UHF Demo User Manual - User Operation Guide

V5.3

FCC Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the

outside of the device into which the module is installed must also display a label

in the user documentation that comes with the product.

Any company of the host device which install this modular with modular approvalshould perform the test of

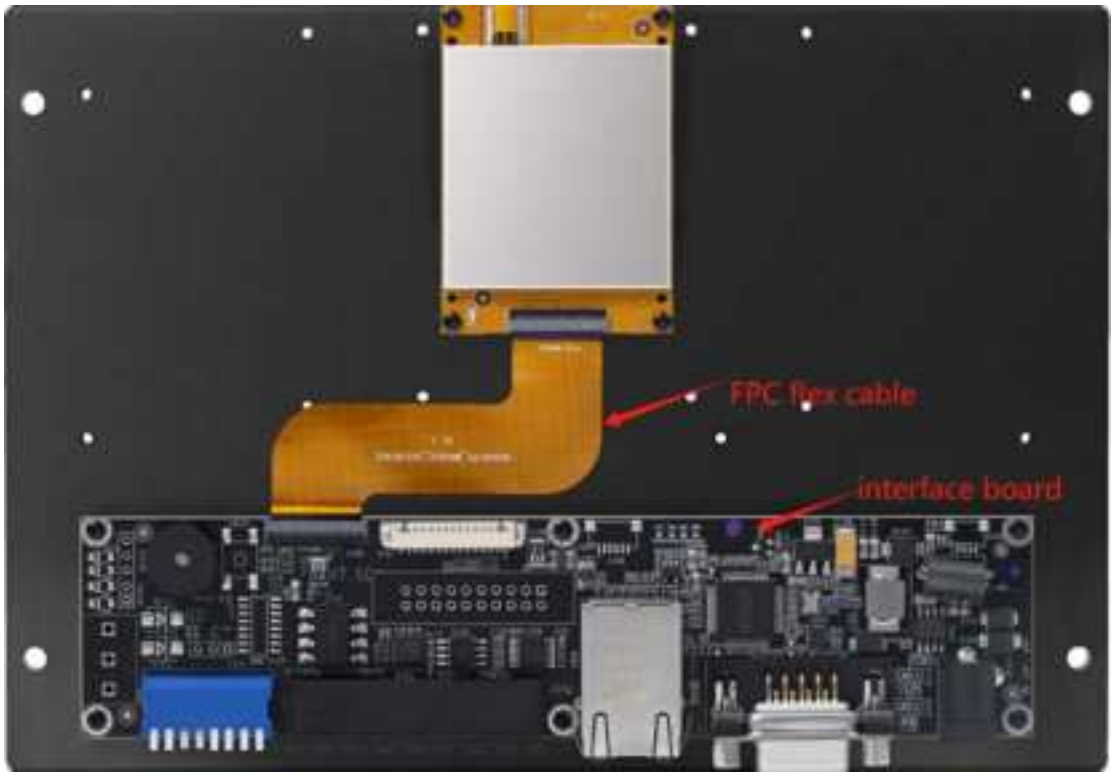
radiated & conducted emission and spurious emission,

FPC connector (30Pin , Space between PINs 0.5mm)

PIN	Interface	Instruction
1	GND	Meanwhile grounding
2	GND	
3	GND	
4	GND	
5	GND	
6	4.5V–5.5V DC	Meanwhile connect power, Recommended input voltage: 4.8V
7	4.5V–5.5V DC	
8	4.5V–5.5V DC	
9	4.5V–5.5V DC	
10	4.5V–5.5V DC	
11	4.5V–5.5V DC	
12	4.5V–5.5V DC	
13	4.5V–5.5V DC	
14	4.5V–5.5V DC	
15	4.5V–5.5V DC	
16	GND	Meanwhile grounding
17	GND	
18	GND	
19	GND	
20	GND	
21	UART_RXD	TTL level
22	UART_TXD	
23	EN	High level enable
24	GPIO1	Input
25	Beeper	Has driven with > 50mA output current
26	GPIO3	Output
27	GPIO4	Output
28	GPIO5	RS-485 direction control
29	GND	Meanwhile grounding
30	GND	

How to connect module

We need an FPC flexible cable to connect the module to a communication interface board (the interface board is only used for testing, and the module can be connected the FPC flexible cable to the customer's own interface board in actual application). The communication interface board is then connected to the computer to conduct communication tests.



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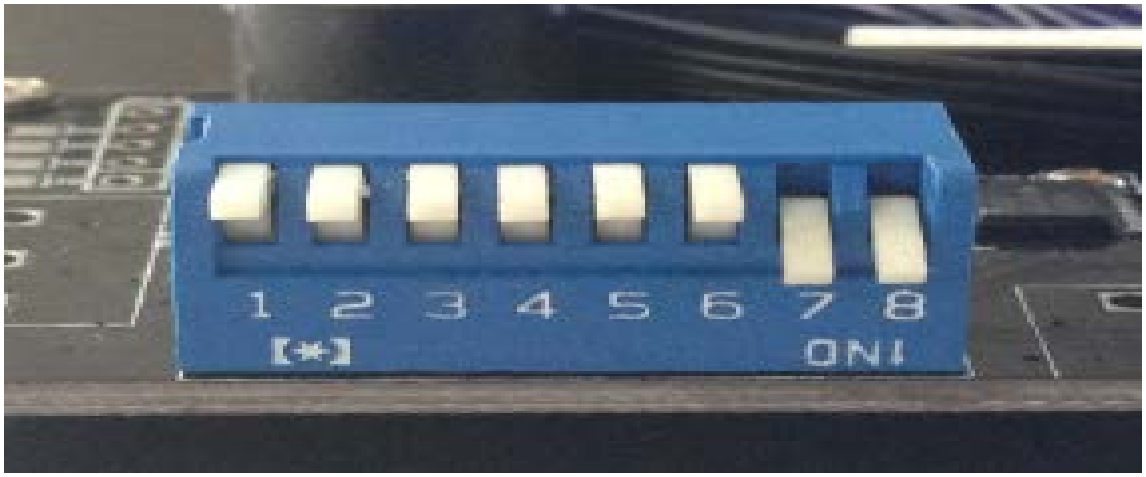
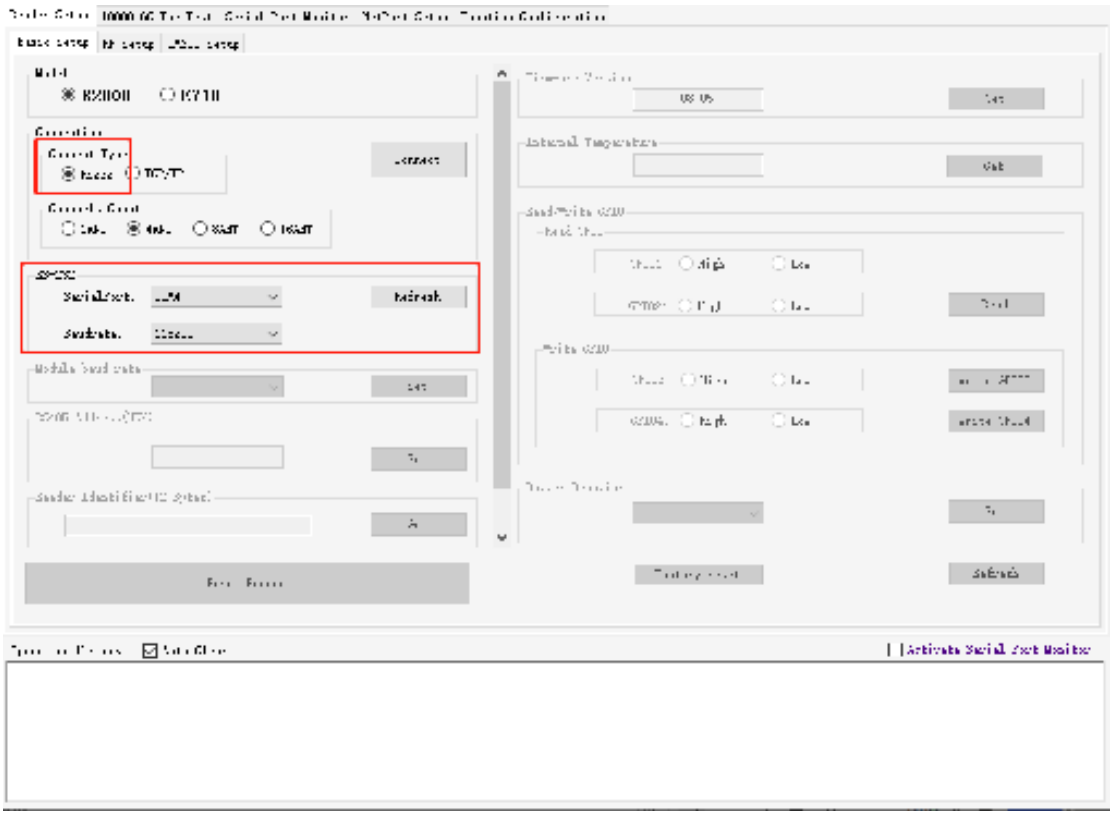
Chapter 1: Reader setting

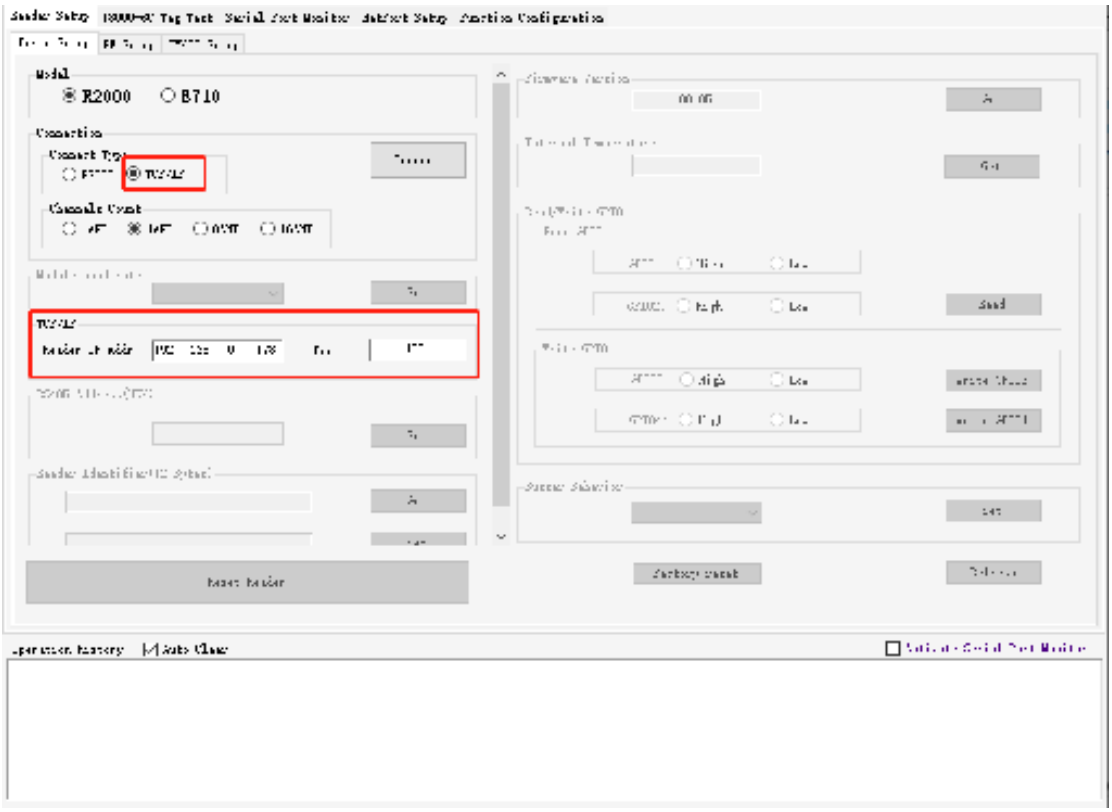
1 Basic parameter setting

1.1 Connection method

Type	Parameter	Flip the switch	Remark
Serial port (RS232)	serial number, baud rate	Dial 7, 8 face down (toward the number), others face up	The default baud rate is 115200
Network port (TCP/IP)	IP, port	Dial 3 and 4 down, others up	The default is 192.168.0.178, port 4001. The IP of the computer must be connected to the same LAN as the reader.

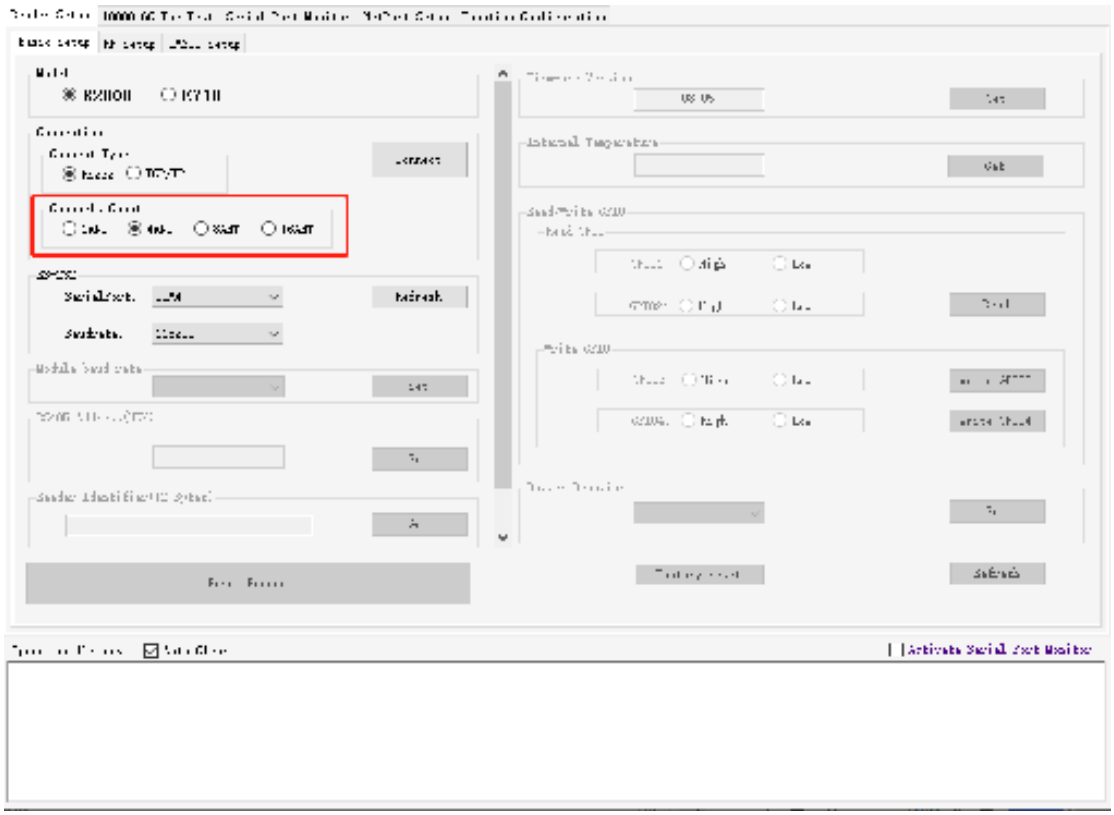






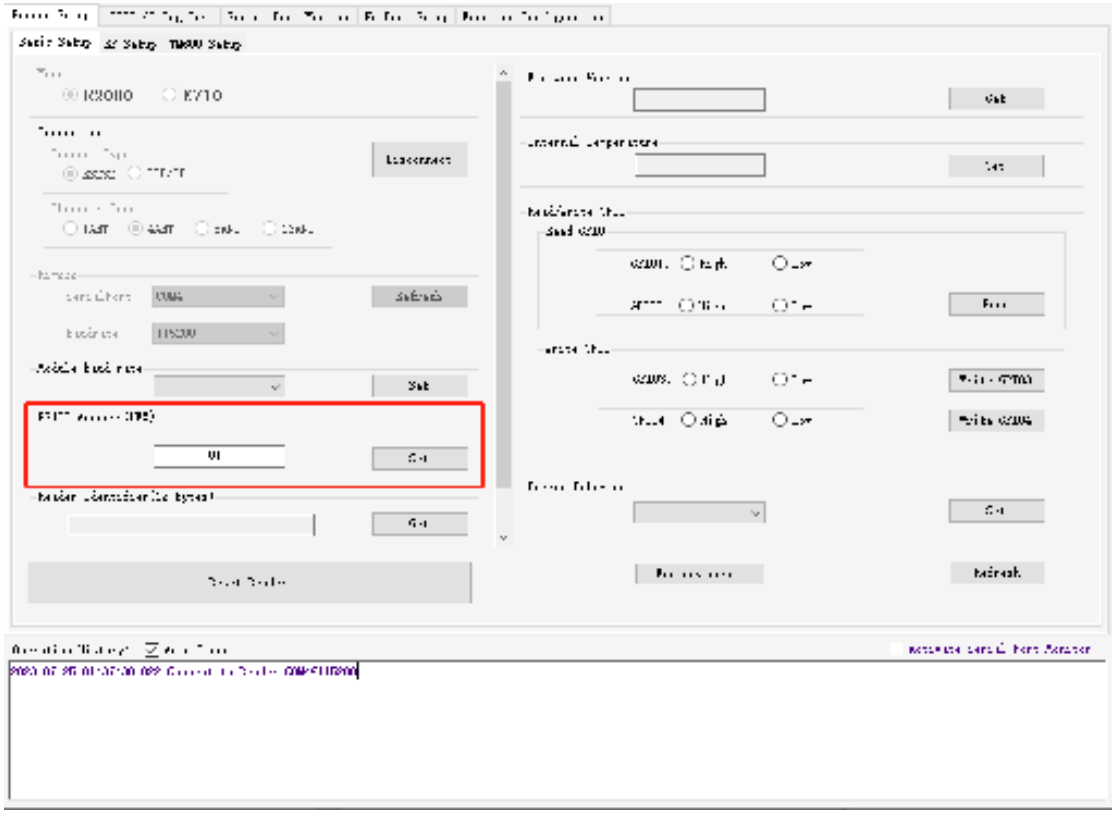
1.2 Reader Type

Type	single channel	4 channels	8 channels	16 channels



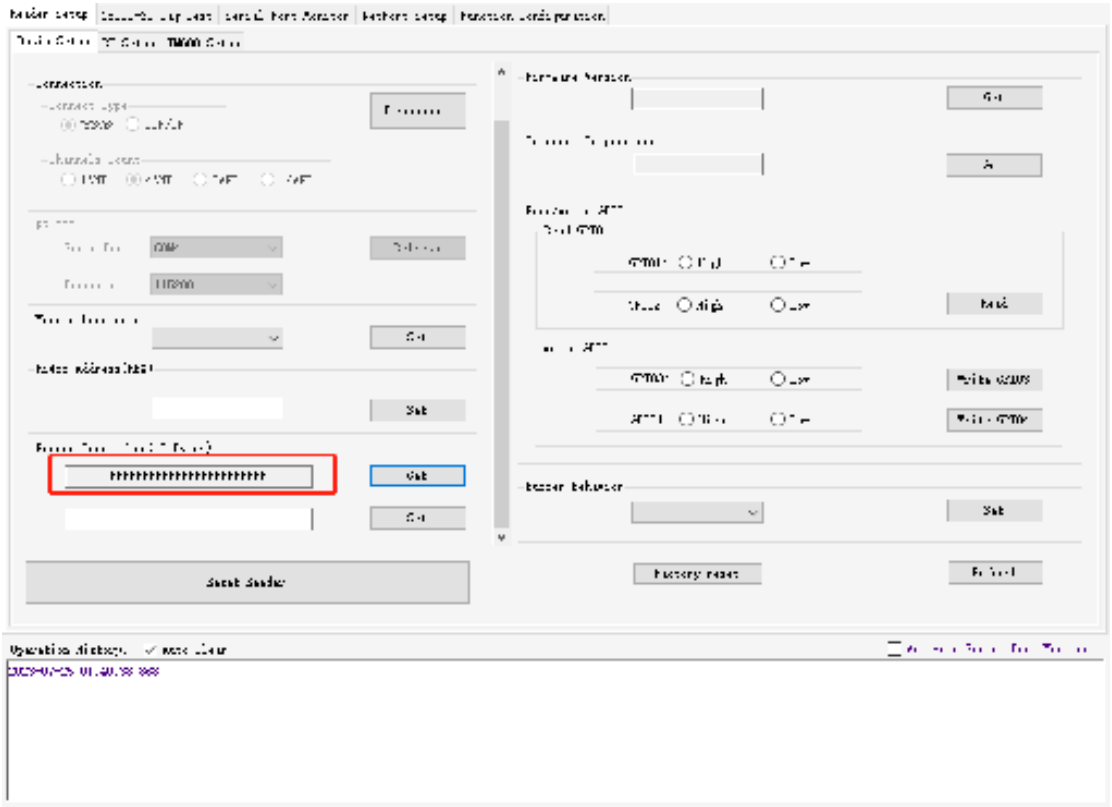
1.3 Reader command address (HEX)

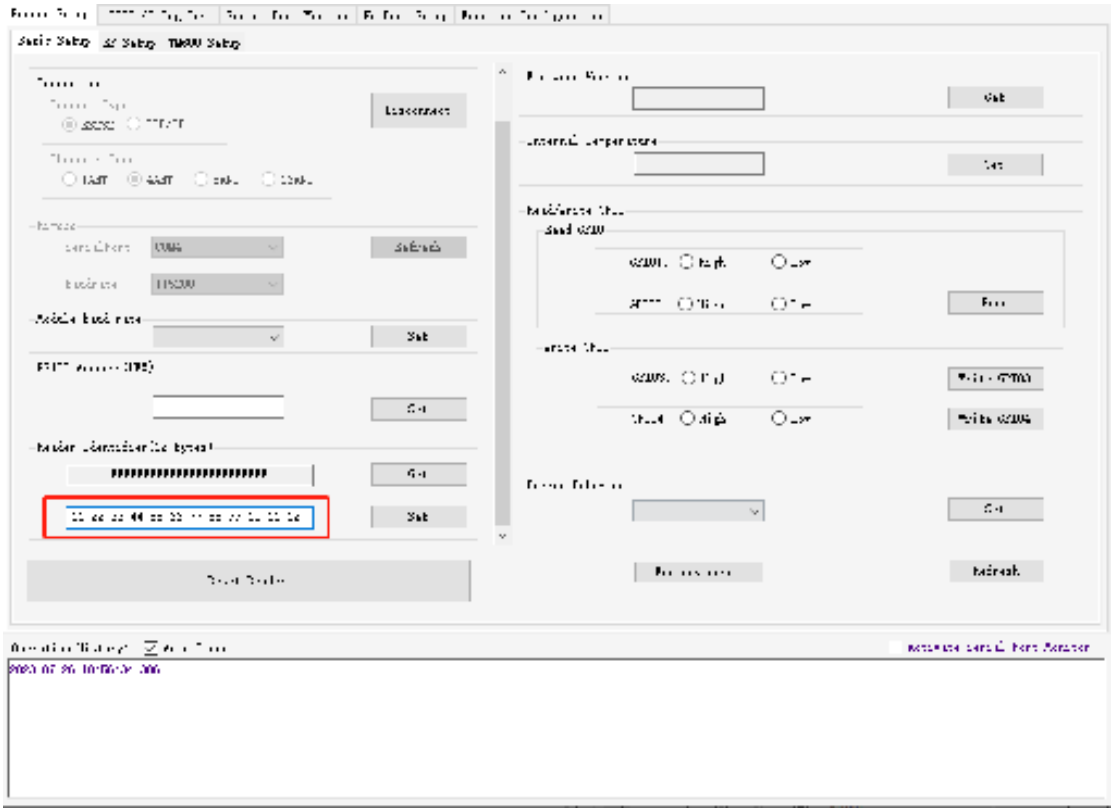
Name	Defaults	Meaning	Remark
reader address	01	Indicates the reader address, editable	Only one byte can be held; the address appears with each instruction

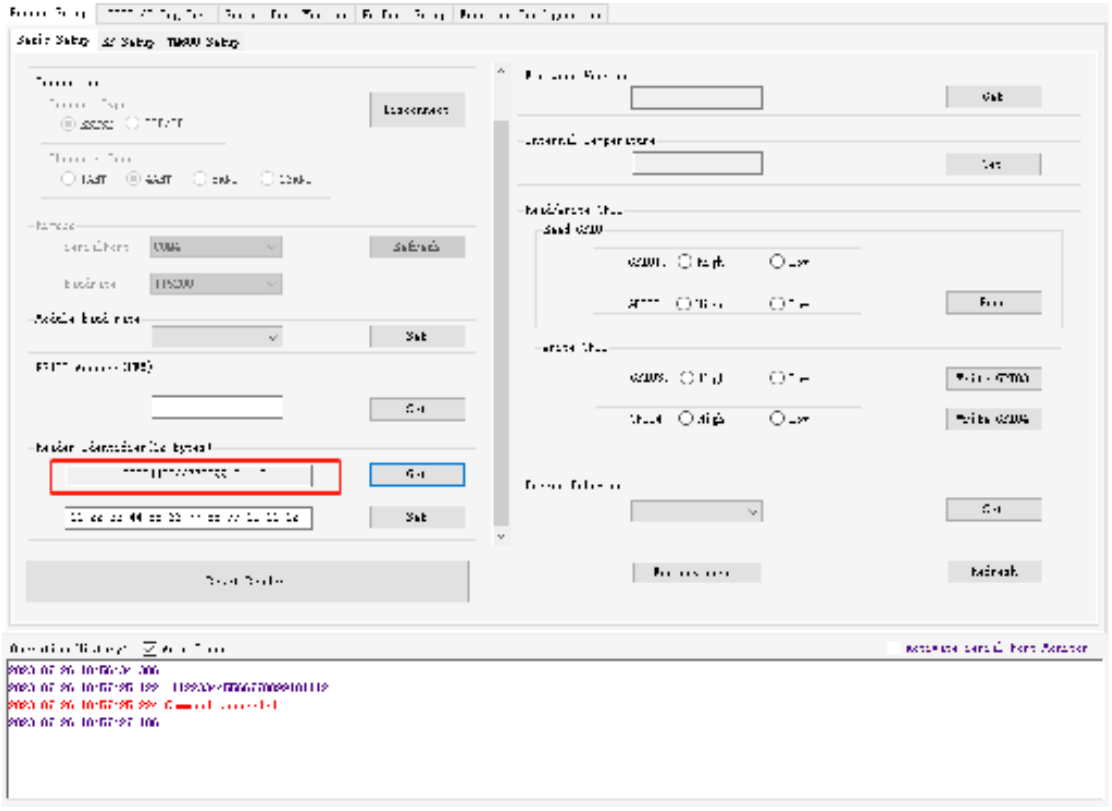


1.4 Reader ID

Name	Default (12 bytes)	Remark
Reader ID	FF FF FF FF FF FF FF FF FF FF FF FF	Distinguish between readers and readers as well as reader addresses

