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MICROELECTRONICS TECHNOLOGY INC.

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MTI RFID Reader
DEMO Integration Program 1.05_02

User Guide

Model : RU-814

A0			AS ISSUED	陳建鳴
LTR.	E.C.O. NO.	DATE	CHANGE INFORMATION	AUTHOR

REVISED HISTORY

DWG NO. 43-RFID INTEGRATION UG105 APPROVED BY 潘任展

PAGE NO. 1 OF 23

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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 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.

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.

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

IMPORTANT NOTE:

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 25cm between the radiator & your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

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Chapter 1 Introduction

1.1 Purpose

This document provides information and procedures on demo software program installation, setup, and use of MTI RFID Reader.

1.2 Trademarks

The product described in this book is a licensed product of Microelectronics Technology Inc.

Microsoft, Windows 95, Windows 98, Windows Millennium Edition, Windows NT, Windows 2000, Windows XP, and MS-DOS are registered trademarks of the Microsoft Corporation.

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Chapter 2 Accessories

2.1 Product and Accessories

- The Reader
- Power over Ethernet Cable (PoE Cable)
- AC/DC PoE adapter & AC power cord
- Antenna (optional)
- TNC reverse to TNC reverse antenna cable (optional)

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2.2 Interface Installation

Please install the accessories as following illustration, see Fig. 1.

