# Functional description

## RFID Reader HH 500

(Users Interface Description)

ADVANCED ID™

ASIA ENGINEERING CO.,LTD.

# HANDHELD READER HH500
# Users Interface Description

AFG ASIA ENGINEERING CO.LTD.
65/12 M.10 T.Tonpao A.Sankumpang
Chiangmai, Thailand 50130
Tel: +66 53 390 909
Fax: +66 53 390 910
Website : WWW.AAE.CO.TH

Mod. AAE-DOC04/1
Rev. 1_01

**Contents :**



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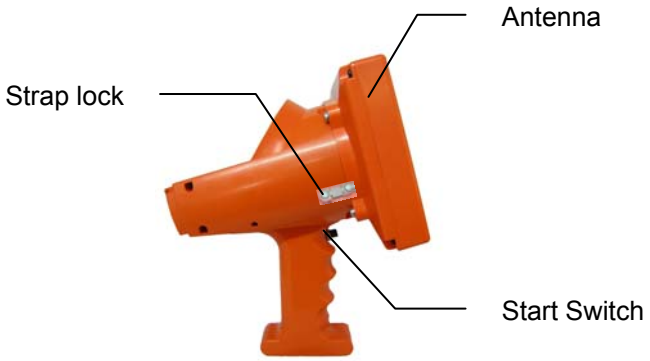
| Revision | Date | Author | Change Record |
|---|---|---|---|
| 1_00 | 2006-11-27 | Sergio Teles | - |
| 1_01 | 2006-12-08 | Mark Sukdee | 1. Pre-installation/Precautions<br>2. add symbols description<br>2. Support Software |
| 1_02 | 2006-12-17 | Mark Sukdee | 1.RFID Note Manual<br>2. add FlashSTA |
| 1_03 | 2006-12-20 | Mark Sukdee | 1. SD Card have to be FAT16 |
| 1_04 | 2006-12-20 | Mark Sukdee | 1. change pre-installation (OWNER)<br>2. change how to install software |

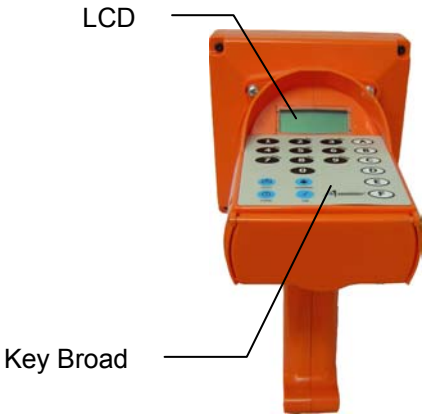
| | | | |
|---|---|---|---|
| 1_05 | 2007-01-23 | Mark Sukdee | 1. Change Keyboard picture |
| 1_06 | 2007-04-07 | Mark Sukdee | 1. Support Bluetooth Module |
| 1_07 | 2008-03-13 | Soemsak Lpps | 1. FCC Statement |

# 1. Pictures of UHF RFID Handheld Reader HH500

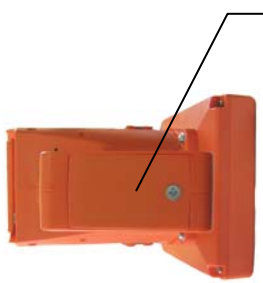
### 1. Side of Handheld Reader



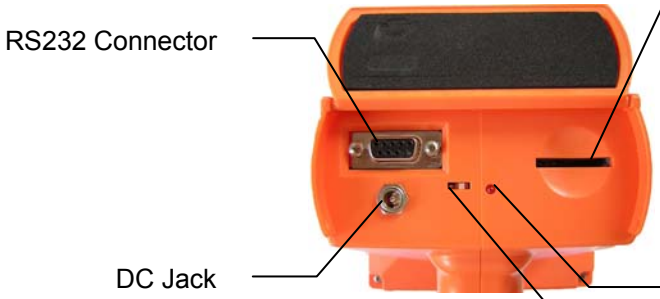

### 2. Side of Handheld Reader




### 3. Side of Handheld Reader




### 4. Side of Handheld Reader




### Package Contents

1. Handheld Reader HH800
   (*please see left pictures*)
2. RS232 Communication cable

3. Switching Power supply

4. Strap Holder

5. Support CD

## 2. Pre-installation Precautions

Take note of the following precautions before you connect the RFID Reader components together or change any RFID Reader setting
precautions before you connect the RFID Reader components together or change any RFID Reader setting

- **Don't open** any of the components. Opening them may **cause severe damage** to the reader and components.
- Hold components tightly and don't drop any components (**they are breakable**).
- Charge handheld module at least 14 hours before first use.
- Set **OWNER ID** first and be sure the owner ID is **NOT NULL**.(*see owner*)
- Whenever you finish using the reader, place it on a dry surface or in the storage box that it comes in. The Reader is not sealed against liquids.
- "Configuration Setting" is **ONLY** for advanced users. Users who want to use these features **MUST** follow instructions carefully and take responsibility for any damages that may result. "Use it at your own risk".
- The sequence of operations depends on the reader configuration (*please see chapter Configuration*).
- Default setting: Owner ID / Physical Location data entry is ASCII, reading type is ISO and EM.

## 3. Abstract

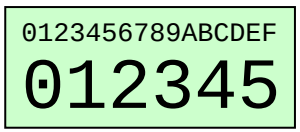
This document describes the user interface of the Handheld RFID reader HH500 for release 5.00 and further.

## 4. General description

The handheld reader HH500 is a robust, long read range, multi-protocol UHF RFID reader for outdoor and indoor use. It employs Advanced ID's state of the art technology that combines high performance and reliability with ease of use.
The unit supports the protocols EM4022, EM4222, ISO16000-6B, EPC C0, EPC C1 and EPC C1 Gen 2 and is upgradeable for future protocols. It may read tags, read user data and write user data into tags as well as program EPC C1 Gen 2 numbers into tags.
It is suitable for all portable applications in warehouse management, livestock tracing or inventory applications.
Its unique User Interface enables easy integration into tracing systems where goods are associated to customers or owners.
Some examples of applications are:

- Customer number is entered followed by reading all the goods that are being shipped to that customer. The procedure repeats for all other customers. At the end, the database will clearly list what goods were shipped to what customer.
- In an auction market for livestock the sanitary inspector enters first the new owner ID and then the animals he just bought. He repeats this procedure for each new owner. At the end the database will register ownership changes of each animal as well as the respective grouping allowing trace back in case of decease outbreak.
- A tire manufacturer supplies racing tires to several teams. When each team fetch their tires, there code is scanned followed by the tires they take. Billing, degrading study and ownership is then easily traced after the race has finished and the tires are brought back for analysis.
- In a supermarket reception gate, the operator scans each incoming pallet and types in the number of boxes in each one. Like this incoming inventory is easily made even if each box is nor tagged. This manual entry is compared with the due quantity that was previously written on the tag of the pallet.
- In a pig farm, pigs get their food only if they didn't eat yet. The information if he already eat or not is written in the tag of the animal allowing weight development control without networking several readers.
- In a lawyer company each file of a process gets a tag that is scanned to a database. When that file needs to be found, the respective TAG ID is typed into the reader and the operator scans through the files. When the correct one is found the unit sounds a beep and the file was found.

## 5. Display and display Symbols




The unit is equipped with a LCD module with 16 dot-matrix characters on the top line and 6 dot-matrix large characters on the lower line. The display contents are as left picture.

### 5.1 Battery status


The unit will show status of battery on LCD. You have to recharge the battery with Switching power supply to keep the unit ready to use.
Note : switching power supply is in the reader package. (*see package contents*)

## 6. Keyboard

The unit has a START key on the handle and a foil keyboard with the following keys:

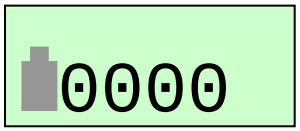

The function of the keys are:

| | |
|---|---|
| START | to start reading or writing tags. |
| 0..9 | for manual entry of Owner, TAG_ID or data or to write action codes to the memory. |
| TYPE | short pressed, to access manual tag ID entry with keys 0..9 and A..F for ISO 6B and EM tags (no function for the others). If pressed long (>1 second) it will allow to change the tag type to be read. |
| OWNER | Pressing this key will cause the reader to ask for a new OWNER or USER. A new record with the new user is created in the memory when finished. |
| TIME | short pressed, to display the time and date temporarily. Long pressed (>2 seconds) to access Date and Time entry. |
| OK | to finalize data entries or to exit FIND mode. |
| A / ON/OFF | for switching the reader ON and OFF. When in data entry mode, to enter hex value 'A'. NOTE 1) |
| B / WRITE | to set the reader to WRITE mode. When in data entry mode, to enter hex value 'B'. NOTE 1 |
| C / READ | to set the reader to READ DATA mode. When in data entry mode, to enter hex value 'C'. NOTE 1 |
| D / FIND | to set the reader to FIND mode. When in data entry mode, to enter hex value 'D'. |
| E / IDs | to set the reader to READ IDS mode. When in data entry mode, to enter hex value 'E'. NOTE 1 |
| F / CLEAR | to clear the tag counter. When in data entry mode, to enter hex value 'F'. NOTE 1 |

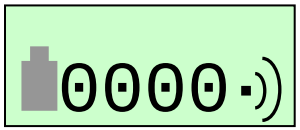
NOTE 1 : If the unit goes to sleep mode it will go back to READ IDs mode automatically.

## 7. Operation

### 7.1 Power ON and OFF

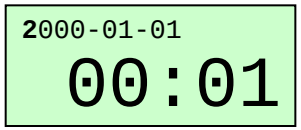



To switch ON the unit press the A / ON/OFF key.
To switch OFF the unit press the A / ON/OFF key again or stop operating the unit for 1 minute.
- the display goes off.




You can also switch ON the unit by pressing the START button:
- the display goes on and the unit starts reading tags while the START key is pressed.

### 7.2 Setting the TIME and DATE




The HH500 is equipped with a quartz clock that runs even when the unit is off. Each reading gets a time stamp.
For that the correct time and date must be set at all times.

To set the time and date press and hold the TIME key for about 5 seconds:
- the display shows the date and time and the first character is blinking.

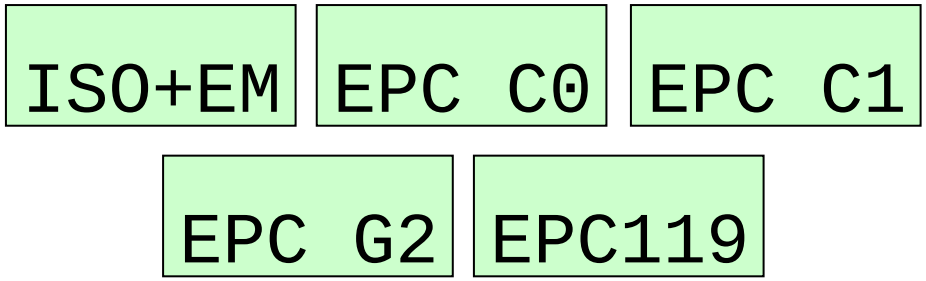
Enter the correct date and time with the keys 0..9. At the end press OK.
- the seconds are automatically set to 0 when you press OK.