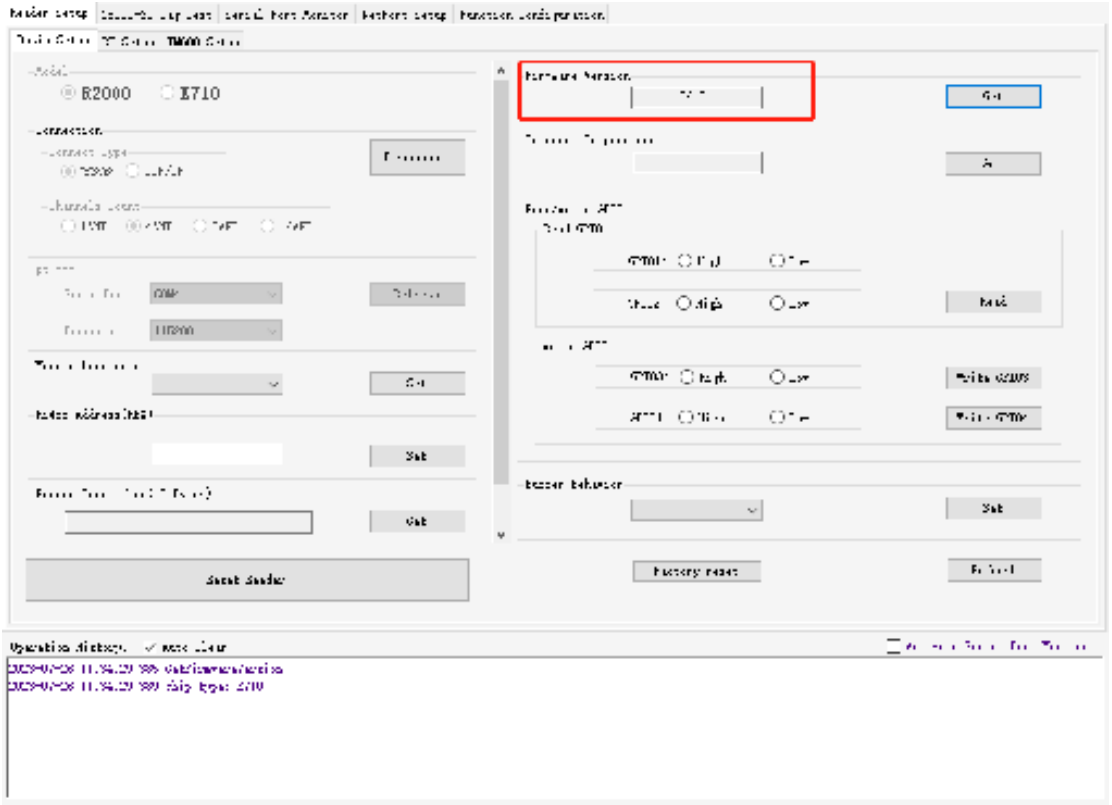






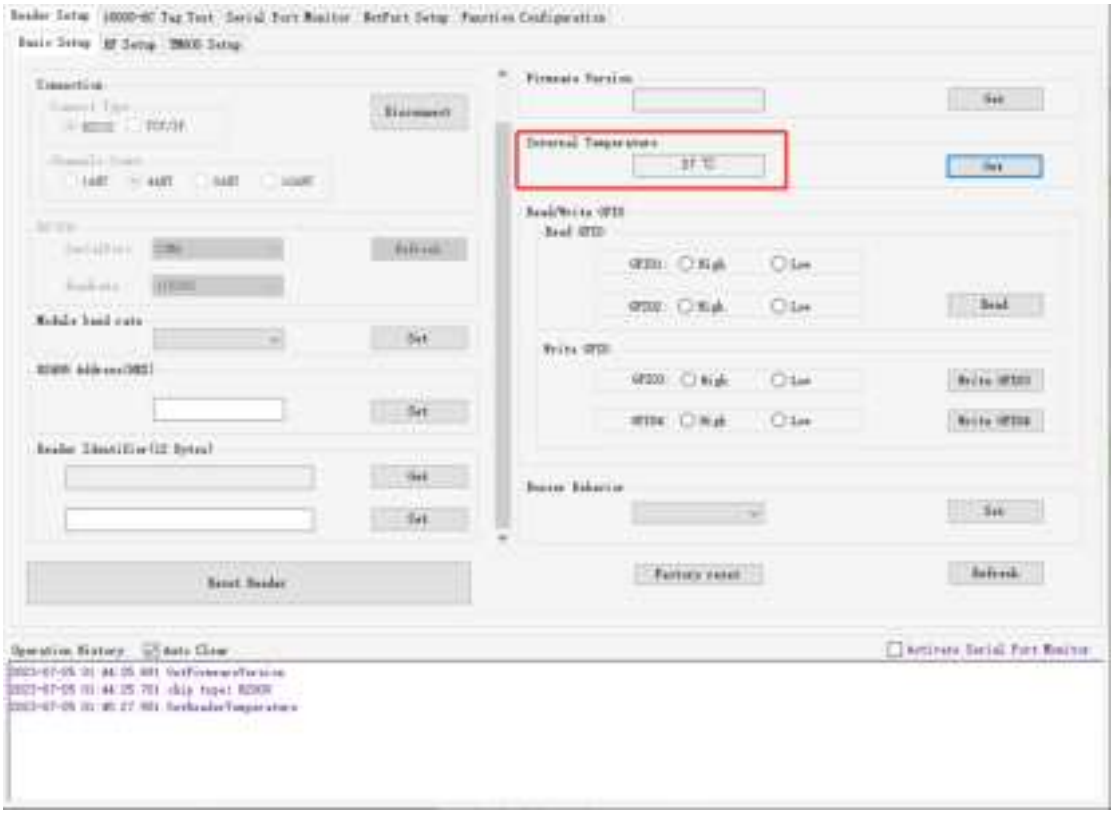
1.5 Firmware version

Name	Effect
Firmware version	Differentiate between firmware batches



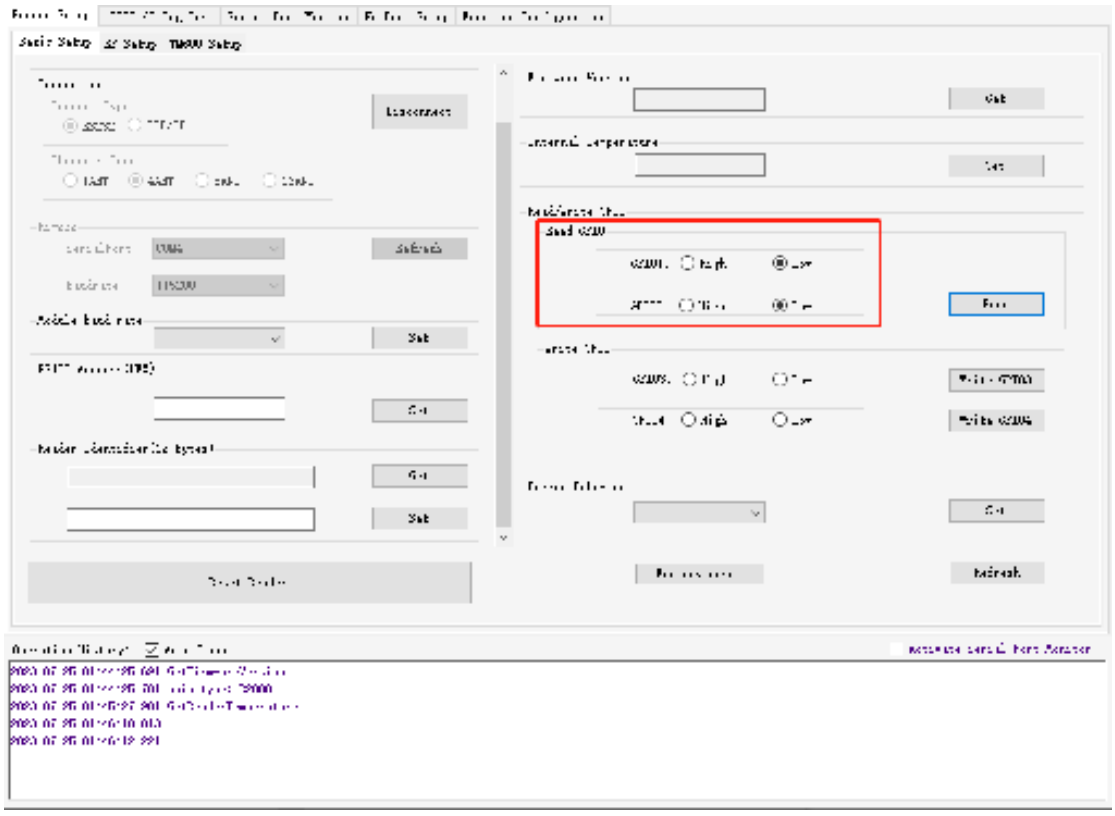
1.6 Operating temperature

Working temperature monitoring refers to the temperature inside the module. If it is combined into a whole, because there are peripheral circuits or equipment, the external temperature may be slightly higher.



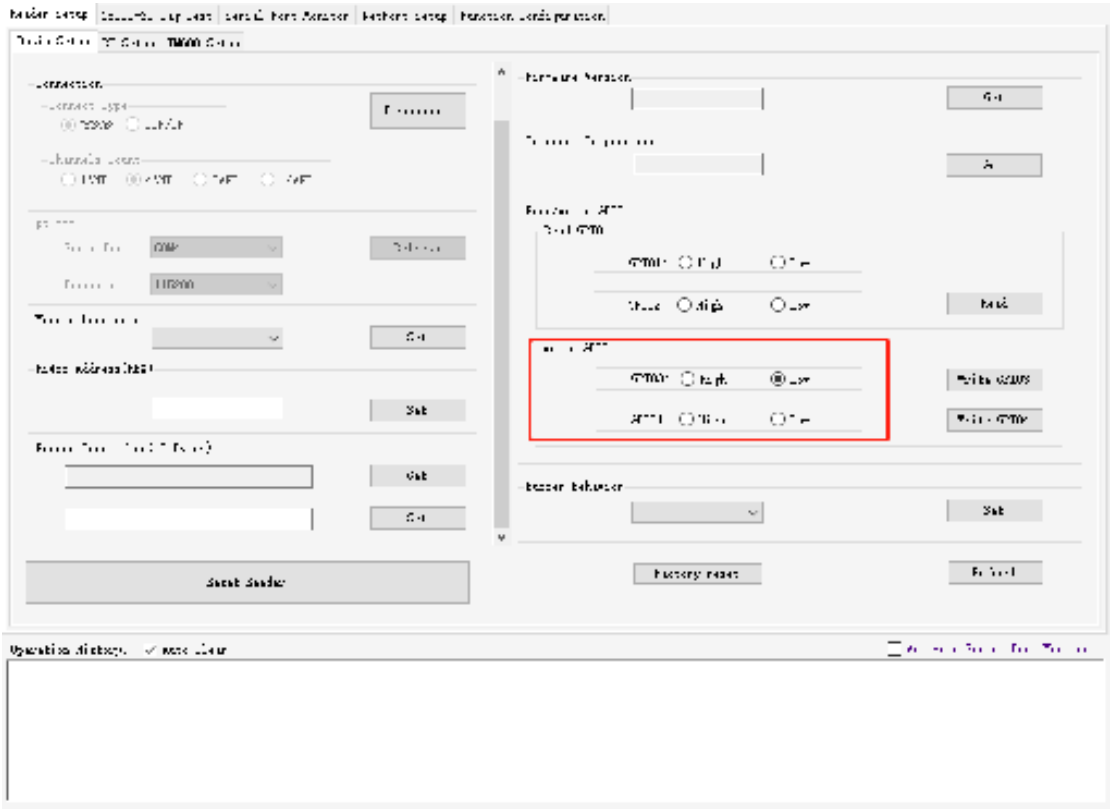
1.7 Read GPIO

GPIOs	Type	Read	Write	Expand	Remark
GPIO1	enter	Y	N	Can be used as a switch for active read mode	Send a command to read the level status of these 2 GPIOs at the same time
GPIO2	enter	Y	N	Can be used with GPIO1 to judge in and out	
GPIO3	output	N	Y	Applicable to alarm lights and horn scenes	separate settings
GPIO4	output	N	Y	Applicable to alarm lights and horn scenes	separate settings



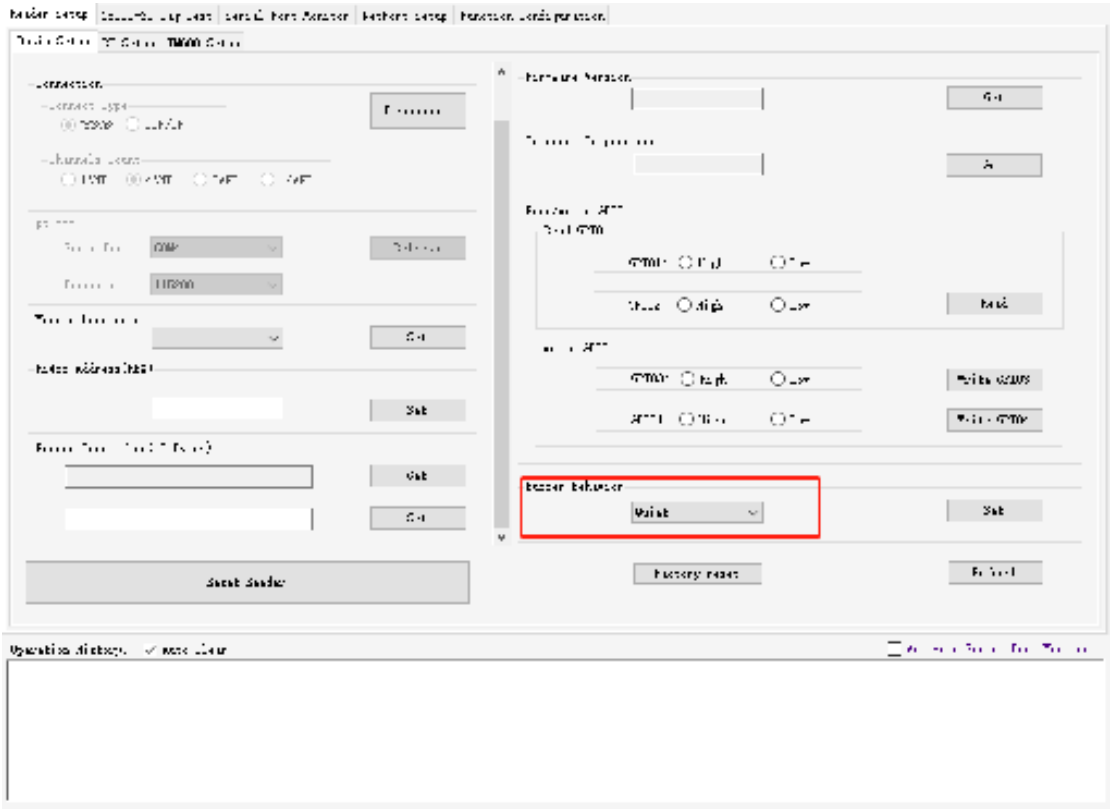
1.8 Write to GPIO

GPIOs	Type	Read	Write	Expand	Remark
GPIO1	enter	Y	N	Can be used as a switch for active read mode	Send a command to read the level status of these 2 GPIOs at the same time
GPIO2	enter	Y	N	Can be used with GPIO1 to judge in and out	
GPIO3	output	N	Y	Applicable to alarm lights and horn scenes	separate settings
GPIO4	output	N	Y	Applicable to alarm lights and horn scenes	separate settings



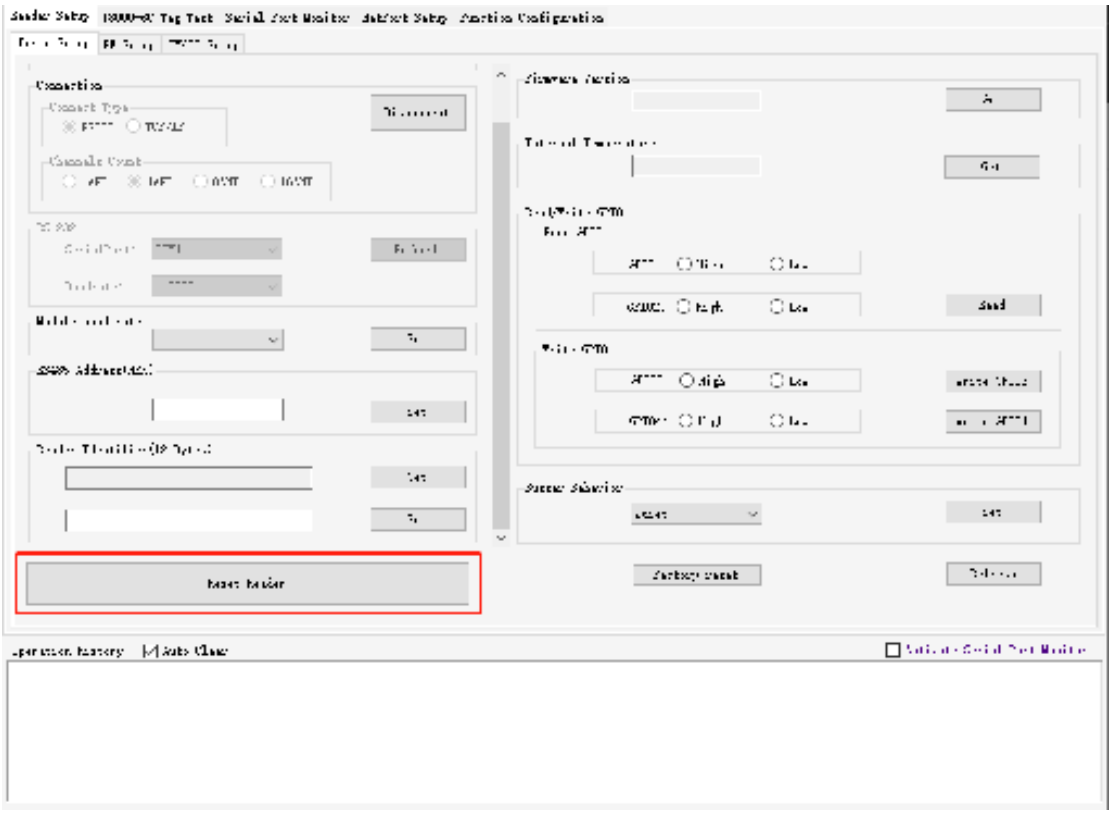
1.9 buzzer status

model	illustrate
Quiet	Inventory to the label, the buzzer does not sound
beep after inventory	Send an inventory command, and read the tag, and it will beep when the order is over
beeps every time a tag is read	Like the literal meaning, every time a label is read, it rings once



1.10 Restart the reader

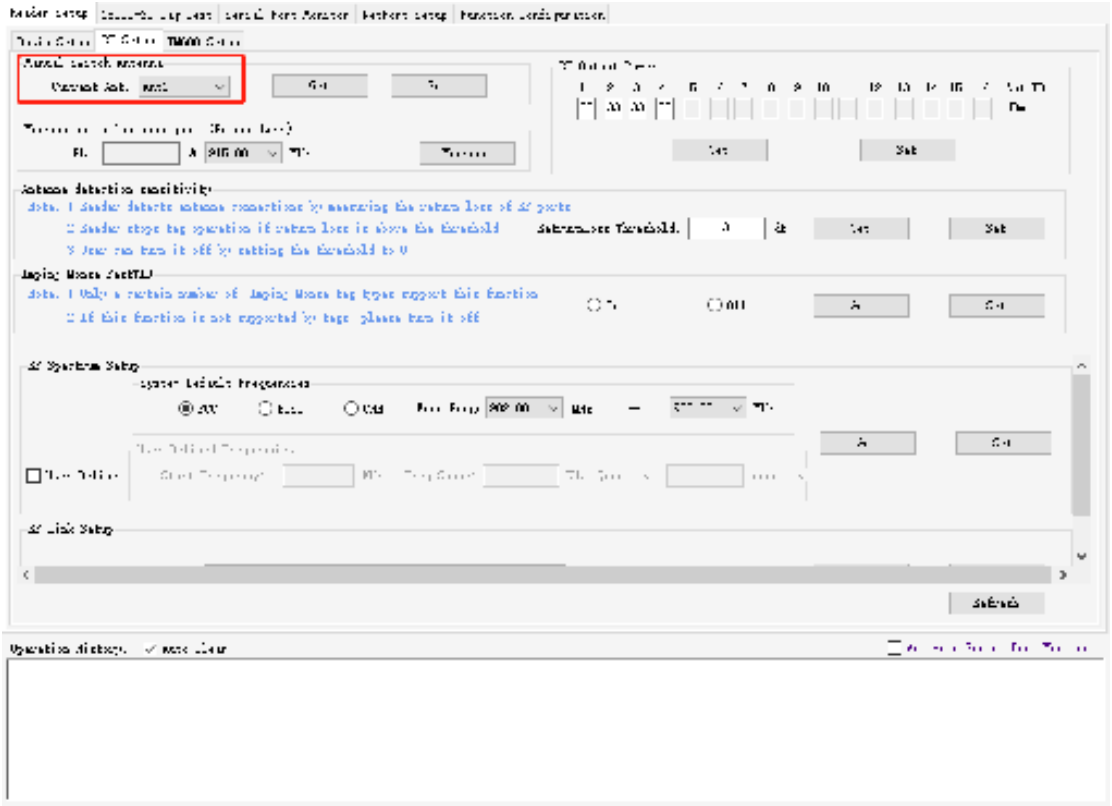
The action of restarting the reader is to power on the module again.



2 RF parameter setting

2.1 Read and set the current working antenna

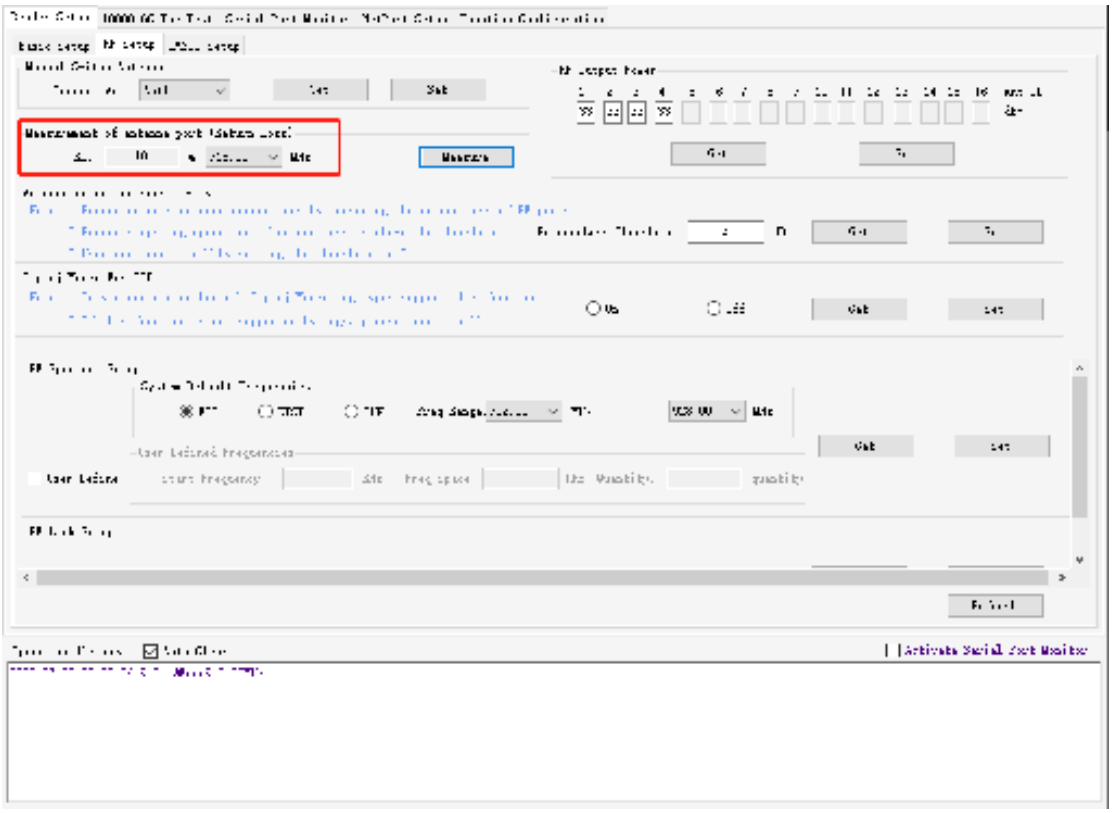
At the same time, only one antenna of the reader is working, so it is necessary to read and write the current working antenna or set the antenna.



2.2 Measuring Antenna Return Loss

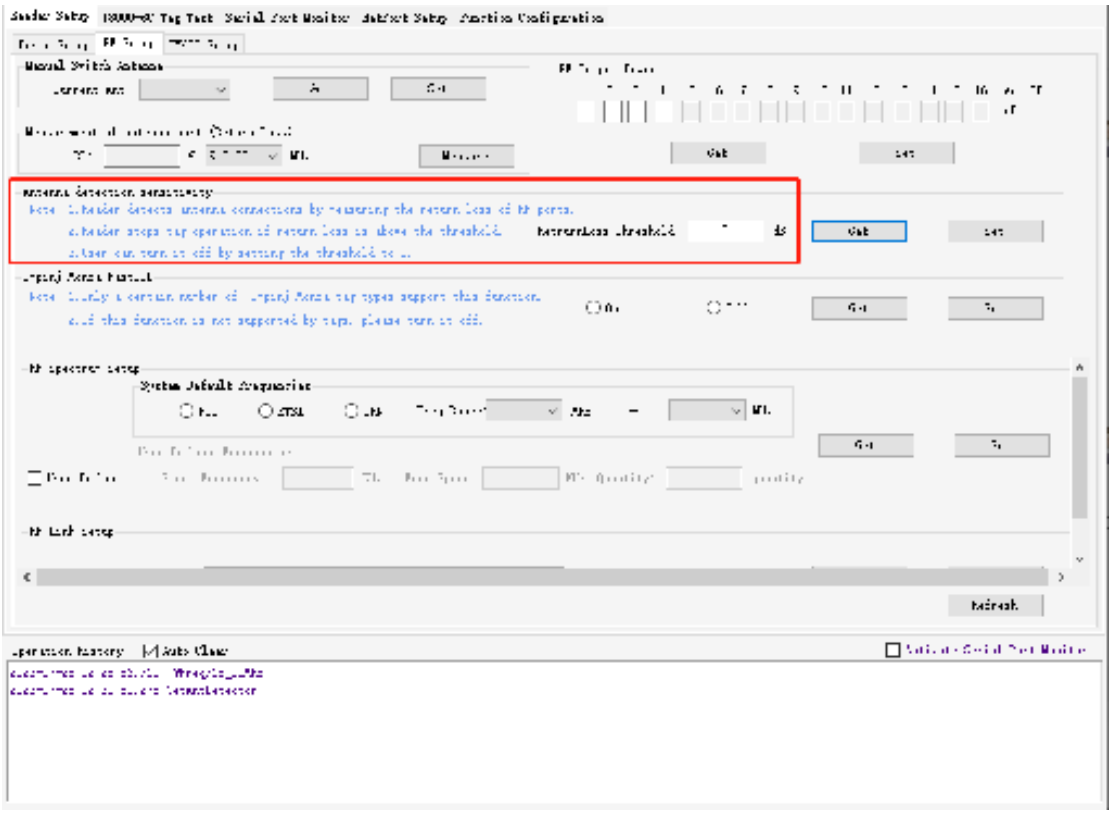
serial number	introduce
1	Antenna return loss: indicates the test data of a certain antenna at a certain frequency point; for example: the data of antenna 1 at a frequency point of 915MHz is 27db;
2	To measure the return loss of the antenna, you need to set the antenna number you need to set first; of course, you can also not set it, if you don’t set it, you will test the current working antenna.
3	When testing, it is necessary to select a certain frequency point within the corresponding frequency point range for testing; for example, the module and antenna are American standard, so the frequency point range is 915-928, but in order to ensure the accuracy and compatibility of the test, the middle value of 915-928 is generally selected as 915 for testing.
4	Under normal circumstances, when the matching between the antenna and the

	module is relatively good, it is greater than 7, generally tens, or even twenty; the return loss of the antenna indicates to a certain extent whether the antenna and the module are suitable for each other.
5	If the American standard module chooses a certain value of the European standard or the national standard to test, the return loss may be 0 or very low (assuming that the antenna is in good contact), so the corresponding frequency point should be selected for testing.
6	When testing, the default is to set the "return loss threshold" to 3, and then test the return loss of the antenna. If the return loss of the antenna is 0, it means that the antenna is not connected (except in special cases);
7	If the "Return Loss Threshold" is set to 0, the module cannot identify whether the antenna is connected;



