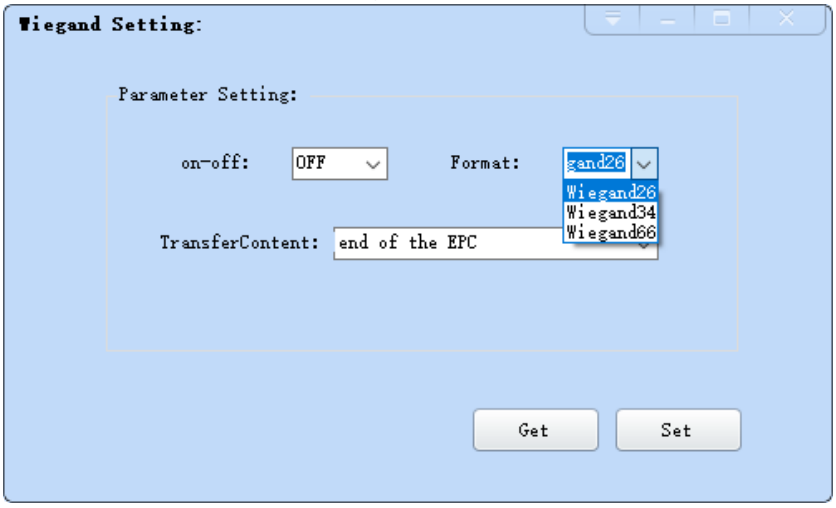
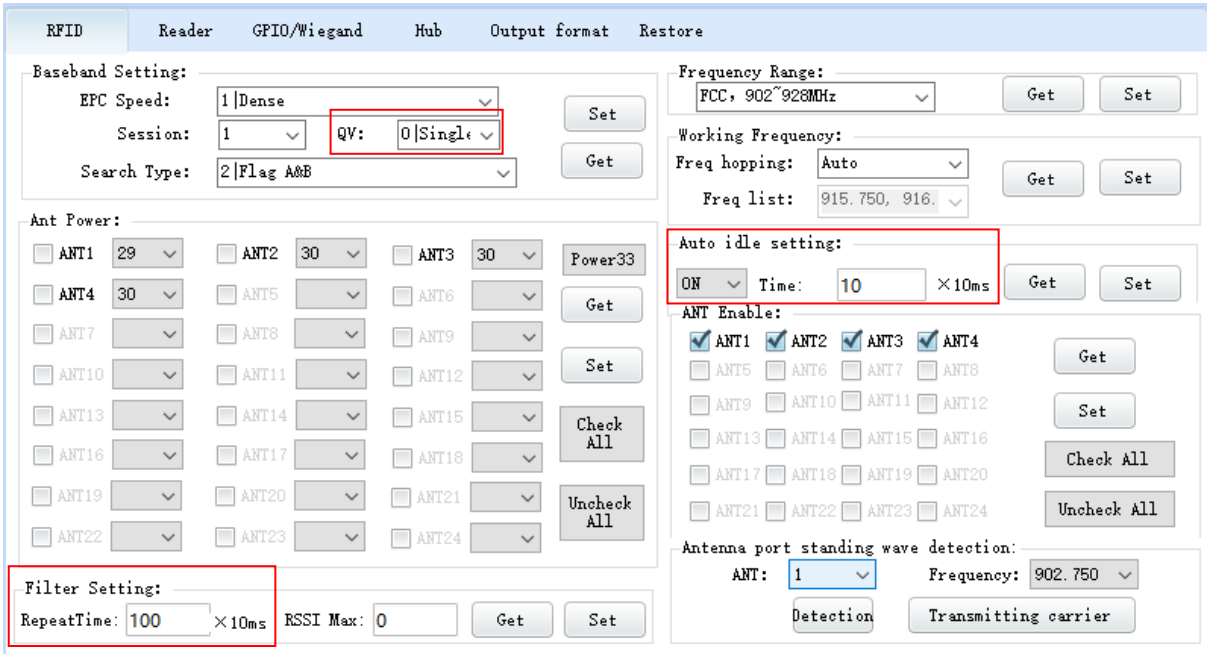


Image4-15

Click the "Get" button to get the current Wiegand configuration information, change the Wiegand configuration information, then click the "Set" button to confirm, Setting up success and failure will be prompted

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

a) Connect with PC via RJ45, USB or RS232. Enter setting: Configuration - Advanced - RFID
   1. QV (Q value), set to 0|single,
   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.

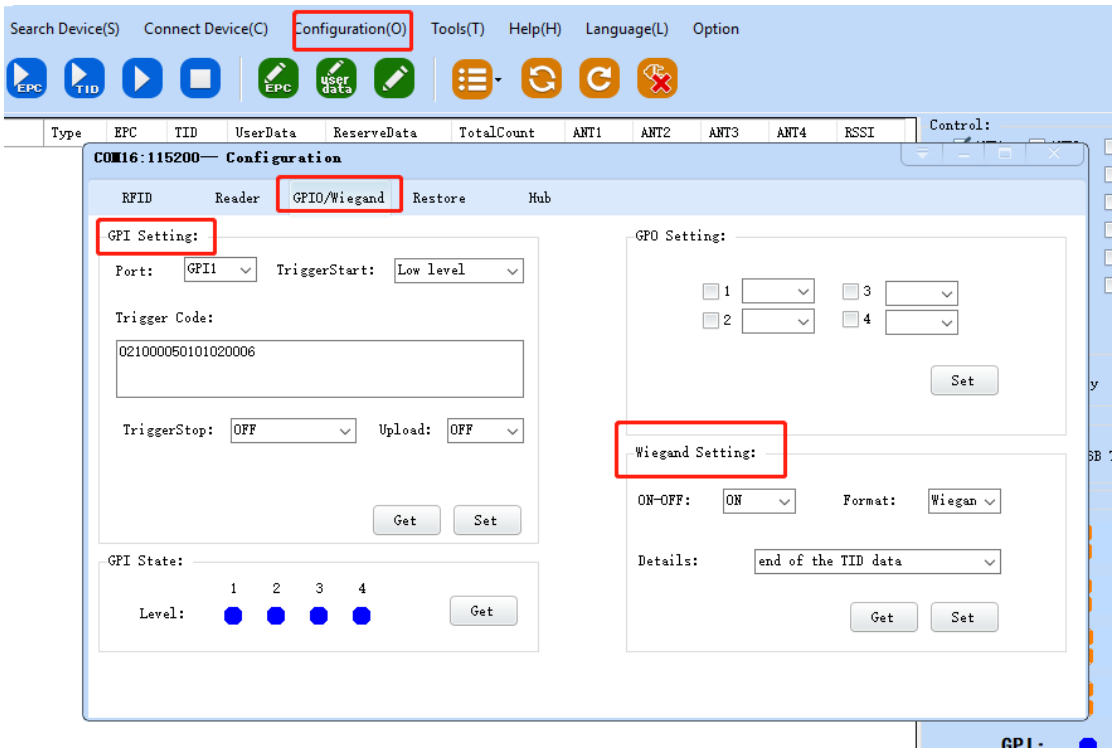


b) Set the GPI to implement the auto read when power on, low level is a special design for the trigger start option to implement auto read when power on without any external sensor.

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

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 (Same as GPI setting)



d). Connect reader Wiegand0 with controller Wiegand0, connect reader Wiegand1 with controller Wiegand1, connect the reader ground to the controller ground.

4.2.6 Factory data reset

Click the toolbar "Configuration"- "Restore Factory" will pop up a prompt box to determine whether to restore the reader, as shown in image 4-16.

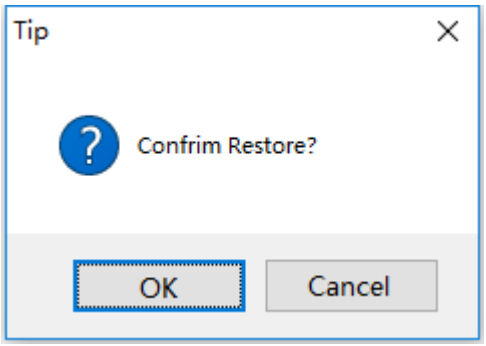


Image4-16

The restore setting means that all other configurations are changed to factory settings except that the reader's MAC remains unchanged.

4.2.7 Breakpoint resume

Click the toolbar "configure" - "advanced" to open the configuration main panel.

The position of breakpoint setting is shown in image 4-21.

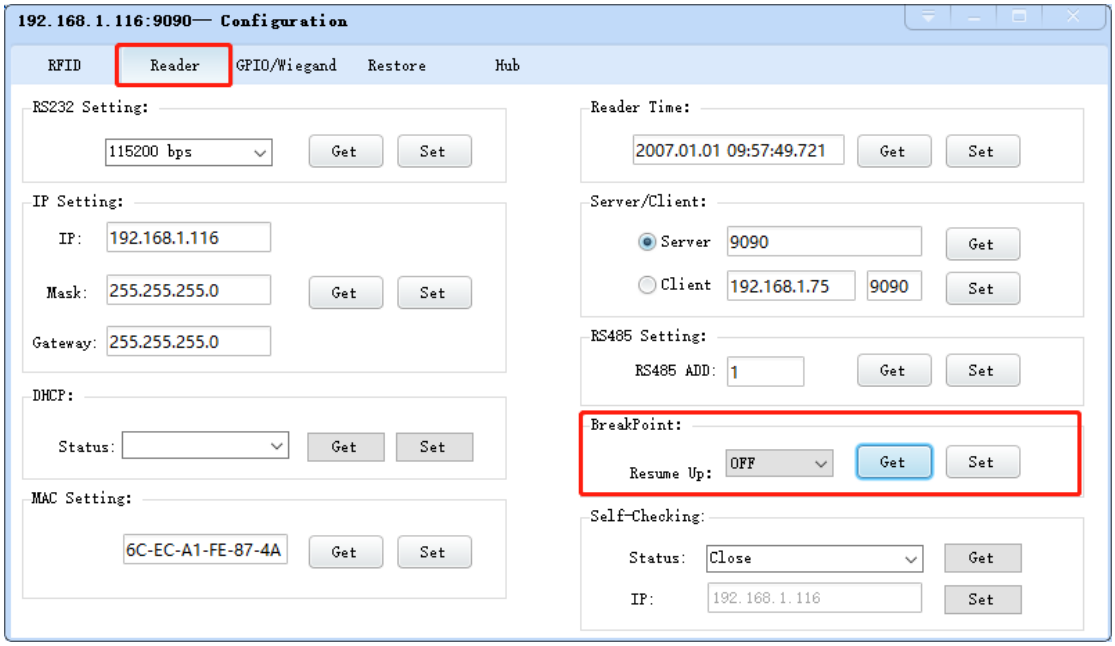


Image4-21

Breakpoint resume indicates that during the reading tags period, if suddenly disconnected, whether it will automatically save the data into reader's cache. After re-connecting reader, we could get the data through 4.2.8(Get cache data) to recover the cache data, only limited to internet port.

4.2.8 Get cache data

When the reader is reading tags, if the connection suddenly disconnect but the antenna indicator light is still flashing , the tag data was read(after the connection is disconnected) will be stored in the reader's memory. After reconnecting the reader, click on the toolbar "Configuration" - "Get Cache". The data read from reader when the connection is disconnected will be updated to the list.