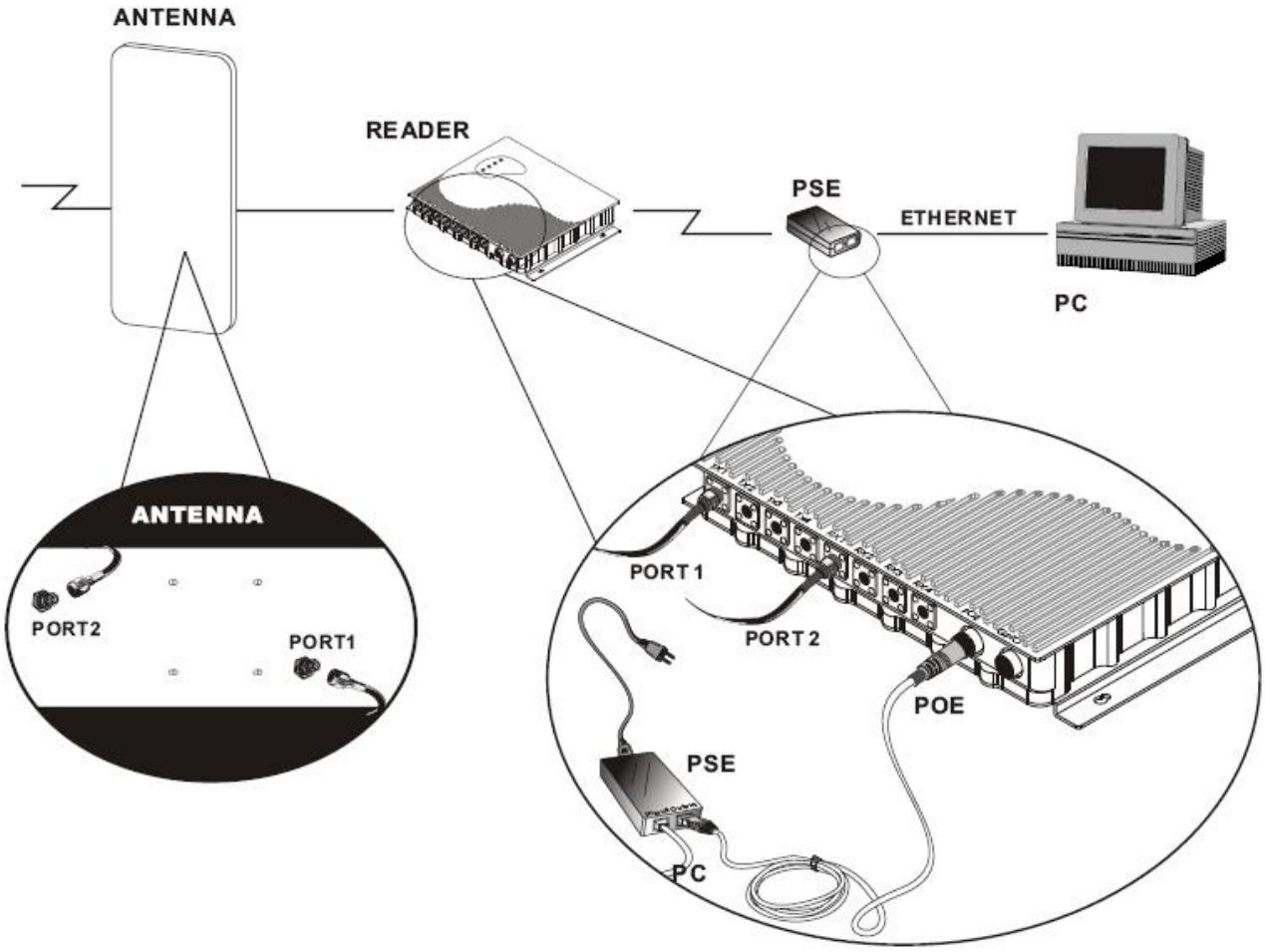

Fig. 1 Interface installation with related ports.

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Chapter 3 Installation

3.1 Install Java Runtime Environment

The MTI RFID DEMO requires Java Runtime Environment (JRE) 5.0 or newer version. Please make sure that your JRE had been installed on your Windows. You can download it from Sun Microsystems, see

http://java.sun.com/javase/downloads/index.jsp

3.2 Install MTI RFID DEMO

Step 1: Run 'MTI_RFID_Integration_setup_1.05_02.exe' to setup the program on your Windows. Please click “Next” button to continue the setup wizard, shown in Fig. 2

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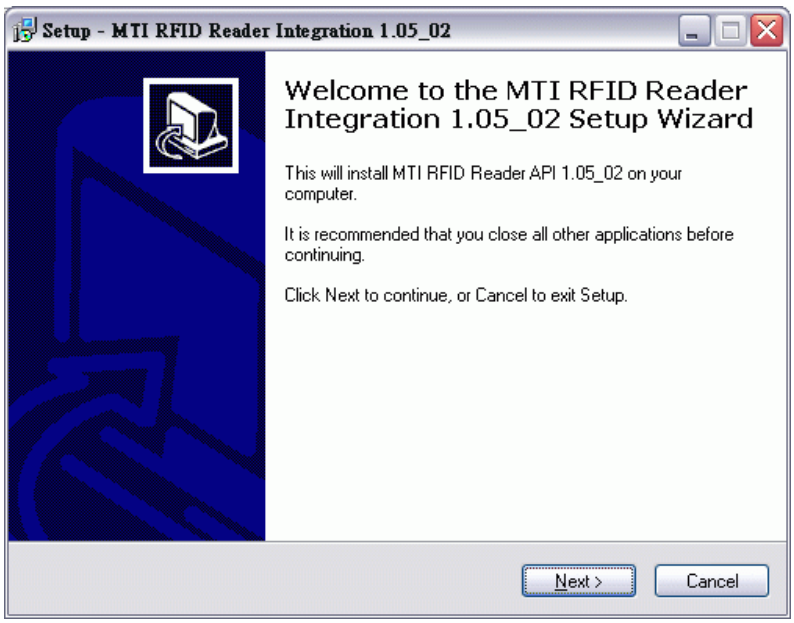

Fig. 2 Start the setup wizard.

Step 2: Select destination location where the program will be installed, shown in Fig. 3

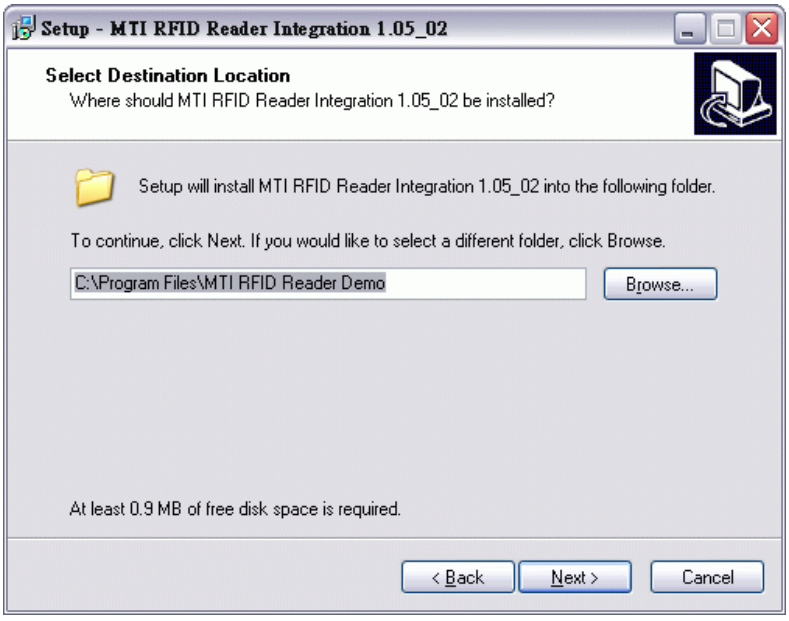

Fig. 3 Select the destination location to install.

