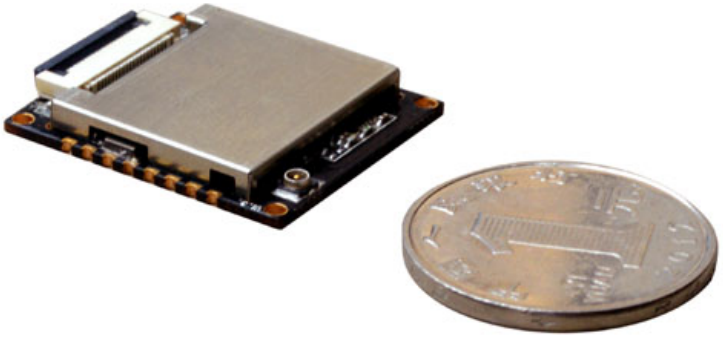
YR903 UHF RFID Evaluation Kit User Manual V1.1



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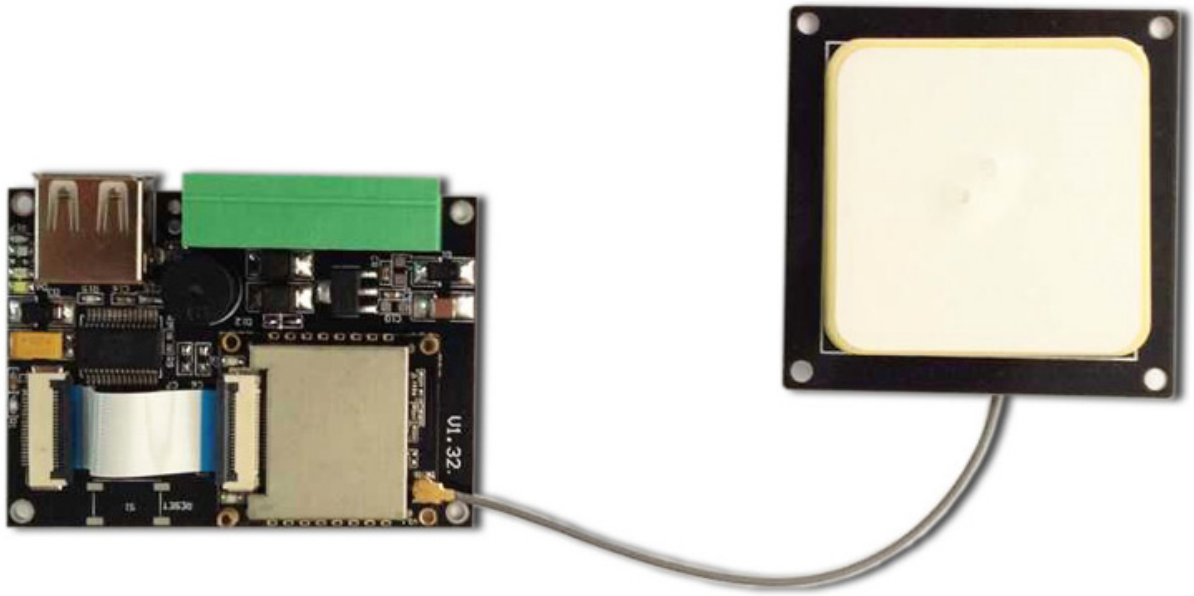
1. YR903 Evaluation Kit View



2. Reader Configurations

2.1 Initial Use

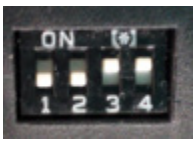
2.1.1 Step 1: Connect The Reader to PC via USB or Serial Port

Method NO.1: You can connect the reader to your PC via USB Cable.

Next, please switch the DIP to the position as illustrated below:

Method NO.2: You can also connect the reader to PC via RS-232 serial port

Next, please switch the DIP to the position as illustrated below:



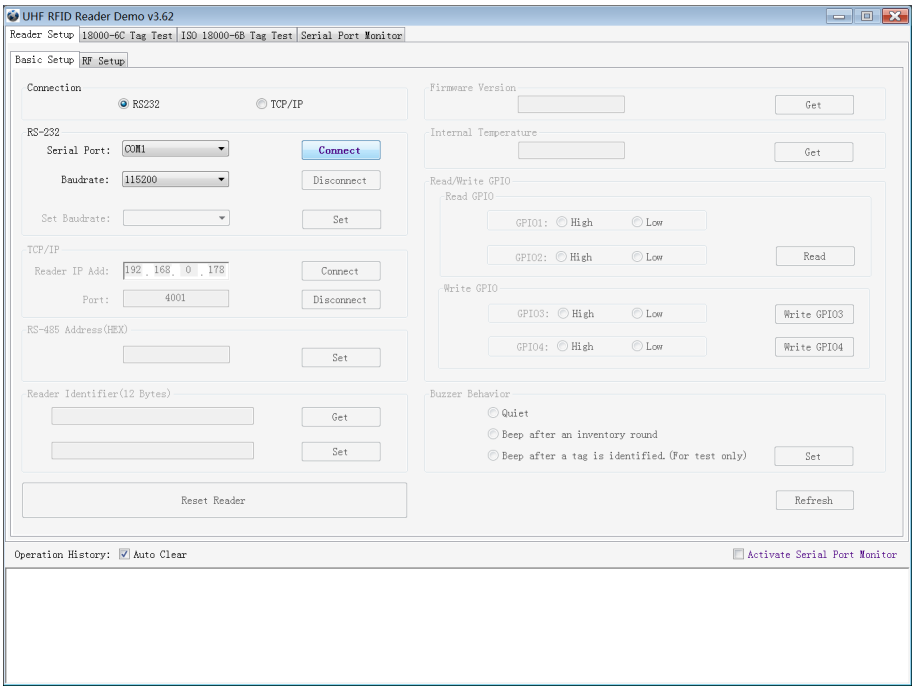
When the indicator light on and sound of a short beep, reader is ready.

