Invengo

User's Manual

RFID Reader Generic Demo Software

Version 1.2.3

Invengo Information Technology Co., Ltd.

Foreword

This manual provides information on software installation, application and other characteristics.

The version of this manual is V.1.2.3, with revision record as follows:

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All introduction and explanation on the product features, as well as the functions and other related information, written in this manual, are the latest and accurate as at time of print. The company reserves all rights to make any correction or amendment to this manual without prior notice, and shall bear no responsibility for these actions.

Safety Information

Warning

Improper handling may result in health damage.
Improper handling may result in equipment damage.

Notification sign

If ignored, it may result in unsuccessful operation.
If ignored, it may cause undesirable effect.

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1 Overview

1.1 Introduction

- **Target clients**

  Invengo reader product users

- **Software introduction**

  Generic presentation software is a reader demo software that is applicable to a wide range of Invengo reader products, can be used to demonstrate reader function and parameters setting. This software is available in Windows and Linux. Both have the application method, so users are only required to be familiarized with one of them.

  Note: This user manual mainly explains the application of Windows system demonstration software. Please refer to appendix for its difference from Linux system demo software.

- **Characteristics**
  - Applicable for wide range of Invengo reader products
  - Based on reader auto start support function and inhibit unsupported functions
  - Support simultaneous operation of ten different reader model

1.2 Application range

This software is applicable to following Invengo reader models:

XC-RF807

XC-RF850

XC-RF861

XC-RM825

XC-RM829

XC-RF812

XC-RF811(V3.0)

1.3 Software use requirement

1. Software installation and removal in Windows/Linux
2. Understand the basic concept of readers and tag

1.4 Terminology and abbreviations

- RFID:Radiofrequency identification, a telecommunication technology which identifies target and reads and writes relevant information through wireless telecommunication signal, not requiring the establishment of mechanical or optical contact between identification system and target.
- IRP1:Invengo reader communication protocol, version 1.0
- Host computer: Refers to the personal computer or other control terminal that is involved in data exchange with the reader.
- RS-232:One of the communication interfaces on the personal computer, asynchronous transmission standard interface developed by the Electronic Industries Association (EIA). RS-232 interface typically consists of 9 pins (DB-9) or 25 pins (DB-25). Normally personal computer will have two sets of RS-232 interface, known as COM1 and COM2 respectively.
- EAS:Electronic Article Surveillance, one of the most widely adopted commercial good security measures by the large retail industry.
- RSSI:Received Signal Strength Indication, which refers to label signal strength in this article.
- 6C label: Label that satisfies ISO18000-6C protocol.
- 6B label: Label that satisfies ISO18000-6B protocol.
- UTC:World uniform time.
- DHCP:Dynamic Host Configuration Protocol, mainly have two purposes: automatic IP address allocation to internal network or network service providers, and a central management measure on all computers for users or internal network administrator
- TID:Tag Identification, refers to the data stored in the label TID data area, which is also the only tag for the label, readable but not customizable.

- EPC:Electronic Product Code, the new generation product encoding system that is introduced by the International Barcode Organization, capable to assign a globally unique serial code to every product, stored in the label's EPC data area, readable and writable.
- UserData: Data stored in label user data area, customizable information by users, readable/writable.
- I/O: Abbreviation of input/output, refers to the input/output port
- Q value: Refers to a parameter used by the reader in the adjustment of label response frequency. Q is a positive integer between (0, 15). The number of label that exists simultaneously within the radiofrequency field is around 2Q. The smaller the Q value, the shorter is the response time.
- Word: Two bytes equal to one word.

2 Software installation

2.1 System requirements

- **Operation system supported**

  Windows 2000 Service Pack 3

  Windows Server 2003

  Windows XP Service Pack 2

  Windows 7

  Windows 8

- **Required Software**

  .NET Framework 2.0

  Note: Under normal condition, your system does not require any extra configuration to complete installation, otherwise please refer to the following:

  Windows Installer 3.0; Recommend Windows Installer 3.1 or higher; IE 5.01 or higher; Able to operate Microsoft Internet Explorer 5.01 or higher to complete the installation of .NET Framework

- **Hardware configuration**

  CPU:P4/1.7GHz or higher, internal memory: 512MB above

2.2 Installation steps

This software does not required installation, copy “RFID Demo” file to the PC and double click on the “RFID Demo.exe” to run the software.

3 User Instruction

3.1 Start screen

Launch the software, the main interface is shown in the following figure:

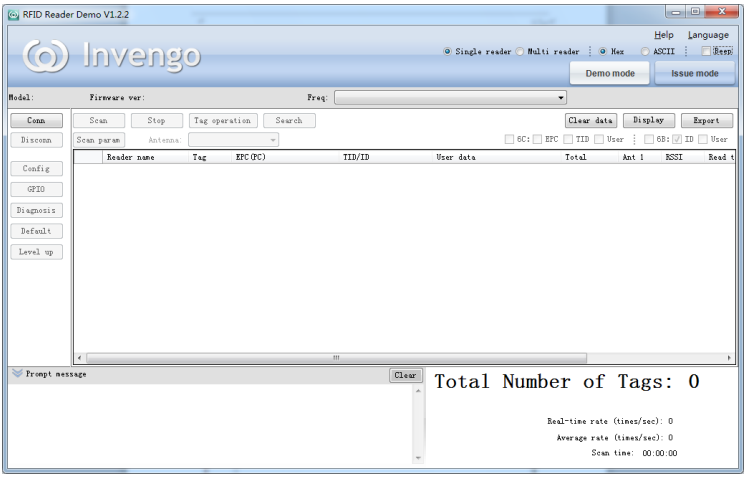


Figure 3-1

Main interface is divided into top, middle and bottom, the default interface is the single reader interface.

1. Top: Showing software name, company Logo, and the single and multiple reader mode, switching between hexadecimal and ASCII, which includes language selection, help information and notification sound

2. Moddile: Connection setting management on the left, result demonstration on the right

3. Bottom: Operation information on the left, showing if the reader has been successfully connected; current label reading condition and statistics on the right

3.2 Single reader connection setting

During first launch, the default setting is single reader mode. Connection configuration operation is located on the middle left of the main interface, as shown in the figure below:

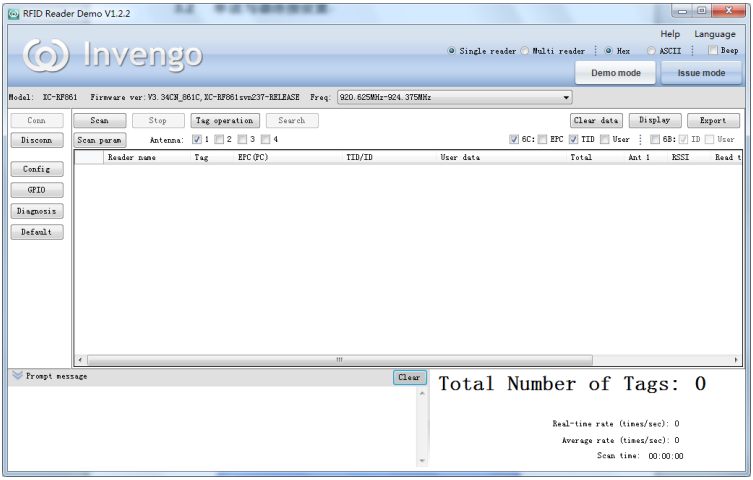


Figure 3-2

3.2.1 Connection

Single click on connection button, as shown in the figure below:

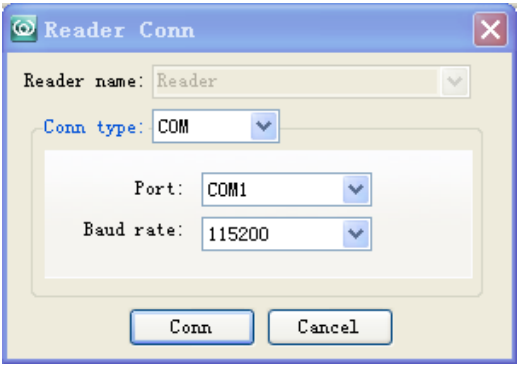


Figure3-3

Please select the connection type based on your actual condition:

TCP/IP client (Network interface)

RS-232 (Ethernet port)

USB

Fill in the correct reader IP and port number and click on “Conn”. If connection failed, a notification shall appear

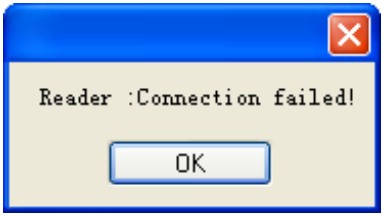


Figure3-4

If connection is successful, then the interface shall disappear and return to single reader interface, successful connection will be indicated at the bottom left of the interface.

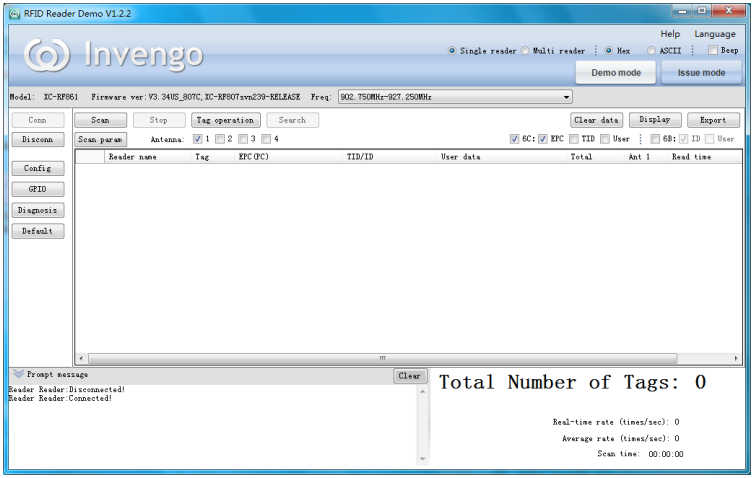


Figure3-5

Once connection is successful, if the connection is required to be disconnected, please click on “Disconn”.

3.2.2 Reader configuration (Single reader)

For reader configuration, click on “Config”. A dialog box will pop up. Set up the reader’s IP address (refer to 3.6.5 if you do not understand the meaning of these settings), baud rate and related information configuration of RFID, as shown in the figure below:

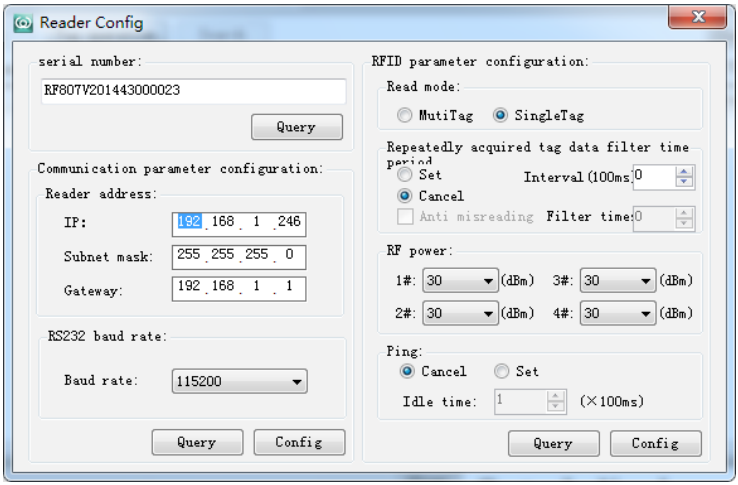


Figure3-6

After completing configuration, click on “Config” to save the configuration. Set up smart hibernation mode. The reader will enter into hibernation after being idle for a period of time. The hibernation duration refers to the idle time in the configuration. Otherwise, click on “Cancel” if no such configuration is needed. Click on “Query” to inquire about the current configuration of all connected readers.

Baud rate: Refers to the configured serial communication baud rate based on actual needs.

RF port power: Refers to the configured RF port power based on actual needs. Normally, the larger the power, the larger is the reading range.

Reading mode: SingleTag, suitable for the quick reading of single tag in the case of one tag under a RF antenna field; MultiTag, suitable for the simultaneous reading of multiple tags under a RF antenna field

Repeatedly acquired tag data filter time period: The configuration for time interval between duplicate label upload, such as enabling the anti-misreading function. Filter time refers to the number of label reading within the setup time which is smaller than the filter time shall not be uploaded.

3.2.3 GPIO

Configure the reader I/O output port signal and the tag reading trigger condition as well as the termination of tag reading trigger condition, as shown in the figure below:

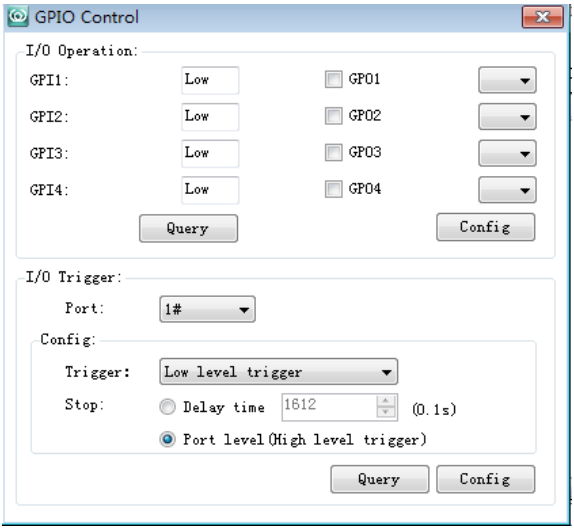


Figure3-7

Query: Inquire on the status of all input ports.

Config: Tick on the desired output ports to make modification before clicking on "Config" to save the configuration.

I/O trigger allows the reader to be trigger based on different status of I/O port, as shown in the figure below:

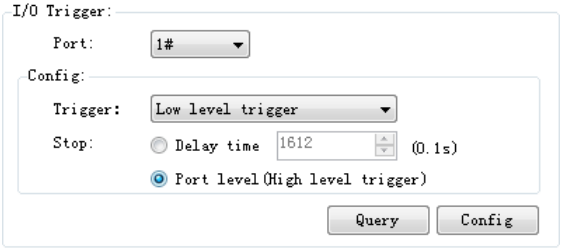


Figure3-8

Refer to 3.6.7 for details on I/O trigger tag configuration.

3.2.4 Diagnosis function

For readers that support diagnosis function, current reader settings, such as voltage, baud rate, and temperature can be obtained through the diagnosis function. The function can also be used to change corresponding parameter, set up voltage and temperature detection and monitoring. For readers that do not support diagnosis function, the window will display a non-configurable status, as shown in the figure below:

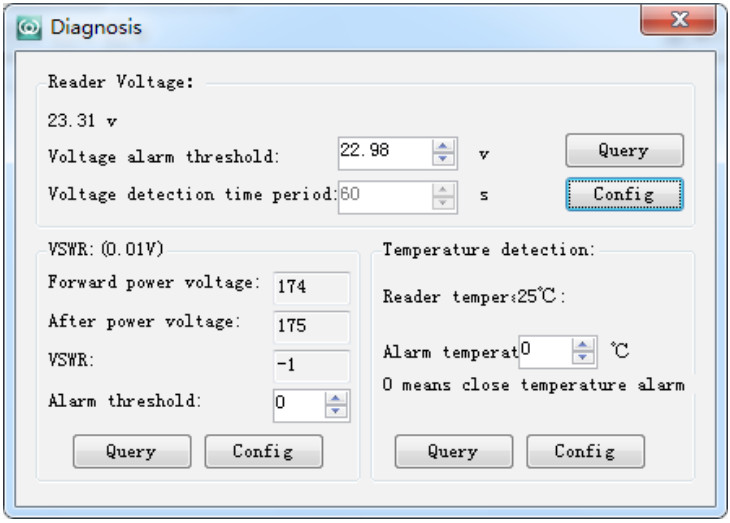


Figure3-9

3.2.5 Scanning configuration

Refer to 3.6.1 for the specific meaning of parameters in scanning parameter setting

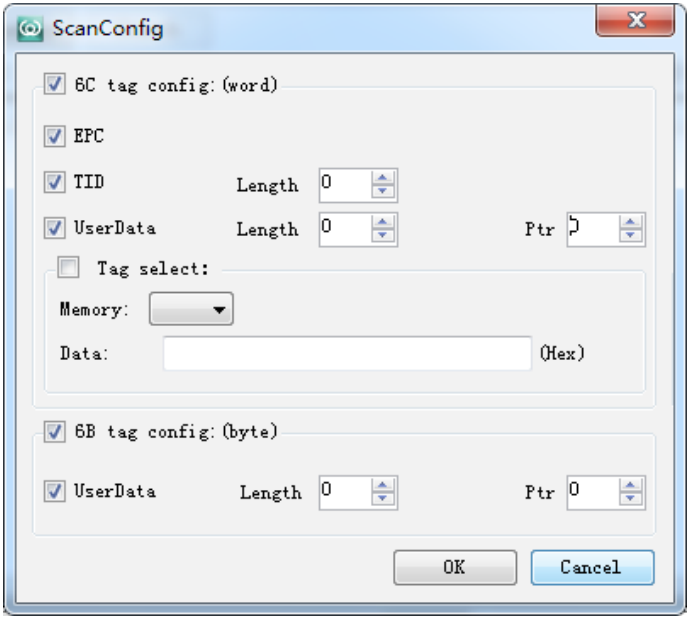


Figure3-10

Refers to 3.6.2 for Tag selection matches and repeatedly acquired tag data filter time period

3.2.6 Other

Restore to factory setting reset all setting to factory default setting. Hardware upgrade provides the related hardware of the readers with long distance upgrade function.

