Invengo

User's Manual

XC2900-F6C Handheld RFID Reader

Invengo Information Technology Co., Ltd.

Thank you for using

Invengo XC2900-F6C Handheld RFID Reader!

Preface

This manual applies to the XC2900-F6C Handheld RFID Reader manufactured by Invengo.

This manual provides the information on the XC2900-F6C's installation, operation, maintenance and repair and other features, to the personnel for installation, operation and maintenance of this XC2900-F6C.

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The information contained herein is provided solely for the purpose of allowing users to operate and service Invengo-manufactured XC2900-F6C, and is not to be released, reproduced, or used for any other purpose without written permission of Invengo Information Technology Co., Ltd.

Information and specifications contained in this document are subject to change without prior notice and do not represent a commitment on the part of Invengo.

The features offered by the XC2900-F6C may vary depending on the configurations.

Main Contents

Safety Instructions

Your safety is extremely important. Read and follow all warnings and cautions in this document before handling and operating Invengo equipment. You can be seriously injured, and equipment and data can be damaged if you do not follow the cautions.

 Warning

A warning alerts you of an operating procedure, practice, condition, or statement that must be strictly observed to avoid death or serious injury to the persons operating on the equipment.

 Notice

A Note either provides: extra information about a topic or alerts to an operating procedure, practice, condition, or statement or corruption or loss of data, or contains special instructions for handling a particular condition or set of circumstances.

Contents

1. Before You Begin

1.1. Introducing the XC2900-F6C

The XC2900-F6C handheld reader from Invengo is an RFID reader that provides connectivity between tag data and an RFID reader system. The XC2900-F6C supports the RF Air Protocol ISO18000-6C. The robust design combines with an impressive array of integrated features and functionality to enable highly cost-effective mobile RFID solutions that allows you to bring the read/write device to the tagged product rather than moving tagged products past a fixed reader.

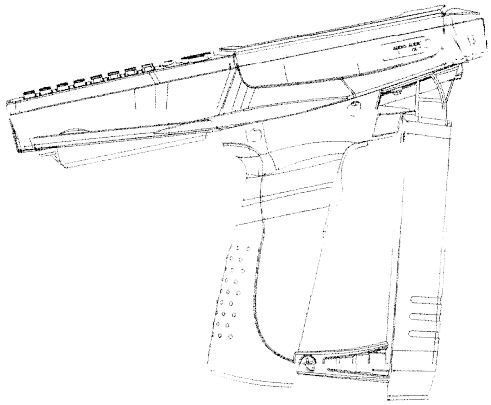


Figure 1-1 XC2900-F6C

1.2. Model information

This XC2900-F6C provides a variety of functional modules to suit your applications requirements. The model and functions as outlined below:

Basic Model: includes Host PDA and RFID module.

Optional modules: one/two-dimensional bar code imager, Wi-Fi module and other modules. The XC2900-F6C equipped with desired module/s is tested at factory before shipment.

1.3. Applications

The Invengo's ultra high frequency (UHF) handheld reader XC2900-F6C provides all the RFID and control functions required to communicate with a variety of UHF transponders which are ISO 18000-6C (EPCglobal Class 1Gen 2) compliant.

The XC2900-F6C are well suited for a variety of applications including but not limited to: warehousing, retail, logistics, enterprise transportation and woke-in-process.

1.4. General requirements

A, Operation temperature: -10℃ ~ +50℃

B, Storage temperature: -20℃ ~ +70℃

C, Humidity: 5% ~ 80%, non-condensing

D, Battery: 3.7V (DC)

E, Power adapter:

Input: 100V ~ 240VAC, 50 ~ 60Hz

Output: DC5V/4A

F, 20 days standby time, 8 hours battery operation(read 10 times / minute)

1.5. Safety and precautions

Avoid long-term exposure to RFID when operating the XC2900-F6C.

Read and understand Safety Instructions before operating the XC2900-F6C.

Any radio transmission equipment, including the XC2900-F6C, may cause RF interference to medical devices without appropriate protection measure. The XC2900-F6C may cause interference to other electronic devices.

2. Features

High-performance embedded CPU, 320X240 pixels, 3.5-inch color touch screen;

Indicator showing the reader’s operation status;

Data exchange via USB interface with PC terminals / specified models of U disks;

.Net SDK and standard environments for secondary development;

Embedded self-test programs assist with equipment debugging and some of the test functions;

Optional TF card slot, expandable up to 2G;

Adaptive mainstream one/two-dimensional bar code (optional feature);

Network connection via Wi-Fi wireless communication module, APs (optional feature).

3. Dimensions & Weight

3.1. Dimensions

Length×Width×Height = 235.9mm×98.5mm×187mm/9.23in×3.88in×7.36in

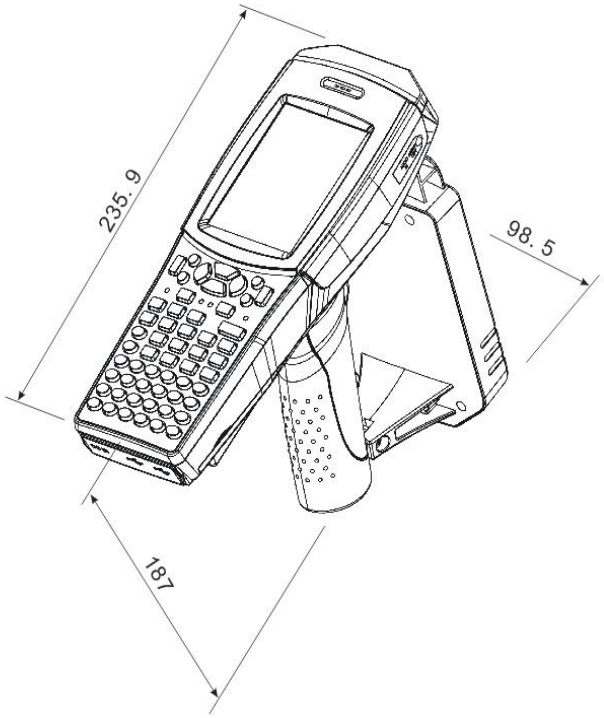


Figure 3-1 Dimensions

3.2. Weight

0.9Kg/1.98lb (configuration dependent)

4. Structure & Operating Principles

This section introduces the components, internal structure, operating principles of modules, and interfaces of the XC2900-F6C.

4.1. Components & Operating Principles

4.1.1. Components

Figure 4-1 shows the front view of the XC2900-F6C:

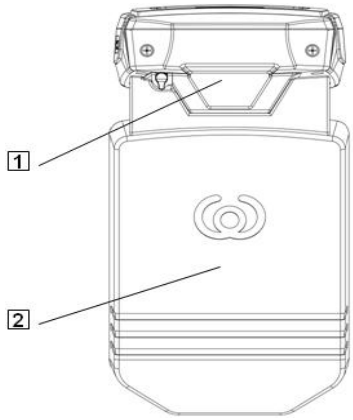


Figure 4-1 XC2900-F6C front view

① - barcode lens;

Typically, the barcode imager window is black and in “off” state. The XC2900-F6C equipped with barcode module from Invengo enables 1/2D adaptive barcode functionalities.

② - antenna;

The antenna features excellent stability, and robust read/write range.

The rear view of the XC2900-F6C shows in Figure 4-2:

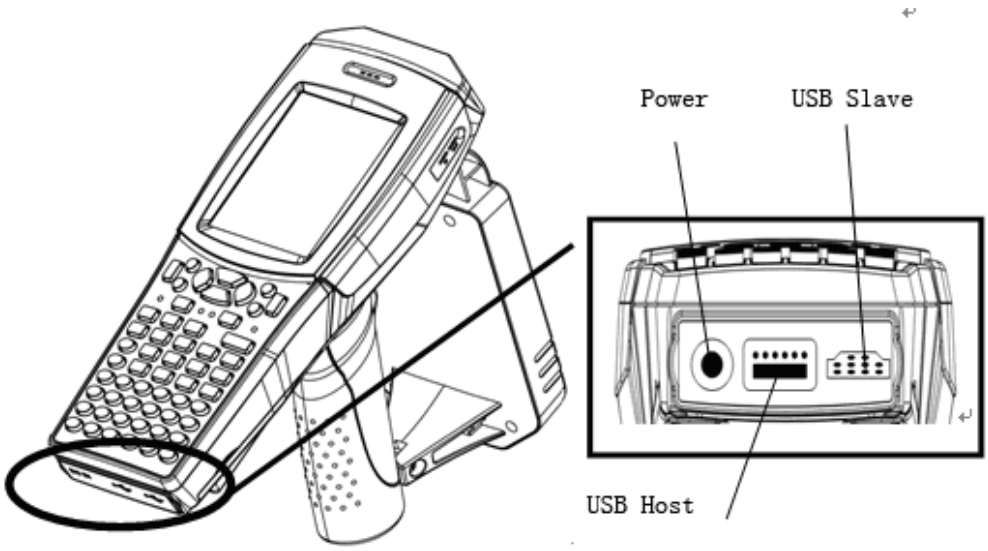


Figure 4-2 XC2900-F6C rear view

① ——Power socket

Power socket: Use DC5V / 4A power adapter for charging on the XC2900-F6C. The power indicator blinks while charging; charging indicator is on when the XC2900-F6C is full charged;

② ——USB host (**USB Host**)

USB Host port: used to connect the USB devices, for example, the specified USB storage devices and SD card reader;

③ ——USB slave port (**USB Slave**)

USB Slave port: used to connect the host PC, and to exchange data with host via synchronization software.

The right view of XC2900-F6C shows in Figure 4-3:

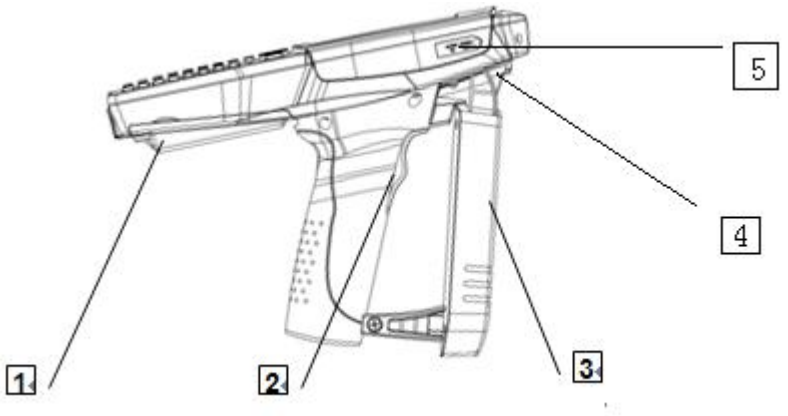


Figure 4-3 XC2900-F6C right view

1——battery compartment

The XC2900-F6C features a 5400mAh battery, which can be taken out of the battery compartment by removing the battery door.

