



User's Manual

XC-RF807 Fixed Reader

Thank you for using Invengo's RFID products!

We are glad that you've chosen XC-RF807 UHF RFID reader.

We hope our product will make your daily tasks at work easier!



Foreword

This manual applies to the following models:

XC-RF807 Reader

This manual provides information on product application, maintenance, repair and other features for users and maintenance staff of the products. This manual uses the basic model for introduction purposes. Further illustration shall be provided for any newly additional features of the upgraded model.

Current version of this manual is V1.2, with revision record as follows:

| | |
|--------------------------------------|---------------------------|
| 10th May 2012 | Initial draft V1.0 |
| 22nd November 2012 | V1.1 |
| 9th October 2014 | V1.2 |

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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.

Main content

Product Overview

Reader Installation and Commissioning

DEMO User Guide

Routine maintenance and service

Transportation and storage

Packaging and Inspection

After-sale service

Safety Instructions



Warning sign

Improper handling may cause damage to health.

Improper handling may result in equipment damage.



Notification sign

If ignored, it may result in unsuccessful operation.

If ignored, it may result in undesired effect.

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1 Product Overview

1.1 Product component, functions and properties

XC-RF807 reader is an expandable UHF RFID equipment compatible with the protocol standards of ISO18000-6C (EPC global UHF Class 1 Gen 2) and ISO18000-6B with superior performance and wide frequency band. This equipment has strong multi-tag reading capability, supports Power of Ethernet (POE), demonstrates reliable network adaptability, and is suitable for multi-reader network application. The structural breakdown of XC-RF807 reader is as follows:

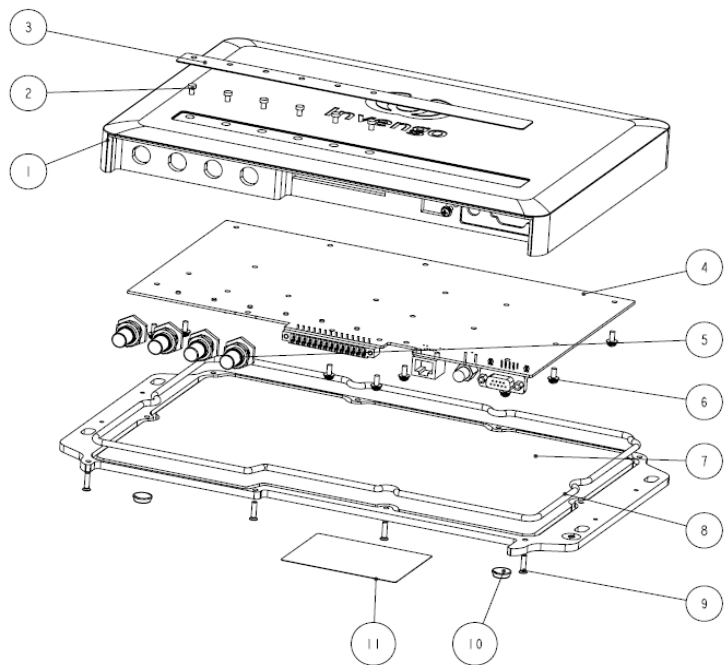


Figure 1-1 XC-RF807 Reader

The components of XC-RF807 reader are as follows:

- 1- Cover
- 2- Guide beam
- 3- Waterproof stickers
- 4- Circuit board
- 5- RF connector
- 6- Pan Head screw
- 7- Base
- 8- Waterproof ring
- 9- Flathead screw
- 10- Non-slip mat
- 11- Nameplate

1.2 Main usage and application range

XC-RF807 reader has high multi-tag reading rate, high single tag identification rate and long distance reading distance. It can be used in multiple fields, such as manufacturing and supply chain management, digitalized warehouse management, retail, access management, asset management and intelligence transportation system. It improves overall efficiency, reduces the error rate, and is compatible with the UHF RFID standard of various countries and regions such as the USA, Europe and China.

2. CE certification

Shenzhen EMTEK CO., LTD.
EMTEK
Address: No. 11-14
Bldg 69, Nianjiang Industry Zone, Nianjiang Street, Shenzhen, Guangdong, China
www.emtek.com.cn Tel: +86-755-26854200 Fax: +86-755-26854282

Certificate of Conformity

NO.: ES120229146E

The following product has been tested by us with the listed standards and found in conformity with the council EMC directive 2004/108/EC. It is possible to use CE marking to demonstrate the conformity with this EMC Directive.

Applicant : INVENGO INFORMATION TECHNOLOGY CO., LTD.

Address : 3/F, No.T2-B, High-Tech Industrial Park South, Shenzhen
518057, China

Manufacturer : INVENGO INFORMATION TECHNOLOGY CO., LTD.

Address : 3/F, No.T2-B, High-Tech Industrial Park South, Shenzhen
518057, China


Trade Mark : Invengo


EUT : Reader

M/N : XC-RF807

Test Standards : EN 55022:2010
EN 61000-3-2:2006+A1:2009+A2:2009
EN 61000-3-3:2008
EN 55024:2010

CE


(Manager)
April 26, 2012



The certificate is based on a single evaluation of one sample of above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab. logo.

1.4 Application areas and frequency

- **China's frequency band(CN/CN2/CN3):**

CN: 920.625MHz ~ 924.375MHz

CN2: 840.625MHz ~ 844.375MHz

CN3: 920.625MHz ~ 924.375MHz and 840.625MHz ~ 844.375MHz

- **North America's frequency band (US):**

902.75MHz ~ 927.25MHz

- **Europe's frequency band (EU):**

865.7MHz ~ 867.5MHz

1.5 Operating conditions

- Operating temperature:-20°C~ +70°C (Operating temperature for power adapter: 0°C~ +40°C)
- Humidity range:5% ~ 95%RH,no condensation
- Power supply:
 - 1) Power adaptor:AC input 100V~240V±10% 1.5A,DC output24V/2.5A,
 - 2) Power of Ethernet (POE):
 - Support POE IEEE 802.3at protocol
 - POE input 48V/0.72A
 - DC output 24V/1.2A

Description:

1. This reader supports power over Ethernet (POE) under IEEE 802.3 at protocol, but users are required to purchase a POE adaptor. The reader also clearly indicates whether the adaptor supports IEEE 802.3 af protocol or IEEE 802.3 at protocol.

2. The reader supports POE, but requires POE from CAT-5 and higher.

3. DC power supply:

DC input voltage range between 20V and 30V. 24V power supply is recommended with DC current not less than 2.5A. Recommended ripple shall not exceed 100mV. However, power range beyond 30V will result in the damage of the reader.



Description: This reader uses the company's 24V/2.5A adaptor with the following specifications:

- A connector with positive terminal inside and negative terminal outside
- Order code: 1080200007
- AC output: 100 V~240V, 50Hz~60Hz
- DC output: 24V/2.5A
- CE, FCC certification

1.6 Safety and protective measures



The input voltage range of the DC power outlet of this product is 20V~30V, **POE power supply design is based on IEEE 802.3at protocol**. Please check your voltage range properly before installation!



When the product is in operation (radiated microwave power), installation and commission personnel should stay 20cm away from the antenna to satisfy the FCC maximum allowable frequency (RF) requirement for human exposure.



Any radio transmitting equipment, including this equipment, may cause interference with medical equipment that is not properly protected. If there is any problem in this regard, please consult with the medical equipment manufacturer. The operation of this equipment may also cause interference with other electronic devices.