Note: Driver will be installed automatically when reader is connected to PC for the first time. But some computers may fail. In this case, please install driver manually. (please see: Installing Driver at page 21).

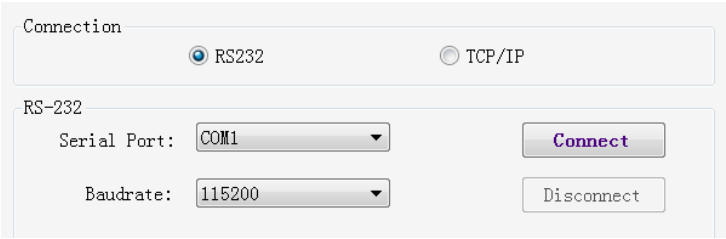
2.1.2 Step 4: Operating Reader via Demo

Put the files that named **UHFDemo.exe**, **reader.dll**, **customControl.dll** into a same folder, and double-click **UHFDemo.exe** to run the software.

1. Open the software and it will shows as below:



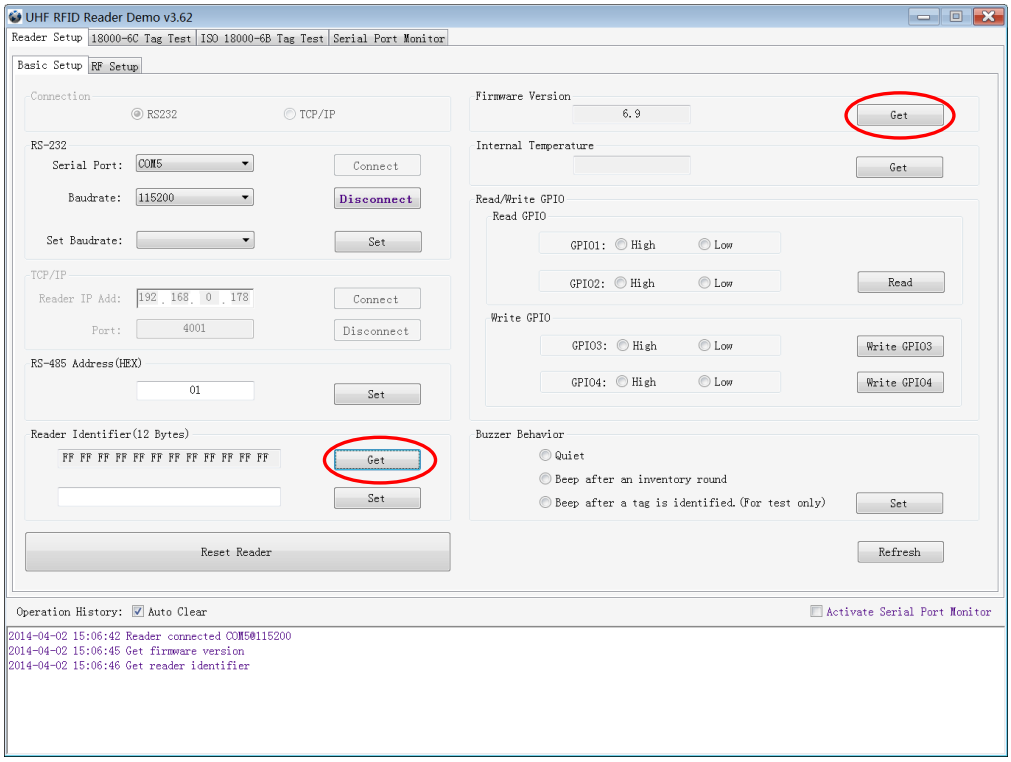
2. Please select **RS232** as **Connection** if the reader is connected via RS -232 port, or select **USB** as **Connection** if the reader is connected via USB. Choose the corresponding **Serial Port** and **Baudrate** (default baudrate is 115200). As illustrated below:



3. Click **Connect** , if it succeeds, the **Operation History** will display as below:

4. Text communication with the reader:

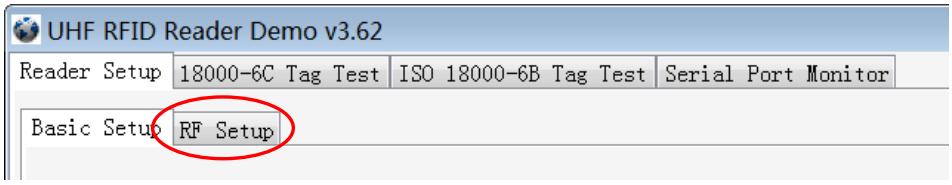
Click on **Get** in **Firmware Version** or in **Reader Identifier**, the following screen displays:



Now the reader has been connected to PC successfully.

2.2 Setting RF Parameter

After connecting the reader with PC, we need to set some basic RF parameters: RF Output Power & RF Spectrum. Please select **RF Setup** as illustrated below:



2.2.1 Setting RF Output Power

RF Output Power is the strength of RF output signal from antenna port whose unit is dBm.

The output power range is 0 - 26dBm. When this setting completes, it will be saved in the reader automatically even if the power is cut off. The default output power is 26dBm.

2.2.2 Setting RF Spectrum

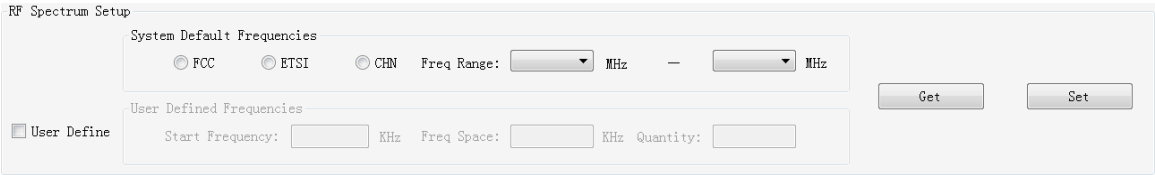
Set the RF spectrum manually.

- Please defer to Frequency parameter tablet in Communication protocol for more information about

the carrier frequency.

- Frequency range the reader supports: 865MHz-868MHz(ETSI), 902MHz -928MHz(FCC).

You can set the reader in **RF Spectrum Setup->User Define**, as illustrate below:



Users can set RF spectrum via these three parameters: Start Frequency, Frequency Interval, The number of Frequency points.

2.3 ISO-18000-6C tag inventory

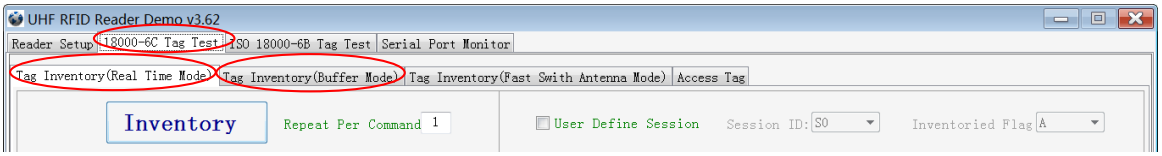
Connect the Reader correctly. Tag operation could be started when RF Setup is completed.
Tag inventory means reader identifying multiple tags'EPC number at the same time. This is the core function of UHF RFID Reader and one of the standards to judge a reader's performance.

2.3.1 Real Time Mode & Buffer Mode

The most commonly used mode for tag inventory is **Real-time Mode**. Data will be uploaded meanwhile you can get the tags'EPC number instantly. **RSSI** and **Parameter of Frequency** are changed and recorded in real time. Due to its dual CPU architecture, performance of multi-tag identification under **Real-time** mode is the best.