There is a “Reset” hole in the battery compartment. The Windows CE system can be rebooted by pressing the hole.

2——Handle and trigger

The XC2900-F6C is equipped with a handle and a trigger.

3——RFID pod

The XC2900-F6C features a high performance RFID module.

4——Stylus

5——Headphone jack

4.1.2. Understanding the panel

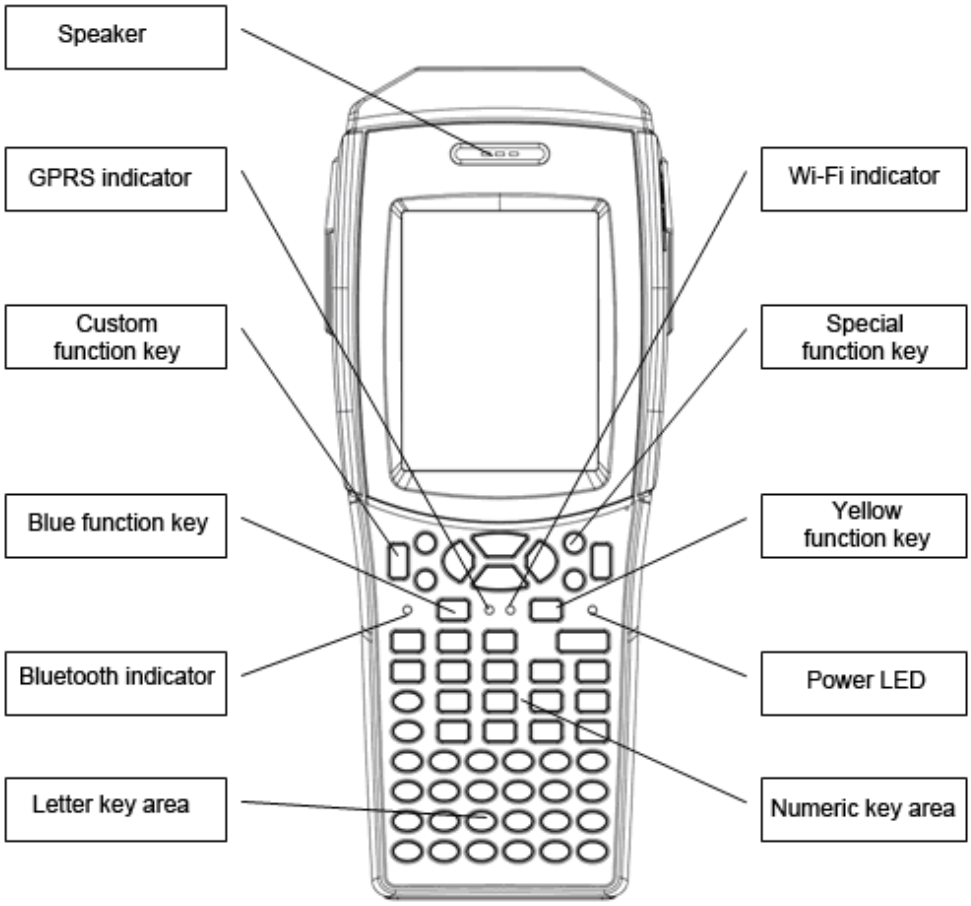


Figure 4-4 XC2900-F6C front panel

There are 4 LEDs and a keypad on the front panel of the XC2900-F6C.

4.1.3. Understanding the LEDs

⇘ Power LED

★ Power LED is on when the battery is sufficient;

★ Power LED blinks when charging the XC2900-F6C;

★ Power LED rapidly blinks when the power of XC2900-F6C is low, and the XC2900-F6C is not charged;

★ Power LED remains off when the XC2900-F6C is automatically or manually set to hibernating mode, or has no power.

⇘ Wi-Fi LED

★ Wi-Fi LED remains on when the Wi-Fi module is in operation and remains off when the Wi-Fi module is deactivated.

Understanding the LEDs:

 Power LED (charging LED, power low alarm LED)

 Wi-Fi LED

4.1.4. Understanding the keys

 Backlight key  Volume key  Backspace

Key types:

 Blue function key  Yellow function key  custom key

 Special function keys

 Numeric keys

 Letter keys

5. Configuring the XC2900-F6C

5.1. Screen Calibration

To calibrate the screen, navigate “My device”→ “Control Panel”→ “Stylus”→ “Calibrate”. Click “Recalibrate” and save configuration as shown in Figure 5-1:

Figure 5-1 Control panel → Stylus

5.2. Query battery power Info & backlight control

[Battery capacity, Charge status query] To query the current overall power, click "Power Update" on the screen.

When the battery status bar shows:

"No battery" indicates the XC2900-F6C is powered with a charger; "Battery" indicates the XC2900-F6C is battery-powered; "The battery is charging." indicates the battery is charging. "Battery charging completed." indicates that the battery is fully charged. It appears in Figure 5-2.

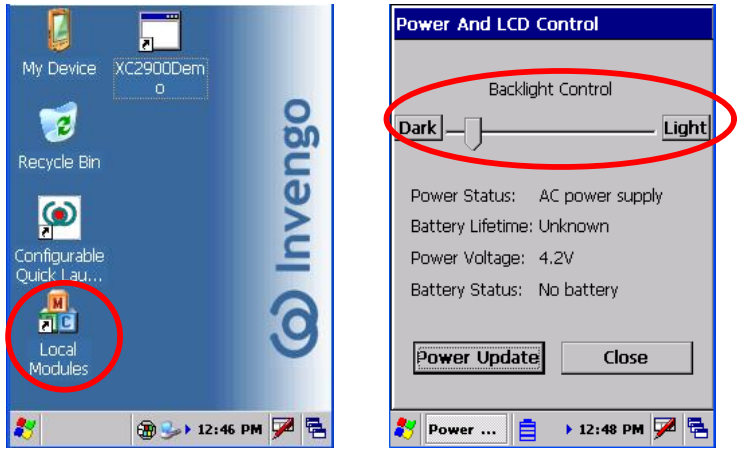


Figure 5-2 Control panel → Power and LCD control

[Backlight Control] Navigate "Desktop" → "Local Modules" → " Power and LCD Control". Move slide bar icon or click the buttons on both sides to adjust the brightness of the LCD. User can also press  to adjust the backlight brightness.

5.3. Volume & sound

Navigate "My Device" → "Control Panel" → "Volume & Sound". Move the slide bar icon or click the buttons on both sides to adjust the speaker volume as shown in Figure 5-3a.

To turn the XC2900-F6C to "mute" state, press  . To cancel “mute” state, press  and "Speaker Setup" dialog box appears as shown in Figure 5-3b. Select "Yes" button to turn on the speaker, and select "No" to turn off the speaker.

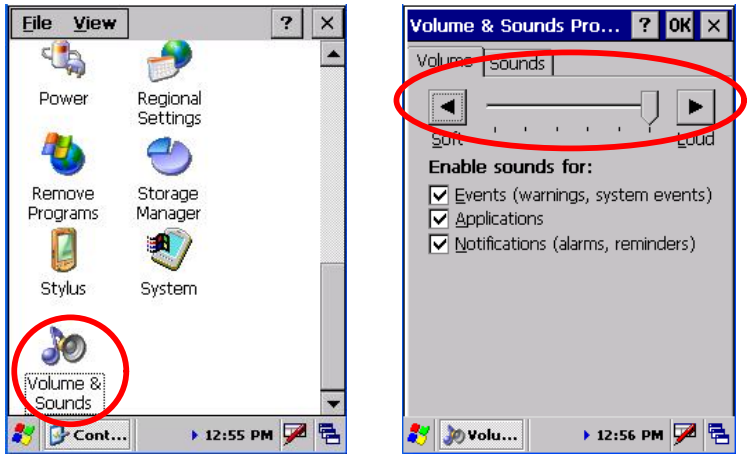


Figure 5-3a Control panel →volume & sound

Figure 5-3b Speaker Setup

5.4. Install USB driver and synchronize data

1. Connect the XC2900-F6C to a PC with the enclosed USB cable.

★ If the system status bar shows "New equipment can be used.", installing the USB driver is not required.

★ If "new equipment required to install the driver file" dialog box is promoted, navigate "Browse" → "XC2900-F6C CD-ROM" → "Software Packages" → "USB Driver" folder. As shown in Figure 5-4:

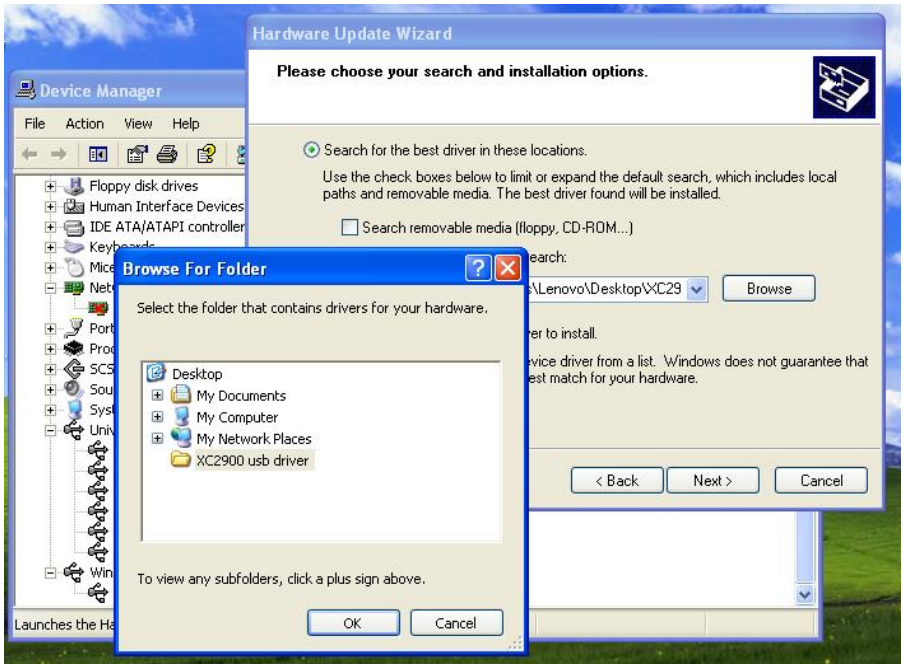


Figure 5-4 Install USB driver

2. Install the synchronization software

Navigate "XC2900-F6C CD-ROM" → "Software Packages" → "Sync" → "ActiveSync4.5_CN_setup.msi"; and follow the prompts to install the software.

3. Reboot XC2900-F6C after the synchronization software installation is completed. Click on "System Power - Reboot". PC devices will prompt a message indicating that the connection is completed.

