I9-2000W/N

UHF RFID Reader

User Manual

ISSUE DATE : 2021.08.09

The pictures and screens shots on this document may be different to actual. .
Please thoroughly read the caution section before installing the reader.
Reasonable measures have been taken to ensure that the information included in this manual is complete and accurate.
However, UBISTS reserves the right to change any specification at any time without prior notice.

Contents

FCC information

FCC notice "Declaration of Conformity Information"

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:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/TV technician for help.

FCC Conditions

This equipment has been tested and found to comply with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference
(2) This device must accept any interference received, including interference that may cause undesired operation.

FCC Notice "Equipment Authorization" Information

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.
This device is authorized under Title 47 CFR 15.519 (the FCC Rules and Regulations).
The operation of this device is subject to the following restriction:
The changes or substitutions of the antennas which are furnished with the device is prohibited.

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 20cm between the radiator

& your body.

Chapter 1. Introduction

1.1 Operation specification

- I9-2000W supports multi-protocols (ISO18000-6C&6B, EPC Class 1 GEN 2) to read and write tags.

- I9-2000W supports RS-232 and TCP/IP.

- I9-2000W supports external I/O and controls other devices through the digital I/O.

- Easy to monitor the status of reader through LED.

- Easy to control the reader through the reader's API.

- I9-2000W provides online upgrade.

- Preferable mode can be saved by the user.

- Possible to operate the programmable multi port antennas.

- Minimize the interference of the frequency Channel. (Dense Reader Mode)

- I9-2000W supports sensitivity setting for LBT.

- I9-2000W supports the reader monitoring mode and measurement of RF receiving level.

- The I9-2000W model supports WIFI mode

- I9-2000W is used for only transmit RFID tag data by WIFI module and WIFI module is not used any other function.

1.2 Communication Specification

External Interface	Serial	230,400bps / 115,200bps / 57,600bps / 38,400bps
	Ethernet	10 BaseT(TCP/IP,)
Air Protocol	Tag Air Protocol	ISO18000-6B,6C
		EPC Class1 GEN II

1.3 Reader specification

Item	Specification	Remark
Model name	I9-2000W/N	
Air interface protocols	ISO-18000-6B/6C, EPC Class1 Gen 2	
Frequency range	910.4~913.6 MHz@Korea/ MIC 917.3~920.3MHz@Korea/ KCC 902.75~929.25 MHz@USA/ FCC 865.7~867.5 MHz@EU/ CE 952.4~953.6 MHz@Japan/ TELEC 920.625~924.375 MHz@China/ CC	ETSI(EU)
RF output power	Max 1W, step:1dBm	
Modulation	PR-ASK	
Antennas	Circular Patch	
Operation Type	FHSS(KOR/USA/CHINA), LBT(JPN/EU)	
Air Protocol speed	Tx 40Kbps/Rx 75Kbps	
Antenna connector	4 monostatic	RP-TNC
Antenna operation	Operate programmable multi-antenna ports	
DSP filter	Minimize the interference of frequency Channel (Dense Reader Mode)	
Read range	≦5m (depends on antenna placement and tag type)	
Channels	17 Channels @Korea/ MIC 6 Channels @Korea/ KCC 50 Channels @USA/ FCC 4 Channels @EU/CE 8 Channels @Japan/ TELEC 16 Channels@China/ CC	
Channel band width	200KHz@Korea/ MIC 600KHz @Korea/ KCC 500KHz @USA/ FCC 600Khz @EU/CE 200KHz @Japan/ TELEC 250KHz @China/ CE	
Operating program	Window 2K / XP / Vista/7	
User API	API for Window	
Program upgrade	Through the use of Network or RS232	
Mode Setup	Preferable mode can be saved by user	