## 7.3 Selecting the kind of tags to read

The unit must be ON for this function to be performed. The HH500 is capable of reading the following protocols:

- EM
- ISO16000-6B
- EPC Class 0
- EPC Class 1
- EPC Class 1 Gen 2
- EPC 119

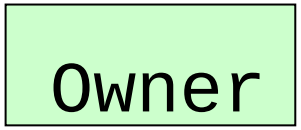
To select the type you desire press and hold for 1 second the TYPE key. The display informs the current selected format(s).



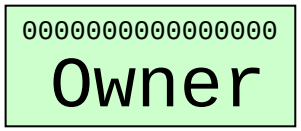

The setting is automatically stored on the unit's non-volatile memory.

## 7.4 Identifying the OWNER

In some applications the identification of the OWNER of some items is necessary (ex. livestock). The HH500 can be configured to always ask for the OWNER ID after waking up the unit. See chapter Configuration later in this manual.
OWNER IDs are stored in the record memory and enables the database software to identify it as such.




To set a new owner, press the OWNER key (the unit must be ON first).
- the display shows the OWNER entry mode.



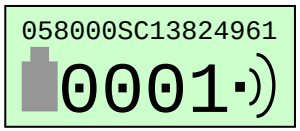

- you can now type in the new owner ID using the keys 0..9. Owners can be identified by tags, by names or by HEX codes (*see configuration later in this manual*).

- to call back the previous owner, press OWNER key again. The top line of the display shows the respective ID.

- press OK when the entry is complete: a new record is made in the memory with this entry.

**Note : OWNER must be set at the first time you start the unit.(or reprogram it)**

## 7.5 Reading TAG IDs




Each tag has a unique identification number – TAG ID.
To read the TAG ID proceed as follows:
- make sure the right format is selected.
- point the antenna of the reader to the area where the tag is.
- press the START button.

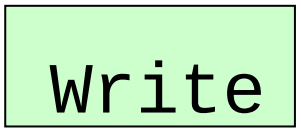
The display shows the read TAG ID on the top line, the tag count is incremented and a beep sounds to inform you that the reading was successful.

## 7.6 Entering codes to the reading

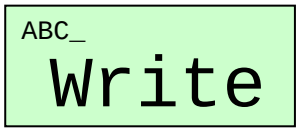
In some applications data can be added manually to the reading by typing in pre-defined codes. For example, the number of items in a pallet can be added to the reading at the material reception or the sex code of an animal can be added to the reading after tagging the animal.
To do so, after reading the respective tag (the TAG ID is shown on the top line) press the code keys you want to associate to this reading using the keys 0..9.
- you can enter as many codes as you wish.
- entries are confirmed by a beep and shown on the display.
- after download of the data to the database, the codes appear associated to the tag read.

## 7.7 Writing data to tags

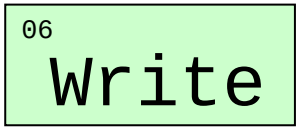
Some kinds of tags have an internal memory that can be written with user data. Please check the tag characteristics with the manufacturer.



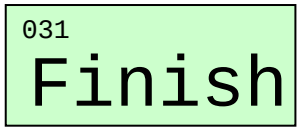

To program data into tags press the B / WRITE key (the unit must be ON first).
- the unit goes to data entry mode




You must now enter the data you want to write to the tag using the keys 0..9.
- the 0..9 keyboard works as the telephone keyboard in text mode: one press for the first letter, 2 for the next and so on.



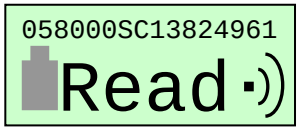

- you must confirm each letter with OK.
- pressing '0' twice to clear the previous letter.
- when all the text to write is input point the reader to the tag and press the START button.



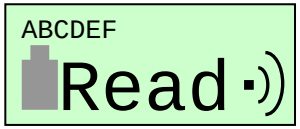

- you can follow the write procedure acoustically and visually on the display: the unit writes the number of bytes as defined in the configuration (*see chapter Configuration*).

- if the write counter on the top line stops (write problems) you can exit the write procedure by pressing the E / IDs key and restart from the beginning.

## 7.8 Reading user data from tags



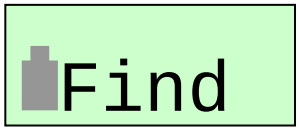

To read the user data from tags press the C / READ key. Then point the reader to the tag to read and press the START key.
- the reader reads both the TAG ID and then its internal data.




- data is read from the tag in blocks of limited size. Therefore it can happen that data is incomplete if the reading conditions are not optimal. Please keep on pointing to the tag as the received data will be updated at each reading attempt.

## 7.9 Finding tags

When a certain tag must be found in a population of several tags, this function enables finding the right tag.




Press the D / FIND key to activate this function.
- the unit is now in data input mode.
- now enter the TAG ID you want to find with the keys 0..9 and A..F. (must confirm with OK)
- when all 16 digits were input press the START key to start scanning the tags.
- the display shows the TAG IDs just scanned but is silent.
- when the correct tag is found the buzzer beeps.
- press OK to exit this function.

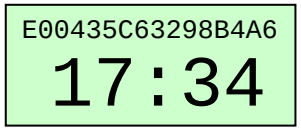
## 7.10 Setting the unit back to read TAG IDs

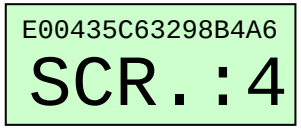
You can set the unit back to normal operation mode where only TAG IDs are read by pressing the E / IDs key. If the previous function was FIND you must press the OK key to finalize this mode.

## 7.11 Clearing the tag count

You can clear the tag count at any time (if the unit is ON) by pressing the F / CLR key.

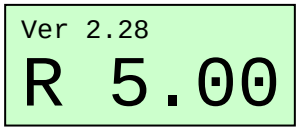
## 7.12 Viewing the readings made




You can navigate through the readings just made as follows:
- press the A / ON/OFF key until the unit is OFF.
- When the display is OFF, press the 5 key.
- the display toggles between time of reading and code associated.
- you can navigate through the memory records with the keys 2 (step back on the record memory) and 8 (step forward on the record memory).

## 7.13 Viewing the Firmware versions




You can view the firmware versions as follows:
- switch the unit OFF first.
- press the OK key.
- the current firmware versions are displayed
- The top line informs the firmware versions of the reader module and the middle one the firmware version of the User Interface part.

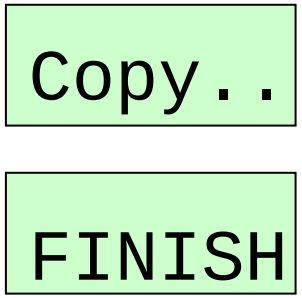
## 7.14 Downloading records from the reader

The HH500 has an internal non-volatile memory where all reading records are kept. They can be downloaded to a PC for processing in 2 basic ways:
- through an SD memory card (SD card format have to be **FAT16**)
- through a RS232 connection to a PC running a special application.
- through a Bluetooth interface to a PC running a special application.

(*see chapter Bluetooth Interface*)

Other options are available on demand.

### 7.14.1 Downloading with an SD card




This is the easiest method to download the data to a PC.

- switch ON the unit
- insert the SD card on the respective slot until it clicks in. (**FAT16** format SD card)
- the display shows COPY while the records are being copied.
- when the copy finishes, a file named AAE_nnnn.AAE is created (nnnn is an order number) on your SD card. Thus you can download this file with "RFID Note" (PC application) for your further use.

### 7.14.2 Downloading through RS232

The HH500 can be connected to any device with a RS232 port. The contents of the memory can then be downloaded using this port.
The supplied PC application "RFID Note" contains this feature and creates a comma separated value (CSV) file for use with other applications.
If you want to integrate the download feature in your own application, please contact your Advanced ID distributor. (*see Support software*)

### 7.14.3 Other download possibilities

The flexible architecture of the HH500 enables upgrade to other connection possibilities. Advanced ID has the possibility to upgrade your unit for Ethernet, Wireless LAN or other ISN band RF connection. Please contact Advanced ID for the options available.

## 8. Configuration

The handheld reader HH500 can be configured to fit particular applications. The configuration can be done with the supplied PC application "RFID Note". (*see Support software*)

## 8.1 Owner mode

The HH500 can be configured to always ask for an owner entry prior to reading or not. Also, owner IDs can be tags or ASCII strings (names). The possible settings are:

| Owner mode | Operation |
|---|---|
| Owner ASCII fixed | The owner ID is a NAME and is never asked. The previous owner ID is automatically stored at the start of each reading session (unit is wake-up).<br>The Owner's name can be entered or changed by pressing the OWNER key. |
| Owner tag fixed | The owner ID is a TAG and is never asked. The previous owner ID is automatically stored at the start of each reading session (unit is wake-up).<br>The user can scan the Owner's TAG by pressing the OWNER key. |
| Owner ASCII | The owner ID is a NAME and must be entered at the start of every reading session. |
| Owner TAG | The owner ID is a TAG and must be scanned at the start of every reading session. |

## 8.2 Data length and start address

The HH500 can store user data into tags as explained before. The number of bytes to be stored and the internal tag address where that data is stored can be set.
Data is written in blocks of 8 bytes to the tag. Therefore the data length must be always a multiple of 8. The PC application enables this setting accordingly.
The number of bytes is limited to 32. For application demanding more bytes, please contact your Advanced ID distributor.
The tag address where data will start to be written depends on the tag's internal chip. Please refer to the chip manufacturer's datasheet for details.
As a hint, ISO 16000-6B tags internal user memory start at address 0x12 (18) and EPC Class 1 Gen 2 start at 0x00 (0).
Please contact your Advanced ID distributor for more details. (*see Support software*)

## 8.3 Date format

The date format for the display can be changed:

| Date format | Example |
|---|---|
| Europe | DD/MM/YYYY: 23/11/2006 |
| USA | MM/DD/YYYY: 11/23/2006 |

## 8.4 Language

The HH500's display can be configured to operate in several languages. The language options depend on the destination countries. Please contact your Advanced ID distributor for the suitable languages of your application.

## 8.5 Reader timeout

The same tag will be stored in the memory only once per reading session. This means if you read tag A now and you read it again and again, it will be stored only once in the memory during this reading session. A new reading session starts automatically when the Reader timeout elapses, when the reader comes out of sleep mode or when the CLEAR key is pressed.

A Reader timeout occurs when the reader does not read any tag for the specified period of time.

Depending on the application, this time can be set.
If, for example, you have an application where it is unlikely that the same tag comes into read range again in a short period of time (ex. conveyor belt) you should set this value to 1 or 2 seconds at most. This means that if the time between 2 consecutive tags is more that 2 seconds you will have a new reading session for each tag, meaning that all tags passing will be read and stored, even if they come more than once in read range.