Step 3: Select start menu folder where the program's shortcuts will be placed, shown in Fig. 4

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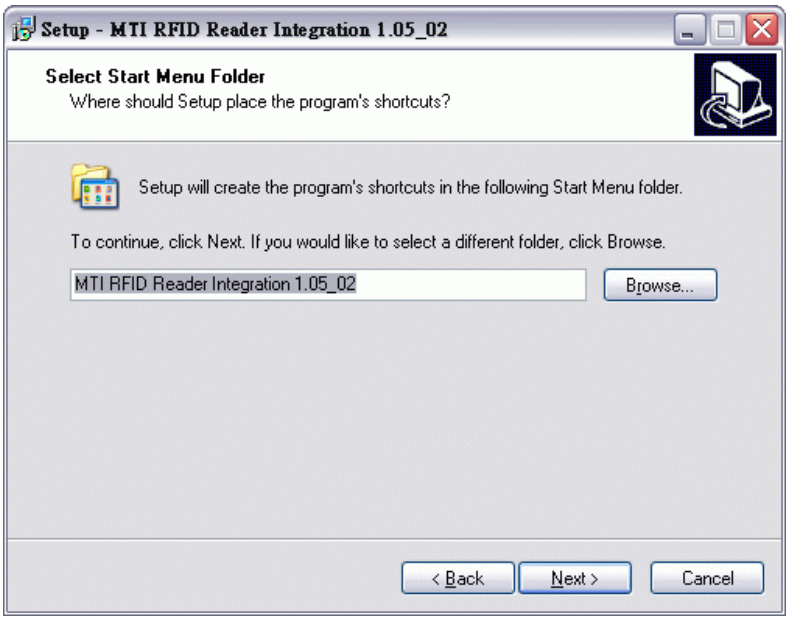

Fig. 4 Select start menu folder to install.

Step 4: Install the program and finish wizard, shown in Fig. 5 and Fig. 6

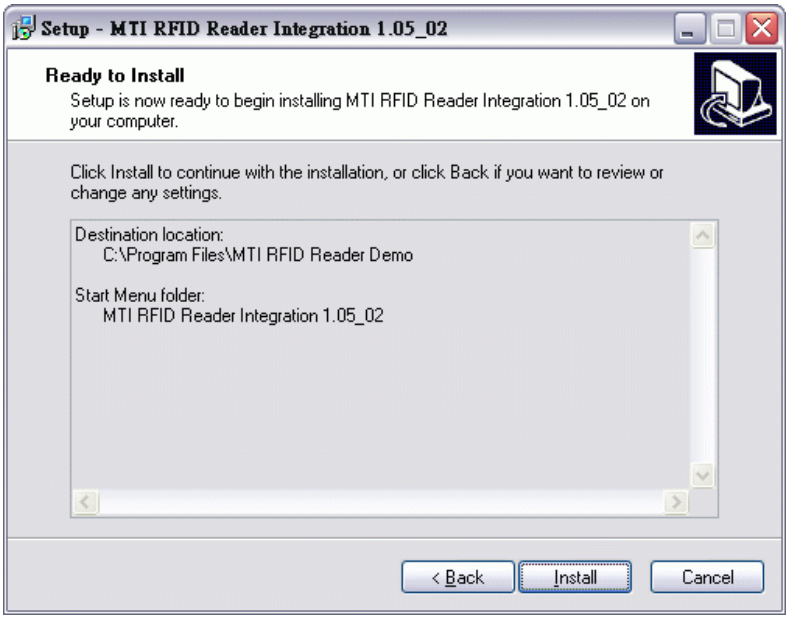

Fig. 5 Ready to install.