2.3 Antenna detection sensitivity

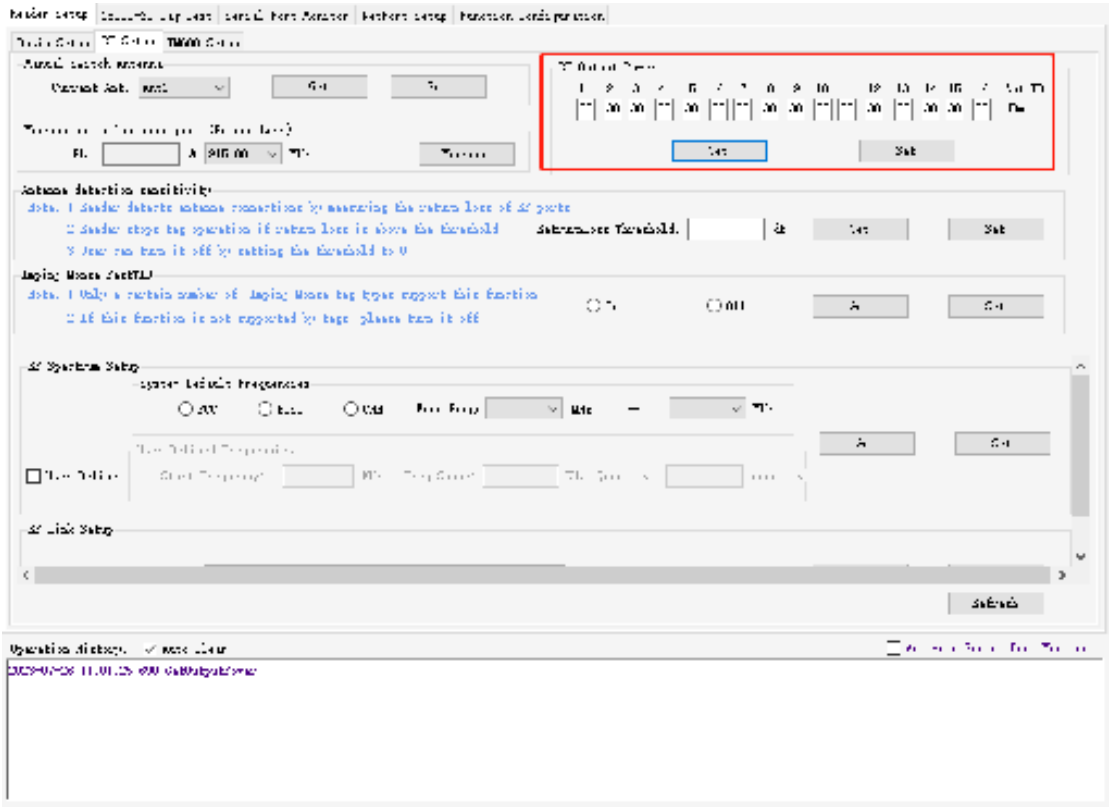
serial number	illustrate
1	The default is to set the "Return Loss Threshold" to 3, and then test the return loss of the antenna. If the return loss of the antenna is 0, it means that the antenna is not connected (except in special cases);
2	If the "Return Loss Threshold" is set to 0, the module cannot identify whether the antenna is connected;



2.4 Antenna output power

mainly two types of current power ranges :

Module chip type	power range
PR9200	10dBm, 18-26dBm
R2000	0-33dBm

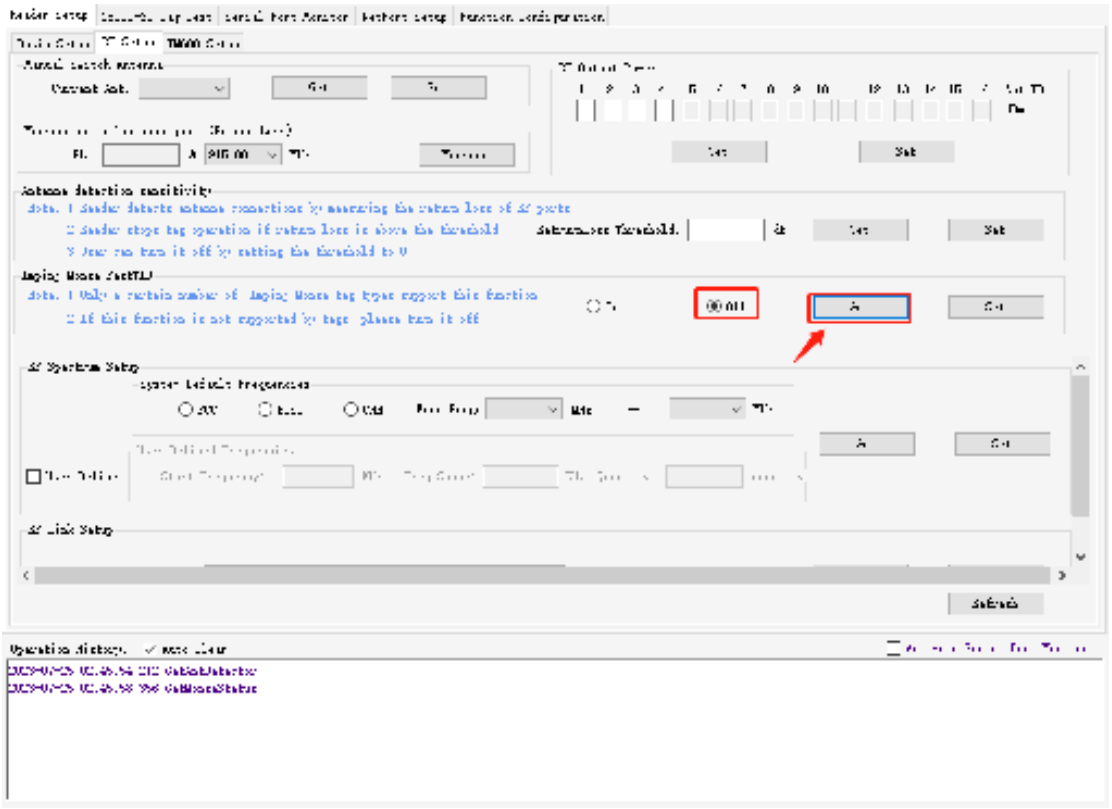


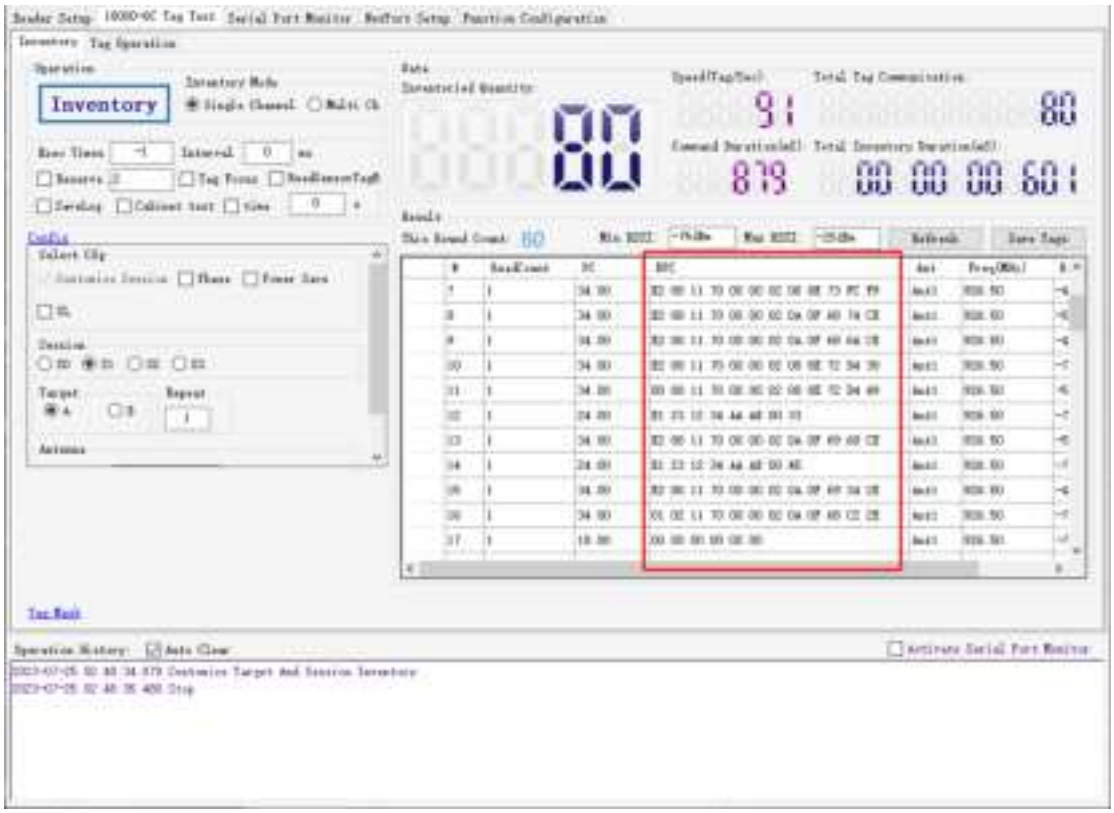
2.5 Quickly read TID

illustration below for details ;

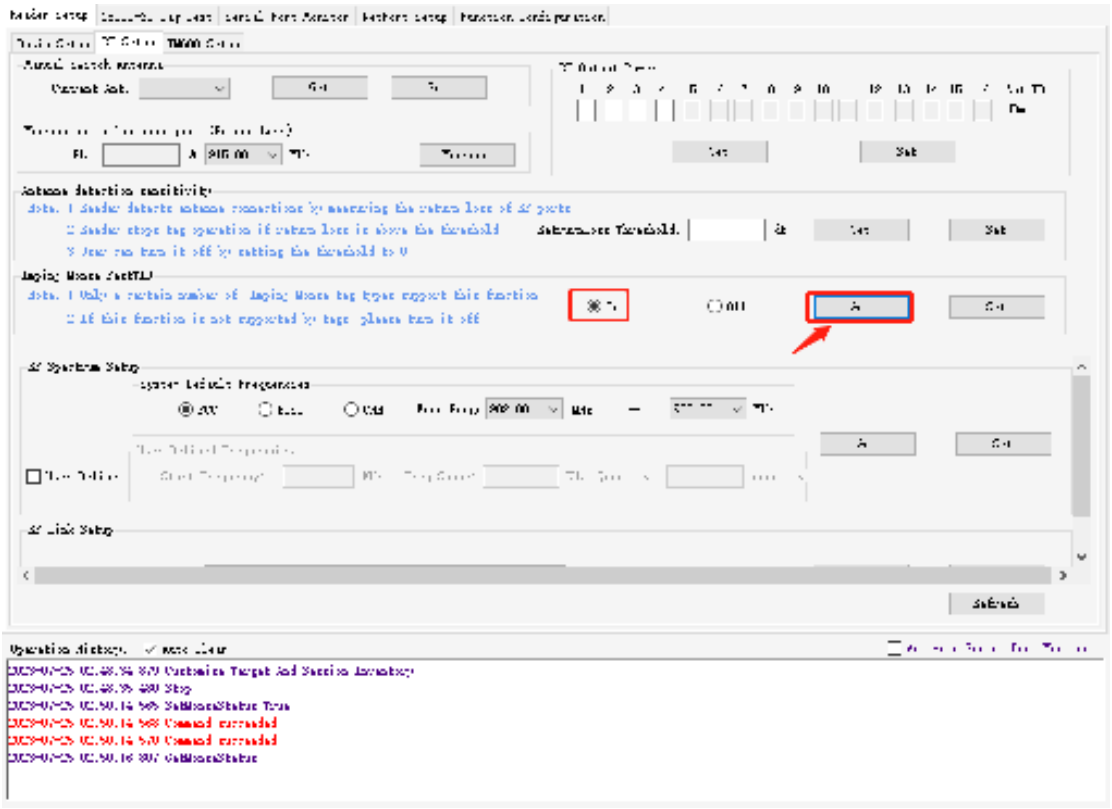
(2) After opening, the inventory interface will display both **TID and EPC ;**

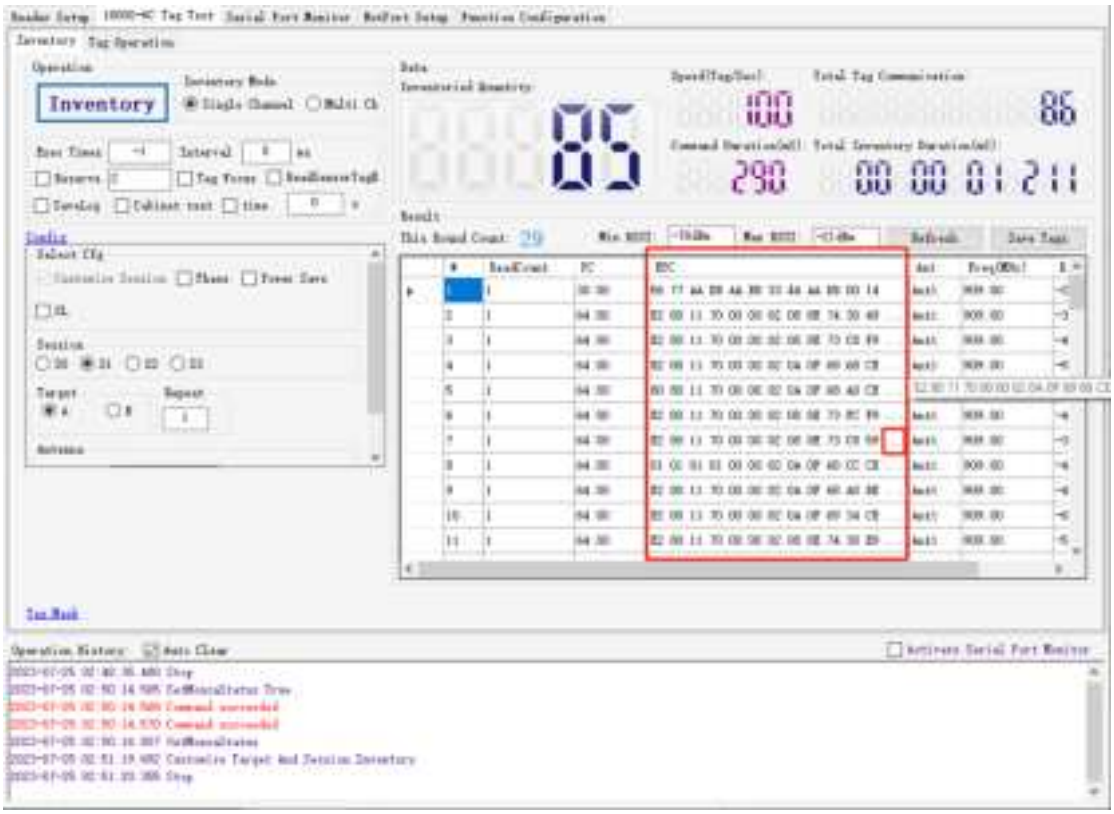
The function is turned off, and the display is as shown in the figure below:





The function is enabled, and the display is as shown in the following figure:




Inventory
85
86
290

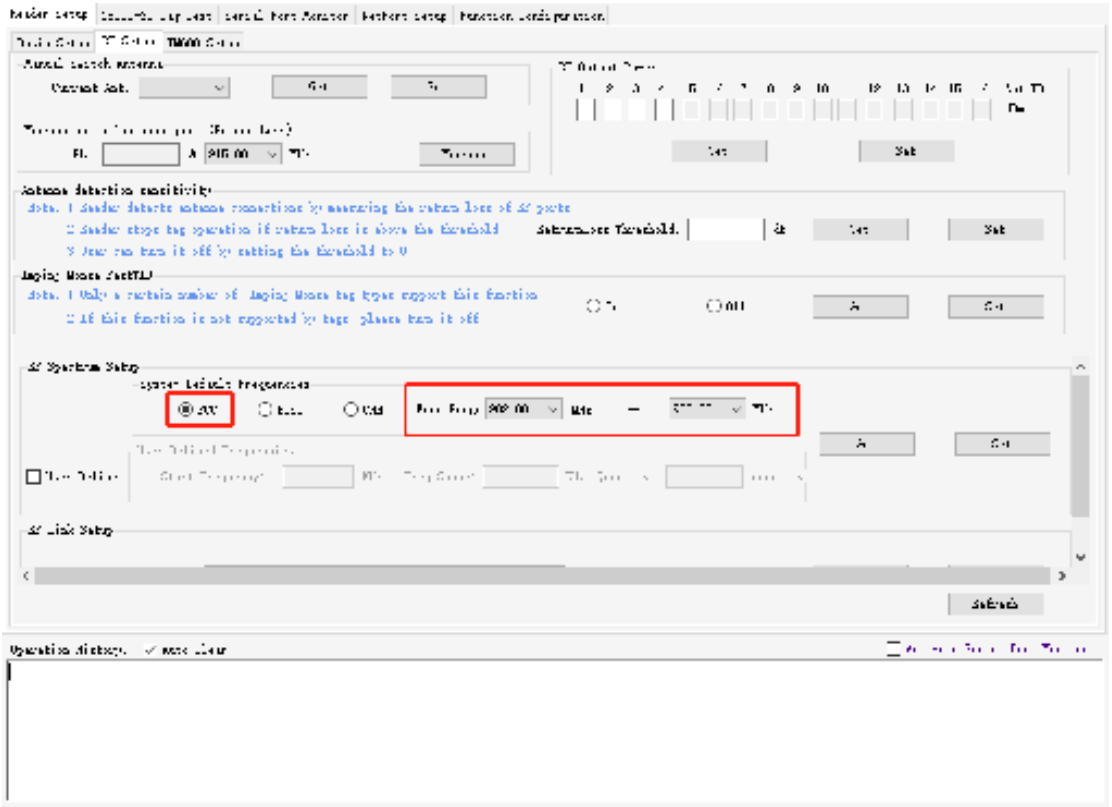
2.6 Radio Frequency Spectrum

Introduction to RF Spectrum

type	scope
FCC (American Standard)	902.00-928.00MHz
ETSI (European Standard)	865.00-868.00MHz
CHN (national standard)	920.00-925.00MHz

（1）System default frequency

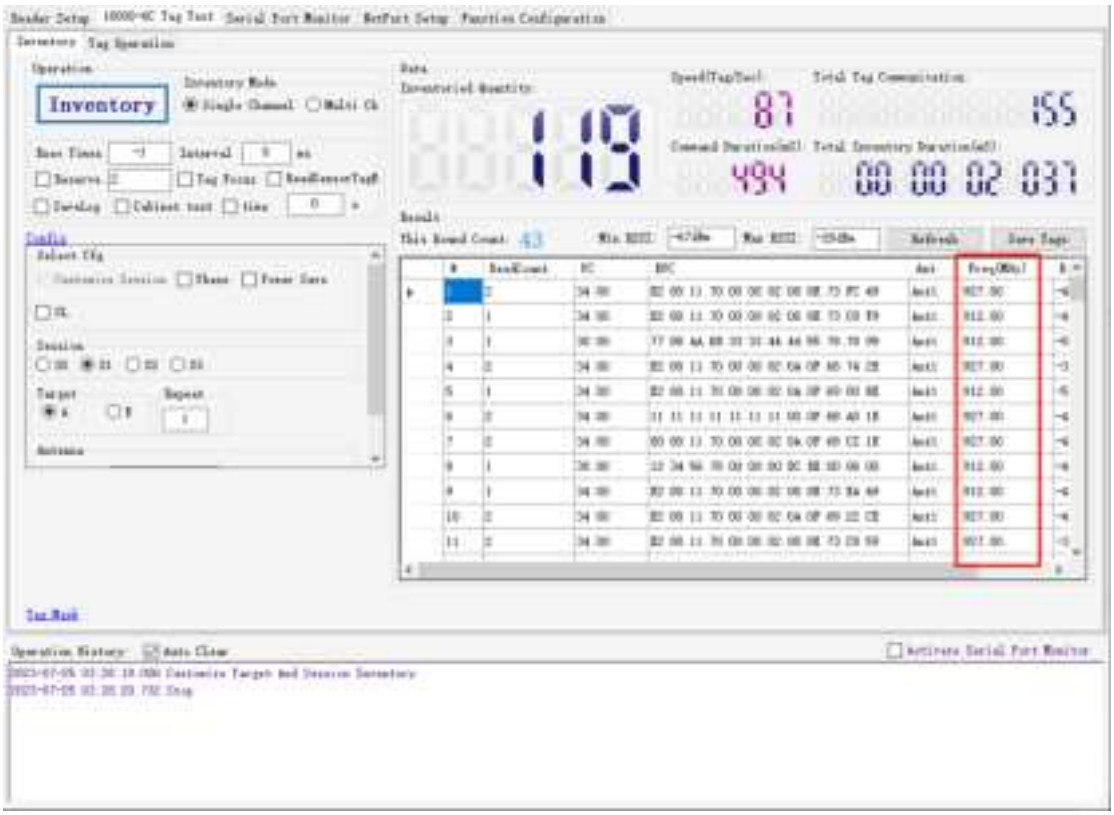
Reasonable settings can be made according to the actual type of RFID module. For example, the module can be set to American standard, or the original frequency range can be narrowed down, or even fixed to a certain frequency point;



Note that

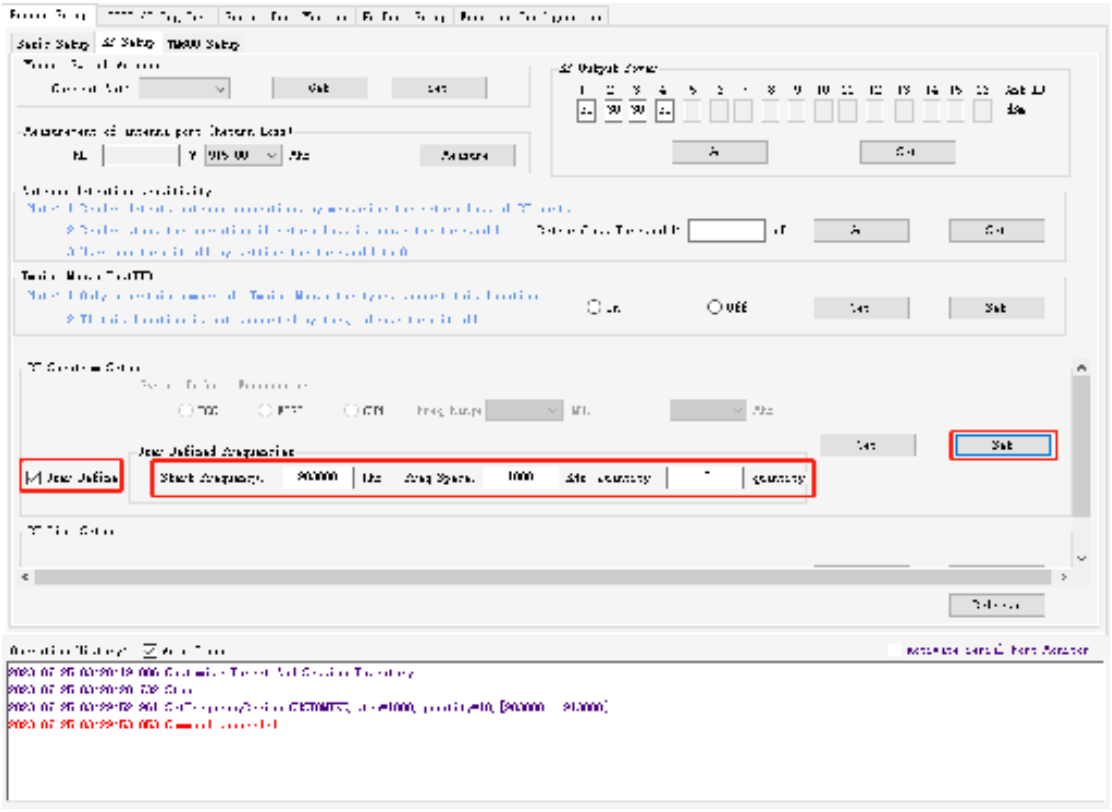
FCC certified equipment has FCC band filters inside. If an FCC certified equipment is set to other bands, the module will be restricted by the filter to emit RF signals.(Only 902-928MHz settings can work for FCC certified equipment properly)

Similarly, CE certified equipment is also a filter with CE frequency band, which is set to other frequency bands and also fails to work normally.



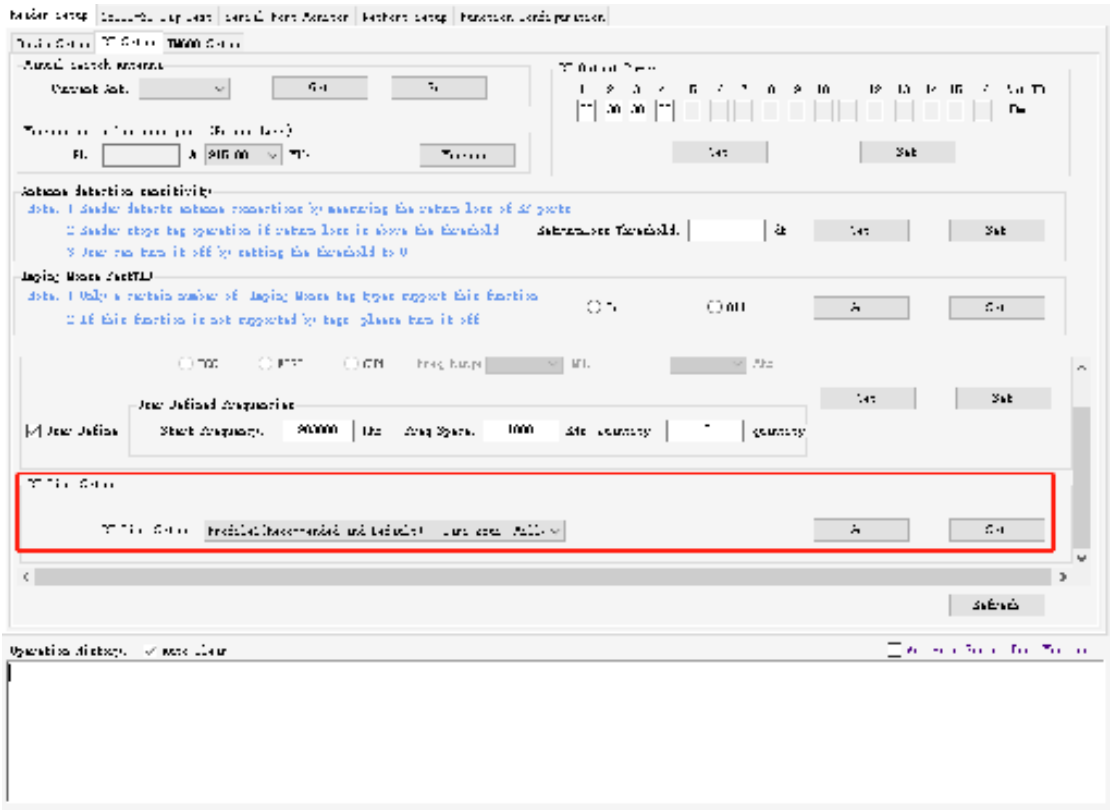
（2）user-defined frequency

It can be set according to the user's own needs, such as the following figure:



2.7 RF communication link

There are four links, default and recommended: **configuration 1**

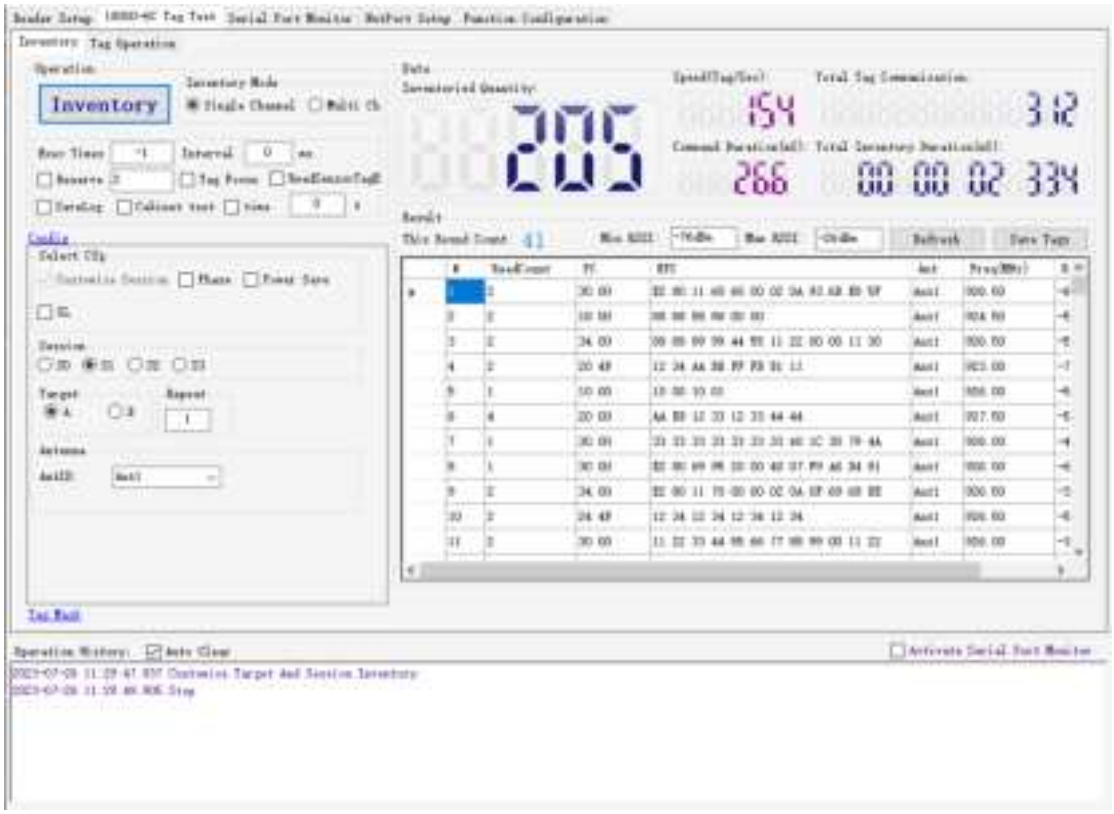


Chapter 2: 18000-6C label test

1 inventory label

Inventory method	illustrate	Remark
single antenna inventory	The single-antenna inventory in 4.3demo corresponds to the 8B command of the previous version of [Real-time Inventory], and [Real-time Inventory] has two commands: [Real-time Inventory (custom)] = 8B command, [Real-time Inventory (automatic)] = 89 command, which is not recommended, so the demo interface of this version is no longer displayed. If you are not familiar with the command, please check **the communication protocol** !	If you need to use the 8B command with multiple antennas, please implement **the code . For details, please refer to 3.9 demo.**
Multi-antenna inventory	Multi-antenna inventory corresponds to [Fast multi-antenna inventory] of version 3.9 demo, and the command corresponds to 8A	Although 8A is also working with a single antenna at the same time, the switching of the antenna is automatically switched by **the module .**
Cache Mode Inventory	Corresponding to the [cache mode] of the demo version 3.9	A single antenna works at the same time, and switching antennas requires **code** switching.