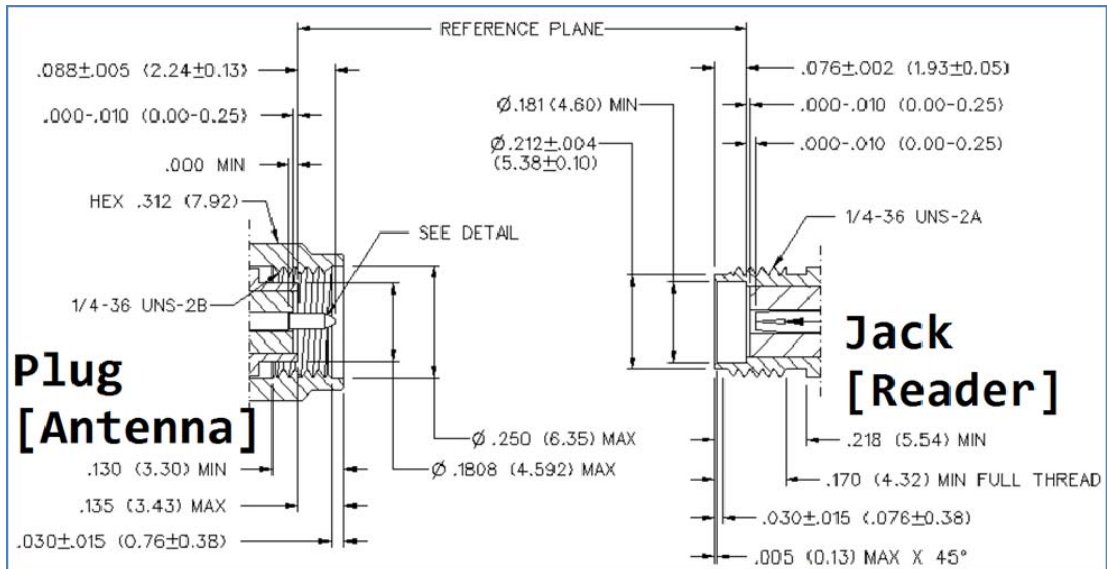|		
LBT control	Supports sensitivity setting	
Power supply voltage	DC 12V ($\pm$10%)	
DC Current	MAX 3000mA	
Weight	3.5kg	
Dimensions	169 x 88 x 47 (mm)	
LAN	Connector:RJ45, Standard : IEEE802.3, 10Base T Protocol: TCP/IP	
Serial	RS-232C, Baud Rate : Max 230,400bps	
Extended I/O	4 Inputs and 4 outputs	

1.4 Product images

- I9-2000W/N reader (Top view, front view)

TopView

FrontView

2.1 Hardware

2.1.1   Reader I/O Panel

DC12V

EXT I/O 1

EXT I/O 2

RS-232

LAN

ANT1

ANT2

ANT3

ANT4

● Power

Table 1] 입력전원 요구 사항

Input voltage	DC 12V (±10%)	
Input Cur	3000mA more than	
Ripple and ripple noise	50mVp-p or less	Spike at the moment: 100mVp-p or less

Power Connector (DC Power Socket & Jack)

- Antenna Port

Antenna Connector

- RF specification

Item	Specification	Remark
Frequency Range	910.4~913.6 MHz@Korea/ MIC 917.3~920.3MHz@Korea/ KCC 902.75~929.25 MHz@USA/ FCC 865.7~867.5 MHz@EU/ CE 952.4~953.6 MHz@Japan/ TELEC 920.625~924.375 MHz@China/ CC	
RF output power	Max 1W (30dBm less)	
Modulation	PR-ASK	
Aerial type	Circular Patch	
Air interface protocol	ISO-18000-6B/ISO18000-6C(EPC Class1 GEN II)	
Antenna ports	4 monostatic	
Read Range	≤ 5m (depend on reader placement and tag type)	

Antenna Gain	6dBi Below	
Channels	17 Channels @Korea/ MIC 6 Channels @Korea/ KCC 50 Channels @USA/ FCC 4 Channels @EU/CE 8 Channels @Japan/ TELEC 16 Channels@China/ CC	
Channel Band Width	200KHz@Korea/ MIC 600KHz @Korea/ KCC 500KHz @USA/ FCC 600Khz @EU/CE 200KHz @Japan/ TELEC 250KHz @China/ CE	

2.1.2   LED Panel

- POWER (Red): It indicates the power; ON/OFF
- READ (dual color): It flashes when the reader reads the tags.

2.2 Hardware installation

① Locate the host PC.

② Connect the reader with the RS-232C cable.

③ Connect the RS-232C cable with the host PC.