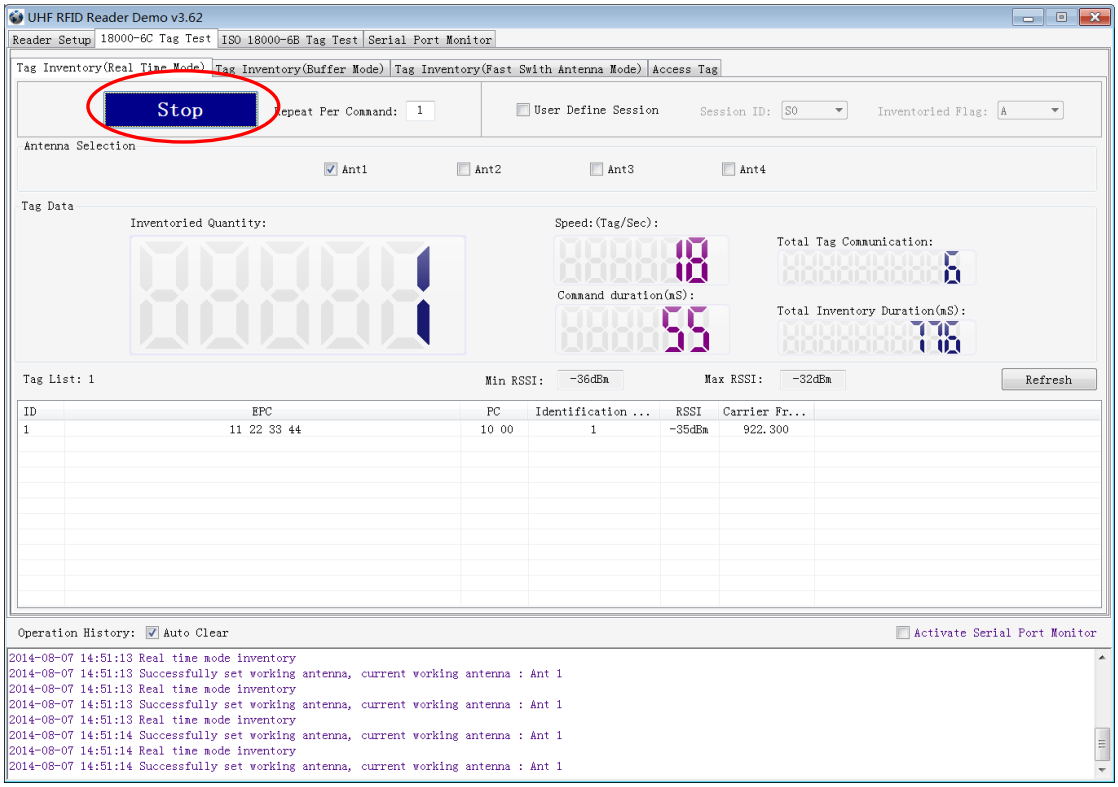
The other is **Buffer Mode**, the data will be cached and uploaded together when you need them. Under this mode, the data are without repeat data and can keep in small volume, because the data will be filtered before being uploaded. But it will take some time to filter duplicate data when reader identifies a large number of tags. Therefore, its identification efficiency will be slightly lower than real-time mode. Note: Tags can't be operated when you extract data in the cache.

Users can choose the appropriate method based on actual situation as illustrated below:



Method NO.1: Real-time Mode

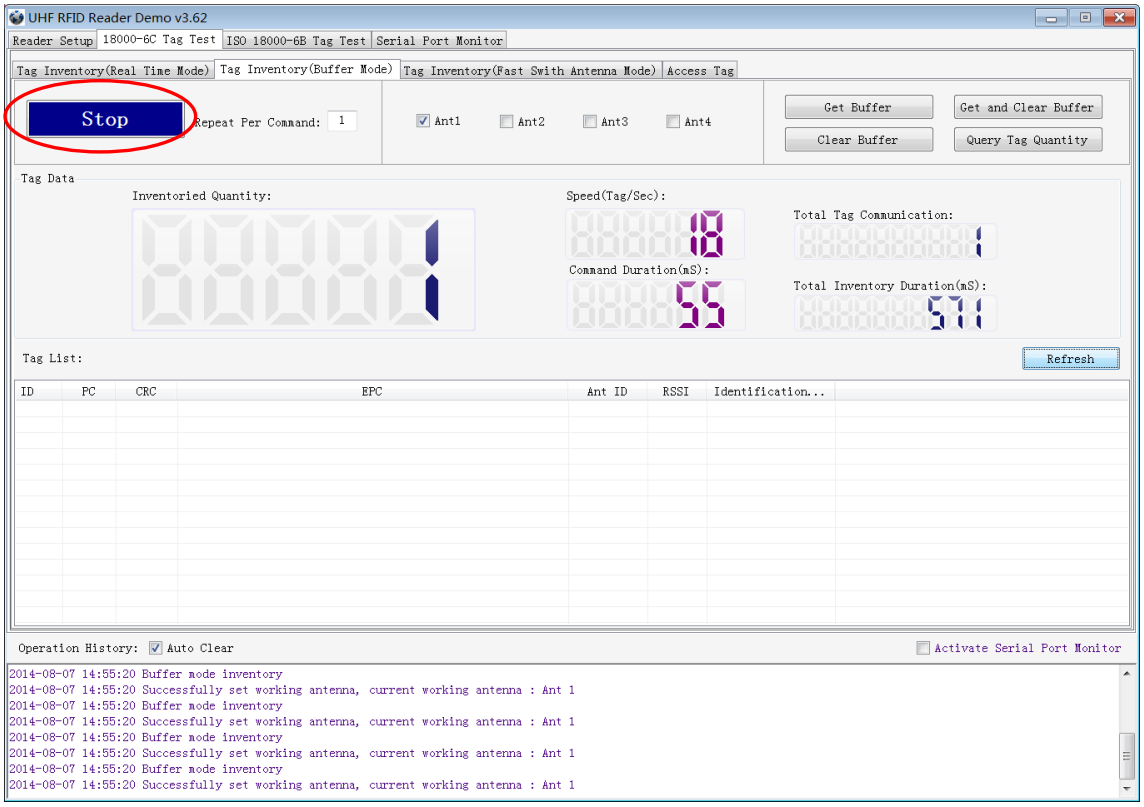
1. Click **Tag Inventory (Real Time Mode)**. Select the connected antenna(s) port. Set the number of **Repeat Per Command**, which is the times of repeat inventory command. For example, inventory command will execute anti-collision algorithm one time when you set the value to 1. It will execute anti-collision algorithm two times when you set the value to 2...
2. Click **Inventory**, you will find that the EPC number is uploaded immediately and it is real-time updating. The reader will keep inventory until you click **stop** as shown below:



Inventoried Quantity	Total number of inventory tags since click on **Inventory.**
Speed	Speed of identification Tag, unit: piece / sec
Total Tag Communication	Total return EPC data of tags (Including repeated data)
Command Duration	Time of each inventory command takes, unit: ms
Total Inventory Duration	Total elapsed time since click on **Inventory** , unit: ms.
ID	The serial number of data.
EPC	EPC number of tag.
PC	Protocol Control word of tag.
Identification Count	Times of tag identified.
RSSI	The signal strength when tag was identified at the last time.
Carrier Frequency	Carrier frequency of tag which is identified at the last time.

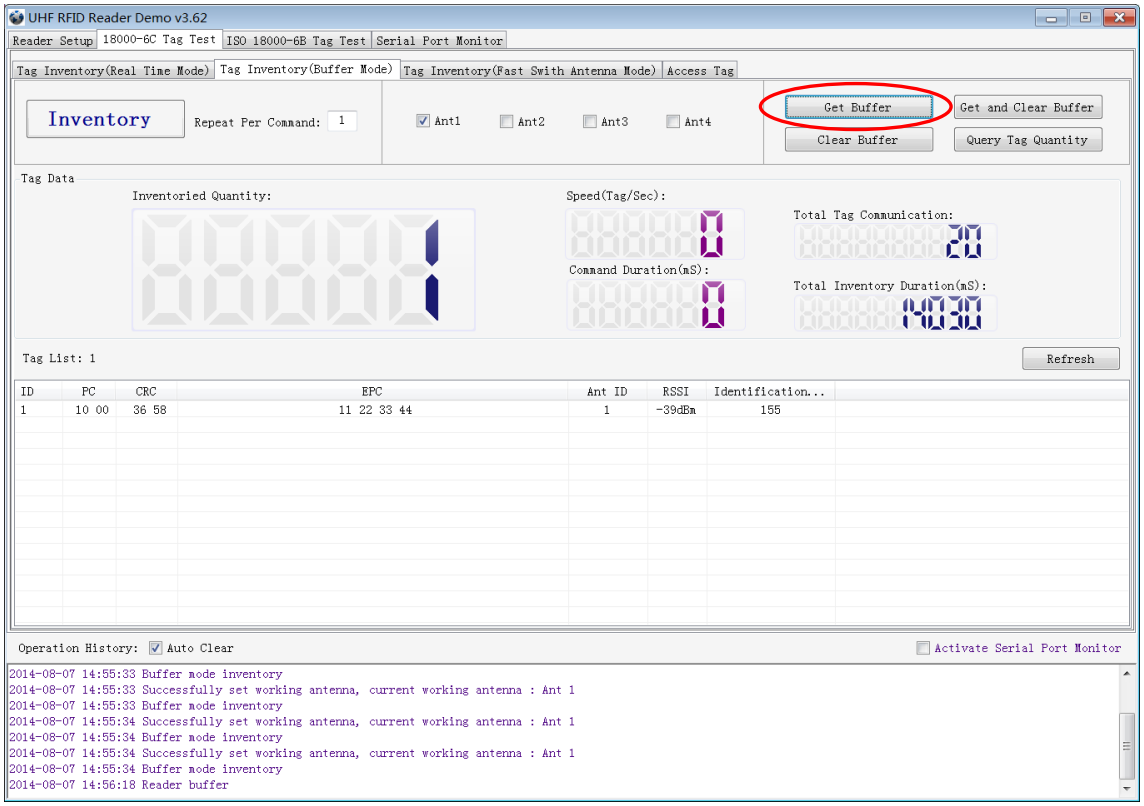
Method NO.2: Buffer Mode

1. Click **Inventory**, the screen will display as below(single tag & multi-tag inventory):



Note: the identified tags won't be shown in the **Tag list**.