3.3 Multi reader connection configuration

Select multi reader, the connection configuration operation is located on the middle left of the interface. No connection configuration will be available in initial launch, please refer to 3.3.1 and 3.3.2 to create connection configuration. Once completed you may see the following interface:

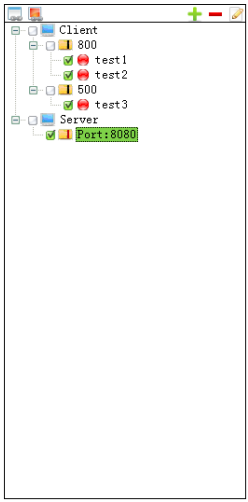


Figure3-11

Connection configuration is displayed in tree structure, the software automatically divides them into two groups: Client and Server

- Client configuration: Each configuration has a check box, status indicator and confirmation name. All operations start with target selection; status indicator light in red, green and grey refer to not connected, connected and disabled respectively; setting name is customizable, an indicative name is recommended. For new connection configuration, select (or create) a group to allow easy categorization and allow batch operation of connecting, disconnecting and clearing, as shown in the two groups in the figure below: 800 and 500 (for details please refer to 3.3.1).
- Client configuration: Similar to a group in client configuration, for details please refer to 3.3.2.
- On the top there are four buttons:

  1. “”:Execute connect operation for all selected and enableed

configurations

2. “ ”:Execute disconnect operation for all selected and connected configurations
3. “ ”:Create a new connection configuration, please refer to 3.3.1 and 3.3.2
4. “ ”:Delete all selected and disabled configurations

- Configuration’s right click menu:

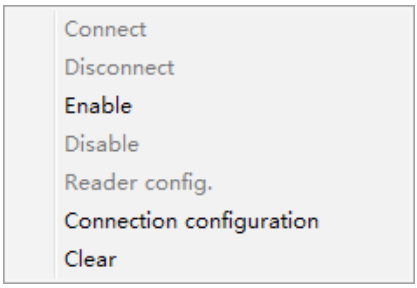


Figure3-12

1. Connect: Execute connect function, but must first be selected and enabled.
2. Disconnect: Execute disconnect operation, but must first be selected and connected.
3. Enable: Enable configuration, but must first be selected and disabled.
4. Disable: Disable configuration, but must first be selected, enabled and disconnected.
5. Reader config. (multi reader): Please refer to 3.6, but must be selected, connected and not in the tag scanning process.
6. Connection configuration: Modify connection configuration, for details please refer to 3.3.3 and 3.3.4, but must first be selected and not connected.
7. Clear: Delete configuration, but must first be selected and disabled.

3.3.1 New client configuration setup

Click on“ ”, enable new configuration directive, as shown in the figure below:

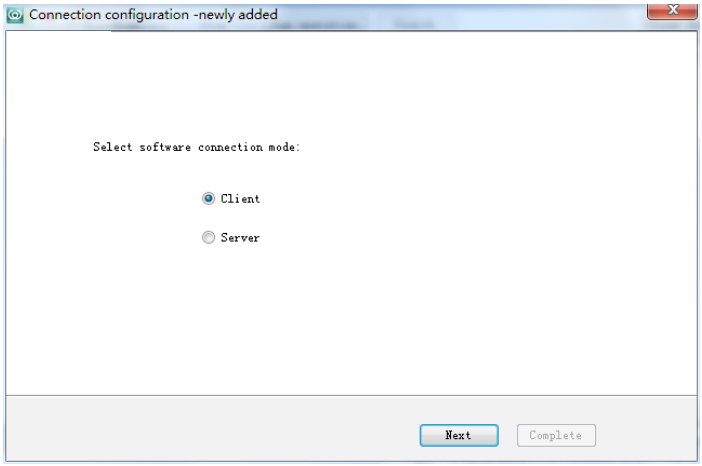


Figure3-13

Select client (Refer to 3.3.2 for server mode), and click on “Next”:

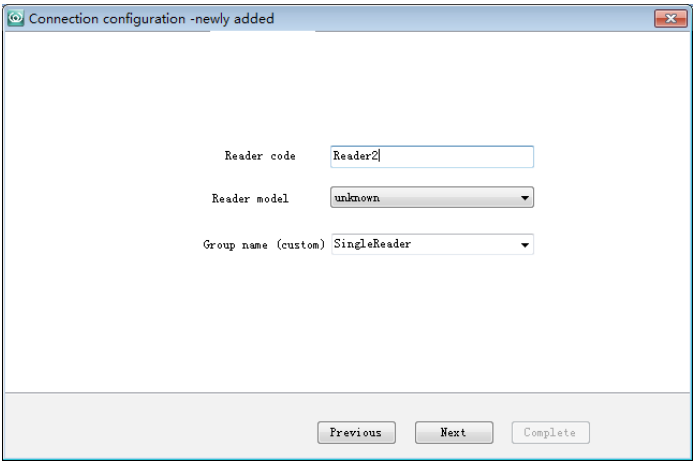


Figure3-14

Reader code refers to the name of this connection configuration and is customizable. The default code is “Reader+No.”. Recommend to name reader

using “Connection mode+Reader model”, such as COM4-115200-806, or using the default or other random names.

Select reader model, selectable value is between 1.2 byte.

Select group name, if need to create a new group, input new group name.

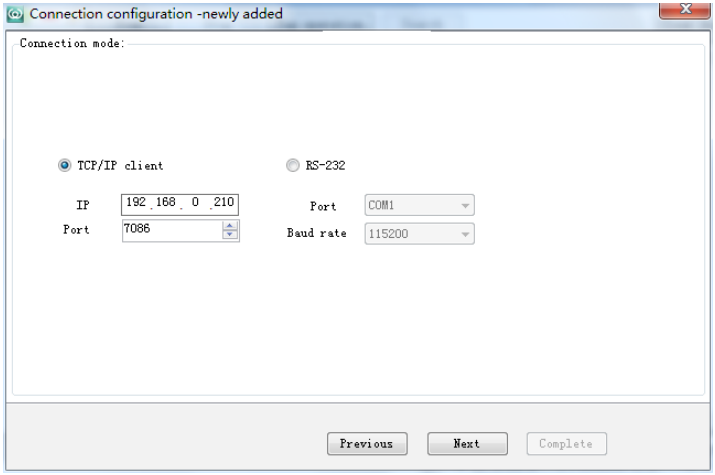


Figure3-15

If the reader supports USB connection, then the page will be like:

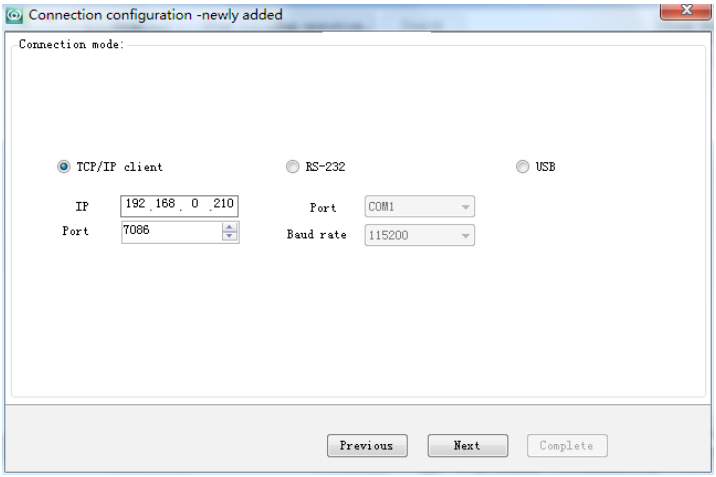


Figure3-16

Please select connection type on your actual condition:

TCP/IP client (Network interface)

RS-232 (Ethernet port)

USB

Then input the connection parameters correctly, such as RS-232, COM4, 115200.

Click on “Next”, the software will examine the validity of the configuration before entering the next interface, such as if IP is valid, if a mistake is discovered in the configuration, a prompt will appear:

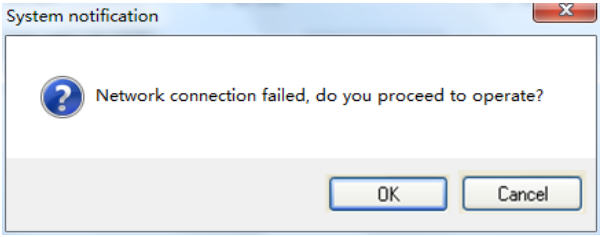


Figure3-17

Otherwise, the next configuration will be loaded:

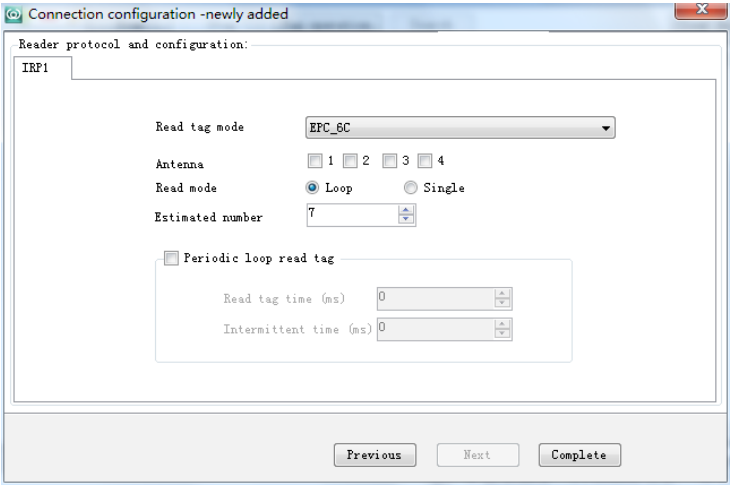


Figure3-18

Antenna choice will change based on reader model, as shown in the figure below:

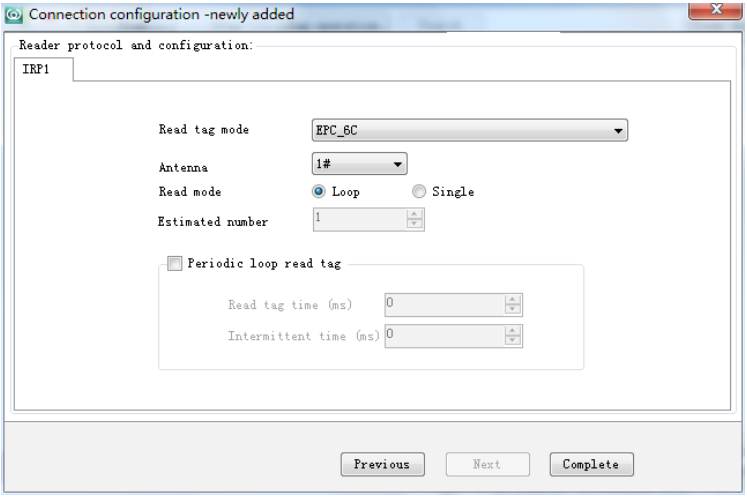


Figure3-19

Note: Please refer to 3.6.1 for detailed introduction on parameters

Reader protocol: Currently only support IRP1

Read tag mode: Select one tag reading method

Antenna: Select working antenna

Reading mode: Select one reading mode, either loop or single

Estimate tag reading number: The largest tag number that exist simultaneously within the coverage area of the antenna signal

Periodic loop read tag (Not selected under default): Select periodic loop read tag

Click on “Complete” to complete the setup of new connection configuration. The newly added client configuration will appear on the interface, as shown in the figure below:

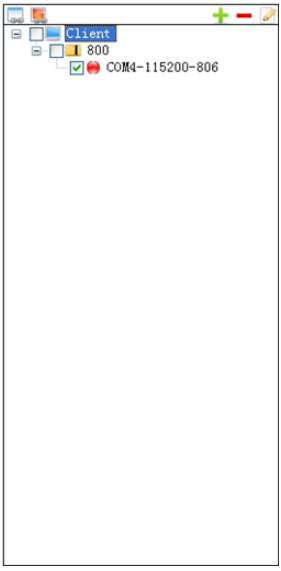


Figure3-20

3.3.2 New server configuration setup

Note:

1. Currently this function is only supported by certain products.
2. This segment only introduce the way to setup server configuration, please refer to detailed information of server as a server in 3.4.5

Click on“ ✚ ”, a new configuration directive will pop out as shown in the figure below:

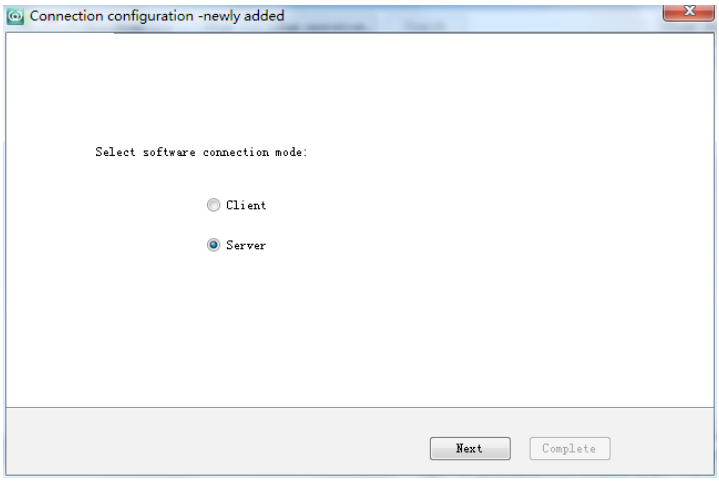


Figure3-21

Select server, and click on “Next”

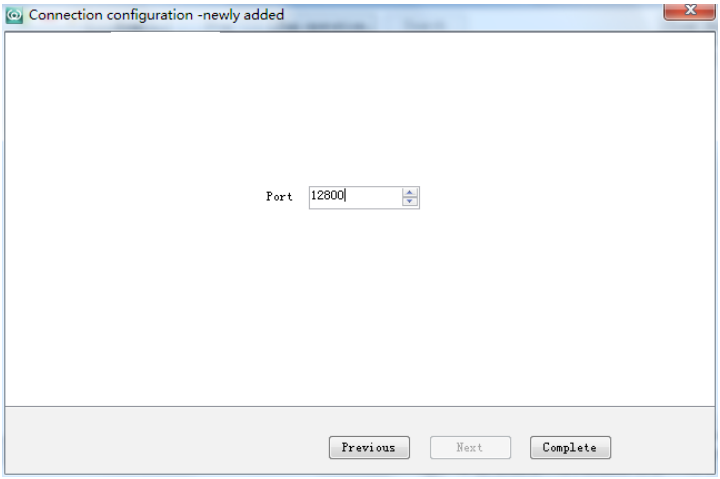


Figure3-22

Select listening port, such as 8080.

Click on “Complete” to complete the setup of new server connection configuration. The newly added server configuration will appear on the interface, as shown in the figure below:

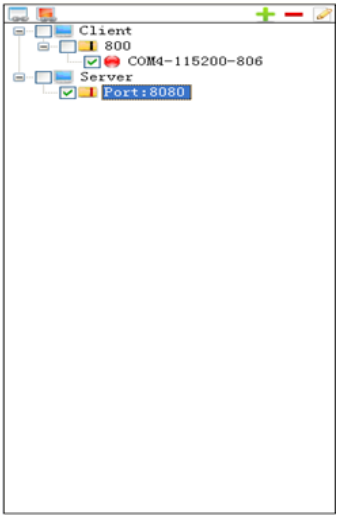


Figure3-23

3.3.3 Client configuration modification

First check on the checkbox of target configuration, then select the configuration and click on the right click of the mouse. Select “Connection configuration” from the pop out menu (Or click on “ ” after selection), as shown in the figure below:

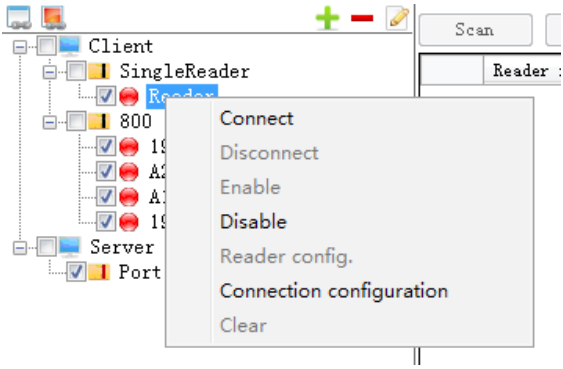


Figure3-24

Connection configuration interface:

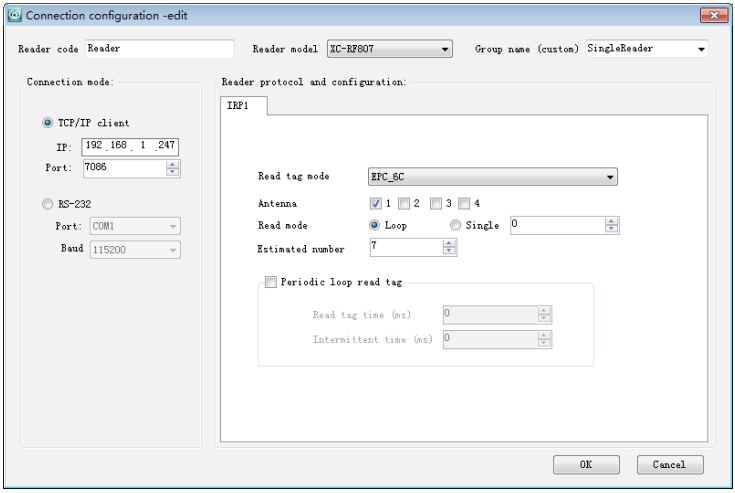


Figure3-25

Note: The configuration option on this page is exactly the same with those in new configuration directive. If there is anything unclear, please refer to 3.3.1.