④ Connect the power adaptor to the reader..

RS-232C Cable & Power Adaptor Connection

⑤ Connect the antenna port (1) with the antenna cable.

⑥ Connect the antenna with the antenna cable.

Reader & Antenna with Connection by Antenna Cable

⑦ Plug the power code.

⑧ Operate the host PC and execute the PC program.

Chapter 3. Software Installation

3.1 Check before installation

① Confirm the appropriate software.

② Confirm the host PC that connects to the network.

3.2 Software installation

① Copy the software into the host PC (E.g.. Copy the U9-2000 folder onto D:)

이름	수정한 날짜	유형	크기
📁 Firmware	2011-05-04 오전...	파일 폴더	
📁 Register Files	2011-05-04 오전...	파일 폴더	
📡 RFIDDEMO.exe	2010-10-13 오후...	응용 프로그램	808KB
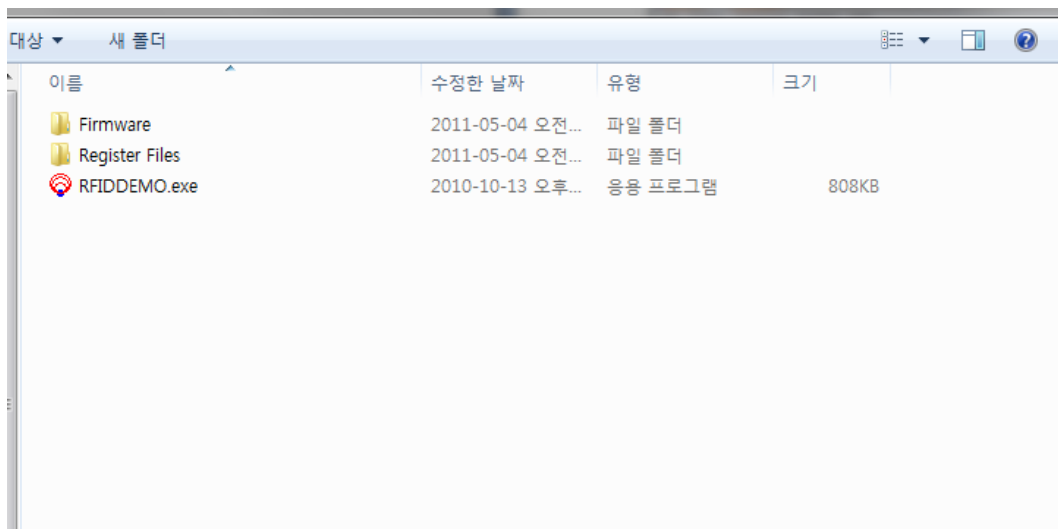
Software Folder

> ※ **Firmware folder**: It includes .bin file in order to upgrade a firmware.
>
> **Register file folder**: It includes .rgs file in order to set a registry
>
> **RfBag.exe**: It is the executable PC program.

② When you execute the RfBag.exe, you can see the Main Menu window as follows.

Main Window after excuting RFIDDEMO

Chapter 4. Software Operation

There are two ways to operate the U9-2000N UHF Reader. One is to operate the reader with directly received input and the other is the Machine-to-Machine(MtoM) mode, in other words, to operate automatically by the connected host or software which has been programmed in the middleware. In order to operate in MtoM mode, you need the program that is developed with the appropriate protocol which is discussed in chapter 6 and 7.

The reader can be controlled using binary protocols (See chapter 7) for the provided program. It can also be controlled as the terminal form which is delivered in text format, while the reader connects through serial or TCP/ IP. User inputs commands directly to the keyboard (See chapter 6,Reader String Protocol).

In this chapter, it describes how to control the reader by the program that uses binary protocols and also discusses how the user reads and writes the tags.

4.1 Execute the RFDEMO (PC Application Program)

① Turn the reader on while connects to the antenna(s).

> ※ It takes approximately 20~30 seconds for booting the reader. (The status LED blinks when the booting finishes)

② Execute **RFIDDEMO** (PC Application Program)

4.2 Connect the host PC with the reader through RS232C

> **※ NOTICE: Check a serial connection of the Reader**
>
> You need to choose the protocol type in the serial communication method that operates only one channel. The factory default setting will be the binary protocol which can be used.
>
> But if you have changed the serial protocol mode to string, it can only work with the terminal method. Therefore, check the next chapter for the serial connection.