Figure 5-5 Set up a partnership

4. If the synchronization software does not respond after connecting the PC with the XC2900-F6C, search for the XC2900-F6C with the synchronization software. As follows:

① As shown Figure 5-6, navigate "File" → "Connect" → "Next";

② Wait until "port search" process is completed. Enter "your device not detected" screen as shown Figure 5-7. Click "Cancel" button, the synchronization software will search for the XC2900-F6C.

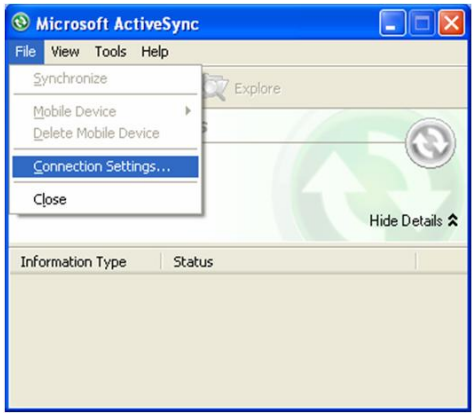


Figure 5-6 ActiveSync screen

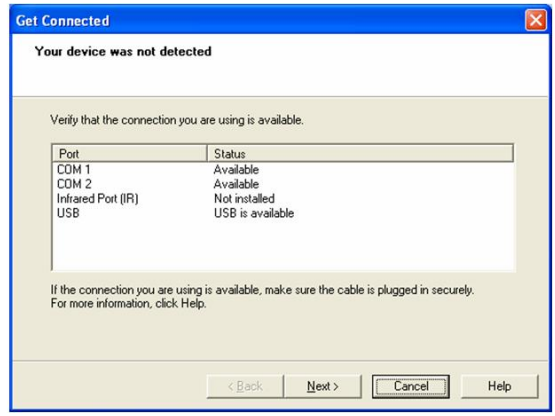


Figure 5-7 Port search screen

5. When synchronizing connection is successful, Navigate "Explorer" → "Mobile Equipment" for file transfer or software development.

Figure 5-8 My computer→mobile device

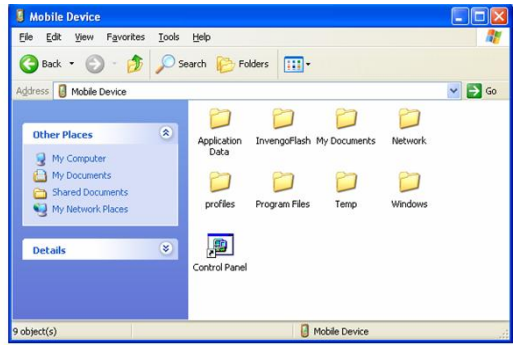


Figure 5-9 Icon and content

Remarks:

<1>USB driver supported by Windows XP, Windows Server 2000 and Windows Server 2003;

<2> Do not reverse the order of the above steps, install the USB driver and then install the synchronization software;

<3> If the above two steps are completed and the system does not respond, try the following steps:

1, wait for some more time, let the computer to find the USB drive.

2, press "ENTER" key to enable the XC2900-F6C to enter "standby" mode and then press "ENTER" key to awake the XC2900-F6C.

3, press the trigger + ENTER to reboot the XC2900-F6C.

5.5. Understanding the keypad

Keys on the XC2900-F6C are categorized into functional, numeric, and letter keys and LEDs.

Figure 5-10 Keypad layout

1. Numeric keys and letter keys are used to input numbers and letters.

2.  Backlight ,  Mute ,  Backspace

3.  When clicked one time, the left blue characters keys will be enabled once; when clicked two times, and the left keys will remain enabled until the user click any key.

4.  When clicked one time, the right yellow characters keys will be enabled once; when clicked two times, the keys will remain enabled until the user click any key.

5.  Shift is case key. Click the key and input an upper case letter. Click twice, the upper case letter input mode enabled until the key is clicked.

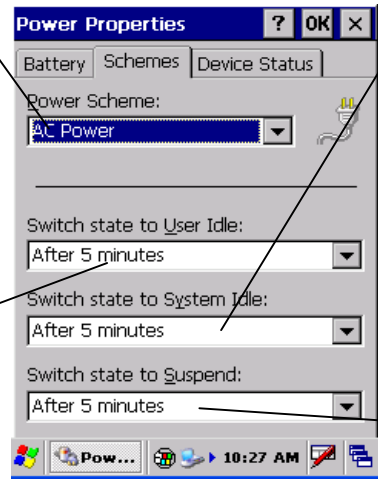
6.  Long press this key to enable the XC2900-F6C enter standby mode; click this key once to return to normal working condition.

5.6. Configuring power management scheme

When the XC2900-F6C is battery powered or charging, different power management schemes are used with an aim to improve the battery navigation. Navigate “My Device”→ “Control Panel”→”Power”→ “Scheme”; in “Scheme”, user can configure “Power Use Scheme” as shown in Figure 5-11.

"AC Power": charging the XC2900.
"Battery Power": battery-powered state.

"User Idle": The user doses not operate the reader. When the set up time arrives, the LCD screen will automatically enter a low power state and the screen becomes black. Each module is still running. Click on the screen or press any key, and the system will return to normal state.



"System Idle": the system application is not running. When the set-up time arrives, the system will power off the module, and stop working. The user are required to manually power on the module to operate.

"Suspending": the reader is not operating. When the setup time arrives, all the modules will be powered off, including the LCD screen. Long press on "Enter" key to bring the system back to normal state, and to power on the module to operate.

Figure 5-11 Power schemes

5.7. Modules power control

In order to facilitate operation on the modules, the operating system provides multiple power interfaces to control the modules (e.g. RFID, bar code, Wi-Fi), which can be located in “Desktop”→ “Local Module”→ “Bar Code and Module Power Control” → “Module Power Configuration”. Change the module power supply mode by clicking the icons as shown in Figure 5-12b. For information of "power and LCD control" see section 5.2. The "Build Time" on information bar is the software version setup time. Version is the software version number. Click "Module Power Setup" to navigate to "Barcode Test and Module Power Setup" screen. The current power status of each module will be displayed.

Click on the button to change the power state of each module as shown in Figure 5-12c:

Figure 5-12a

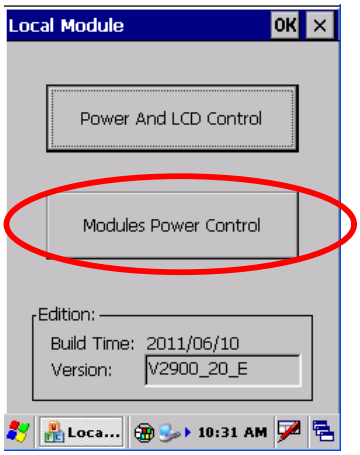


Figure 5-12b

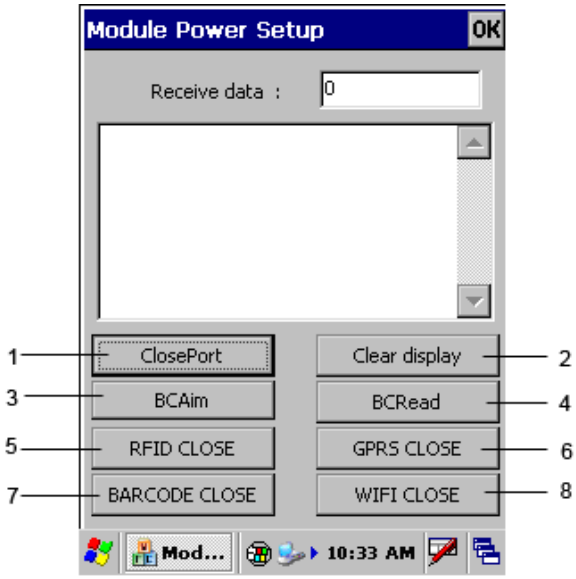


Figure 5-12c Module power setup

Button 1, 2, 3 and 4 shown in Figure 5-12c are used in a one-dimensional bar code operation (described in detail in 6.2.2). Button 5 is the RFID module power control button; Button 7 is the barcode imager module power control button; Button 8 is the Wi-Fi module power control button.

Check the module is powered on before operation.

5.8. Set auto start

After cold booting or removing the battery, the XC2900-F6C will restore the factory configuration, and the user settings will not be saved. To facilitate the operation, the XC2900-F6C offers the auto-start function, which enables the auto start of the desired configuration programs. Configure as follows:

Create a text file called "startup.txt" 

, and then copy to [my device] → [InvengoFlash] directory with the PC synchronization software, ActiveSync. Write following data on the “startup.txt”:

1. Users can set up the auto launch program of Windows directory after booting the system, as follows: Open the “startup.txt”, Enter [program full name.Extension name]. For example, just type [locMods**.**exe] in the file to start the " locMods" program in the Windows directory when booting the XC2900-F6C.

The program will be automatically started when booting the XC2900-F6C.

2 Users can set up the launch of the program in [InvengoFlash], as follows: Open the “startup.txt”, enter [the process name. Extension name]. For example, just type [locMods**.**exe] in the file to start the " locMods" program in the “InvengoFlash” when booting the XC2900-F6C.

The program will be automatically started when booting the XC2900-F6C.

5.9. Set “quick launch program”

When the XC2900-F6C is “cold-booted” or the battery is removed, the XC2900-F6C will restore the default configuration. The XC2900-F6C features “Quick Launch Program” function. Double-click the icon “Configurable Quick Launch” to configure the programs as follows:

Navigate “My Device”→ and create or save a file named “Launch.txt” in the directory of “InvengoFlash” with ActiveSync.

1. User can set the “Quick Launch Programs” on “InvengoFlash” as follows: input the [program complete name.extension name] in the “launch.txt”, and click the desktop icon/s. For example: input [demo.exe] in the “launch.txt”, and click the desktop icon to run the “demo” program.
2. The program/s installed in SD card can be set to be as “Quick Launch Program/s” as follows: open “launch.txt”, input [program complete name.extension name]. For example: input [demo.exe] in the “launch.txt” and the desktop icon will appear.

Note: Input Only one program name in a separate line in the “launch.txt’.

5.10. Power-down protection

To save the settings before battery replacement, strictly operate as follows:
When the battery power is low, Set the XC2900-F6C to standby mode, and then replace the battery (The XC2900-F6C in standby mode can maintain standby within 15 seconds after power-down) within 15 seconds. Rebooting the XC2900-F6C is not required when the battery replacement is completed within 15 seconds. Press the Enter key to wake up system, and the system parameters configuration and user data remains unchanged.

If the battery replacement takes more than 15 seconds, reboot the XC2900-F6C. (Press the trigger + Enter key to reset the 2900).

6. Introducing Optional Modules

The XC2900-F6C is equipped with WINCE5.0 operating system, offering a robust scalability. The user can flexibly use optional modules, including "one / two-dimensional bar code" module, "Wi-Fi" module and other modules to meet application requirements.