1.7 Main functions

1. Reader mode: Supports FHSS (Frequency hopping) and LBT (Listen before speaking), connectable via host PC software.
2. Working frequency: Supports 3 frequency bands in China, North America and Europe.
3. IO control: Possesses I/O port pulse change driven tag reading function (response time: <15ms)
4. Standing wave detection: Possesses standing wave detection
5. Port expansion: 4-channel optocoupler input and 4-channel relay outputs
6. Remote upgrade: Supports remote firmware upgrade, capable to login and update via Ethernet. Repeated upgrade available in case of failed attempt. Note: Limited to administrator.
7. System maintenance: Able to check system running log, record system operating status and fault record. Note: Limited to administrator
8. Tag filter: Supports the EPC code filter of bitwise matching tag and repeated tag time filter
9. Time stamp: Supports the addition of time information onto the tag, connectable via host PC software
10. .NET API: Supports Windows XP(SP2), Windows 2000(SP3), Windows Server 2003, Windows 7, Windows 8.
11. JAVA API: Supports Windows series operating system and Linux series operating system
12. Protection: Supports current overload (3A), overheat protection, with adjustable temperature protective threshold and DC reverse polarity protection
13. Security: Supports tag encryption and hidden function (Requires tags to support encryption and hidden features)
14. Network protocol: TCP/IP, HTTP, SSH
15. Expansion through various ports through XC-AP02000 universal junction box (for example 1-channel RS485 connector, 4-channel relay output, 4-channel I/O input, 2-channel Wiegand input)

1.8 Main functional parameters

1. Tag capacity supports:
 - TID:512bits
 - EPC:496bits
 - User data:64kbits
2. Air interface protocol:
 - Supports EPC global UHF Class 1 Gen 2/ISO18000-6C ,ISO18000-6B
3. RF output power:11dBm~30dBm, stepping 1dB (For the output frequency of actual reader, please refer to state and local regulations)
4. Frequency hopping:
 - China's frequency band:32
 - CN: 920.625MHz ~ 924.375MHz, hopping interval 250kHz
 - CN2:840.625MHz ~ 844.375MHz, hopping interval 250kHz
 - CN3:920.625MHz ~ 924.375MHz, **840.625MHz ~ 844.375MHz, hopping interval 250kHz**
 - North America frequency band: 50
 - 902.75MHz ~ 927.25MHz,hopping interval 500kHz
 - Europe's frequency band: 4
 - 865.7MHz ~ 867.5MHz, hopping interval 600kHz
5. Largest distance for continuous tag reading (read 12 byte of EPC code) not smaller than: 5m (subject to tag, antenna and operating environment)
6. Largest distance for continuous tag writing (write 12 byte of EPC code) not smaller than: 3m (subject to tag, antenna and operating environment)
7. Single tag reading rate: >40 times/second
8. Multi-tag identification rate: Identification rate 100% (400 tags within 5 seconds, subject to tag position, antenna and operating environment)

1.9 External dimension

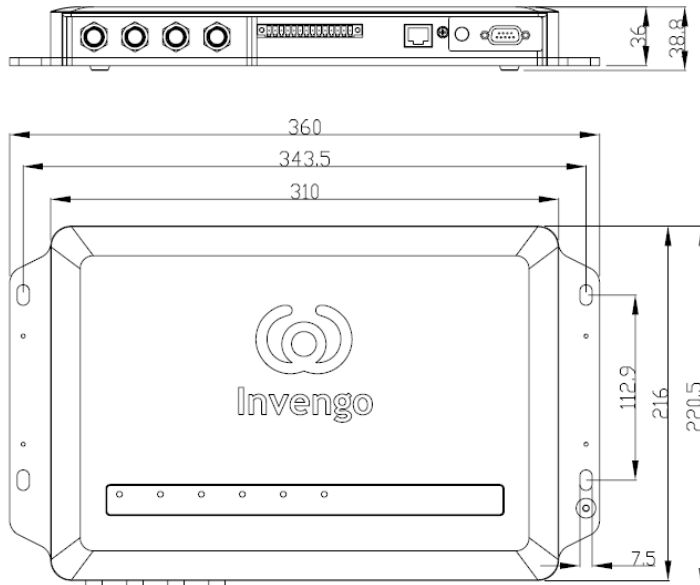


Figure 1-2 XC-RF807 reader

The size of XC-RF807 reader is

- Metric 360 mm x 220.5 mm x 38.8 mm
- Imperial 14.17 in x 8.68 in x 1.53 in

1.10 Weight

The weight of XC-RF807 reader is

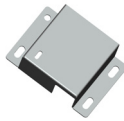
- Metric 2.5 Kg
- Imperial 5.51 lb

2 Reader installation and commissioning

2.1 Unboxing instruction

Aside from XC-RF807 reader, the package also includes the following items:

1. One 1.5m long RS-232 null modem cable
2. One 1.5m long Ethernet crossover cable
3. One 14-pin single roll plug
4. Four M6 Hex Socket Head Cap Screws
5. Four $\Phi 6$ Philip head bolts
6. One power adapter with a three-prong power code
7. Power adapter bracket



8. CD-ROM, product certification and product warranty (One each)

There is also an optional accessory available:

1. 6m RF cable-TNC type-N type (6m long, order code: 2200800009)



Please check thoroughly the items in the package in accordance with the list of items. Should there be any discrepancy or damage, please contact our company immediately.

2.2 Installation requirement

Before the installation of XC-RF807 reader, please check thoroughly the items in the package in accordance with the list of items. Should there be any discrepancy or damage, please contact the local supplier immediately for replacement. At the same time, please check if the following items fulfill the installation requirement:

- Compactible with the operating environment
- Complete list of accessories that sufficient to fulfill the required standard and form a complete tag reading and writing environment.

2.3 Panel description

This section details the functions of various ports and LED indicator of the equipment.

2.3.1 Patch panel description

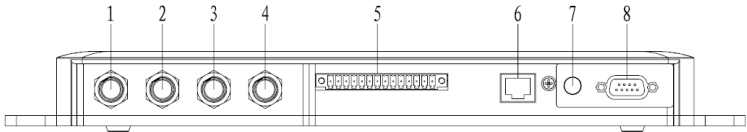


Figure 2-1 XC-RF807 patch panel

The description of each port:

- 1-4 - 4 RP-TNC RF antenna ports (ANT1-ANT4)
- 5 — IO port

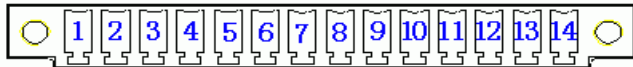


Figure 2-2 IO control panel

Table 2-1 Signal definition for each pin

| Pin | Signal definition | Remark |
|-----|-----------------------------|---|
| 1 | Output +5V voltage | 5V±0.2V 300mA |
| 2 | Ground | GND |
| 3 | Relay output channel 4-2 | Contact voltage / current:30VDC/1000mA 125VAC/500mA |
| 4 | Relay output channel 4-1 | |
| 5 | Relay output channel 3-2 | |
| 6 | Relay output channel 3-1 | |
| 7 | Relay output channel 2-2 | |
| 8 | Relay output channel 2-1 | |
| 9 | Relay output channel 1-2 | |
| 10 | Relay output channel 1-1 | |
| 11 | Optocoupler input channel 4 | DC 5V/20mA |
| 12 | Optocoupler input channel 3 | |
| 13 | Optocoupler input channel 2 | |
| 14 | Optocoupler input channel 1 | |

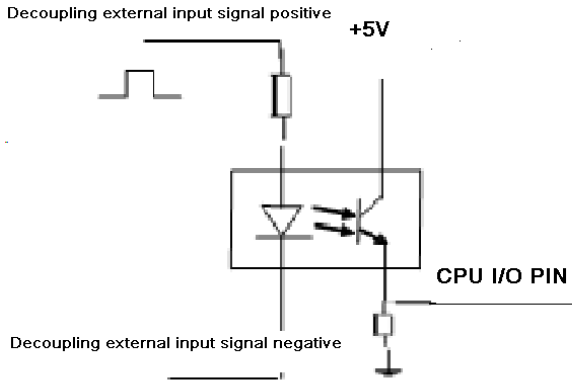


Figure 2-3 1-channel optocoupler input control

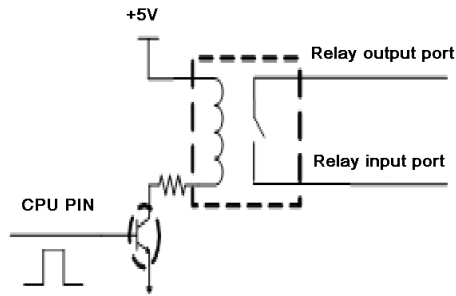


Figure 2-4 1-channel relay output

- 6 — RJ45 network port

For communication with host PC, supports 10M/100Mbps self-adapting, supports POE;

- 7 — DC 24V/2.5A power port

For 24V/2.5A power adapter

- 8 — RS232 serial port

For the data exchange with PC or equipment, the pin number, signal name and signal flow are indicated below, with the pin number is similar with the number indicated on DB9 plug.

