

Principle description

PDA module consists of function backboard and core system board.

1 Principle of function backboard

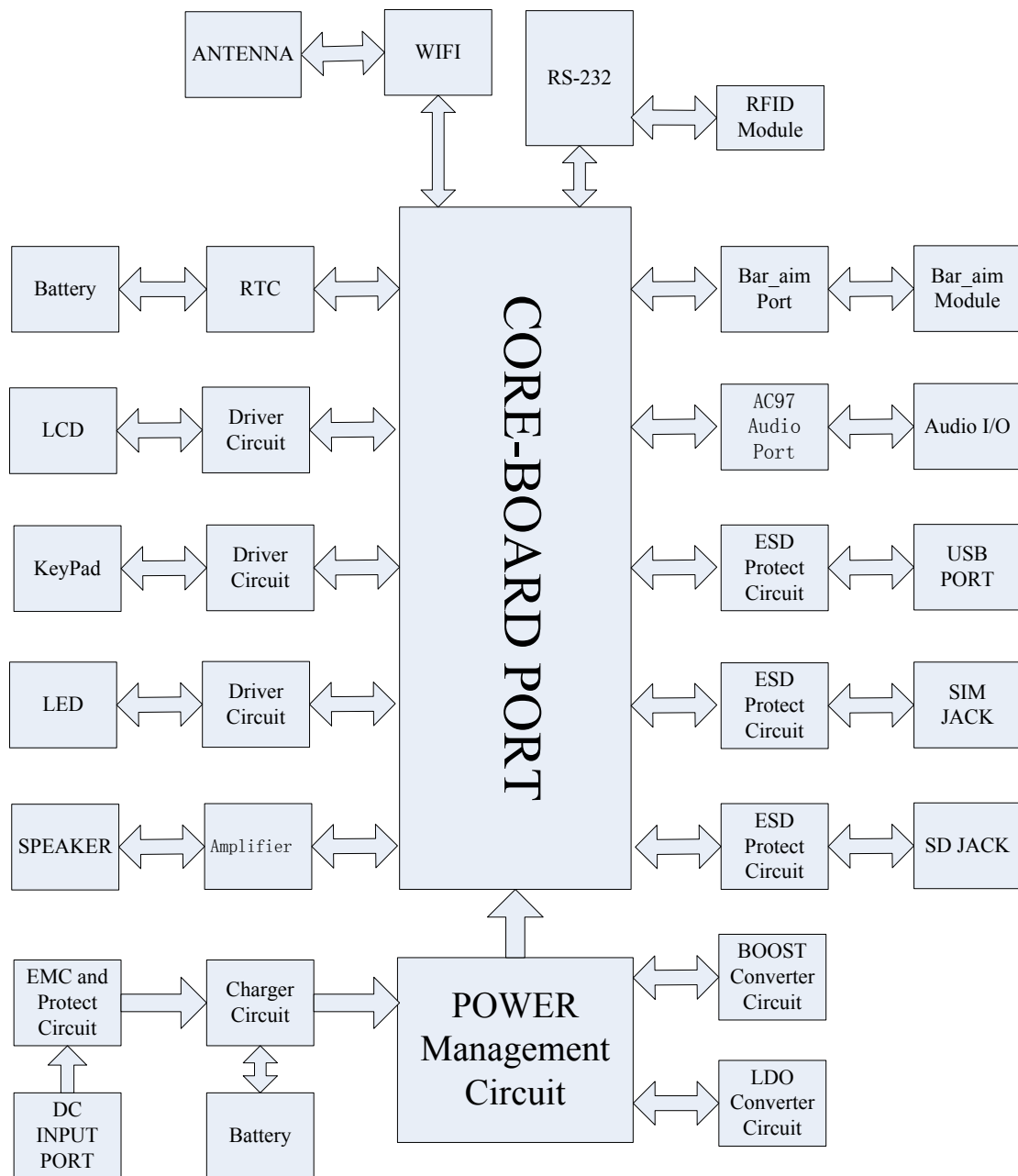


Fig.1 function backboard block diagram

The function backboard is used to connect the core system and all kinds of function modules. The interface of the PDA to peripherals, keyboard, LED and extended communication modules are all placed on the function backboard. all these modules are designed to realize the required function under the control of the core system board. power management, battery charge, UART interface/USB interface, AC97,WIFI, barcode scanner, keyboard and touch screen are all realized on the function backboard.

The RFID module is connected with UART interface of PXA 270 processor by RS-232 interface directly, which is used to realize RFID reading / writing function.

The core system board offers a USB Client controller interface, which is transferred to be an External USB device interface of the reader after adding necessary EMC and ESD components

After adding some necessary EMC and ESD components, The USB Host controller interface provided by the core system is transferred to be an external USB host interface by the function backboard. it is used to operate the USB device, such as U disk.