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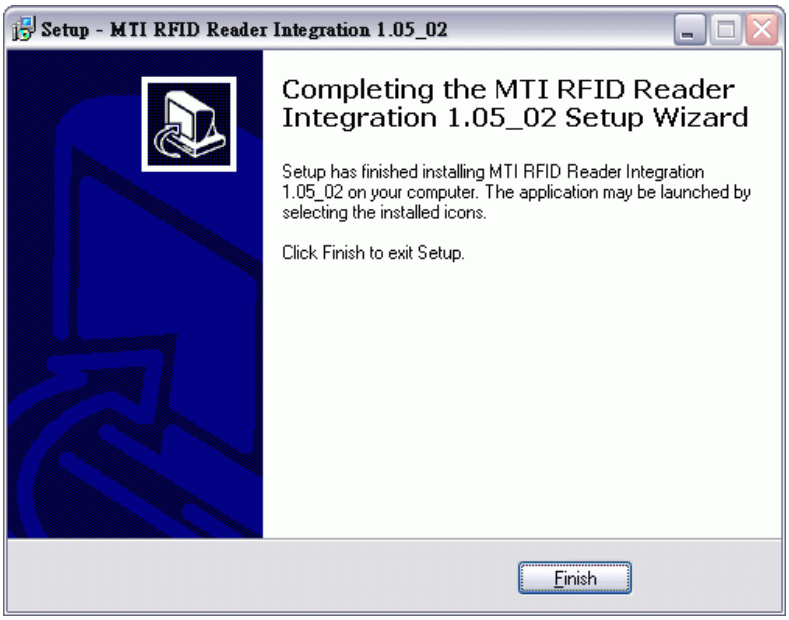

Fig. 6 Finish the installation.

Step 5: The shortcuts will be created on startup program group and desktop.

3.3 Uninstall MTI RFID DEMO

Step 1: Click shortcut of "Uninstall MTI RFID Integration".

Step 2: Click "Yes" of confirmation to remove program, shown in Fig. 7

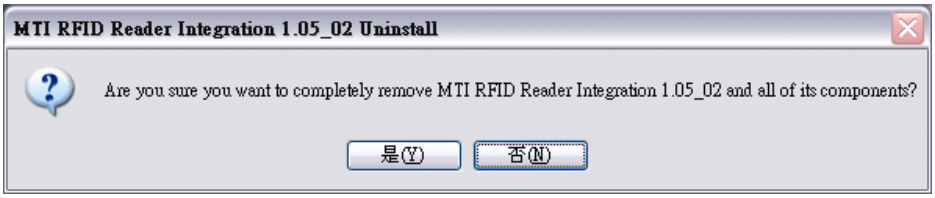

Fig. 7 Confirmation of uninstallation.

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Step 3: Click "OK" to finish uninstallation, shown in Fig. 8

Fig. 8 Uninstall MTI RFID Integration successfully.

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Chapter 4
MTI RFID Integration

4.1 Launch Software

"RFID Integration v1.05_02" can be launched by double clicking the shortcut on desktop, or from startup menu. The Fig. 9 shows the running screen. If the program couldn't run, please check the JRE (in section 3.1) was installed correctly.