Modify in accordance with personal need, click “OK” to save or “Cancel” to abandon the modification.

3.3.4 Server configuration modification

First check on the checkbox of target configuration, then select the configuration and click on the right click of the mouse. Select “Connection configuration” from the pop out menu (Or click on “ ” after selection), as shown in the figure below:

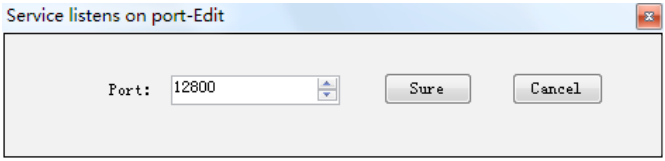


Figure3-26

Modify listening port in accordance with needs, then click “Sure” to save, or click on “Cancel” to abandon the medication.

3.3.5 Delete configuration

First check on the checkbox of target configuration, then select the configuration and click on the right click of the mouse. Select “Disable” from the pop out menu, and the setting will turn grey. Finally select “Clear” from the right click menu to complete, as shown in the figure below:

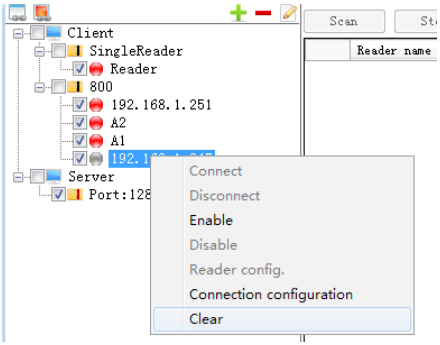


Figure3-27

Note: Click “▬” after the disable configuration, but this operation will delete all selected and disabled checkboxes.

3.3.6 Establish/disconnect connection

First check on the checkbox of target configuration, then select the configuration and click on the right click of the mouse. Select “Connect” from the pop out menu and execute the connect operation of the device. If successful, the icon before the connection configuration will turn green, as shown in the figure below:

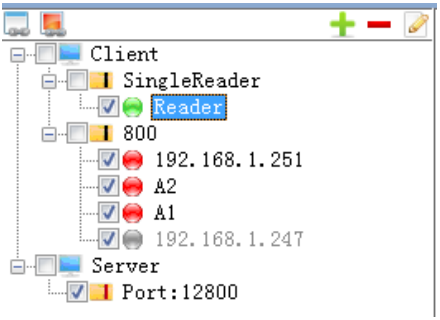


Figure3-28

If failed, the color remains red.

(Note: Successful or failed connection can be seen as a notification in the operation message, especially during failed connection the operation message allows quicker cause detection. Please refer to 3.3.7 for operation message introduction.)

To disconnect, select target configuration, click on the right click of mouse and select ‘Disconnect”

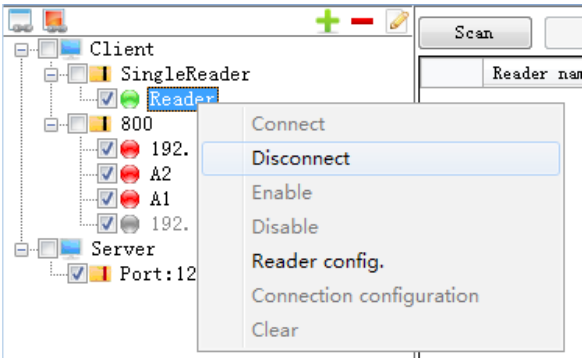


Figure3-29

3.3.7 Operation message

Unexpected results or mistakes are unavoidable during the operation of this software. Therefore, the operation message that appears on this software greatly helps to increase troubleshoot efficiency. The message indicates not just the operation condition, but also the name of the connection configuration. The operation message is located at the bottom left corner of the software main interface, as shown in the figure below during the connection failure of COM4-115200-806:

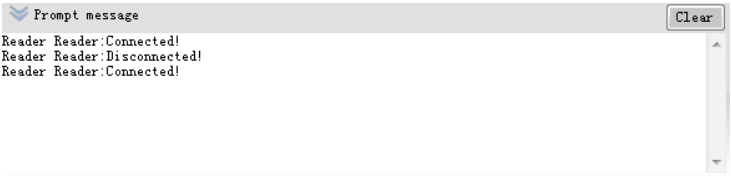


Figure3-30

At the same time there will be popup windows indicating the failed connection.

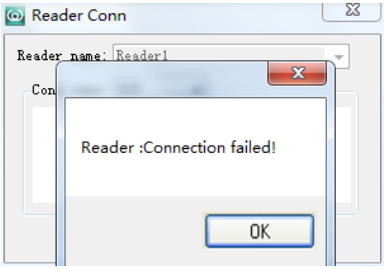


Figure3-31

3.4 Software operation

Software operation mode can be divided into demo mode, scan mode, issue mode, EAS mode and software server mode five modes. These models are not mutual exclusive and can work together. User can use the two bottoms on the top right corner, Demo mode and Issue mode, to switch between the modes. For the required settings for EAS mode and software service mode, refer to the following 3.4.3 and 3.4.4 for more details.

3.4.1 Demo mode

Demo mode can show real time scanning conditions. User can check, in real time, the number of tags scanned by a specific antenna in a specific reader. The default mode for the software at launch is demo mode, otherwise click on “Demo mode”, as shown in the figure below:

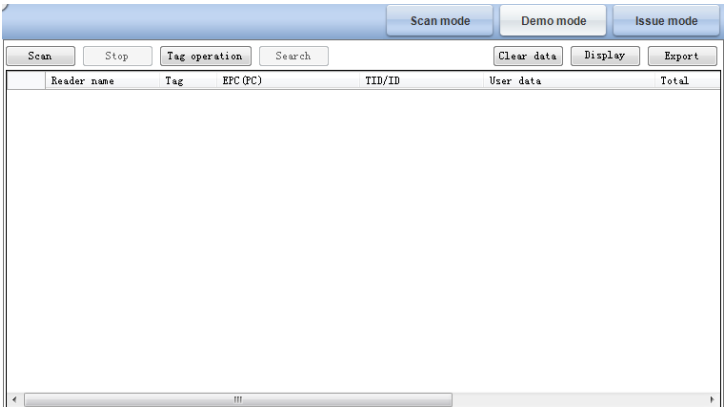


Figure3-32

When the software is displaying real time reader tag reading, the data result will provide the following function while appearing in the data list:

Scan: Enable scan, but must first be an existing connection configuration that is selected and connected.

Stop: Stop scan.

Tag operation: Open tag operation interface, please refer to 3.5 for detailed introduction

Search: Search in the data list using keywords

Clear data: Clear data list

Display: Customize display column, select to show, otherwise no, as shown in the figure below:

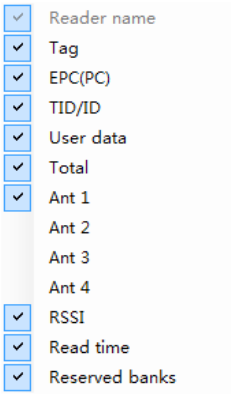


Figure3-33

This software supports multiple readers working simultaneously. Here let's focus on single reader before introducing the demo for multi reader:

1. Single reader demo

Single reader demo is very simple. Once a connection has been successfully established, click on “Scan” to see the data retrieved by the reader in the data list, as shown in the figure below:

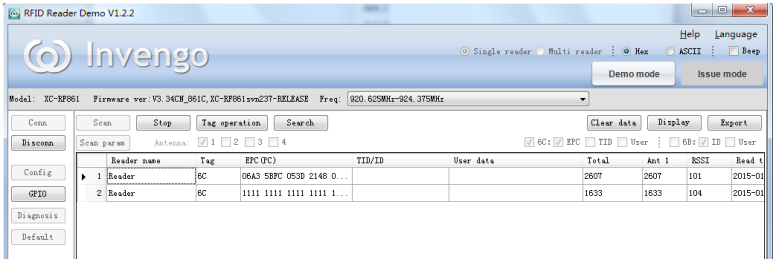


Figure3-34

At the same time relevant information to the current scanning operation will be statistically tabulated in the right bottom corner:

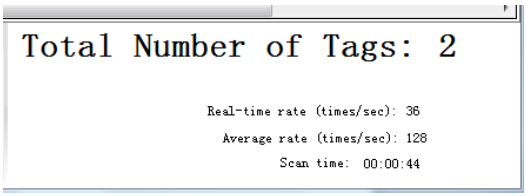


Figure3-35

Total number of tags: Total number of tags read

Real time rate: Current tag reading speed, unit: times/sec Average rate: The average tag reading speed from the start, unit: times/sec

To terminate scanning, just click on “Stop”

Note: If the data area and antenna needs to be altered when the device is under connection, in terms of, please refer to 3.6.1

2. Multi reader demo

Connect two or more readers, click on “Scan” as shown in the figure below:

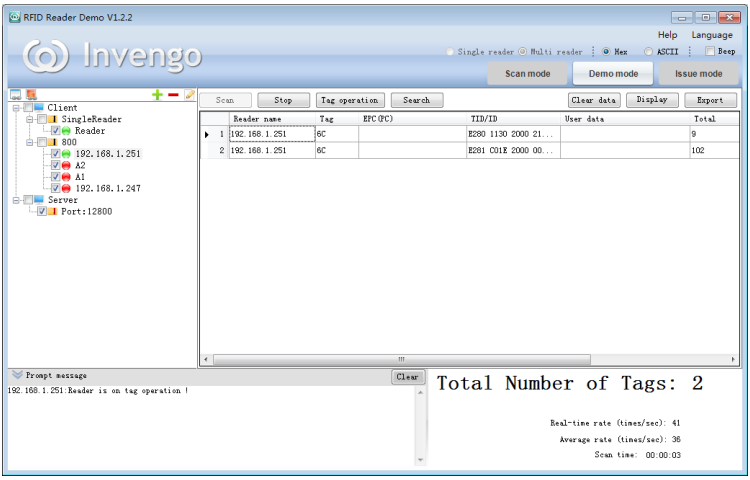


Figure3-36

Under multi reader, use reader name (first column of data list, corresponding to the name of the connection configuration) to differentiate data scanned between the reader.

Users can randomly configure the starting bit and ending bit of the scanning. The key is the checkbox in front of the connection configuration. If the checkbox is not checked, all operation will be not be recognized by the reader. Therefore, remove those selected readers that are not needed before clicking on “Scan”. Cancel the selection of scanning readers that do not need to be terminated before clicking on “Stop”.

3.4.2 Scan mode

The scan mode displays the scanned tags in pictures, as the information is simpler but more vivid as compared to demo mode. Click on “Scan mode” to enter this mode (If the demo mode is still working, stop it first), scan mode has various operation, such as scan, stop, clear (clear list), which are the same as display mode. Apart from those in above, there are also tag brand recognition and Received signal strength indication (RSSI), as shown in the figure below:

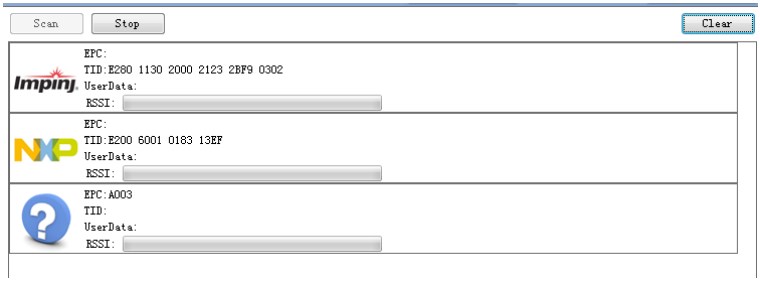


Figure3-37

The first tag belongs to NXP. Unrecognized tag will appear as a question mark icon. The horizontal line under the tag refers to RSSI.

3.4.3 EAS mode

EAS mode is used to reject the passage of the unauthorized tag, such as unprocessed library book will trigger the alarm at the library entrance. The initialization of the mode is located in scan configuration (refer to 3.6.1 for more details). Open the interface, click on “EAS”, as shown in the figure below:

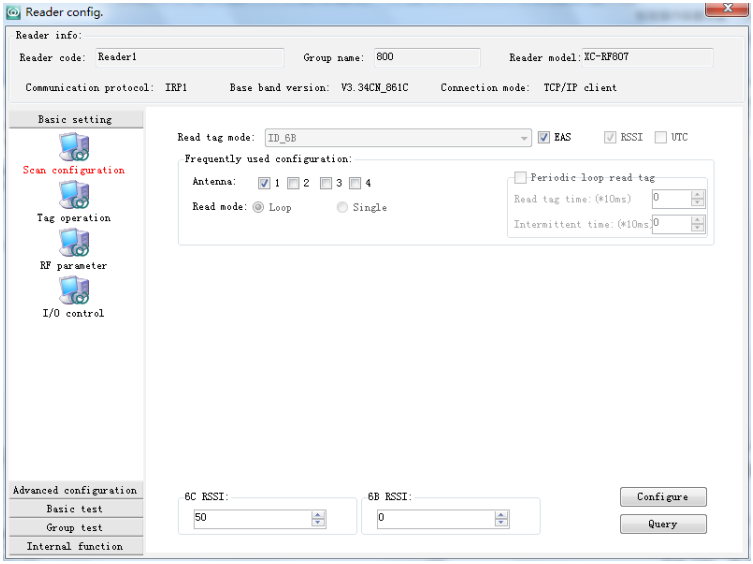


Figure3-38

After enabling EAS, enable scan under demo mode or scan mode,, the normal tag will not be read, only those tags with EAS label that enter the valid scan area of the antenna will trigger the alarm.