> String Protocol Mode methods in the transition to Binary Protocol String Protocol "SerialMode" command is listed in detail.

① Connect the RS232C cable to the reader.

② In the Main Menu, choose the Option from Help or configuration button, [config.] the Configuration window opens.
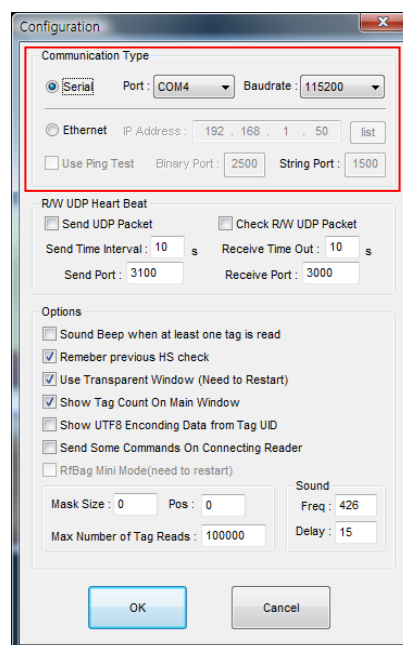
③ Choose the Serial from Communication Type.

④ Select the host PC's communication port. (ex. COM1, COM2....)

> ※ **How to check the host PC's communication port**
>
> Right click on My computer → Select Properties → Systems Properties → Hardware → Device Manager → Ports (COM/ LPT)

⑤ Select 115200 bps for Baudrate and then click OK. [OK]

⑥ In the Main Window, click connect button. [connect] It will connect the reader to the host PC.

⑦ If you want to check the connectivity between the reader and the host PC, click the Info button. [info] The Information of Internal Message window appears.
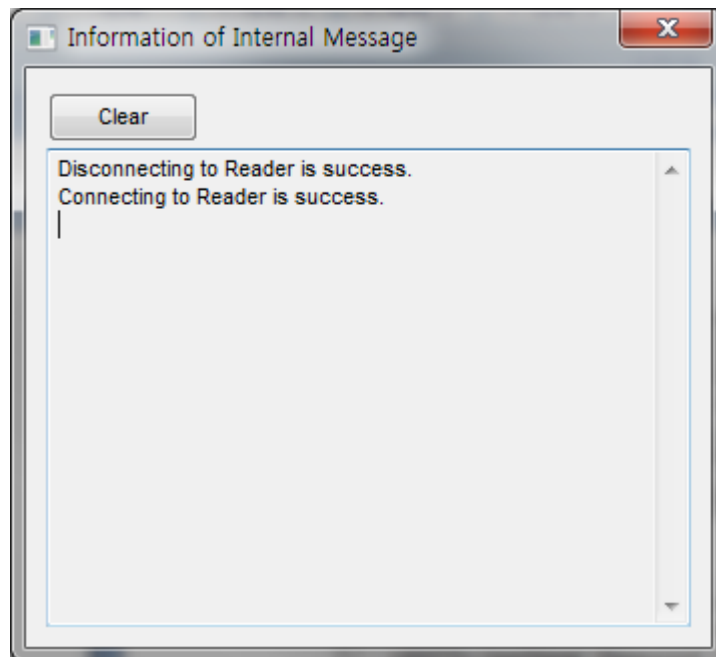
Information of Internal Message

4.3 Search the reader using the program and Ethernet

① Connect the Ethernet cable to the reader.