2. Click **Stop** first, then click **Get Buffer**. All the data in cache will be uploaded as illustrated below:



Functions description under Buffer Mode:

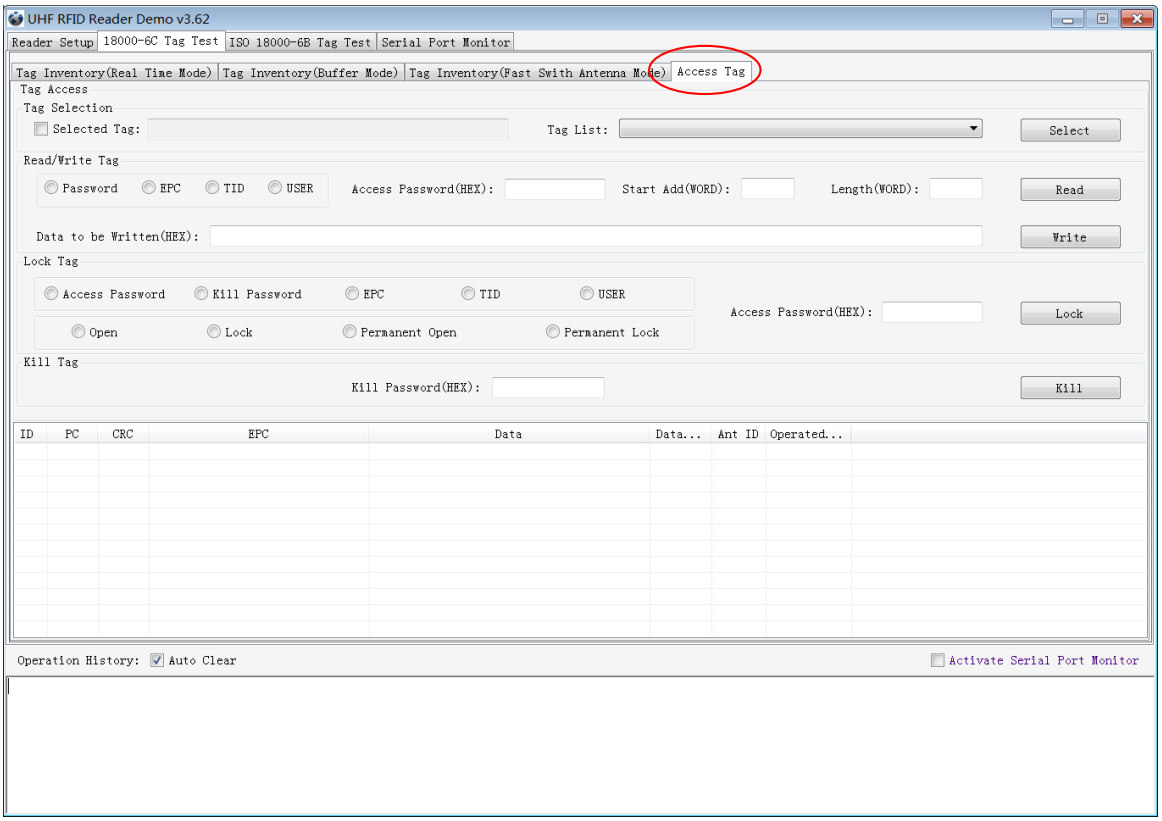
Get and Clear: Read the data form cache and then clear the cache. It will be empty when you read the cache again.

Query tag Quantity: If you just want to know how many tags are there in cache without details, click on this button.

Clear Buffer: Clear the cache and refresh the screen.

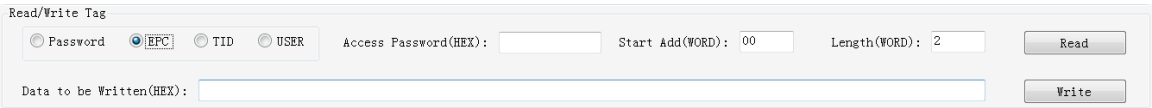
2.4 Accessing ISO-18000-6C Tag

Click **Access Tag**, and the screen will display as following:



2.4.1 Read tags

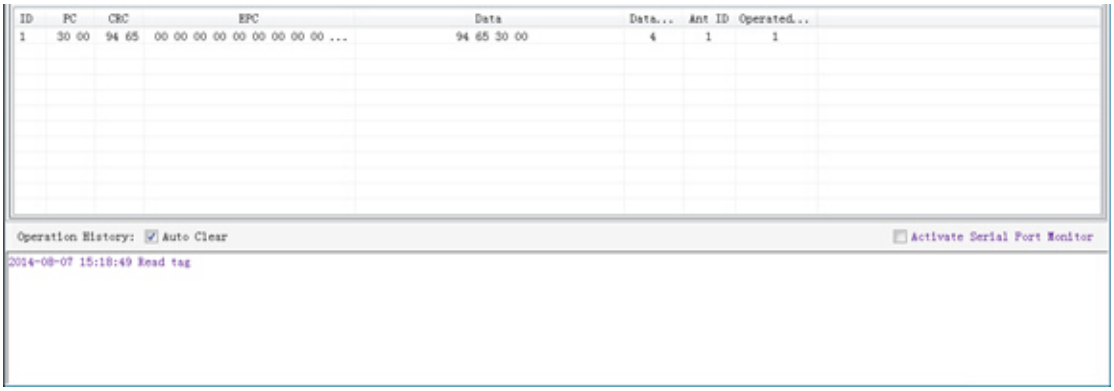
You can set the parameter(zones to be read, Start Address and Data Length) as illustrated below:



Note: the unit of Starting Address and Data Length is WORD which is 16 bit double-byte.