6.1. Wi-Fi modules

The optional Wi-Fi module extends the wireless LAN transmission function. Common operations are introduced as follows:

Power setting: click “Local Modules”, click “Modules Power Control” and click “Wi-Fi Close” to power on the Wi-Fi module as shown in Figure 6-1:

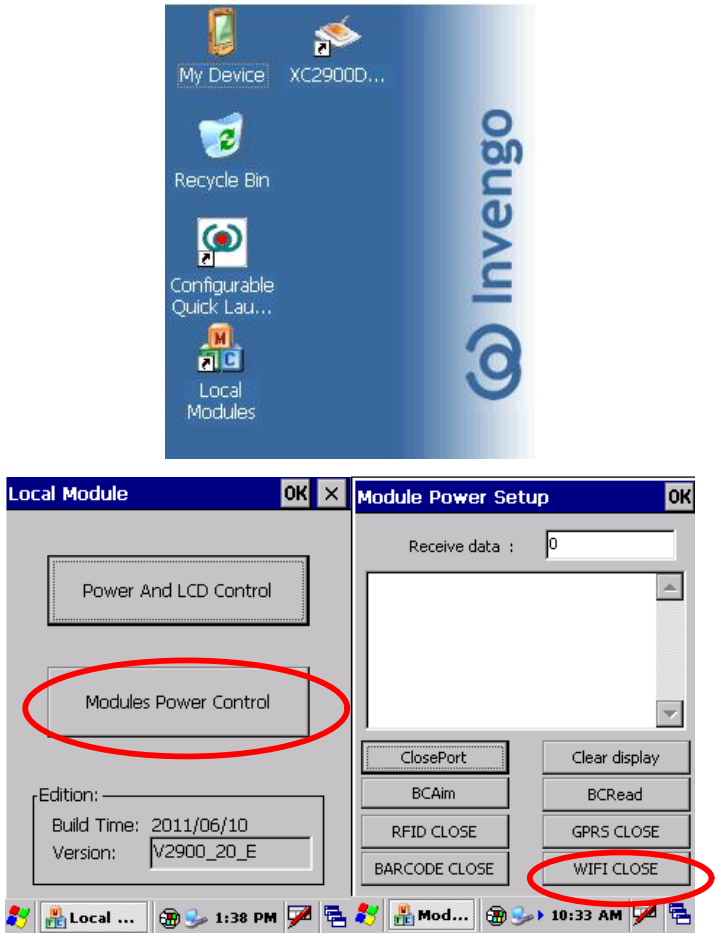
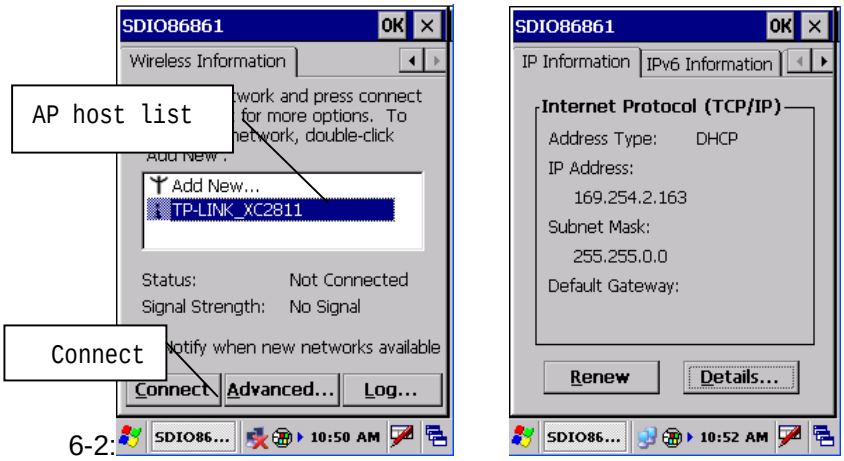


Figure 6-1 Power on Wi-Fi module

Connection settings: when the system pops up the following screen, select a host in "AP host list", and then click "Connect." When the network connection is completed, a network icon appears in the status bar. Double-click this icon to see the relevant IP information. As shown in Figure 6-2.



6-2:

Figure 6-2 Wi-Fi module setting

6.2. Barcode module

6.2.1. Barcode engine specs & supported formats

Two-dimensional bar code:

Resolution: 752 X 480 pixels

Scan Mode: Trigger mode and interrupt mode

Supported symbologies:

One- dimensional symbologies: Code 39, Code 128, Codabar, UPC, EAN, ITF25, RSS, Code 93, Code block

Two- dimensional symbologies:: PDF 417, MicroPDF417, Maxi Code, Data matrix, QR Code, Aztec, Aztec Mesa, Code 49, UCC Composite

6.2.2. Read barcode with module

Click on the desktop "Local Modules" icon as shown Figure 6-3. In the pop-up dialog box, click the "Module Power Control" button, as shown in Figure 6-3b. A "Module Power Setup" dialog box appears as shown in Figure 6-3c. Click the "Barcode open" button once. Then click [BCRead] button once and click the

[BCRead] button once to read a barcode supporting the one-dimensional bar code (IS4823) placed within the effective range. Barcode data appears in the “Data column”.

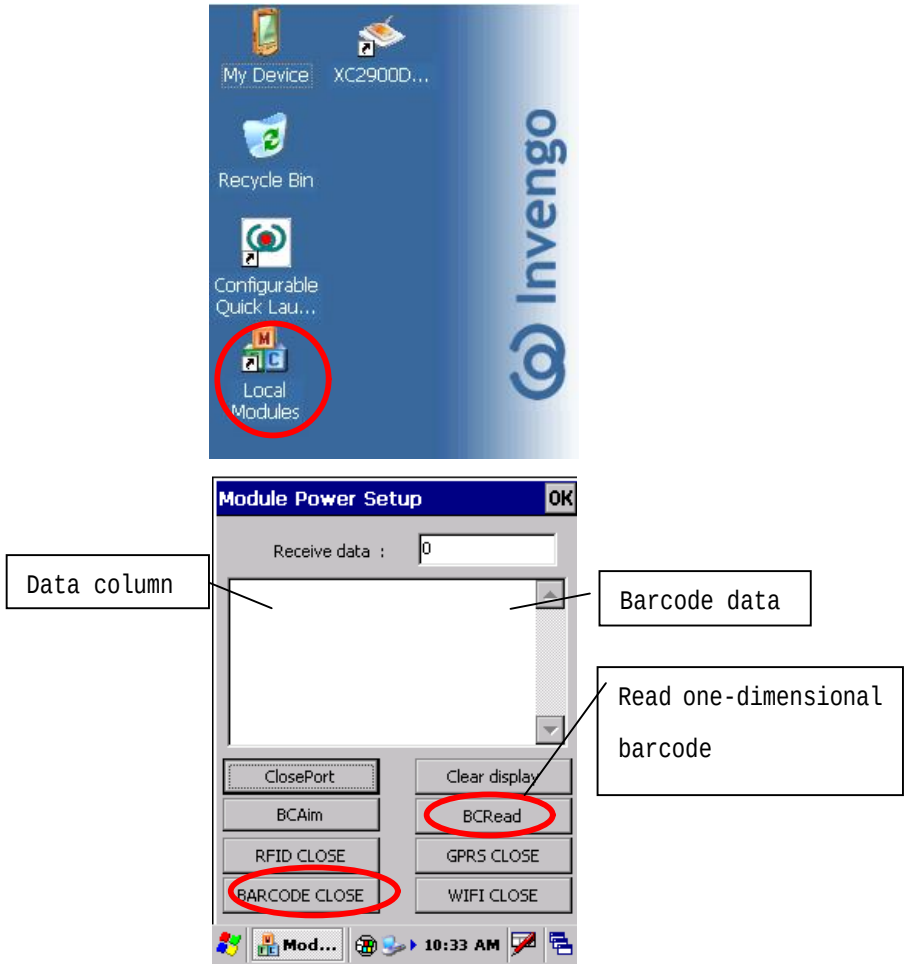


Figure 6-3

Understanding the buttons:

Closeport button is used to close or open the barcode imager

Clear Display button is used to empty the data in the box

BCAim button is used to open aiming light for the imager.

6.2.3. Read barcode with Demo

Navigate the main interface of RFID Demo software, and click the title bar and a drop-down menu pops up:

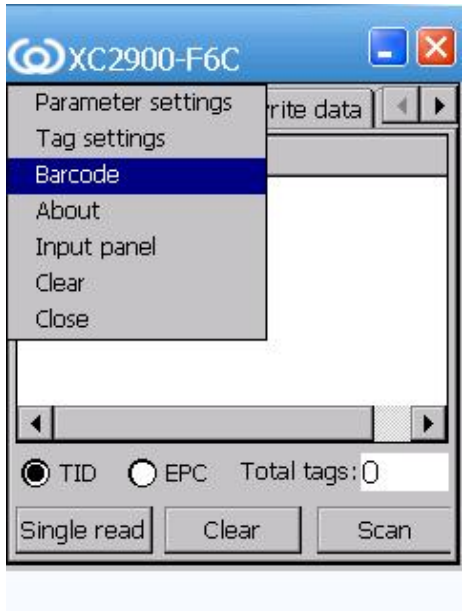


Figure 6-4

Then click on the "Barcode" menu item and pop up the read barcode interface:

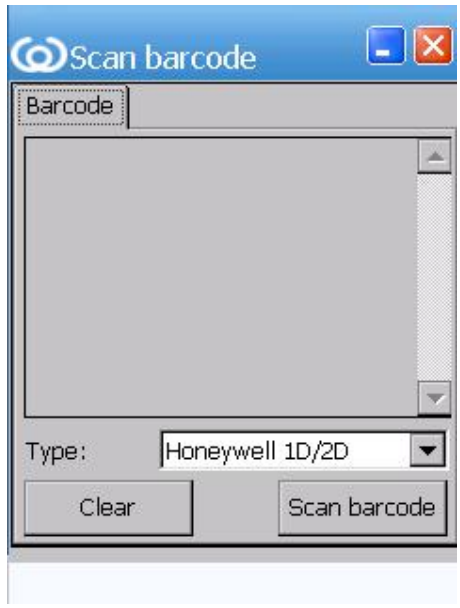


Figure 6-5

Select the appropriate barcode imager types: Symbol 1D/2D barcode imager, Honeywell 1D barcode imager, and Honeywell 1D/2D barcode imager:

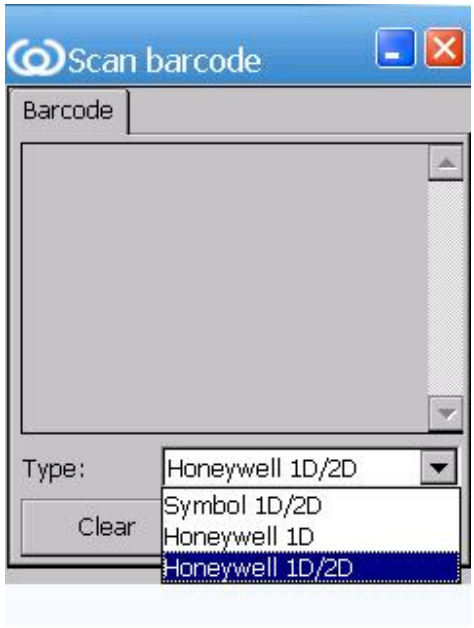


Figure 6-6

Click "Scan Barcode" or pull the trigger to read barcode/s:

Figure 6-7

For info on barcode module development methods see 2.7 Read barcode on " XC2900-F6C Handheld RFID Reader Programmer's Reference Manual".