On the contrary, if you have an application where the same tag may come into read range in a reading session (ex. scanning a herd of sheep when they are in the corral) you would like to prevent the same animal's reading to appear again. In this case you should set the timeout to 2 minutes.

Note: the reader timeout has no influence on the tag counting feature. Once a tag is count, it will only be count again after the CLEAR key is pressed, regardless of its reading being stored or not in the memory.

## 8.6 Speaker

The HH500 beeps when a positive reading is made except in TAG FIND mode, where it beeps only when the searched tag is scanned.
The speaker can be turned off in the feature is not desired.
Note: the speaker will beep in the TAG FIND mode when the tag is found, regardless of the speaker setting.

## 8.7 Reader ID

Each HH500 can be assigned an own identification to enable identifying it in an application with several readers. The reader ID is 8 bytes long that can be assigned as you like.(*see Support software*)

## 8.8 Set TAG type

You can set the tag type similar to the TAG TYPE key using the PC application.

## 8.9 Set time and date

You can easily set the time and date of the HH500 to the time and date of the computer or enter manually the time and date using the PC application.

## 8.10 Set owner id

You may enter the Owner ID using the PC application. (*see Support software* )

# 9. Support software (PC Applications)

This chapter describes how to use PC software to control HH500 RFID reader, for examples;

- to download tag ID read by the unit
- to write data into tags(ISO-EM tag, EPC tag)
- to edit tag data
- to configure operation for the unit

Installation short descriptions : AAE Support CD. (*see in packing contents*)


1. Insert CD into CD-Rom drive.
2. Auto run window will appear.
3. Click on **RFID Note** to start installation
4. Follow the instructions.

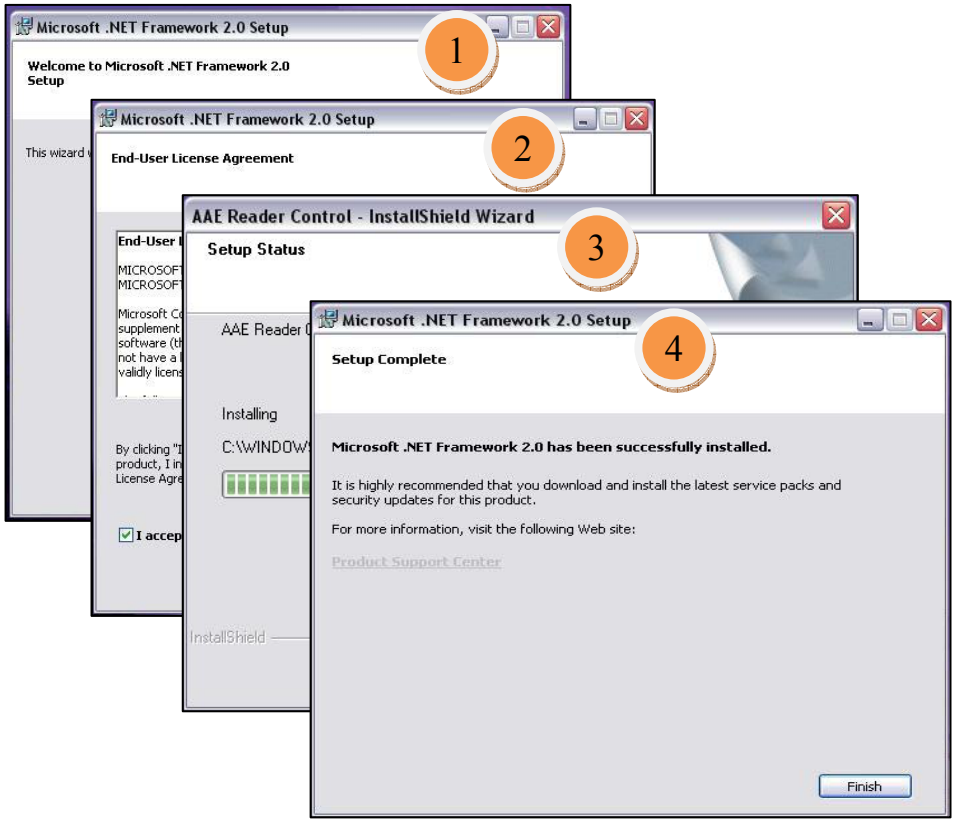
Note : MS dot net frame work 2.0 and FlashSTA software will be installed to your pc automatically.

If CD is not auto run, please see next sections. (manual installation)

## 9.1 Dot Net Frame work 2 (manual installation)

This step is required if your PC does not already have .Net Framework v1 (only) already installed. If it does, setup software will skip to next section.


To install Dot Net Framework 2.0
- double click the **Dot Net Framework 2.0.exe** icon (as left picture)
- follow the instructions in dialogue boxes until installation is finish. (as lower picture)



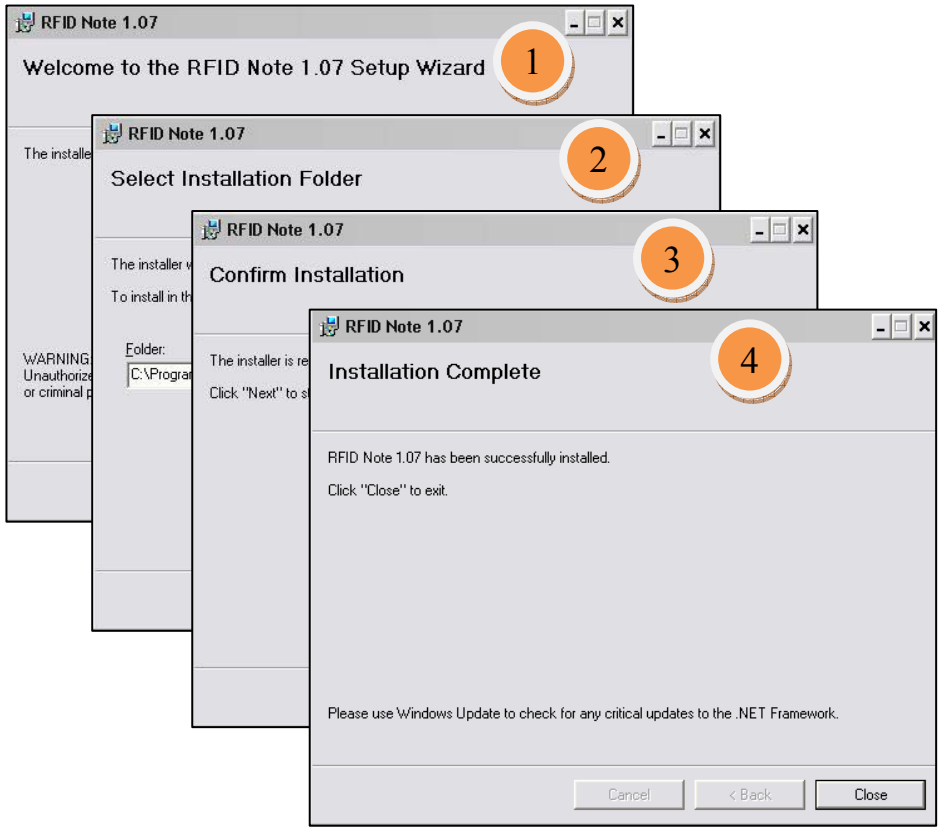

Note : Support software are in AAE Support CD/PC Application.

## 9.2 RFID Note (manual installation)

RFID Note is a pc application for controlling storing data from Reader to PC, reader configuration and some operations which users want to control the reader via PC.
Note : RFID Note version D1.07 supports Handheld Reader Firmware version 5.00 and further.

### 9.2.1 Installation RFID Note


To Install RFID Note,
- double click on **RFID Note R 1.xx Setup.msi** icon (as left picture)
- follow the instructions in dialogue boxes until installation is finish. (as lower picture)



### 9.2.2 Start RFID Note


To start RFID Note
- connect the Unit to PC with **RS232 communication cable.** (male side connect to unit and female side connect to pc)
- switch “ON” the unit
- double click on **RFID Note icon** (as a left picture)
- then RFID Note starting window (*see lower picture*) and Connection tab window will appear.

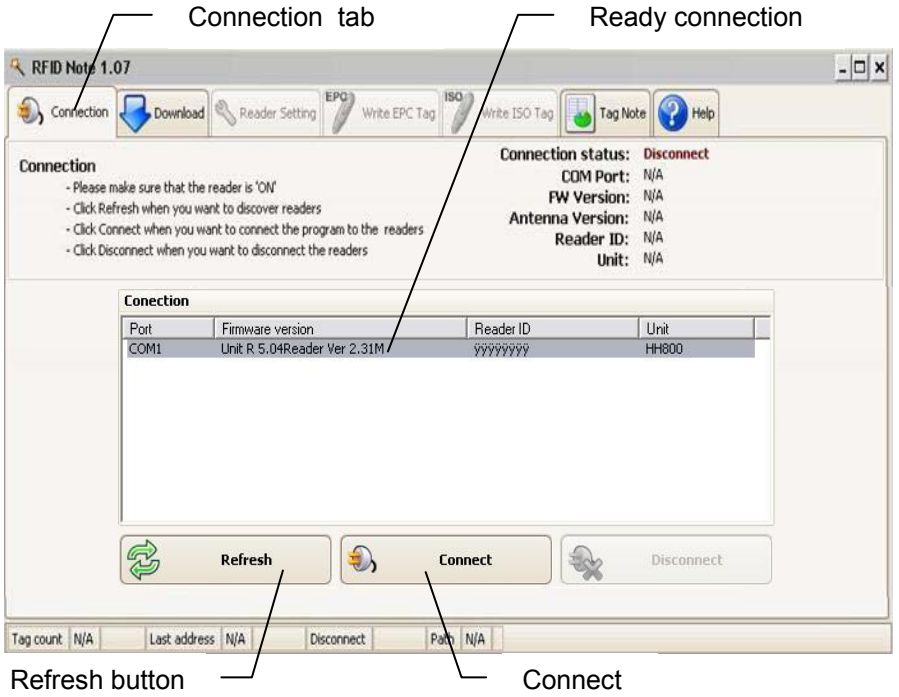
Note : RS232 communication cable is in the reader package. (*see package contents*)

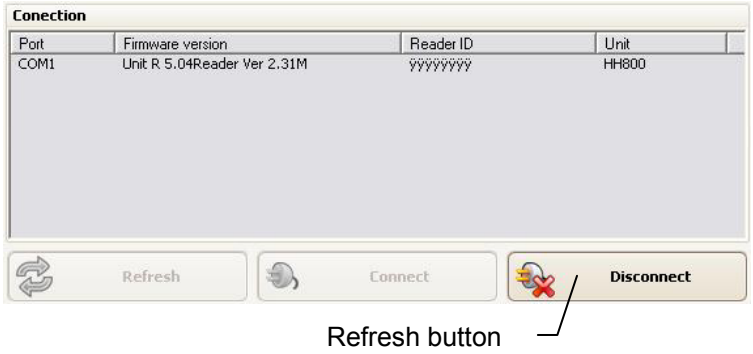

### 9.2.3 Connection tab (checking Reader connection)

This is the first and most important tab in RFID Note you will see. This tab is use for checking connection between reader and pc. It is automatically searching for the reader when you first start RFID Note. It will show the details of reader and ready connection comport. (*please see right pictures*)

To start connection
- click on **Connect button** then you will move to Download tab.