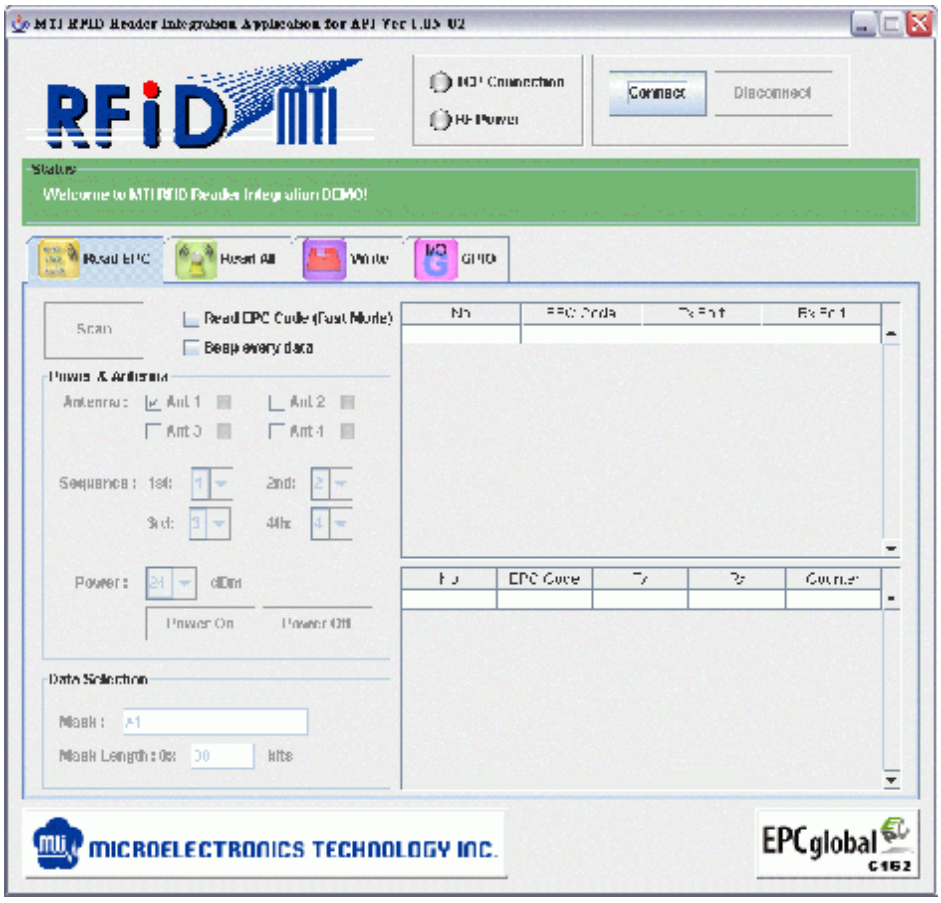

Fig. 9 Running screen.

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4.2 Connect

The program contacts RFID Reader by TCP connection. It could be running as TCP Server mode or TCP Client mode by selecting the radio box of "TCP Server" or "TCP Client". Please press “Connect” button to enable the connection dialog as Fig. 10 shows.

In server-mode (see Fig. 10), “TCP Server IP” field and “Connect” button are disabled. Only the “TCP Socket Port” filed is needed that is the port to listen. After press “Listen” button, the TCP Server runs and listens to reader’s request.

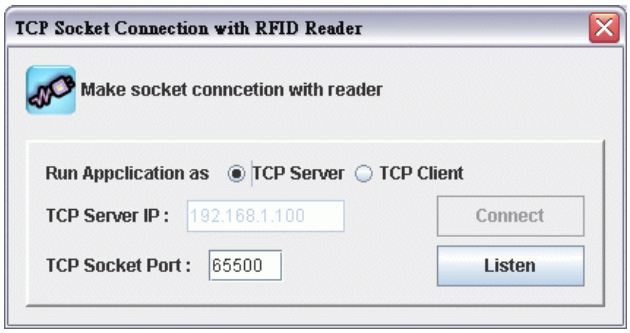

Fig. 10 Connection dialog - TCP Server.

In client-mode, shown as Fig. 11, “Listen” button is disabled. The IP address of reader must be input in “TCP Server IP” field. The socket port of reader must be input in “TCP Socket Port” field. After press “Connect” button, the program request for connection to reader according to the input IP and port.

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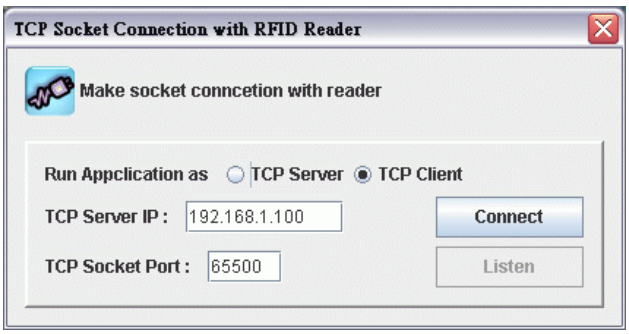

Fig. 11 Connection dialog - TCP Client.

When the socket is connected, the icon of "TCP Connection" will be green as Fig. 12 shows; otherwise it will be red to indicate the failure of socket connection. The failure is caused by timeout in most of the cases. Please check the IP address of reader and computer's setting.

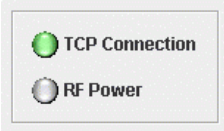

Fig. 12 TCP Connection icon.

Before exit the program, the socket must be disconnect, please press "Disconnect" button. The color of "TCP Connection" icon will be gray, and then you could exit the program or connect again.

4.3 Read EPC

The RF power must be turned on before reader read data from tags. Set the parameters of antenna and power before turning on the power. MTI RFID reader supports four pair of antennas. This program can switch these antennas and decide reading sequence. When Tx/Rx pair antennas were plugged in, please check the check-box of antenna number. When you plugged in multiple pair of antennas, please choose sequence of individual antenna number. If you checked the box and plugged the antenna in, the color of square will become green. If you checked the box and didn't plug the antenna in, the color of square will become red. All other squares that you didn't check will retain in gray. If there is no antenna

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available, the RF power of reader won't turn on. The default value is that only antenna number 1 was plugged in and its sequence is 1st. If you want to adjust the RF power, change the value of "Power". The degree is from 24 to 28.5 dBm. Please see Fig. 13 about above setting, and Fig. 14 shows the status of antenna's switch.