4.2.9 Clear the cache data

Click the toolbar "Configuration" - "clear cache data" to clear the current reader cache.

4.2.10 EPC baseband configuration

Click the toolbar "Configuration""-"Advanced" to open the configuration panel, the position of baseband setting is shown in image 4-17.

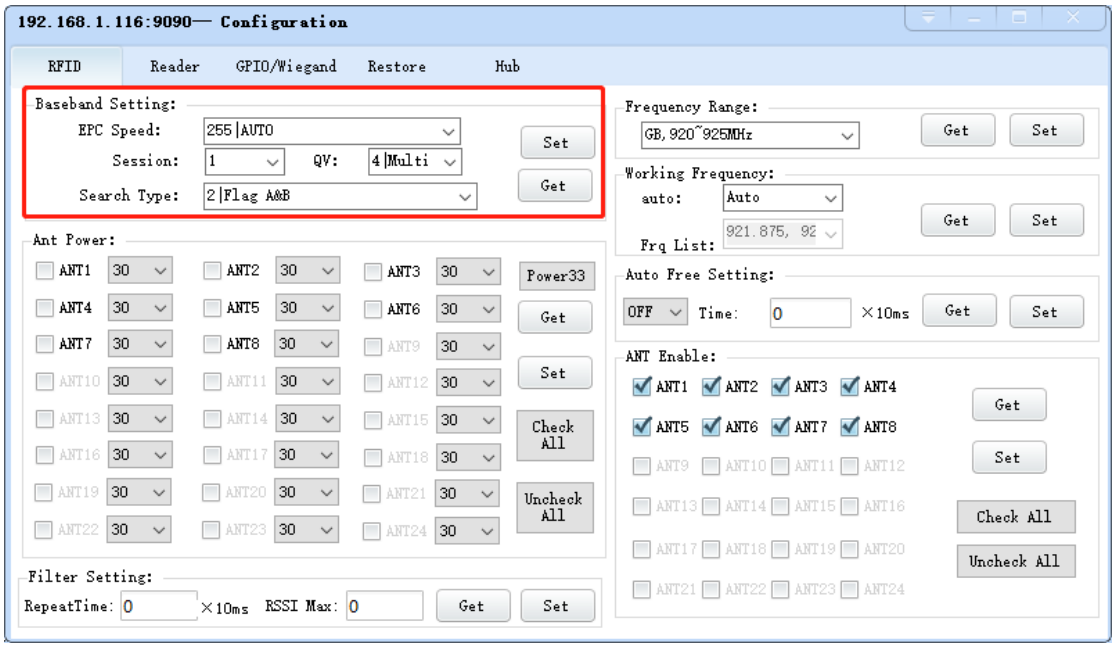


Image4-17

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

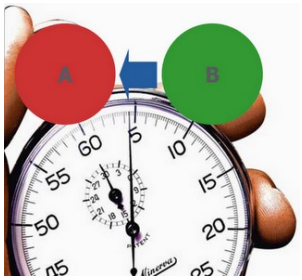
The EPC GEN 2 standard allows for up to four sessions; these sessions serve two purposes:

- 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

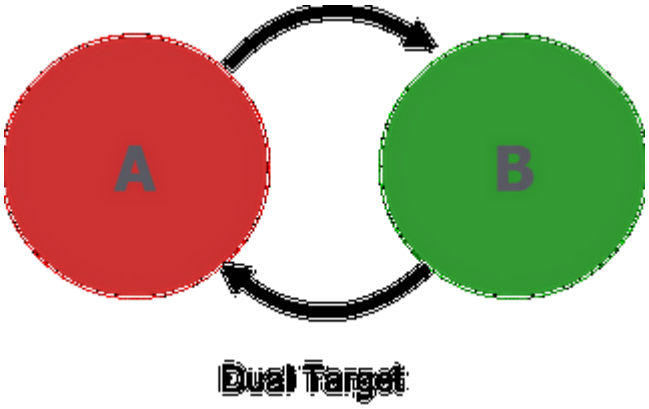


Once the RFID reader inventories the tag, the flag state is changed from 'A' to 'B' – how long the tag stays in the 'B' state before reverting back to the 'A' state is called "persistence". It is important to realize that exact persistence times cannot be set by the user; they can only be approximated 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.

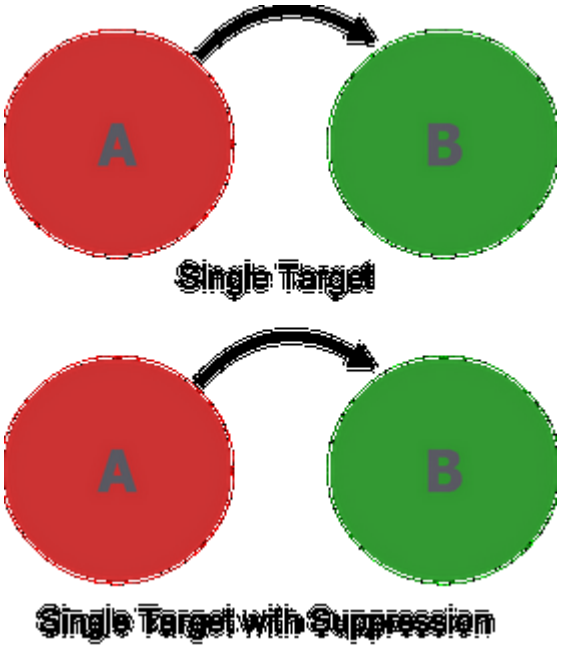
Search Modes

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).



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.

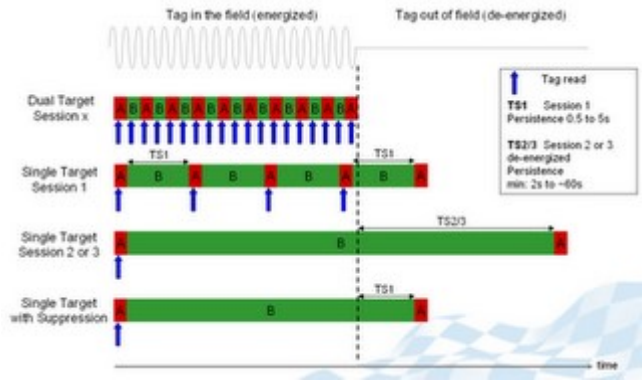
This search mode generates many reads and is good for small populations or static environments (i.e.smart shelf).



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.

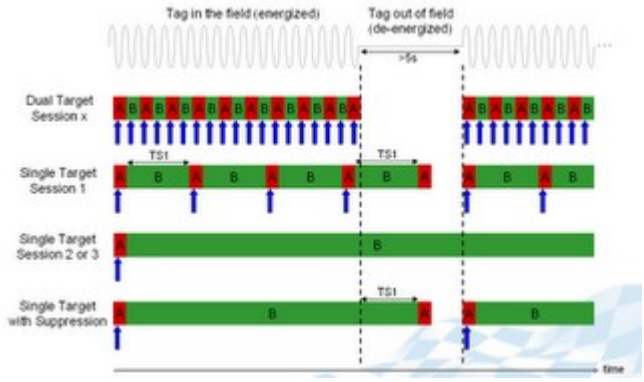
In Dual Target, the tag will be read continuously regardless of tag state 'A' or 'B'; the Session setting has no influence.

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.

4.2.11 DHCP configuration

Click the toolbar "configure" - "advanced" to open the configuration main panel. The position of DHCP setting is shown in image 4-18.

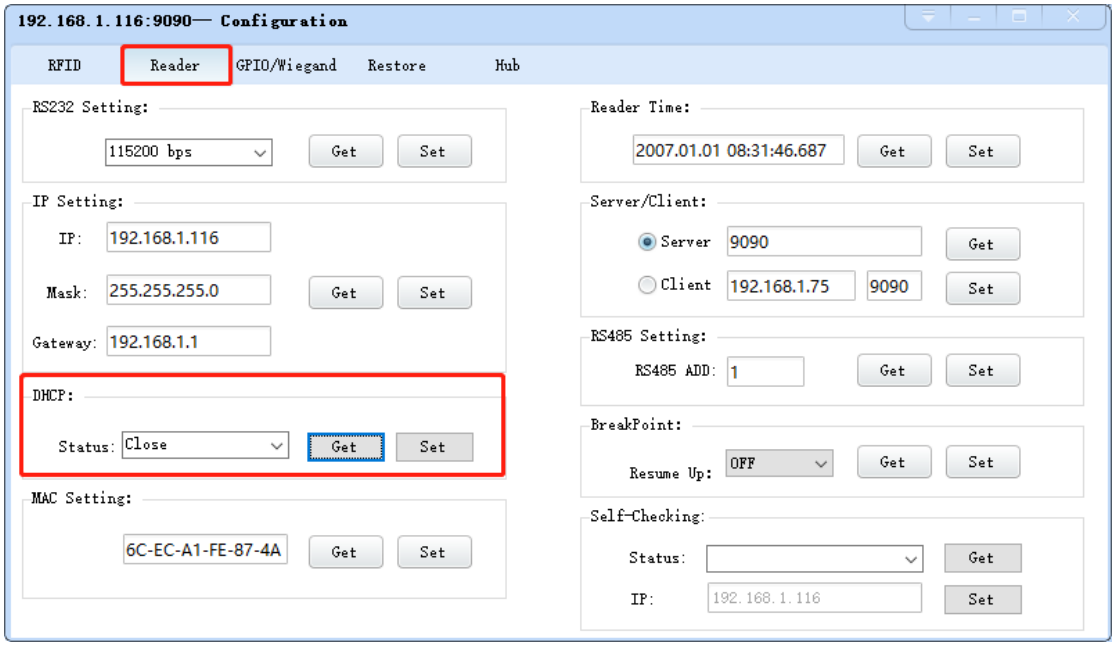


Image4-18

DHCP configuration indicates that the reader is gaining the IP address from router or not, if DHCP configuration closed, then IP setting is available, if DHCP configuration is open, then the IP setting is not available. As below image 4-19, this function needs reader to support.