If the reader can not be found,
- please check RS232 connection and be sure the unit is switched “On”
- click on **Refresh button** to rescan for the connection.



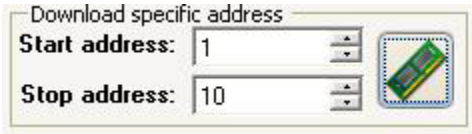

Note : you can disconnect unit any time by clicking on Disconnect button

### 9.2.4 Download tab

This tab is use for management the data from the unit.
For example;

- download tag ID read by unit. (you can download all the data or select from the specific address )
- download data from SD card.
- make a online(real time) communication between unit an pc.
- edit tag data, etc.

To download all data from the unit;
- click on **Download button.**
- then all data read by unit will be downloaded into your pc automatically. (*see right picture*)



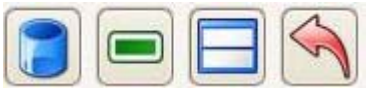

To download data from the specific address with this operation box.
- input Start address to download.
- input Stop address.
- click on this button.(*left picture*)

To download data from SD card;
- connect SD card to pc.
- click on **SD button** and browse path to your SD card.

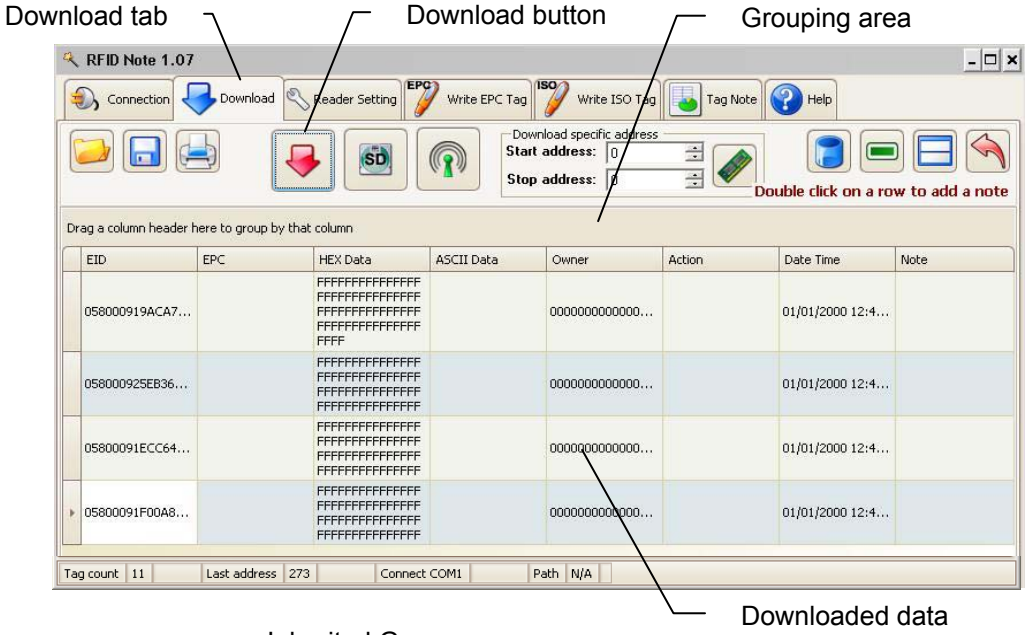
To make an Online Communication (real time) between the unit and pc;
- click on **Online button** to start online mode.
- click **Pause button** to stop online mode.

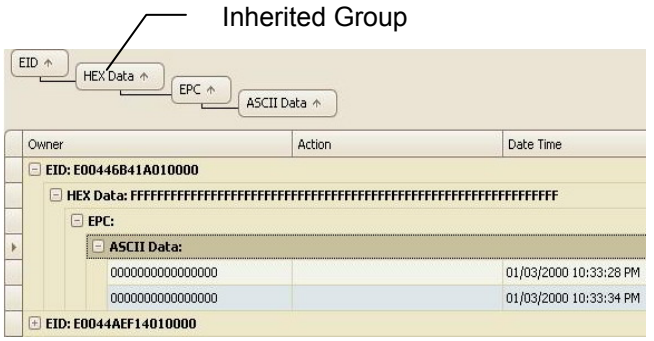
Note : In Online mode, every Action you input into the unit(press key board) will be on RFID Note directly.

You can Open(AID file, XML), Save(AID file, Excel, XML, HTML), and Print your AID file with these 3 buttons .
Note : AID file is a default data format for RFID Note.



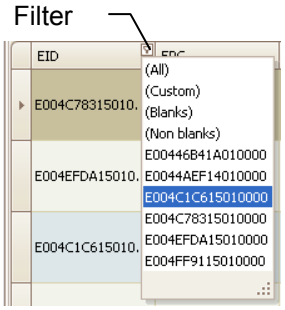
You can perform Clear data grid, Delete rows, Grid customization, and Delete filter with 4 buttons.(*left picture*)




You can Group data by
- dragging column header on Grouping area.
- data will be grouped by a name of header column.

Note : If you drag 2 groups, you will create inherited groups.(please *see left picture*)




You also can filter data which make you focus on the data you really concern. To do so;
- click on ▼ **Filter triangle button** on column header.
- select filter from drop down list.

Note : You can cancel filter by click on Delete filter button on tools bar. (*see left picture*)

### 9.2.5 Reader Setting tab

This tab is allow you to change configuration and set up the unit with firmware 5.00 and further. Some commands **will erase all data** and failure to follow instructions correctly may cause severe damage to the unit's memory and may permanently erase your data.

**DISCLAIMER:** Some operations will erase all data in the unit's memory. Users understand this and accept the risks – Advanced ID Corporation will not be response for any loss of data through the use of this software; use at your own risk.

#### 9.2.5.1 Clock

You can set Date format to display on LCD in 2 types (Europe format and USA format) by
- select one type from Date time format drop down list(*see configuration*)
- click on **Set button**

You also can set Clock for the unit by
- input hours in **HH**, minutes in **MM**, and seconds in **SS**.
- select date from Clock setting list
- click on **Set button**

You can set date time to be same as your pc clock by simply clicking on **Set to now button**.

#### 9.2.5.2 Data length and Start address

You can set which address in unit's memory to store the data. **These operations will erase all data in the unit's memory.** (*see configuration*)

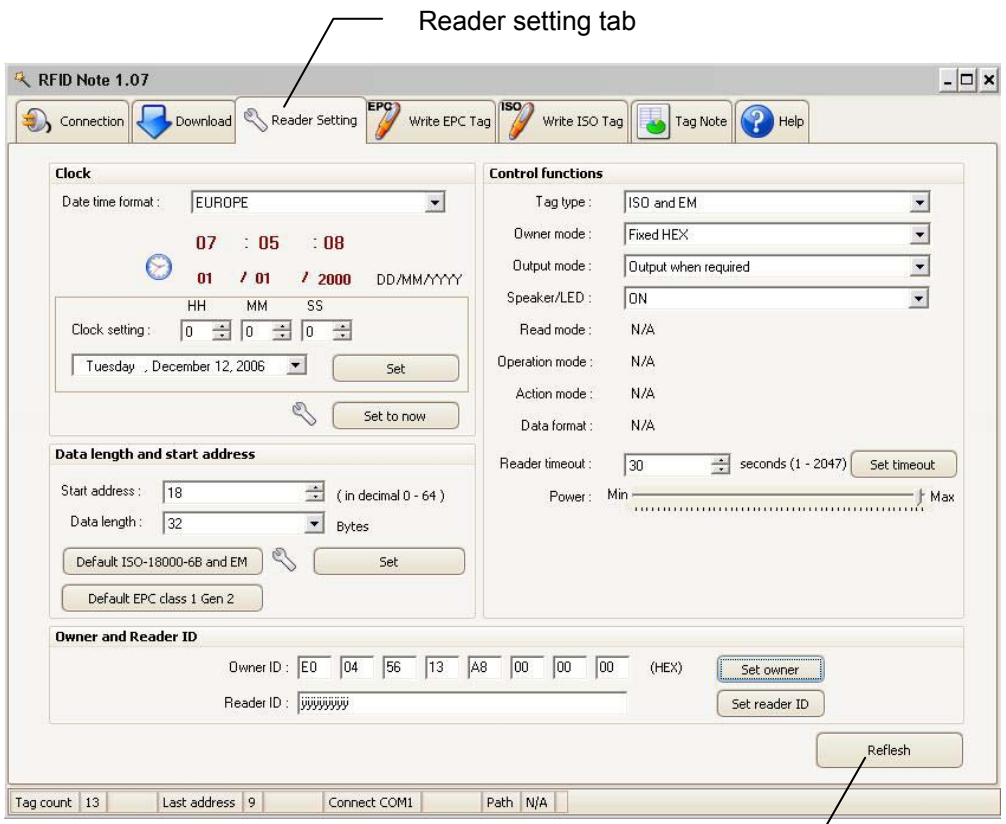
- input value into **Start address box**
- input value into **Data length box**
- click on **Set button**

To reset address for ISO/EM tag and EPC class1 Gen2 tag to default value
- click on **Default ISO-1800-6B and EM**
- click on **Default EPC class 1 Gen 2**

#### 9.2.5.3 Owner and Reader ID

You can set owner ID and Reader ID(unit ID) with this operation box.
To set owner ID (the ID is depended on Control functions setting)
- input value into **Owner ID box** then
- click on **Set owner button**

To set Reader ID(unit ID)
- input value into **Reader ID box** then
- click on **Set owner button** to confirm




#### 9.2.5.4 Control functions

You can set the unit's operations here.

**Tag type** : select tag type which unit will work with. (*see operation for details*)

**Owner mode** : select type of owner ID.

**Output mode** : select when unit have to send out data.

**Speaker/ LED** :switch On/Off speaker and LED when unit is operating.

**Read mode** : set unit to read mode.

**Operation Mode** : set read ID operation

**Action Mode** : set action when read tag.

**Data format** : set unit's data format.

**Reader timeout** : set timeout for unit.(*see operation for details*)

**Power** : set unit's read/write power. (between 20dB-30dB)

Note : Some options do not permitted to set depend on unit's Firmware version. Please contact your Advanced ID distributor for more details.

### 9.2.6 Write EPC tag tab

This tab is use for command unit to write data into EPC tag.