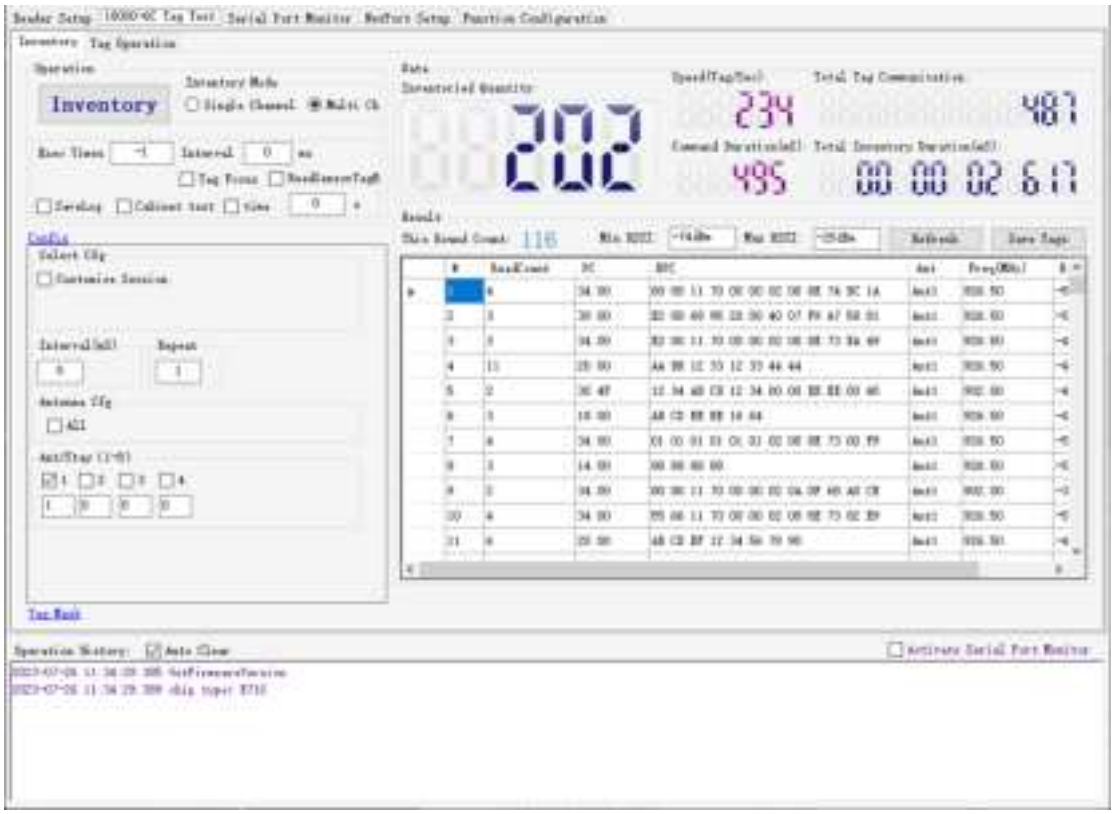
1.1 Single antenna inventory (8B instruction)



Software instruction parameter	illustrate
Number of runs	Enter -1 to keep inventorying; input a positive number, send as many instructions as the value is, and then stop inventorying.
time interval	The time interval of inventory command time, the default is 0ms.
Reverse AB	The state of the tag is switched back and forth between state A and state B. The default is state A, so the command is generally Session+A. Reversing AB means that after reading the label, send an instruction to return the label from state B to state A.
Tag Focus	Indicates that the 8D8C function has been started to improve the reading speed, and it is generally used with S1.
Phase	Tick to enable the phase
Power save	If checked, it means that the power saving mode is turned on, and the essence is to set the command interval time (**firmware layer processing**)
SL	00, 01, 02, 03
session	S0, S1, S2, S3, it is recommended to use S0 and S1
target	A and B respectively represent the A side and B side of the label, or the A state and the B state, and the default is A
Antenna number	You can choose the antenna you need for inventory

Software Interface Parameters	illustrate
The total number of tags that have been inventoried	the total number of all labels of one or more instructions **after deduplication**
recognition speed	The speed of identifying labels is generally around 200
Cumulative return data	This data is the total number of labels for one or more instructions

1.2 Multi-antenna inventory (8A instruction)



Software instruction parameter	illustrate
Number of runs	Input -1 to keep inventorying, input a positive number, send as many instructions as the value is, and then stop inventorying.
time interval	The time interval of inventory command time, the default is 0ms.
Delay between antennas	Spacing time between antennas (firmware controlled, not software controlled)
Phase	phase
temporary power	Not save when power off
optimization	is not equal to the number of tags in the last inventory, it will be inventoried again (**cancelled**)
Cycles	Send a single instruction, the number of executions

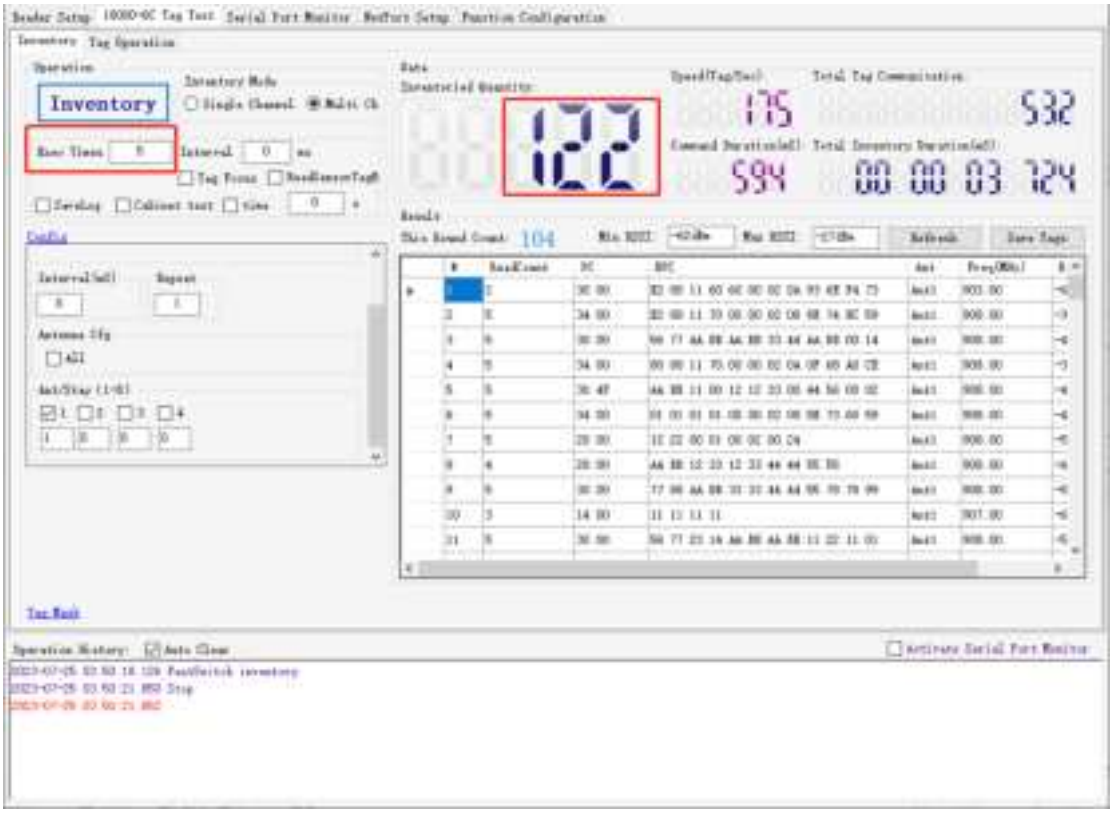
Software Interface Parameters	illustrate
The total number of tags that have been inventoried	the total number of all labels of one or more instructions **after deduplication**
recognition speed	The speed of identifying labels is generally around 200
Cumulative return data	This data is the total number of labels for one or more instructions

1.2.1 How many instructions need to be sent to test read

In some scenarios, it is necessary to read all tag data, but one command may not be read completely, so this software has a test function in this case, which is convenient for customers to test. The specific parameters are as follows: (data are just examples, for **reference** only)

（1）**Enter a positive number** for the number of runs , generally not too large, just to solve the problem of incomplete reading of an instruction

In this way, **the user can see the total number of tags read by the 5 instructions (data accumulated between each instruction)**



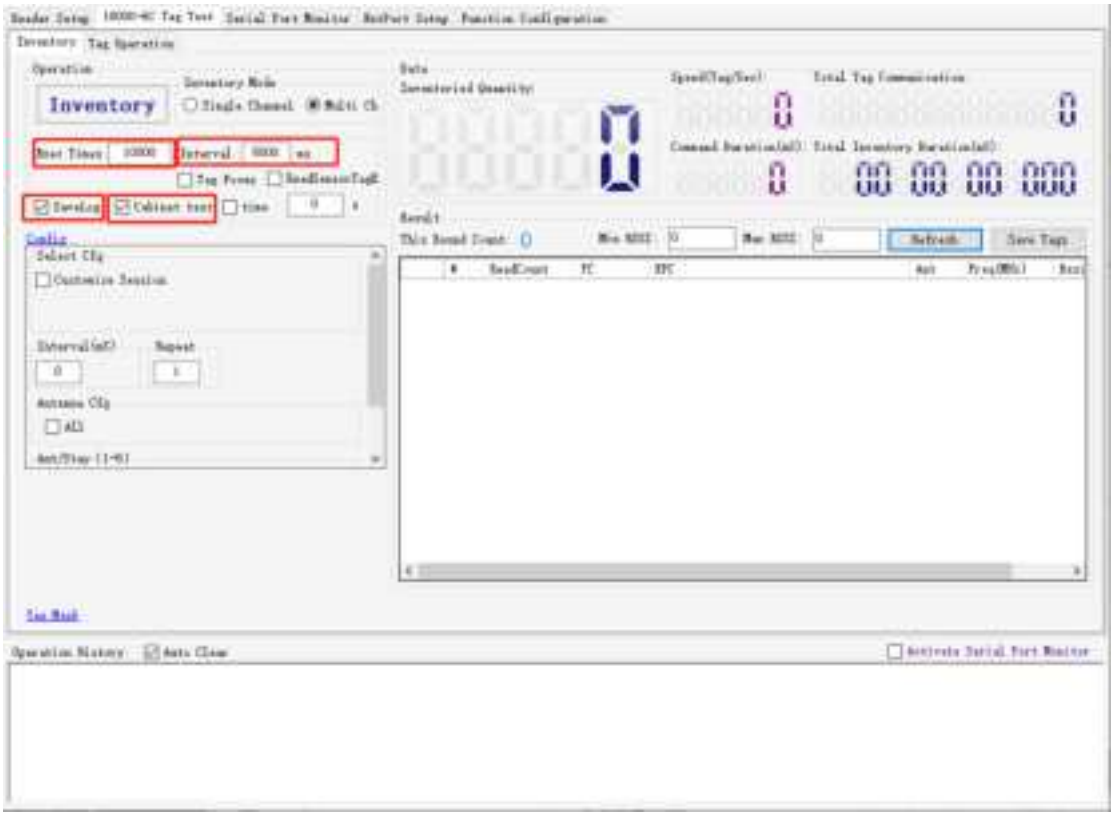
1.2.2 Test the configuration of the read-full rate parameters in the cabinet-like scenario

Using this function, the scenario is generally that all tags can be read with one command. In the current case, retail and smart medical cabinets can read all 300 tags in about 3 seconds (the data in this case is for reference only, see the test environment for details **)** ;

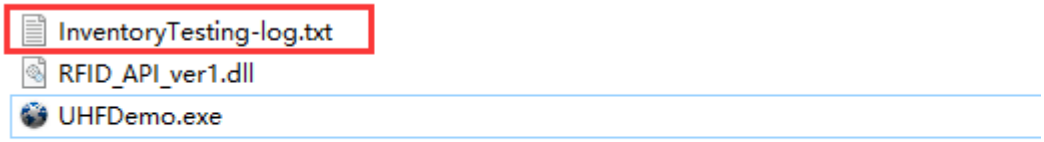
When the user needs to test the read rate of RFID tags, for example, a smart medical cabinet needs to test the read rate, assuming that the cabinet has a total of 300 tags, it needs to be tested 10,000 times as a reference base, and through the statistics of the read rate of 300 tags, you can choose to check [Save Log] at this **time** .

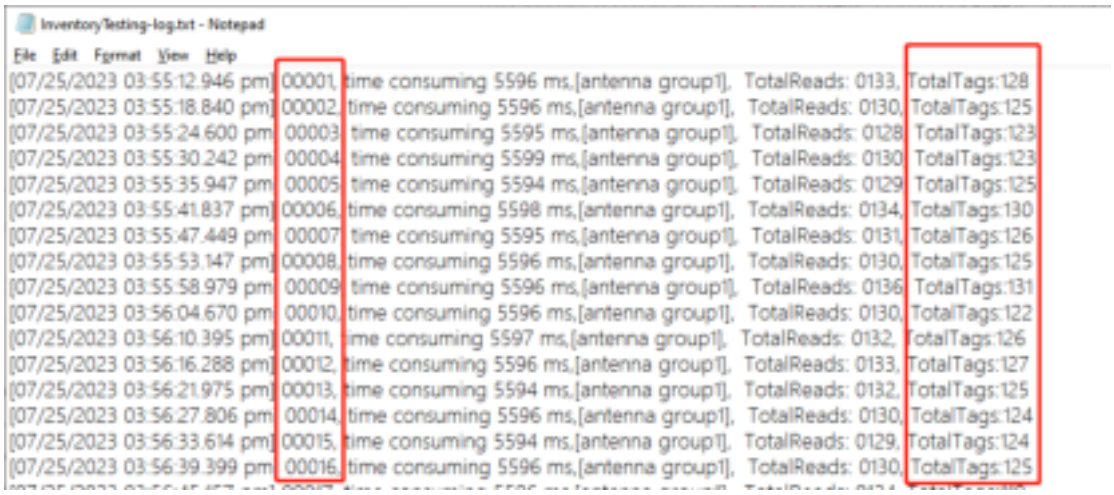
In the case of [number of runs = positive number] and the time interval is greater than 1ms and [freezer test] is checked , there will be two important observation areas:

（1）**The data on the right will be refreshed every time a command is executed** , which is convenient for users to observe the number of tags read each time. If there are too many missed readings, the inventory can be stopped in time, and the parameters can be adjusted before testing to avoid unnecessary delays in testing time.



（2）The record file is automatically generated in the directory of the same level as the demo, so that it is convenient to clearly view **the reading time, test time, and running times, and can calculate the reading rate.**



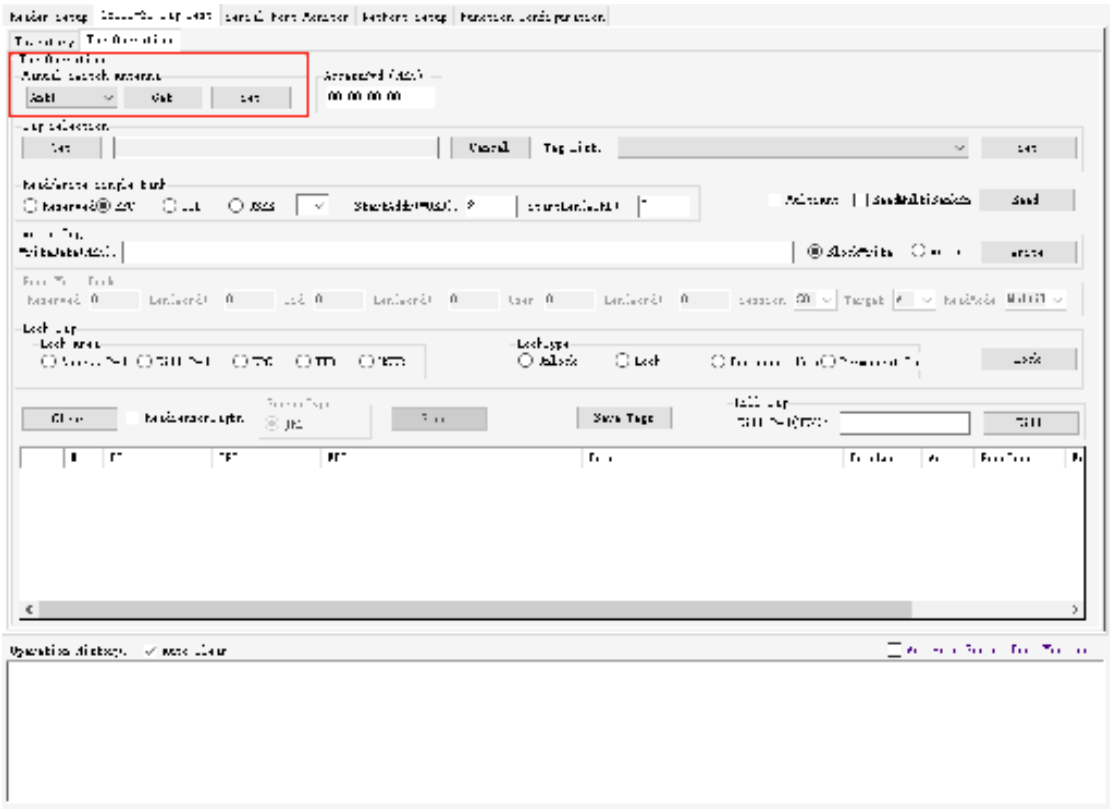


Note : This screenshot is just a simple demonstration, so the data looks very messy. In the actual application process, the **total number of tags** should tend to a certain number, and it will not be so messy.

（3）When [Save Log] is checked, every time you click [Start Inventory], the log will be cleared, and then new data will be recorded. If you need to save the previous data, you can change the name of the log first, and it will not be replaced.

2 access tags

2.1 Obtain and set the working antenna



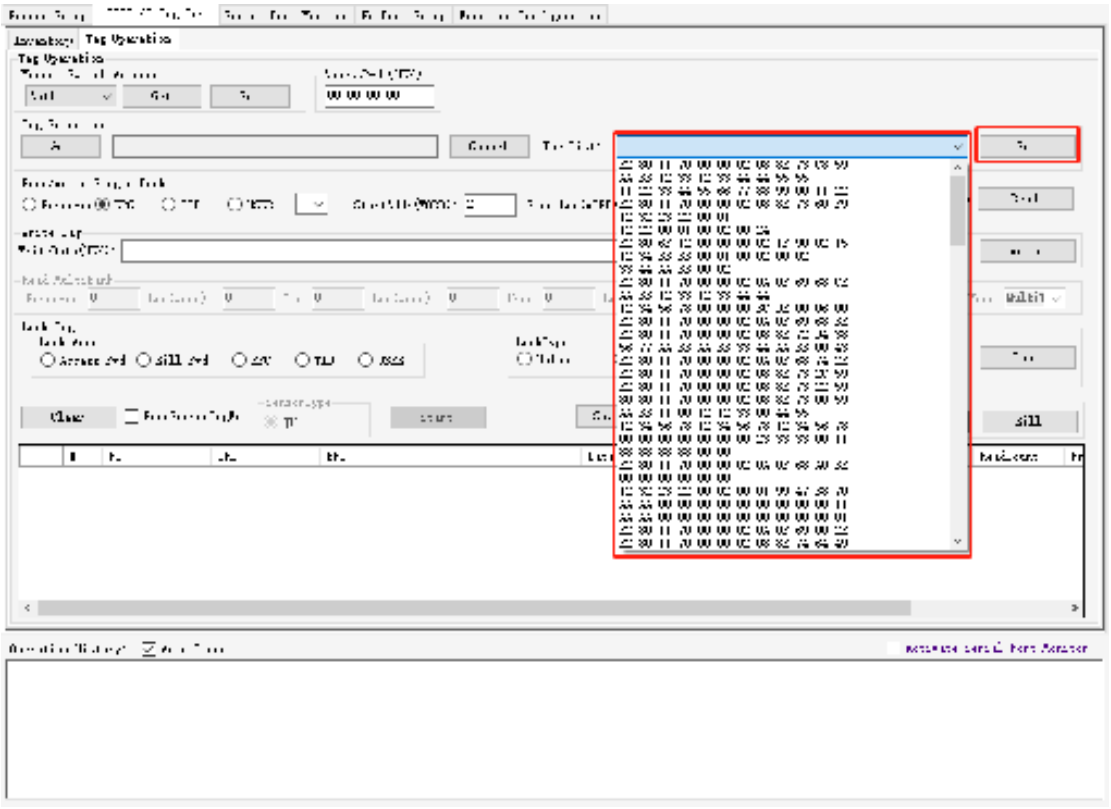
2.2 Selected tabs

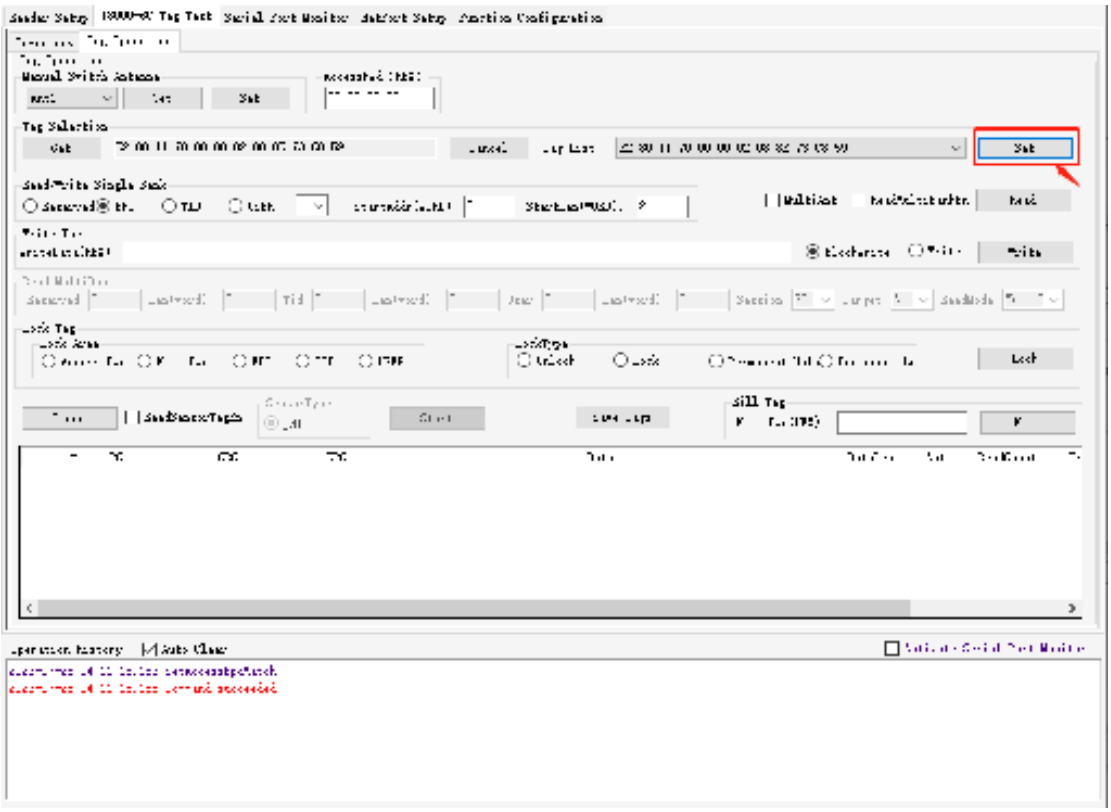
Users can inventory tags in the inventory interface now, confirm that the tags they need are in the tag list, stop the inventory, and then they can pull down on the tag interface of the [Access Tags] interface, select the tags they need, and finally click the selected tag.

The function of the selected label is to operate on a certain label, and the nearby labels will not be affected.

Notice:

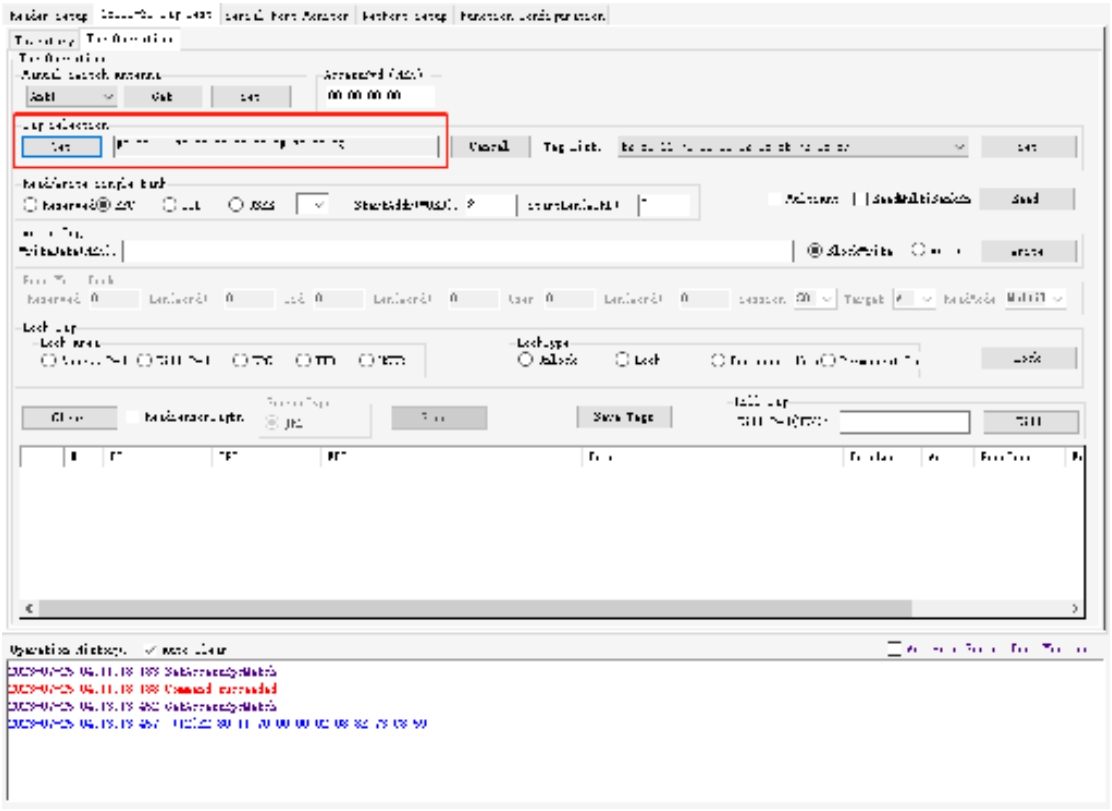
（1）The selected label will not be saved when the power is turned off.