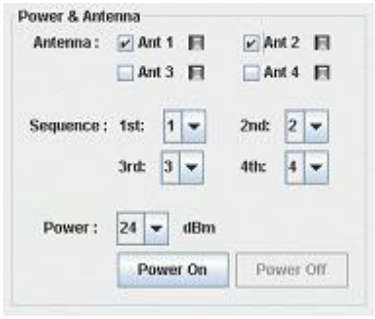

Fig. 13 Parameters of antenna and power.

Fig. 14 Status of antenna's switch.

After choosing the parameters, press "PowerOn" button to wake up the reader and turn on RF power. When the RF Power was turned on, the color of "RF Power" icon will be yellow (), see Fig. 15.

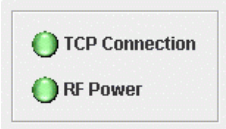

Fig. 15 RF Power icon.

The "Scan" button is enabled only if RF power was on. Press "Scan" button to read EPC from any tag. Additionally, read the memory bank of EPC Code in fast mode will make reader report data more quickly. You could check box of "Read EPC Code (Fast Mode)" to enable the fast mode. Enabling the box of "Beep every data" will cause the system beep on every data's arrival. See Fig. 16.

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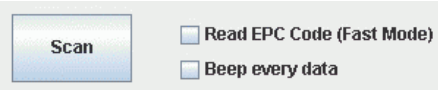


Fig. 16 Scan button and additional options.

The data mask supplies the filter of EPC data. The "Mask" field is the bytes of filter; the "Mask Length" is the number of bits to filter. When the "Mask Length" is zero, the "Mask" is meaning nothing (see Fig. 17). For example, in order to read EPC code which started bytes are "A1A0", the "Mask" filed must be input as "A1A0" and "Mask Length" field must be "0x10" bits.

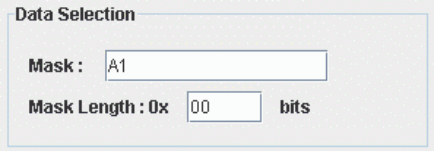
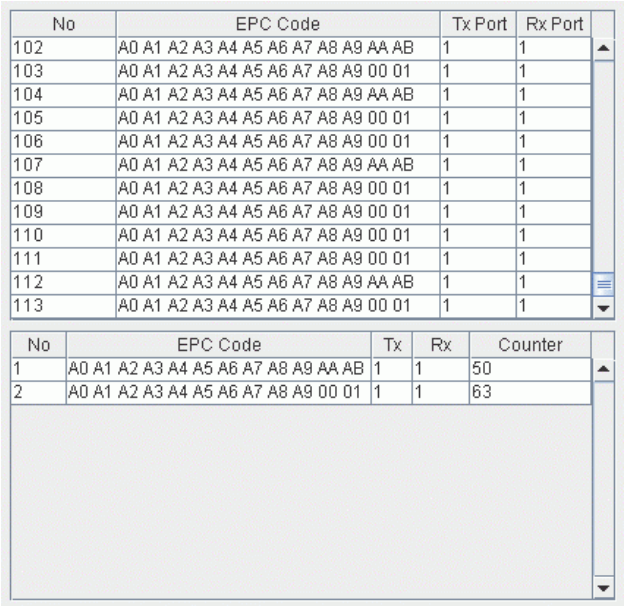


Fig. 17 Data mask.



No	EPC Code	Tx Port	Rx Port
102	A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 AA AB	1	1
103	A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 00 01	1	1
104	A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 AA AB	1	1
105	A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 00 01	1	1
106	A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 00 01	1	1
107	A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 AA AB	1	1
108	A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 00 01	1	1
109	A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 00 01	1	1
110	A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 00 01	1	1
111	A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 00 01	1	1
112	A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 AA AB	1	1
113	A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 00 01	1	1

No	EPC Code	Tx	Rx	Counter
1	A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 AA AB	1	1	50
2	A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 00 01	1	1	63

Fig. 18 Reading EPC data.

The upper table shows each EPC data entry received from Reader. The lower table shows the cumulative counter of EPC data, different EPC code or different antenna will have different counter (see Fig. 18).

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After starting to scan the EPC data, the button “Scan” will become to “Stop”. To stop the scanning, press “Stop” button, then the reader stops to read EPC. You can press “Scan” to make reader to scan again, and the showing table will be reset.

4.4 Read All

"Read All" is the same as Read EPC in section 4.3 except masking data. "Read All" reads the data of all the banks from tag.