The function backboard offers an interface to LCD touch screen and driving circuit. The driving circuit is connected with the LCD controller module of PXA270 processor directly. Considering EMC and

driving ability, some driving components and necessary filtering components are applied.

A SD deck is provided by the function backboard, which is connected with the Mobile Scalable link (MSL) interface of PXA270 processor via the backboard. It is used to realize the data local memory. Considering EMC and driving ability, some driving components and necessary filtering components are used.

Considering EMC and driving ability, some driving component and filtering/protecting components are used.

An interface to the 1/2 dimension barcode scanner is provided by the function backboard. An barcode scanner module is connected with Quick Capture Interface of PXA270 processor directly, which is used to realize 1/2 dimension barcode scanning and data processing.

A 6X7 keyboard and driving circuit are provided by the function backboard. It is connected with Keypad interface of PXA270 processor, which is used to input data to the reader.

The function backboard provided an audios output which originates from the core system board. After amplified, the audio signal is transmitted to loudspeaker.

The audio encoding/decoding chip on the function backboard provides standard AC97 interface and audio input/output interface. The

AC97 interface on the backboard is connected with the AC97 module of PX270 processor directly.

The WIFI module on the function backboard is connected with the SDIO controller in PXA270 processor via SDIO interface, which is used to realize wireless LAN communication.

The PXA270 processor on the system board offers a RTC module, and there is a backup battery on the function backboard. which is used to realize RTC functionality.

A battery interface is provided by the function backboard. which is assigned to each unit through a serials of power control switches.

A power supply interface is available on the function backboard. By this interface, the power is feed into protection circuit and then to the charge management circuit to charge the battery and power the system.

On the other hand, the power management realizes the switch between battery supplying and charger supplying regarding whether the reader is connected with a charger. When there is a power input by the charger, the system is powered on by the charger, and cut off the connection between the charger and the system. when the connection between the reader and charger is cut, the battery continue to power the system.

2 principle description of the core system board:

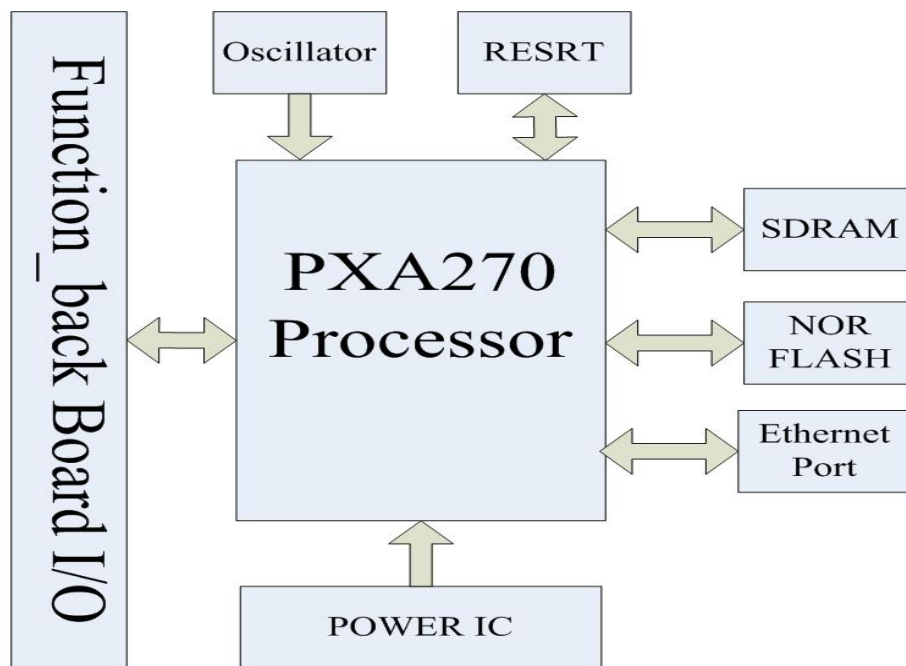


Fig. 2 block diagram of the core system board

The core system board is a minimum system which can execute separately based on PXA270 processor. Besides the main processor PXA270 and required oscillator and reset circuit, there are also a SDRAM and NOR FLASH which used to memory the data and program. Both of them are connected with processor by data bus, address bus and function bus. In addition, an Ethernet chip is used for the convenience of development.

SDRAM and NOR FLASH are connected with the memory controller module of PXA270 processor via data bus、 address bus、 and read/write control bus, Which is used to realize data reading and writing.

The address bus and control bus of the Ethernet chip is connected

with the interface of the address bus and control bus in the PXA270 process respectively, Which is used to provide an external RJ45 interface.

The connection between core system board and function backboard is realized by the B&B linker.