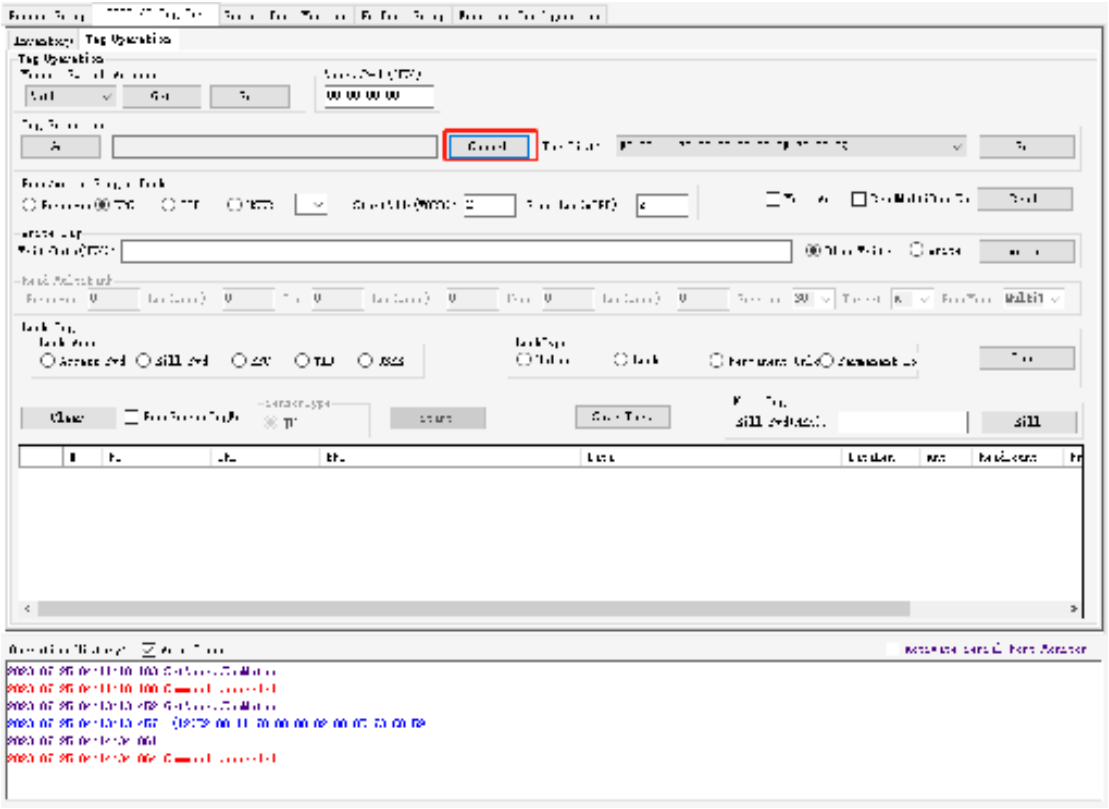
2.3 Get selected tags

You can click the [Get] button to get the tag selected by the user. If there is a selected tag, the tag information can be displayed. If not, it will not be displayed.



2.4 clear(label)

After clearing the label, the previously set selected label will become invalid.



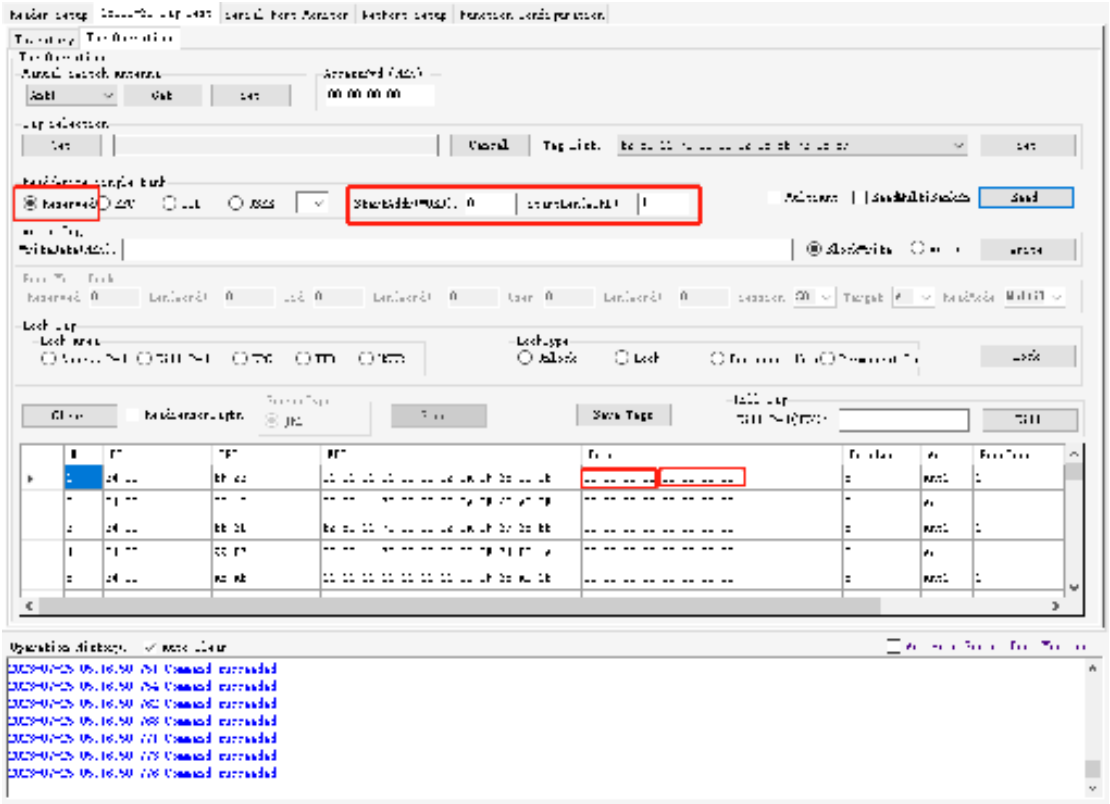
2.5 Read tags

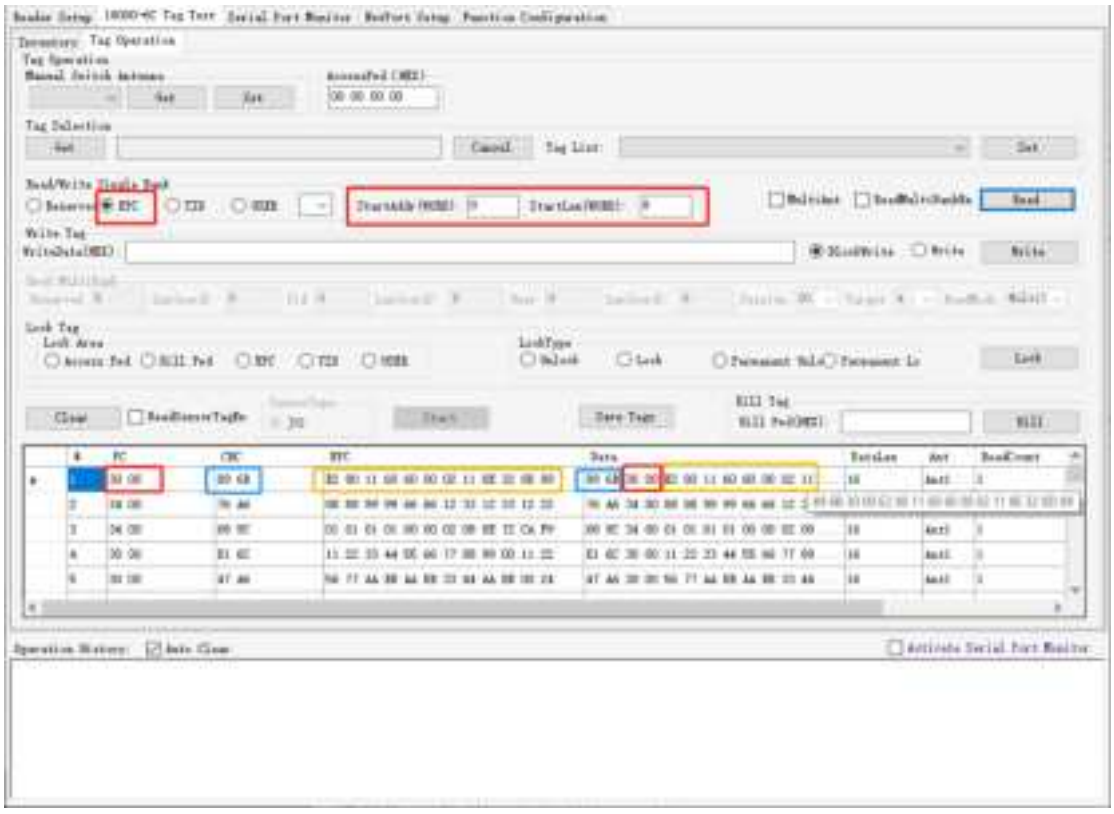
label area	initial address	length	Remark
password area	00	04 (Adjusted according to actual needs)	Password area = destroy password + access password
EPC area	**02**	06 (Adjusted according to actual needs)	00-02 in the EPC area is PC+CRC
TID area	00	04 (Adjusted according to actual needs)	not writable, readable
UER area	00	04 (Adjusted according to actual needs)	user area

password area	destroy password	access code
start address-length	Start address: 00 Length: 02	Start address: 02 Length: 02

The first two bytes of the EPC	PC	CRC
start address-length	0-1 word	1-1 word

The principle of reading the four areas of the label is the same. The following is a simple screenshot explanation for the password area and EPC:





Remarks: If you need to operate on a certain tag, you can select the tag first, then read or write the tag.

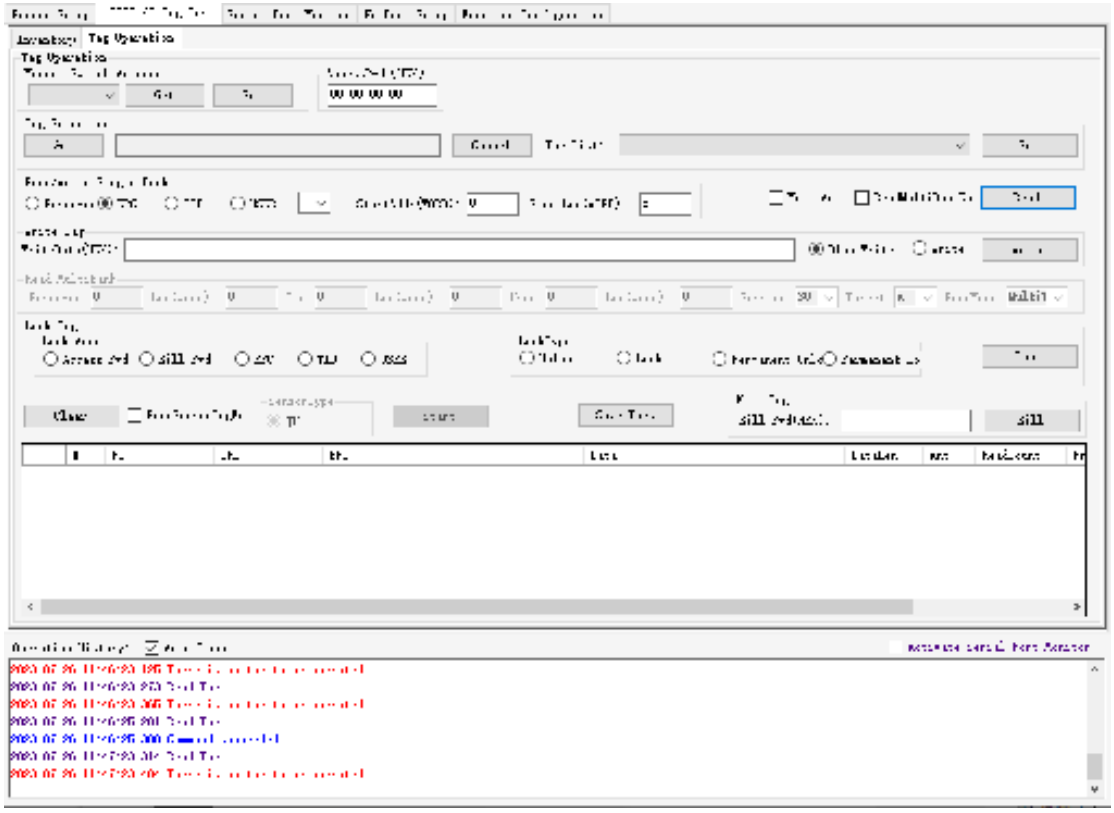
Since the reading and writing tags under the [Access Interface] are more difficult than

inventory, the power should be set higher. If the selected label is not within the recognition range, an error will be reported, as shown in the figure below, in this case:

（1）can try a few more times

（2）Turn up the power

（3）The tag is closer to the reader



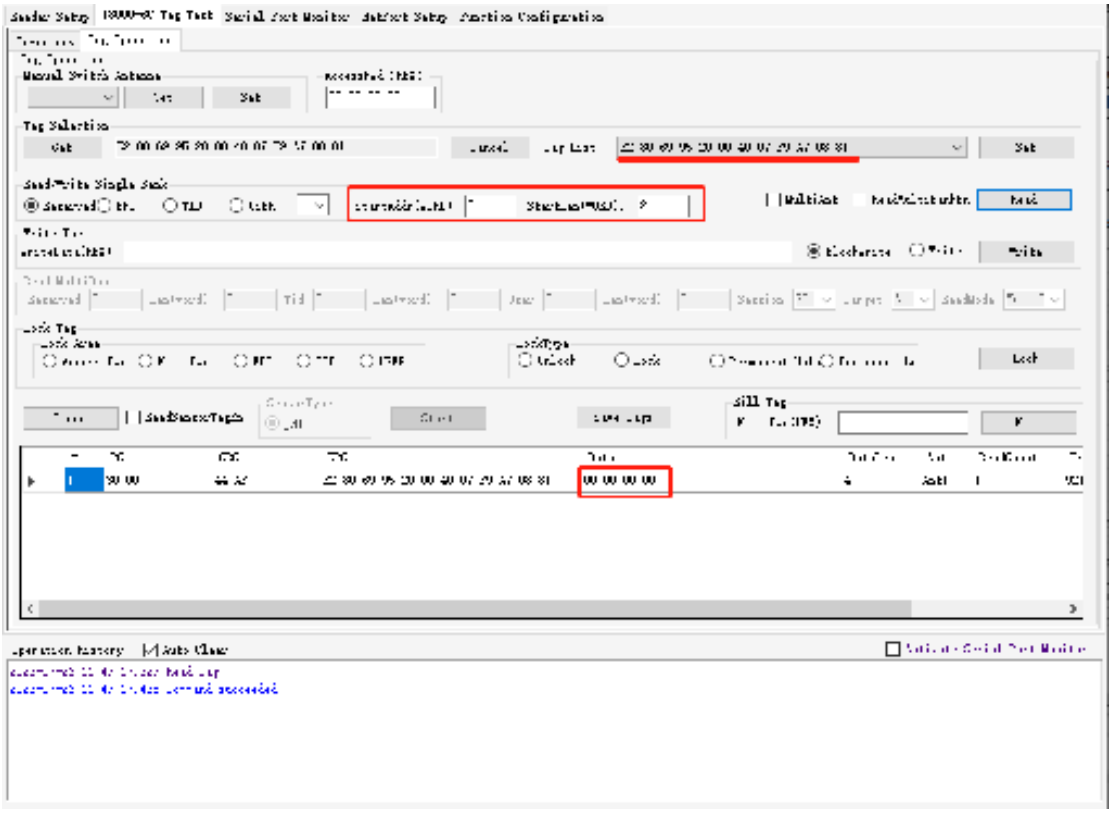
2.6 Write tags

label area	initial address	length	Remark
password area	00	04 (Adjusted according to actual needs)	Password area = destroy password + access password
EPC area	**02**	06 (Adjusted according to actual needs)	00-02 in the EPC area is PC+CRC
TID area	00	04 (Adjusted according to actual needs)	not writable, readable
UER area	00	04 (Adjusted according to actual needs)	user area

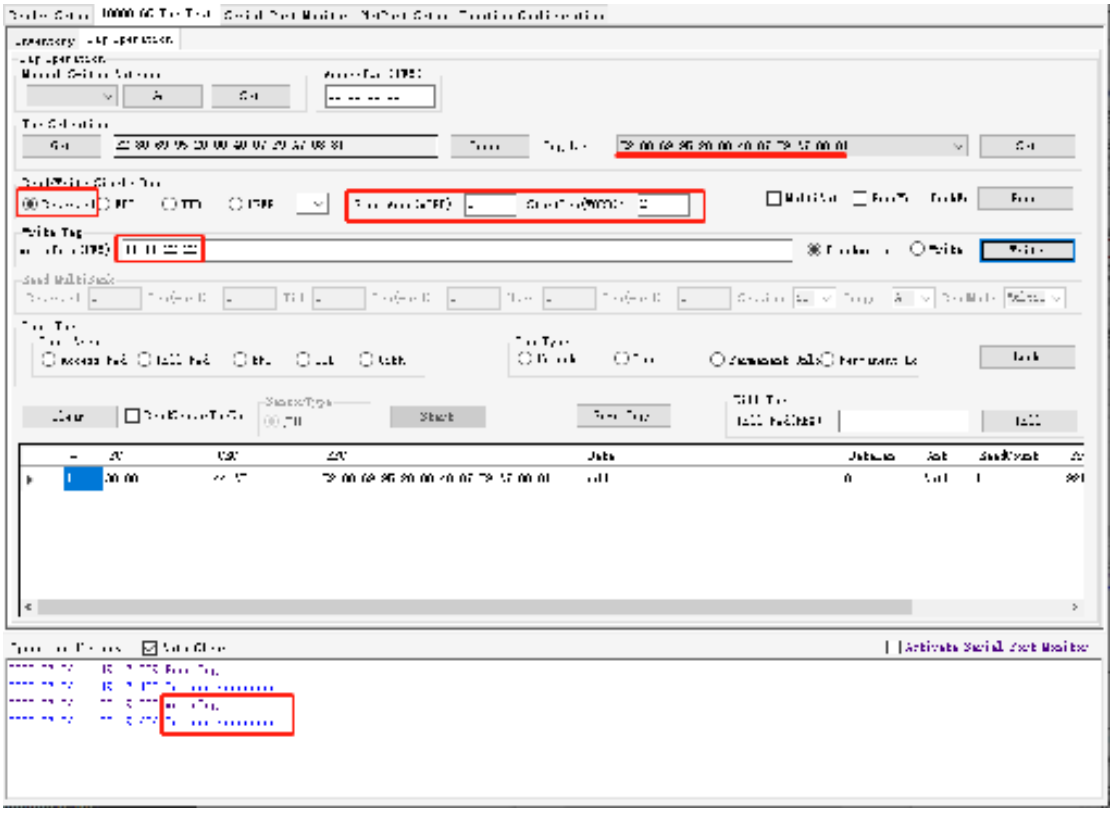
password area	destroy password	access code
start address-length	Start address: 00 Length: 02	Start address: 02 Length: 02

The first two bytes of the EPC	PC	CRC
start address-length	0-1 word	1-1 word

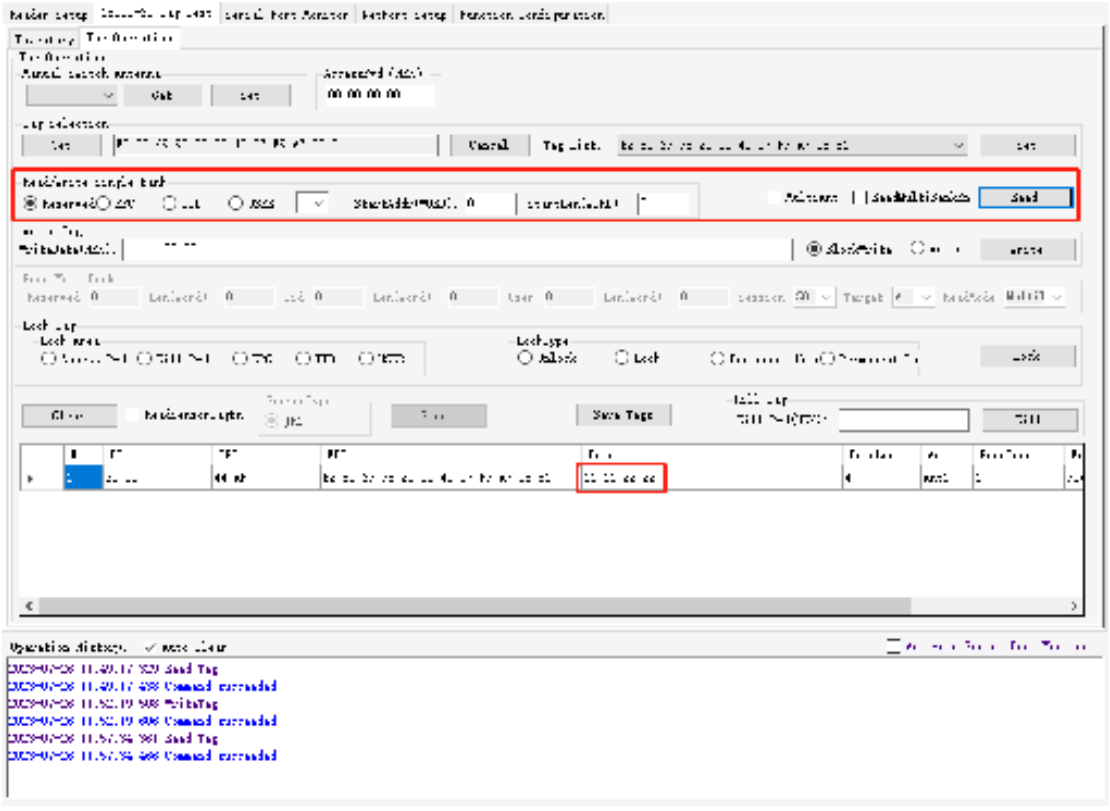
The four areas for writing labels have the same principle. In addition, [Write Label] has two commands, corresponding to two buttons. The following is a simple screenshot description for the password area and EPC:



As can be seen from the figure, the current tag’s **destruction password** is the default 8 0s. Now demonstrate [Write Tag], just fill in the content you need to modify:



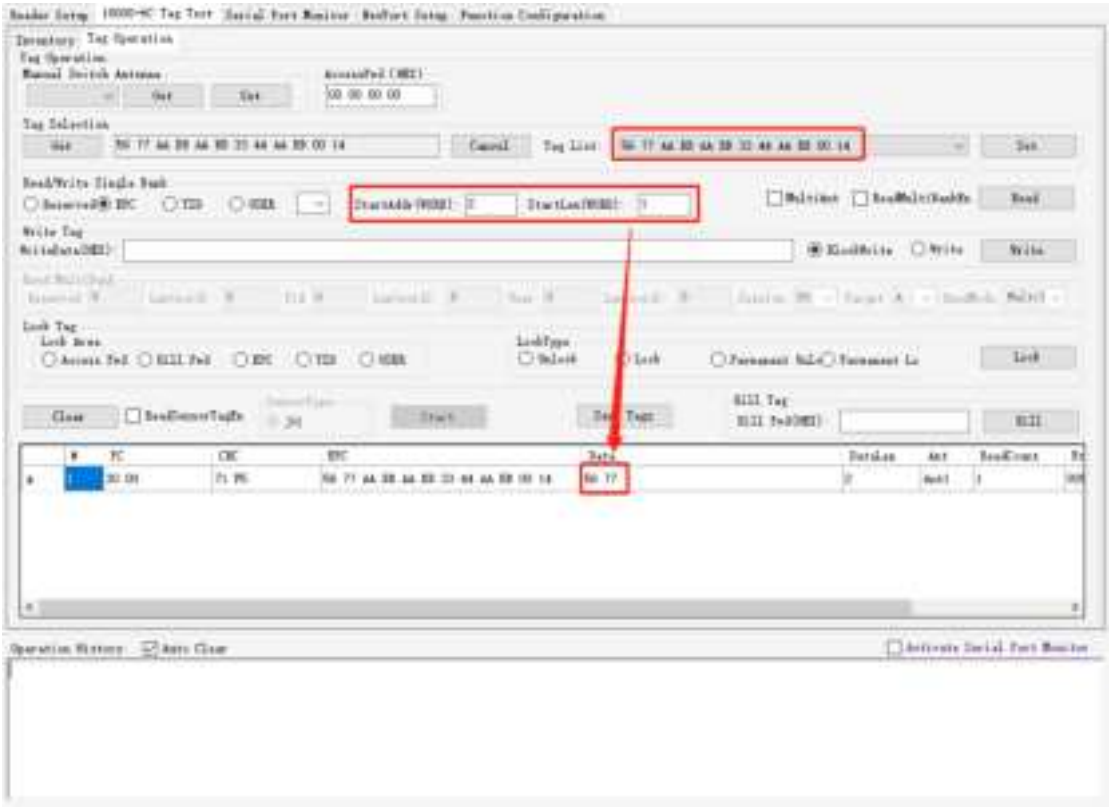
After the prompt modification is successful, click Read again to see the new data.