② Either select the Search Reader from the Function or Scan button to search the reader.
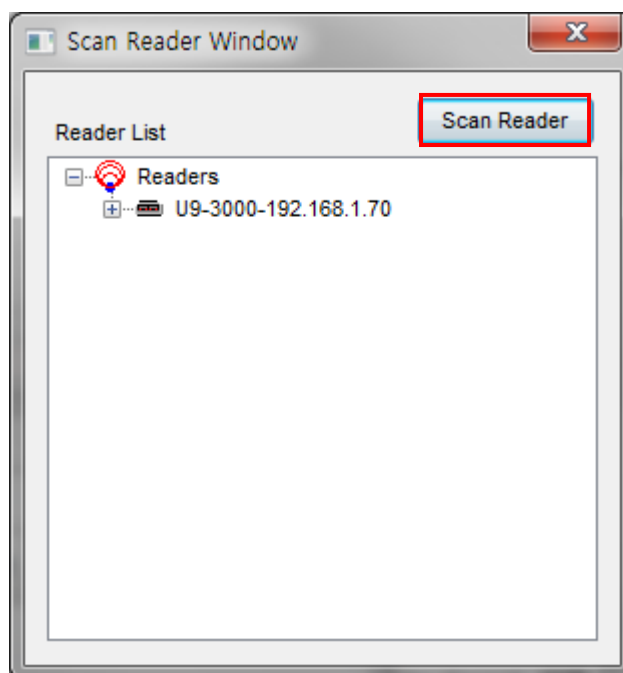
Reader Search Screen

③ Click a Scan Reader button.

④ The information about thea reader on the local network area will appear.
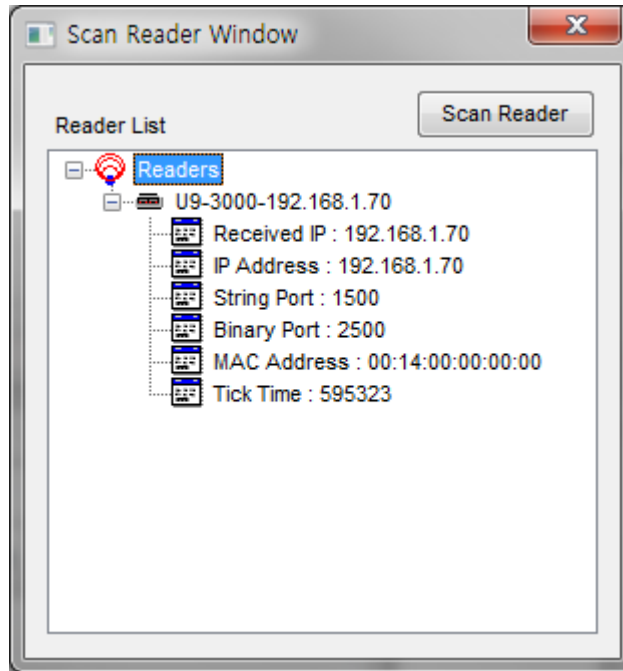
Search the Reader's info

4.4 Connect the host PC and reader through the Ethernet

① Connect the reader and host PC using the Ethernet Cable (Cross Cable). If you have multiple readers, use the Ethernet Network Hub to connect with the PC.

② From the Main Menu, select Help → Option or configuration button. The Configuration window appears.

③ From the Configuration window, select the Ethernet from the Communication Type.

④ Type the IP Address of the reader and set port number as 2500 and then click OK.
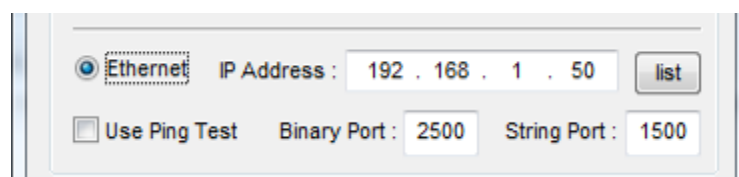
Setting the Ethernet Configuration Window
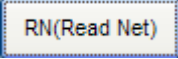
⑤ From the main window, click the Connect button to connect the reader and the host PC.

⑥ To check the connectivity between the reader and the host PC, click the Info button.

※ **How to check the IP Address of the reader**

1. Connect the reader and the host PC through the RS232.

2. From the main window, click the reader button. The Reader Config Command window appears.

3. Click the RN(Read Net) button from the Reader Network to see the IP Address, Subnet Mask, Default Gateway and DNS Address.

Reader Config Command Window of the Reader Network

4.5 Check or change the register settings

You can view the value of the Register using the HR(HardwareRead) button. And also you can modify the value using the HS(HardwareSetup) button.

① Connect the reader and the host PC, click Register button. ▦ register   The Register Read/Write window appears.

.