7. Introducing RFID Module

7.1. Understanding RFID module

7.1.1. Brief introduction

The RFID module operates the ISO18000-6C compliant tags manufactured by different vendors located within an average read/write distance of 3 meters, especially for long-distance tagging application.

7.1.2. Specifications

Frequency: 902 MHz ~ 928MHz

RF output power: 21dBm, 24dBm, 27dBm

Modulation: PR-ASK

Mode: Trigger operation, The XC2900 performs one read operation when the trigger on the XC2900-F6C is pulled for one time; Scan operation, the XC2900-F6C keeps continuous read operation until the trigger is released.

Read distance: 0-3m (configuration dependent)

Write distance: 0-1.2m (configuration dependent)

Supported tag data capacity: up to 62 bytes EPC numbers, up to 14 bytes TIDs, and up to 510 bytes user data.

7.2. Introducing Demo

Demo offers the functionalities for controlling XC2900-F6C reader system, setting parameter, querying parameter, and reading data and writing data on the tags.

7.2.1. Demo application environment

Windows CE 5.0 and .Net Compact Framework 2.0

7.2.2. Installing & launching Demo

1). Installation: First, install the XC2900-F6C synchronization software “Microsoft ActiveSync 4.5”, and establish communication between the

XC2900-F6C and the PC. The users can locate the installation files ActiveSync in the directory on the XC2900-F6C.

Copy the folder of “Demo" in the XC2900-F6C CD-ROM to the directory on Flash memory card (InvengoFlash) on "the XC2900-F6C". Then double-click "XC2900DEMO.exe" file to launch the Demo program.

2). Launch the demo: Double-click the "XC2900Demo" icon to launch the Demo program. This shortcut points to the application software on the Flash memory card and Demo folder. The screen appears as follows:

Figure 7-1 XC2900-F6C main screen

7.2.3. Running demo

Running demo until the interface appears, as shown:

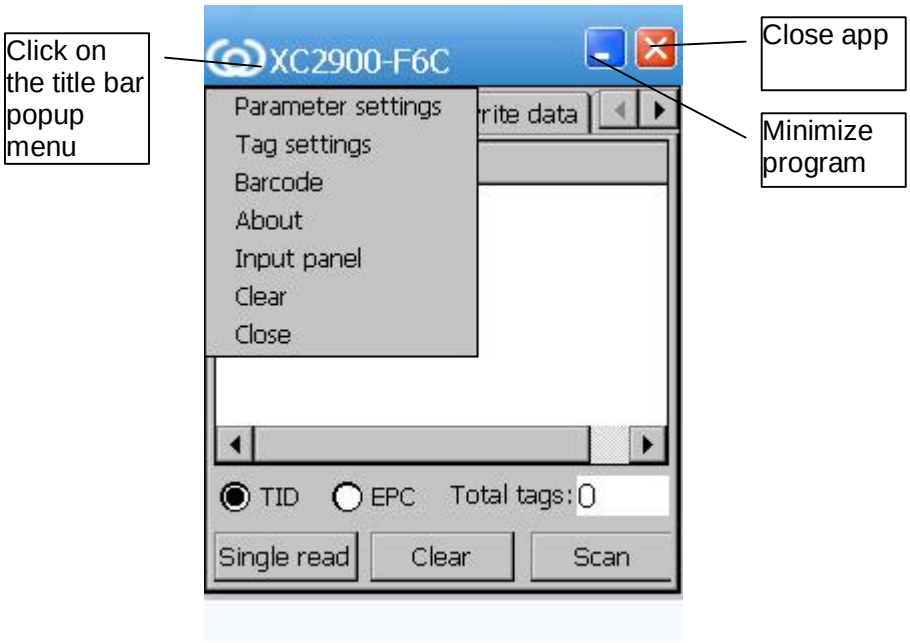


Figure 7-2 Demo main screen

Note: Navigate "Input panel" on the drop-down menu to open or close the soft keyboard.

7.3. Demo operation

7.3.1. Scan tag

After launching Demo, the scan tag screen appears:

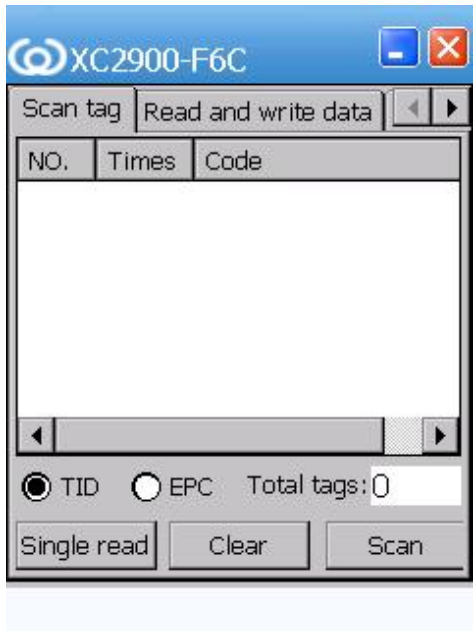


Figure 7-3 Scan tag

Users can perform scan TIDs or EPC numbers operation. Click the "Single read" button to command the reader to read a TID or an EPC number. Click on "Scan" button to continuously read the TIDs or EPC numbers which will show in the text box as shown below:

Figure 7-4 Read TID

Click the "Clear" button to delete all the data in the text box. Operating results information will be displayed in the information column.

Note: before reading user data or filtering tag/s operations, select a TID in the text box.

7.3.2. Read and write EPC number

On “Read and write data” screen, select the tag data type “EPC” as follows:

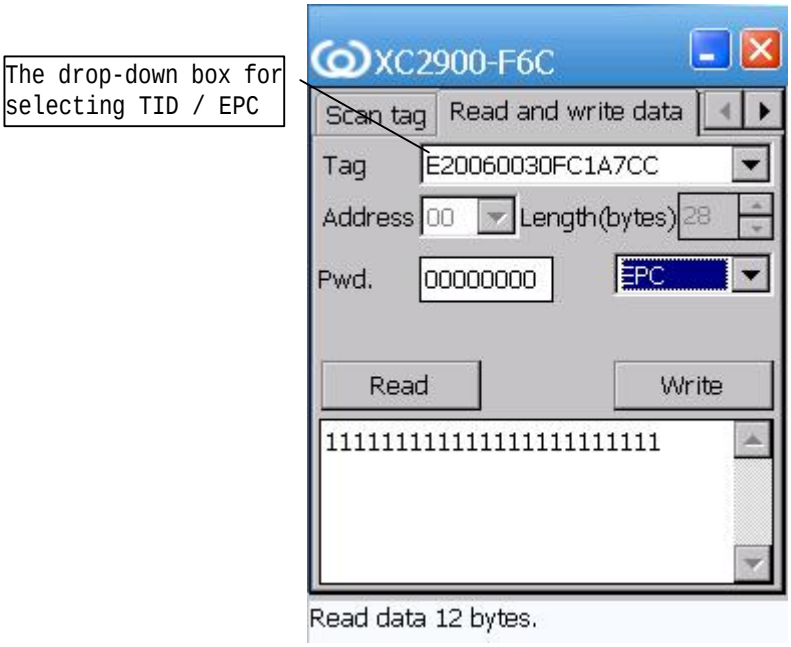


Figure 7-5 Read EPC number

The selected TIDs/EPC will be automatically added to the drop-down box for selecting TID / EPC. Click “Read” button to acquire the tag's EPC number. The acquired EPC number will be displayed in the text box (to change the data length will not affect the length of EPC number to read, valid only for reading user data).

Select a tag for EPC write operation, and then enter the tag access password (the default is "00000000"), and enter the EPC data to be written (the user can enter their own data, but also it can be achieved by adjusting the length of the data to enable the program randomly generate EPC number. The input data must be of an even number), and finally click the “Write” button

to complete the write operation. operating results information will be displayed in the information column.

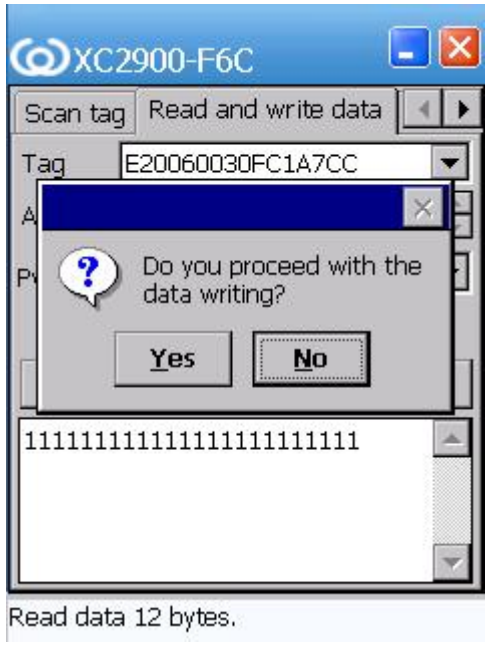


Figure 7-6 Write EPC number

Figure 7-7 Write EPC completed

7.3.3. Read and write user data

The write data screen appears. Select the data tag type “Userdata” as follows:

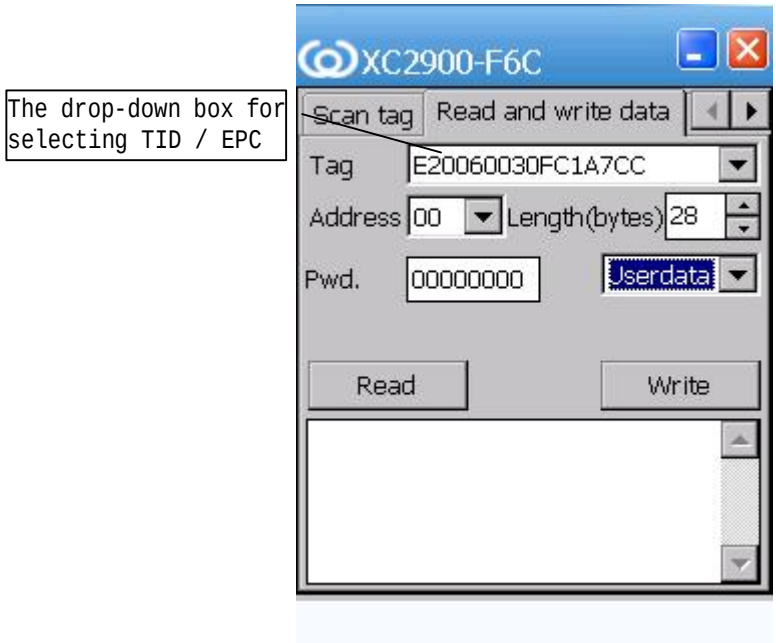


Figure 7-8 Read and write data

In the "scan tag" screen, user can acquire the TIDs/EPC which will be automatically added the drop-down box for selecting TID / EPC when navigating the write data screen. Set the data bank’s starting address and the data length, and then enter the tag access password (the default is "00000000". Operation will fail if the password is not entered or an incorrect password is entered). Click the "read" button to command the reader to read the user data bank on the target tag. Operating results information will be displayed in the information column:

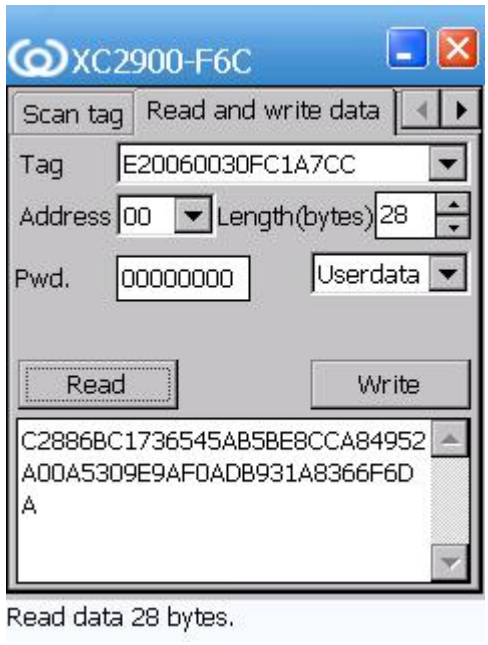


Figure 7-9 Read user data

Select the TIDs, select the starting address and data length, write the desired data in the bank, enter the tag access password (the default is "00000000"), click the “write” button, and click the "yes" button in the pop-up box. As shown:

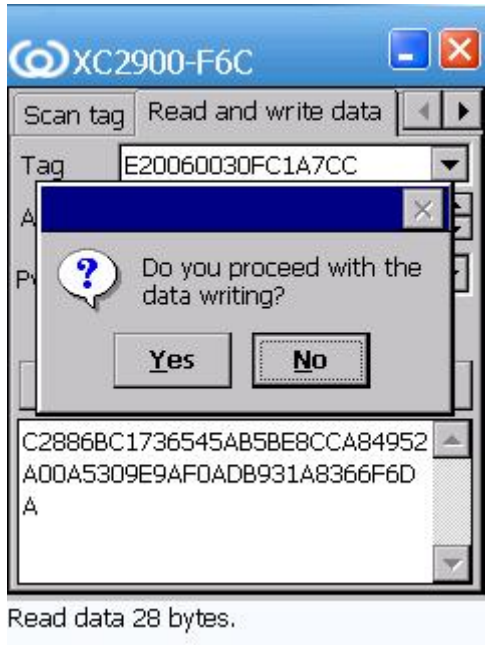


Figure 7-10 Write user data

Figure 7-11 Write data completed

7.3.4. Setting

Select the "Settings" screen for setting the read rate.

Continuous scan interval: refers to the interval between two reads in the "scanning" mode. Decreasing the value enables faster scanning.

Read tag(TID/EPC) timeout: refers to the maximum time required to wait for the data returned from the RFID module when performing read TID/EPC number operation.

Read user data timeout: refers to the maximum time required to wait for the data returned from the RFID module when performing read user data operation.

Read the tag's Q value: the number of tags located in the effective reader field should be less than 2^{Q}-1, ranging from 0 to 15. The default is 3. Set as 0 when reading one tag.

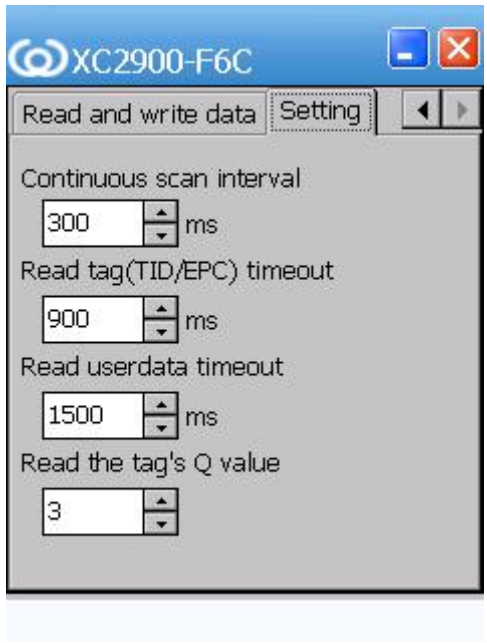


Figure 7-12 Settings

7.3.5. Operating frequency

In the main screen click on the title bar, a drop-down menu pops up. Select menu "Parameter setting" as shown:

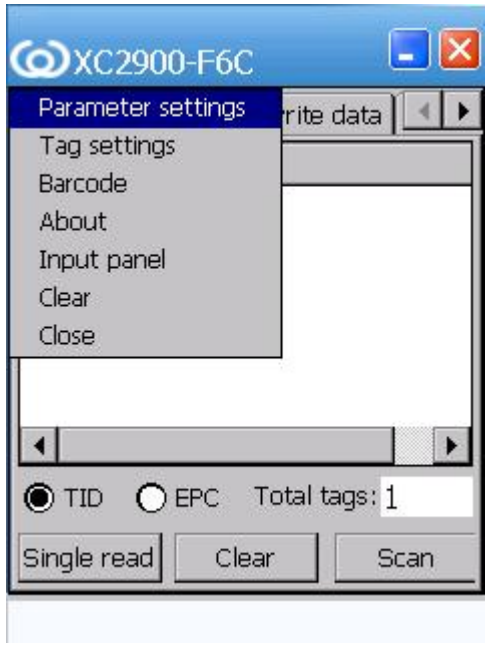


Figure 7-13 Main screen

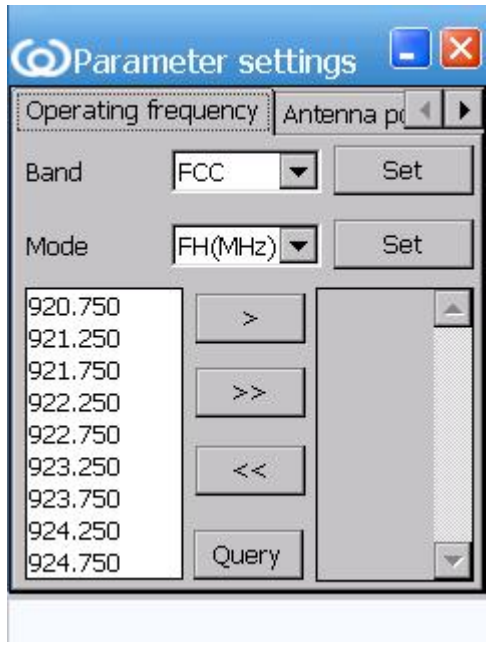


Figure 7-14 Operating frequency

Band: switch between FCC and CN operating frequency band;

Mode: the frequency point can be queried and set. Click “Query” to query the frequency point as shown:

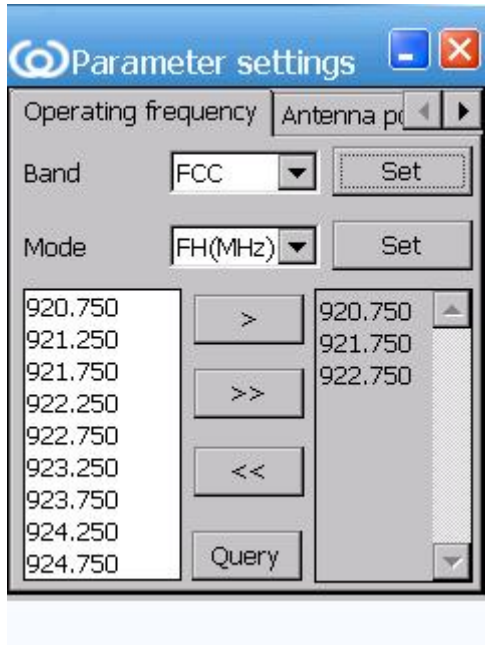


Figure 7-15 Query frequency point

Select “FH“ in “Mode” ， select the desired frequency, and click “>” to add the desired frequency or “>>” to add all frequencies available. Click “Set”. The screen appears:

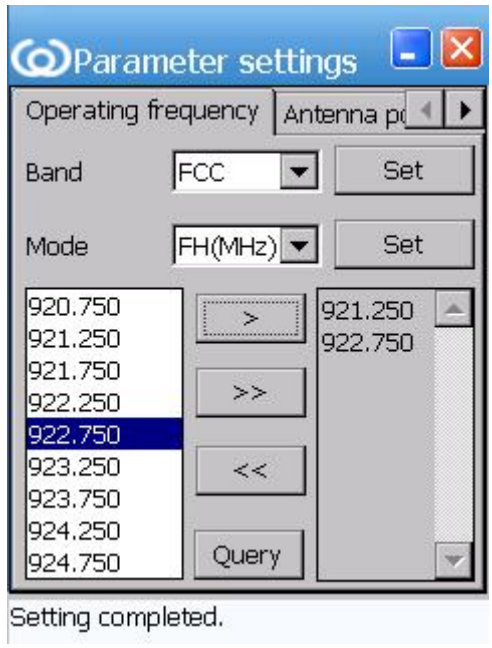


Figure 7-16 Setting frequency completed

7.3.6. Setting power

Select “Parameter setting” and the screen appears:

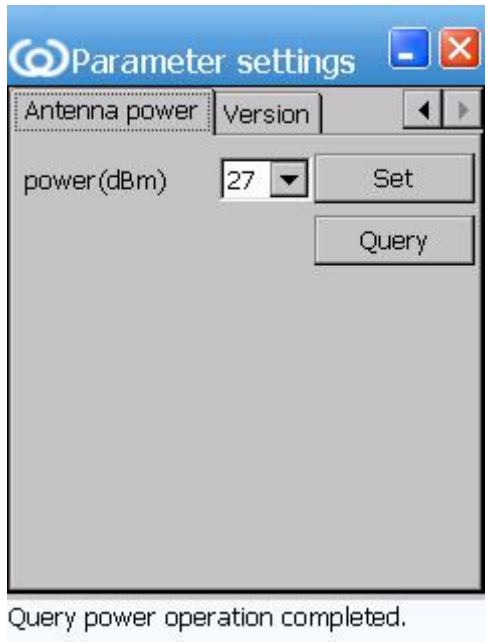


Figure 7-17 Setting power

Antenna power mainly affects read and write distance; the greater the power, the longer the read/write distance. When entering the page, the screen displays the current antenna power. Users can select the desired power level in the drop-down list, and click "Set" button.