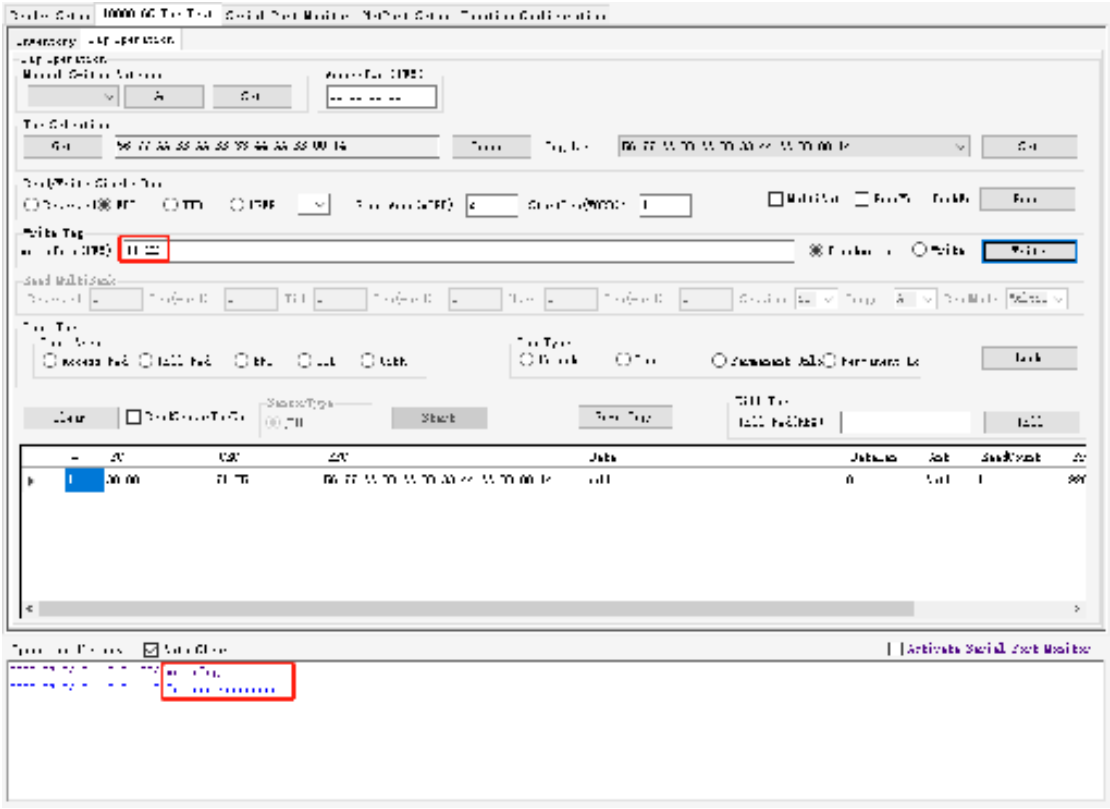
Note: If **the selected tag is used** and **the modification is in the EPC area** , after the writing is successful, it is necessary to cancel the selected tag first and then read the tag to find the tag

modified by the user, because the EPC value of the originally selected tag has changed:

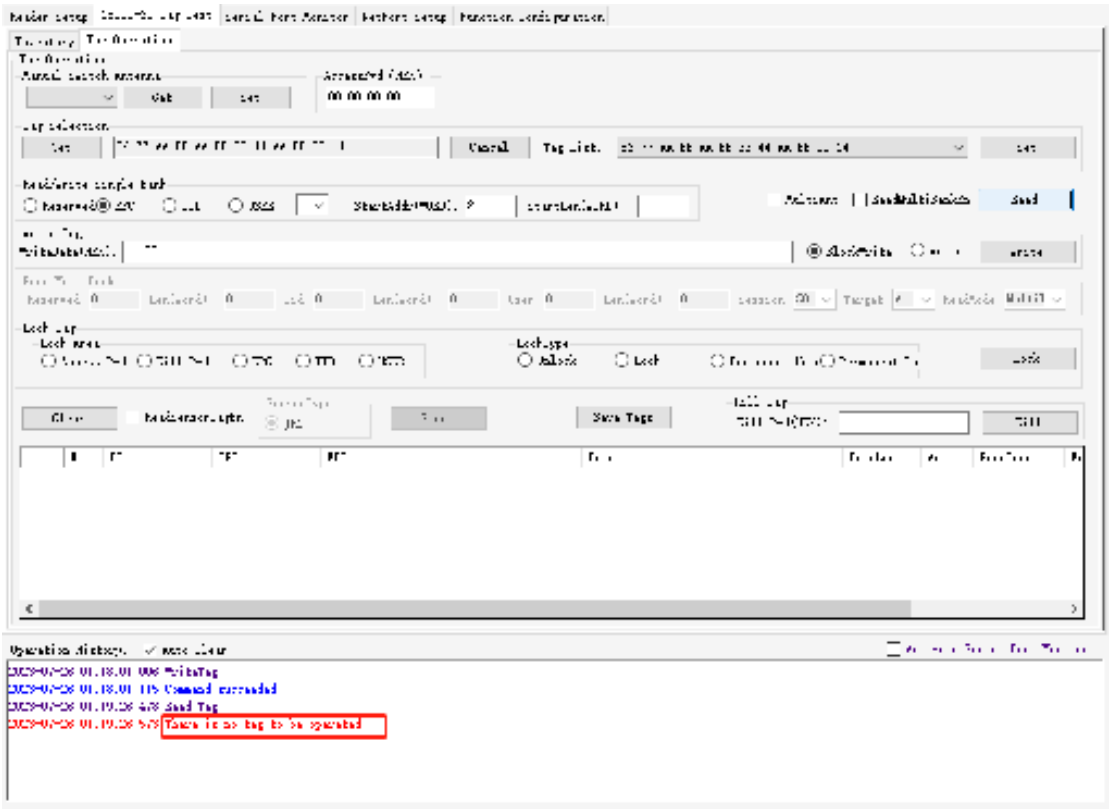
Example: Modify the value of 5677 of the following label to 1122:



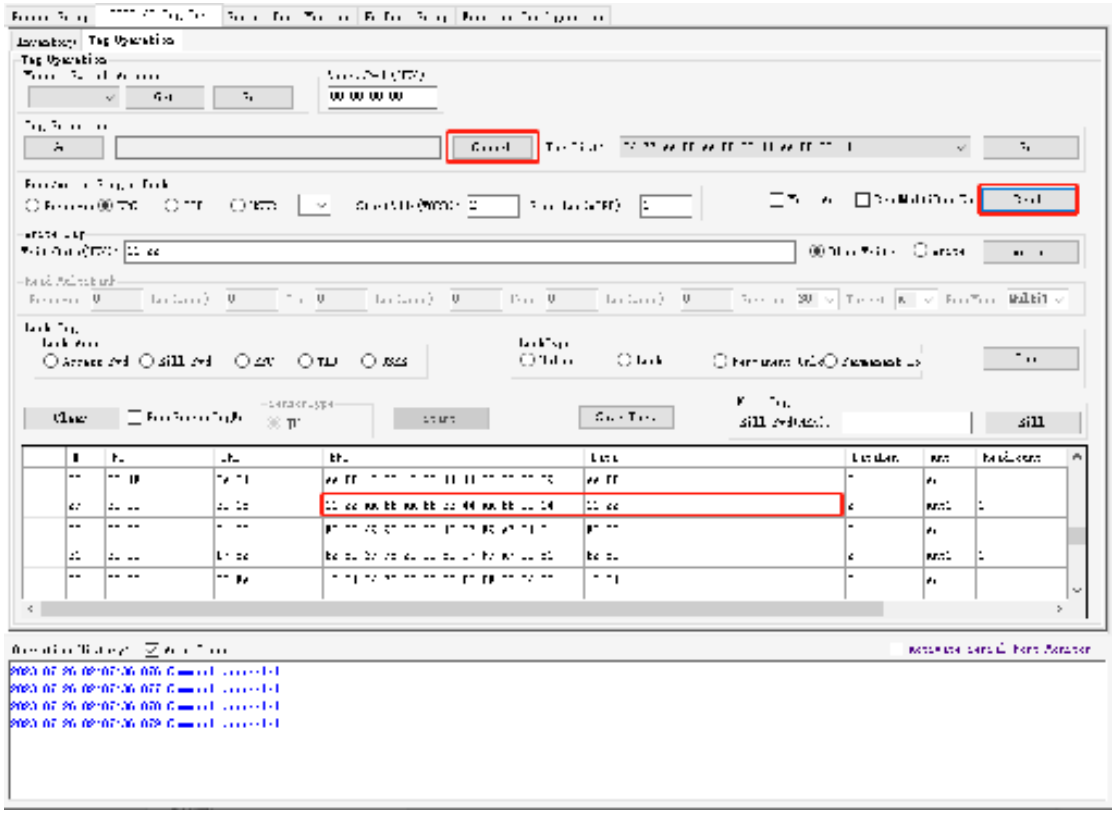
Enter a value corresponding to the length:

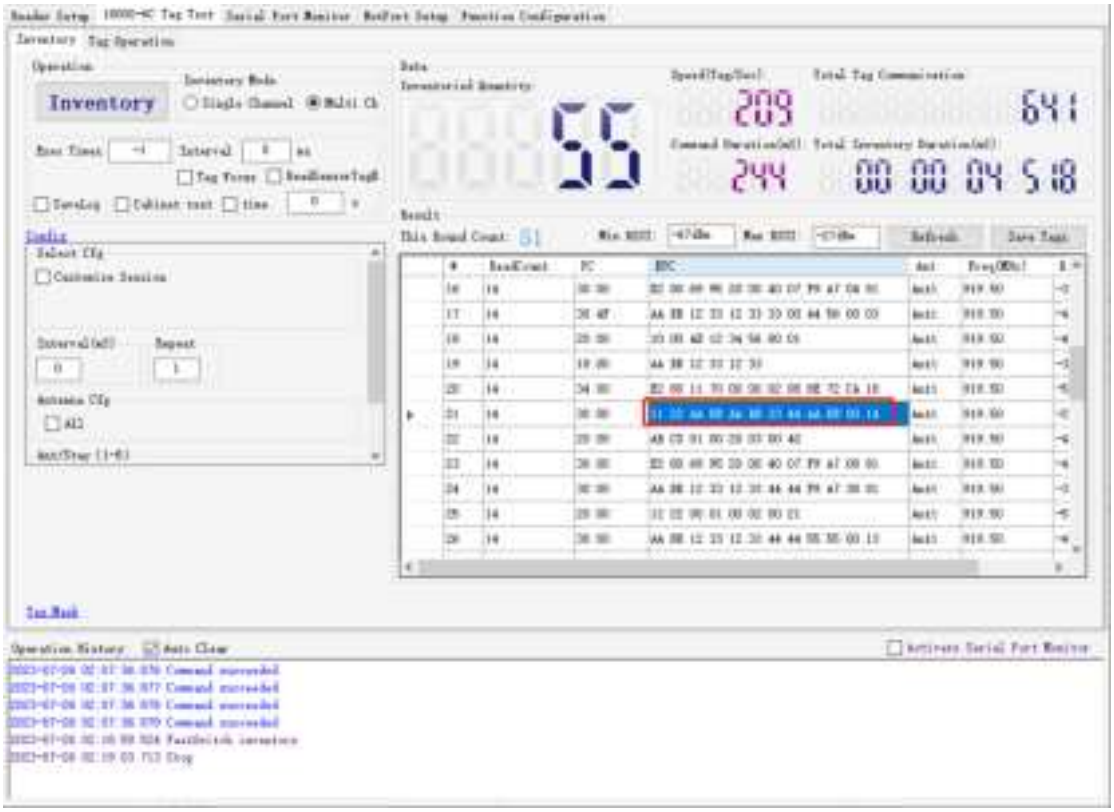


Prompt success, do not cancel the selection, read directly, it will prompt:



After deselecting, click Read, you can see that the data has been modified successfully:

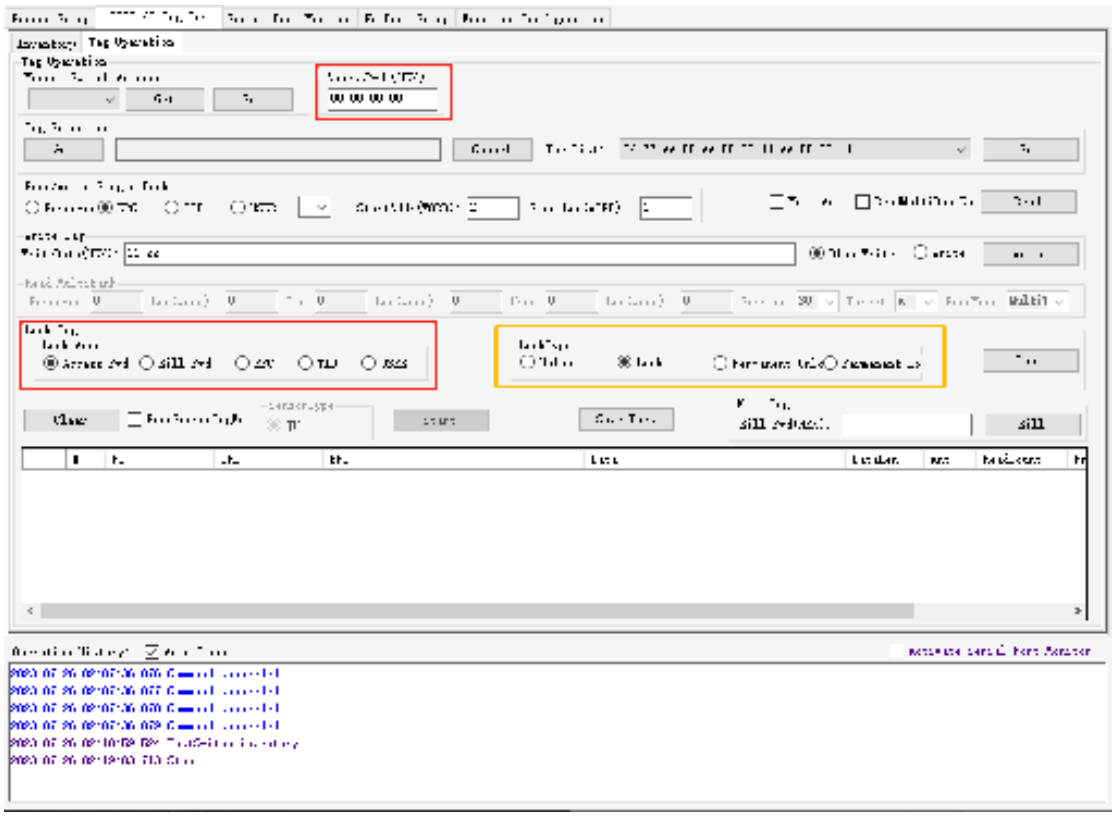




2.7 Locked area

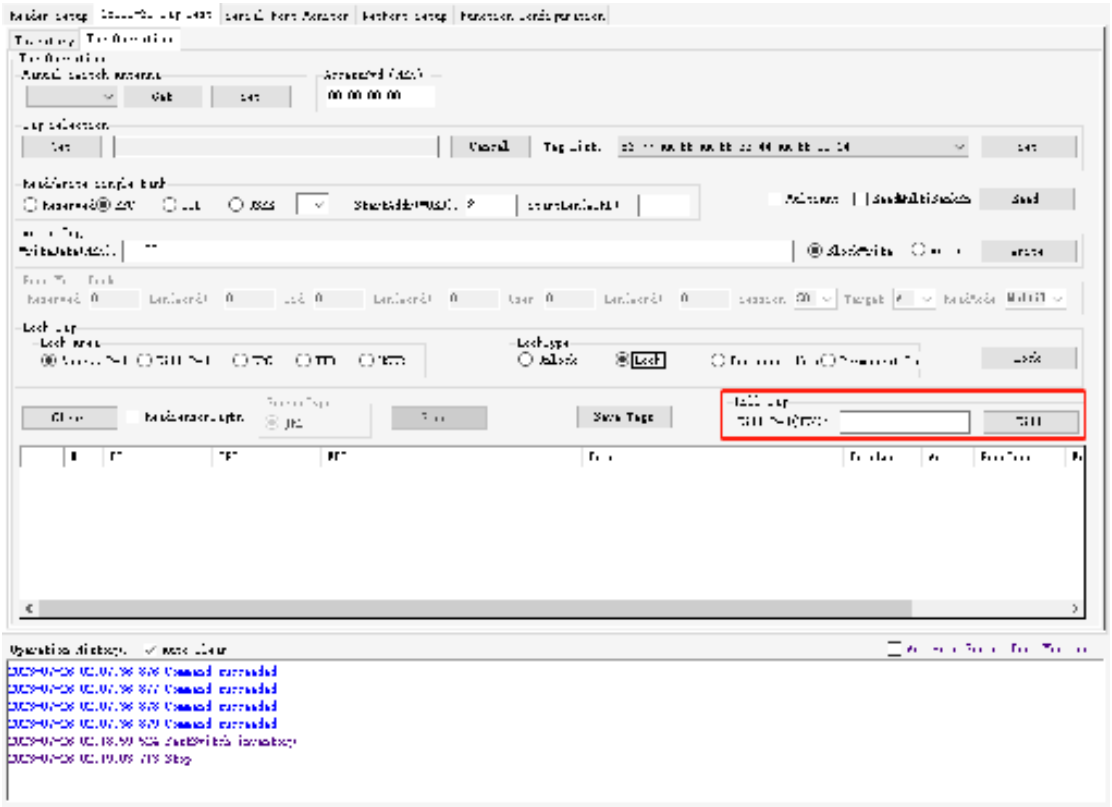
Locking the area refers to performing related operations on certain areas of the label, as follows:

name	introduce
open	Tags are open by default, readable and writable (EPC area of general tags), except for special tags.
locking	The default access password cannot be written, and a new access password is required to write.
permanently open	After operation, the label cannot be locked.
permanently locked	After the operation, the tab cannot be opened.



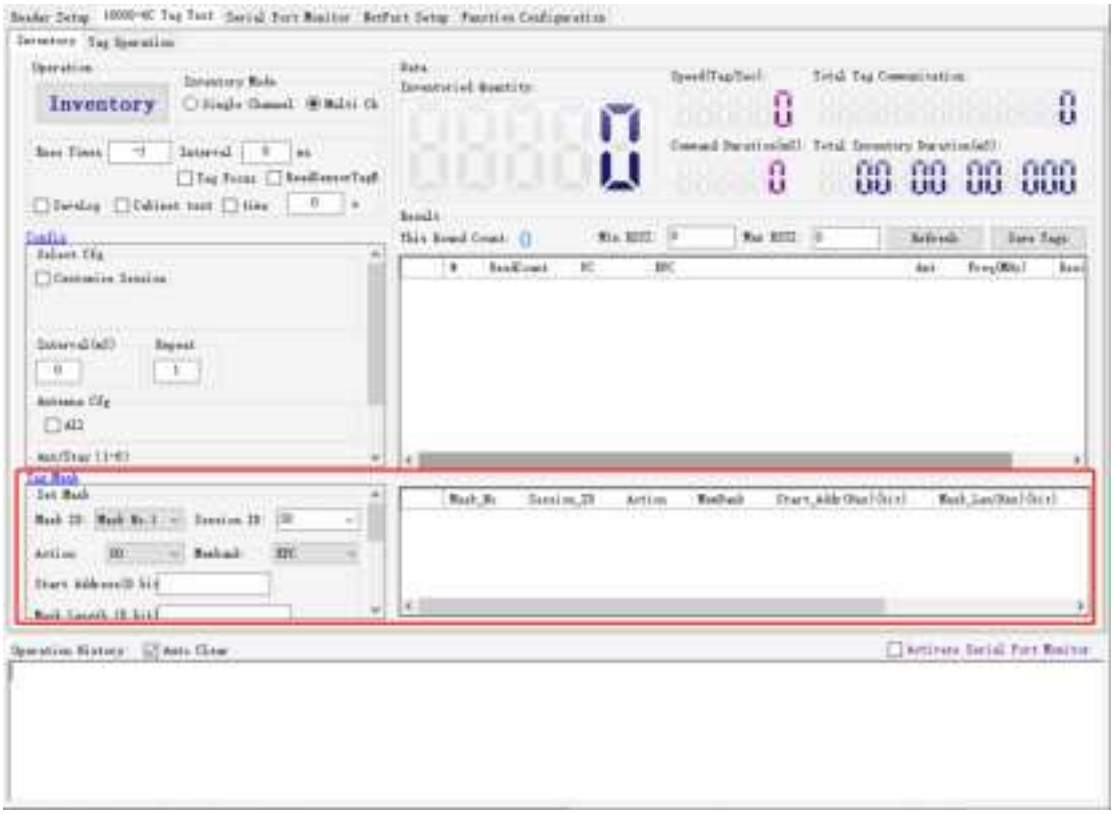
2.8 Kill tags

To destroy the label, you need to modify the default destruction password first. For specific modification steps, please refer to the tutorial of **writing the password area (kill password)** . After the label is destroyed, the label becomes invalid and cannot be used, read, or written. The specific operation is as follows:



3 Tag filtering

3.1 Set filter



filtering behavior	illustrate
00	For [**Access** Tag]
04	For [**Inventory** Label]

Filter ID	illustrate
No.1	Default and commonly used, others are not commonly used

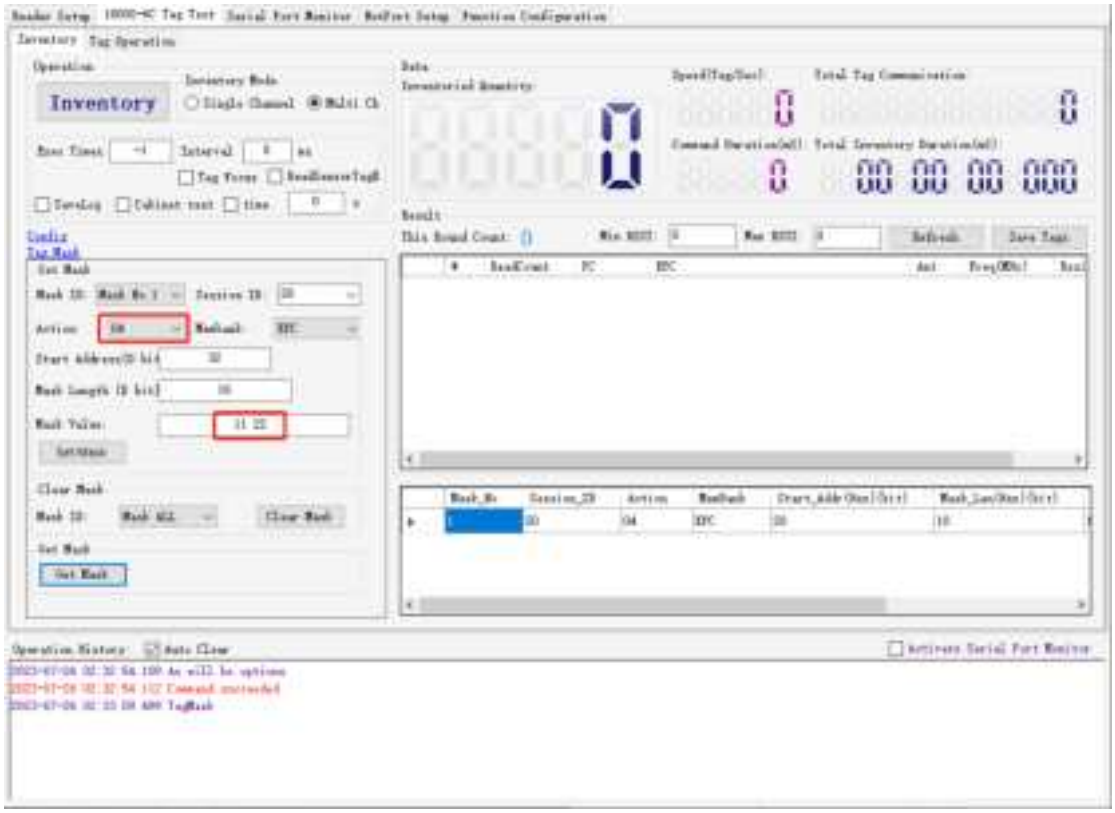
session	illustrate
S0, S1, S2	Choose according to the inventory method you use, but you need to correspond. For example, if you set the filter to use S0, use the S0 mode to inventory the tags you need.

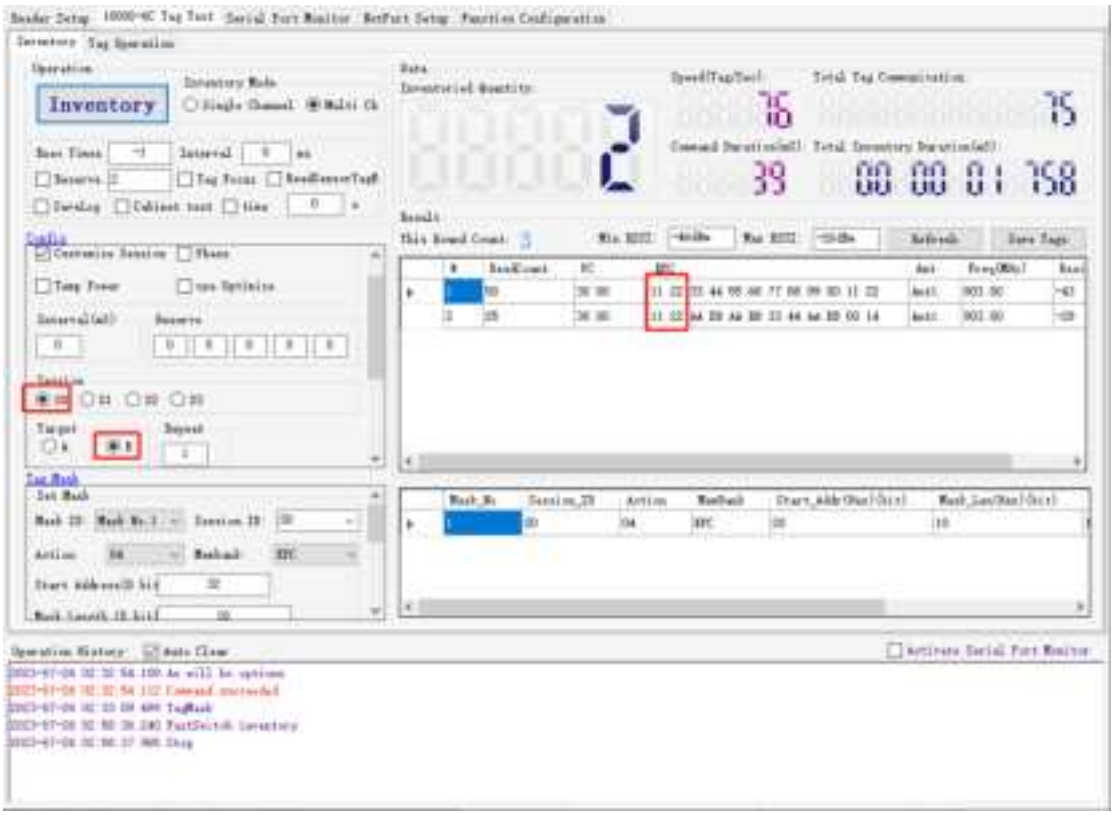
filter area	illustrate
EPC	The default and commonly used EPC, the software inventory refers to the EPC area

3.1.1 Filtering of inventory tags

filtering behavior	illustrate
04	For [**Inventory** Label]

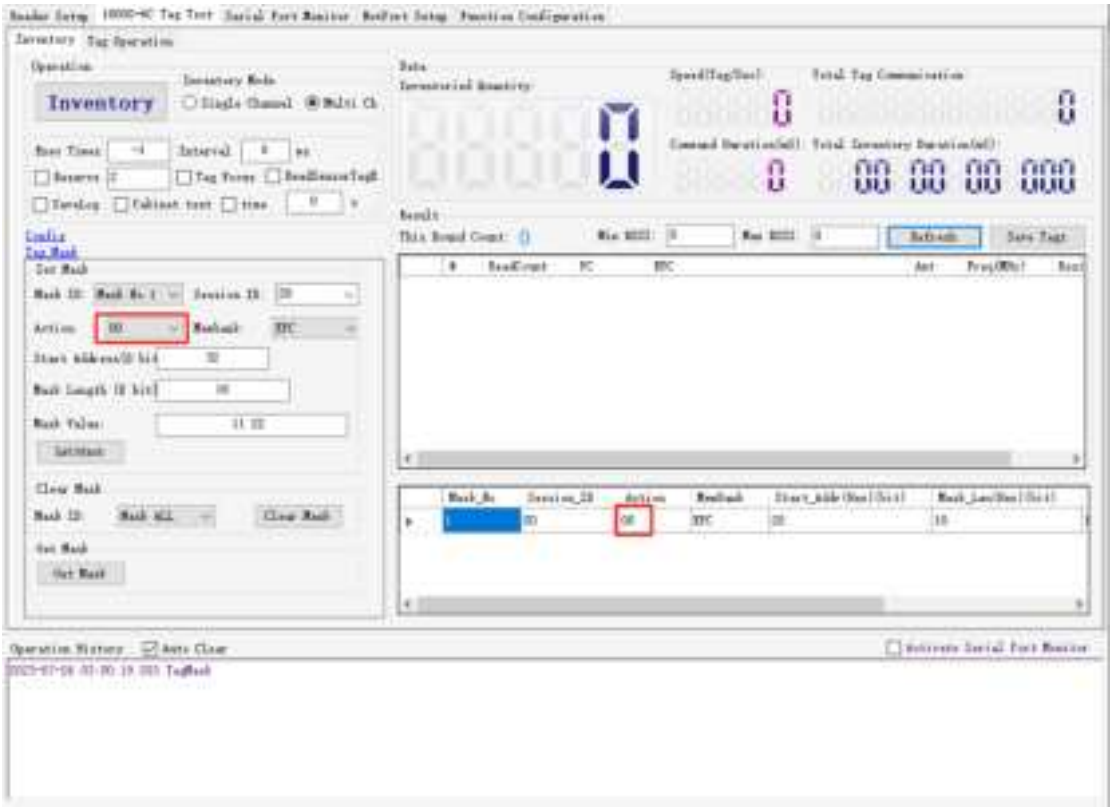
Since the EPC common data of the label starts from 02word, the corresponding starting address is: 32bit, and the length is filled in according to the length of the content you need to find, for example: use S0 mode to find the label starting with 1122