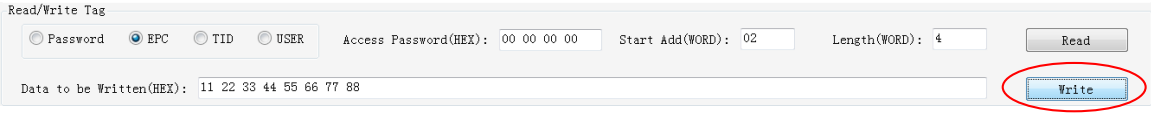
Click **Read** when the parameter setting is completed.

Picture as below shows that one tag has been identified successfully.

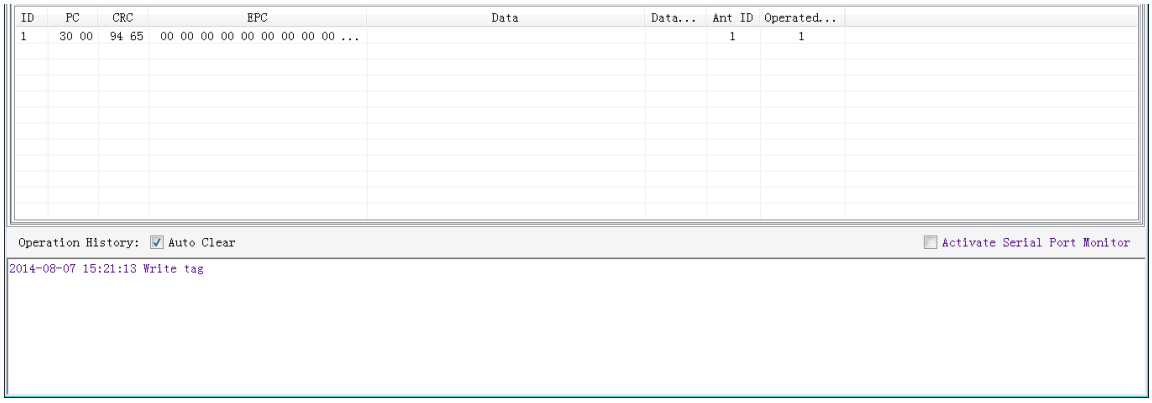


2.4.2 Write Tags

The area of Write Tag is the same as Read Tag, but you need to provide access password and information of data to be written.



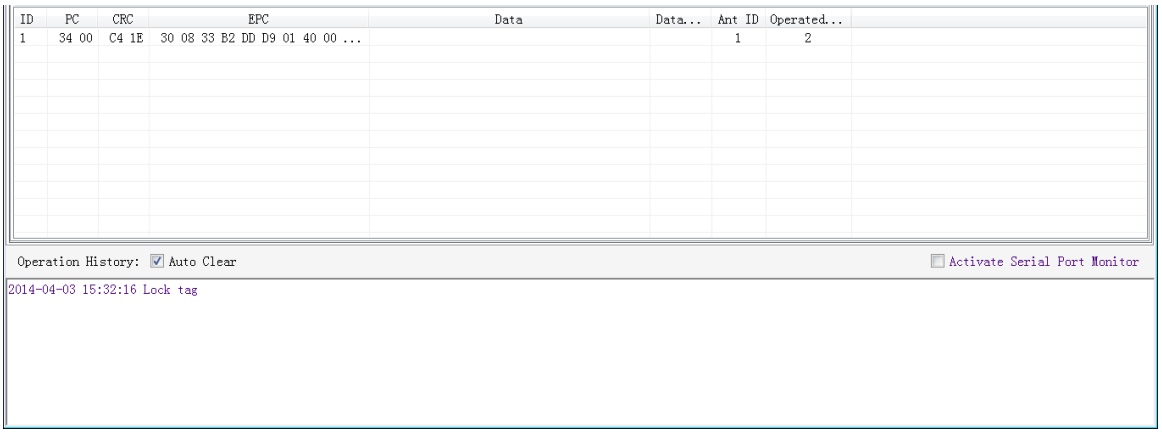
When the operation done successfully, the screen will display as follows:



Note: The maximum length of one-time write is 32 Word (64 bytes, 512bits).