Table 2-2 DB9 Pin Signal

| No. | Pin No. | Signal definition |
|-----|---------|----------------------|
| 1 | Pin-1 | NC |
| 2 | Pin-2 | RXD(Reader receives) |
| 3 | Pin-3 | TXD(Reader transmit) |
| 4 | Pin-4 | NC |
| 5 | Pin-5 | GND |
| 6 | Pin-6 | NC |
| 7 | Pin-7 | NC |
| 8 | Pin-8 | NC |
| 9 | Pin-9 | NC |

2.3.2 LED panel description

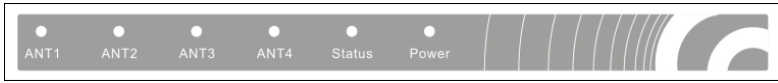


Figure 2-5 XC-RF807 reader LED panel

Table 2-3 Definition of LED panel indicators

| Label | Name | Status description |
|--------|----------------------------|--|
| ANT1 | Antenna 1 indicator | Blue light indicates tag reading |
| ANT2 | Antenna 2 indicator | Blue light indicates tag reading |
| ANT3 | Antenna 3 indicator | Blue light indicates tag reading |
| ANT4 | Antenna 4 indicator | Blue light indicates tag reading |
| Status | Operating status indicator | Blinking blue light indicates normal operation of the reader |
| POWER | Power indicator | Constant blue light indicates power on |

2.4 Commissioning preparation

It is mentioned previously that a complete RFID data collection system is consisted of reader, electronic tag, antenna, PC system and reader interface software. The detailed descriptions of the specific requirements for each component are as follows:

2.4.1 Personal computer

- CPU: Pentium 4, Clock speed: 2.8G and above
- Internal storage: 512M Byte and above
- Harddisk: 500G and above
- Communication port: 9 pins RS-232, RJ-45 network port (10/100M)
- Operating system: Windows 2000 (SP3), Windows Server 2003, Windows XP (SP2), Windows 7, Windows 8

2.4.2 Reader interface software

- RFID reader universal presentation software
- .NET API ,VC and JAVA dynamic link library



For detailed description please refer to *RFID reader universal API technical reference manual* and *RFID reader universal presentation software user manual*

2.4.3 External antenna

This reader can be connected to 4 antennas. Based on different application scenario, we recommend Invengo's XC-AF11-A and XC-AF12-A antenna, in which XC-AF11-A is a linearly polarized antenna and XC-AF12-A is a circularly polarized antenna.

The performance indicators of XC-AF11-A are as follows:

- Frequency range:840MHz~868MHz,902MHz~928MHz
- Voltage Standing Wave Ratio: $\leq 1.4:1$
- Gain: $>7.15\text{dBi}$
- HPBW (H-plane): 60°
- HPBW (E-plane): 70°
- Polarization: Linear polarization
- Relative humidity:5%~95%RH
- Input impedance: 50Ω
- Connector type:N-type RF coaxial connector
- Dimension:291mm \times 291mm \times 52mm
- Weight:0.91kg (Exclusive of bracket)
- Material:Plastic ASA,aluminum
- Color:White
- Protection:IP65
- Operating temperature: $-40^\circ\text{C}\sim +70^\circ\text{C}$

The performance indicators of XC-AF12-A are as follows:

- Frequency range:840MHz~930MHz
- Voltage Standing Wave Ratio:≤1.3:1
- Gain:>7.15dBi
- HPBW (H-plane):60°
- HPBW (E-plane):60°
- Polarization: Circular polarization
- Relative humidity:5%~95%RH
- Input impedance:50Ω
- Connector type:N-type RF coaxial connector
- Dimension:291mm×291mm×52mm
- Weight:0.88kg (Exclusive of bracket)
- Material:Plastic ASA,aluminum
- Color:White
- Protection:IP65
- Operating temperature:-40°C~+ 70°C

Other than these, we also provide more options for you by allowing XC-RF807 reader to work with your existing antenna, as long as the antenna fulfills the following requirements:

- Input impedance: 50Ω
- Gain:7.15dBi
- Voltage Standing Wave Ratio:≤1.4:1
- Frequency range:802MHz~928MHz

2.5 Safety during installation

To ensure your personal safety and the safety of your belongings, please make the following preparations before the installation of XC-RF807 reader.



Check if the ground terminal of the power outlet has been connected to the ground, and check if the local power supply voltage is compatible with the reader's voltage range!



Ensure the grounding of the equipment metal casing



Measure and estimate the distance between the equipment and the system (for example the reader and the antenna, the reader and the PC, the reader and the power outlet);



Check if the location and direction of the reader and the antenna will generate signal interference to the information exchange between the reader and the electronic tag;



Take note of the choice and length limitation of the serial cable;



Install and use the reader only after status testing;



During the installation of multiple readers or a high concentration of readers, take note of the antenna positioning and minimum distance between each antenna to avoid mutual interference.

2.5.1 External RF cable

Below are several options for RF cables and connectors:

1. Thin cable with N-type antenna connector

Cable (2200800009):

RF cable RP TNC-4(male)_KSR240_N-J4Y(male)_6m

2. Thick cable with N-type antenna connector

TNC to N-type RF adapter (1110800016):

RF adapter N/(RP)TNC-KK

RF cable N-J7B_SYWV-50-7_N-J7B_10m (2200400001)

RF cable N-J7B_SYWV-50-7_N-J7B_15m (2200400002)

3. Thick cable with SMA-type antenna connector

RF adapter N/SMA-KJ(1110800098)

RF cable N-J7B_SYWV-50-7_N-J7B_10m (2200400001)

RF cable N-J7B_SYWV-50-7_N-J7B_15m (2200400002)



Extra-long RD cable will lead to attenuation of RF transmitting signal and receiving signal, resulting in deterioration of reading and writing performance.

2.6 Equipment installation

Horizontal placement

This placement only requires reader to be placed on a level surface (please use screws to fix grounding cable at the icon from the installation dimension (order no.: 2200500034) onto the reader and ground the other end)

Wall-mounted

Installation step 1: Select a solid installation surface in accordance with the on-site application. During mounting, please mark out the locations for the four mounting holes of the reader, then use an impact driver to create four 6mm wide, 50mm deep holes on the wall, as shown in the installation dimension below.

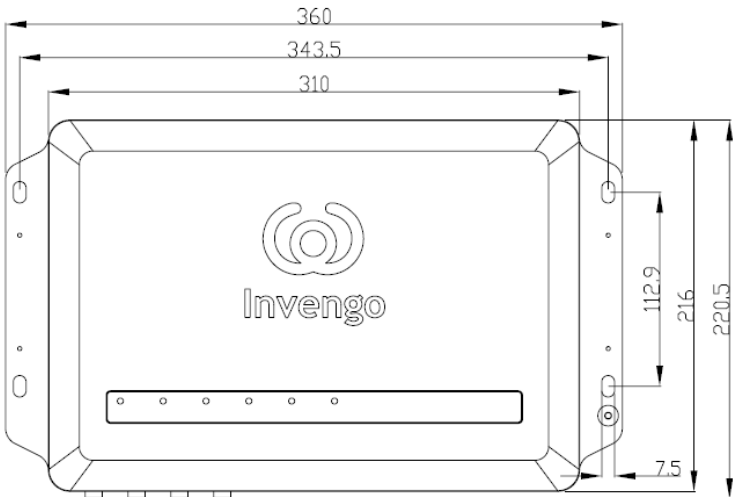


Figure 2-6 Installation dimension

Installation step 2: There are four expansion bolts inside the product package. Please hammer the nut end of the expansion bolts into all the four mounting halls and align the mounting holes of the reader with the four holes on the wall.

Installation step 3: Pass the expansion bolts through the mounting holes of the reader and screw them in for a distance of 4mm. Hammer in the expansion bolt until the distance between the bolt cap and the wall is around 8mm. Then simply use screwdriver to tighten up the bolts. Similarly, when using XC-RF807 reader as a forklift reader, drill four 6mm wide screw holes on the forklift arm before mounting the reader onto the surface using four hex socket head cap screws.