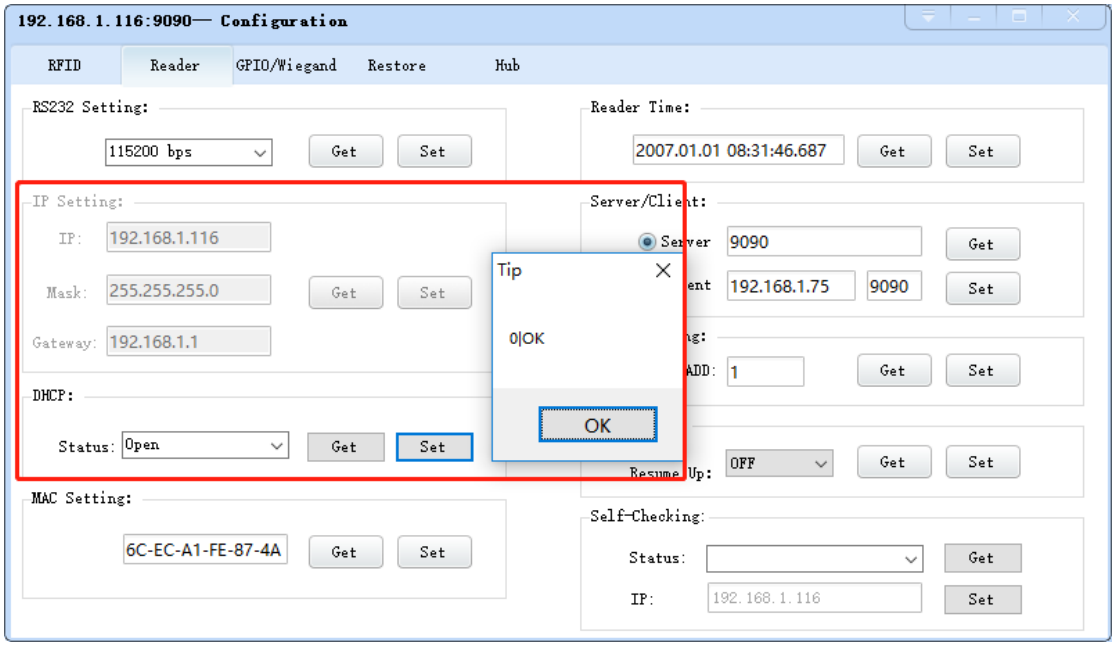


Image4-19

4.2.12 Network self-checking

Click the toolbar "configure" - "advanced" to open the configuration main panel. The position of network self-checking is shown in image 4-20.

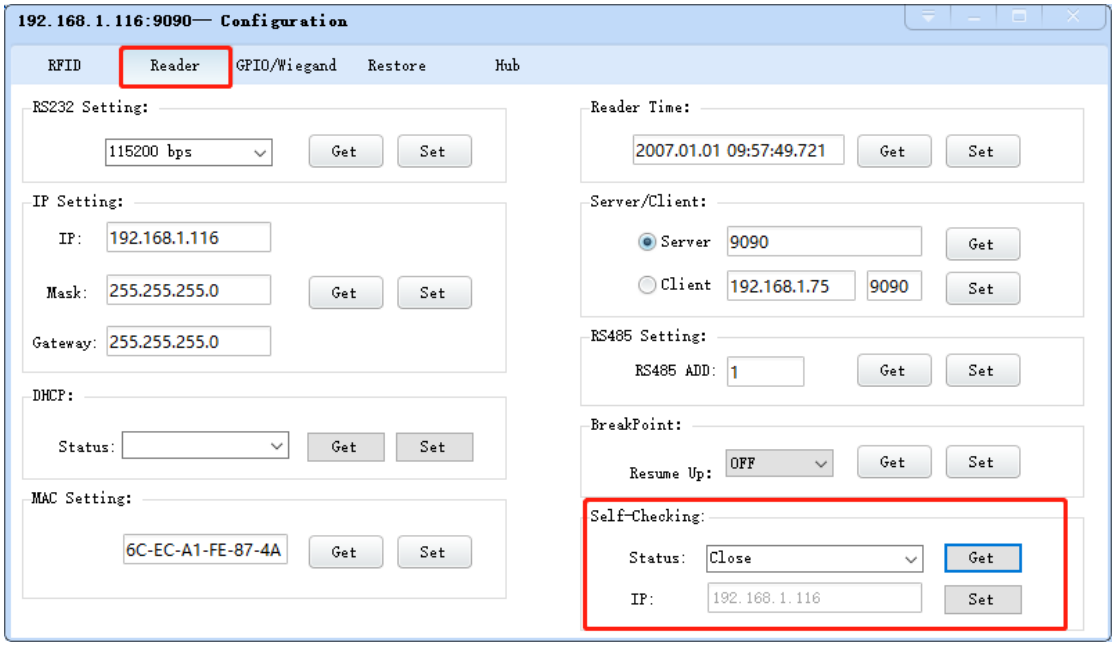


Image4-20

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.

4.2.13 Antenna hub configuration

Click "configure" - "advanced" in the toolbar to open the configuration main panel. The position of the antenna hub configuration is shown in image 4-22.

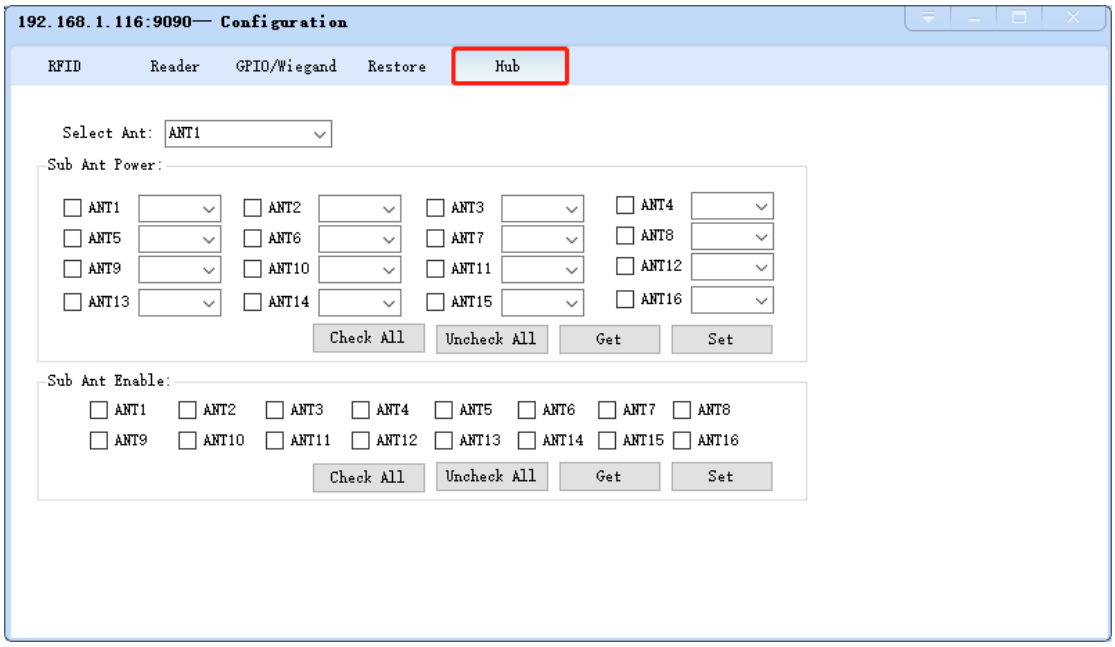


Image4-22

Select antenna of the reader firstly, then configure the hub's sub antennas, each sub antenna's output RF power and enable status can be separately setting up. This function requires the reader works with antenna hub.

5.Advanced operation

5.1 Custom read

If you need to read the user data or reserved data, then you need the advanced operation. It could control the reading area freely, click this button  to enter the advanced reading interface, as shown in image 5-1.

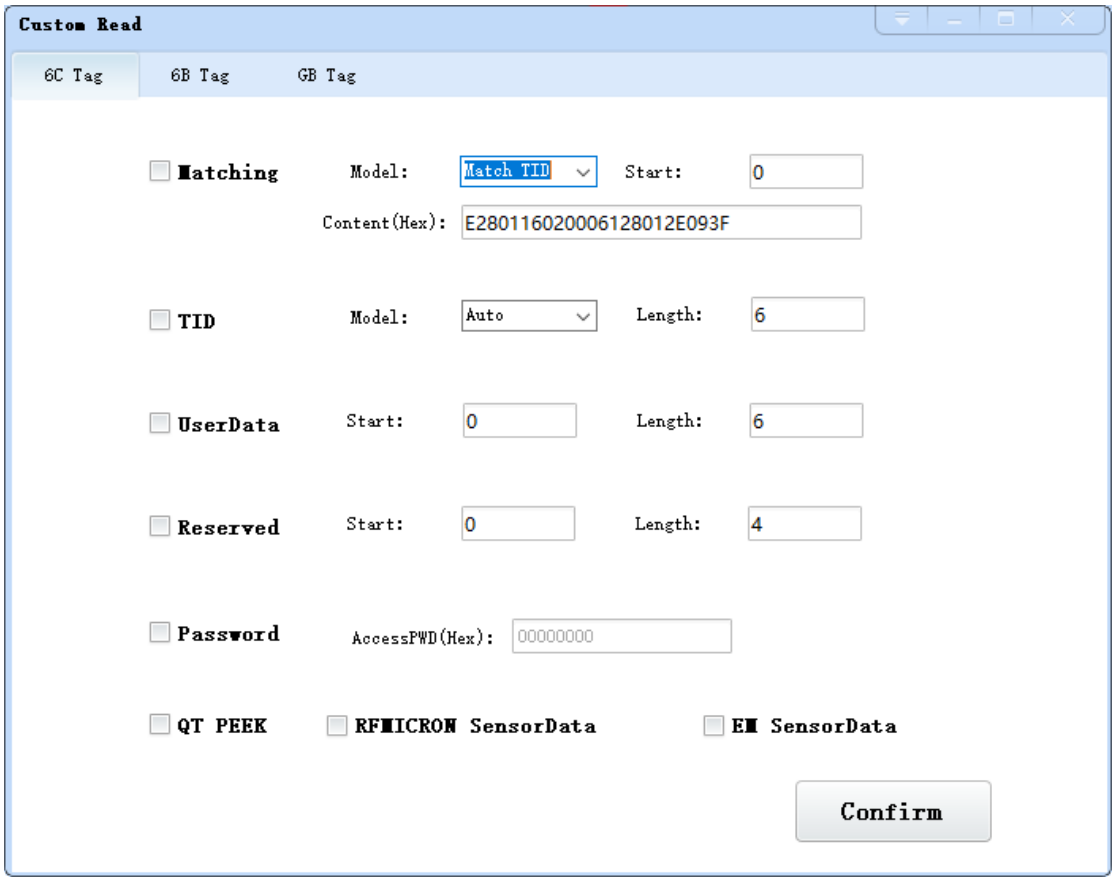


Image5-1

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, click confirm, reader will read according to the configuration, if there is any tag match the configuration, the interface will update 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.

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, 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

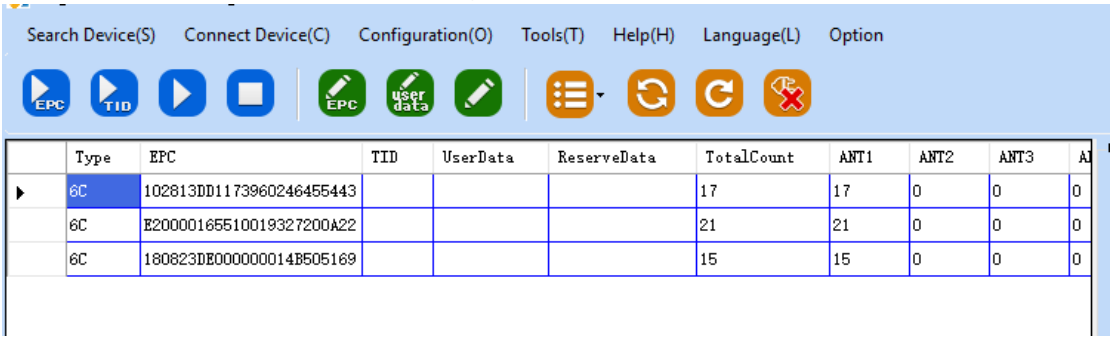
If the reader is allowed to read only the tags that match the rule, the rule is defined in accordance with the TID bank of the tag memory. The 12 digits starting from the 13th digit of the TID, FA000093C04F, will be read. Otherwise, does not be read.

