Invengo

# User's Manual

## XC-RF861 Reader

Invengo Information Technology Co., Ltd.

## Thank you for using Invengo's RFID products!

**We are glad that you've chosen XC-RF861 UHF RFID reader.**

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

# Foreword

This manual provides information on product application, maintenance, repair and other features for users and maintenance staff of the products.

Current version of this manual is V1.0, with revision record as follows:

| | |
|---|---|
| **19th January 2015** | **Initial draft V1.0** |
| | |

# Main content

# 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.

# Content

# 1 Product Overview

## 1.1 Brief introduction

XC-RF861 is a high performance UHF RFID reader. It is compatible with ISO18000-6C/6B protocol, has operating frequency between 902.75MHz - 927.25MHz, excellent security and performance. The reader also has a sleek design and is very easy to install.


**Figure 1-1 XC-RF861 reader**

XC-RF861 reader is compatible with the tag under ISO18000-6C/6B protocol standards, capable of conducting wireless communication with the tag through antenna, and perform reading and writing operation on tag ID code and memory data.

## 1.2 Main usage and application range

XC-RF861 has high accuracy, quick scanning speed, as well as long reading distance. It can be used in multiple sectors, such as library management, manufacturing and supply chain, digitalized warehouse management, retail and asset management. It will increase the efficiency of the supply chain significantly and lower the operating cost. This product meets FCC standards.

## 1.3 Product certification

### FCC certification

TCB

GRANT OF EQUIPMENT AUTHORIZATION

Certification

Issued Under the Authority of the

Federal Communications Commission

By:

TCB

Siemic Inc.
775 Montague Expressway
Milpitas, CA 95035

Date of Grant: 05/23/2014

Application Dated: 05/23/2014

**Invengo Information Technology Co., Ltd.**
**3/F, NO. T2-B, High-Tech Industrial Park South,**
**Shenzhen,**
**China**

**Attention: Shuangliang Yi , Quality manager**

**NOT TRANSFERABLE**

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is VALID ONLY for the equipment identified hereon for use under the Commission's Rules and Regulations listed below.

| | |
|---|---|
| FCC IDENTIFIER: | TQ4XC-RF861 |
| **Name of Grantee:** | Invengo Information Technology Co., Ltd. |
| **Equipment Class:** | **Part 15 Spread Spectrum Transmitter** |
| **Notes:** | **Reader** |

| Grant Notes | FCC Rule Parts | Frequency Range (MHZ) | Output Watts | Frequency Tolerance | Emission Designator |
|---|---|---|---|---|---|
| | **15C** | **902.75 - 927.25** | **0.542** | | |

Power listed is the maximum conducted output power.

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

## 1.4 Application areas and frequency

North America's frequency band (US)

902.75MHz ~ 927.25MHz

## 1.5 Operating condition

- Operating temperature:-20°C ~ +70°C (Operating temperature for power adapter: 0°C ~ +40°C )
- Humidity range:5% ~ 95%RH,no condensation
- Power supply:Power adapter (Standard)

  The technical standard of power adapter is as follows:

  - Product code:1080200007
  - AC input:100V ~ 240V,50Hz ~ 60Hz;
  - DC output:24V/2.5A
  - Operating temperature:0°C ~ +40°C
  - Storage temperature: -20°C ~ +65°C

## 1.6 Safety and protective measures

When the product is in operation (radiated microwave power), installation and commission personnel should stay 20cm away from the antenna so as to meet 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

- EPC protocol:Supports EPC global UHF Class 1 Gen 2 protocol
- Supports external 4-channel antenna
- Support tag data filter
- GPIO: 2-channel optocoupler input, 2-channel optocoupler output, 2-channel relay output
- Maintenance: Supports remote maintenance and upgrade Protection: Supports overload protection (automatic power supply cutoff once current larger than 3A)
- Operating mode: Available in fixed frequency and hopping frequency
- Network protocol: Supports SSH,TCP/IP

## 1.8 Technical parameters

- Air interface protocol:EPC global UHF Class 1 Gen 2 / ISO 18000-6C/6B
- Operating frequency (North America frequency band): 902.75MHz ~ 927.25MHz,frequency interval: 500KHz
- Largest RF output power:30dBm
- Reading distance 0 – 6m (subject to tag, antenna and operating environment)
- Power supply (Power adapter): DC 24±1.5V 2.5A
- Network connection communication rate: 10M/100M self-adapting
- RS232 serial port communication rate:115200bps