Installation step 4: Connect RF cable. XC-RF807 provides four RF connectors for antenna connection. Try to use low-loss RF cable for the connection. The cable connection at the reader port and the antenna should be tightened.

Installation step 5: Install external antenna. XC-RF807 external antenna is normally installed outdoor. Its beam coverage is essentially the effective range of the tag reading and writing system. In accordance with the on-site specific requirement, the equipment's external antenna can be installed horizontally (at the gantry of vehicle pass way) or vertically (mounted on a pillar). Antenna tilt or swivel can be adjusted to the perfect position through commissioning.

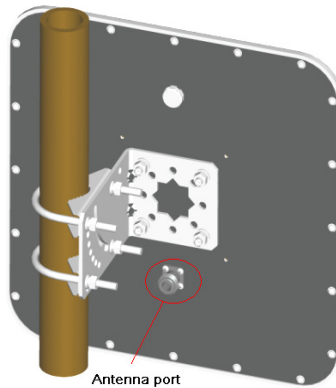


Figure 2-7 External antenna

Installation step 6: Connect to PC or switch. Inside the product package, there are one 1.5m long RS-232 null modem cable and one 1.5m long Ethernet crossover cable. Users can use these cables to connect the reader to PC directly, or to create a local area network in accordance with the figure below.

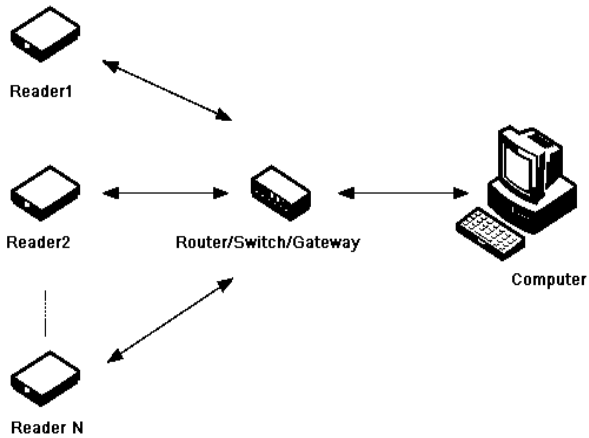


Figure 2-8 XC-RF807 reader networking application

Installation step 7: Connect to the power supply. The reader can be powered by both power adapter and batteries. The power outlet of the reader is an AC adapter with positive terminal inside and negative terminal outside. Please take note of the positive and negative terminal while connecting to a battery or power adapter. Once connected to power supply, the “Power” indicator of the LED panel will light up and the Linux operation system of the reader will initialize. Wait for approximately 15 seconds. Once the reader releases a “di-di” sound, the system has completed its initialization and enters into standby mode. Now, the reader is ready for normal operation.

The reader can also be powered through POE.

Please check if your PSE power supply equipment is compatible with IEEE 802.3at standard protocol. POE application is rare in China, but it requires less complicated power network cabling. Below is the overall layout of POE:

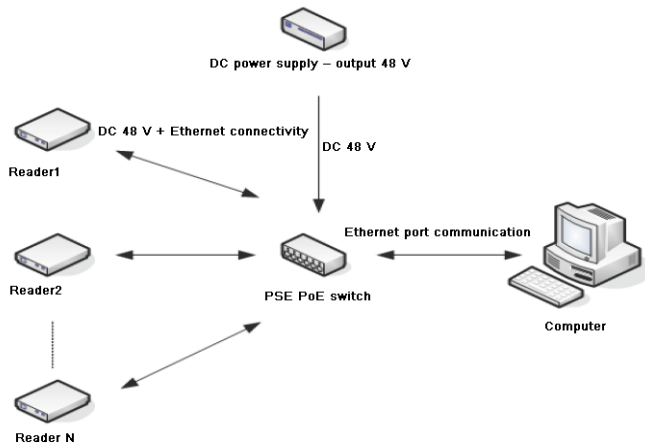


Figure 2-9 POE layout

Notes:



XC-RF807 reader enters standby mode by default after initialization. The reader does not transmit any frequency during initialization and under standby mode (RF amplifier is turned off). RF amplifier only enters into operating condition after being connected to the antenna or current load and received “read or write tag command” or “start amplifier” command from the PC.



The RF cable connectors of the reader must be tightened, otherwise the tag reading distance and tag written success rate will be directly impacted;



This reader is not suitable to be use in unstable environment, such as during the transportation process;



The reader should be install in sheltered and well-ventilated places, protected from the rain, humidity and the sun (not suitable for places with high humidity);



Measure and estimate the distance between the equipment and the system (for example the reader and the antenna, the reader and the PC, the reader and the power outlet);



Check if the location and direction of the reader and the antenna will generate signal interference to the information exchange between the reader and the electronic tag;



Take note of the choice and length limitation of the serial cable (serial cable < 10m, network cable < 70m);



During the installation of multiple readers or a high concentration of readers, take note of the antenna positioning and minimum distance between each antenna to avoid mutual interference;



When connected to DC, avoid reversing the positive and negative terminal as well as open circuit.



Avoid supplying the reader with DC higher than 30V.

2.7 Common scenario during commissioning

The section details the common scenario during commissioning, with special focus on the general issues that appear during incorrect installation, and provides solutions to these scenarios.

Main issues during commissioning:

- Unresponsive reader
 - Power supply indicator status → Check the power cable connection and inspect the corresponding items under the indicator status inspection;
 - Network communication condition → Check if the connection IP is correct, check also if IP address is in conflict;
 - Check serial port → check if the setting for port and the communication rate of the application software correct;
 - Check if the setting for antenna signal is correct
- Tag reading/writing error
 - Check if the reader configuration in the application software is correct;
 - Check if the reader and tag are compatible with one another;
 - Check the tag position whether the tag is located within the effective reading range of the reader;

- Check if there is any electromagnetic interference between the readers or other devices;
- Check if the tag requires access password and if the password is correct;
- Check if the tag is damaged;
- Unsatisfactory reading/writing range:
 - The positioning of antenna installation;
 - Interferences from the surrounding.

2.8 Inspection

Inspection is conducted mainly on two aspects: Structure and performance

1. Structural inspection

Check if the installation fulfills safety standards and if all the equipment can function normally.

- Whether the reader is fixed firmly without loosening.
- Whether all cables are securely connected.
- Whether the bolts are tightened.

Refers to Notes under Installation for other criteria!

2. Performance

Normal performance of the reader is inspected from two aspects:

- Check if the reader is functioning properly;
- Check if the reading/writing range fulfills the requirement.

3 DEMO User Guide

3.1 Preparation and examination

Demo software mainly conducts system control, parameter setting, parameter queries, communication mode selection and RF tag reading, writing and display on the reader. The CD-ROM provided contains .NET version of demo software and .NET version API, JAVA API and C++ API for users to use during secondary development.


3.2 Demo software

- RFID Demo V1.2.2 and above

3.2.1 Demo software installation

Note: This section introduces the installation and application on Windows version software.

STEP 1:

Double click setup document  ,if the system is not preinstalled with .NET Framework 2.0, the system will automatically prompt the user to install, as shown in the figure below:

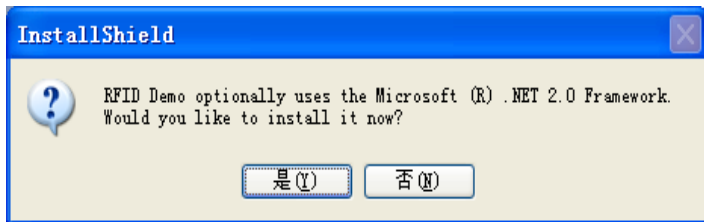


Figure 3-1

Click on “Yes”, install .NET Framework 2.0:

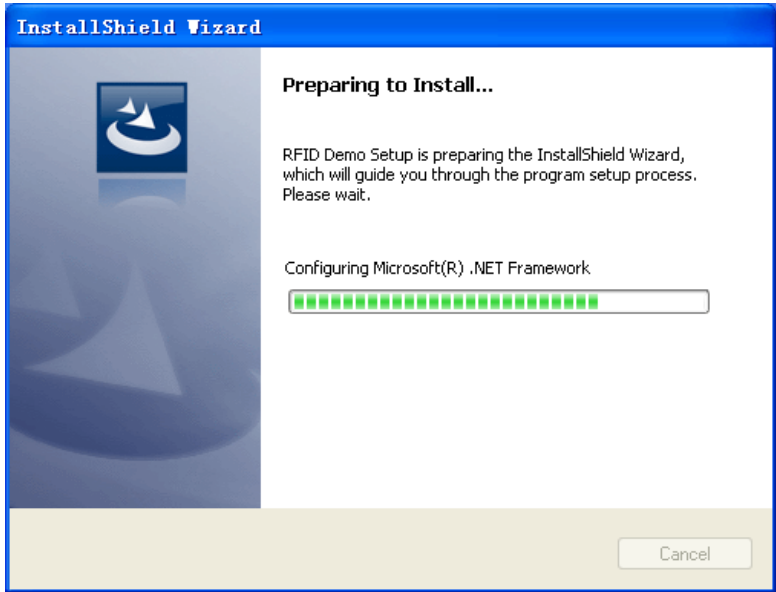


Figure 3-2

STEP 2:

Upon the completion of installation process, the screen will enter into language setup interface as shown in the figure below (if the system has been pre-installed with .NET Framework 2.0, the screen will enter directly to the language setup interface):

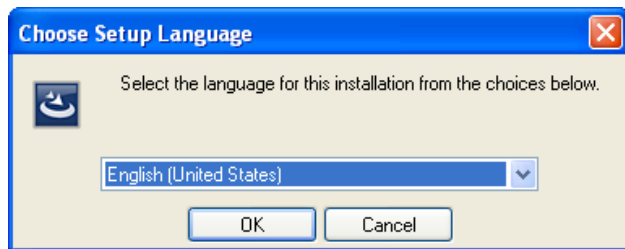


Figure 3-3

Select the setup language, Mandarin and English are both available.

Here, Mandarin is used as an example, click on confirm. The system starts to unzip folders and this process requires several seconds. Upon completion, the screen will enter into the following interface:

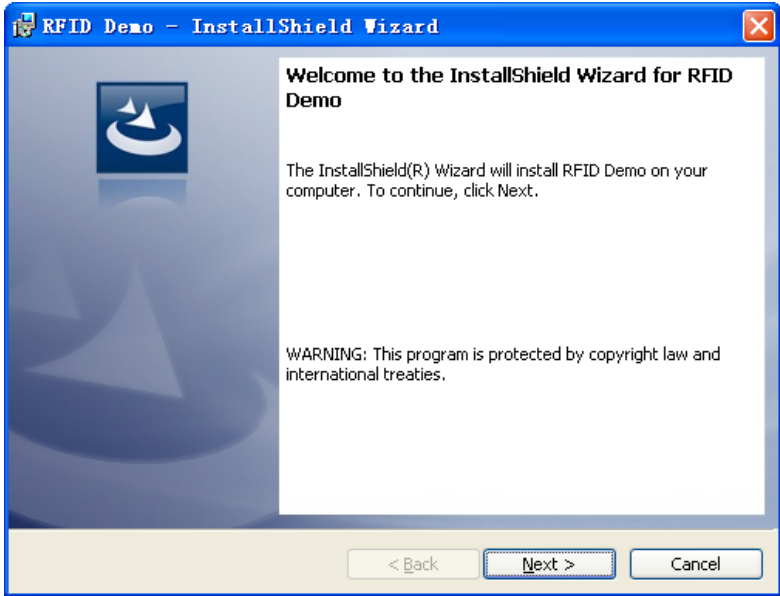


Figure 3-4

STEP 3: Click on “Next”:

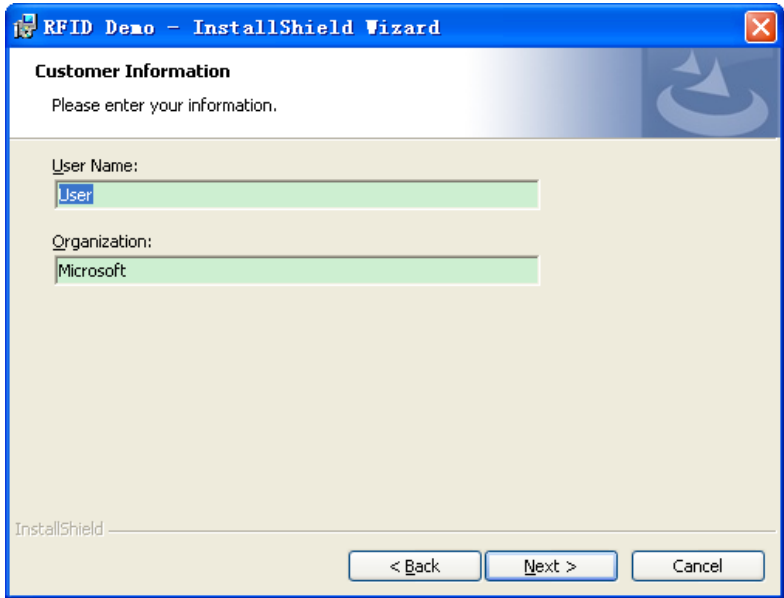


Figure 3-5

Enter user name and organization,

STEP 4: Click on “Next”:

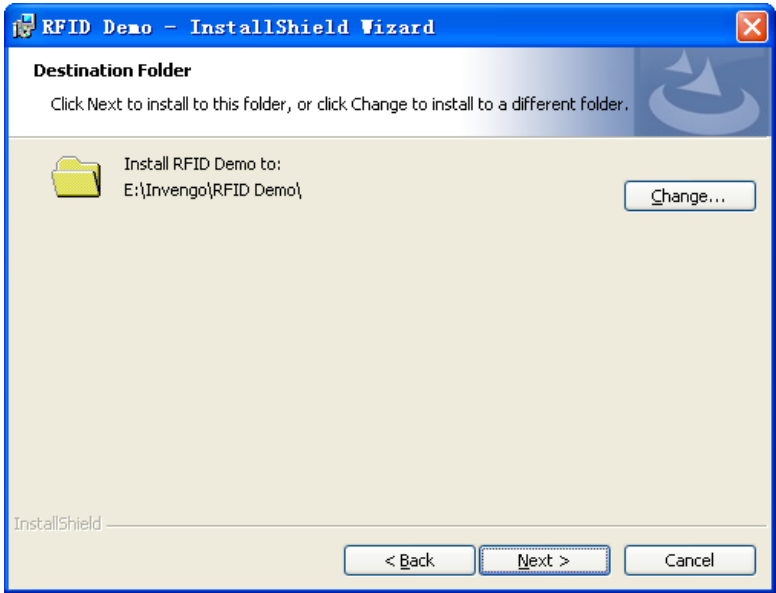


Figure 3-6

Select the destination folder for the program. The default selection is: “E:\Invengo\RFID Demo\”. If there is a need to change, please click on “Change...” to customize and then click on “Next”:

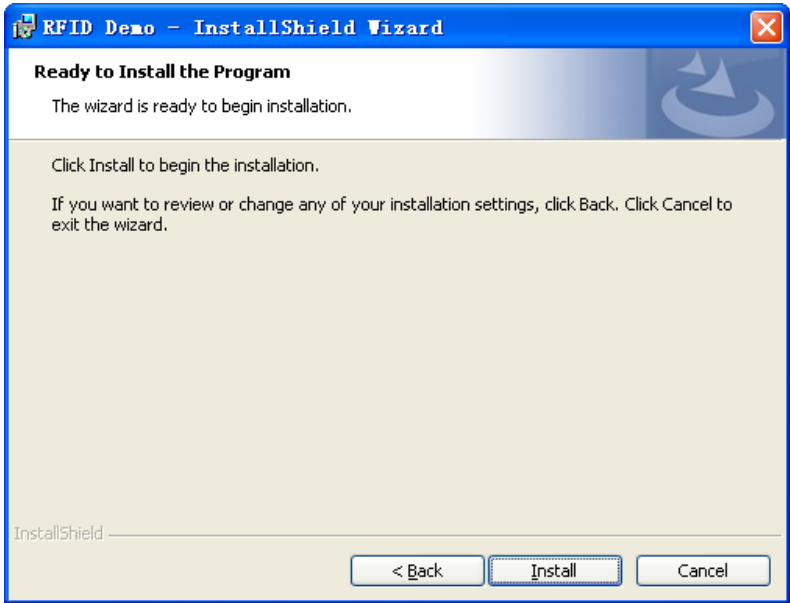


Figure 3-7

STEP 5: Click on “Install”:

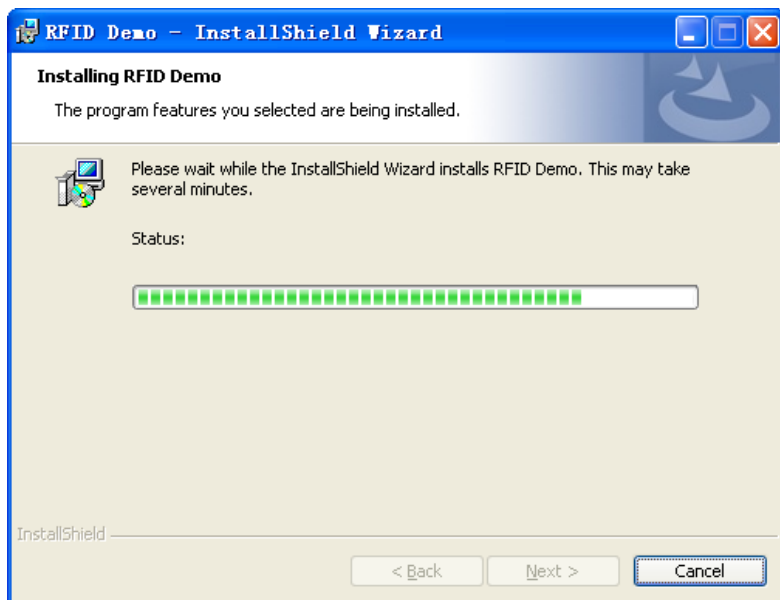


Figure 3-8

Installing...below shows the screen upon completion:

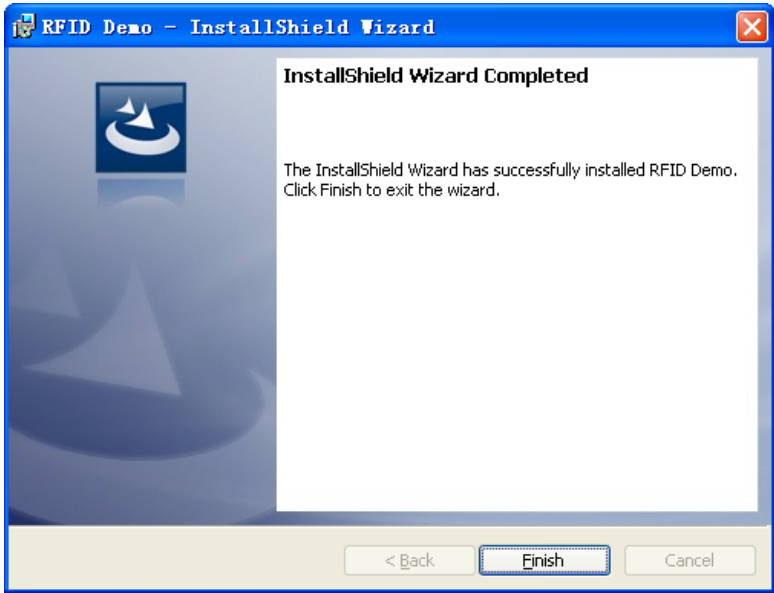


Figure 3-9

STEP 6: Click on “Finish” to complete the software installation. There will be a “RFID Demo” shortcut appeared on the desktop.

3.3 Demo software operation

During initial run, the default mode is single reader mode. The connected device operation is located on the central left of the main interface, as shown in the figure below:

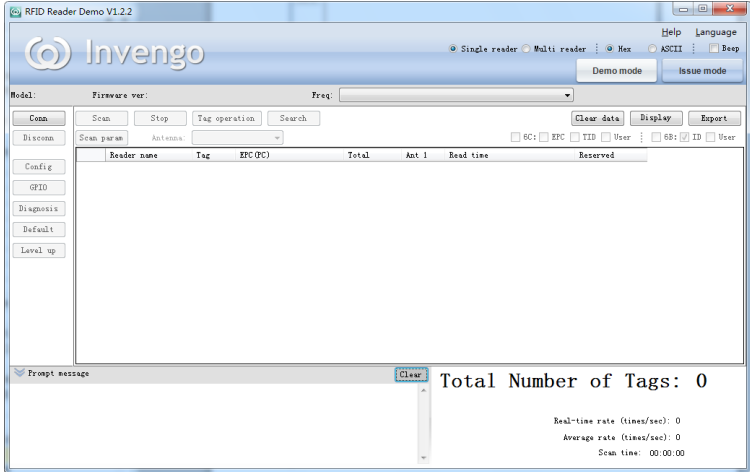


Figure 3-10

3.3.1 Connection

Click on “Conn” button as shown in the figure below:

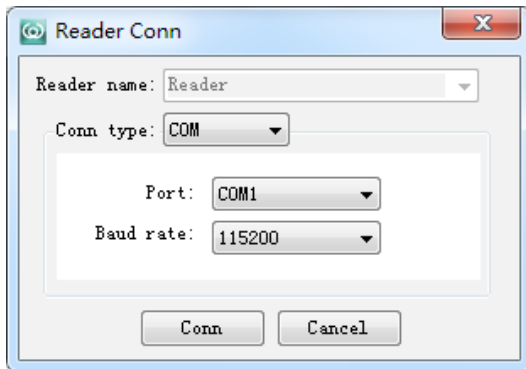


Figure 3-11

Please select connection method based on the actual scenario:

TCP/IP client (Network)

RS-232 (Serial)

Enter the control reader IP and port no. and click on “Conn.” Failed connection will be prompted.

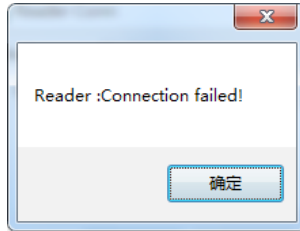


Figure 3-12

If the connection is successful, the interface will disappear and the screen will return to the single reader interface. Successful connection will be indicated on the bottom left corner.

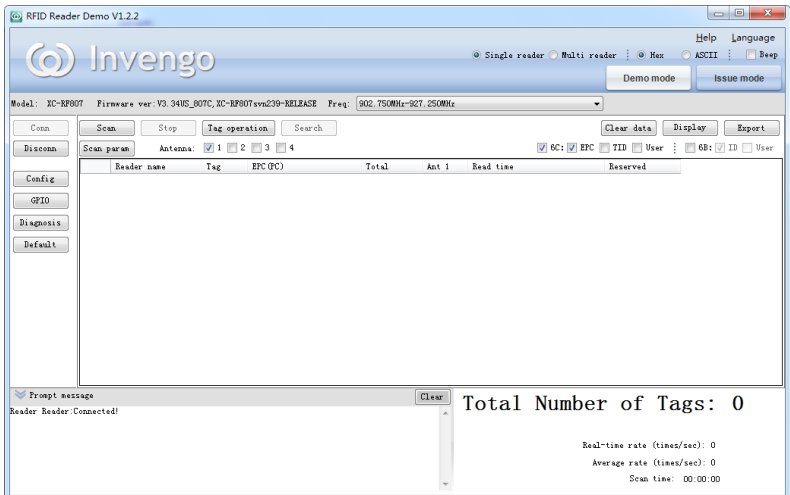


Figure 3-13

After successful connection, if there is a need to disconnect, click on “Disconnect”.