3 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:

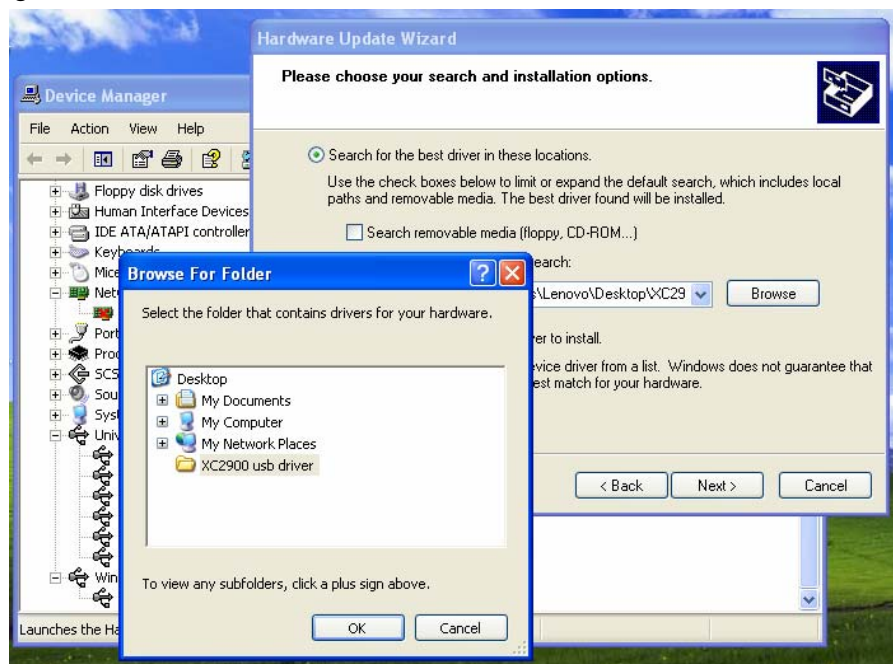


Figure 5-4 Install USB driver

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.

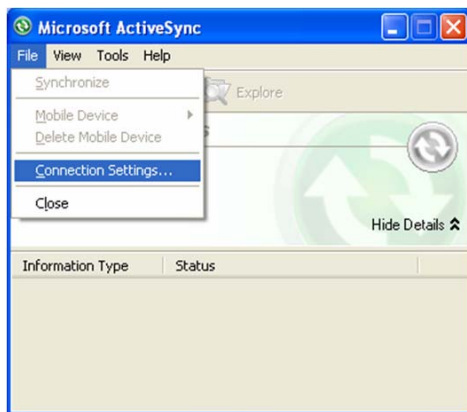


Figure 5-6 ActiveSync screen

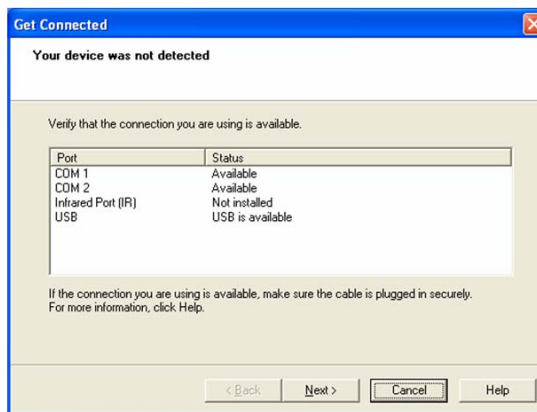


Figure 5-7 Port search screen

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



Figure 5-8 My computer→mobile device

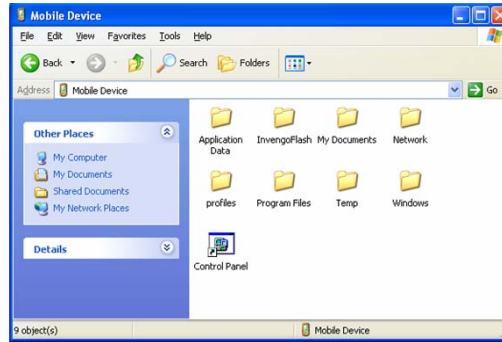


Figure 5-9 Icon and content

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

4 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:

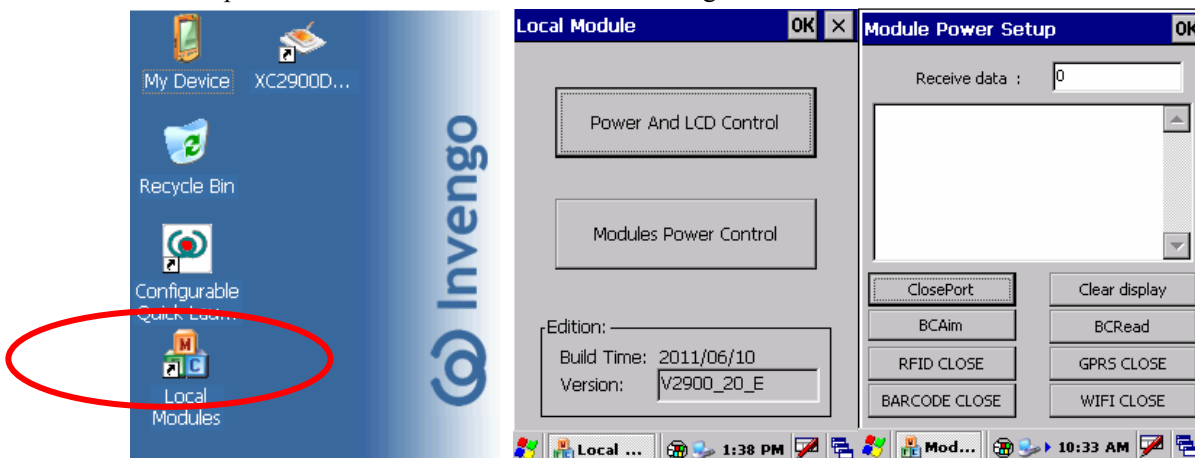


Figure 6-1 Power on Wi-Fi module

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.

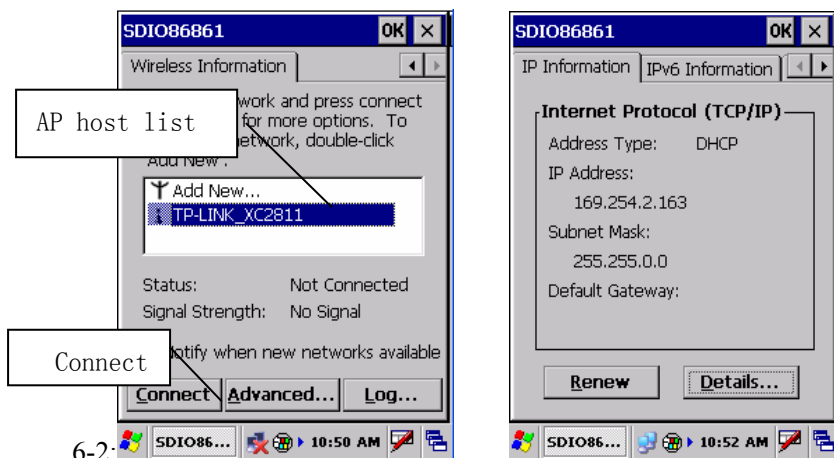


Figure 6-2 Wi-Fi module setting

5 Introducing RFID Module

5.1 Understanding RFID module

5.1.1 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.

5.1.2 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.

5.2 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.

5.2.1 Demo application environment

Windows CE 5.0 and .Net Compact Framework 2.0

5.2.2 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

5.2.3 Running demo

Running demo until the interface appears, as shown:

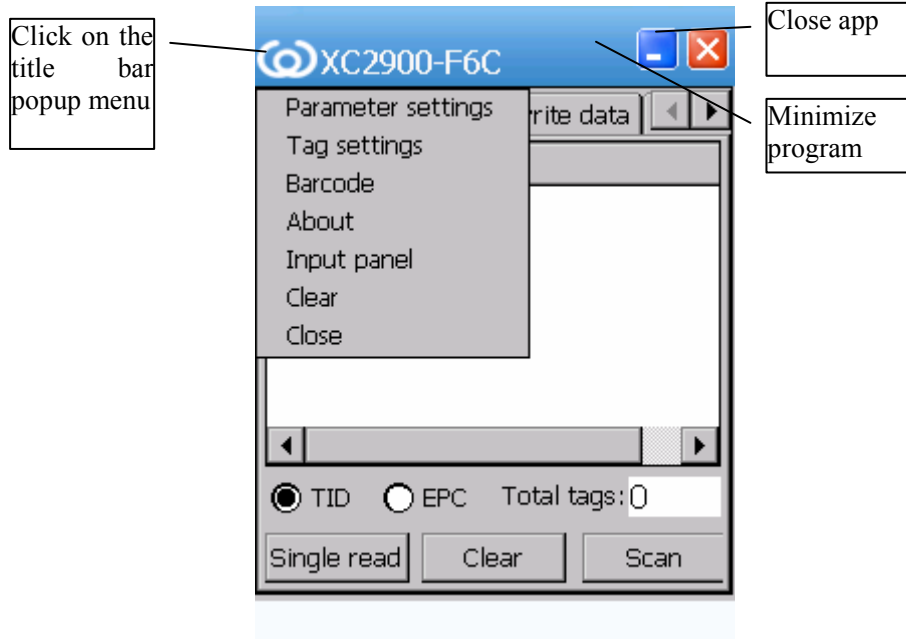



Figure 7-2 Demo main screen

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

5.3 Demo operation

5.3.1 Scan tag

After launching Demo, the scan tag screen appears:

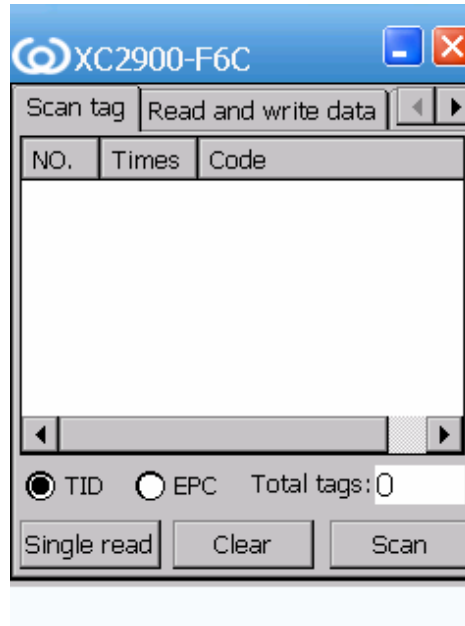


Figure 7-3 Scan tag

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:

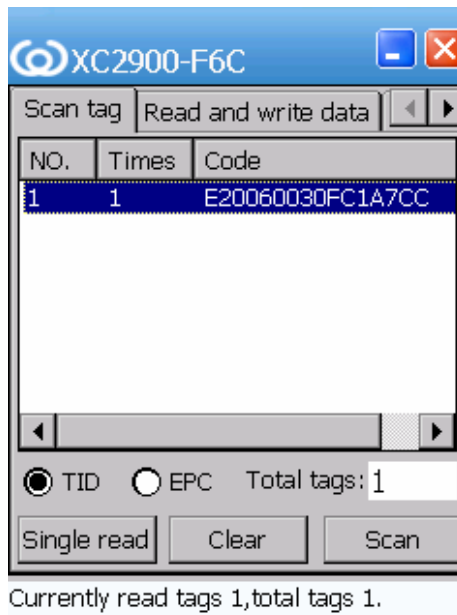



Figure 7-4 Read TID

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.

5.3.2 Read and write EPC number

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

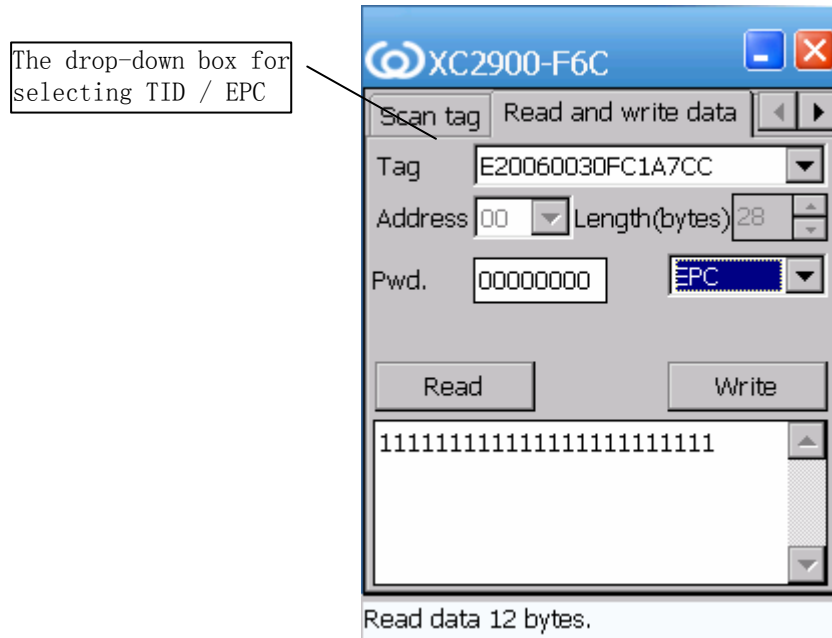


Figure 7-5 Read EPC number

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.