## 1.9 External dimension

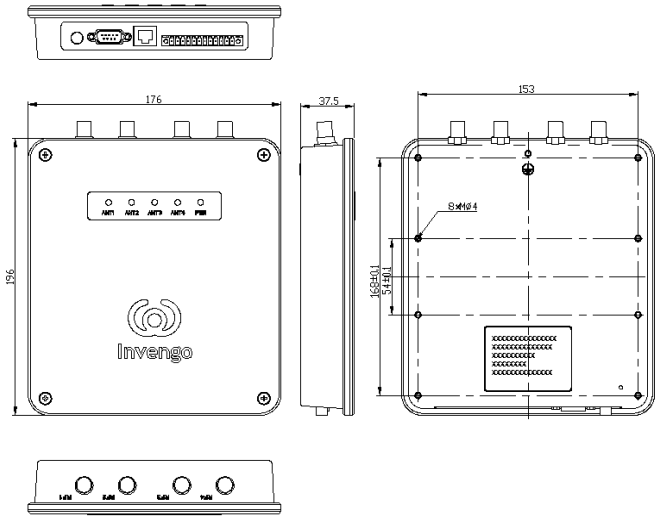


**Figure 1-2 XC-RF861 reader**

The size of XC-RF861 reader is:

- Metric 196mm x176mm x 38mm(Not inclusive of accessories)
- Imperial 7.71 in x 6.92 in x 1.50 in

## 1.10 Weight

The weight of XC-RF861 reader:

- Metric Approximately 1.0kg (Not inclusive of accessories)
- Imperial Approximately 2.20 lb

# 2 Reader installation and commissioning

## 2.1 Unboxing instruction

Aside from XC-RF861 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 12-pin single roll plug
4. Cross recessed countersunk head screws M4×8_nickel-plated_GB819
5. Mounting bracket_XC-RF861-FRS
6. One power adapter with a three-prong power code
7. CD-ROM, product certification and product warranty (One each)

## 2.2 Installation requirement

Before the installation of XC-RF861 reader, please check thoroughly the items in the package according to 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:

- Compatible 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 I/O and communication patch panel

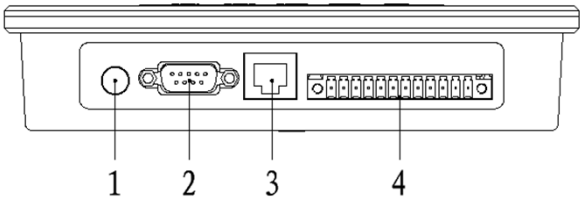


**Figure 2-1 XC-RF861 reader's I/O and communication patch panel**

The description of each port:

- 1 —DC 24V/2.5A power outlet

  For 24V/2.5A power adapter

- 2 —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 2-1 Definition of DB9 Pin Signal**

| No. | pin | 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 | RS485_B |
| 7 | Pin-7 | GND |
| 8 | Pin-8 | RS485_A |
| 9 | Pin-9 | NC |

- 3 —RJ45 network port

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

- 4-IO control panel

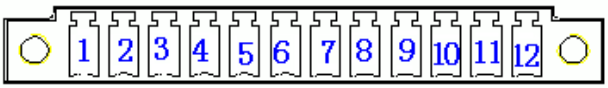


**Figure2-2 IO control panel**

**Table 2-2 Signal definition for each pin**

| Pin | Signal definition | Remark |
|---|---|---|
| 1 | Optocoupler input channel 2 | Driving voltage: DC 5V ~ 12V<br>Driving current: 20mA |
| 2 | Negative terminal or ground | |
| 3 | Optocoupler input channel 1 | |
| 4 | Optocoupler input channel 4 | High level: 5V; Low level: 0V |
| 5 | Negative terminal or ground | |
| 6 | Optocoupler output channel 3 | |
| 7 | Relay output channel 2-2 | Contact voltage/current:30VDC/1000mA<br>125VAC/500mA |
| 8 | Relay output channel 2-1 | |
| 9 | Relay output channel 1-2 | |
| 10 | Relay output channel 1-1 | |
| 11 | Ground | GND |
| 12 | Output +5V voltage | 5V±0.2V 300mA |

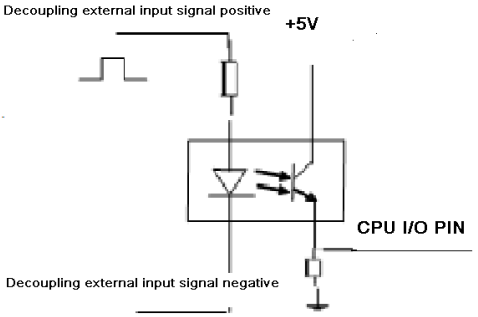


**Figure 2-3 1-channel optocoupler input control**

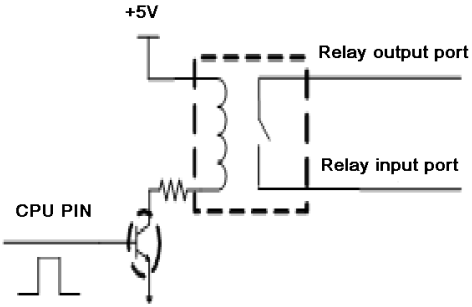


**Figure 2-4 1-channel relay output**

(1)Connect DB9 RS232 serial port with PC serial port through RS232. The connection to PC can also be extended with a maximum of 10m.