Register Read/Write Window

② To check the default value of the Register, click HR(Hardware Read).   HR (HarewareRead)

> ※ If the HS or HR are deactivated, check the connectivity between the reader and the host PC.

③ Check the check box to modify the value of the Register.

Register Time Slot Change the value of the RF Attenuator

④ Click the HS(HardwareSetup) button to apply the changed value.

⑤ To check the modified value, click HR(HardwareRead) button
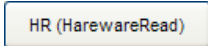
> ※ If you want to have more information on the Register, please see the chapter6 for the Binary protocols.

※   How to keep the current setting as the default register value

①   The default register value is saved on the flash memory.

②   You can change the default register setting using the SR Command.

③   From the Main Menu, click the Register button.   The Register Read/Write window appears.

④   Click the HR(HardwareRead) to view the current register value. Ant the click the Save Register button.
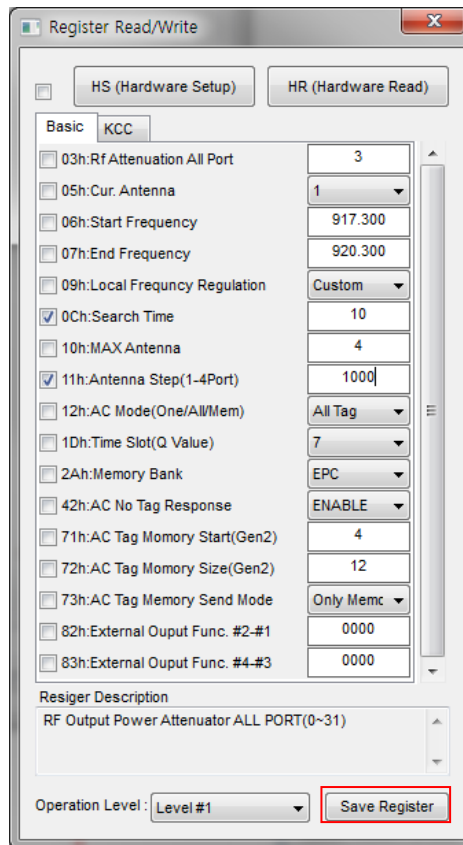
Register Read / Write Window of SR

⑤   After rebooting the reader the Connect Host PC and the Reader

⑥   Click [HR (HarewareRead)] the Apply button [Save Register] when you Register is set to a value that can be found

4.6 How to read tags while using the single port

<div>

※Tag caveat before reading

    1. [Chapter 2] Hardware Installation Connect the Reader to read and make sure that appropriate.

    2. Reader supported on this machine is ready to make sure that the Tag.

    3. Tag Reader to read well and where you can make sure that you have placed in front of the Ant.

</div>

①   You need to set the Register value in the reader to read the tag.

②   Click the Register button   register   from the Main Menu, the Register Read/Write window appears.

    ※ If the button is deactivated,   HS (HarewareSetup)   HR (HarewareRead)
check the connection between the reader and the host PC.

③   Click the HR(HardwareRead) button to set the current register value.   HR (HarewareRead)

④   Check the antenna port number that is connected to the reader.

⑤   After any changes in the register value, click HS(HardwareSetup) to set the changes.

⑥   After setting the Register value, click the TagCmd button   tagcmd   from the Main Menu, the Command Window1 (Tag) appears.

Command Window1 (Tag) of the AC (Anti Collision)

⑦ Click 1 Port Notify Start button [1 Port Notify Start] from the AC(Anti Collision) to read tags.

※ To view the raw data view, click Raw button from the Main Menu. The Serial Raw Data View window appears.

From this window, you can see the [Send Data] from the reader to the host PC and the [Receive Data] for their responses.

※ Use this view to check other commands.