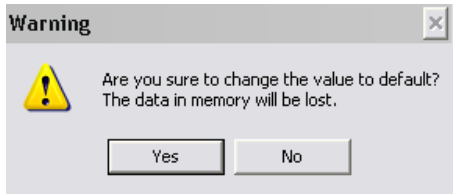
#### 9.2.6.1 Set data length and start address

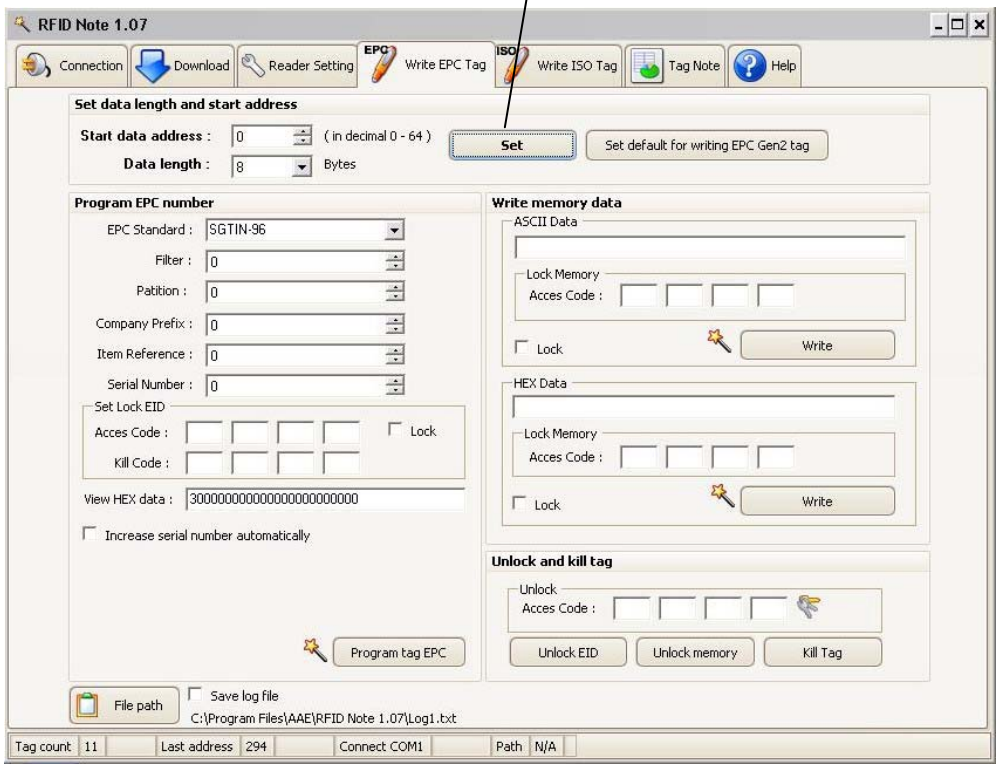
First of all you need to set data length and start address to match EPC data format.

- input value into **Start data Address box**
- input value into **Data length box**
- click on **Set button**

You can the set value to default value by
- clicking on **Set default for writing EPC Gen 2 tag button**.
- You need to confirm setting because changing these value **will erase all data in the unit's memory.**

Set data address and Data length need your confirmation because these operations will erase all data in the unit's memory. (*see left picture*)




#### 9.2.6.2 Program EPC number

You can select EPC standard which you want to write into tags and the details for each standard will be prompt to be set.

- select one from **EPC Standard drop down list**
- input value into each box
- click on **Program tag EPC**

**Set Lock EID** : You can set Access Code and Kill Code for preventing writing new EID or data into tag
- input value into **Access Code box**
- input value into **Kill Code box**
- click on **Program tag EPC**

#### 9.2.6.3 Write memory data

**ASCII data** : you can write ASCII format data into tag according to Data Length and Start Address setting. To do so
- input data into a box
- click on **Write button**

**HEX Data** : you can write HEX format data into tag according to Data Length and Start Address setting. To do so
- input data into a box
- click on **Write button**

If you want to prevent writing data into tag, you also can lock tags' memory after writing for the first time.
- input Access Code
- click on lock box then
- click on **Write button**

#### 9.2.6.4 Unlock and kill tag

You can **Unlock EID**, **Unlock Tag's Memory** and even **Kill Tag** by using Access Code and Kill Code.
- input Access code
- select operation you want to

You can save log file to keep the writing details for further use.
- click on **Save log file box**
- click on **File path button** and browse save location

Note : Unit LCD will show writing status same as normal writing operation.
(*see operation for details*)

### 9.2.7 Write ISO tag tab

This tab is use for command unit to write data into ISO tag.

#### 9.2.7.1 Set data length and start address

First of all you need to set data length and start address to match EPC data format.

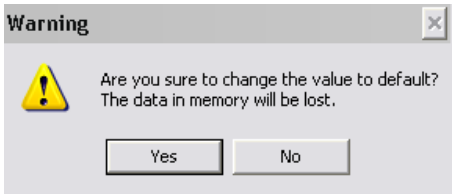
- input value into **Start data Address box**
- input value into **Data length box**
- click on **Set button**

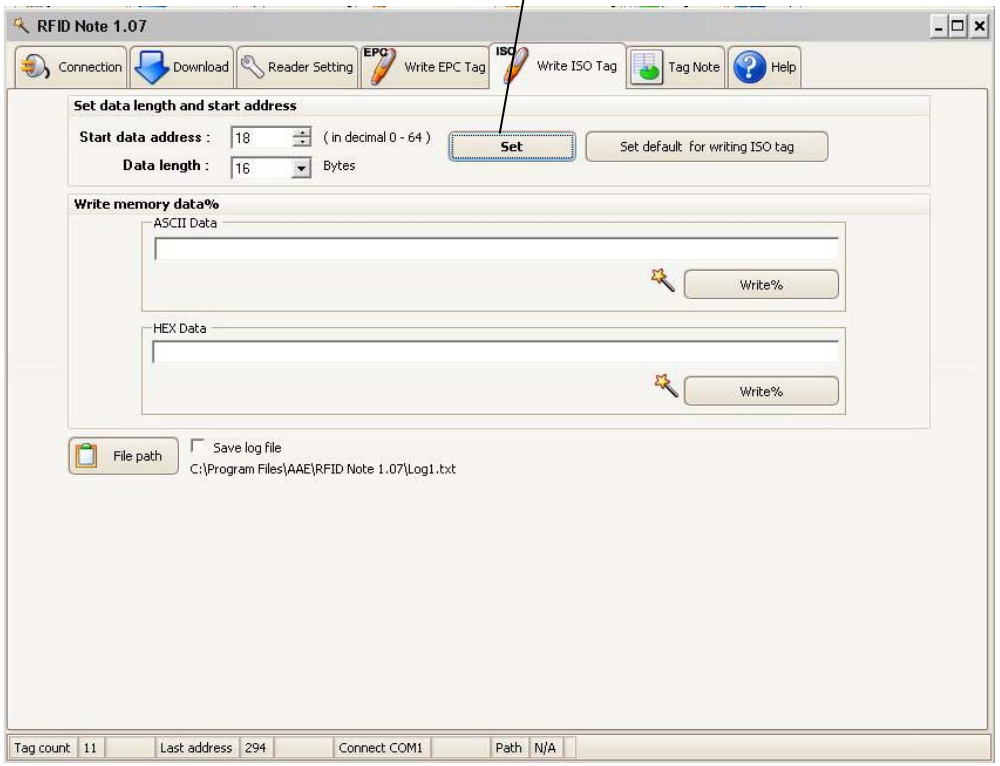
You can the set value to default value by
- clicking on **Set default for writing ISO tag button**.
- You need to confirm setting because changing these value **will erase all data in the unit's memory.**

You can save log file to keep writing details for further use.
- click on **Save log file box**
- click on **File path button** and browse save location

Note : Unit LCD will show writing status same as normal writing operation. (*see operation for details*)

Set data address and Data length need your confirmation because these operations will erase all data in the unit's memory. (*see left picture*)




#### 9.2.7.2 Write memory data

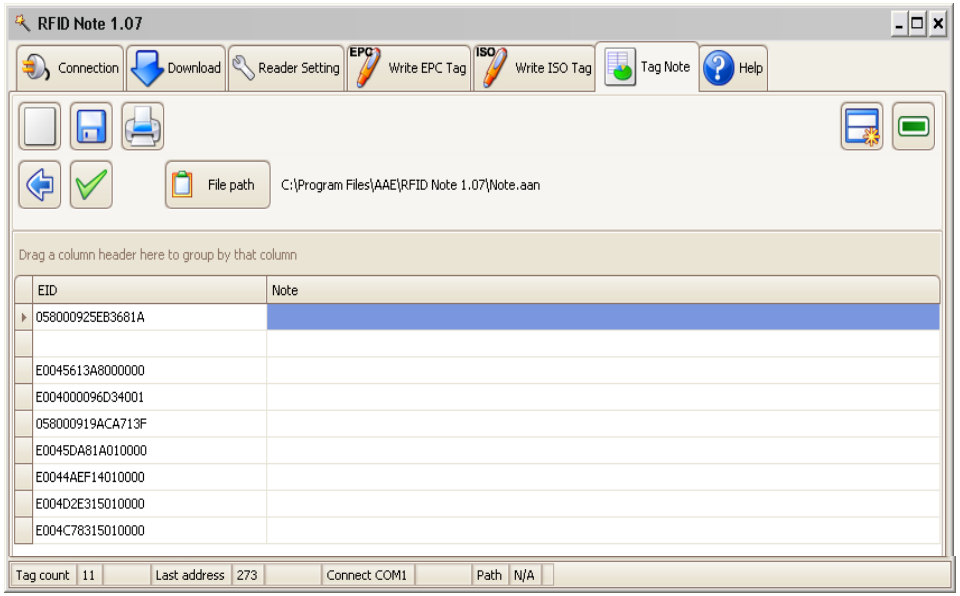
**ASCII data** : you can write ASCII format data into tag according to Data Length and Start Address setting. To do so
- input data into a box
- click on **Write button**

**HEX Data** : you can write HEX format data into tag according to Data Length and Start Address setting. To do so
- input data into a box
- click on **Write button**

### 9.2.8 Tag Note Tab

You can add more tag details which you read by unit in this tab and the tag data will be stored in database. You can access to this tab by **double click on any row of Tag ID when you are in Download tab**.

To add details into tag
- click on tag ID you want(a row next to that ID will be prompt)
- input data
- click on **Green Tick button** to confirm




You can create new Note file, Save(AAN file), and Print your AID file with these 3 buttons .
Note : AID file is a default data format for RFID Note.

You can move to Download tab by clicking on **Blue arrow button**(save and back), and confirm changing any details in this tab with **Green tick button**.(save, update and back)

You can add New Row or Delete Row with these buttons.

You can browse file location with by clicking on **File path button**

### 9.2.9 Help tab

This tab contains Users Interface Description documents, RFID Note software details others support software descriptions, and Firmware support details.

## 9.3 Programming new firmware into HH500 Reader

RFID Handheld reader HH500 can be programmed by users. This chapter will describe how to program it with **FlashSTA software**.

Note : Support software are in AAE Support CD. (*see in packing contents*)

**DISCLAIMER:** This command will erase all data in the unit's memory. Users understand this and accept the risks – Advanced ID Corporation will not be response for any loss of data through the use of this software; use at your own risk.