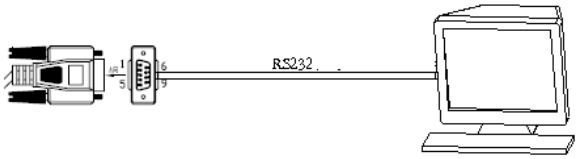


**Figure 2-5 RS232 serial port connection**

(2)Connect the attached power adapter (DC24V/2.5A output) to the power outlet and tighten the screw.

(3)Network port is for long distance high speed connection (maximum 70m). Network port can be connected via network cable to a switch or router, or directly to the PC network port, as shown in the figure below:

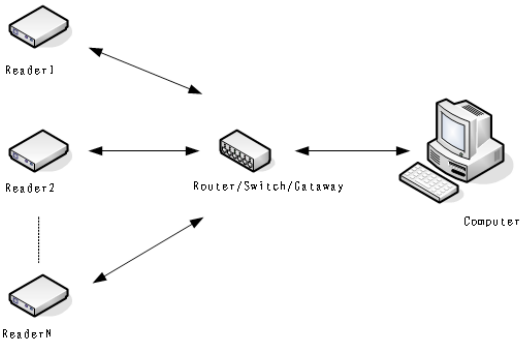


**Figure 2-6 Network connection**

RF connector panel

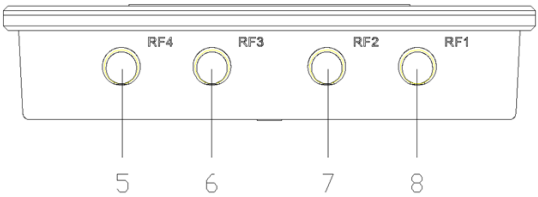


**Figure 2-7 XC-RF861 reader RF connector panel**

The description for each port is as follows:

5-RF4 RF output port

6-RF3 RF output port

7-RF2 RF output port

8-RF1 RF output port

If the reader is not connected to an external antenna, it must be connected to a 50 ohm load terminal. Purchase code: 1001300004

## 2.3.3 LED display panel


**Figure 2-8 XC-RF861 reader display panel**

The definition for each LED indicator is shown in figure 2-3:

**Table 2-3 Definition of LED panel indicators**

| Label | Name | Status description |
|---|---|---|
| ANT1 | Antenna 1 indicator | Green light indicates the selected internal antenna port is working, red light indicates the antenna port has received tag data |
| ANT2 | Antenna 2 indicator | Green light indicates the selected internal antenna port is working, red light indicates the antenna port has received tag data |
| ANT3 | Antenna 3 indicator | Green light indicates the selected internal antenna port is working, red light indicates the antenna port has received tag data |
| ANT4 | Antenna 4 indicator | Green light indicates the selected internal antenna port is working, red light indicates the antenna port has received tag data |
| PWR | Power/Operating status indicator | During power on, green light indicates the reader has power supply, blinking red light indicates the system has completed initialization and enters into normal operating condition |

## 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
- Hard disk: 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

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:≤1.4:1
- Gain:>7.15dBi
- 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×291mm×52mm
- Weight:0.91kg (Exclusive of bracket)
- Material:Plastic ASA, aluminum
- Color:White
- Protection:IP65
- Operating temperature:-40°C ~ + 70°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-RF861 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

In order 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 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 reader and antenna, reader and PC, reader and power outlet);

Check if the location and direction of reader and 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 after only 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

RF cable requirement:

RP-TNC (male) connects to the connection port in the reader, while the N-JAY (male) connects to the connection port in the antenna. Therefore the recommended RF cable is RF cable RP

TNC-4(male)_KSR240_N-J4Y(male)_6m, input impedance 50Ω and line losses of less than 2dB.

The internal order no. for the RF cable is 2200800009

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

Directly placed on a level surface

- Wall-mounted

Installation step 1: On the 8 M4 bolt holes on the back of the reader (as shown in figure 2-9), add the mounting bracket (as shown in figure 2-10) to fix the reader in a vertical position. The appropriate way is to first fix the mounting bracket onto the reader, and then install the mounting bracket onto the vertical surface fastener. The completed installation is as shown in figure 2-11.

During the mounting process, reserve space on the top and bottom of the reader, as shown in figure 2-12.