Turn on the RF power before read all banks from tag. Press “Scan” button to scan banks, such as User, TID, EPC, and Reserved bank. You can also adjust antenna and power (see Fig. 19). After reader has read all the banks from tag, the data of banks will be shown on yellow field (see Fig. 20).

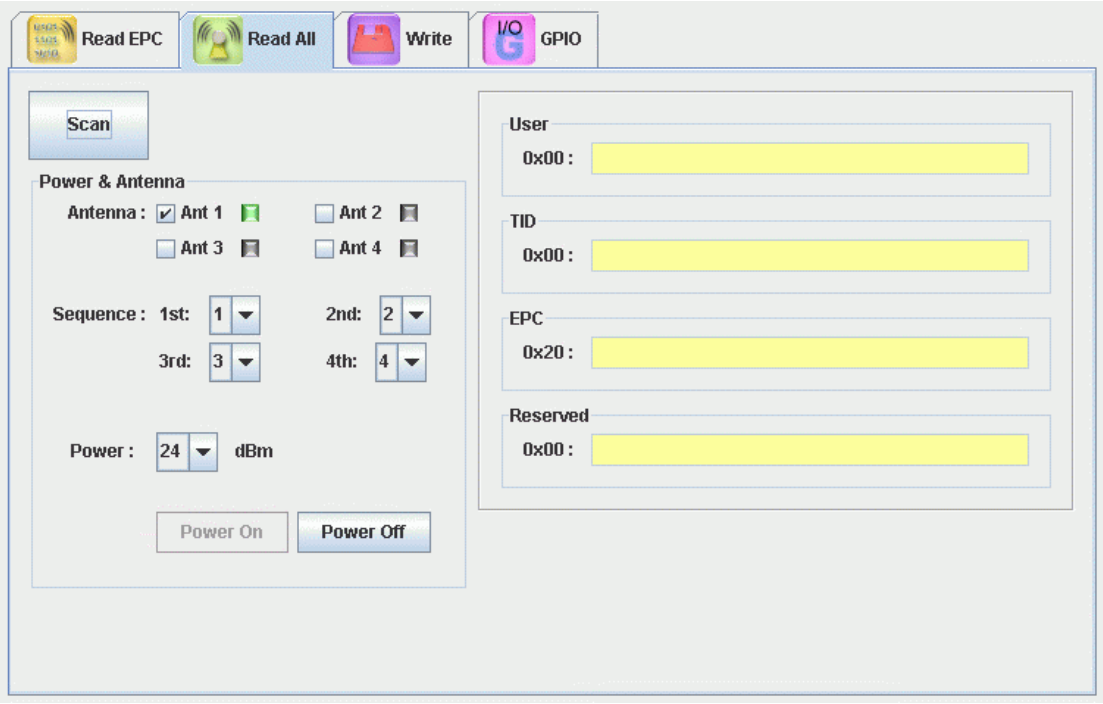

Fig. 19 Read all panel.

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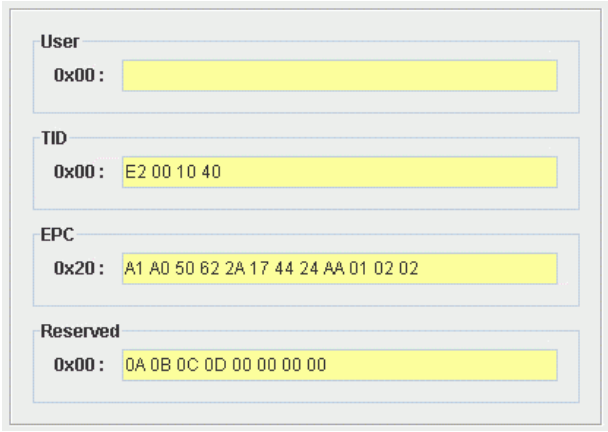

Fig. 20 Read data of banks.

4.5 Write

Before writing data to tag or locking the tag, you must turn on the RF power. Different with reading, the antenna setting is just the Tx selection. Choose one Tx antenna which you want to use to write the tag (see Fig. 21). You can also adjust power like reading.

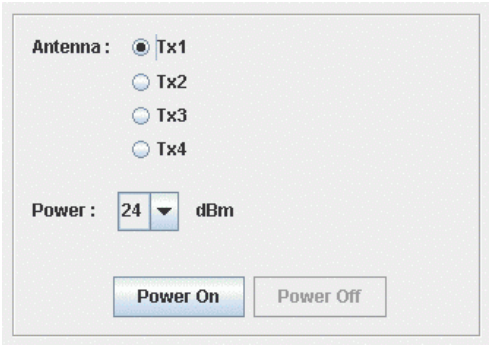

Fig. 21 Antenna selection and power adjuster.