3.3.2 Reader configuration

To configure the reader, click on the reader configuration button, a dialog box will pop up. Set up the reader’s IP address, baud rate and related information configuration of RFID, as shown in the figure below:

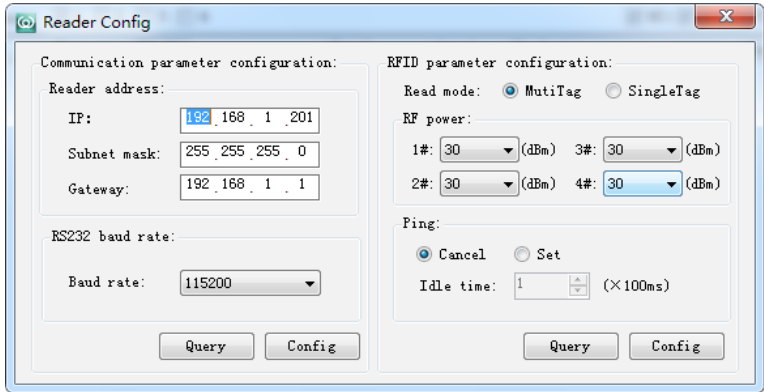


Figure 3-14

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 field of RF antenna field

3.3.3 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:

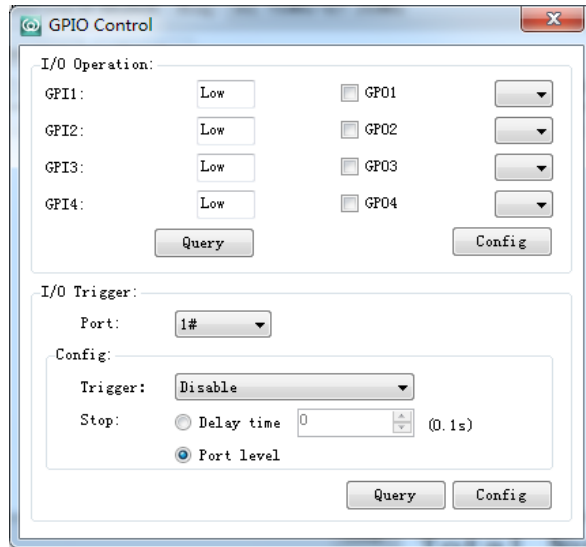


Figure 3-15

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:

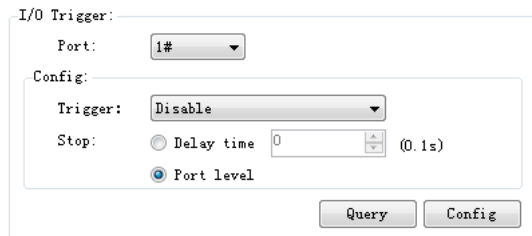


Figure 3-16

Tag reading I/O trigger configuration:

Trigger port: Select the trigger port. There are four options available:

- 1#
- 2#
- 3#
- 4#

Query: Inquire on the configuration of selected input port.

Config: Configure the trigger configuration of the selected input port.

Trigger condition: Available options shown below:

- Close (turn off trigger condition)
- Falling edge (level changes from high to low)
- Rising edge trigger (level changes from low to high)
- High level trigger (high steady state)
- Low level trigger (low steady state)

Termination condition: Available in delay timing and port level.

Delay timing: Configure the continuous operating duration and cause the reader to stop automatically once time runs up. Unit: 0.1 second.

Port level: Automatically select condition that contradicts the trigger condition.

Detailed description: I/O trigger is an automated tag reading function that is based on I/O trigger condition and transfers the tag data to the host PC. There are four trigger ports that can be configured independently. The tag reading configuration is similar to the current reader scanning configuration.

Note: During the configuration of tag reading trigger, first configure the scanning configuration. Click on the scanning configuration, like the setting in 3.3.4, then configure the trigger port, trigger condition and termination condition.

3.3.4 Scanning configuration

Scanning parameter setting as shown in the figure below:

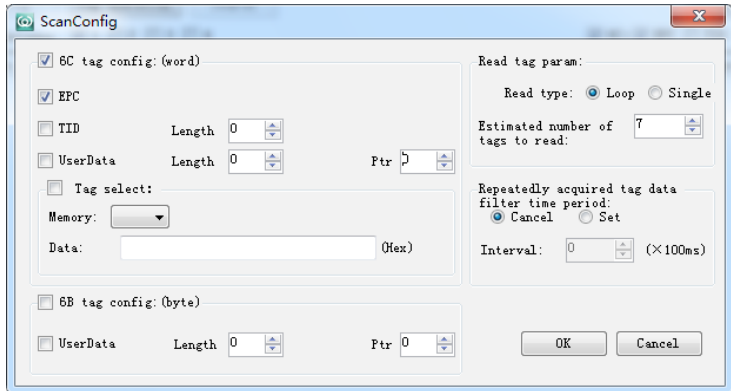


Figure 3-17

6C tag reading configuration: Select the required 6C tag domain, including EPC, TID, UserData

6B tag reading configuration: Select the required 6B tag ID domain, for example tick on UserData and user data will be read. Both length and start address can be configured.

Tag selection matches: Select specific tag to match with EPC or user data area

Tag reading parameter: Select reading method, available in loop reading and single reading

Repeatedly acquired tag data filter time period: Similar tag upload time, configuration and query

3.3.5 Antenna choice

This reader has 4-channel antenna and this antenna can be formed random combinations as shown in the figure below:

Antenna: 1 2 3 4

Figure 3-18

3.3.6 Tag operation

To perform EPC or user data area reading and writing operation on specific tag, enter tag reading and writing interface (click on “Scan” → select scanned tag → click on “Tag operation”). Main operations includes write EPC_6C, read user data_area_6C, write user data_6C, block operation_6C, as shown in the figure below:

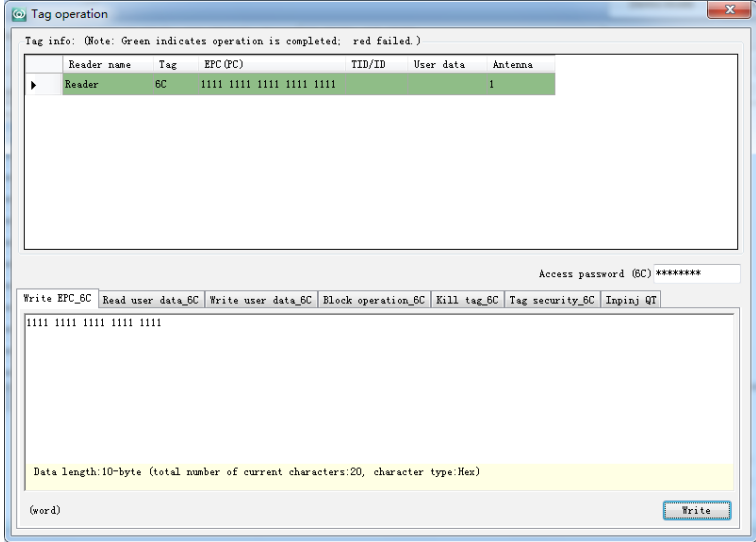


Figure 3-19

3.3.7 Diagnosis function

Diagnosis function inquires on some of the basis electrical characteristics data of the equipment and set alarm threshold to the parameters. Its main diagnostic functions includes the reader power voltage, baud rate and temperature detection, as shown in the figure below:

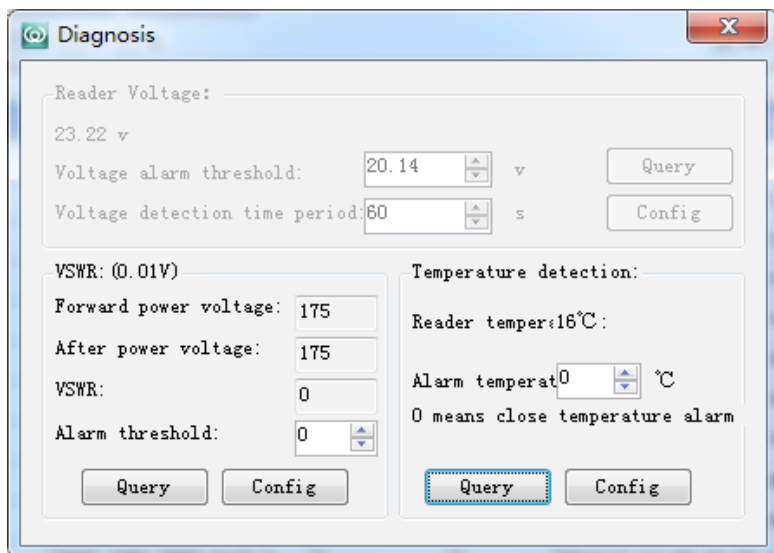


Figure 3-20

3.3.8 Factory setting

Factory setting provides some default factory parameter settings. Click on “OK” to confirm the restoration to factory setting. Otherwise, click on “Cancel”.