7.3.7. RFID module version

Select the "Version" screen to view the model of RFID, the software version, the hardware version of the RFID module.

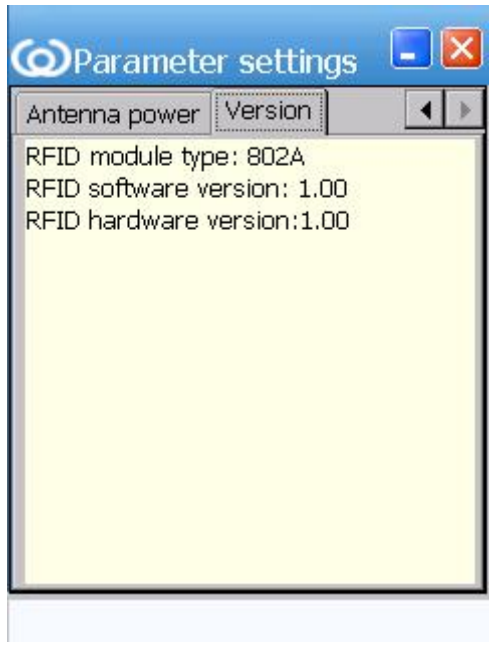


Figure 7-18 Version info

7.3.8. Tag security

In the main screen, click the title bar and a drop-down menu pops up. Select “Tag settings”. Following functionalities can be performed: modify tag’s access password, and lock or unlock data bank/s. Select a TID, and enter the access password. Select the desired operations, input the relevant data, and click “set”. Setting options include:

Access password: to modify the current access password. Enter the hexadecimal characters, 4 bytes length;

Tag Lock: to lock or unlock banks on tag, including: TID, EPC, user data, access password, and all the banks. Select the desired lock or unlock operation;

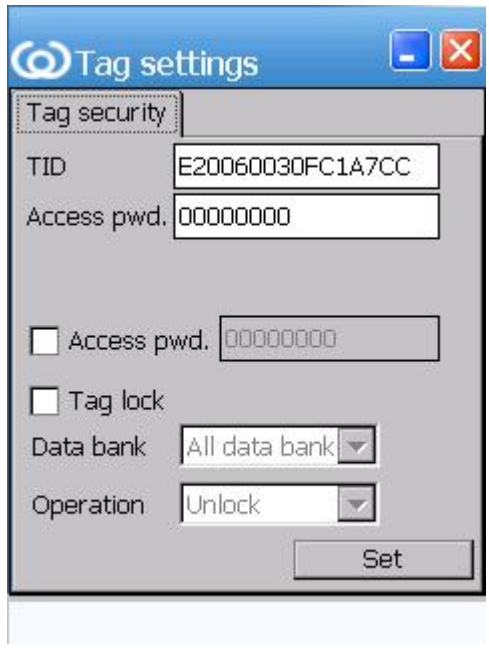


Figure 7-19 Tag security

Note that the new access password will take effect only if the operation of lock tag data is completed after the access password is changed.

7.3.9. About Version

Click the title bar in the main screen and a drop-down menu appears. Select "About" menu to view the demo version info and the dynamic library version info and company information.

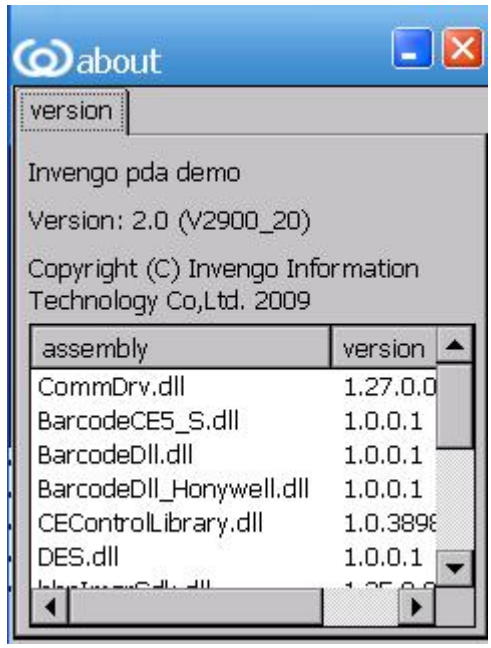


Figure 7-20 About

7.4. About APIs

The APIs are the middleware of the XC2900-F6C and the application software, which provides the interfaces for secondary software development for the system integrator or end-user.

For more information view [CD-ROM] - [RFID module] - [RFID-F6C].

For information on API calling and application software development, refer to the XC2900-F6C Handheld RFID Reader Programmer's Reference Manual.

8. Notes

8.1. Installing battery

Remove the battery compartment door, and install the battery as follows:

Correct installation:

Position the right contact points of battery to contact the corresponding contact points in the battery compartment, and apply force on the other side of battery to push the battery into the compartment as shown in Figure 10-1

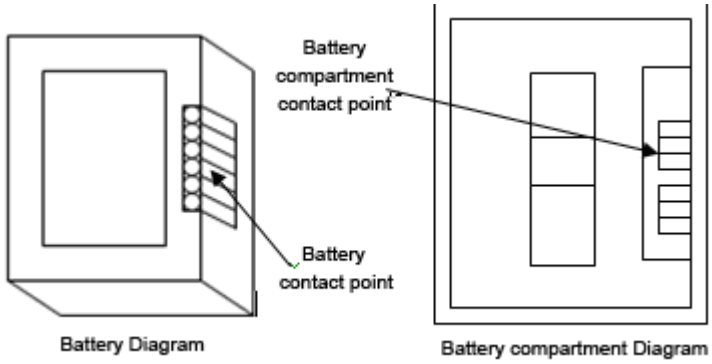


Figure 8-1

Incorrect installation:

1) Vertically apply force on the battery and insert the battery into the battery compartment, which may result in insufficient contact or damage to the power supply component.

2) Position the left contact points of battery to contact the corresponding contact points in the battery compartment, and apply force on the other side of battery to attach the battery into the compartment, which may result in insufficient contact or damage to the power supply component.

8.2. Power supply management

To increase the XC2900-F6C‘s battery power navigation time, the XC2900-F6C uses a flexible power management method as follows.

1) Power control: The reader system in default configuration will not automatically switch to the standby mode. There are two ways to switch to the power-saving standby mode.

A) Press Enter key for about 2s, the system will switch to standby mode.

M) According to the methods in [3.7 Configuring Power Management Scheme], set and switch the system to the different power-saving mode.

2) Module Control: in standby mode all modules are powered off; the system switches to low power consumption mode. However, due to the module's characteristics, when the XC2900-F6C switches from the standby mode to normal operation, rebooting the Wi-Fi module is required.

Note: to maximize the batter navigation time, charge the XC2900-F6C in time.

8.3. Recommended USB storage device models

Memory / Model	Max. 1G	2G	4G	Note
Kingston -DataTravele	√	√	√	
Kingston101	√	√	√	
KingMax	√	√	√	
aigo L8266/8206/8298	√	√	√	
unis	√	√	√	

Apida	√	√	√	
EAGET	√	√	√	
SD Reader	√	√	√	

Notes: Use the recommended models for optimum performance and compatibility.

8.4. Abnormal power-down

A sudden power-down occurs and four status LEDs incorrectly indicate the current conditions. After re-installing the battery, the problem still exists. Reboot then the XC2900-F6C. The best way to reboot the XC2900-F6C is to use the key combination reset (trigger + Enter). The XC2900-F6C can also be reset by pressing the reset button on the XC2900-F6C. After rebooting the XC2900-F6C, the XC2900-F6C will be restored to the factory settings.

Do not press the trigger and the Enter key when resetting the XC2900-F6C is not required.

8.5. Replace the battery

Set the XC2900-F6C to standby mode, and then replace the battery (The XC2900-F6C in standby mode can maintain standby within 15 seconds after power-down) within 15 seconds. Rebooting the XC2900-F6C is not required when the battery replacement is completed within 15 seconds. Press the Enter key to wake up system.

If the battery replacement takes more than 15 seconds, reboot the XC2900-F6C. (Press the trigger + Enter key to reset the 2900).

8.6. Install TF/SIM card

① Install TF & SIM card:

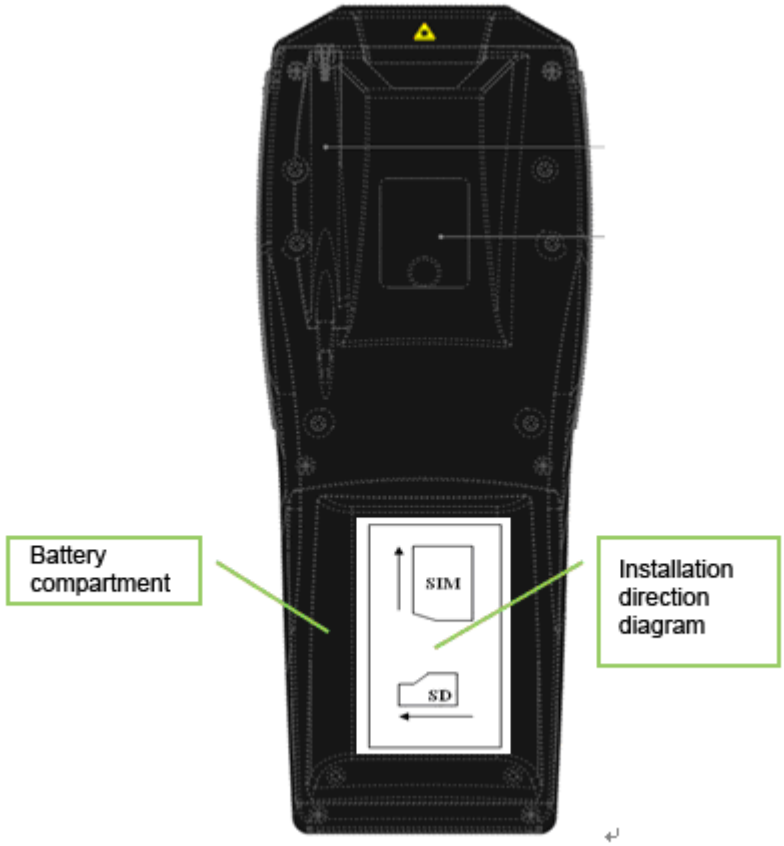


Figure 8-2 Install SD card & SIM card

Install the SD card and SIM card as shown in Figure 8-2.

② Recommended models of SIM card & TF card

SIM card: Please use the second generation SIM card. 3G SIM cards are not supported.

TF card: ScanDisk 1G, TransFlash card (max. 2G) is recommended.