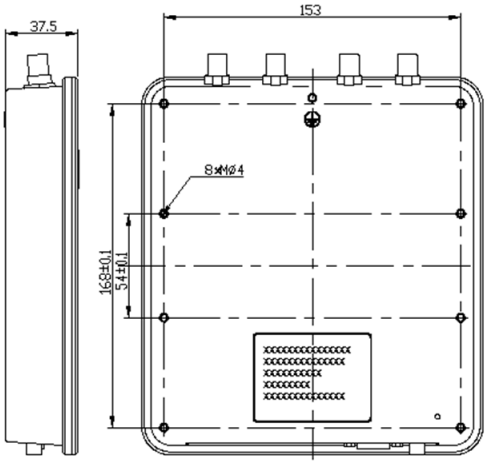


**Figure 2-9 Bolt hole location**

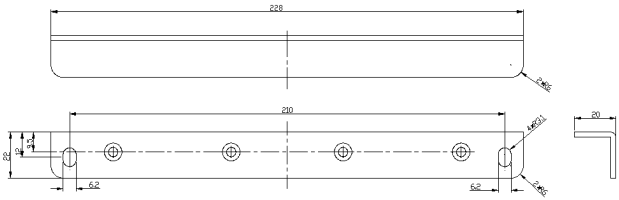


**Figure 2-10 Mounting bracket**

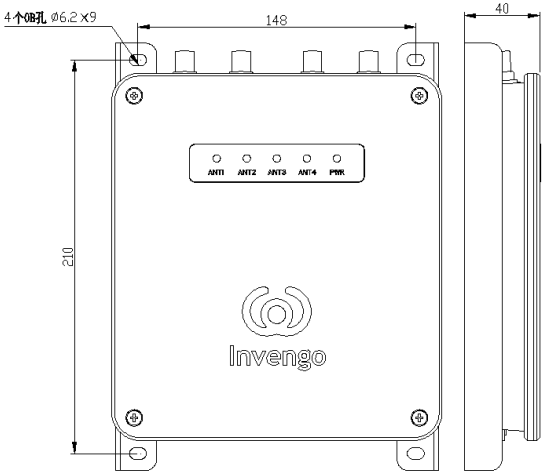


**Figure 2-11 Wall-mounted location**

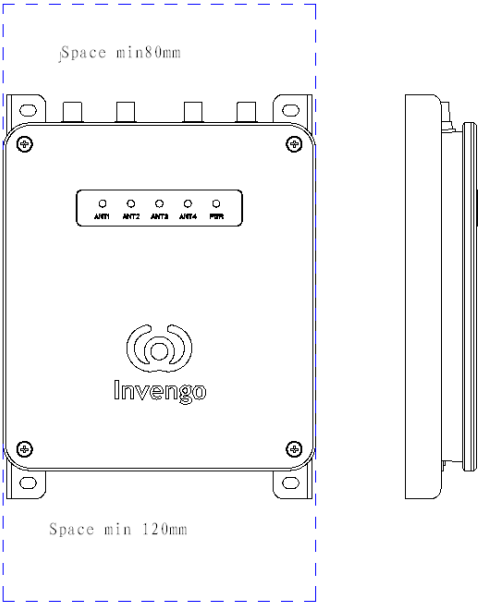


**Figure 2-12 Reserve installation space**

Installation step 2: Connect RF cable. XC-RF861 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 3: 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.

Installation step 4: 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.

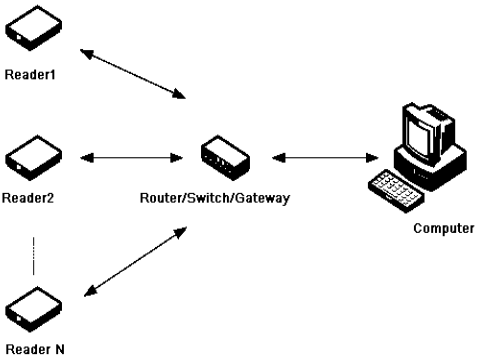


**Figure 2-13 XC-RF861 reader network application**

Installation step 5: Connect to the power supply. The reader is powered through power adapter. 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 power adapter. Once connected to power supply, the "PWR" 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.

**Note:**

XC-RF861 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.