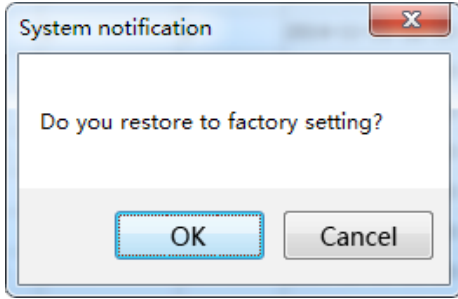


Figure 3-21

3.3.9 Version Enquiry

Inquire the reader model and firmware version through RFID DEMO software, as shown in the figure below:



Figure 3-22

Explanation:

- For detailed introduction on the DEMO software operation, please refer to “RFID Universal Demonstration Software User Manual”.

4 Routine maintenance and service

4.1 Routine maintenance

The routine maintenance of the reader involves the followings:

- Check if the RF connector loosened. This is crucial.
- Check if the bolts that the reader and antenna hinged on has loosened
- Check if the cover at the RF cable connection has torn apart and the inner layer exposed
- Check if the power supply connection to the reader is solid
- When the reader is powered by battery, check if there is any abnormality in both terminals of the battery

4.2 Troubleshooting and solution

During the application of XC-RF807 reader, a user may encounter various issues. This section consolidates all common issues during application and their solutions.

1. "Power" indicator does not light up after the power supply has been switched on for 15 seconds

- Check if the power supply from the power adapter is working normally, check also if the AC power voltage falls between 100V and 240V
- Check if the power cord connection is poor or not properly connected
- Check if the positive and negative terminal has been reversed

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.

3. Unable to connect through serial port

- The baud rate of the reader is 115200bps. Once connected through serial port, the baud rate should be 115200bps.
- Check if the COM port selected in DEMO software DEMO is the COM port of the host PC that is connected to the reader.
- Check if the serial cable connection is proper. Any disconnection or insecure connection will cause the command from the PC not being transferred to the reader.

4. 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.
- Please check if both ends of the RF connector has been tightened. Check also if the tag is damaged.

5. Tag reading and writing error

- Check if the reader configuration in the application software is correct;
- Check if the reader and the tag are compatible;
- Check the tag position whether the tag is located within the effective reading range of the reader;
- Check if there is any electromagnetic interference between the readers and other equipment;
- Check if the tag is damaged.

6. Unsatisfactory reading/writing range

- The positioning of antenna installation;
- Interferences from the surrounding.

7. The reader fails to detect the tag

- Check if the configuration of the antenna is correct. If the antenna is connected to 1# RF port, 1# antenna must be chosen in the DEMO software.
- Check if the tag is compatible with ISO18000-6C protocol. Any tag that is not compatible with ISO18000-6C will not be detected.
- Check if the tag is damaged. If the ID is undetected, please try with a different reader and check if the tag has been damaged. If the data area remains undetected, check if the tag data area has been locked. Locked tag needs to be

unlocked.

- Check if the tag is located in the effective reading range of the reader.
- Check if there is any electromagnetic interference between the readers or other equipment.

8. Short tag reading distance

- Check if the reader frequency setting is correct. If the antenna operating frequency range is 902.75MHz - 927.25MHz, the hopping point selected for the reader should not exceed the antenna's operating frequency range (902.75MHz - 927.25MHz). Otherwise it will affect the performance of the reader.
- Check if the RF output power is low. The RF output power is adjustable.
- Check if the polarization direction of the tag and the antenna is compatible. If the antenna is vertically polarized, the tag must be placed vertically.
- Check if the tag surface is covered with any other materials. If the tag surface is covered with other material, the material may cause deviation in the antenna's frequency and affect the reading effect of the reader. If the material is metallic, the reader will be unable to detect the tag, as RF signal is unable to penetrate metal.
- Check the RF cable connecting the reader and the antenna. If the connector of the RF cable is loosened or broken, RF signal will become very weak and the reading distance will be affected.
- Check the properties of the tag. Metallic tag should be installed at metal surface for the tag to function at full capacity. For other types of tag, please avoid installation near metallic surface.
- Normal aging of tag performance. Due to long term use, the tag performance will decline and result in the shortening of the tag reading distance. However, this will not affect normal usage. Only in the extreme case of aging where the reading distance becomes extremely close and a replacement should be considered.

9. Slow tag reading speed under single tag reading environment

- If "MultiTag" mode is selected under the reading mode of the "RFID parameter configuration" on the reader configuration (3.3.2) interface, please change to "SingleTag".
- If the output power under "RF output power configuration" on the reader configuration (3.3.2) interface is low, this will affect the success rate of the tag reading and results in the decline in reading speed. Please increase the RF output power.
- If the "Config" option has been selected under the "Smart hibernation mode"

on the reader configuration (3.3.2) interface, please change to “Cancel”.

- Transmission through RS-232 is slower as compared to Ethernet, please change to Ethernet transmission.
- The tag reading speed in EPC area is faster than tag reading speed in TID area, while tag reading speed in TID area is faster than USERDATA area.
- For the configuration of “Repeatedly acquired tag data filter time period” on the “Scanning configuration” interface, if repeated acquired tag data filtering function is not necessary, please select “Cancel”.

10. Incomplete tag reading under multiple tag reading environment

- If “SingleTag” mode is selected under the reading mode of the “RFID parameter configuration” on the reader configuration (3.3.2) interface, please change to “MultiTag”.
- If the “Config” option has been selected under the “Smart hibernation mode” on the reader configuration (3.3.2) interface, please change to “Cancel”.
- Check if there is any underperforming tag and please remove them.

For any unsolvable issues, please get in touch with the customer service center or technical support department of Invengo.

5 Transportation and storage

5.1 Transportation requirement

XC-RF807 reader meets all the requirements of relevant standard under road, rail, air, and water transportation.

Items to take note during transportation: Avoid heavy impact, rain, corrosive chemicals and harmful gas.

5.2 Storage requirement

The long term warehouse for XC-RF807 reader must fulfill the following conditions:

- Ambient temperature:-30°C~+75°C
- Relative humidity:5%RH~90%RH
- No drastic temperature change, no acidic or harmful gas in the surrounding air

6 Packaging and Inspection

6.1 Packaging

XC-RF807 reader is packaged using cassette packaging and can be transported through large transport container.

Package size:415mm×305mm×140mm

6.2 Inspection

In order to facilitate future storage and transport, keep the box and packaging materials during inspection.

Apart from XC-RF807 reader, the package also contains the following accessories, as shown in the table below:

Table 6-1 Accessories checklist

| No. | Item | Amount | Purchase order | Remark |
|-----|---|--------|----------------|----------|
| 1 | RS232 null modem cable -1.5m | 1 | 2200300008 | Standard |
| 2 | Power adapter with output of 24V/2.5A | 1 | 1080200007 | Standard |
| 3 | US Standard power cord_1.8m | 1 | 2200500027 | Standard |
| 4 | RJ45 crossover cable-1.5m | 1 | 2200300003 | Standard |
| 5 | Product warranty card | 1 | | Standard |
| 6 | Product certification | 1 | | Standard |
| 7 | RF cable RP TNC-4(male)_KSR240_ N-J4Y(male)_6m | 1 | 2200800009 | Optional |
| 8 | XC-AF12-A antenna | 1 | 4060000023 | Optional |



Please check the product and its accessories carefully based on the packing list. Please contact us immediately if there is any discrepancy or damage.

7 After-sale service

When a user encounters unsolvable problems during the device usage, please contact our customer service center.

1 Other matters

If our customer service staff has confirmed with the user to return his/her portable reader for maintenance, our representative will present the user with a return merchandise authorization (RMA). Please indicate the RMA no. on the exterior of the return product packaging and provide the same no. on a piece of paper and place it inside the packaging. This will ensure the quick processing of the return product.

Please follow these steps when returning the portable reader for maintenance:

- Carefully pack the portable reader and its accessories into the original antistatic foam box. If the box no longer exists, please use a box with protective effect;
- Use filler to cover up the products in the box;
- Place a note written with RMA no. into the box;
- Indicate RMA no. and the word “fragile” on the exterior of the box.



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