Then the arguments should be filled as:

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

For example, there are 3 tags, the length of each tag's EPC is 96bits, that is 24 hexadecimal numbers.

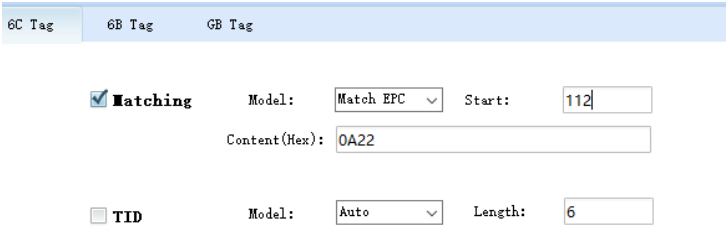
Take EPC as the matching condition, if we want the reader only to read the tags whose EPC with 0A22 as the last 4 digits



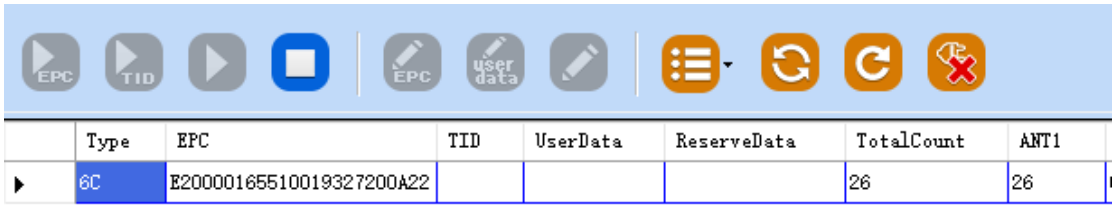
	Type	EPC	TID	UserData	ReserveData	TotalCount	ANT1	ANT2	ANT3	A
▶	6C	102813DD1173960246455443				17	17	0	0	0
	6C	E2000016551001932720 0A22				21	21	0	0	0
	6C	180823DE000000014B505169				15	15	0	0	0

In the custom read interface, check Matching, select Match EPC for model option, inputs 112 to the start textbox, inputs 02AA 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

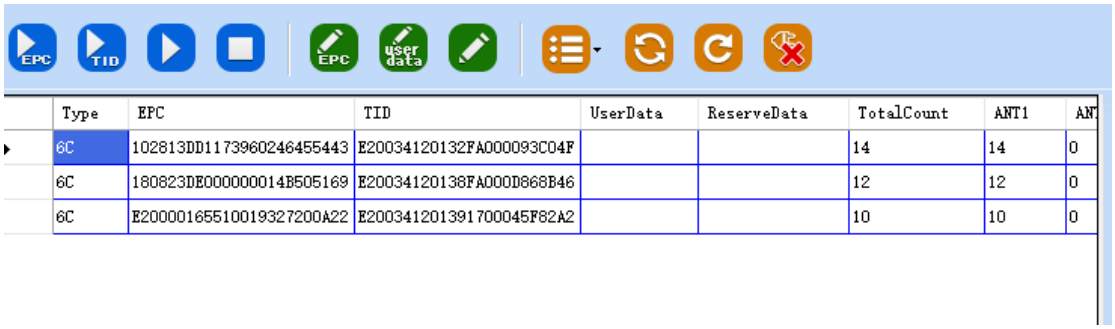


The custom read result is shown as below screenshot



	Type	EPC	TID	UserData	ReserveData	TotalCount	ANT1
▶	6C	E200001655100193272 00A22				26	26

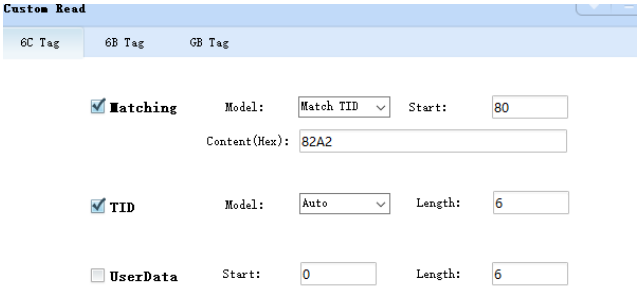
Take TID as the matching condition, if we want the reader only to read the tags whose TID with 82A2 as the last 4 digits



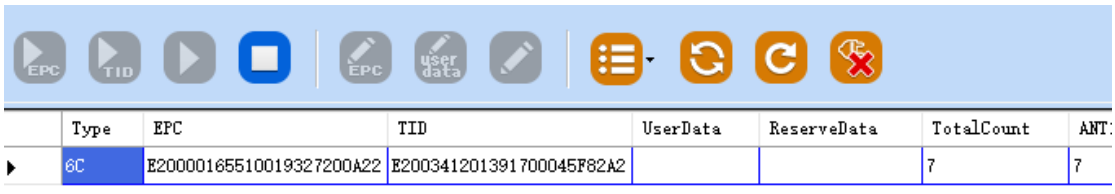
	Type	EPC	TID	UserData	ReserveData	TotalCount	ANT1	ANT
▶	6C	102813DD1173960246455443	E20034120132FA000093C04F			14	14	0
	6C	180823DE000000014B505169	E20034120138FA000D868B46			12	12	0
	6C	E200001655100193272 00A22	E20034120139170 0045F82A2			10	10	0

In the custom read interface, check Matching, select Match TID for model option, inputs 80 to the start textbox, inputs 82A2 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	ReserveData	TotalCount	ANT1
▶	6C	E200001655100193272 00A22	E20034120139170 0045F82A2			7	7

5.2 Advanced write

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

button  to open advanced writing interface, as shown in image 5-2.