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⑧ The tag data is displayed. Each raw show the tag ID, number of times tag has been read, antenna

number and the tag reading time.
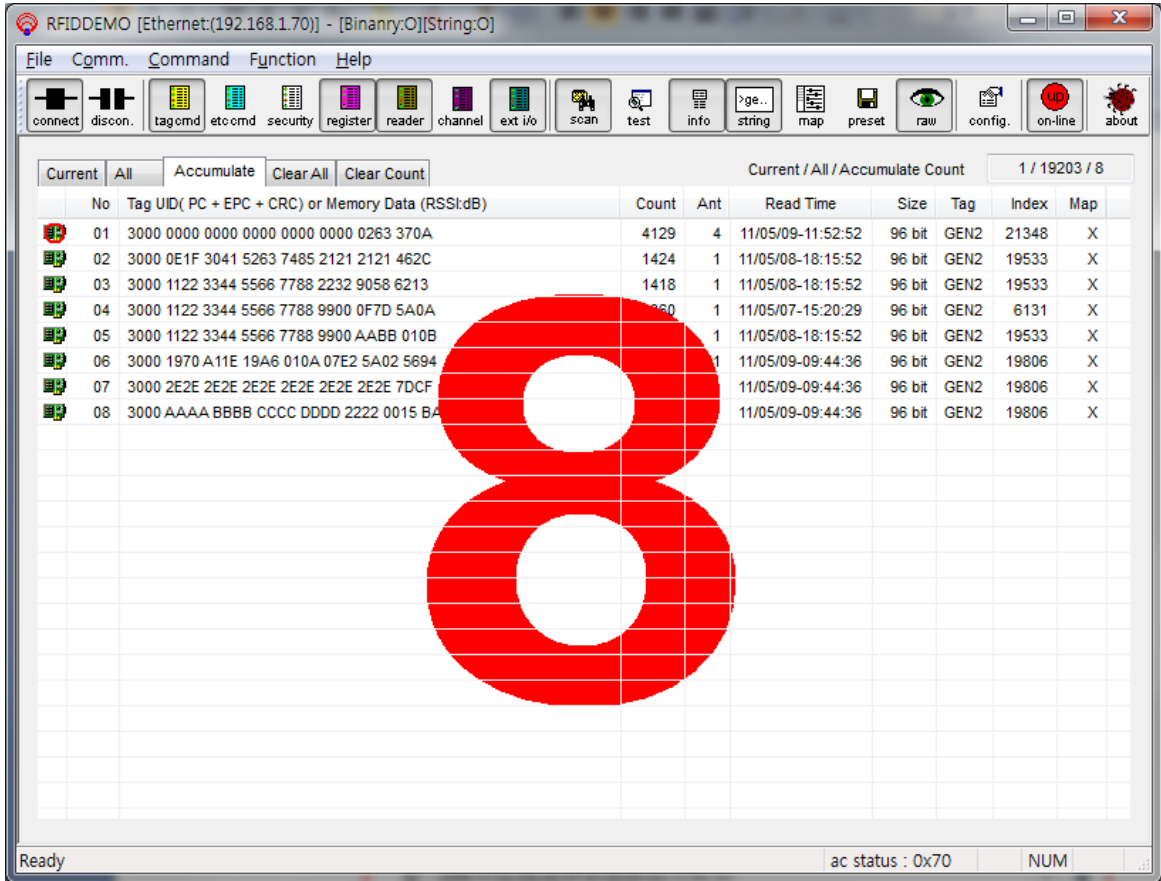
메인 **Window** 에서 **Tag UID** 확인

⑨ In order to stop the transmission Tag Command Window1 (Tag) of the AC (Anti Collision) from the
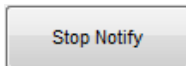
[Stop Notify] Clicking Tag transfer is complete.

4.7 How to change antenna setting while using a Single Port

① Connect the reader and the host PC.

② Check the current port.

Check the current Port(ANT1)

③ Change the antenna cable from ANT1 to ANT2.

Port 1 and Port 2 as a replacement

④ Click the Register button from the Main Menu.

⑤ Select the 05h:Cur. Antenna and choose 2 for the antenna port 2. Click HS(HardwareSetup) button to save the changes.
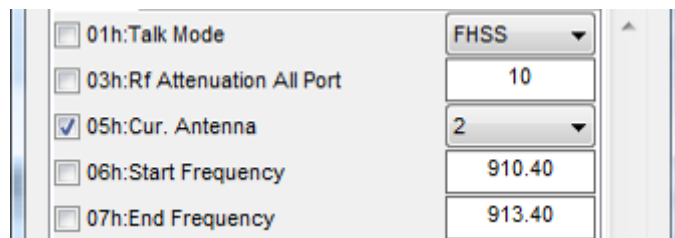
Change the settings for the antenna Register

⑥ From the Main Menu, click the Tagcmd button to open the Command window1 (Tag). Click 1 Port Notify Start button.