The following describes the steps how a tag triggers the alarm under EAS mode:

1. First this tag must support EAS tag setting (such as NXP tag).
2. Read the tag under demo mode (Note: Do not enable EAS, otherwise the tag can't be read).
3. Select a tag, enter tag operation -> Tag safety -> EAS setting, and configure the EAS label in the tag. (Note: Refer to the detailed introduction on tag safety in 3.5.1)
4. Enter reader configuration -> Scan configuration, select EAS, select "Config".
5. Return to the demo mode interface, select "Scan" and the following effect can be observed:

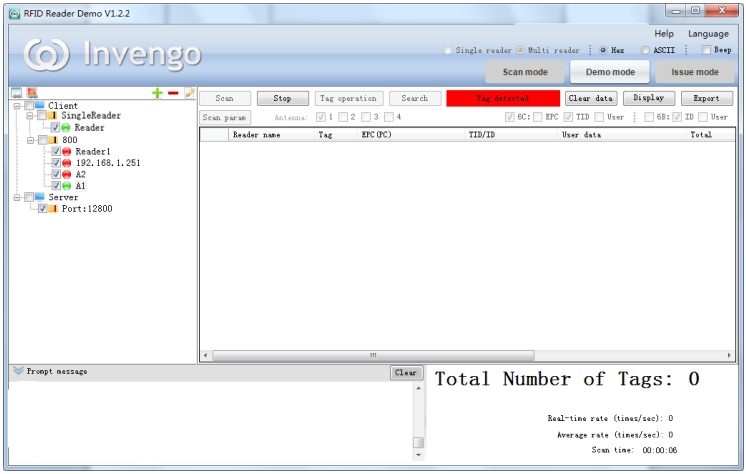


Figure3-39

Enable scan under scan mode with similar effect:

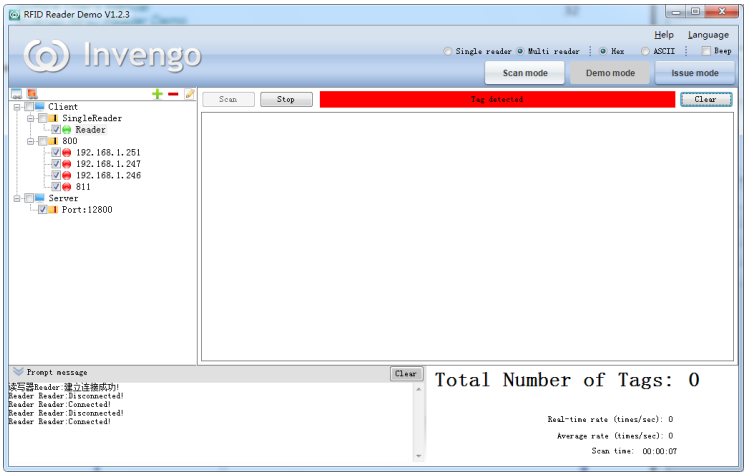


Figure3-40

Alarm Figure

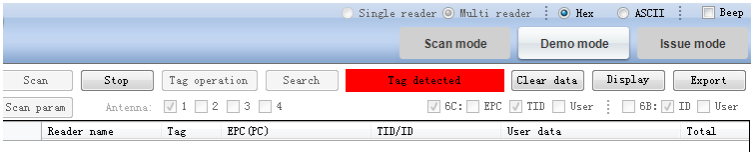


Figure3-41

The part in red in the above figure indicates alarm for tag detection, with the details shown in the following figure:

Figure3-42

3.4.4 Issue mode

1. Single reader interface

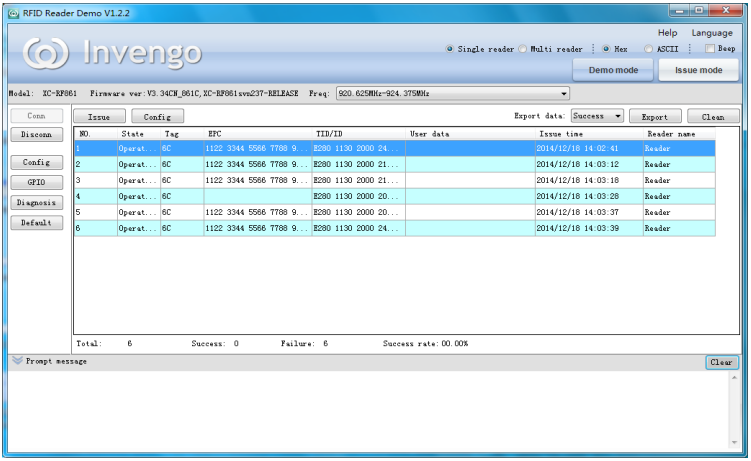


Figure3-43

2. Multi reader interface

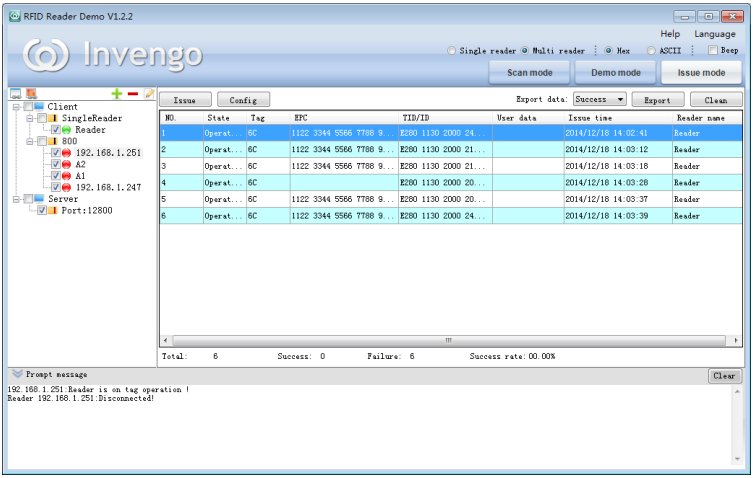


Figure3-44

3. Configuration

For the specific meaning of the parameters in the following figures, please refer to 3.6.1.

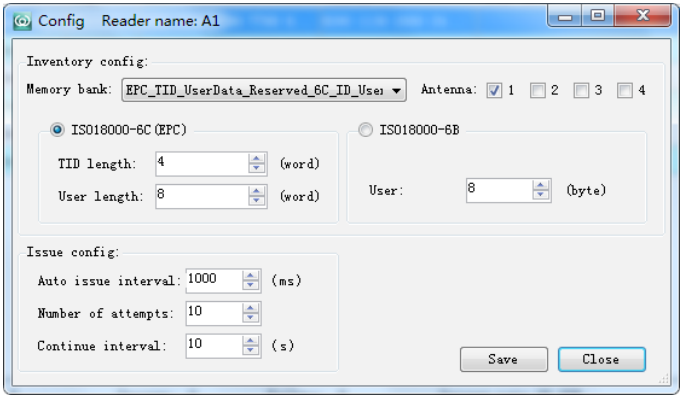


Figure3-45

Auto issue interval: The time between the issuance of the previous card and the next card

Number of attempts: The largest number of card issuance attempt. If a card is successfully issued within the number of attempt, continue to issue the next card.

Continue interval: If multiple tags are encountered during auto issue, pause setting time and wait for the participation of client. If the client does not participate in operation, card to be issued based on default method.

4. Card issuance

Normal card issuance

Normal card issuance, the top part is the tag area, indicating the scanned tag; the bottom part is the data writing area, including EPC, UserData and Reserved.

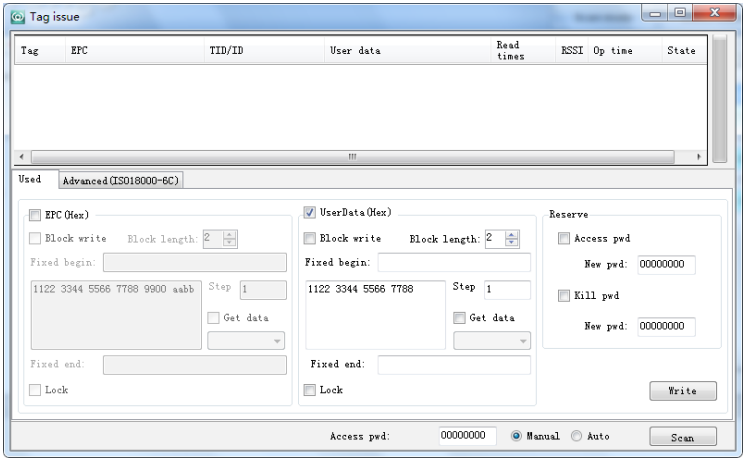


Figure3-46

EPC and UserData area setting

Fixed begin: The beginning part of the label

Fixed end: The ending part of the label

Central area: To be added based on stepping in central area using hexadecimal, as shown in the figure below

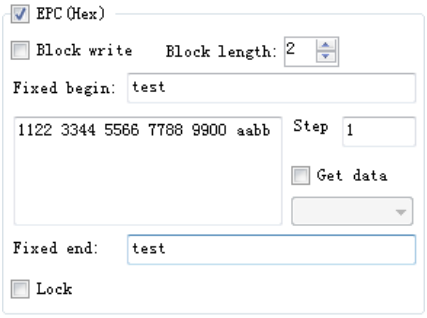


Figure3-47

The content of EPC area is test1122334455667788990 0aabbtest

The next content is test1122334455667788990 0aabctest

Note: If ASCII is selected, the central area only consisted of digit 1 to 9

High grade card issuance

High grade card only allows data writing in one area, the options in the bottom column of the area includes: Reserved, EPC, TID, UserData. The data parameters configuration is similar to normal card, please refer to the parameter setting for normal card.

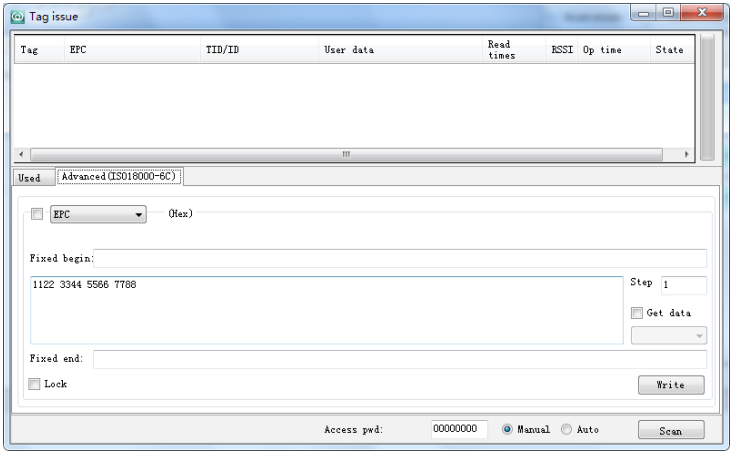


Figure3-48

After completing setting, if manual issuance is selected, scan one tag, select the tag, and click on write card to complete card issuance. If auto issuance is selected, click on “Start issue card”, to read tag and complete tag issuance, as

shown in the figure below:

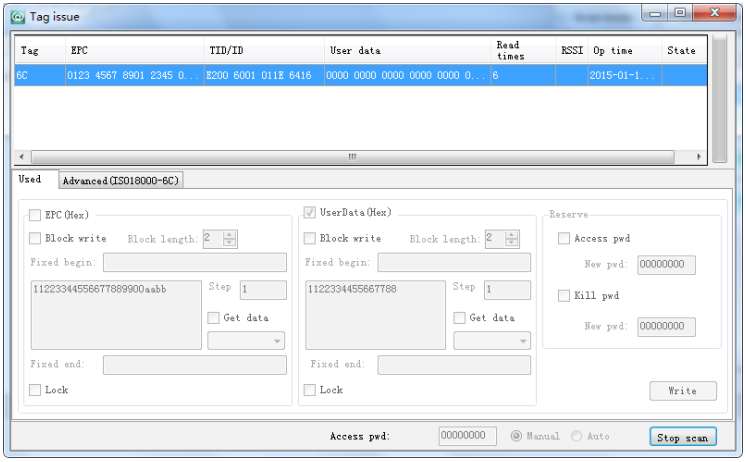


Figure3-49

3.4.5 Software server mode

Under normal circumstances, the reader serves as the server and allows passive software connection. Software service mode sets the software to become the server and the reader as a client, allowing the reader to connect to the software automatically.

The prerequisite for this mode:

1. The reader supports this mode (only supported by selected products)
2. Reader connection to LAN through Ethernet port

Below describes, in details, the steps on the configuration of this mode:

1. First configure the reader as a client, use client connection configuration (refer to 3.3.1) to connect to the reader, select “Reader config.” -> “Advanced configuration” -> “Network communication”. On the “Reader network mode” on the right side of the interface, select reader as client, and set up the reader port number, listening port number and add the IP address of the computer where the software is located into the server list (Please refer to 3.6.5 if there is anything unclear about the meaning of these settings). The figure below shows a completed setup example:

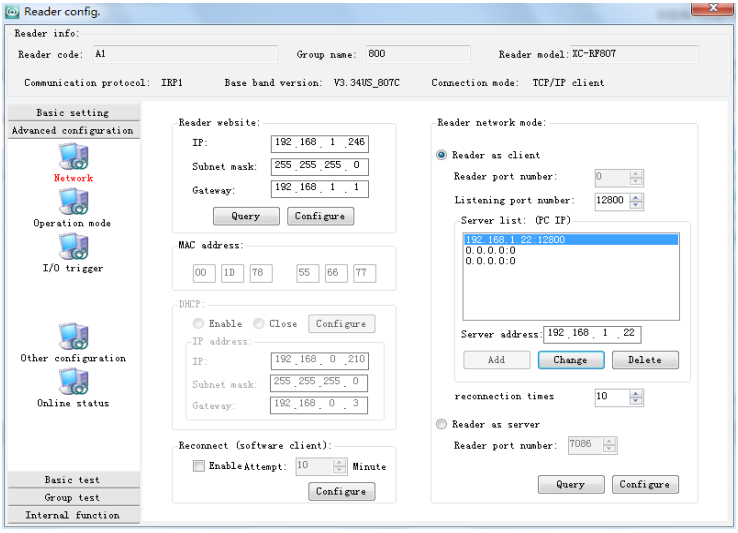


Figure3-50

Click on “Configure” to save the settings and exit

2. Create a new software server configuration (Please refer to 3.3.2), assume listening port as 8080 (must be the same as the listening port in step 1), as shown in the following figure:

Figure3-51

3. Disconnect the connection of client connection configuration, enable the server connection configuration (if forget how to disconnect and enable connection, please right click on the configuration name and select “Disconn”, “Conn”), as shown in the figure below:

Figure3-52

4. After a moment, the reader will connect automatically:

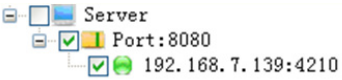


Figure3-53

The name of the connection is “Reader ip+Reader port”. The server port should be the same as the reader port number in the first configuration step. If the setting here is 0, this means the port number will be assigned automatically by the reader. Below users can operate this connected reader just like operating a client connection.

Note: If the reader as client as additional configurable parameters, please refer to 3.6.9

3.5 Tag operation

Tag operation includes read/write tag EPC, user data area, password change, block/unlock data area, kill tag, block write and block erase and other functions.

Under the demo mode, after tag scanning, select the tag to operate (Can select multiple tag), click on “Tag operation” to enter into tag operation interface (can enter by double clicking the icon).

Tags are divided into 6C and 6B, tag operation interface will show different functions based on the tag difference. If the selected tags have both, all functions shall be enabled, as shown in the figure below:

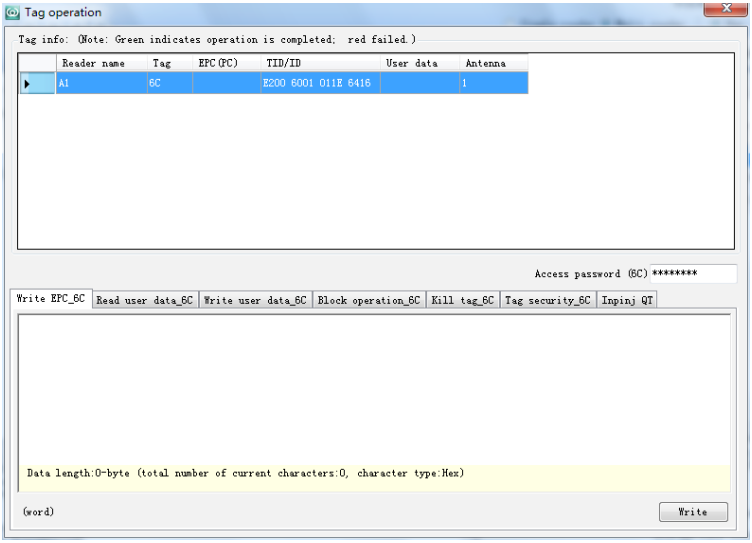


Figure3-54

Access password (6C):

Correct access password is required to write data, change password and lock operation. The password consists of 8 hexadecimal digits, with the default as 8 zeros. Operation interface that does not require access password will not have such control.

Data entry column:

During data entry: Enter data through this entry, the data must be in hexadecimal, otherwise the data can't be entered. The following display in real time the entered data length in full length and the total digit statistically tabulated.

During data reading: Display the data read

(Note: The calculation formula is divided into double byte and two single-bytes. The software will prompt and this will again be explained during the introduction of all functions below)

Before every operation, select target tag. The software provides different colors to indicate different status:

White: Not selected

Blue: Selected

Green: Successful operation (Not selected)

Red: Failed operation (Not selected)

Multiple tags can be selected. Multiple selections not only allow batch operation, data can be written in sequential based on stepping, as shown in the figure below:

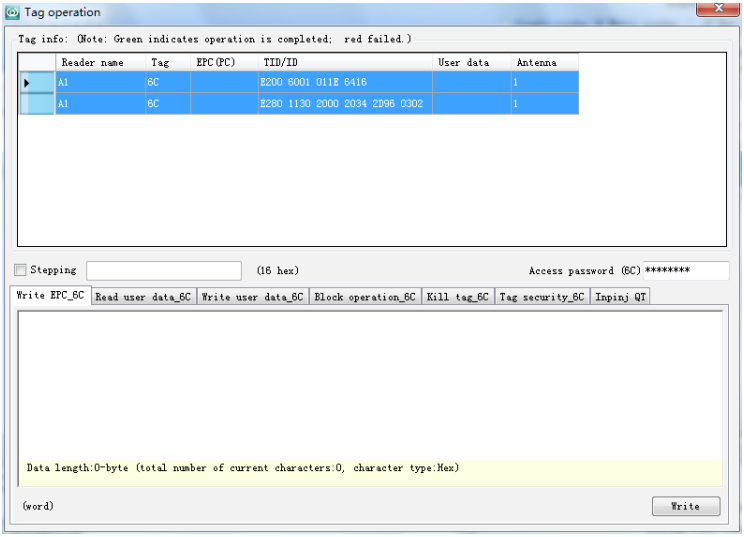


Figure3-55

Like the figure above, during multiple tag selection, the stepping input column will appear where stepping value can be entered (16 hex), the start value is entered into the input column at the bottom, click on “Write” to write the start value onto the first tag, and every subsequent step will add one additional stepping value to the next tag.