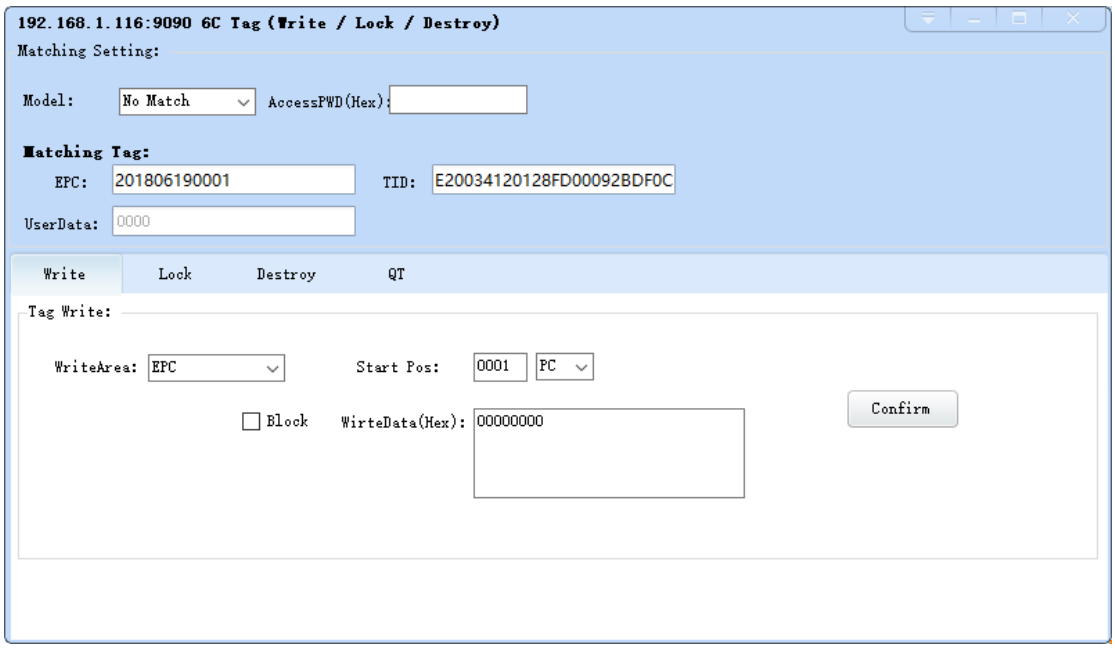


Image5-2

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

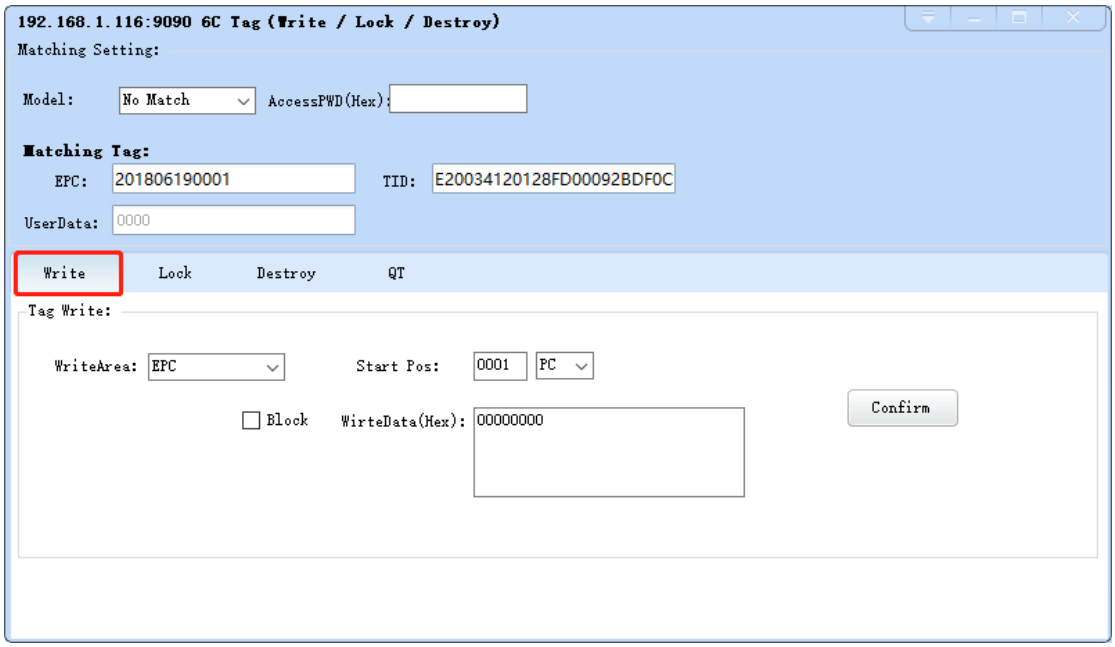


Image5-3

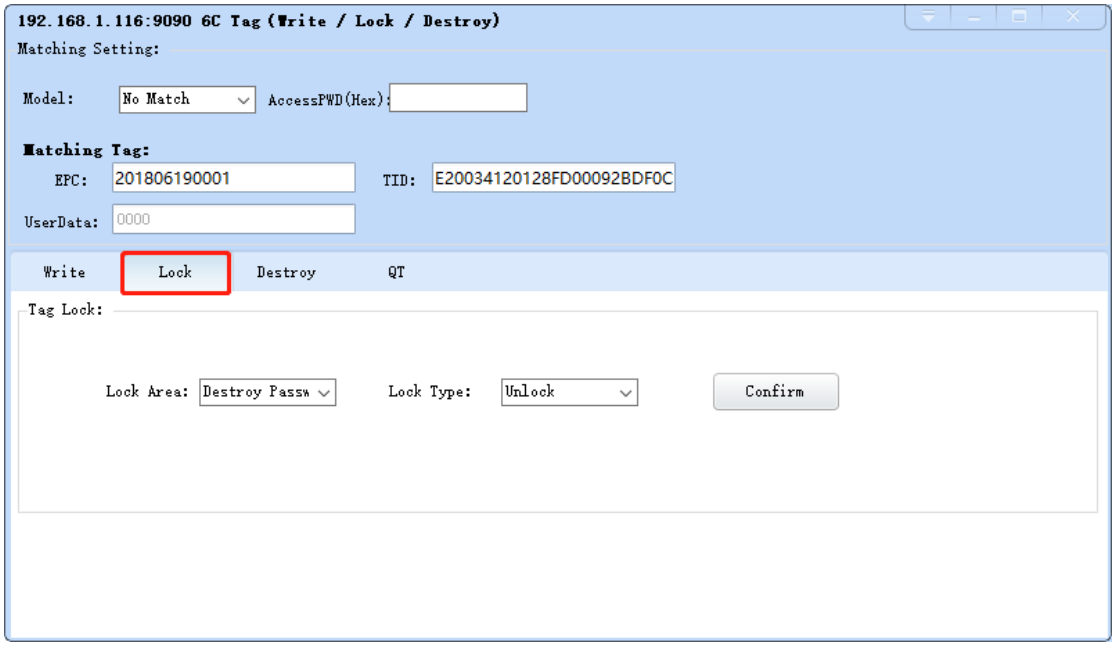


Image5-4

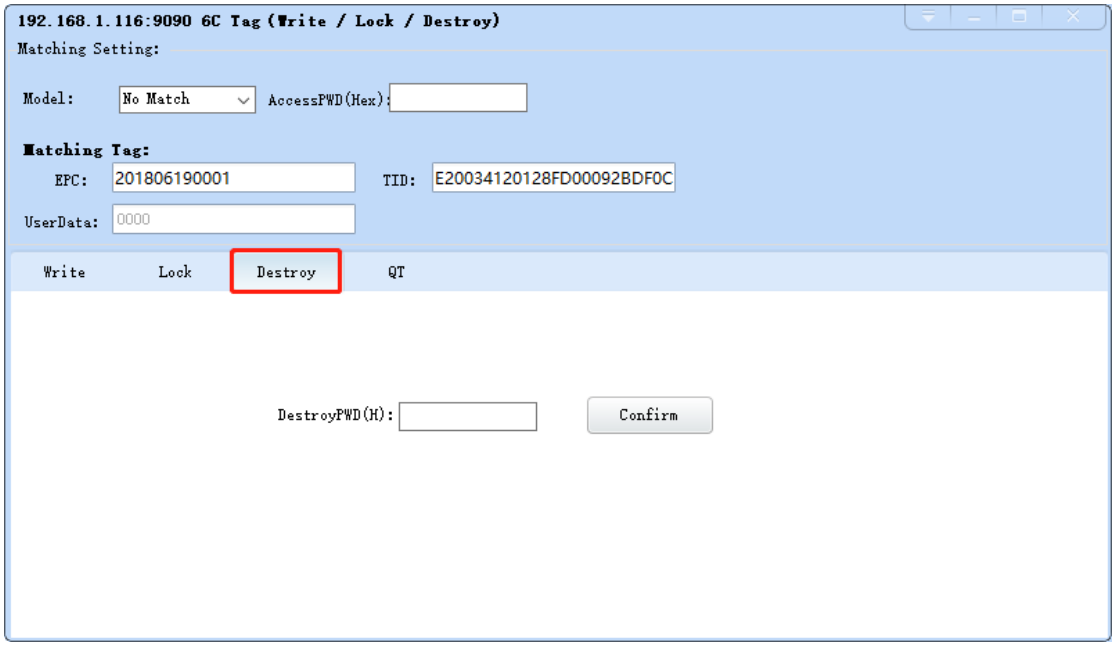


Image5-5

The address length unit is word, and the content is hexadecimal data. After modifying the setting option, click the confirm button on the right side for operation, and the next operation can be carried out according to the prompt.

5.3 Debug switch

Click the toolbar "Tools" - "Debug" to turn on or off the reader debug information, mainly showing hexadecimal instructions sent and received by the reader, as shown in

image 5-6.

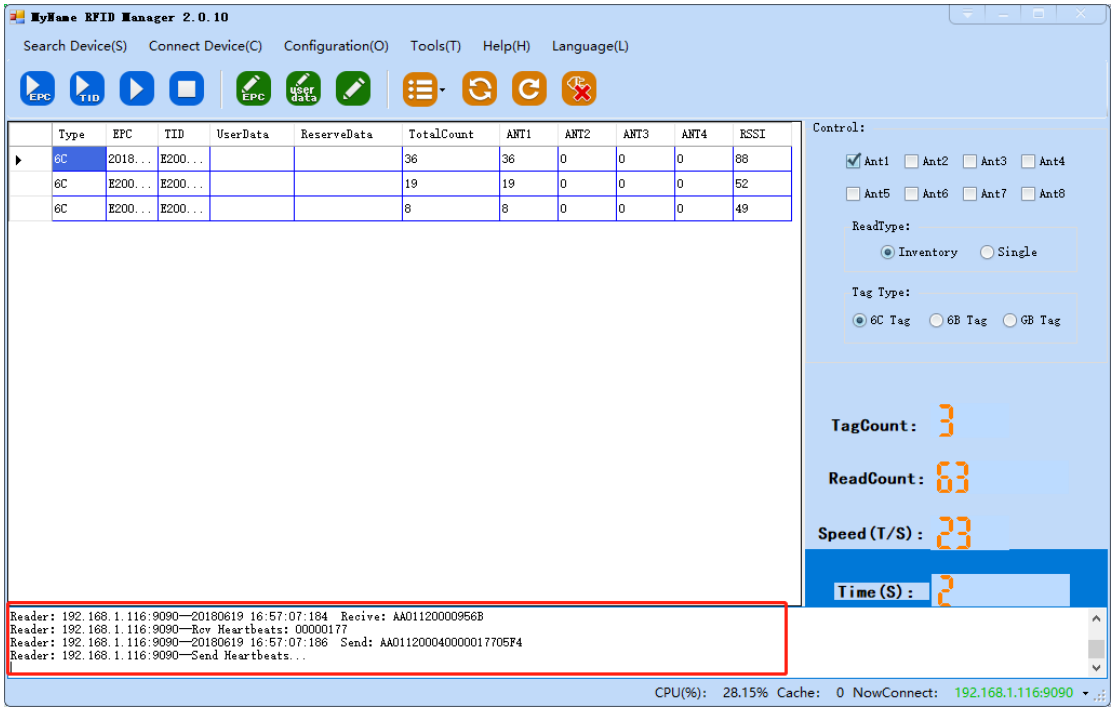


Image5-6

5.4 Sound

Click "Tools" - "Sound" in the toolbar to set the operation sound of the reader, as shown in image 5-7.

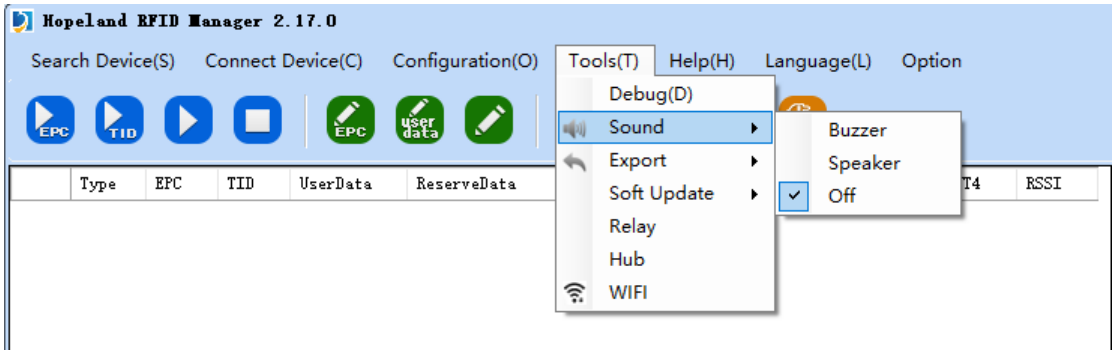


Image5-7

You can set whether the buzzer is ringing or the speaker is ringing or you can turn it off. It's not the voice of the reader, it's the voice of the PC.

5.5 Data export

Click "Tools" - "Export" in the toolbar to export the label information in the list to the file, which can be saved as.csv file and.xls file, as shown in image 5-8, image 5-9 and

image 5-10.