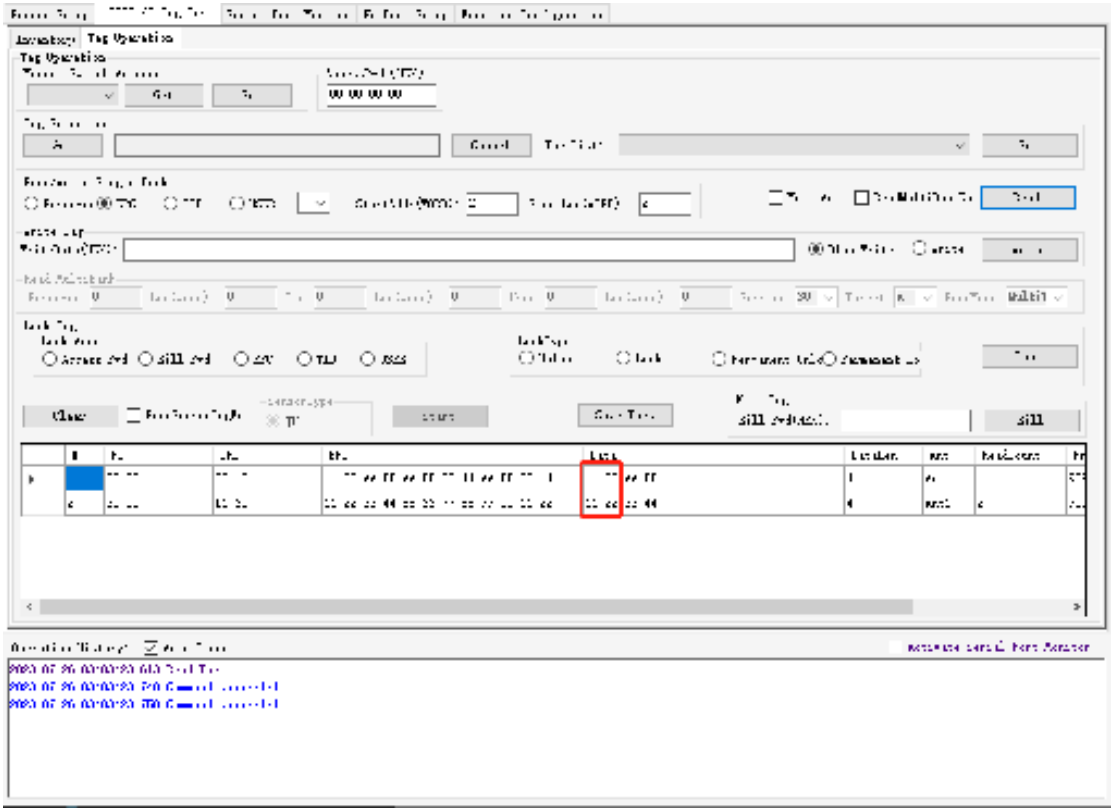


3.1.2 Filtering of access tags

filtering behavior	illustrate
00	For [Access Tag]

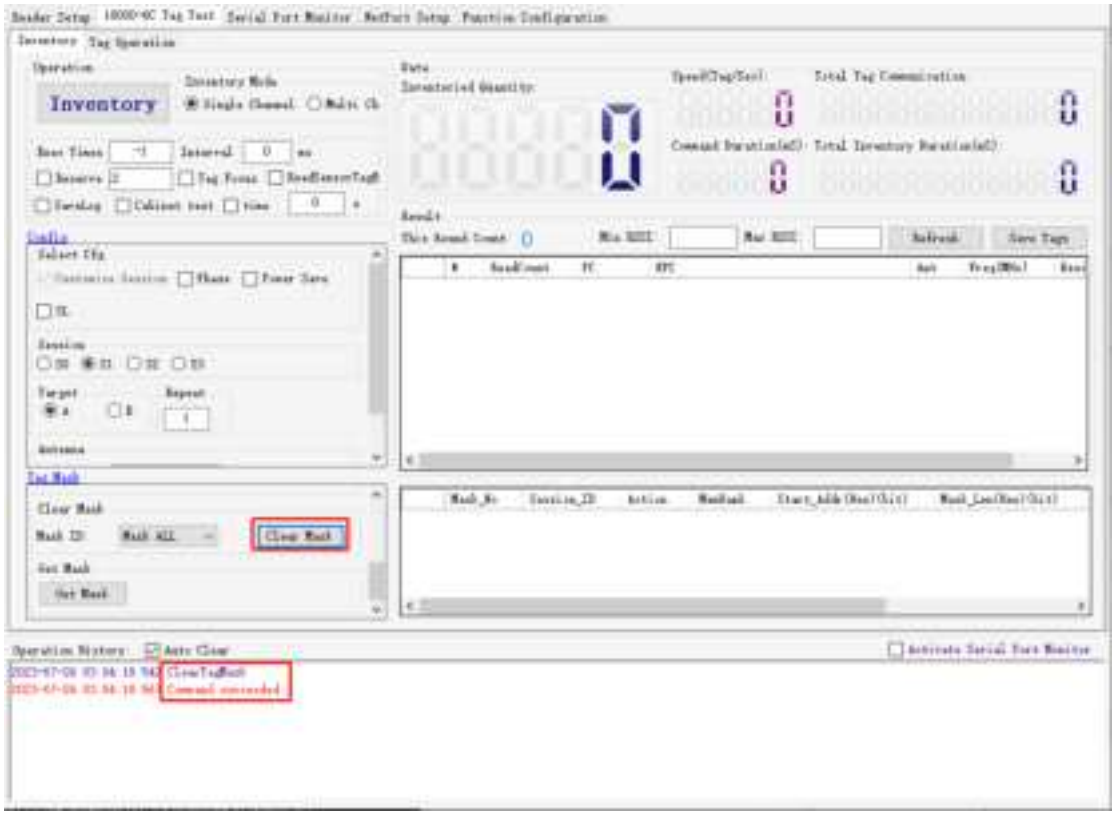


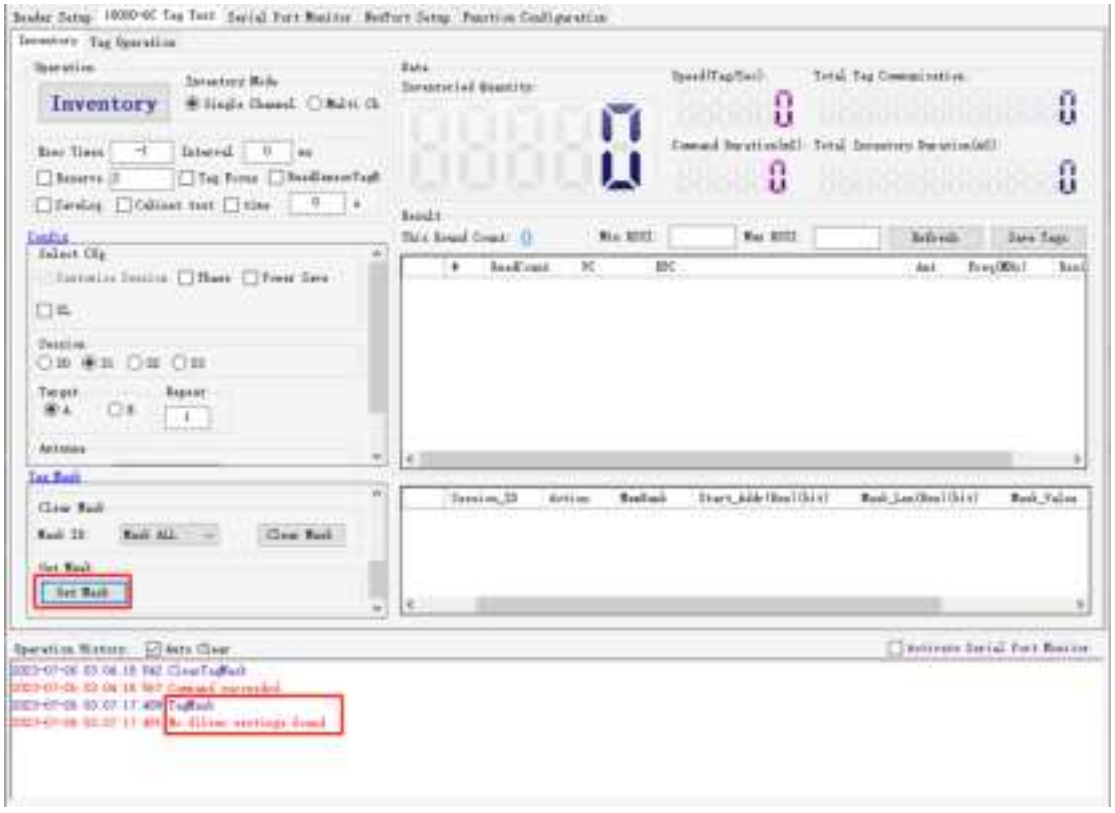
After setting, on the [Access Tags] interface, every time you click Read Tags, the returned tag information is returned according to the set rules. For example, the filter rule set this time is: only display tags starting with **1122**



3.2 Clear filter

To clear the filter ID, you can choose to clear only a certain pattern, or choose to clear all filtering rules.





Chapter 3: Special function configuration

Function configuration list

function number	Function	GPIO1 status	Note 1	Note 2
0x00	standard mode	none		
0x04	automatic tag reading 4- antenna polling cruise available .	GPIO1 active high		
0x08	Automatic aging.	GPIO1 active low		
0x09	automatic tag reading 4 antenna polling, ~~Wiegand 26 output (in phase).~~	GPIO1 active high	M 500 automatically reads tags, serial port output, GPIO1 active high	
0x0F	automatic tag reading 4- antenna polling cruise available .	GPIO1 active low		
0x11	automatic tag reading 4- antenna polling cruise , automatic reading reader identification			
0x12	automatic tag reading 4- antenna polling cruise, triggering GPIO3 output (high) every time a tag is read	GPIO1 active high	Change the trigger time by setting the delay between antennas Note unit: 20 milliseconds	
0x13	Single tag low power consumption (single antenna inventory)	GPIO1 low level automatic reading	Handheld devices	
0x15	Automatically return to GPIO status when reading tags	none		
0x18	Automatic tag reading, 8-antenna polling cruise	GPIO 1 active high	Note : Only for 8-channel modules	
0x19	Automatically read tags and automatically return to GPIO status	GPIO1 active high		
0x20	Automatically report when input GPIO status changes	none		2 020 - 09 - 30 _
0x23	Automatic tag reading can be polled by single antenna	GPIO 1 active low	Conversational Mode S1	2018-9-30
0x24	Automatic tag reading can be polled by single antenna	GPIO 1 active low	session mode S 0	2 020-04-30 _ _ _ _
0x25	Automatic tag reading can be polled by single antenna	GPIO 1 active low	Conversational Mode S1	2 020-04-30 _ _ _ _

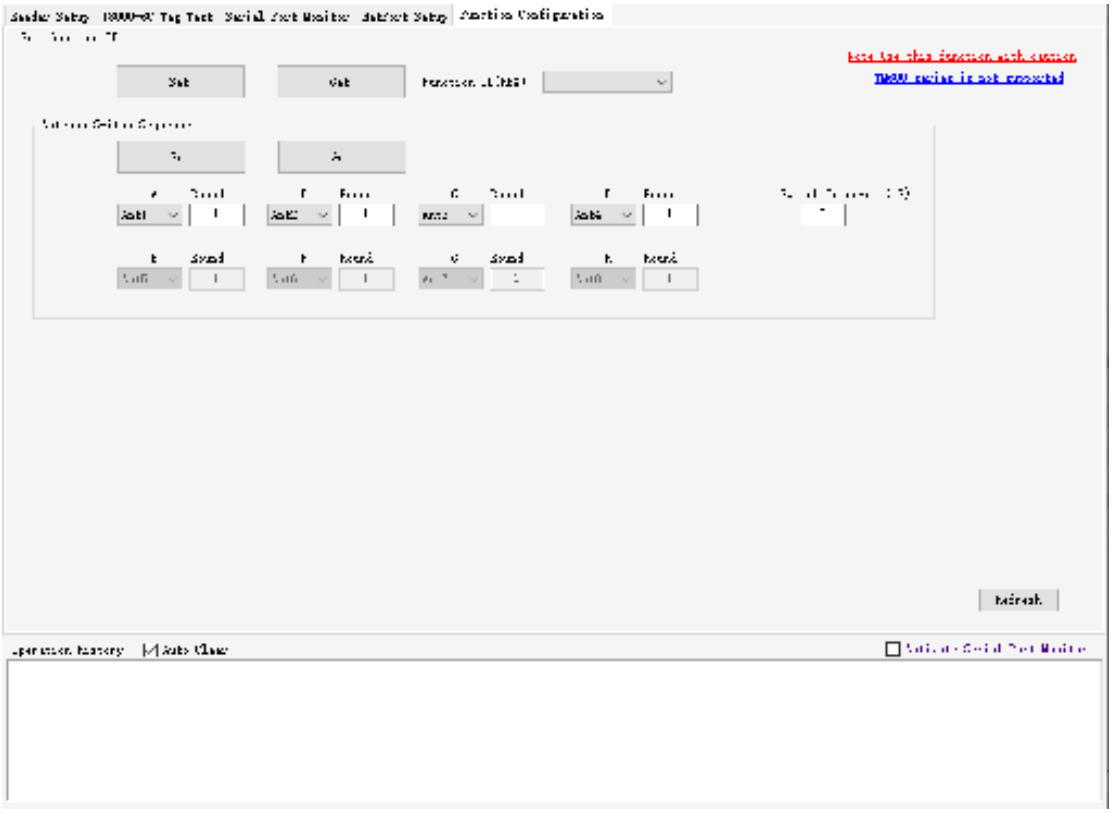
0x31	Automatic tag reading, 4-antenna polling navigation	GPIO 1 active high	Conversational Mode S1	
0x32	Automatic tag reading, 4-antenna polling navigation	GPIO 1 active high	Conversational Mode S2	

Note : 8-channel reader/writer 0x 18 mode configuration , please refer to 1.2->manual sending command setting

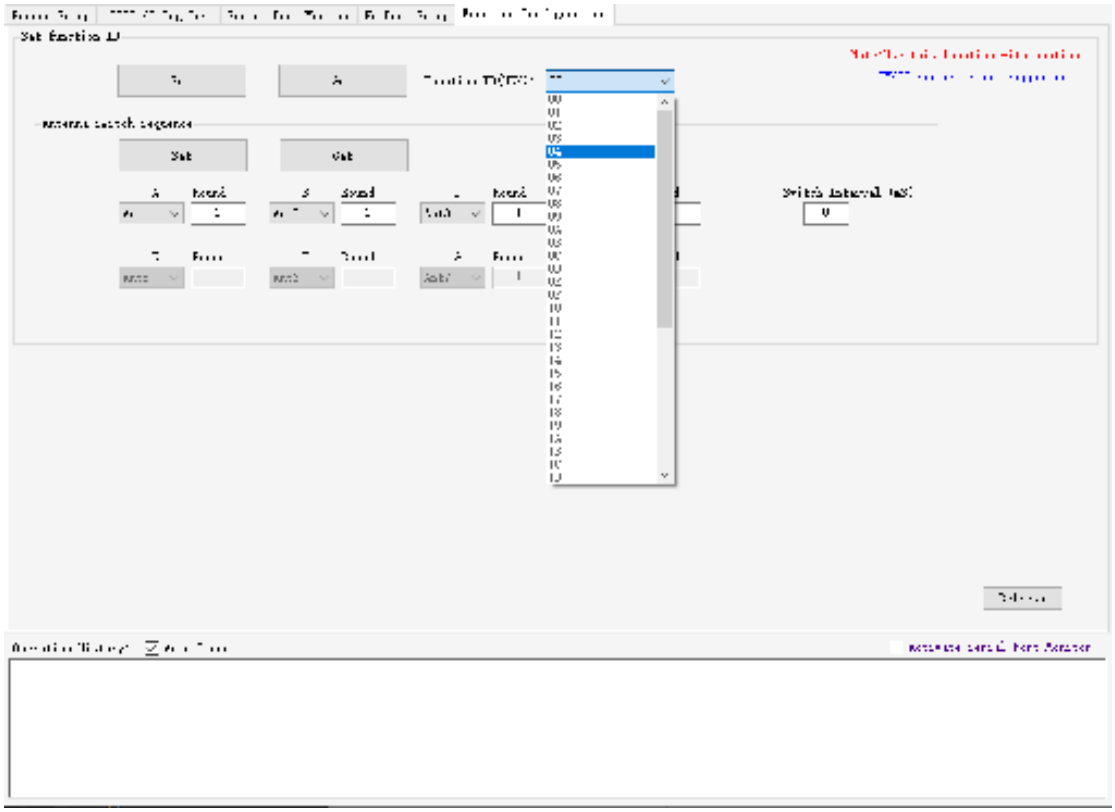
When the reader is in automatic working mode, please do not send other commands to the reader frequently.

1 Special function configuration

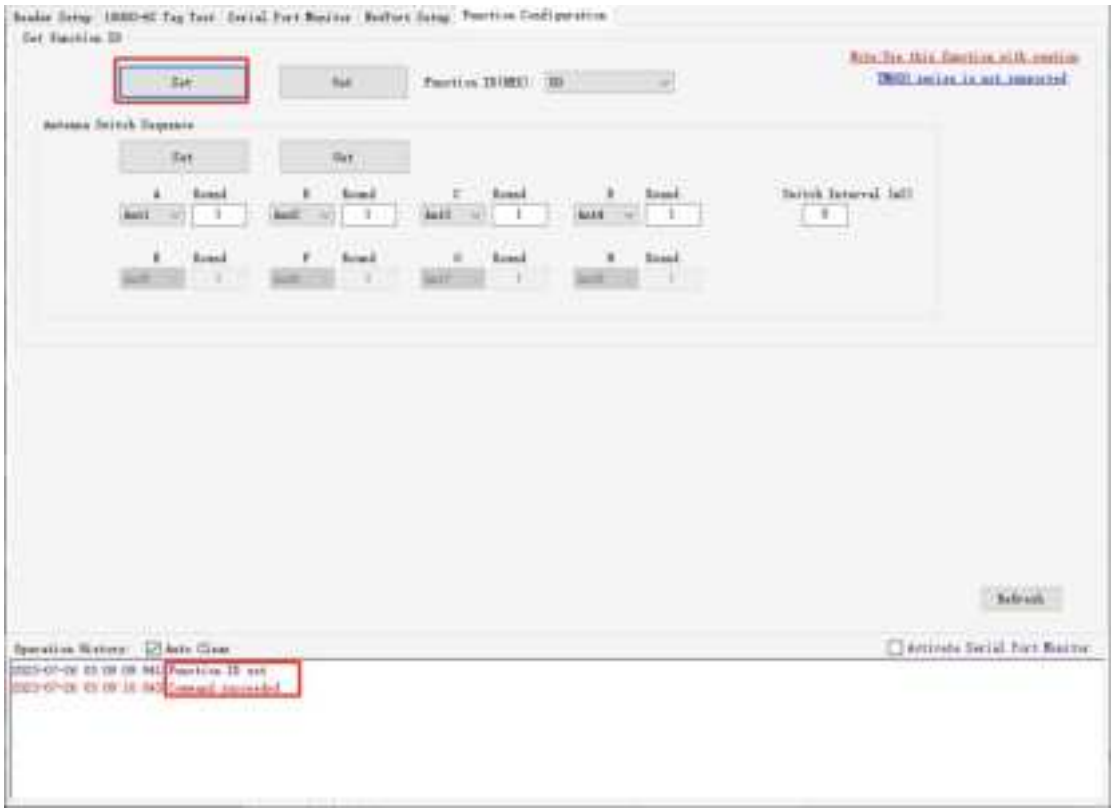
1.1 Configuration via software



Connect the reader, select the corresponding working mode, and click **Settings** :



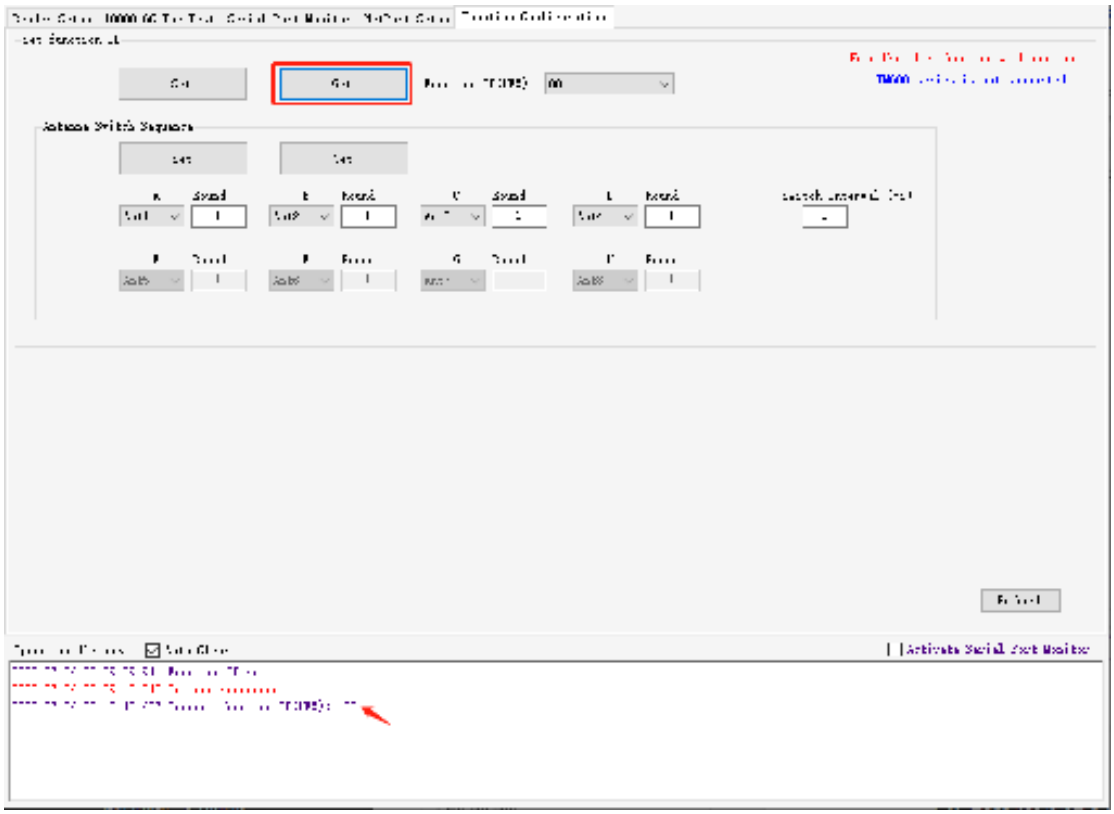
After setting the configuration function successfully, the software returns the data interface as follows:



At this point, the special function configuration is successful, and the reader has started to

work in this mode.

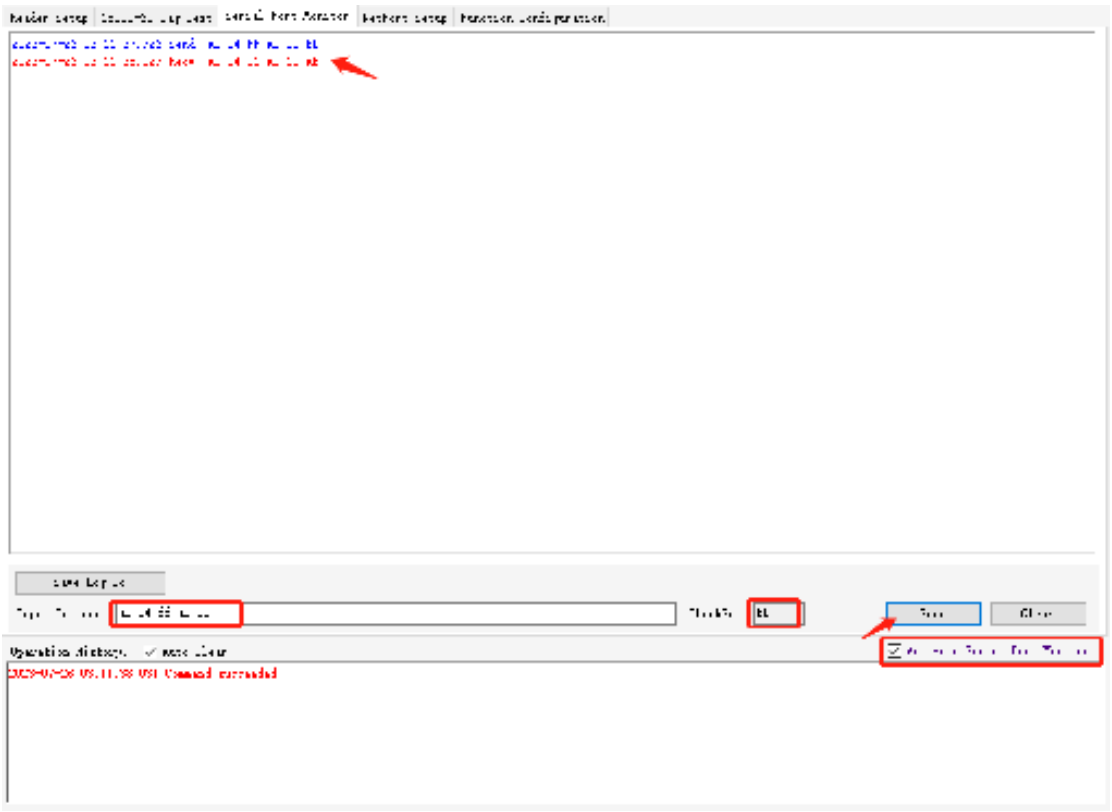
Users can also confirm whether the configuration is successful through the query button:



1.2 Manual send command settings

Command : A0 04 FF A0 **(Cmd No.) **(Check)

For example: standard mode: **A0 04 FF A0 00 BD**



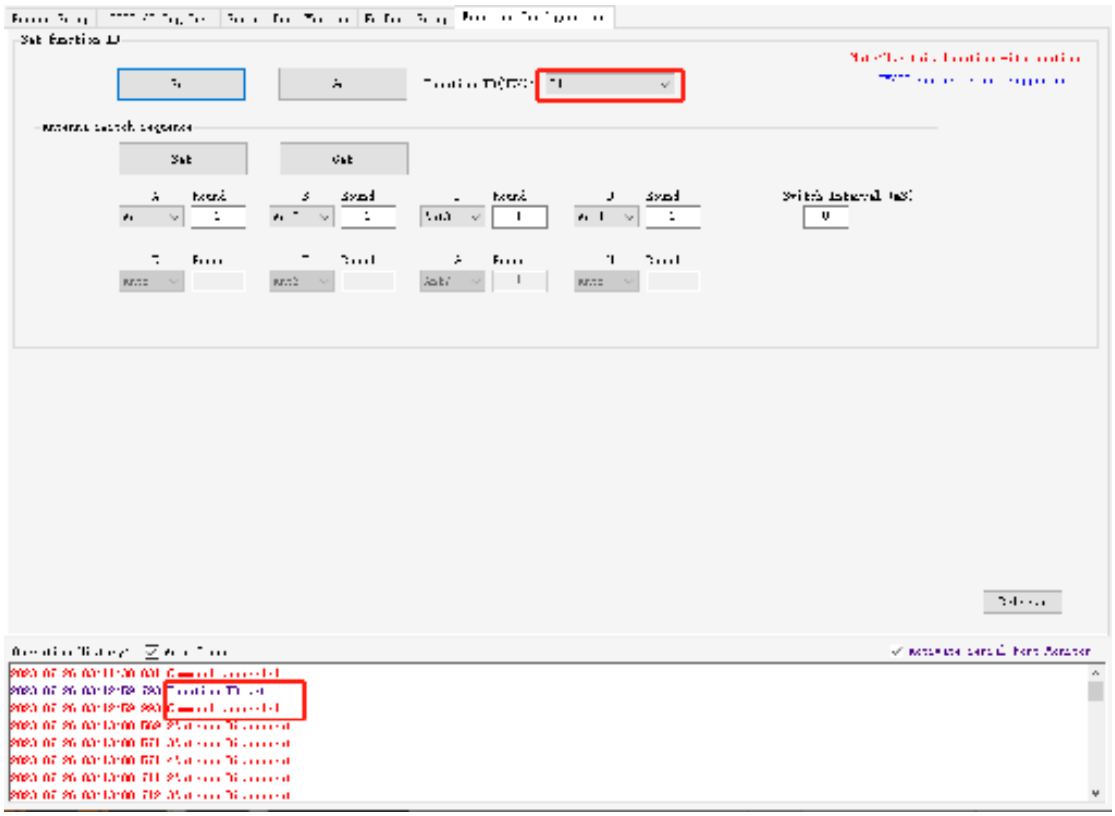
Note: For the calculation method of the check digit, please refer to the communication protocol user manual

After the command is sent successfully, the reader enters the corresponding working mode.