3.5.1 6C tag operation

The data processing of 6C tag is based on double byte as the unit (please refer to the actual data, this software will indicate “double byte” at the back of the controls), which means one double byte refers to one length, when the data is presented in 16 hex, one length equals to four 16 hex digits.

1. Write EPC_6C

Access password: Enter the correct access password

Input column: Enter the wanted EPC data

Write: Write EPC

Note: Based on the calculation of double byte, the maximum length of EPC is 15. This value can be altered with the modification of configuration document “Sysit.xml”.

2. Read user data_6C

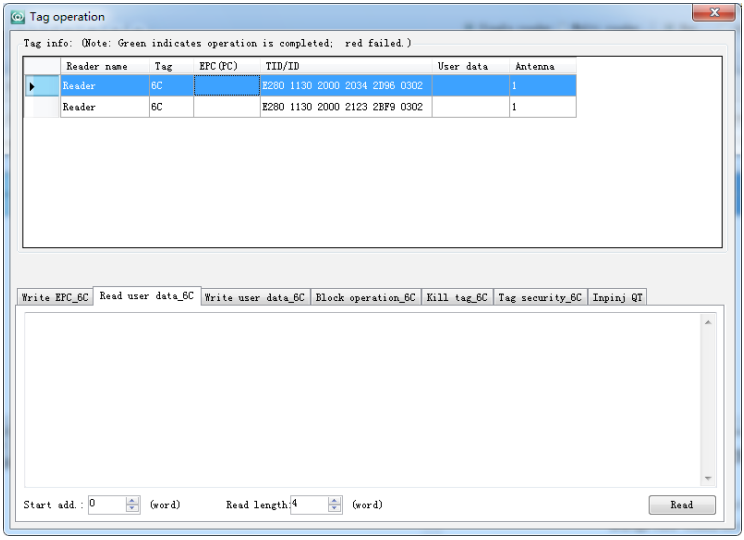


Figure3-56

Input column: Unable to enter, used for the displaying read data

Start address: To read the start address of the data

Reading length: To read the length of the data

Read: Read user data

Note: Based on the calculation of double byte, read the user data area of 6C label, the start address plus the reading length should not exceed 32, this restriction can be altered with the modification of configuration document “Sysit. xml”.

3. Write user data_6C

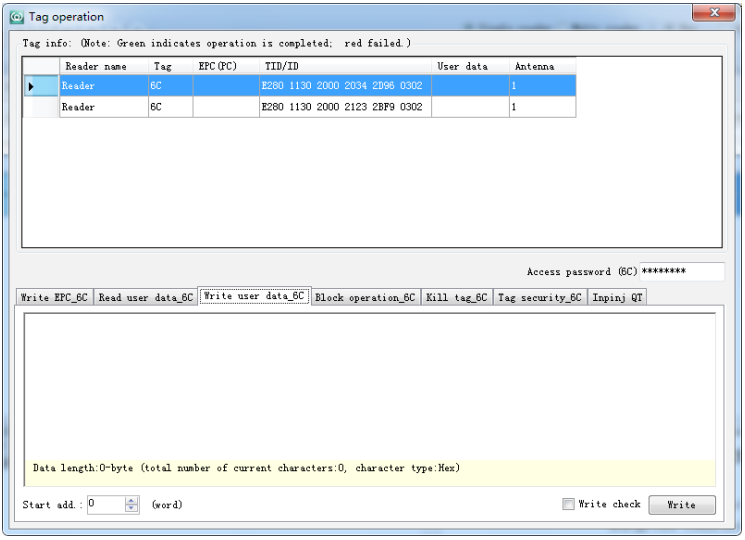


Figure3-57

Access password: Input correct password

Input column: Enter the wanted data

Start address: To enter the start address of the data

Write check: Once selected the successfully written data will be re-read to ensure the validity of the written data

Write: Write data

Note: Based on the calculation of double byte, read the user data area of 6C label, the start address plus the reading length should not exceed 32, this restriction can be altered with the modification of configuration document “Sysit.xml”.

4. Block operation_6C

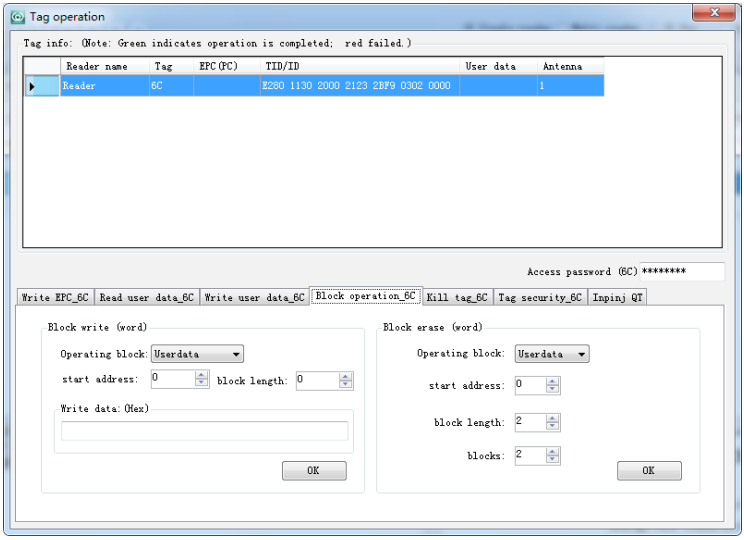


Figure3-58

Access password: Input correct password

Block write:

Block write: Optional values are 0 to 3:

0	Reserved
1	EPC data area
2	TID data area
4	User data area

Block start address: To operate block start address

Write data (Input column): Input the wanted data

Confirm: Execute block operation

Block erase:

Block start address: To operate block start address

Length: Length to be erased

Confirm: Execute block erase operation

5. Kill tag_6C

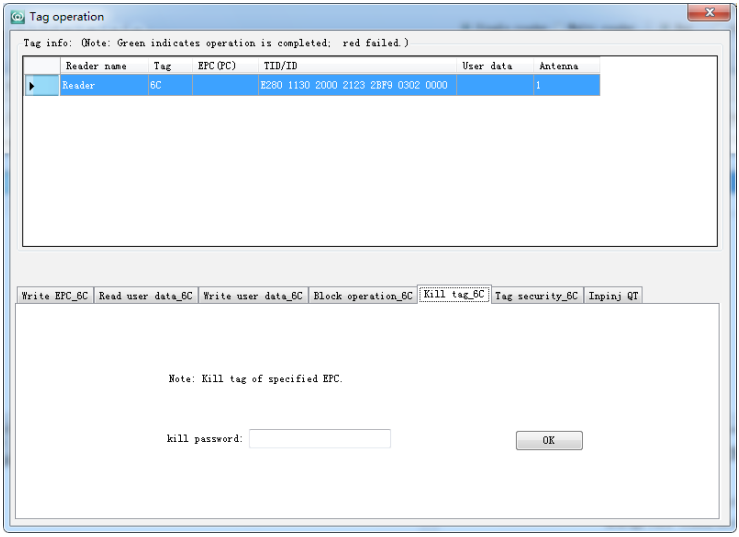


Figure3-59

Note: A killed tag can't be recovered and can't be reused.

Killed tag must be supplied with tag EPC code.

Tag kill password: Enter the correct tag kill password.

Confirm: Execute kill operation.

6. Tag safety_6C

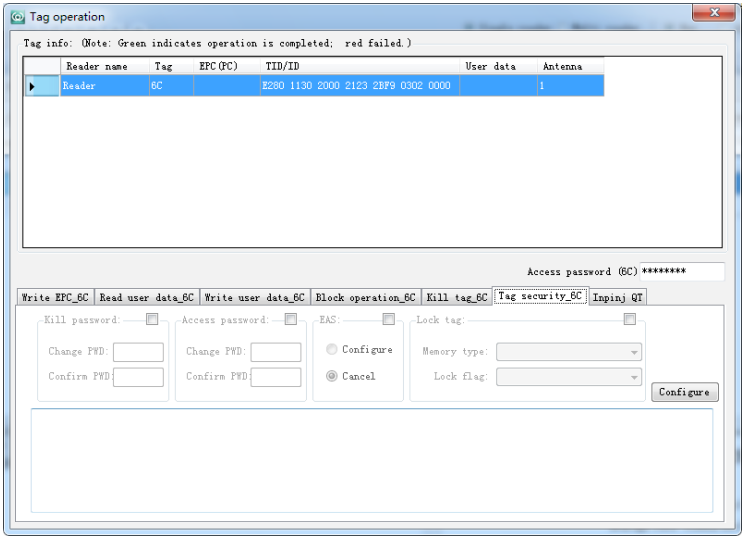


Figure3-60

Access password: Enter correct access password.

Kill password:

Change password: Enter new kill password (8 hexadecimal digits)

Confirm password: Reenter new password

Access password:

Change password: Enter new access password (8 hexadecimal digits)

Confirm password: Reenter new password

EAS:

Configure: Configure the EAS tag in the label (which means the tag will trigger alarm under EAS mode).

Cancel:Cancel the EAS tag in the label.

Lock tag:

Description: Using non-default password to lock specific data area, once locked the default password may not be able to operate this data area.

Data area type: Select the data area type that will perform the operation

Lock label: Lock/unlock

Setting: Execute operation

3.5.2 6B tag operation 6B

The data processing of 6B tag is based on single byte as the unit, which means one single byte refers to one length, when the data is presented in 16 hex, one length equals to two 16 hex digits

1. Read user data_6B

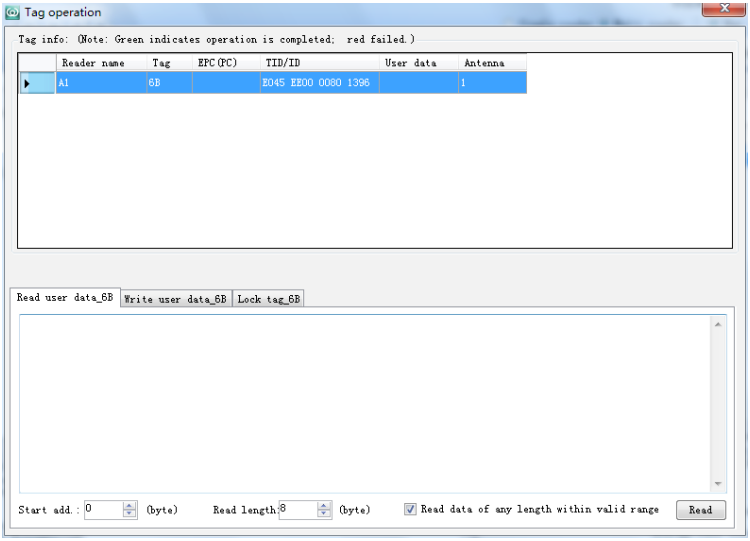


Figure3-61

Input column: Unable to enter, used for the displaying read data

Start address: To read the start address of the data

Reading length: To read the length of the data

Long length reading: This method allows higher reading efficiency, but not supported by all readers

Read: Read data

Note: Based on the calculation of single byte, the start address plus the reading length should not exceed 216, this restriction can be altered with the modification of configuration document “Sysit.xml”.

2. Write user data_6B

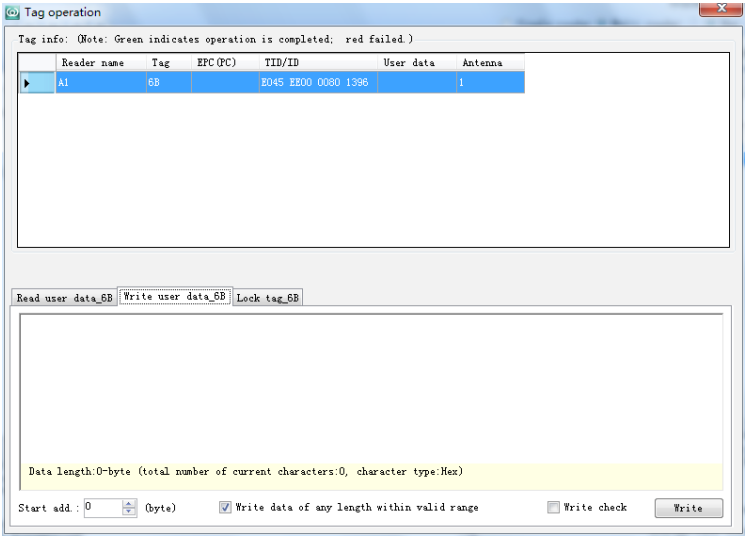


Figure3-62

Start address: To read the start address of the data (calculated based on single byte)

Long length writing: This method allows higher writing efficiency, but not supported by all readers

Write check: Check if the writing is correct

Input column: For written data

Write: Write data

3. Lock tag_6B

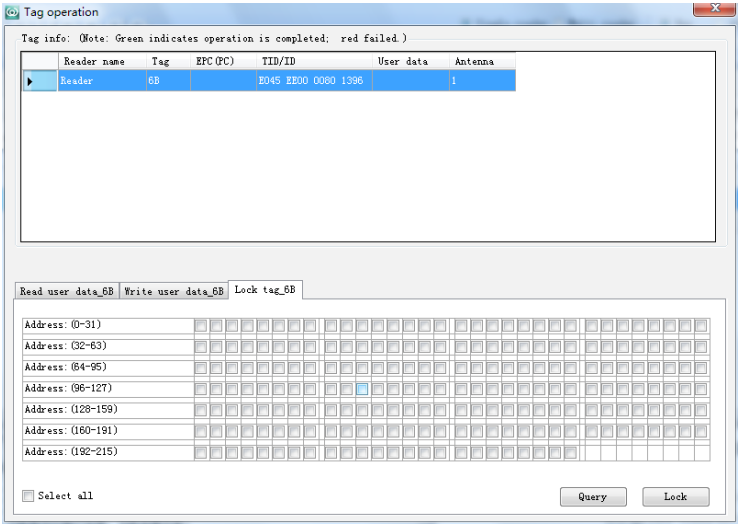


Figure3-63

Lock up data area using single byte as unit; remember that data will not be changed or unlock after locking.

There is a total of 216 bytes in this area, from 0 to 215. This indicates that the user data area for 6B tag allows the storage of user customizable data. This area allows users to lock the data they want.

Query: Select the address for query, click on this button to query the lock condition of the selected address

Lock: Select the address to lock, click on this button to lock the selected address

Select all: Select all bytes

Notes:

1. When many addresses are selected (for example select all), the time for query or lock up is longer. Please wait patiently for the operation to complete.
2. Red background on multiple selection indicates the data for the address has been locked, as shown in the figure below:

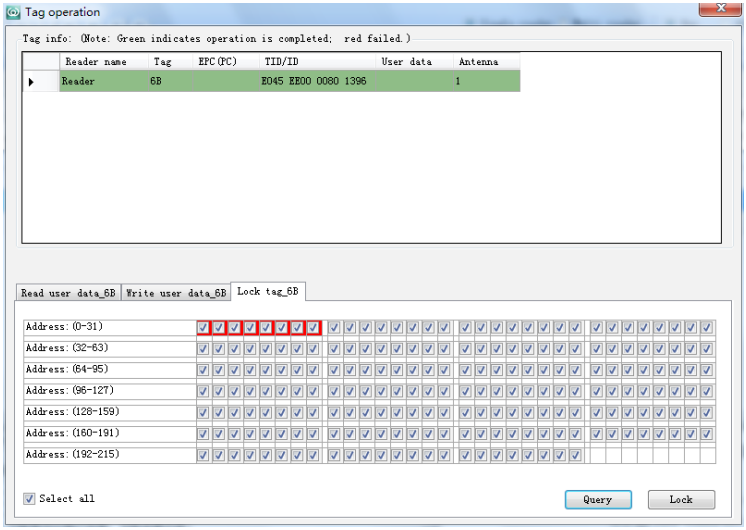


Figure3-64

3.6 Reader configuration (multi-reader)

Reader configuration provides the reader with various configurations, such as scan parameters, tag filter, RF parameter, network communication and other basic testing.