Please refer 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:

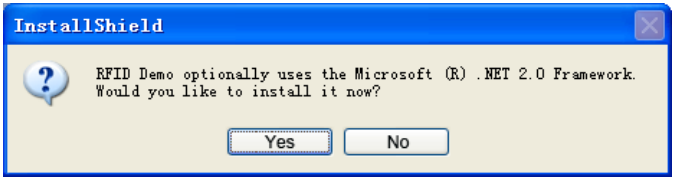


**Figure 3-1**

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

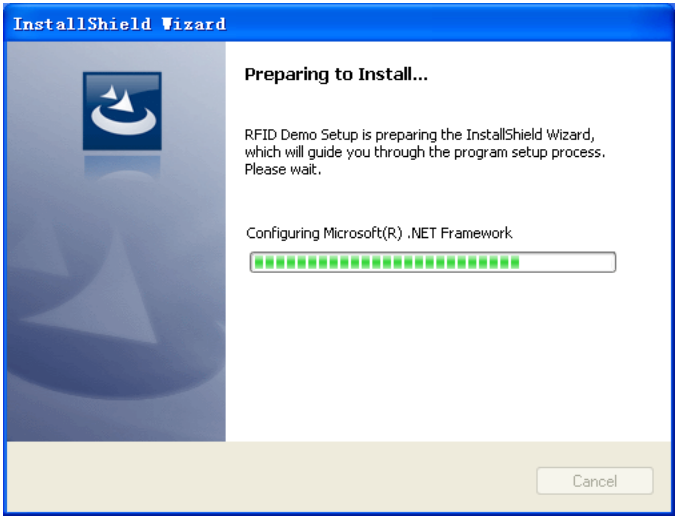


**Figure 3-2**

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):

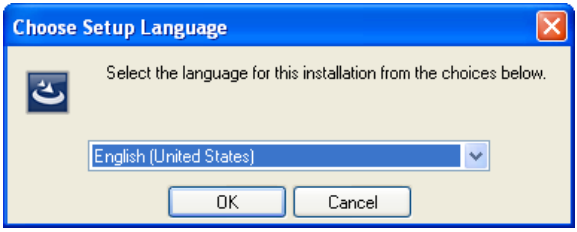


**Figure 3-3**

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:

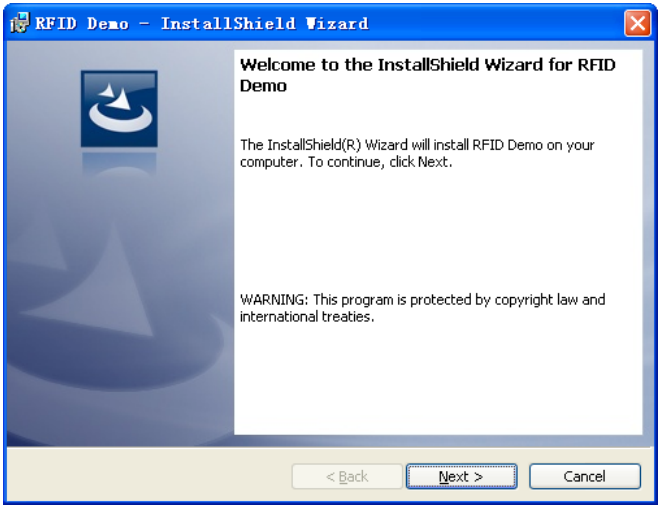


**Figure 3-4**

STEP 3: Click on “Next”:

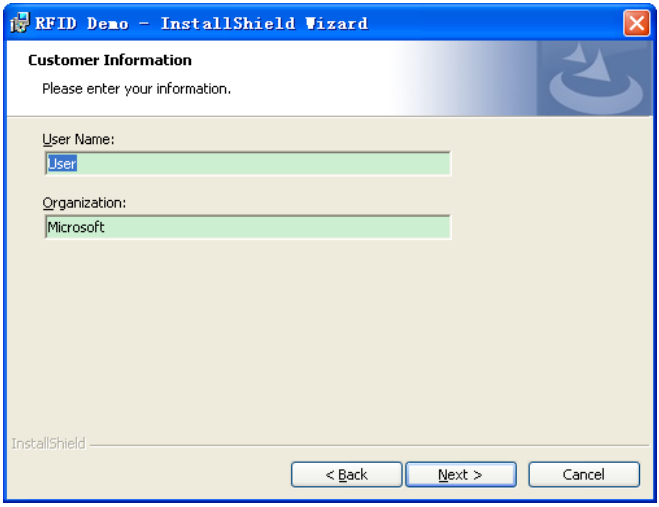


**Figure 3-5**

Enter user name and organization,

STEP 4: Click on “Next”:

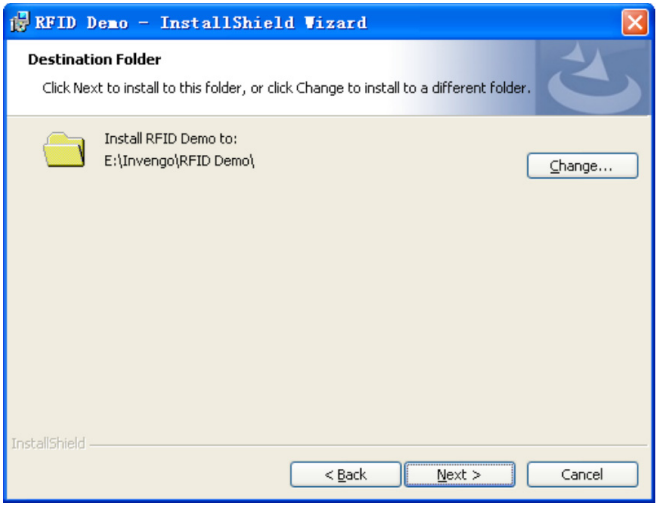


**Figure 3-6**

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":

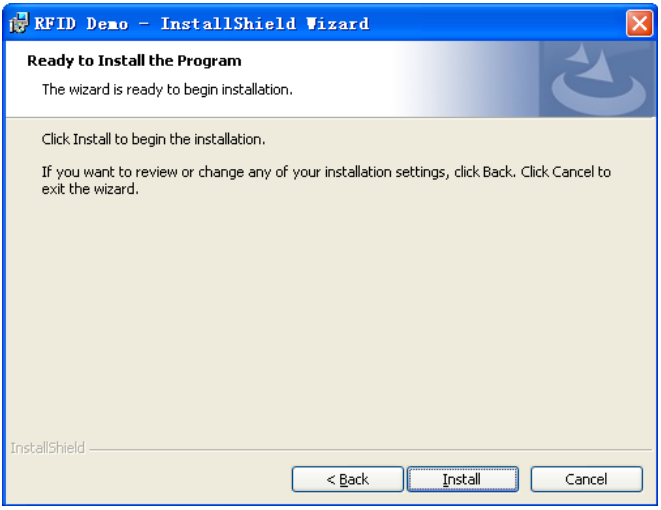


**Figure 3-7**

STEP 5: Click on “Install”:

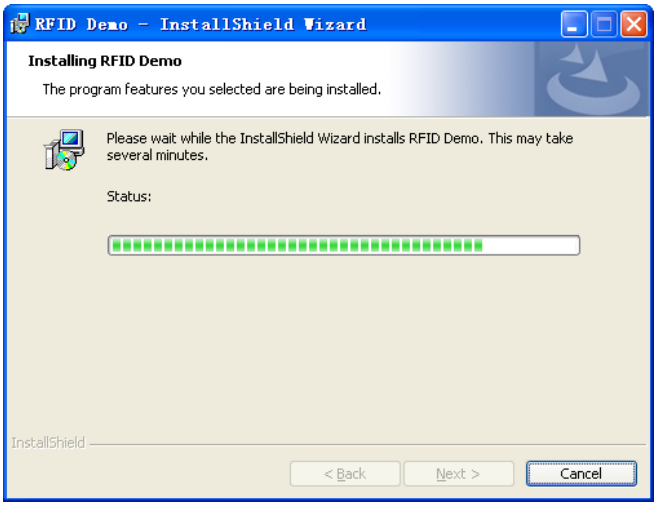


**Figure 3-8**

Installing…below shows the screen upon completion:

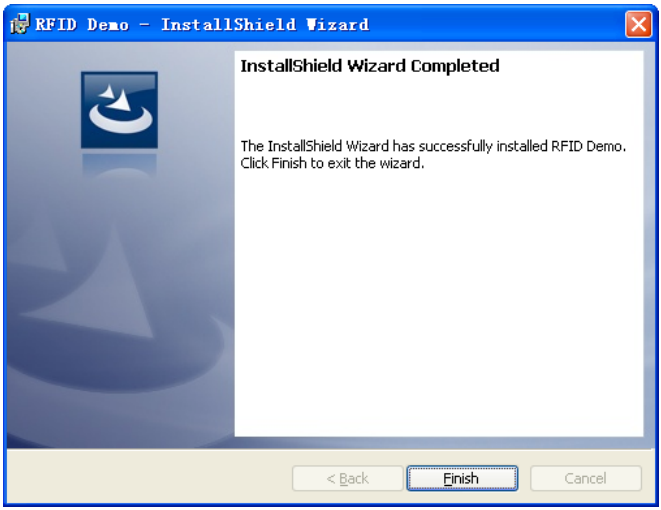


**Figure 3-9**

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

### 3.3.1 Demo initialization

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:

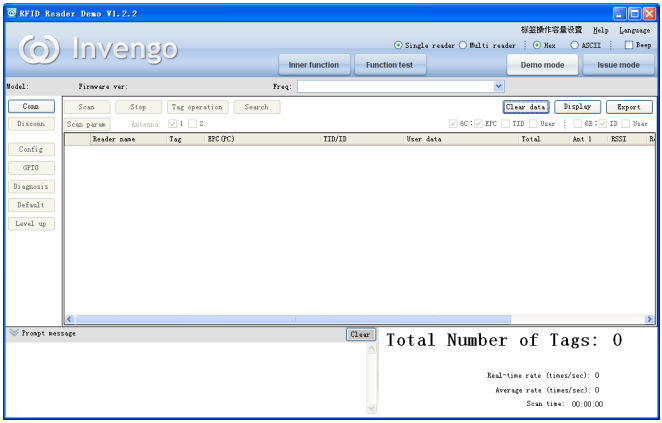


**Figure 3-10**

### 3.3.2 Connection

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

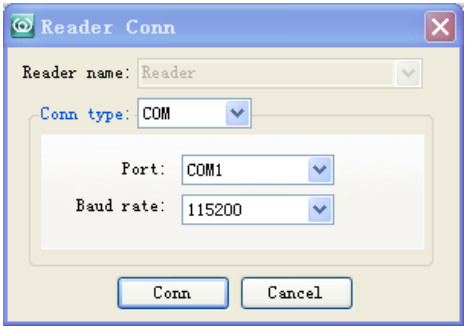


**Figure 3-11**

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.” Failure to connect 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.

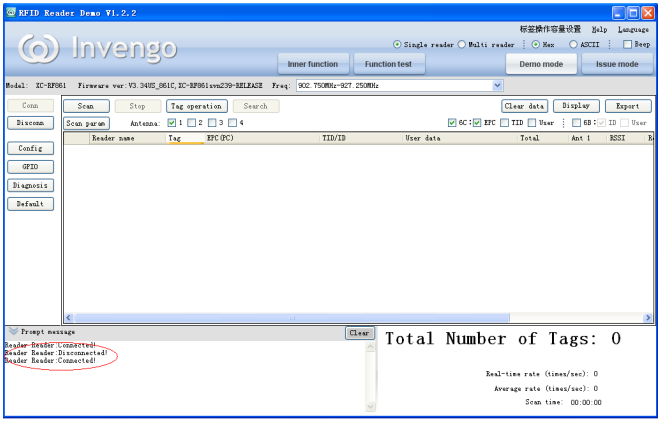


**Figure 3-13**

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

## 3.3.3 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:

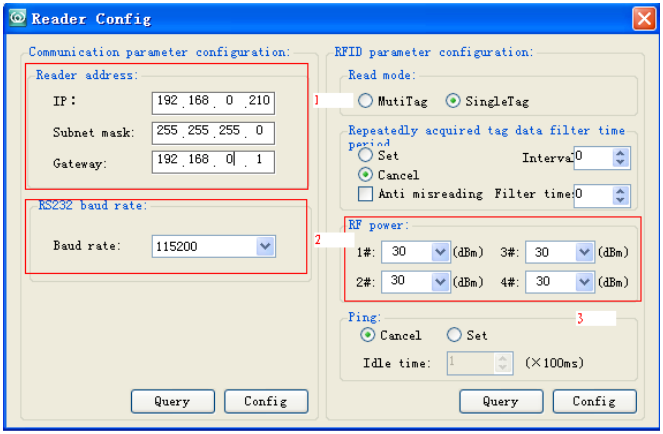


**Figure 3-14**

After completing configuration, click on “Config” to save the configuration. Click on “Query” to inquire about the current configuration of all connected readers.

**Reader URL:** Refers to the configured network parameters based on actual needs (connecting reader in the same network segment)

**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

**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.

## 3.3.4 Antenna choice

This reader has 2-channel antenna and these antenna can be formed random combinations as shown in the figure below:

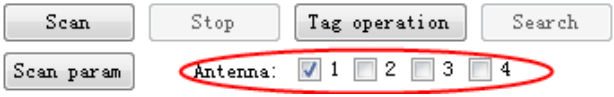


**Figure 3-15**

## 3.3.5 Scanning configuration

Scanning parameter setting as shown in the figure below:

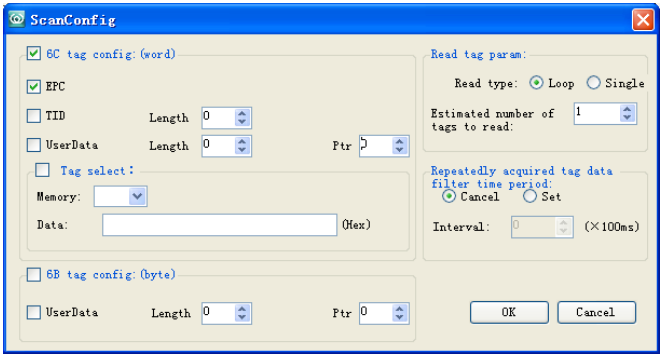


**Figure 3-16**

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

## 3.3.6 Tag operation

After configuring the reader in accordance with 3.3.3 and 3.3.4 and 3.3.5, select the corresponding tag type (6B or 6C tag), then click on “Scan” to scan the tag, as shown in the figure below:

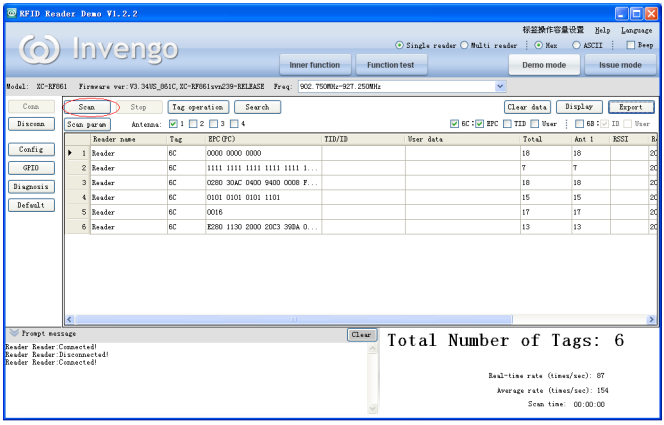


**Figure 3-17**

## 3.3.7 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:

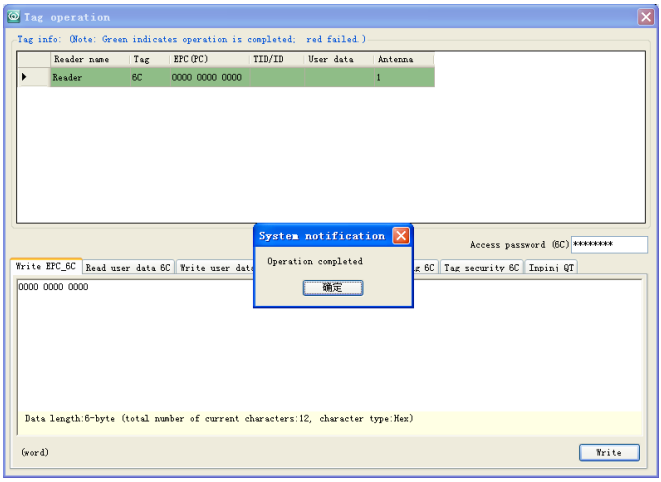


**Figure 3-18**

## 3.3.8 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:

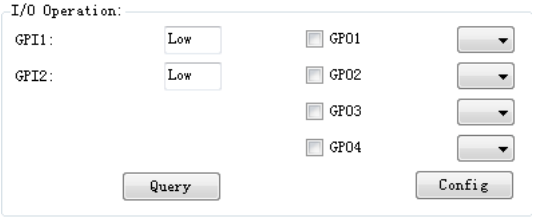


**Figure 3-19**

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 3-20**

Tag reading I/O trigger configuration:

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

1#

2#

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 explanation: 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 two 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 6.4.5, then configure the trigger port, trigger condition and termination condition.

## 3.3.9 Version Enquiry

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

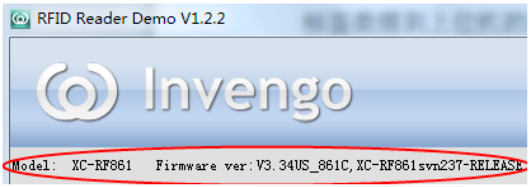


**Figure3-21**

The definition of each information is as follows (this is just an example, subjected to changes with version upgrade):

Mode: XC-RF861 reader

Firmware version:

V3.34US_861C (RFID processor software version)

XC-RF861SVN237-RELEASE (Application processor software version)

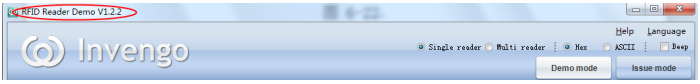


**Figure 3-22**

V1.2.2 is the version of RFID DEMO software, as shown in figure 6-2

## 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.
- 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

## 4.2 Troubleshooting and solution

During the application of XC-RF861 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 rat 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.

# 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 temperature: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-RF861 reader is packaged using cassette packaging and can be transported through large transport container.

Package size: 320mm×255mm×120mm

## 6.2 Inspection

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

Apart from XC-RF861 reader, the package also contains the following accessories, as shown in the table below:

**Table 6-1 Accessories checklist**

| No. | Item | Unit | Order No. | 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.

Before the user contacts the customer service center, please prepare the following information:

## 7.1 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, provide the same no. on a piece of paper and place it in 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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