2 Set the switching order of the four antennas

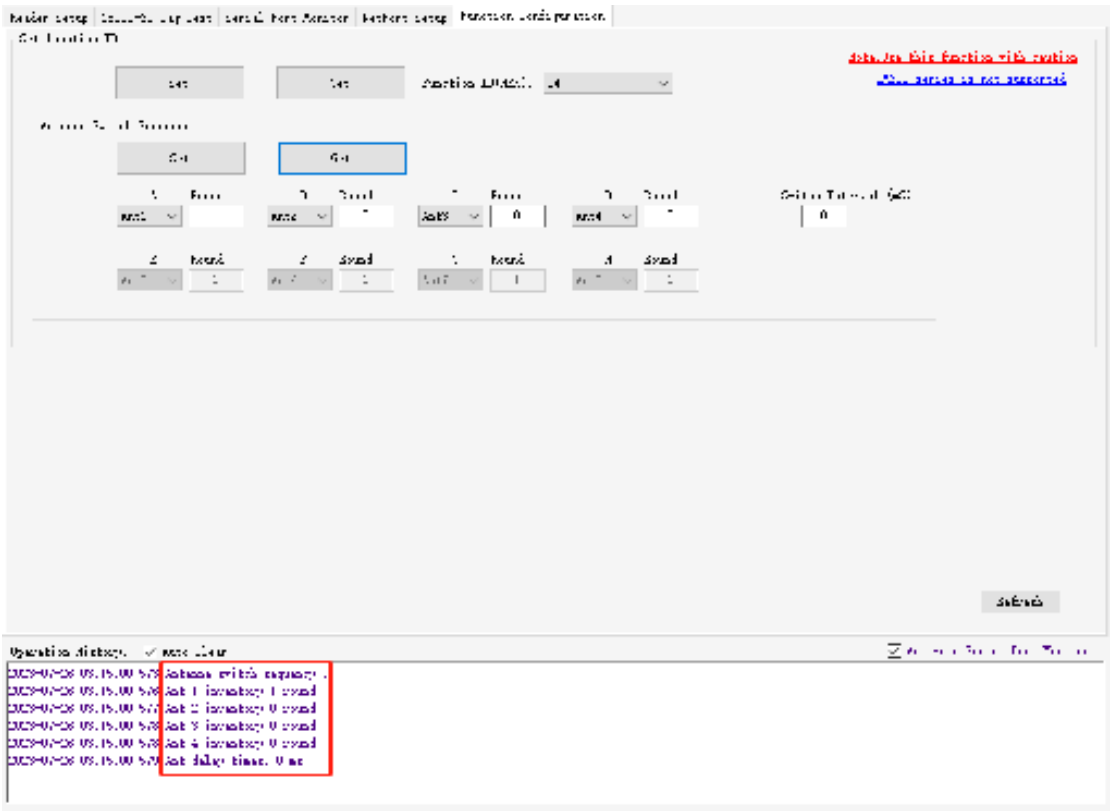
Take antenna 1 as an example in working mode 04:.

The first step: set 04 working mode:



The second step is to change the rotation times of antenna 2, 3, and 4 to 0, and click Settings:

Then you can click the query button to confirm whether the setting is successful:

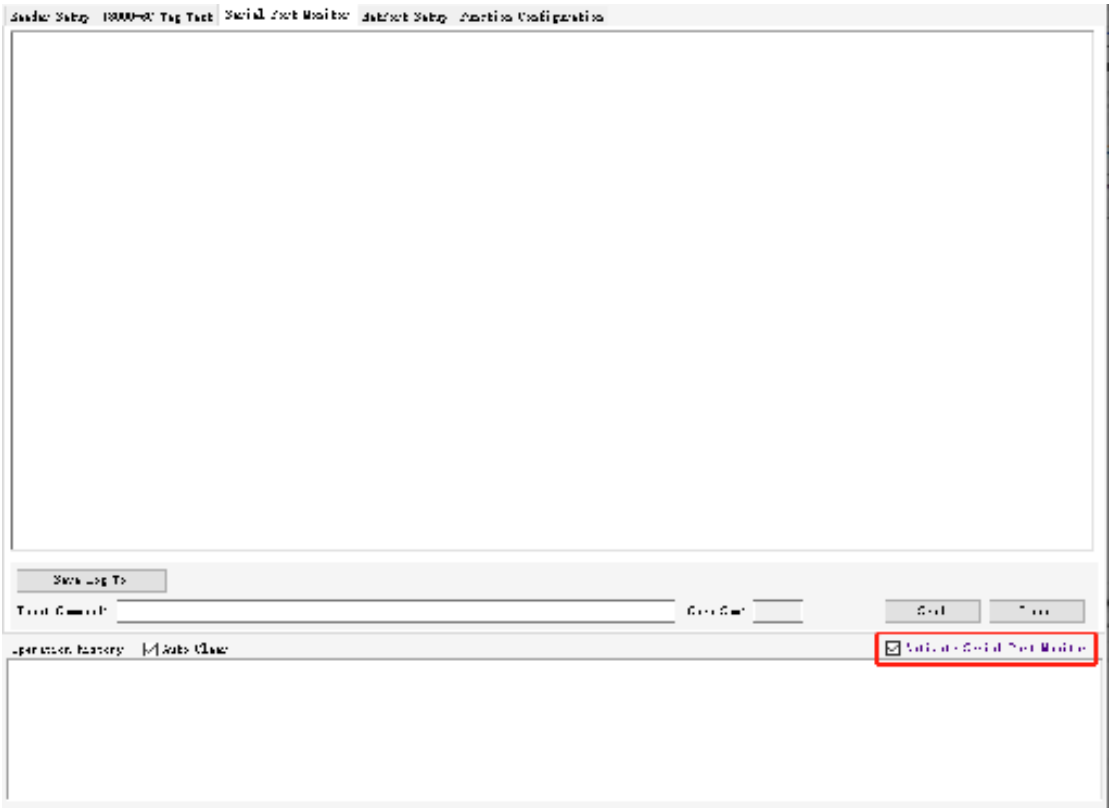


8 Antenna switching sequence is the same.

Chapter 4: Serial port monitoring

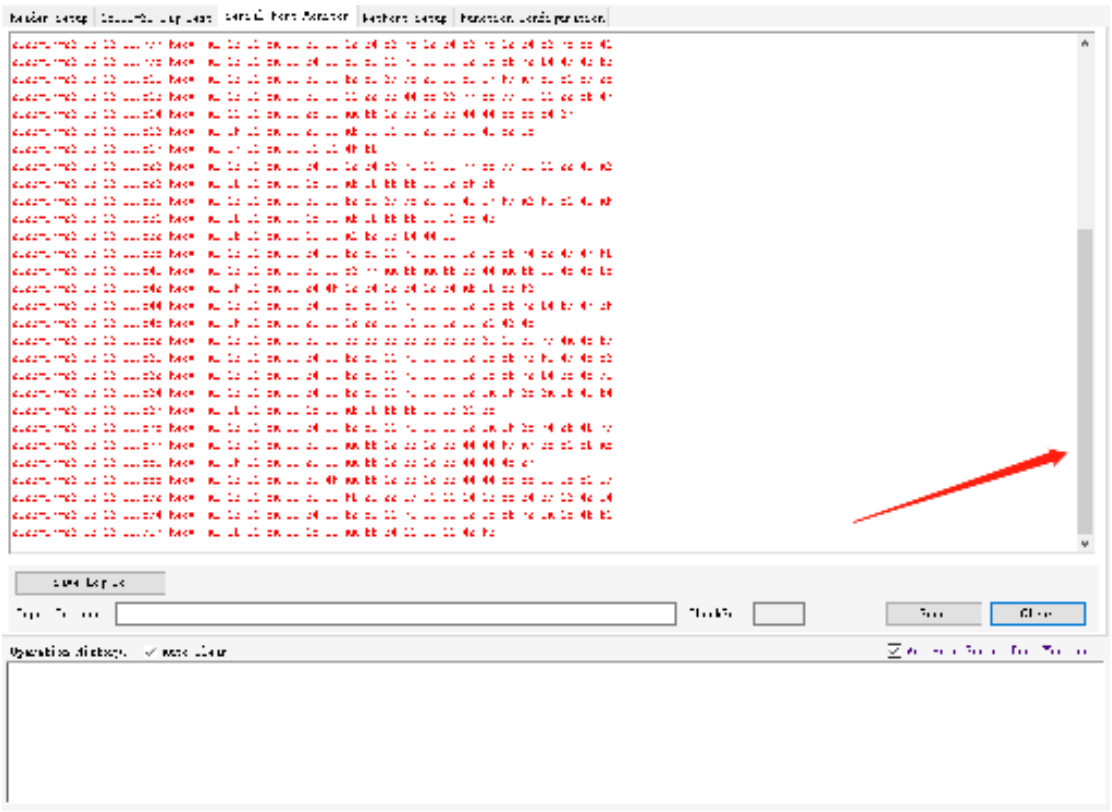
1 serial monitor

Serial port monitoring is used to view instruction set data, if you need to view it, check [Serial port monitoring]



2 Operation records

If you check the [Auto Clear] of the operation record, the serial port monitoring interface will automatically refresh after displaying all the data:



If you do not check the automatic clearing, the data does not need to be refreshed, and more serial port monitoring data can be retained.

Notice:

1、For short-term observation, you can open the serial port monitoring or not clear the serial port monitoring

2、If you want to run the demo for a long time, it is recommended not to enable serial port monitoring. If you need to enable serial port monitoring, it is recommended to clear it automatically. Otherwise, the amount of data is large, which will cause the refresh of the demo interface to freeze or increase the software burden.

Chapter 5: Network configuration guide

1 serial port connection reader/kit

(1) First, make sure that the DIP switch of the reader/kit is set correctly. To connect to the network port, you need to turn down the DIP switch 7-8 (towards the number), and then enter the corresponding serial port number and baud rate to connect to the reader/kit.

(2) This software automatically obtains the serial port number, but if the software has already been opened, the serial port cable is inserted, and the serial port number can be automatically recognized only by clicking the refresh button (the demo version below 4.1 requires a drop-down box to select the serial port number, and the corresponding serial port number can be viewed at: Computer (right click)--Management--Device Manager--Port);

(3) The default baud rate is: 115200.

2 Ethernet to connect to the reader/kit

Firstly, make sure that the DIP switch of the reader/kit is set correctly. To connect to the network port, you need to turn down the DIP switch 3-4 (towards the number), and then enter the corresponding IP and port to connect to the reader/kit.

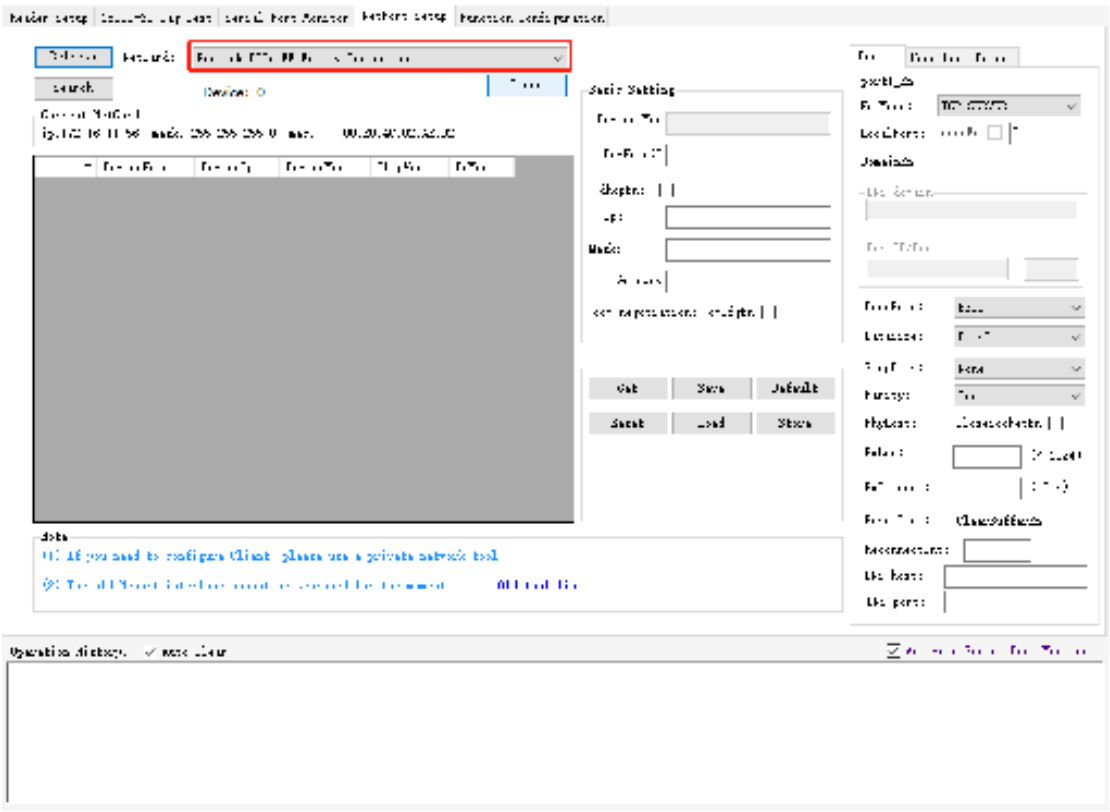
3 Network parameter configuration

This function integrates the configuration function of the new version of the network port on the basis of the version 3.9 demo , so the devices with the old network port cannot be searched or configured with this software. If you have any questions, please consult the salesperson or technical support.

Time : *Around July 2020, readers and kits will gradually use the new network port.*

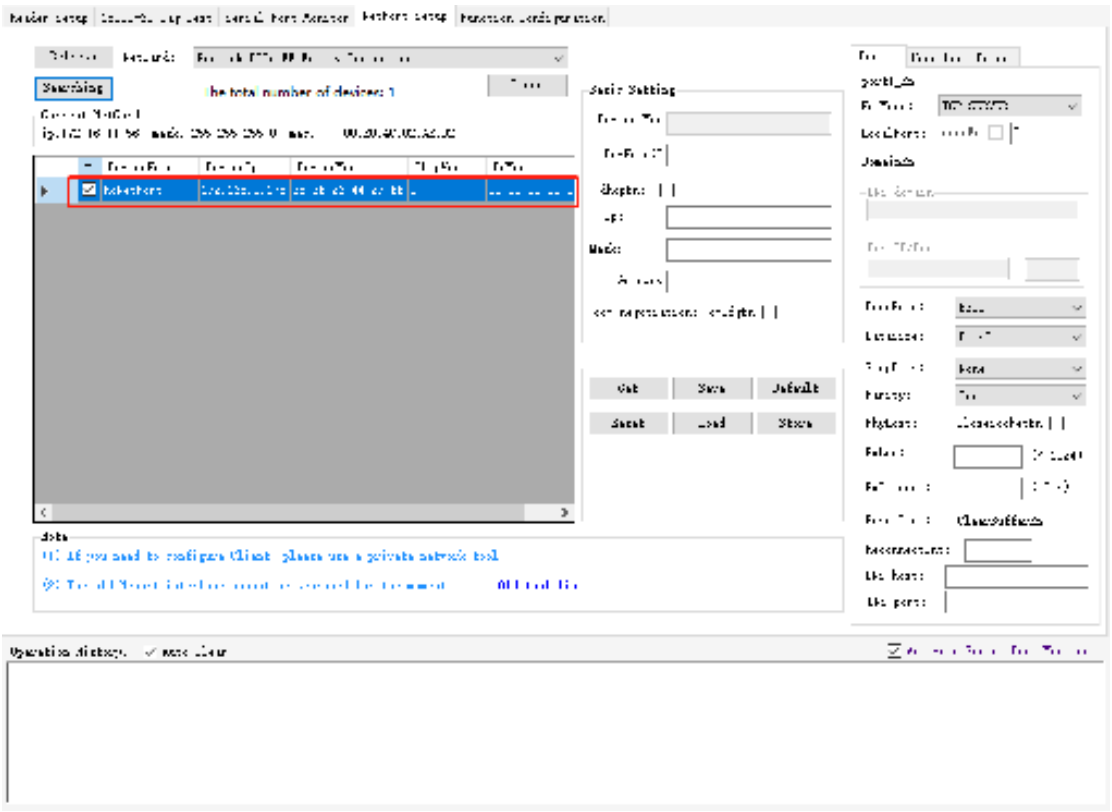
3.1 Refresh/select network card

First select the network card corresponding to the reader. For example, the network card of a notebook may have a wired network card and a wireless network card. If a virtual machine is installed, there is also a network card of the virtual machine, so the corresponding network card must be selected first. If there is no network card, you can click the refresh button.



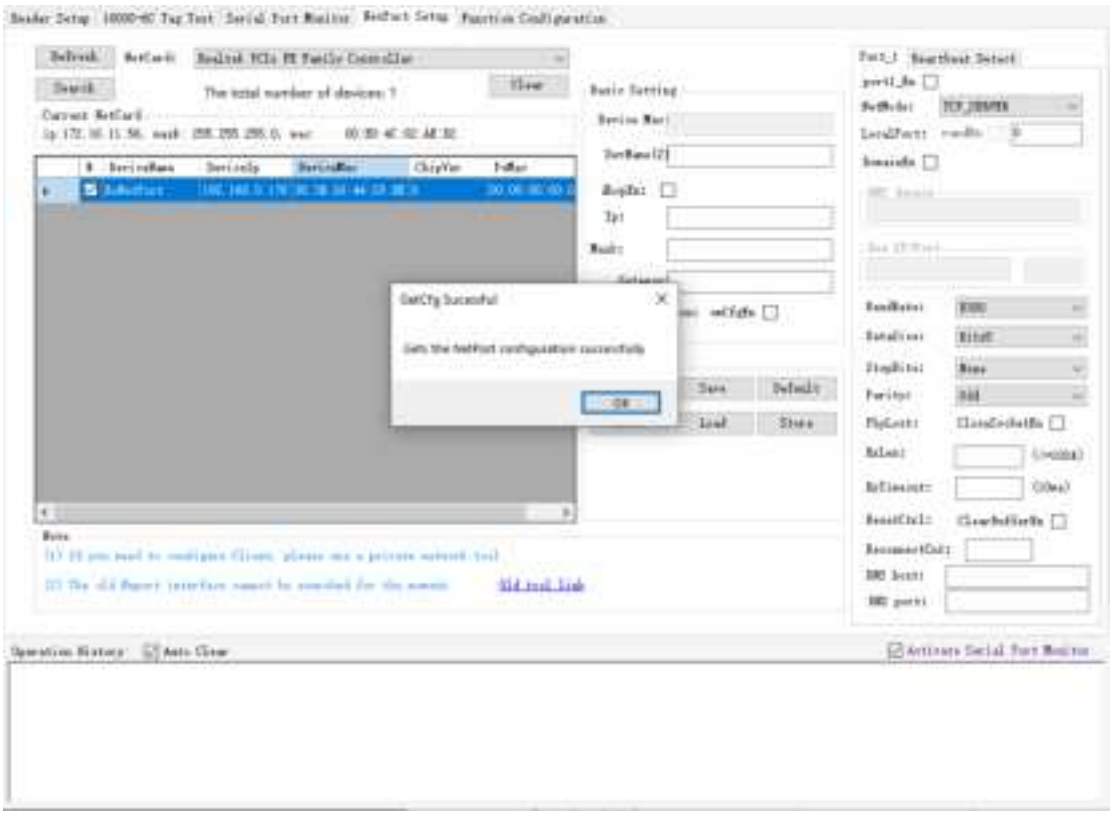
3.2 Search device

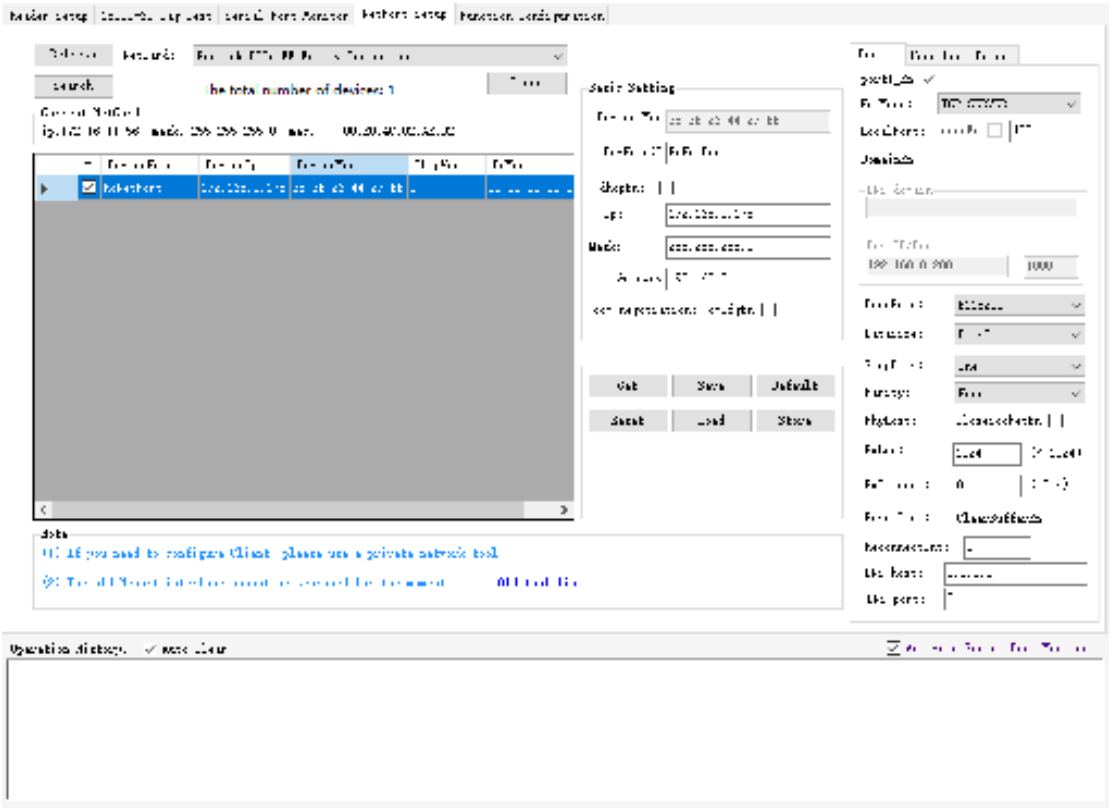
Click Search Device, if there is a device, it will be displayed first, and you can see the IP and other information of the reader/kit device, as shown in the figure below:



3.3 Load/View Device Details

After searching out the device, you can double-click the corresponding device list to view the detailed configuration information



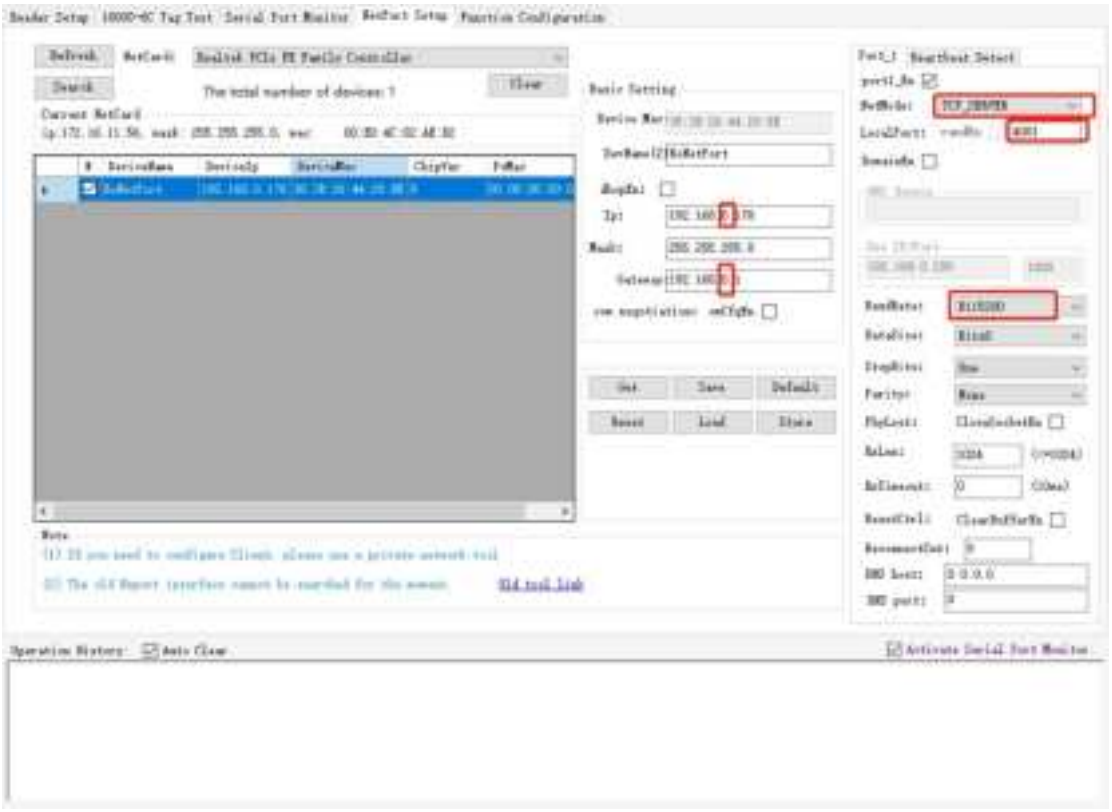


some parameters	Parameter Description
DevName device name	Users can modify it to distinguish devices
DHCP	Not enabled by default
IP	The current IP of the reader

NetModel network model	The default is to use Server mode, which can be set to Client mode, but this software does not support it, you need to use the network port debugging assistant to test
LocalPort local port	The default is 4001, which is not recommended: the port number is randomly generated.
Baudrate serial port baud rate	Baud rate, the default is 115200
Phylost network disconnected	If it is not checked, it means that the disconnection reconnection mechanism of the network port is enabled

3.4 Server mode

Pull down **the network mode** , select the server mode TCP_SERVER, set the parameters, and then click [Save Configuration] . This software does not support client mode operation.



Note: Although the search device, the reader and the computer are directly connected, the IP of the two devices may not be in the same network segment, and the IP of the computer can also be searched; but if the software of the computer needs to be able to connect to the reader, it is best to let the IP of the reader and the IP of the computer be in the same **network segment** .