Before configuration, make sure the reader is connected correctly, then select this configuration, click on the right click of the mouse and select reader configuration. The interface is shown in the figure below:

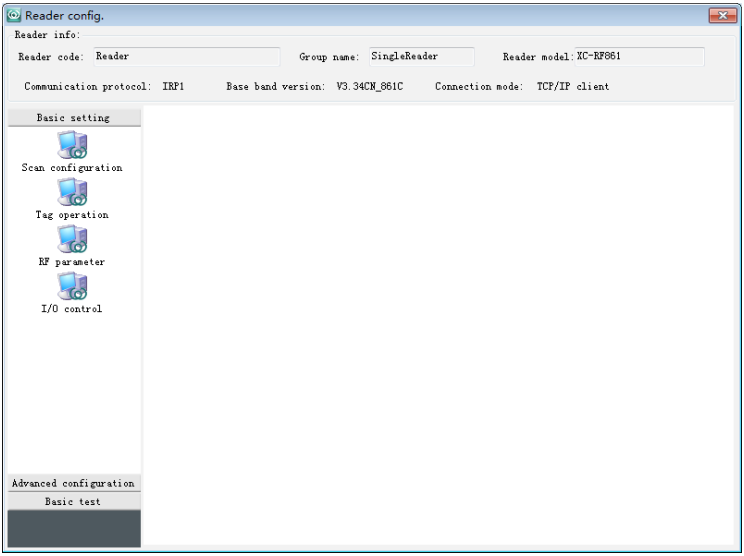


Figure3-65

On the top of the interface is the basic information of the connection configuration and reader. Various configuration functions are located at the multiple tag pages on the left and they are divided into three groups: Basic setting, Advanced Configuration and Basic Test. The article below introduces all tag pages in details.

3.6.1 Scan configuration

Scan configuration mainly provides the setting of read tag mode, in addition, the switch for EAS is located here, select “Basic setting” -> “Scan configuration”, as shown in the figure below:

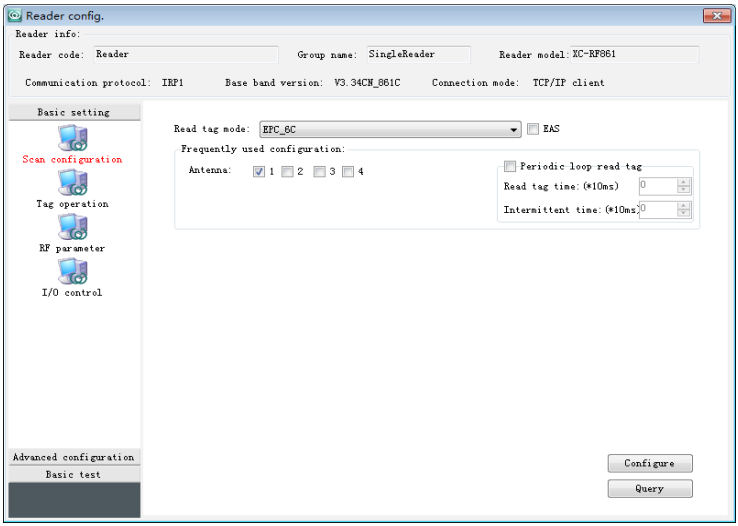


Figure3-66

Current configuration will be queried automatically when the page is loaded.

EAS: Enable/Cancel EAS alarm mode, refer to 3.4.3 for more details.

Read tag mode:

Different reader models have different optional reading mode, including one or more of the below:

- EPC_6C: Read the EPC in 6C tag
- TID_6C: Read the TID in 6C tag
- EPC_TID_UserData_6C: Read the EPC, TID and user data area in 6C tag
- EPC_TID_UserData_6C_2:Read the EPC, TID and user data area in 6C tag, with customizable TID length, user data area’s starting bit and length
- ID_6B: Read 6B tag ID
- EPC_6C_ID_6B: Read 6C tag EPC and 6B ID
- TID_6C_ID_6B: Read 6C tag TID and 6B tag ID
- EPC_PC_6C: Read EPC and PC of 6C tag (Note: EPC data area include

CRC, PC and EPC, EPC commonly refers to the EPC data in the data area, here PC refers to the PC data in the data area.

- EPC_TID_UserData_6C_ID_UserData_6B: Read the 6C, TID and user data area of 6C and ID and user data area in 6B tag
- EPC_TID_UserData_Reservedd_6C_ID_UserData_6B: Read the 6C, TID, user data area and reserved of 6C and ID and user data area in 6B tag

Antenna: The number of the chosen antenna.

Read mode: Select read mode, optional in loop and single

Estimate read tag number: The largest tag number that exist simultaneously in the coverage range of the antenna signal

Periodic loop read tag (default, unchecked): Setup periodic parameters, parameters include read tag time and intermittent time, in milliseconds, set tag read time = 1000, intermittent time = 2000, this allows the tag reading to read for 1 second and stop for 2 seconds, and so on.

Note: This page will change based on the different reader models and different read tag mode, such as connect XC-RF807 reader and select read tag mode as EPC_TID_UserData_Reservedd_6C_ID_UserData_6B, as shown in the figure below:

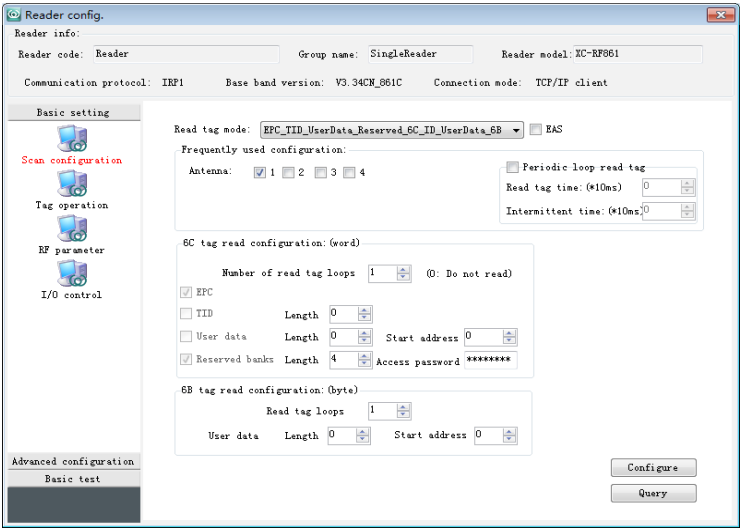


Figure3-67

The extra configuration is for the configuration of data area and length scanning

Read tag cycle: Indicates the probability of tag reading, 0 represents no reading.

3.6.2 Tag filter

Tag filter allows readers to send back interested tag data, which means tag filtering. Select “Basic setting” -> “Tag filtering”, with the interface shown in the figure below:

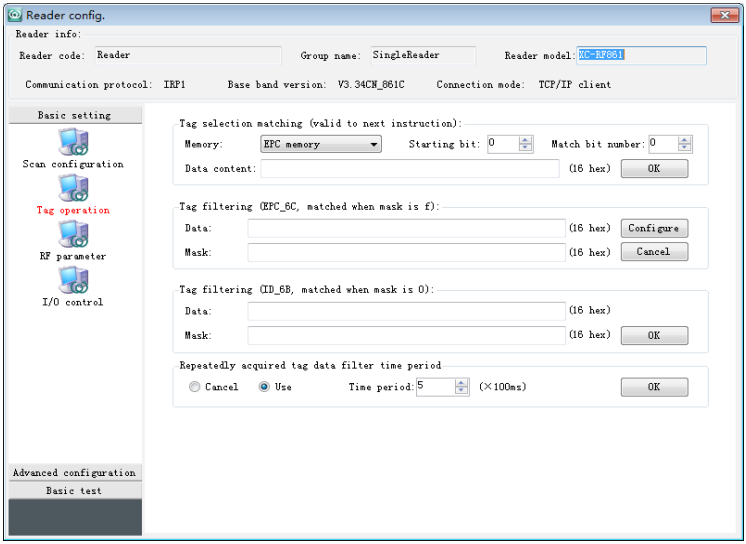


Figure3-68

Disabled operation indicates this reader model does not support this function, please based on the actual situation.

Tag selection matching:

Data area: Select target data area

Starting bit: The start address of the target data area, unit: bit

Matching bit number: Note that the unit here is bit, 8 bits equals to 1 byte.

Data content: Matching data is in hexadecimal, the length must match the bit number.

Note: 2 hexadecimal digits indicate 1 byte, which is 8 bit.

Confirm: Execute operation.

Note: This operation is only valid during the next command.

Tag filter (EPC_6C) (only matches with EPC data in 6C tag):

Data: Enter the matching data

Mask: Enter mask to confirm matching (f indicates matching, 0 indicates no matching required)

Confirm: Execute operation

Cancel: Cancel matching

Tag filter (ID_6B) (only matches with ID data in 6B tag):

Data: Enter the matching data

Mask: Enter mask to confirm matching (f indicates matching, 0 indicates no matching required)

Confirm: Execute operation

Cancel: Cancel matching

Description:

Allows the reader to filter repeated tag based on the configured intermittent time, which means during this timeframe, regardless the number of times a tag is scanned, the data will only be returned once.

Cancel: Cancel code issuance intermittent time

Configuration: Set up code issuance intermittent time

Intermittent time: Enter intermittent time, unit: 100 milliseconds

Confirm: Execute setting

3.6.3 RF parameters

RF parameter includes antenna power setting and frequency setting, select “Basic setting” -> “RF parameter”, with the interface shown in the figure below:

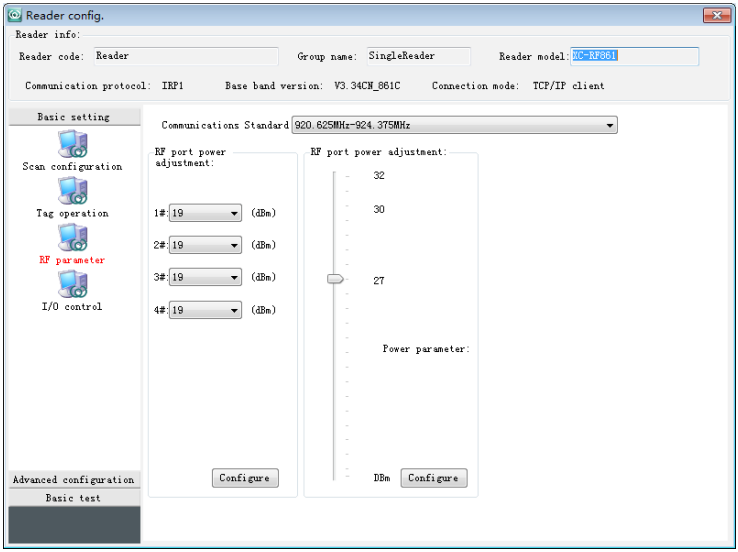


Figure3-69

The power and frequency of all antennas will be queried automatically when the page is loaded.

There are two power adjustment settings on this interface, the software will select one of them based on the reader model and disable the other.

Power adjustment column on the left:

Adjust the RF power of the 800 series reader, allows adjustment on every individual antenna, the optional power for different readers are different, but the bottom column will automatically indicate all supported power value of the current reader, hence users just need to select the desired power value from the drop-down list.

Power adjustment column on the right:

Adjust the RF power for 500 series reader; selected range is between 0 and 32. Scroll through the slider to select the desired power value.

3.6.4 I/O control

I/O control provides query and setting functions for I/O port status and I/O control setting.

Select “Basic settings” -> “I/O control”, as shown in the figure below:

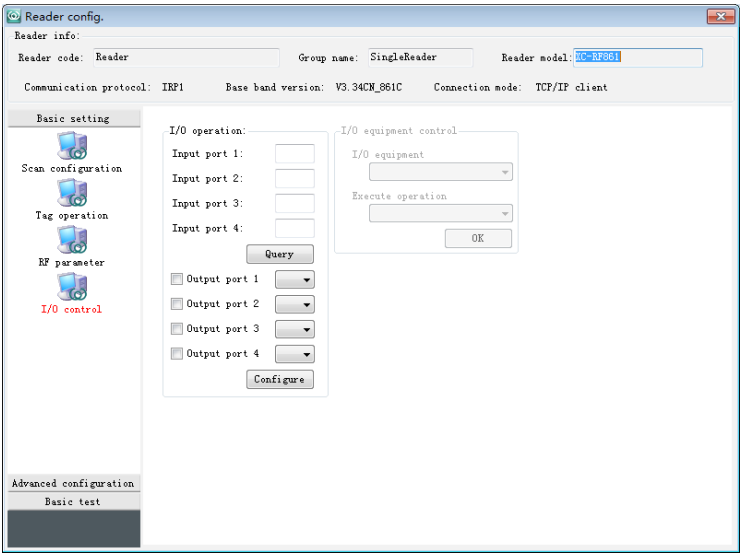


Figure3-70

Query: Able to inquire on all port status.

Setting: Select the port to configure, click on “Configure” after modification to execute the setting.

I/O device control: Select I/O device.

Execute control: Select the operation to be executed by the device.

Confirm: Save I/O device control setting.

3.6.5 Network communication

Under network communication, there is reader website setting, DHCP, reconnect and network mode. The mac address of the reader can also be queried through this function.
Select “Advanced settings” -> “Network communication”, with the interface shown in the figure below:

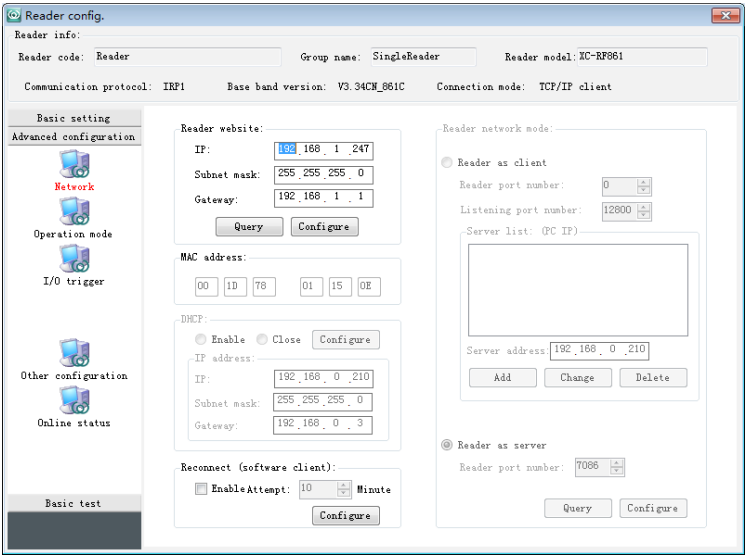


Figure3-71

The current network setting will be queried automatically when the page is loaded.

Reader website: Query/configure reader’s Up, subnet mask and gateway.

MAC address: Display the MAC address of the reader (only for reading).

DHCP:

Enable: Enable DHCP.

Close: Close DHCP (must manually configure an IP address)

IP address: Set up IP address

Configure: Execute configuration

Disconnect:

The reader must be connected through Ethernet port, can be configured to reconnect after disconnected for a certain amount of time.

Enable attempt: Select to enable reconnect attempt

Note: This configuration will not be saved during the launch of the software. There will be no reconnect attempt

Reader network mode:

Reader as client: Configure the reader to actively connect with the software server configuration (refer to 3.3.2)

Reader port number: Port number used for connection, if the default 0 is used, the reader will automatically assign the port.

Listening port number: The listening port number in server configure (refer to 3.3.2)

Server list: Reader will attempt to connect with server based on the IP in the list.

Server address: Enter server address

Add: Add one address to the server list

Change: Select one IP in the list, enter the modified value to server address and click on “Configure”.

Delete: Select one IP from the list and click on “Delete”.

Reader as server: Under normal circumstance, the reader will be in this mode. Wait for the software to connect after enabling.

Reader port number: The port number used during connection, normally is 7086

Query: Inquire current configuration

Configure: Execute current configuration

3.6.6 Work mode

This part provides change function to work mode, please select work mode that is compatible with work environment or work mode.

Select “Advanced setting” -> “Work mode” (If there is no such setting, this means the setting is not supported by the reader), with the interface shown in the figure below:

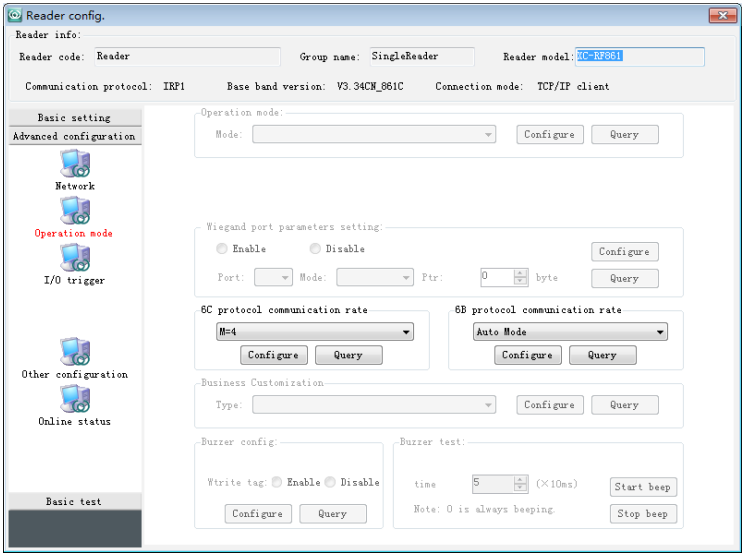


Figure3-72

The current mode will be queried when the page is loaded.

Query: Inquire the working mode of the current reader.

Single reader: Continuous work mode, the reader will work continuously. This is the default work mode.

Multi reader: Intermittent work mode, the reader will work intermittently. The intermittent time is random and not customizable.