### 9.3.1 Connect the unit

- connect the Unit to PC with **RS232 communication cable.**
(male side connect to unit and female side connect to pc)
- switch "ON" the unit
- slide **Program Switch** to **Start position** (*see picture below*)


Note : When the switch is moved to Start position, the unit's LCD will be still. But when it is moved to End position, the unit's LCD will show unit's firmware version.

### 9.3.2 FlashSTA

FlashSTA is a free programming software that is used for reprogramming a new firmware to RFID Handheld Reader HH500. It will be automatically installed into your pc when you install RFID Note.


- double click on **Launch FlashSTA.exe icon** (Start Program) then Select program window will appear
- make sure **Internal flash memory** is tick
- select **RS232 port**
- click on **OK button**

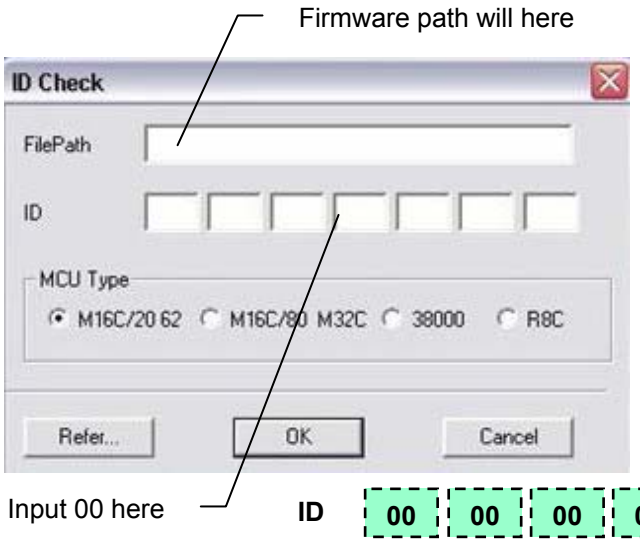


If the **Timeout window** appears,
- please check RS232 connection
- be sure the unit is switched On
- be sure Program Switch is on the right position

After checking all
- double click on **Launch FlashSTA.exe icon** to start over again

After the software found the unit and you click on OK, **ID Check** window will appear.

- click on **OK** to ignore Can not found the ID file popup


- click on **Refer… button** to browse a new firmware file you want to program.

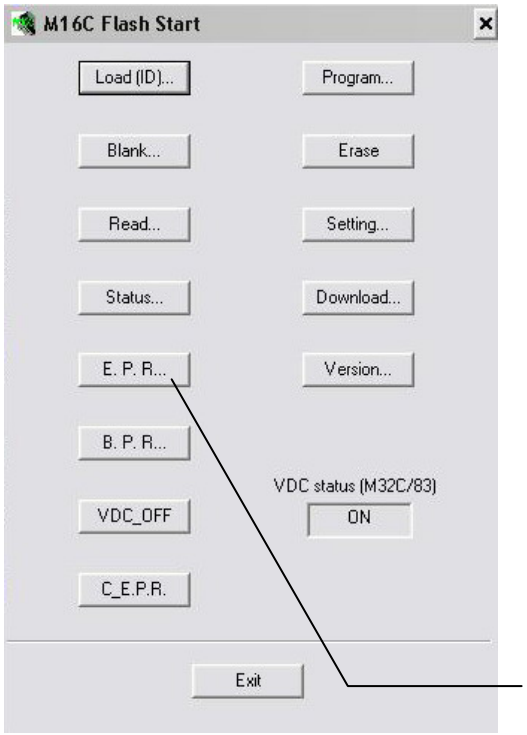
- input **00** (zero) into **ID box** (*same as boxes below*)

- click on **OK button**

Note : Default firmware is in AAE support CD.

Input 00 here

**ID** 00 00 00 00 00 00 00




Then M16C Flash Start window will appear
- click on **E.P.R… button**

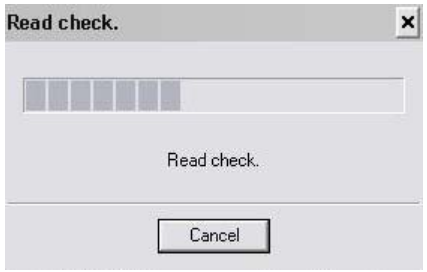
Erase Confirmation window will appear to ask for your confirmation.

Note : This command will erase all data in the unit's memory.

- click on **OK button** to confirm


Click on E.P.R… button

Progress windows will show programming status; Program, and Read check.

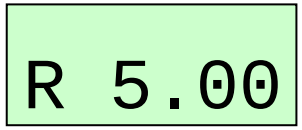




When the flashing process has been completed, Program OK window will appear.


- click on **OK button** to finish
- click on **Exit button** to close FlashSTA software
- slide **Program Switch** to **End position**
(*see picture below*)

**Slide right to END**

**Slide left to Start**




The unit's LCD will show unit's firmware version.
It means you reprogram new firmware to the unit completely.
**Note : You must set OWNER ID after flashing the unit.** (*see identifying the Owner*)

## 10. Bluetooth Interface (PC Applications)

This chapter describes how to communicate to HH500 with Bluetooth interface instead of RS232 connection. You can use all functions in RFID Note with the Bluetooth interface as same as RS232 interface.

Note : RFID Note version 1.14 demo support Bluetooth interface.

### 10.1 Bluetooth driver installation and setting

Bluetooth interface require driver installation and setting before use.

#### 10.1.1 Driver installation

1. Insert CD into CD-Rom drive.
2. Auto run window will appear.
3. Click on **Bluetooth driver** to start installation
4. Follow the instructions.

Note : Installation process depends on your Bluetooth brand which you use please refer to your Bluetooth user manual.

#### 10.1.2 Active Bluetooth device

1. Switch on HH500 and the unit have to be activated when it connect to Bluetooth on your PC.
2. Click on "**Bluetooth**" icon as a left picture (on your PC).
3. Then LED will blink to show Bluetooth stand by mode.

4. Double click "**Find Bluetooth device**" to search for HH500.

5. Then device icon will appear as picture below.

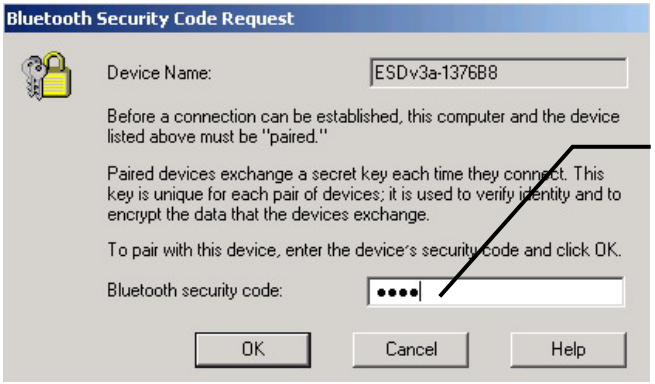
6. Right click and select "**Pair device**" same as this right picture.


7. Then you have to enter "**Security code**" in "Bluetooth Security Code Request window".

**The Security code is '1111'**

(*see a picture in next page)*

This picture shows how to enter Security code.




**Enter 1111 here**

8. A When Bluetooth is connected an icon will be as a left picture and ready to use.

9. you can use “RFID Note” as usual now. (*see 9.2.2 Start RFID Note*)

**Note :** 1. RFID Note will scan for every Bluetooth devices in your area and takes several minutes.

2. Bluetooth HH500 can synchronize only 1unit at a time.

3. If RFID Note cannot found the unit please check;
   - Bluetooth driver already installed
   - Bluetooth device is already pair
   - No others Bluetooth device are activated in the area
   - HH500 which you want to communicate is switch on

If you have more than 1unit in your area or have others Bluetooth devices in area please turn them off before start RFID Note. (*see next section for more details about Bluetooth device status*)

## 10.2 Bluetooth device status

Bluetooth status is very important for communication between PC and HH500. Because Bluetooth interface can be configure as a virtual communication port and this can cause port conflict. To check the status;

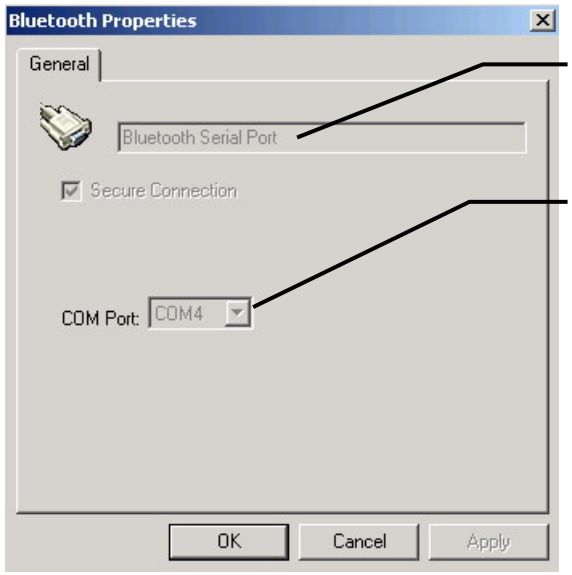
1. Double click on the left icon (to see available services in the device) then

2. An icon will appear as a right picture

3. Right click on the right icon and select “**Bluetooth properties**”

4. A Bluetooth properties window will appear.

This picture shows Bluetooth properties.



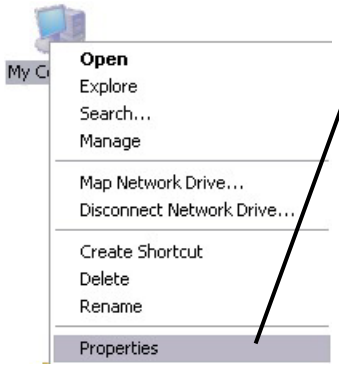

**Bluetooth Serial port (virtual serial port)**

**COM Port : COM4**

This picture shows the present Bluetooth device is a virtual serial port. And it work as a serial COM port 4.

5. Go to Device Manager in your PC. (*see pictures below*)

(Right click on “My Computer”→select “Properties”→Hardware→Device Manaeger)




Select Properties


Click on Device Manager here

6. Fine **Port section** and **disable** others Bluetooth devices which not use

For example, there are 2 Bluetooth devices in your PC (COM3, COM4).
And according to Bluetooth properties window, the device in concern is as COM4.
So disable COM3 by

1. right click on "**Bluetooth Communication port (COM3)**" and
2. select "**Disable**". (*see a picture below*)


Disable COM3

HH800 Bluetooth port
As COM4

### 10.3 Bluetooth LED status

Bluetooth operating status is showed by orange LED at the back of HH500.
There are 3 patterns of Bluetooth status;

Bluetooth not activate (HH500 is off) : LED will off
Bluetooth ready to synchronize : LED will blink twice every 2 seconds
Bluetooth is Synchronizing : LED will light on

## 11. FCC Statement

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.
To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. (Example - use only shielded interface cables when connecting to computer or peripheral devices).

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 Radiation Exposure Statement:**

"This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. The antenna(s) used for this transmitter must be used to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter".
Power output listed is conducted. Use of this device is limited to handheld operation and applications where 20 cm distance to the body is ascertained. The device must not be co-located or operating in conjunction with any other antenna or transmitter. End-users must be provided with transmitter operating conditions for satisfying RF exposure compliance.