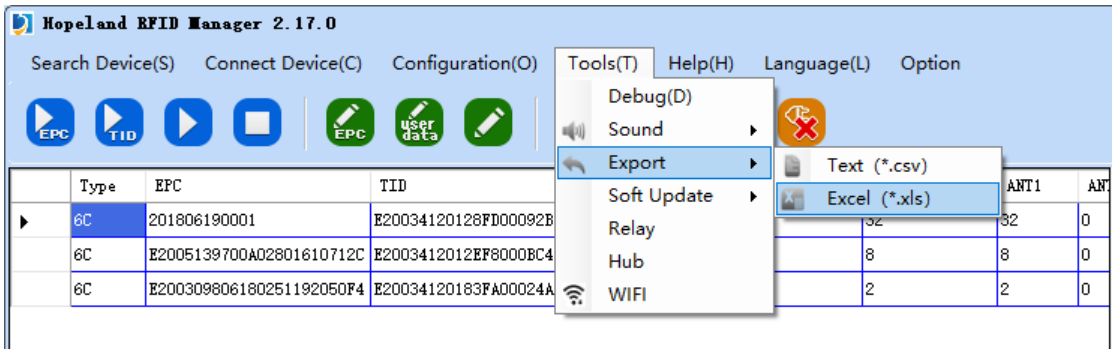


Image5-8

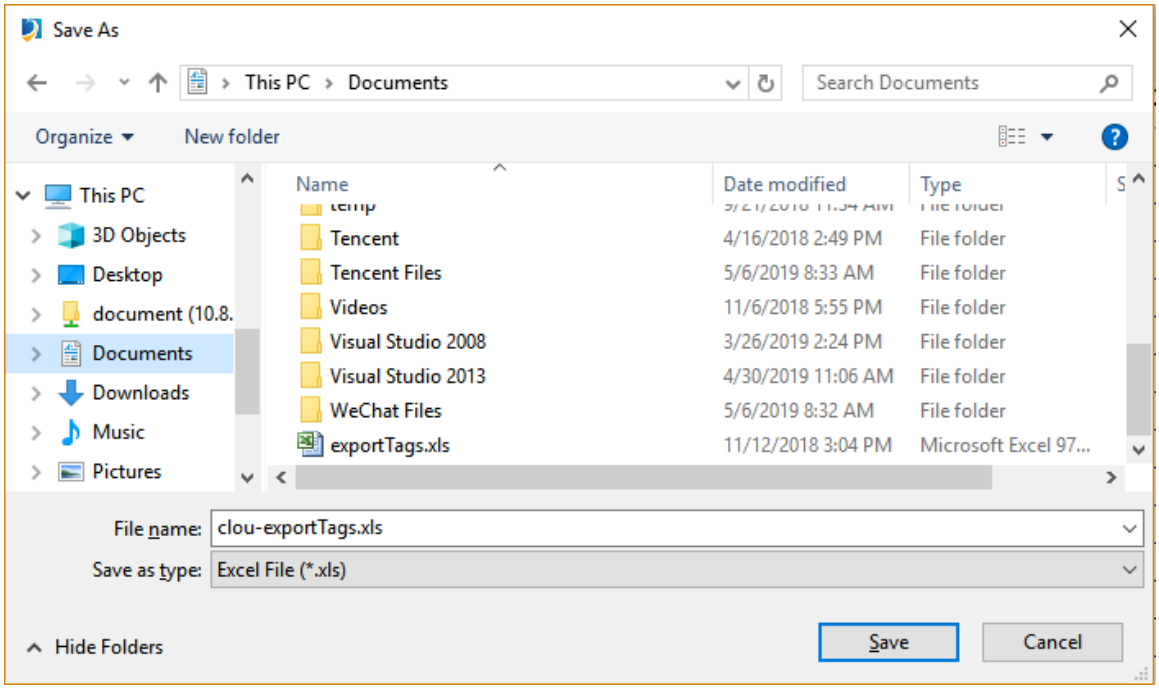
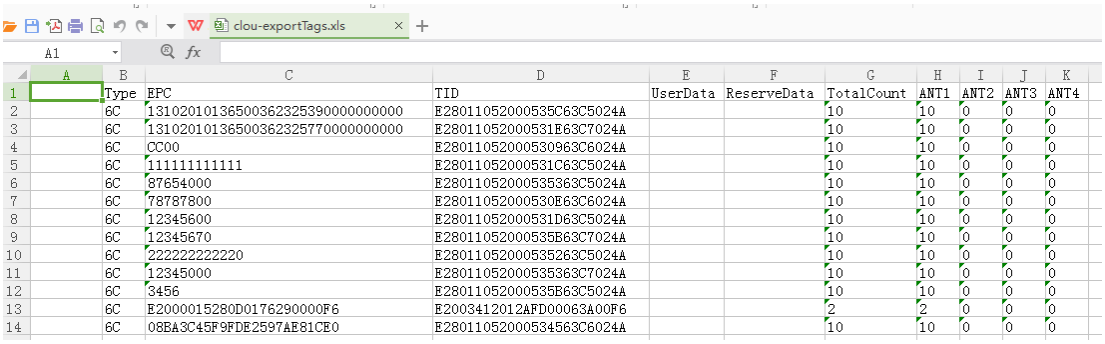


Image5-9



clou-exportTags.xls

	A	B	C	D	E	F	G	H	I	J	K
1		Type	EPC	TID	UserData	ReserveData	TotalCount	ANT1	ANT2	ANT3	ANT4
2		6C	131020101365003623253900000000000	E28011052000535C63C5024A			10	10	0	0	0
3		6C	131020101365003623257700000000000	E28011052000531E63C7024A			10	10	0	0	0
4		6C	CC00	E28011052000530963C6024A			10	10	0	0	0
5		6C	111111111111	E28011052000531C63C5024A			10	10	0	0	0
6		6C	87654000	E28011052000535363C5024A			10	10	0	0	0
7		6C	78787800	E28011052000530E63C6024A			10	10	0	0	0
8		6C	12345600	E28011052000531D63C5024A			10	10	0	0	0
9		6C	12345670	E28011052000535B63C7024A			10	10	0	0	0
10		6C	222222222220	E28011052000535263C5024A			10	10	0	0	0
11		6C	12345000	E28011052000535363C7024A			10	10	0	0	0
12		6C	3456	E28011052000535B63C5024A			10	10	0	0	0
13		6C	E2000015280D0176290000F6	E2003412012AFD00063A00F6			2	2	0	0	0
14		6C	08BA3C45F9FDE2597AE81CE0	E28011052000534563C6024A			10	10	0	0	0

Image5-10

5.6 Software upgrade

5.6.1 Application software upgrade

Click the toolbar "Tools" - "Soft Update" - "Application" to enter the application software upgrade interface, as shown in image 5-11.

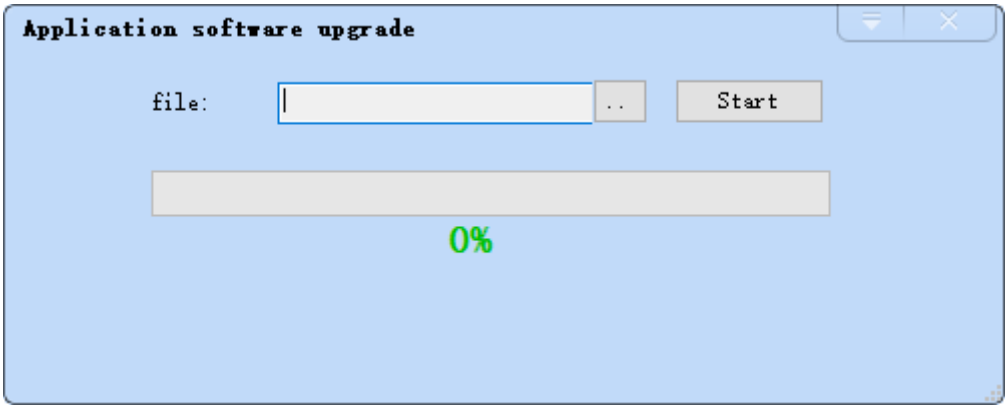


Image5-11

Click .. pop-up the selection file dialog, select the application upgrade software, as shown in image 5-12.

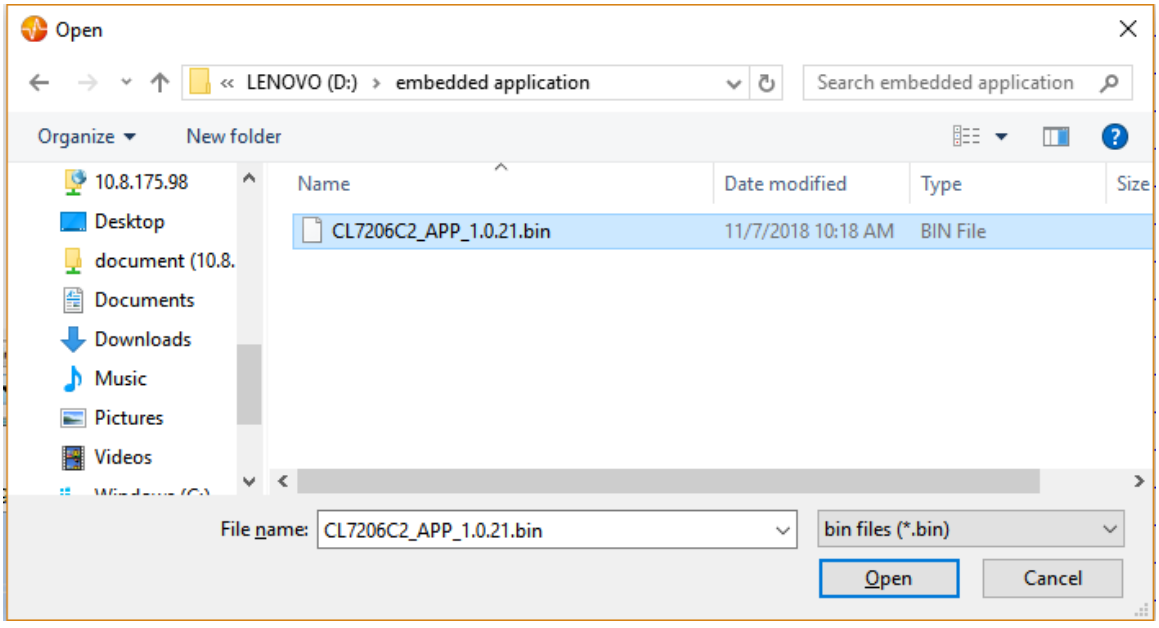


Image5-12

Click on "Open" - "Start" to perform the upgrade, as shown in image 5-13.

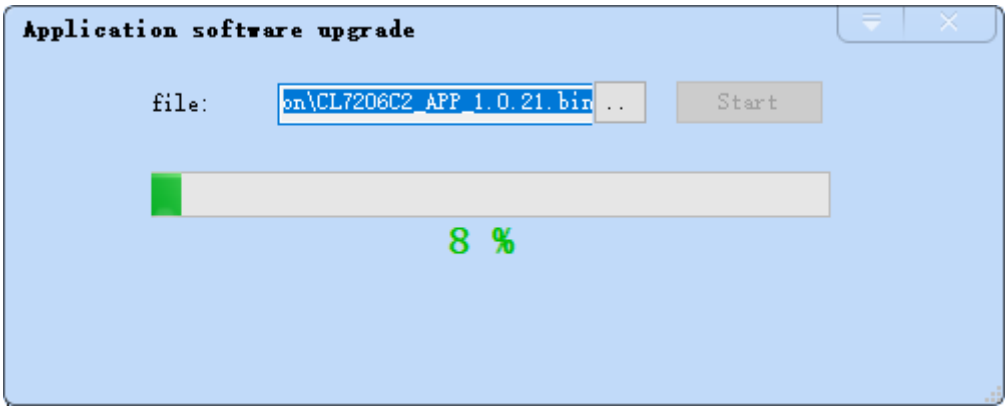


Image5-13

Tips after success upgrade, as shown in image 5-14.

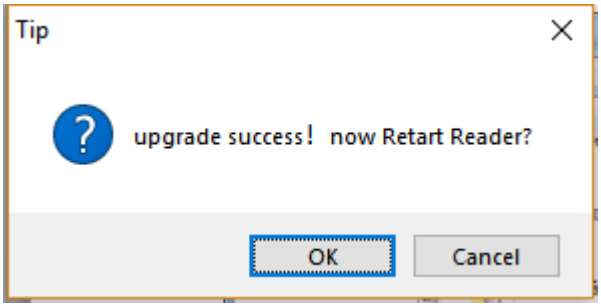


Image5-14

Click "OK" to restart the reader for the setting to take effect. if tips failure, Please follow the failure prompt for the next step to upgrade again.

5.6.2 Baseband software upgrade

Click the toolbar "Tools" - "Soft Update" - "Baseband" to enter the baseband software upgrade interface, as shown in image 5-15.