Window to verify the result f a change through the main antenna

4.8 How to read tags while using multiple ports

① Connects the reader with more than 2 antennas.

Reader Connect the two antenna

② Connect the reader and the host PC, click Resister button.

Register Read/Write window appears.

③ Select 10h:MAX Antenna and choose 2. Click HS(HardwareSetup) to save the changes.

☐ 0Ch:Search Time	100
☑ 10h:MAX Antenna	2
☐ 13h:Tag Send Size(8/16/PC)	Variable ▼

④ From the Main Menu, click the Tagcmd button to open the Command window1 (Tag). Click 1 Port Notify Start button.

⑤ From the Main Menu, you can see the number of antenna which is activating with the tags.

Check the results through the Multi Port Main Window

※ Tag Multi Port while reading only the specific antenna Register Read / Write Window at 05h: Cur.Antenna antenna set to receive the part after Tag Command Window1 (Tag) Window of the AC (Anti Collision) If you click [1 Port Notify Start] on the button Tag can be read only on a specific antenna.
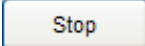
4.9. Tag Read Test

①   From the Main Menu, click the Test button [test]   The Tag Read Test window appears.
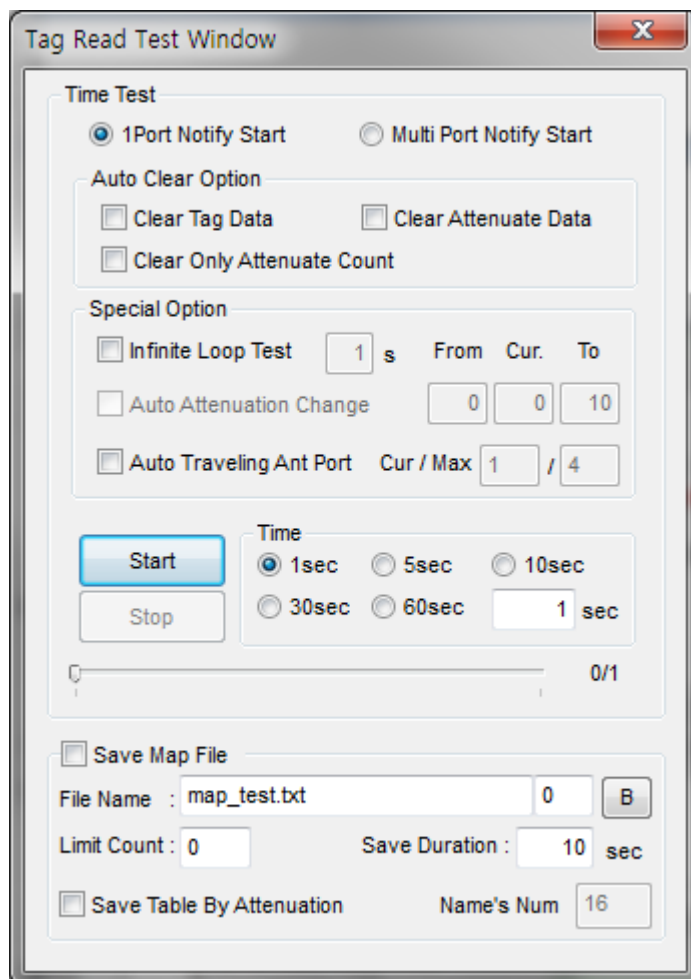
Tag Read Test Window

②   Select the 1Port Notify Start and set the time for tag reading test. Click Start button. [Start]

③   The Stop button stops the test. [Stop]

※ **Auto Clear Option**: Before the test, delete the tag data from the Main Menu automatically.

- **Clear Tag Data**: Delete the all tag data from the Main Menu.

- **Clear Attenuate Data**:   Delete the tag data of Accumulate tab window from the Main Menu

- **Clear Only Attenuate Count**: Initialize the Count of Accumulate tab window from the Main Menu.