# PR500

## User manual

| | |
|---|---|
| ***Ref.*** | (PR500 readers) |
| ***Date:*** | 2008-03-13 |
| ***Rev.*** | 1_01 |
| ***Status:*** | Released |

## Contents:



AFG ASIA ENGINEERING CO.LTD.
65/12 M.10 T.Tonpao A.Sankumpang
Chiangmai, Thailand 50130
Tel: +66 53 390 909
Fax: +66 53 390 910

## Revision Index

| Revision | Date | Author | Change Record |
|---|---|---|---|
| 1_00 | 2007-11-07 | Soemsak | New document |
| 1_01 | 2008-03-13 | Soemsak | - Added (4) FCC Statement |

AFG ASIA ENGINEERING CO.LTD.
65/12 M.10 T.Tonpao A.Sankumpang
Chiangmai, Thailand 50130
Tel: +66 53 390 909
Fax: +66 53 390 910

# 1. Introduction

This document specifies how to use the PR500 RFID reader, the reader user interface and the communication protocol with some modifications.

# 2. Preparing

In this chapter specifies what tools and environments that you need for working with the PR500 RFID reader and also how to install driver and support software.

## 2.1 Environments

- a PC (recommended >= Pentium 4, 1.00Ghz, 512MB Ram, 1GB hard drive space, a USB port)
- Window XP SP2
- Microsoft Dot Net Framework 2.0
- Microsoft Excel 2000 or newer version

## 2.2 Tools (In Support CD)

- PR500 Download Software version1.0.0.0 – uses for downloading data from the memory of the PR500 RFID reader
- EZTerminal.exe – uses for monitoring sent data from the PR500 RFID reader and debugging
- FlashSTA .exe – uses for updating a new firmware to the PR500 RFID reader

## 2.3 Installing PC drivers

The PR500 RFID reader uses virtual RS232 port to communicate with a PC via USB port. The instruction below will show you how to install the driver.

- Insert Support CD to a PC
- Go to “x:\Driver”
- Follow the instruction in “x:\Driver\Windows_XP_Installation_Guide.doc”

## 2.4 Installing Microsoft Dot Net Framework 2.0

PR500 Download Software version1.0.0.0 runs under Microsoft Dot Net Framework 2.0 environment. Therefore, use needs to install the framework before attempting to use PR500 Download Software version1.0.0.0. . The instruction below will show you how to install the framework.

- Insert Support CD to a PC
- Double click on “x:\Microsoft Dot Net Framework 2.0\dotnetfx.exe”
- Follow the installing instruction.

# 3. Getting Start

This chapter will show you how to use the PR500 RFID reader.

## 3.1 Turn ON and OFF

User can turn ON and OFF the PR500 RFID reader by pressing the “POWER” button

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**Picture 3.1.1** Layout of the keyboard

And also user can turn ON the PR500 RFID reader by pressing the “Trigger” button on the reader.

**Picture 3.1.2** the “Trigger” button

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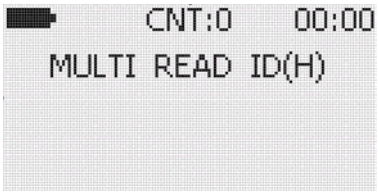
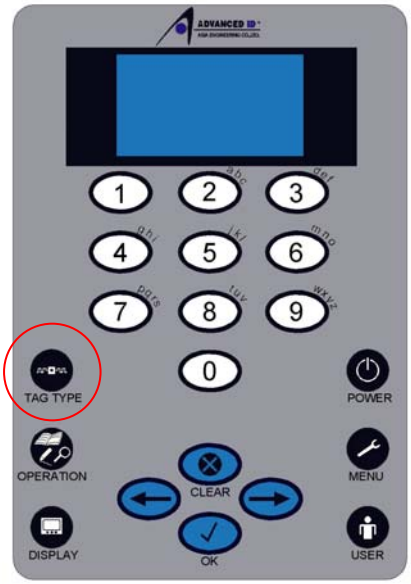
***For saving power, the reader will turn OFF itself after 10 minutes if no pressed keys or no commands sent via virtual RS232 port.




**Picture 3.1.3** after the reader turn ON, it will go to the "MULTI READ ID(H)" mode

## 3.2 Reading IDs

The PR500 RFID reader supports 2 standard types of the RFID transponders/tags, ISO18000/6B and ISO18000/6C (EPC Class1 Gen2). User can change reading tag type by pressing the "TAG TYPE" button.



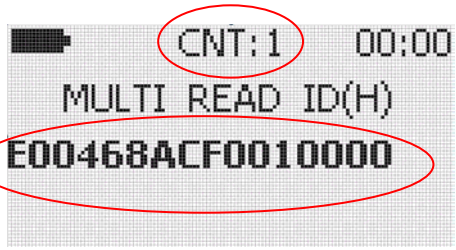

**Picture 3.2.1** the position of the "TAG TYPE" button

Once, user press on the "TAG TYPE" button, the reading mode will change by the sequence below.

MULTI READ ID(H)* -> ISO-6B READ ID(H) -> EPC-G2 READ ID(H)

Note: *(H) means the reader will show IDs in Heximal number (0 – F)

If user is in the “MULTI READ ID(H)” mode, after user presses and hold the “Trigger” button, the PR500 RFID reader will read tags both ISO18000/6B and ISO18000/6C (EPC Class1 Gen2) and show 8 or 12 bytes IDs on the display such as below.




**Picture 3.2.2** the reading ID was shown in the display

The counter number will increase according to the number of read tags.
Note: the maximum tag number that the reader can count is 50 unique tags.

If user wants to clear the tag counter and the data on the display, just press the “CLEAR” button.


**Picture 3.2.3** the position of the “CLEAR” button

When the PR500 RFID Reader reads tag’s ID, the reader will store the information of the tag into the flash memory and user can download the information by using the program “PR500

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Download Software version1.0.0.0" (this document will explain it in the next chapter). The contents of the information are as below:

| Name | Description |
|---|---|
| Record number | The address in flash memory that the tag was stored. |
| Date | Date when the tag was read. |
| Time | Time when the tag was read. |
| Tag type | Type of the tag(ISO18000/6B or ISO18000/6C) |
| Action | The action mode(READ or WRITE or FIDE) |
| Display | The read field of data(ID, DATA, TID, RESERV) |
| ID | ID of the tag |
| Start address | If user is in "READ DATA" or "WRITE DATA" mode, this field will identify which address of the tag is the start address for reading/writing. |
| Data length | If user is in "READ DATA" or "WRITE DATA mode, this field will identify how long of the data that user read/write from the start address to the end of data. Note: the maximum is 32bytes |
| Data | If user is in "READ DATA" or "WRITE DATA mode, this field will identify the data in the tag. |

## 3.3 Writing data/ID

The PR500 RFID allows user to write data/ID into RFID tags. However, **user needs to know first which RFID tag type that they are using (ISO18000/6B or ISO18000/6C)**.

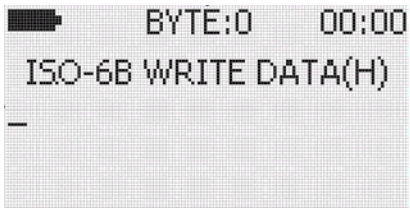
For writing data into tags ISO18000/6B type, user has to go to "ISO-6B WRITE DATA(H)" or "ISO-6B WRITE DATA(A)*" by pressing the "TAG TYPE" button to select "ISO-6B" type and then press the "OPERATION" button.

Note: *(A) means the reader will show data in ASCII characters (0-9, A – Z).


**Picture 3.3.1** the position of the “OPERATION” button

Once user presses the “OPERATION” button, the operation will change to sequence below:

“ISO-6B READ ID(H)” -> “ISO-6B WRITE DATA(H)” -> “ISO-6B READ DATA(H)”



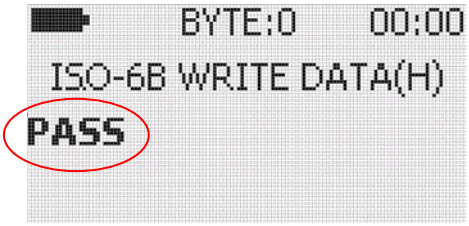

**Picture 3.3.2** “ISO-6B WRITE DATA(H)” mode

User can type in 1 – 32 bytes data from the keyboard on the PR500 RFID reader.

Trip: if user wants to type in A,B,C in heximal, just repeat pressing the “2” button. If user wants to type in D,E,F in heximal, just repeat pressing the “3” button.

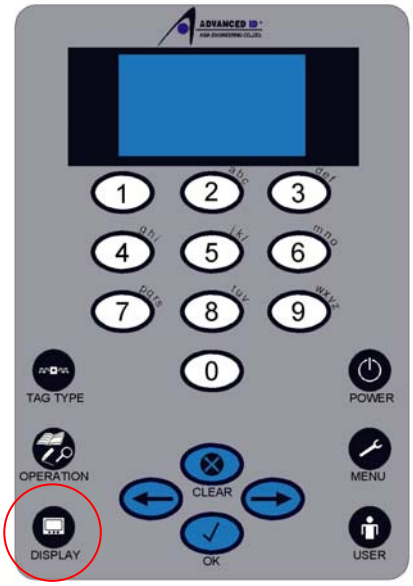
Note: user must enter the heximal data correctly. For example, the reader does not allow writing the heximal data which has wrong data length such as 0102030 (3 and half bytes), the reader will show error “WRONG LENGTH” on the display when user attempts to write it.

When user finishes typing in the data, point the reader to an ISO18000/6B tag ,press and hold the “Trigger” button to write the data into the tag until the display shows “PASS”. When it finishes writing the display will show “PASSED” and the buzzer will beep.




**Picture 3.3.3** writing success

If user wants to write data in ASCII mode, just press the “DISPLAY” button.




**Picture 3.3.4** the position of the “DISPLAY” button

Once user presses the “DISPLAY” button, the operation will change to sequence below:

“ISO-6B READ ID(H)” -> “ISO-6B READ DATA(H)” -> “ISO-6B READ DATA(A)”
Or
“ISO-6B WRITE DATA(H)” -> “ISO-6B WRITE DATA(A)”

When user is in “ISO-6B WRITE DATA(A)” mode, the PR500 RFID reader will allow typing in ASCII Characters (0 – 9, A – Z).

## 3.4 Reading other field of ISO18000/6B(EPC Class1 Gen2)

The PR500 RFID reader allows user to read 4 fields in ISO18000/6B(EPC Class1 Gen2) tags. The fields are as below:

- Reserve – the data such as “ACCESS CODE”, “KILL CODE”(read/write or read only).
- EPC – EPC(ID) number of a tag (read/write/lock).
- TID – tag’s manufacture number and/or serial number. This field is written from a factory (read only).
- USER DATA – reserves for user data (read/write/lock).