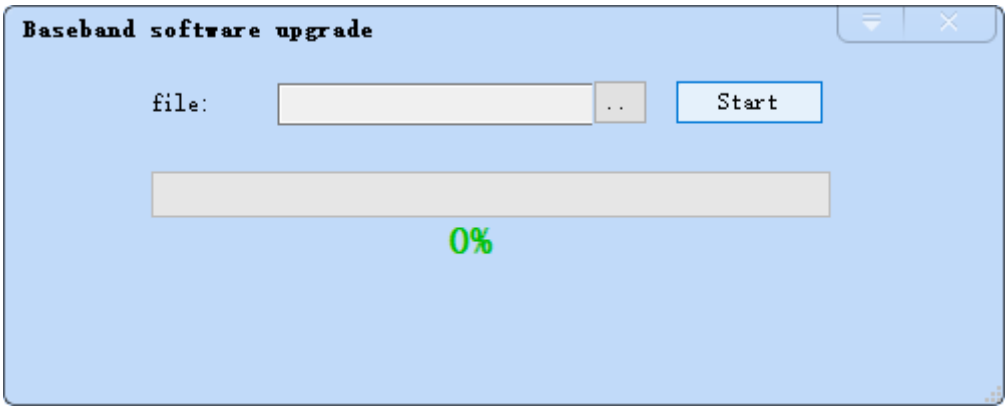


Image5-15

Click  pop-up the selection file dialog, select the baseband upgrade software, , as shown in image 5-16.

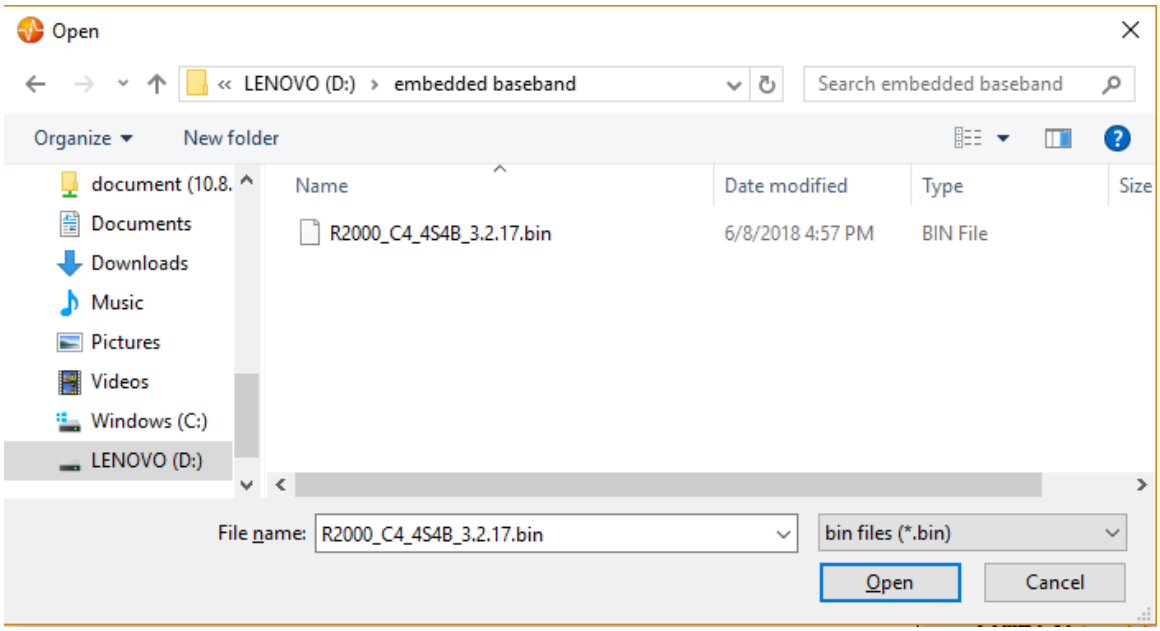


Image5-16

Click on "Open" - "Start" to perform the upgrade, as shown in image 5-17.

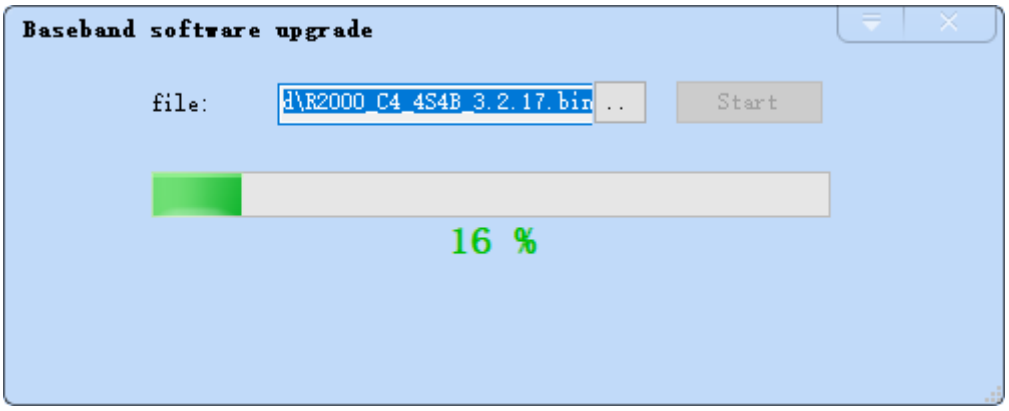


Image5-17

Tips after success upgrade, as shown in image 5-18.

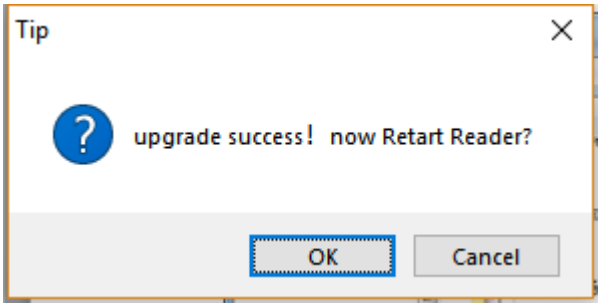


Image5-18

Click "confirm" to restart the reader for the setting to take effect. if tips failure,Please follow the failure prompt for the next step to upgrade again.

5.7 Relay

Relay configuration is similar to GPO, refer to image 4.1.8.

5.8 Hub

Click "Tools" - "Hub" in the toolbar to open the hub reading interface, as shown in image 5-19.

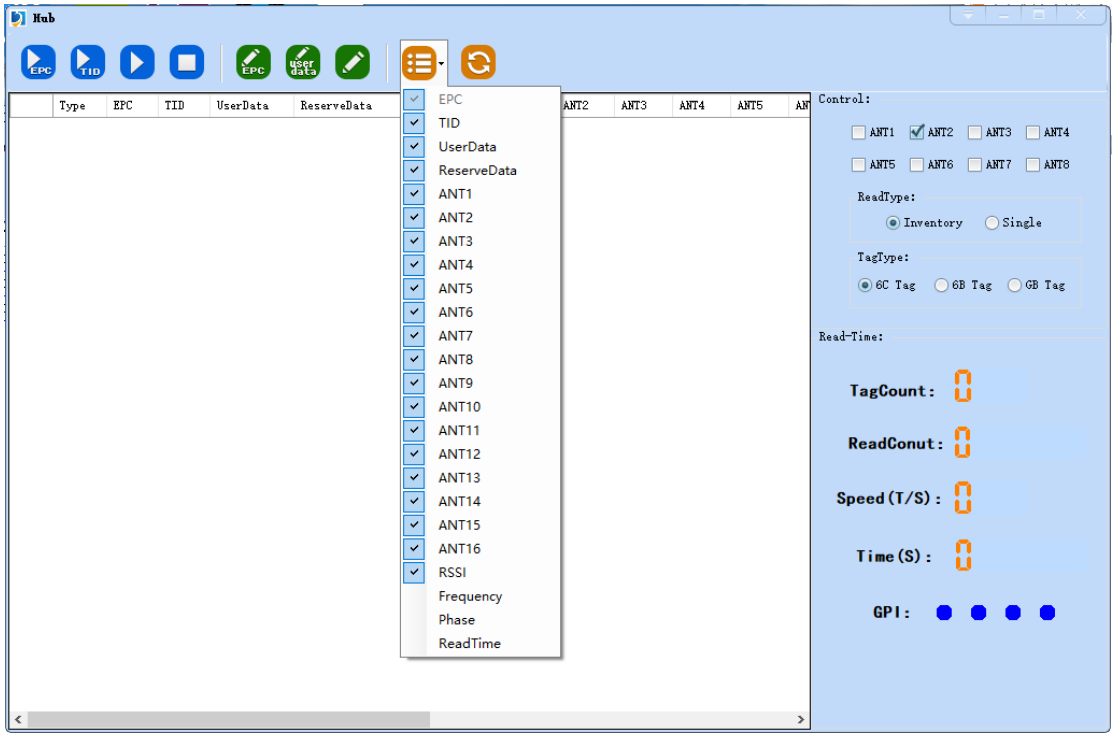


Image5-19

Hub reading interface is similar to the main interface, only difference is there are 16 ANT numbers from ANT1 TO ANT16, which means the sub antenna number expanded from the hub. The other operation are all the same as the main interface, refer to the Quick Use Section.

5.9 WIFI

Note: WIFI function requires reader support.

First connect the DEMO to the reader, and click the toolbar "Tools" - "WIFI" to open the WIFI interface, e.g. image 5-20. The WIFI module is turned off by default.

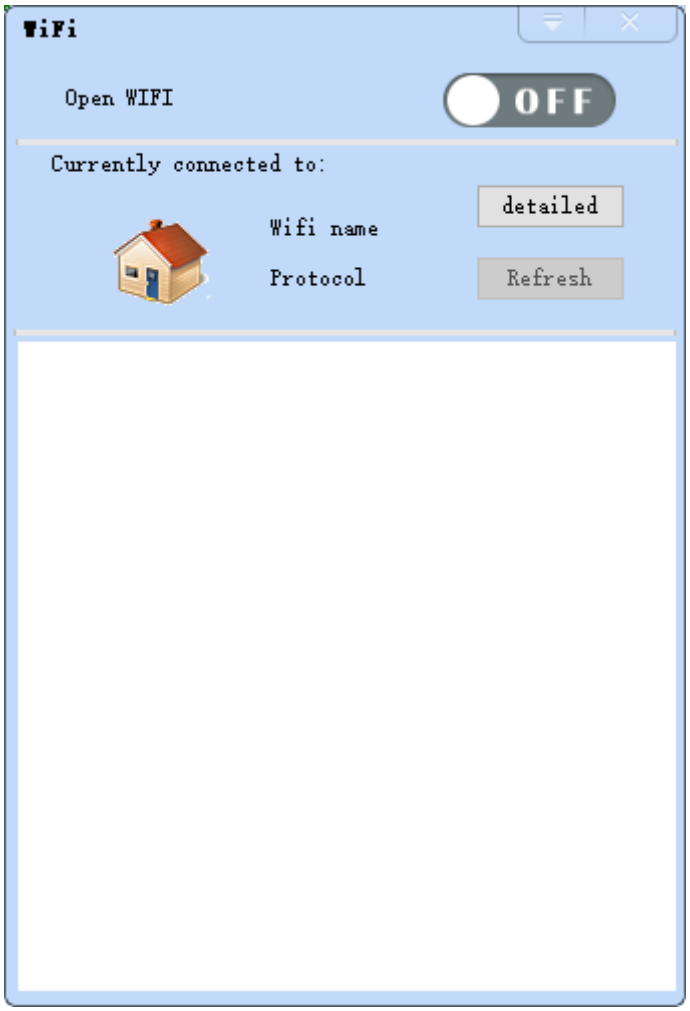


Image5-20

5.9.1 Set the IP address of WiFi module

Firstly need set the WIFI module IP to the same network segment of the pending access WiFi hotspot. Click "detailed"of the WIFI interface to set the WIFI module IP, as shown in image 5-21.