9. Maintenance & Troubleshooting

9.1. Daily Maintenance

The XC2900-F6C is stored in a cool dry location with the temperature range of ¬ 10 ℃ between 40 ℃, and kept away from fire and heat (for details see 12.2 Storage Requirements).

The lithium battery characterizes self-discharge characteristics. Remove the battery from the XC2900-F6C when the XC2900-F6C is not in use for a period of more than a month. The batter is to be appropriately stored. (The battery with 40% power level is in the best condition for long-term storage. Discharge battery every three month if possible).

Notes for battery

1. Do not directly connect the anode to the cathode.
2. Do not submerge the battery in water, and keep the batter in a dry location.
3. Do not use or store the battery in a location near any heat source (for example, fire or heater);
4. Using the original charger is recommended;
5. Do not reverse the polarity of battery;
6. Do not connect the battery directly to a wall outlet or in-car cigarette lighter-type socket;
7. Do not throw batteries into fire or heat the battery; avoid battery short-circuits;
8. The battery should be appropriately packed for the transport and storage;
9. Do not disassemble the battery or cause the battery short-circuits;
10. Avoid any impact to the battery and hitting the battery with sharp object.

9.2. Troubleshooting the XC2900-F6C

Many common problems you may encounter when operating with your RFID system can be solved by carefully checking the RFID settings and changing them accordingly.

- What is a "reboot" operation? How to "reboot" the XC2900-F6C?

☆ "Reboot" the XC2900-F6C, the XC2900-F6C will restore the factory settings.

☆ Click the menu on lower left corner in the main screen of the XC2900-F6C. Click the Start menu, click "System", and "Reboot" button.

☆ Press the RESET key to reboot the XC2900-F6C.

☆ Pull the trigger and press the Enter key simultaneously to reboot the XC2900-F6C.

- Why are the installed applications and settings missing after rebooting the XC2900-F6C? How to solve it?

☆ There are two common ways to reboot the XC2900-F6C, including "reboot the XC2900-F6C" and "hot start the XC2900-F6C". "Reboot the XC2900-F6C" corresponds to "cold start the XC2900-F6C."

☆ [Rebooting] is a hardware reset process. After rebooting, the XC2900-F6C will be fully restored to factory settings.

[Hot start] is a software reset process during which the registry will be refreshed mainly for the import and export registry information. [Hot start] does not reset the hardware.

The XC2900-F6C currently support [Rebooting] only. Click the "System" – click "Reboot" button or "unplug battery" will reboot the XC2900-F6C.

☆ The power consumption will be minimized when the XC2900-F6C enters “Standby” mode. To keep settings or install applications, do not reboot the XC2900-F6C or remove the battery from the XC2900-F6C.

Long press the red "Enter" key to enable the system to enter "Standby" mode.

- **Backlight is off**

☆ Check the backlight is turned down to a minimum.

☆ Check the pending button “Enter” is clicked.

- **No sound**

☆ Check the “Mute” button is on.

☆ Check the system volume is turned down to a minimum.

- **Click on black screen, and the XC2900-F6C does not respond.**

☆ Check if the standby mode is enabled: Click “Enter” to activate the system.

☆ Check the battery is correctly attached.

- **When charging the XC2900-F6C, the LED remains off.**

☆ It is normal. The modules installed on the XC2900-F6C are powered off to in-crease the navigation time and standby time.

☆ When charging the XC2900-F6C of which the “Standby” mode is not enabled, the LED blinks evenly.

- **The XC2900-F6C is unable to read data.**

☆ Check the transponder is placed within the reader field.

☆ Check if RF signal interference occurs.

- **The XC2900-F6C is unable to write data on the transponder.**

☆ Check the transponder is placed within reader field.

☆ Make sure data banks on tags are locked.

☆ Make sure the write command parameter is correctly set.

☆ Check if the RF signal interference occurs

- **Write distance is shorter than read distance.**

☆ This is technically normal. Writing data on tags require more power than reading transponders do.

- **For different transponders, read distance significantly varies.**

☆ This is technically normal. The transponders with different transponder chips and packaging material have different sensitivities, thus the read/write distance and power might be different.

- **When the XC2900-F6C is synchronizing with PC, the system crashes or halts during file transfer.**

☆ Remove the battery, and reboot the XC2900-F6C.

☆ If the problem remains, proceed the following steps:

Navigate to “Control Panel” - “Storage Device Manager”- Select storage device (flash or SD storage card) in drop-down box

Select “Remove” - “Format” - “New Storage Device”, and input storage device name

 After formatting, data on Mirco TF card will be lost.

- **The XC2900-F6C system crashes when user attempts to operate Flash card or SD card.**

Complete following steps:

☆ Navigate to “Control panel ” --“Storage Device management” – select storage device (Flask card or TF card) in the drop-down box.

☆ Select “Remove”- “Format” - “New Storage Device”, and input the storage device name.

 After formatting, data on Mirco TF card will be lost.

- **When the power adaptor or battery is attached to or on the XC2900-F6C, the XC2900-F6C is not booted. (Black screen or system halt occurs.)**

☆ Black screen:

a) Make sure USB cable is connected to the XC2900-F6C. If connected, remove the USB cable, and reboot the XC2900-F6C.

b) Check if power adaptor is well connected, and battery is correctly attached.

☆ The XC2900-F6C system halts:

a) If there is a progress bar, pull the trigger and press ENTER key to reboot the XC2900-F6C.

b) If there is no progress bar, contact your Invengo representative for more information.

For additional information on troubleshooting the XC2900-F6C, contact your Invengo representative.

9.3. Optimizing RF communication

The system performance of handheld RFID reader is typically affected by signal interference and attenuation. This section introduces tips to optimize the RF communication between the XC2900-F6C and the transponders.

9.3.1. Signal interference

Signal interference occurs during data exchange between the XC2900-F6C and transponders. Signal interference significantly affects the read/write performance on standard compliant RFID transponders.

Disturbing signals may come from:

- RF system, for example: Local wireless data network (RF local-area network), adjacent interactive identification system; or
- Security gate, garage door or other device issuing RF signals; or
- Other RF radiation sources

The RFID system performance reduces when signal interference occurs. The XC2900-F6C receives one signal once, and cannot distinguish the disturbing signals and the desired signals.

9.3.2. Signal Attenuation/Reflection

Signal attenuation indicates the decrease of signal strength along with the increase of operation distance. When the signal encounters obstacles during transmission, the signal attenuation also occurs. The RF signal obstacles may include:

- Cement wall, floor and ceiling of closed space
- Metal application environment
- Water and other liquid

Signal attenuation occurs in the RF signal transmission paths. The signal attenuation can be minimized by adjusting the RFID antenna positioning. Signal reflection on metallic surface could also affect the signal attenuation. In some cases, it can slightly increase the read distance. However due to that there are blind spot/s, the quality of communication between transponder positioned in this/these blind spot/s and the XC2900-F6C will be low.

Generally speaking, it is impossible to make accurate predictions of performance of mobile RFID systems located in any given environment, which attributes to the complexity of electromagnetic radiation, including signal source frequency stability, antenna radiation patterns, antenna side lobe issues, application environments, etc.). Following advices on specific environment and application scenarios are provided with an aim to optimize the RFID system performance:

● Consider carefully the environmental factors, including building materials, operation period, window and pipeline configuration. The RF field patterns and read distance may be affected by the nearby metal objects, such as household appliances, device and metal frame.

● Ensuring that objects to be identified is positioned within the valid read range of the XC2900-F6C for minimum 100ms (for XCTF-5000 series transponder).

● The packaging or embedded non-conductor materials are related to the optimal length of antenna. The basic idea is: the transponders are embedded in non-conductor medium which dielectric constant generally is greater than the dielectric constant in the air, resulting in that effective wavelengths are shorter than the valid wavelength in the air. When the effective electrical length of the transponders is adjusted to the optimal value (the maximum read distance which the XC2900-F6C configuration supports), the transponders should be embedded in non conductor medium or other substrates, and the electric length of antenna should be adjusted toward the smaller angle in order to achieve the best performance equivalent to that of transponders positioned in the air. On the contrary, if effective electric length of the transponder antenna is adjusted to the

optimal length in non-conductor medium, the optimal electric length in the air should be adjusted to achieve the maximum electric length.

● Keep the transponders away from chemicals. Contacted with some chemicals, e.g. alcohol, at room temperature, the transponders performance will not be affected. However, when the storage or operating temperature is high, the chemicals might erode the transponders.

10.Transportation & Storage

10.1. Transportation

The transportation of the XC2900-F6C should meet the road transport, rail transport, air freight, water transport, and other relevant requirements.

10.2. Storage

Choose a storage location for the XC2900-F6C that meets these requirements:

- User temperature: -10℃ to 40℃;
- Humidity: 5% ~ 80%, non-condensing;
- Avoid drastic temperature changes, acidic gas and other hazardous gases;
- Lithium battery for the XC2900-F6C is of self-discharge characteristics. Remove the battery from the handheld devices which will not be used for a long period. Choose a location for the battery that meets these requirements:

a User temperature: -10℃ to 40℃;

b Humidity: 5% ~ 80%, non-condensing;

10.3. Package of the XC2900-F6C

The XC2900-F6C is packed in a box which is suitable for turnover box transportation.

10.4. Unpacking the XC2900-F6C

Keep the package and the packing materials in good condition after unpacking the XC2900-F6C for future storage and transportation.

The accessories and the XC2900-F6C are contained in the package; check that the accessories and the XC2900-F6C are complete.

11. After sale service

11.1. After sale Service

Contact your Invengo Representative if problem/s arising in using the XC2900-F6C can't be solved.

Provide the following information, when you your Invengo Representative:

- Model
- Serial number
- Modification to the reader or the Transponders
- Application software information

11.2. Additional Information

To return the XC2900-F6C for repair, your Invengo representative will give you a Return Merchandise Authorization (RMA). Please write the RMA on the product package and put a note with the RMA inside the package in order to ensure the returned product will be processed in time.

- Carefully pack the XC2900-F6C and its accessories and put them into the original antistatic foam package; Find a package that has equal protective measures if the original package is unavailable;
- Cover the items in the package with filling materials;
- Put a note with your RMA number in the package;
- Mark the RMA number and "Fragile" on the package.

FCC Warning:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-- Consult the dealer or an experienced radio/TV technician for help.

FCC RF Radiation Exposure and SAR Statements SAR Statement the XC2900-F6C Handheld Reader has been tested for body-worn Specific Absorption Rate (SAR) compliance. The FCC has established detailed SAR requirements and has established that these requirements. RF Exposure Information The radio module has been evaluated under FCC Bulletin OET 65C (01-01) and found to be compliant to the requirements as set forth in CFR 47 Sections, 2.1093, and 15.247 (b) (4) addressing RF Exposure from radio frequency devices