Wiegand Interface Control: Multi reader mode + send data to Wiegand Interface Control, reader work intermittently and transfer the last third, fourth and fifth byte of the ID data from 6B tag to the Wiegand Interface Control, while returning tag data to host computer,

3.6.7 I/O Trigger

I/O Trigger is the function that allows the reader to trigger scan operation based on the different condition in I/O port. Select “Advanced setting” -> “I/O trigger” (If there is no such setting, this means the setting is not supported by the reader), with the interface shown in the figure below:

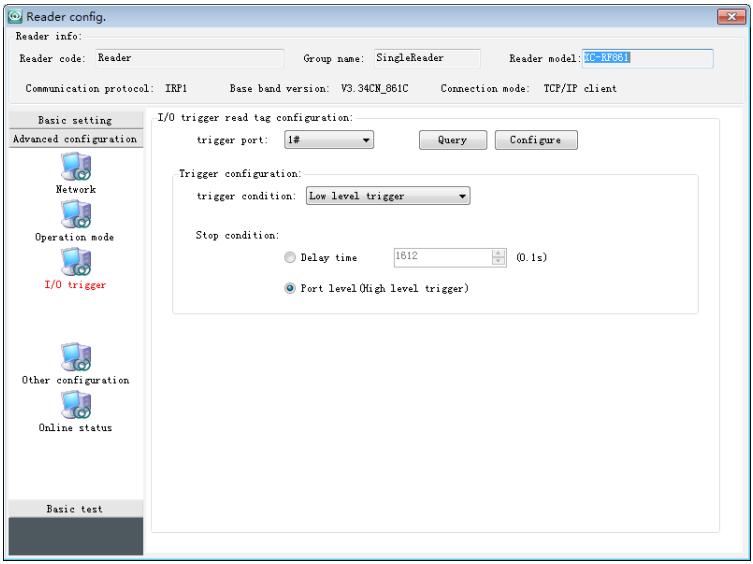


Figure3-73

Trigger port: Select trigger port from the following four ports:

1#

2#

3#

4#

Query: Inquire on the currently selected port configuration

Configure: Configure the trigger configuration of the current selected port.

Trigger condition: Optional conditions are as follow:

Switch off

Low level trigger

High level trigger

Stop condition: Optional in delay time and port level.

Delay time:

Continual configuration operational time, automatically stop once the time is up, unit: 0.1 seconds.

Port level: Automatically select conditions that are opposite to the trigger condition.

Detailed explanation: I/O trigger is a function that automatically triggers read tag operation based on I/O trigger condition and returns the tag data to host computer. There are four port levels which can be configure individually. Read tag mode is the current reader scan configuration (refer to 3.6.1). For example, first configure the scan configuration by referring to the figure below:

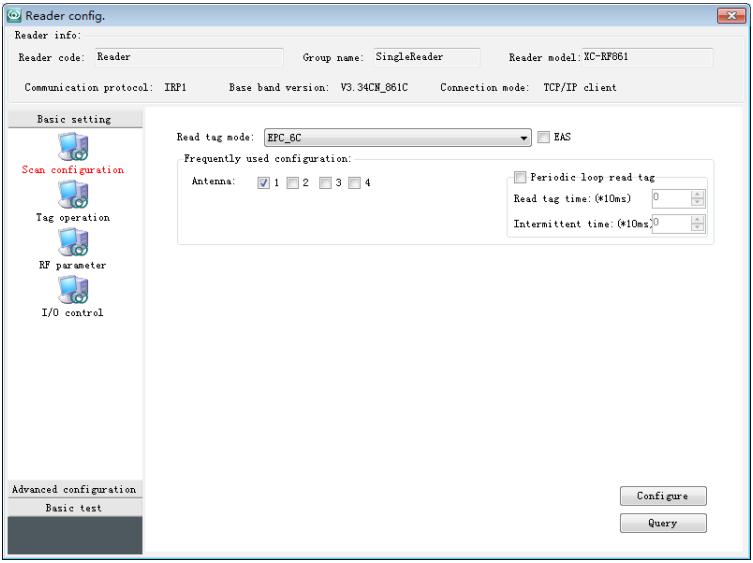


Figure3-74

Then configure trigger port:

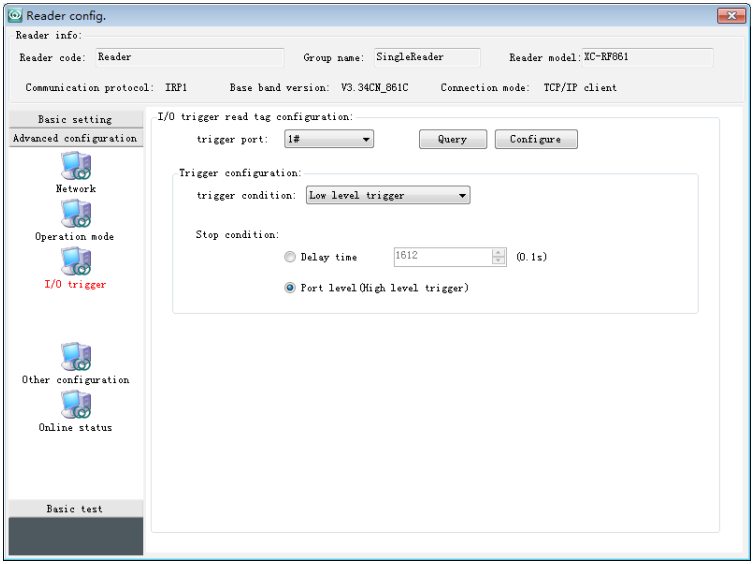


Figure3-75

Select 1# trigger port (ascending edge) and the effect below can be seen:

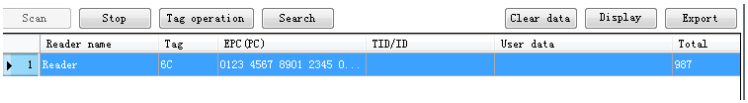


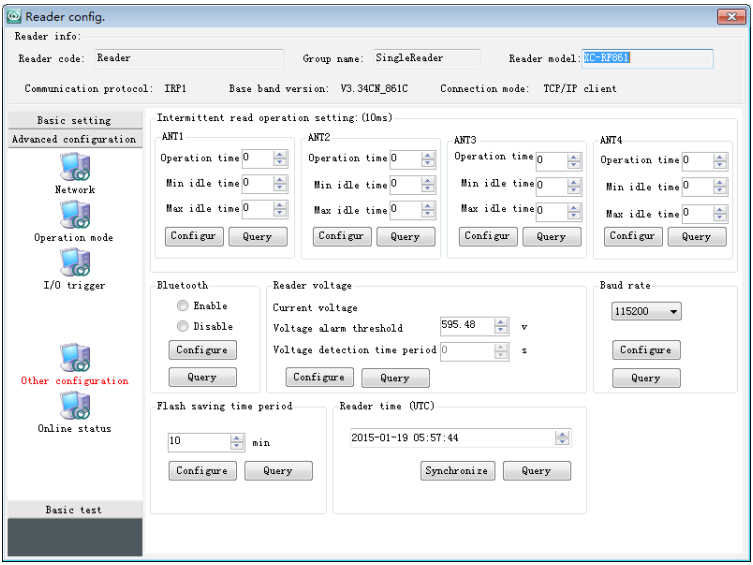
Figure3-76

EPC data from the tag is scanned and uploaded in accordance with the scan configuration. Tag reading will be terminated once the descending edge triggers 1# trigger port.

Note: If multiple trigger ports have been configured, when one port has been triggered, triggering the other port will not cause any effect. The triggering effect is only valid if the reader has not been triggered.

3.6.8 Other configurations

Select “Advanced configuration” -> “Online status” (If there is no such setting, this means the setting is not supported by the reader), with the interface shown in the figure below:



Intermittent read operation setting: Configure the read intermittent timing of each antenna.

Bluetooth: Enable and disable bluetooth function.

Reader voltage: Inquire reader voltage, equire or configure alarm threshold voltage, inquire voltage detection inteval. If the current voltage is smaller than the alarm voltage, the reader’s buzzer will sound three times “Tick tick tick” when inquire abou the current voltage.

Port baud rate: Configure the port communication baud rate.

Flash saving time period: Inquire or configure Flash saving time period.

Reader time (UTC): Inquire or synchronize reader time.

3.6.9 Online status

Enable this function to allow the reader to regularly detect the current connectivity. If there is an abnormal connection, the connection will disconnect automatically and wait for the next connection.

Select “Advanced setting” -> “Online status” (If there is no such setting, this means the setting is not supported by the reader), with the interface shown in the figure below:

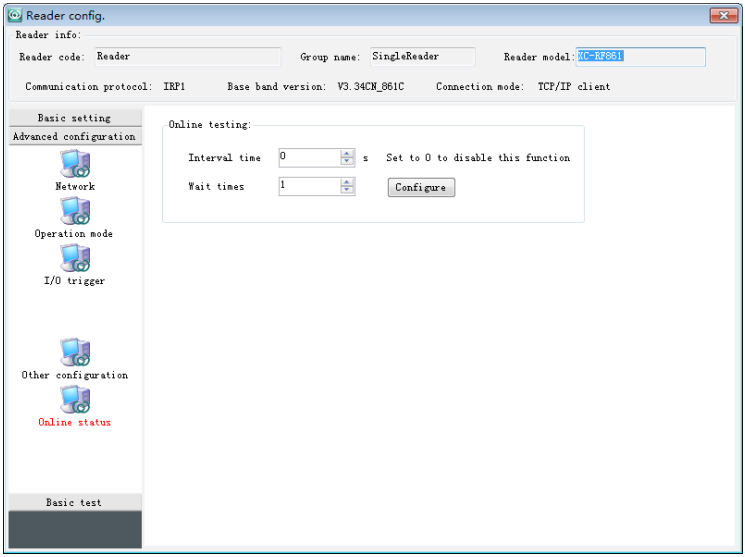


Figure3-77

The intermittent time will be queried automatically when the page is loaded.

Intermittent time: Condition inspection interval time, unit: millisecond.

Configure: Execute configuration

Note: Intermittent time is set at 0, indicates this function is disabled.

3.6.10 Parameter setting

This setting is only applicable to the readers under client mode.

Select “Advanced setting” -> “Parameter setting” (If there is no such setting, this means the setting is not supported by the reader), with the interface shown in the figure below:

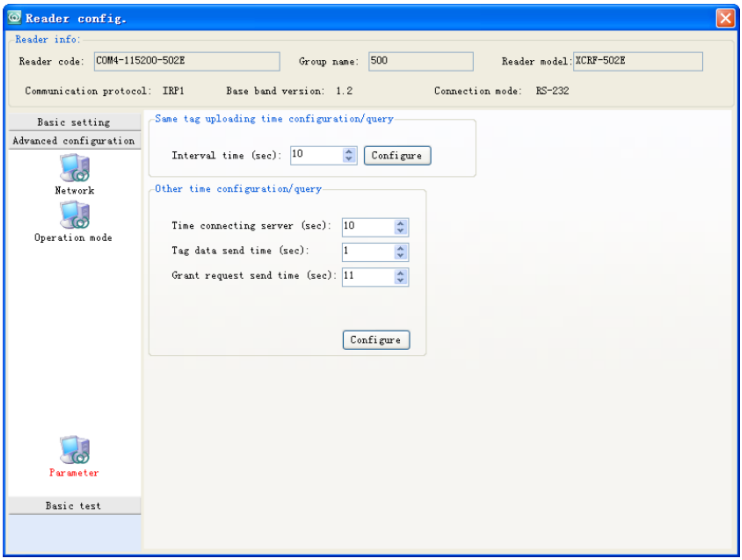


Figure3-78

The current setting will be queried automatically when the page is loaded.

Intermittent time: The intermittent time to upload the data from the same tag under the circumstances where the reader needs to upload tag data.

Time connecting server: The time interval of the reader reconnecting with the server after it detects the connection to the server has been disconnected.

Tag send time: The time interval of the reader sending the tag data under the circumstance the reader needs to upload tag data.

Grant request send time: The time interval of the reader sending requests to the server

3.6.11 Basic test

Basic test include repeat reading/writing, static read, dynamic reading/writing

1. Repeated reading/writing

Providing the test function on single tag that performs repeated reading or writing.

Select “Basic test” -> “Repeated reading/write” as shown in the figure below:

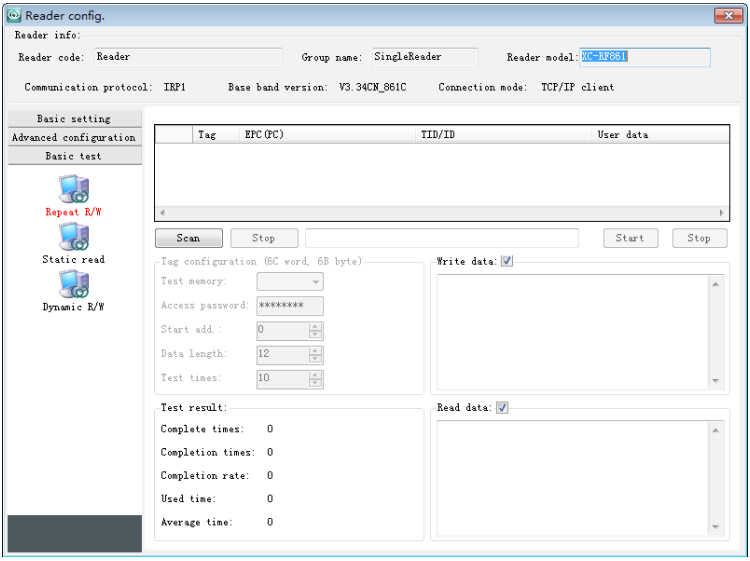


Figure3-79

Click on “Scan”, and then click “Stop” after the tag is scanned and select the tag to test for.

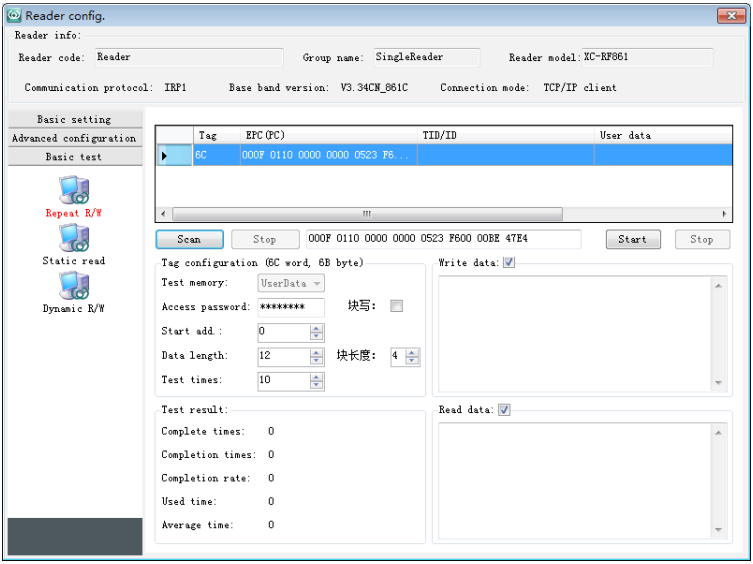


Figure3-80

Test area: Optional in EPC and UserData, but EPC is only available under TID reading.

Access password: Enter access password Start address: The start address of data area (if the test area is EPC, then the value should be 0 and can't be altered).

Data length: Test length.

Test number: Number of test.

Test can be done by choosing "Write data" and "Read data". The test result will be statically tabulated on the bottom left of the page.

2. Static read

Provides time fixed and amount fixed tag reading test function.

Select "Basic test" -> "Static read", with the interface shown in the figure below:

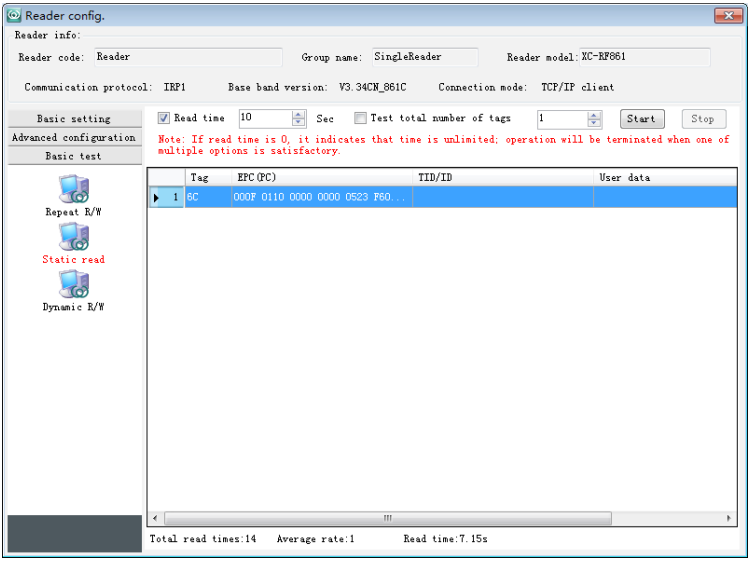


Figure3-81

Start: Start test

Read time: Fixed time, stop reading when time is up.