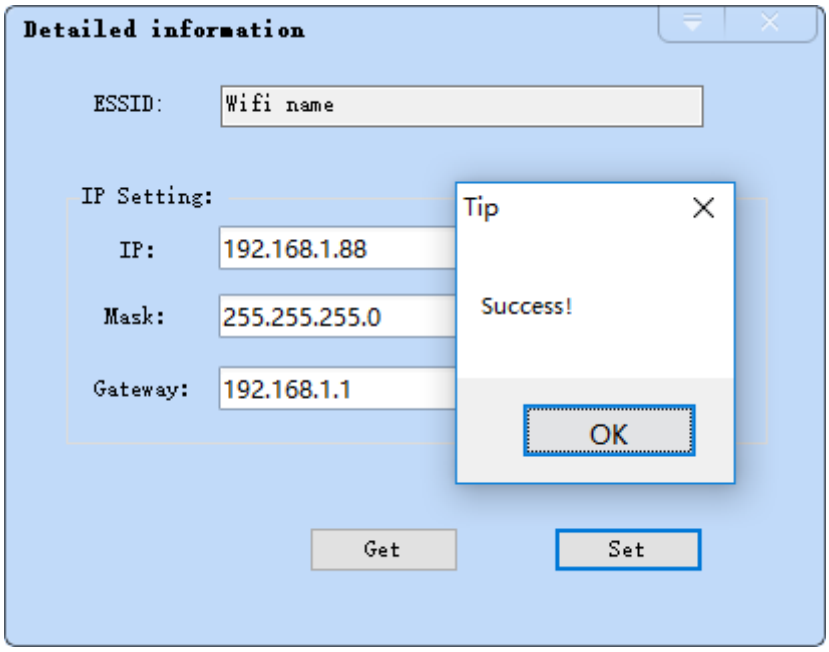


Image5-21

5.9.2 Turn on WiFi module

Click 

at the WIFI interface to open the WIFI module. After opened, WIFI module will search the connectable hotspot automatically, as shown in image 5-22 and 5-23

Image5-22

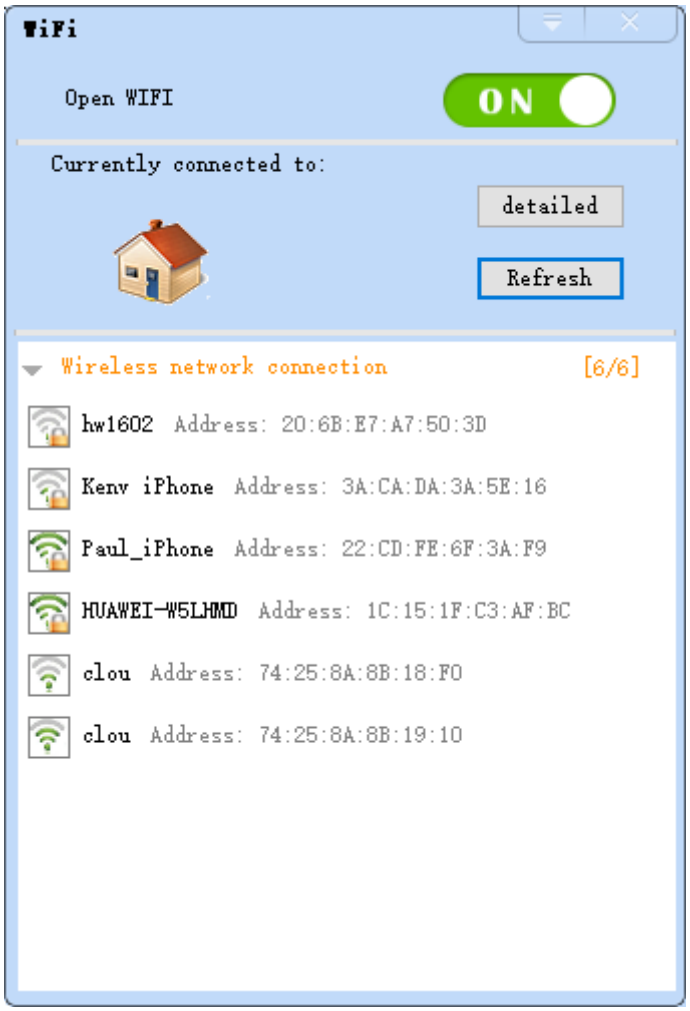


Image5-23

5.9.3 Connect WIFI hotspot

In the WIFI interface hotspot list, find the WIFI hotspot to be accessed, double-click, if no password, will be directly connected; if need a password, open the interface to input security key. Input the password, confirm, then connected to the hotspot. See image 5-24, 5-25.

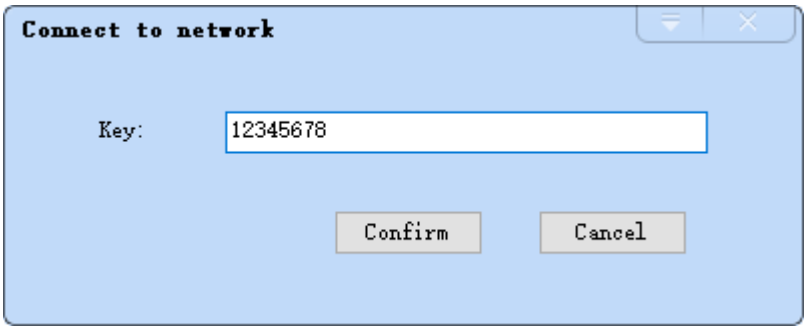


Image5-24

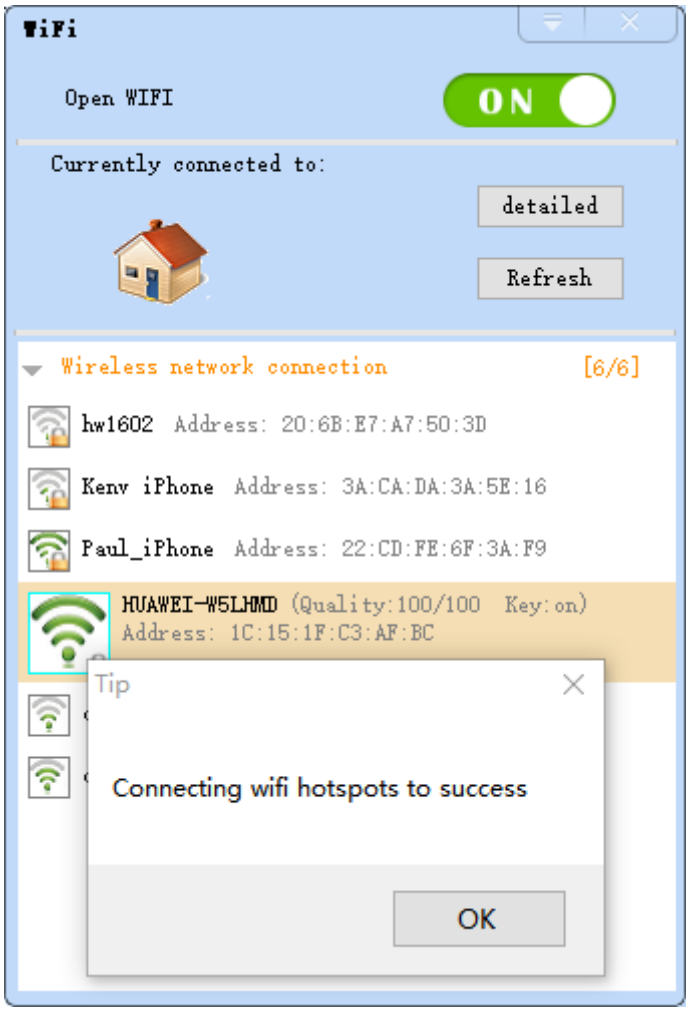


Image5-25

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

Note: After connected 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.

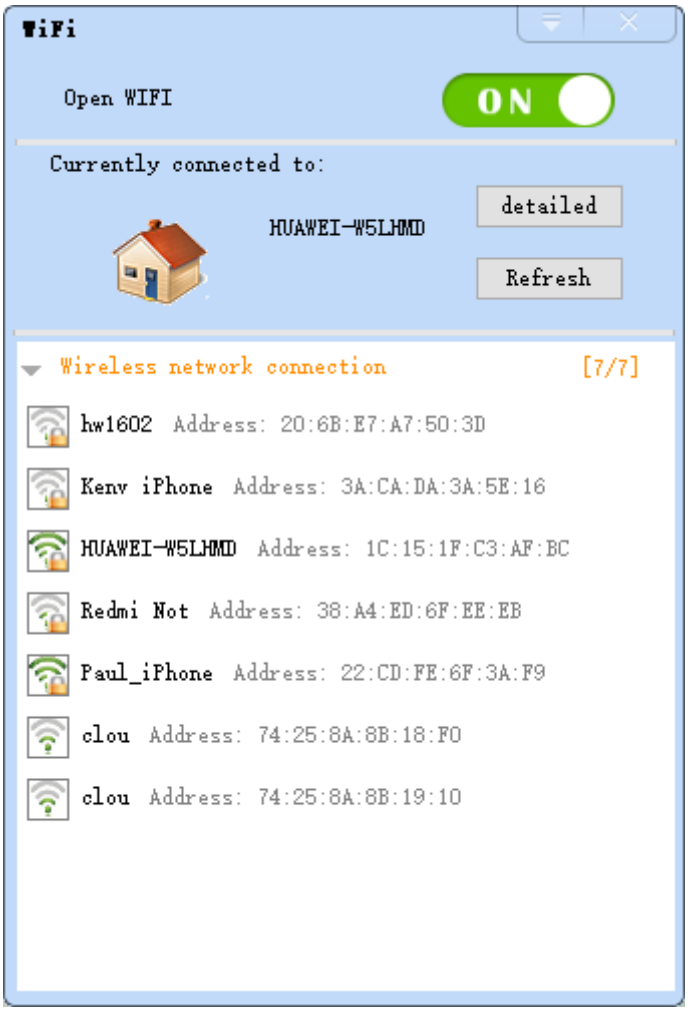

WiFi
Open WIFI
ON
Currently connected to:
HUAWEI-W5LHMD
detailed
Refresh
Wireless network connection [7/7]
hw1602 Address: 20:6B:E7:A7:50:3D
Kenv iPhone Address: 3A:CA:DA:3A:5E:16
HUAWEI-W5LHMD Address: 1C:15:1F:C3:AF:BC
Redmi Not Address: 38:A4:ED:6F:EE:EB
Paul_iPhone Address: 22:CD:FE:6F:3A:F9
clou Address: 74:25:8A:8B:18:F0
clou Address: 74:25:8A:8B:19:10

Image5-26