In writing, there are two banks that can be written – User & EPC. You can select what bank you want to write by change "Memory Bank" (see Fig. 22).

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Fig. 22 Memory bank selection.

The data what you want to write is in "Data", and "Data Length" means that how many bytes will be written (see Fig. 23). For example, if you want to write a 96 bits data to EPC bank. The "Data" must have 12 bytes data, and "Data Length" must be "0x06". Note that one words is two bytes. After press "Write" button, the reader will write these bytes to tag, and you will get a status of writing.

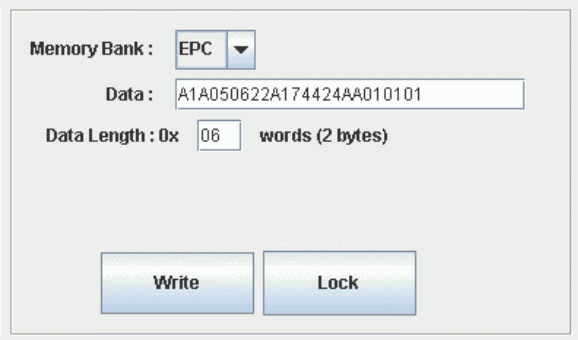

Fig. 23 Writing data.

If you press "Lock" button, the reader will lock the tag, and the tag won't be written anymore. The "Lock" command is independent of memory bank and data; it just locks the tag anyway.

4.6 GPIO

GPIO panel supports the "Set" and "Get" commands of external I/O. There are one external input and two external outputs. The check-box is used for the switch between Enable and Disable; the combo-box is the choice of I/O function. If you want to get the current status of external I/O of reader, click button "Get Status". The check-box and combo-box will be related to the current status of reader. In another way, if you want to set the switch or choice of external I/O of reader, click button "Set Selection" after choosing what you want. See Fig. 24.

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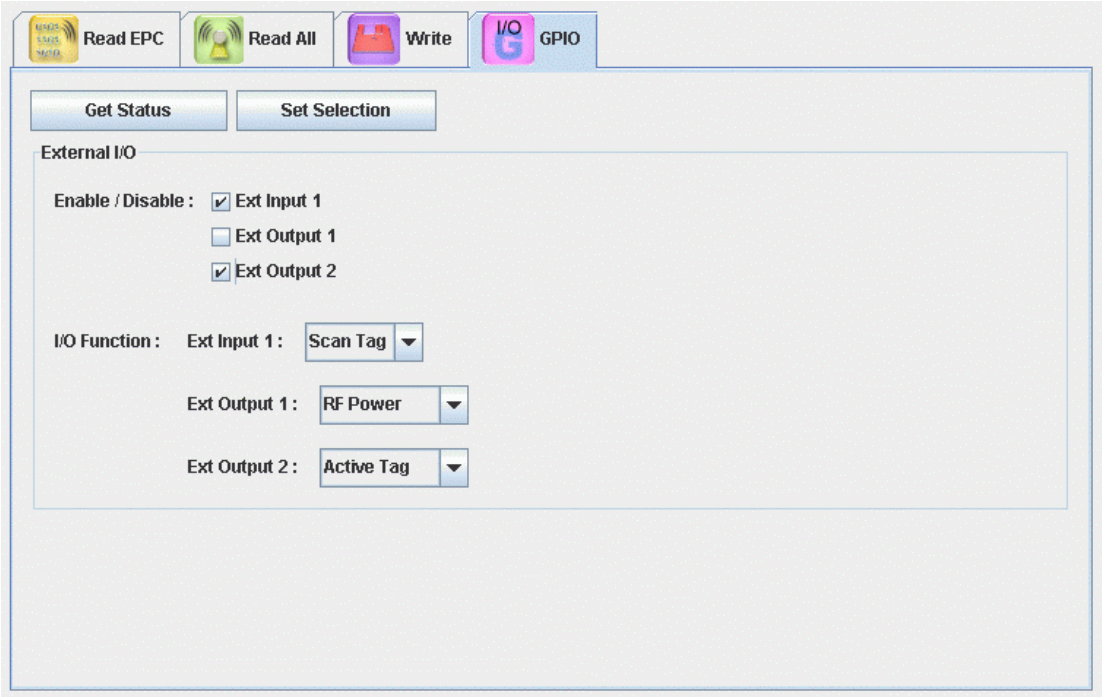

Fig. 24 GPIO panel.

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