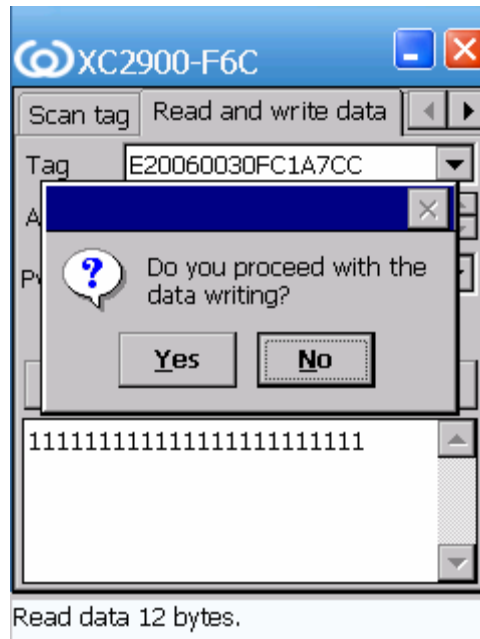


Figure 7-6 Write EPC number

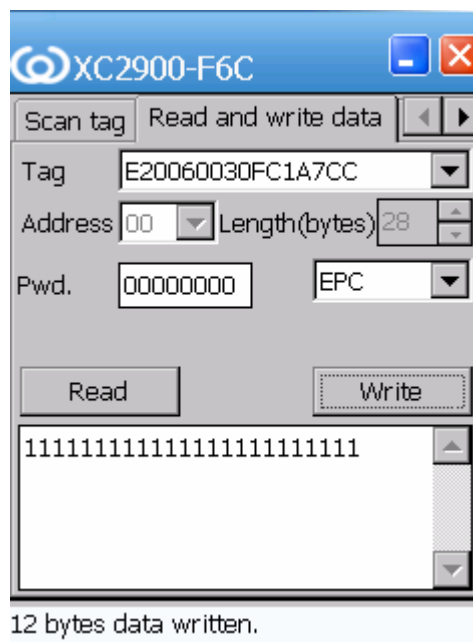


Figure 7-7 Write EPC completed

5.3.3 Read and write user data

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

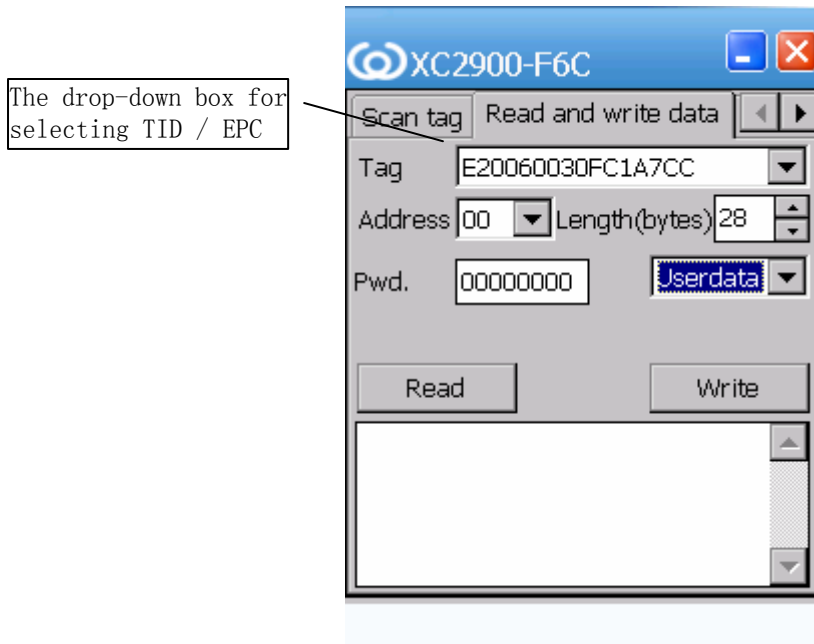


Figure 7-8 Read and write data

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:

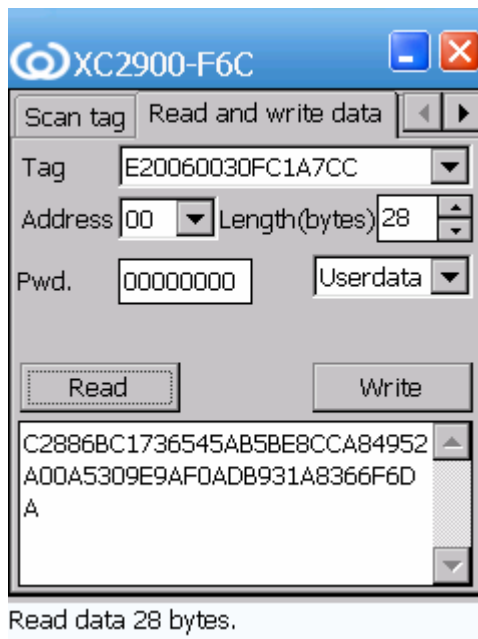


Figure 7-9 Read user data

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:

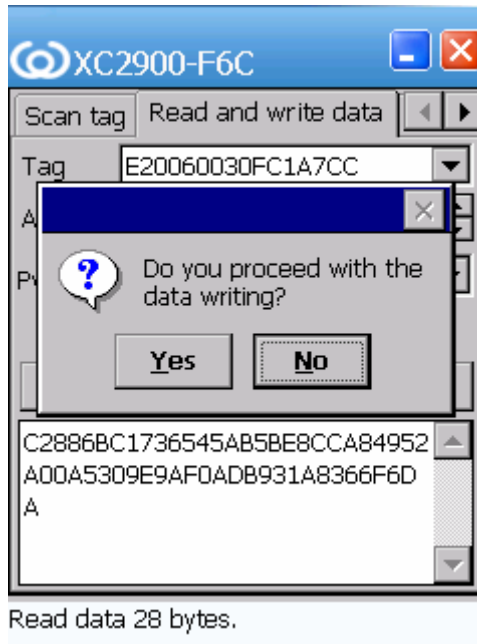


Figure 7-10 Write user data

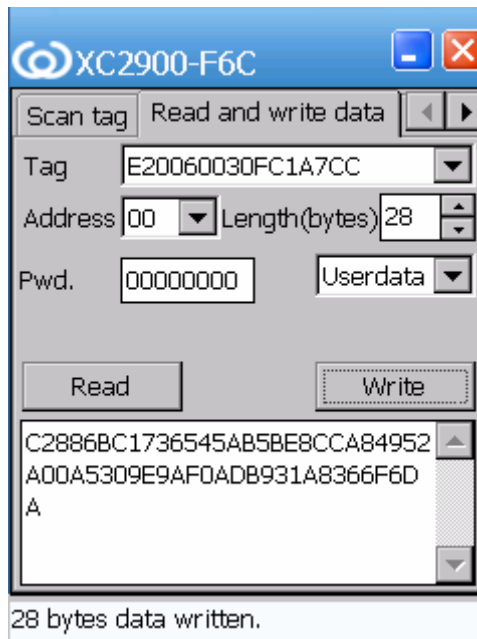


Figure 7-11 Write data completed

5.3.4 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.

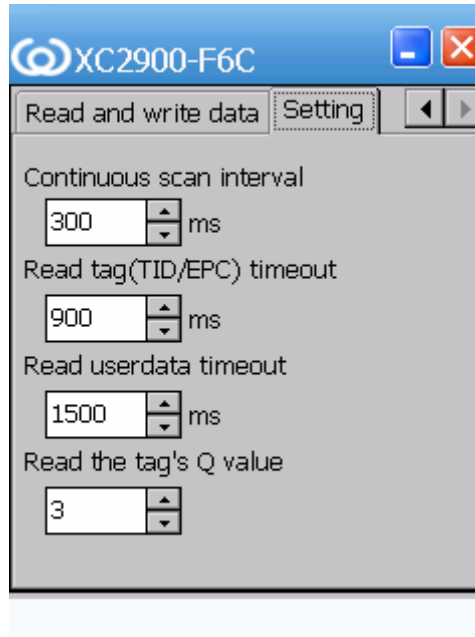


Figure 7-12 Settings

5.3.5 Operating frequency

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

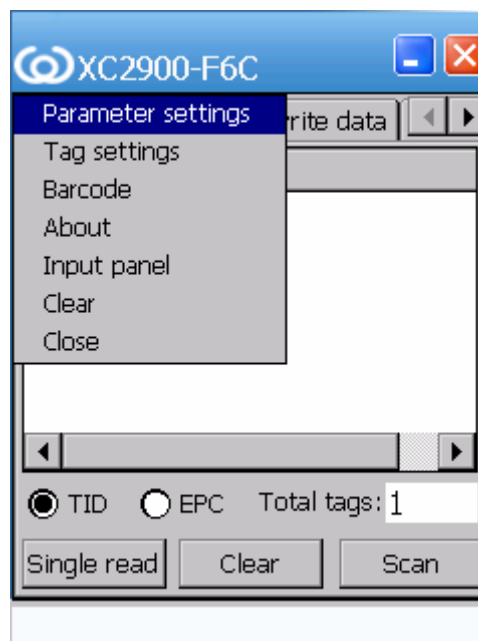


Figure 7-13 Main screen

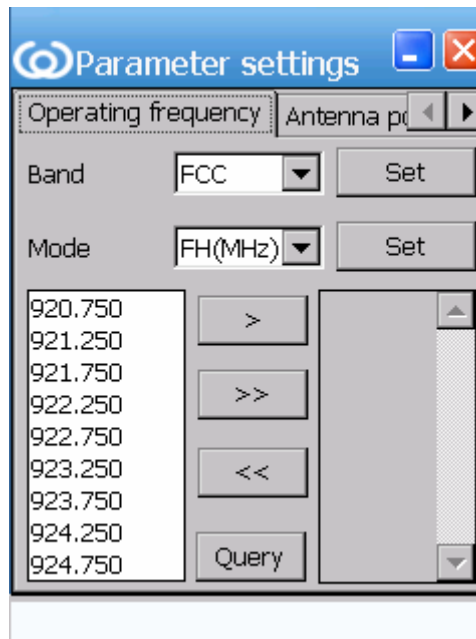


Figure 7-14 Operating frequency

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:

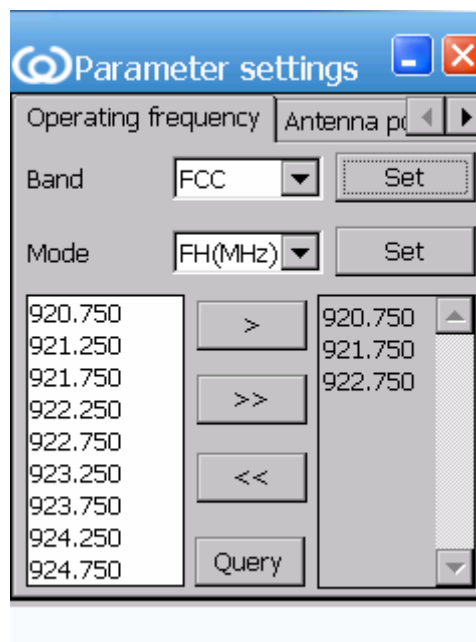


Figure 7-15 Query frequency point

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:

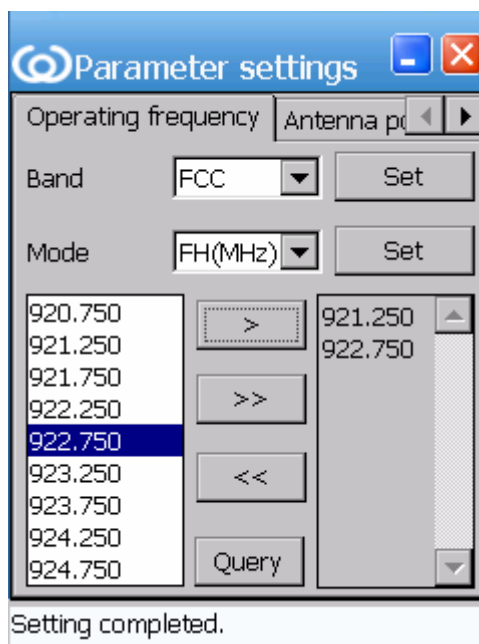


Figure 7-16 Setting frequency completed

5.3.6 Setting power

Select "Parameter setting" and the screen appears:

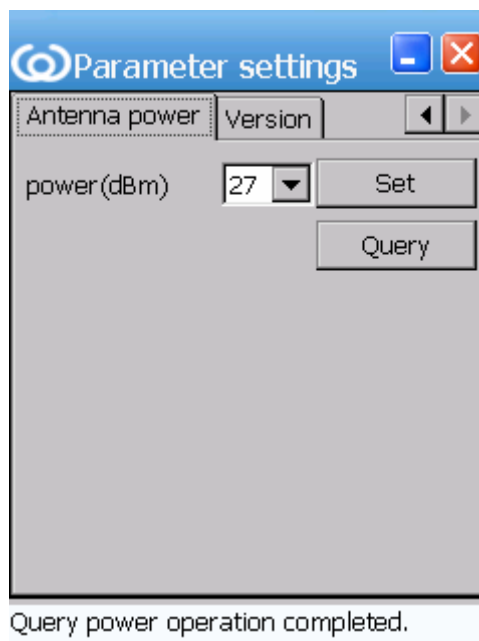


Figure 7-17 Setting power

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.

5.3.7 RFID module version

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

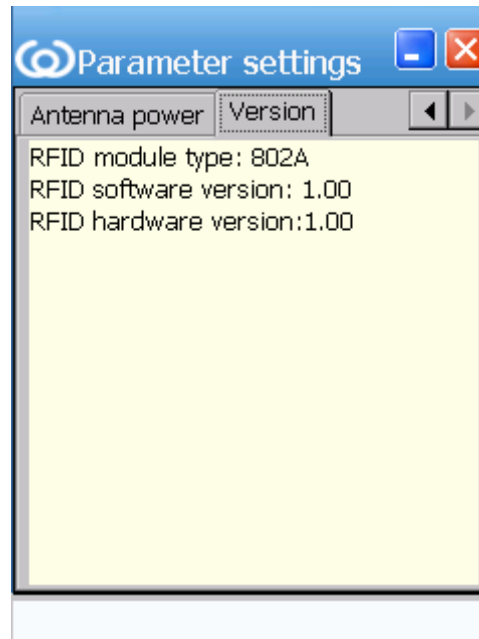


Figure 7-18 Version info

5.3.8 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;

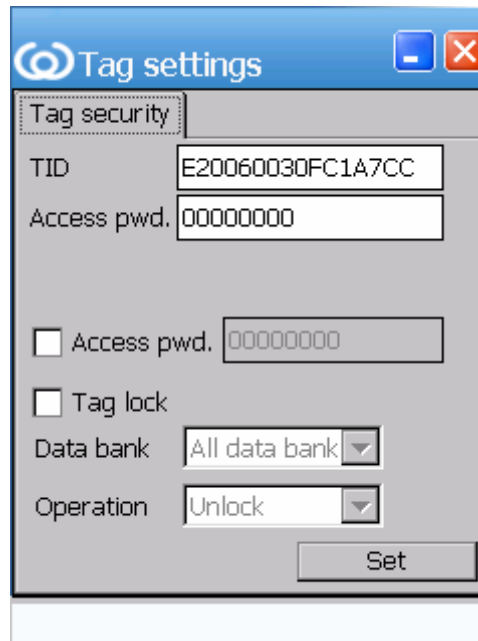


Figure 7-19 Tag security

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.

Note:

On the Schematic, the lines for GPRS prepared for future used, the products sell to USA will not use the GPRS module.