Total number of tested tag: Fixed mount, stop when the amount has been reached.

Able to choose both, and stop once one of them is satisfied. Can be stop manually by clicking on “Stop”.

3. Dynamic reading/writing

Provides dynamic test function where every tag read will be entered, and continues to read/write the following tag.

Select “Basic test” -> “Dynamic Reading/Writing”, with the interface shown in the figure below:

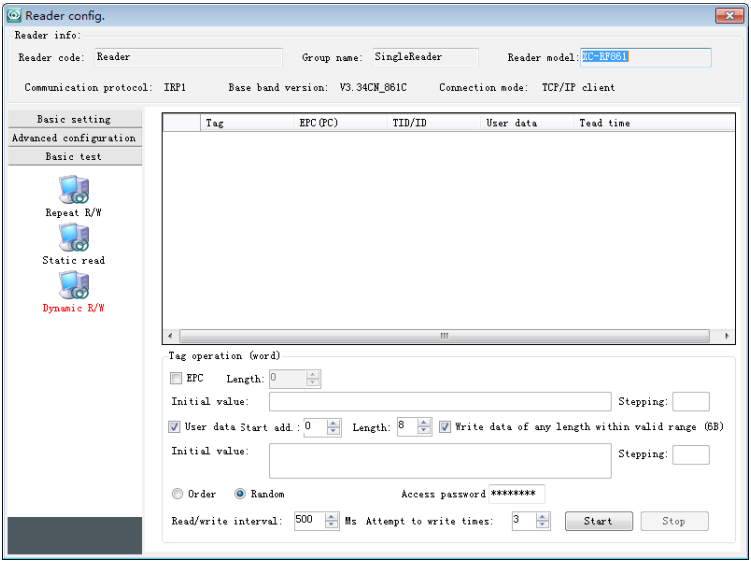


Figure3-82

Long length write: If the 6B tag failed to be written, please check this checkbox.

Reading writing interval: The interval between the two tag functions.

Attempted writing time: Largest number of writing attempt, write all tag until successful or until this number is reached.

Start: Start test.

Stop: Stop test.

Two types of dynamic testing:

1. Select “Random”, the software will scan tag automatically, and enter random data based on the selected and entered condition.

2. Select “Sequential”, then enter the data start value and stepping value. The software will scan automatically, entering the first tag starting with the start value and subsequently add a stepping value to the following tag.

3.7 Other functions

Functions such as language, theme, overall tag parameter settings, help, notification sound and upgrade can be found on the top right corner of the software main interface.

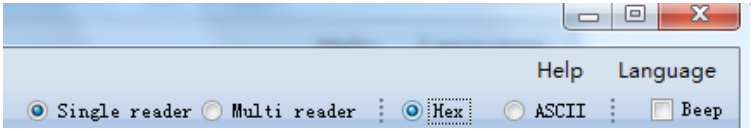


Figure3-83

3.7.1 ASCII

Under default condition, the data is presented in 16 hexadecimal, the software provides functions to demonstrate EPC and UserData in ASCII code, as shown in the figure below:

Figure3-84

Then re-read the tag under demo mode, the EPC data will be displayed in ASCII code format:

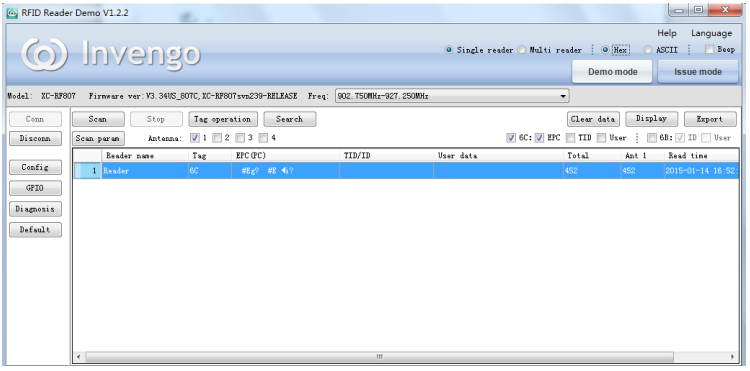


Figure3-85

3.7.2 Language

Configure software language, switch between Mandarin and English, as shown in the figure below:

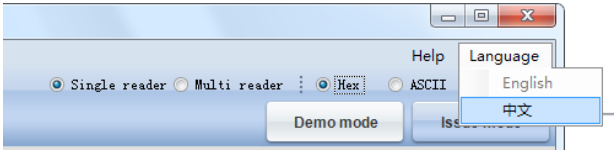


Figure3-86

3.7.3 Help

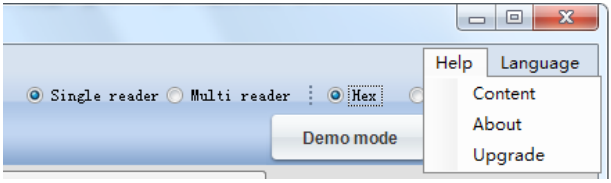


Figure3-87

Content: Open help document.

About: Display software information.

Upgrade: Upgrade software, for details please refer to 3.7.4.

Upgrade software

Upgradability is a key function of software. This software also provides software upgrade service, select “Help” -? “Upgrade”.

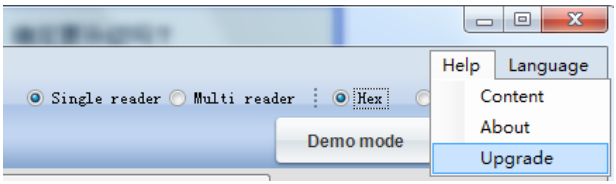


Figure3-88

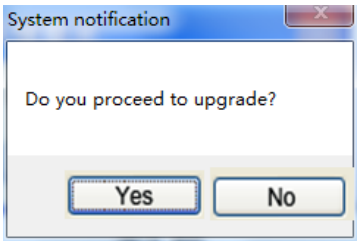


Figure3-89

Select “Yes” and enter the following interface:

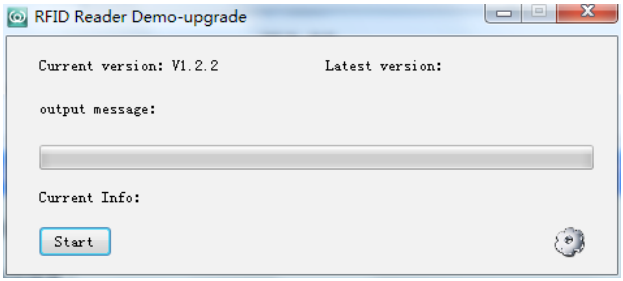


Figure3-90

Click on “Start” to update, the software will first detect if the current version is the latest version, if yes it will prompt:

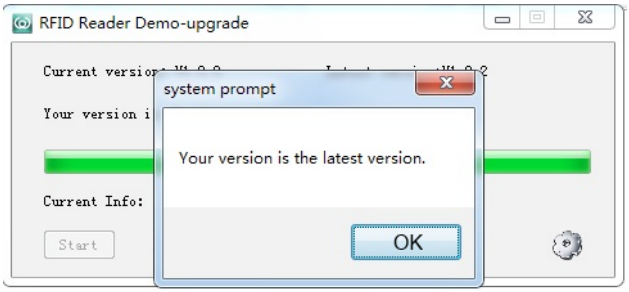


Figure3-91

Otherwise upgrade will start:

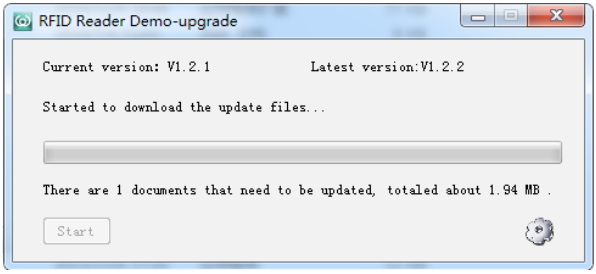


Figure3-92

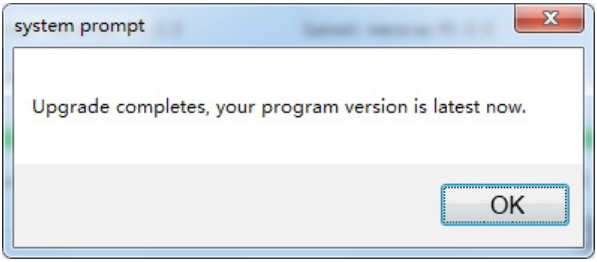


Figure3-93

Click on “OK” to complete upgrade.

Notification sound

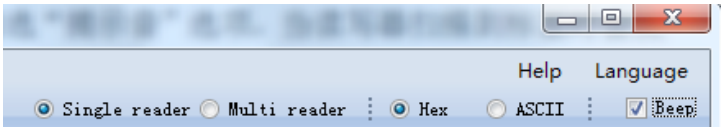


Figure3-94

Under actual application, there are times where the users are unable to look at the screen constantly. Under this circumstance, notification sound option can be selected, and the reader will sound once it scans a tag.

4 FAQs

4.1 Unable to connect Ethernet port

Check if the selected COM port is similar with the connection between reader and PC, check if the baud rate is setup correctly, and check if the port cable has been connected in a right manner. Any disconnection or insecure connection will cause the command from the PC not being transferred to the reader.

4.2 Unable to connect through Ethernet port

The default IP address of the reader under factory setting is: 192.168.0.210. If the host PC's IP address is belonged to the same network segment as the reader, for example "192.168.0.XXX", both devices will connect. If the user forgot about the reader's IP address, please look for a reader that is connected to the host PC through RS-232 serial port (or USB serial port), and reconfigure the IP address of the current reader.

4.3 Unable to read tag

Check if the serial cable or the network cable is properly connected. Any disconnection or insecure connection will cause the command from the PC not being transferred to the reader. Check if the SMA connector of the antenna has been tightened, and if the tag has been damaged. Check if the "Antenna number" selected is correct and compatible with the actual receiving antenna port. Check if the "Estimate read tag number" is entered appropriately (should be close to the number of tag within the coverage of the current antenna)

4.4 No notification sound

First confirm if the notification sound function has been enabled, secondly check if the tag is read, next it could be the issue with operating system (For example Windows 7 needs speakers for sound, so please ensure the equipment has speaker or earphone, finally it could be due to the motherboard that either does not support the program or is damaged.

4.5 Tag matching filter

First look at the introduction in 3.5.2. Tag selection match:

Here is an example on how to use this function. Assume there are a lot of tags and their EPCs are 1111 1111 or 2222 2222, now the user only wants the reading to return those data with 1111, use the following configuration -

Data area: EPC data area

Start value: 0

Match bit number: 16 (similar to the data content length).

Data content: 1111 (16 hexadecimal, every digit equals to four bit).

Click on “Confirm”, then the scan will only return tag data as 1111 1111 in the next scan. This configuration is only valid until the next command. The subsequent scan will return all tag data.

Tag filter:

F means match, 0 means no need to match, similar to the example above, configuration below can be used:

Data:1111

Mask:ffff

Note: The software will automatically fill up the empty space.

Click on “Configure”, this configuration will allow the reader to be constantly under filter mode. To cancel filter, click on “Cancel”.

4.6 Lock tag

- 6C tag: The default tag access password is eight 0s, this means even if the password has been changed, this password can still be used to control. To render the default password invalid, perform lock operation on the tag. Access password medication and lock tag operation are all located on the page of “Tag operation” -> “Tag safety” (refer to the introduction to “Tag safety” in 3.5.1). Modify the password here and use new password to lock the target data area. Now the default password can no longer control the locked data area unless the new password is used to unlock the data area. The unlock function is located at the same location.
- 6B tag: Only user data area can be locked in 6B tag. No password is required to lock any random byte in the data area. Once locked, the corresponding data can no longer be altered or unlocked. Please operate carefully. For the detailed introduction of this function, please refer to the introduction on “Lock tag_6B” in 3.5.2.

4.7 EAS trigger alarm

Under EAS mode, tag is unable to trigger alarm, maybe due to the absence of EAS tag configuration in tag. This function is located in “Tag operation” -> “Tag safety” (refer to the introduction to “Tag safety” in 3.5.1). Before configuration, first obtain a tag that supports EAS tag (such as NXP tag). After successfully configuration of EAS tag on the tag, this tag will trigger alarm under EAS mode. Cancelling of EAS tag function is also at the same location.

4.8 Difference between word and byte

Byte: The basic unit for the computer storage capacity

Word: One word equals to two bytes

6C tag uses word as unit; 6B tag uses byte as a unit.

If the users have any other issues, please refer to technical reference manual. For any unsolvable issues, please seek technical support from Invengo. Please refer to after sale information.

For issues on reader demo software upgrade, please refer to the related information on Invengo website.

5 After sales

5.1 Contact method

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6 Appendices

6.1 Linux software introduction

6.1.1 Supported operating system

SUCE 10 and above

Fedora 12 and above

openSUSE 11.2 and above

Ubuntu 9.10 and above

6.1.2 Installation requirement

Before installation, please confirm that the system has been correctly installed with JDK 1.6 (and) above version and the related environment variables have been configured correctly. Please refer to the guidelines below.

Download JDK6:http://www.oracle.com/technetwork/java/javasebusiness/downloads/java-archive-downloads-javase6-419409.html

Select Linux download zip file and download, for this example download jdk-6u18-linux-i586.bin, the following is the installation steps:

1) Move the installation file to the desired directory:

Use the following /usr/local/ as example:

mv jdk-6u18-linux-i586.bin /usr/local/

(Note: The linux command in this article are all shown in italic)

2) Unzip file

This operation requires administration authority, please switch user from su to root and then start:

./jdk-6u18-linux-i586.bin (Note: the dot in front indicates the current directory)

Wait for unzip to complete and produce the file jdk1.6.0_18.

3) Configuration environment variables:

Open file/etc/profile (Note: Must be a root user)

vi /etc/profile

Add three lines at the bottom of the file:

export JAVA_HOME=/usr/local/jdk1.6.0_18
export JRE_HOME=$JAVA_HOME/jre
export PATH=$JAVA_HOME/bin:$PATH

Exit after save, then enter command:

source /etc/profile

To check if configuration is successful, enter command:

java –version

If information such as java version "1.6.0_18" can be seen, then the configuration is successful, otherwise inspect and fix under the above steps:

6.1.3 Installation step

Linux version is java, compressed by zip as shown in the figure below:

Figure6-1

Unzip it:

unzip RFID_Demo.zip

Figure6-2

Enter into menu RFID_Demo/lib, these three files can be found:

Figure6-3

Start installation, please follow the following steps: Note: Must have root authorization, the italic part is the command to be entered in Linux terminal

1. **First start with simsun.ttf, it is a word file.**

   Open a terminal and enter jre directory:

   cd $JRE_HOME

   Enter fonts directory:

   cd lib/fonts

   Create folder then enter:

   mkdir fallback

   cd fallback

   Copy simsun.ttf to this directory:

   c*p (simsun.ttf's path)/simsun.ttf ./*

   Then enter the following commands line by line:

   mkf*ontscale*

   mkfontdir

   fc-cache –f

   We are done with simsun.ttf.

2. **Next move on to libnativeUtil1.so and librxtxSerial.so.**

   This is relatively easier, just copy them to JRE_HOME/lib/i386:

   cp libnativeUtil1.so librxtxSerial.so $JRE_HOME/lib/i386/

   Installation complete, enter the RFID_Demo menu, enter command:

   cd bin

   ./startup.sh

   The software can now be launched. The main interface is as shown in the figure:

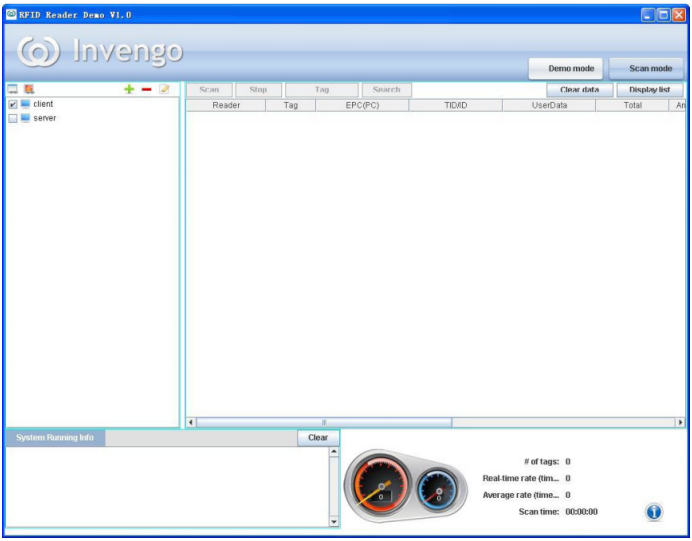

Figure6-4

Its application is exactly same as the Windows version. Please refer to the elaboration in this article.

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