When user want to read EPC(ID),DATA(H),DATA(A),TID or Reserve in ISO18000/6B(EPC Class1 Gen2) tags, just press the “TAG TYPE” button to select “EPC-G2” mode and then press the “DISPLAY” button. The sequence after pressing the “DISPLAY” button is as below:

“EPC-G2 READ ID(H)” -> “EPC-G2 READ EPC” -> “EPC-G2 READ DATA(H)”
-> “EPC-G2 READ ID(A)” -> “EPC-G2 READ TID(H)” ->“EPC-G2 READ RESV(H)”

The PR500 RFID reader allows user to write EPC(ID) and DATA into ISO18000/6B(EPC Class1 Gen2) tags. When user want to write EPC(ID) or DATA, just press the “TAG TYPE” button to select “EPC-G2” mode and then press “OPERATION” to select “WRITE ID(H)” mode and then press the “DISPLAY” button. The sequence after pressing the “DISPLAY” button is as below:

“EPC-G2 WRITE ID(H)” -> “EPC-G2 WRITE DATA(H)” -> “EPC-G2 WRITE DATA(A)”

## 3.5 Finding IDs

The PR500 RFID reader allows user to find the ID of tags.

User can go to “MULTI FIND ID(H)” by pressing the “TAG TYPE” button to select “MULTI” type and then press the “OPERATION” button. When user is in “MULTI FIND ID(H)”, user can type in 8 or 12 bytes of the ID that want to find in the reader then press and hold the “Trigger” button to find the ID. When the read found the ID, the buzzer will beep and store the information of the tag into flash memory.

## 3.6 Menu

User can change the data length, start address for reading/writing ISO18000/6B and start address for reading/writing ISO18000/6C by pressing the “MENU” button. If user repeats pressing the “MENU” button, the reader will go to the sequence below:

“SET DATALENGHT” -> “SET START ADDRESS FOR ISO-6B” -> ‘“SET START ADDRESS FOR EPC-G2”

To change the values, just press the “LEFT” or “RIGHT” button.
To go back to reading/writing mode press “OK” or “CLEAR”

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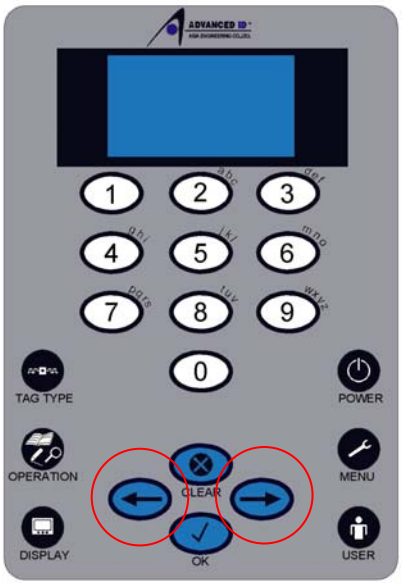
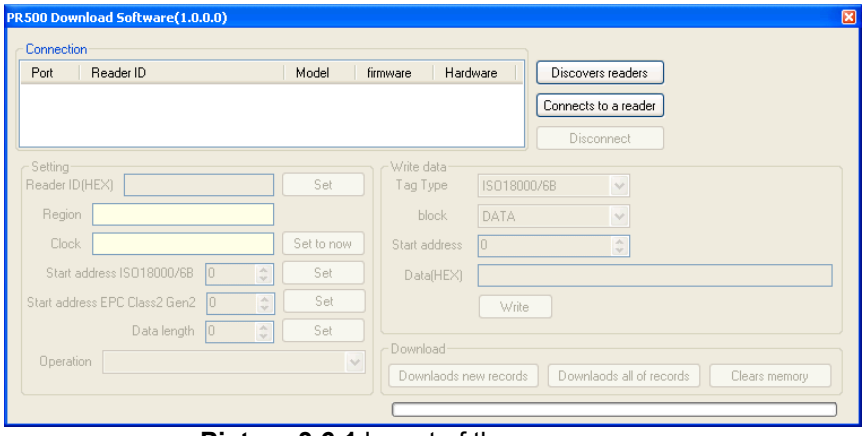



**Picture 3.6.1** the position of the “LEFT” and “RIGHT” button.

## 3.7 Downloading data from flash memory

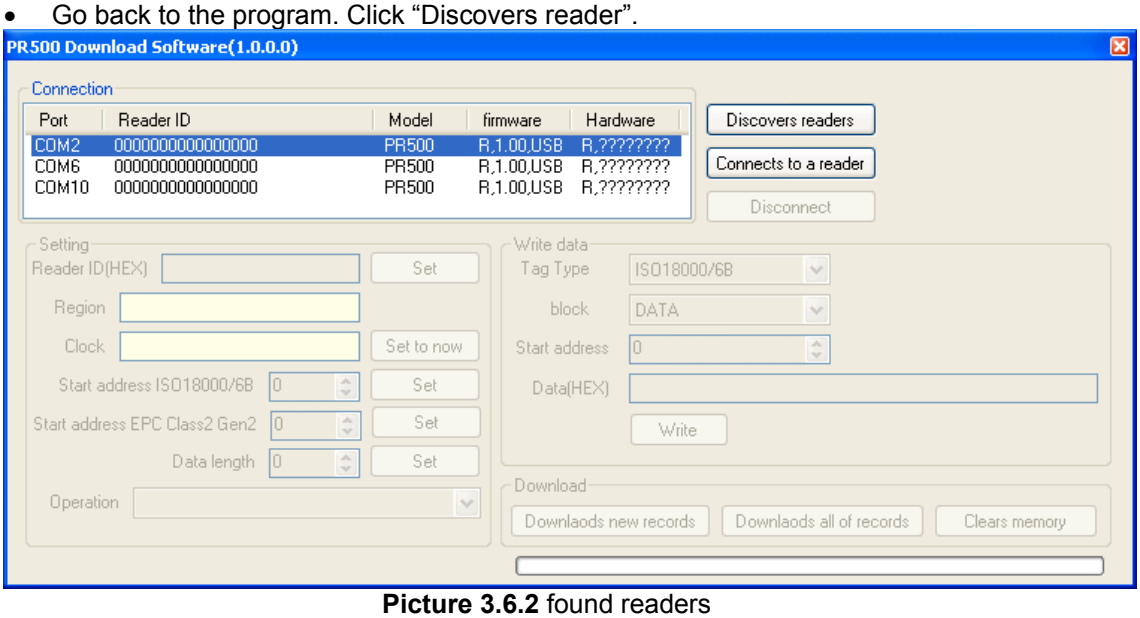
After user was reading RFID tags, they will be able to download the data out of the flash memory by using program “PR500 Download Software version1.0.0.0”. the instruction below will show you how to download data.

- Insert Support CD
- Makes sure you have already install Microsoft Dot Net Framework 2.0. if not, please go to chapter 2.
- Go to “x:\PR500 Download Software.exe” in the CD.
- Open the program



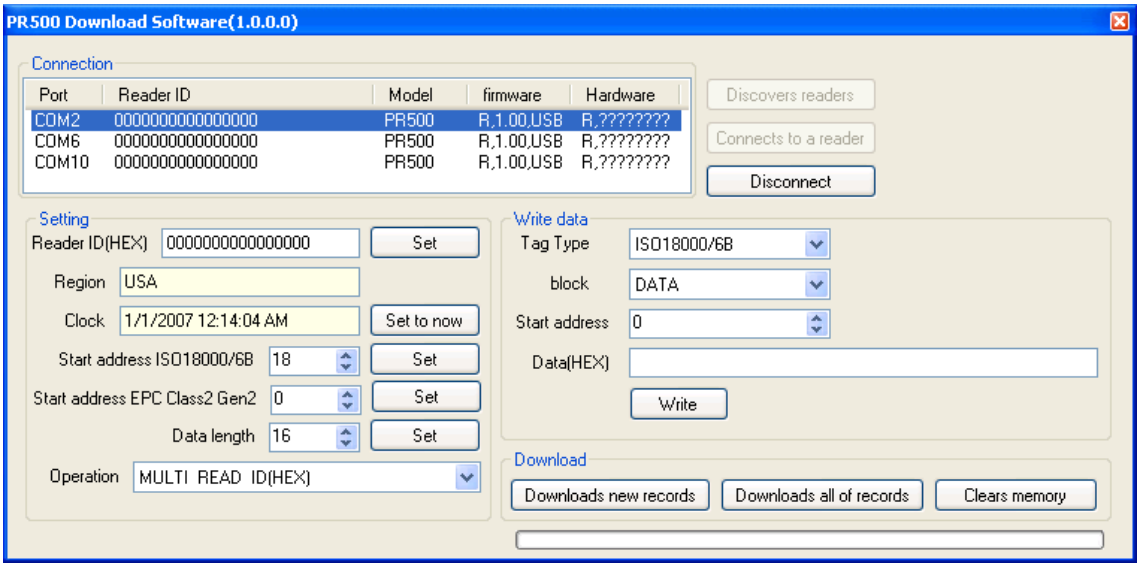

**Picture 3.6.1** layout of the program

- Connect the PR500 RFID reader to the PC using the USB cable.
- Turn ON the reader.
- Go back to the program. Click “Discovers reader”.

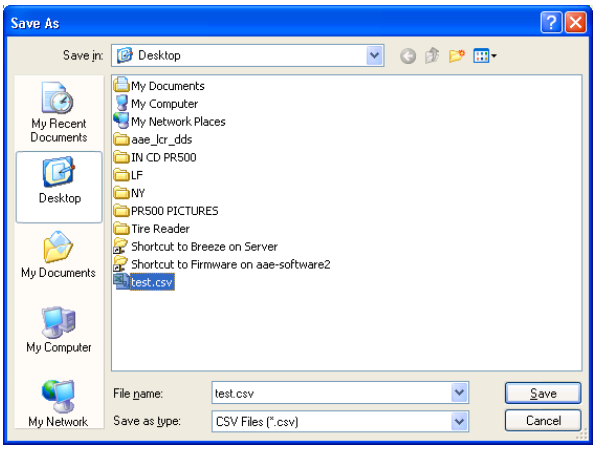



**Picture 3.6.2** found readers

- The program will list the readers and show in the list box.
- Select the reader and then press “Connects to a reader”




- User can download data by pressing “Downloads new records” or “Downloads all of records”. “Downloads new records” will continue downloading data from the last time but for “Downloads all of records” will download all of data that was stored in the memory. After you press “Download”, Save As dialog will show as below.




- Select the path for saving the data. Click “Save”
- User can select 2 extensions. First is .CSV(opened by MS-Excel) and second is .TXT(opened by Notepad).

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Chiangmai, Thailand 50130
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Fax: +66 53 390 910

## 4. FCC Statement

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.
To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. (Example - use only shielded interface cables when connecting to computer or peripheral devices).

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 Radiation Exposure Statement:**

"This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. The antenna(s) used for this transmitter must be used to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter".

Power output listed is conducted. Use of this device is limited to handheld operation and applications where 20 cm distance to the body is ascertained. The device must not be co-located or operating in conjunction with any other antenna or transmitter. End-users must be provided with transmitter operating conditions for satisfying RF exposure compliance.