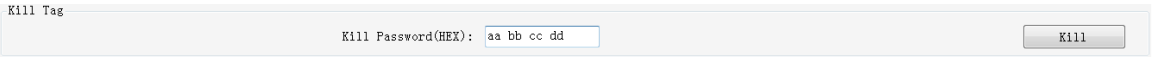
2.4.3 Lock Tags

A password is necessary to be provided for locking tags. When the operation is completed successfully, the screen will display as follows:



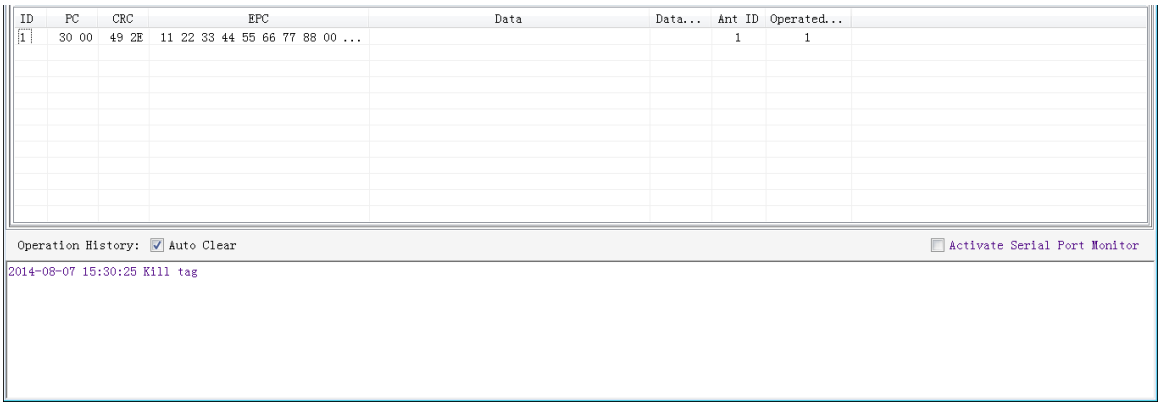
Same as **Write Tags,** data of identified tags will be displayed in **Tag List.**

2.4.4 Kill Tags



Password is necessary which can not be 00 00 00 00 before Kill Tags. Therefore, to kill a tag please need change the content of password via **Write Tag Operation** first.

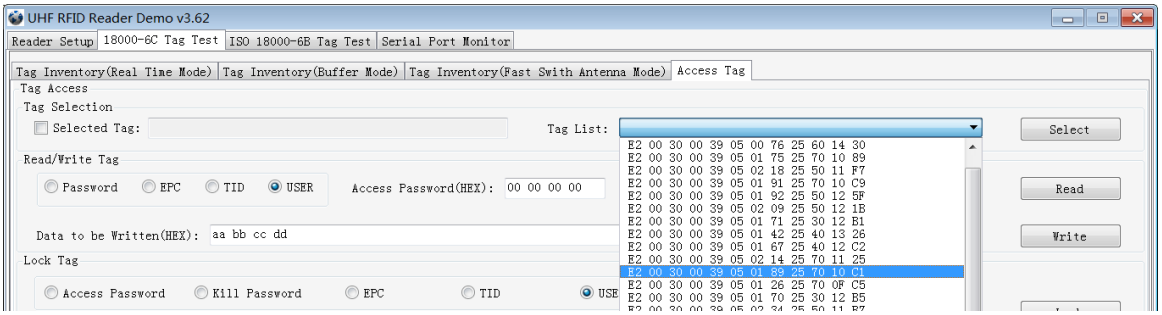
When tag is killed successfully, the information will display as follows:



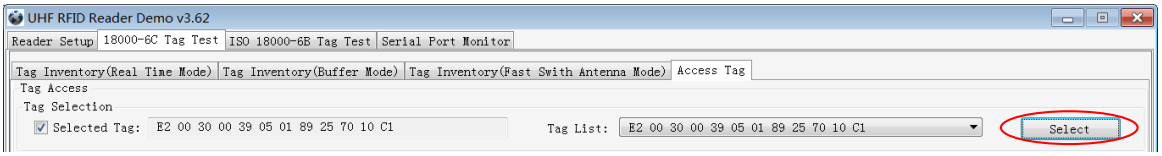
2.4.5 Tag Selection

No matter how many tags in RF region, we just want to access EPC tags which are already identified. Now, we can use the function of **Tag Selection**(EPC matching).

1. Tag inventory in **Buffer Mode** to get all tags'EPC number.
2. Get tags in cache.
3. Access tags and choose the EPC NO. which is needed, as illustrated below:

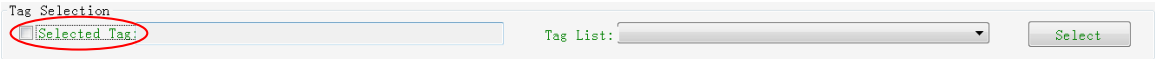


After choosing the tag, please click **Select** and the screen will display as follows:



We could see that the column on the left for **Selected Tag** has been selected. Next, all the operations are based on the tag with this EPC NO.

If you want to cancel the match of EPC, just deselect the column for **Selected Tag**, as below:



2.4.6 Error Display Might Be Returned

Errors occur if wrong operations done:

◆ **Inventory success, access failure:**

There are two steps to get access to tags: firstly, tag inventory; secondly, access tags. Picture above shows the inventory is successful, failed to access to tags.

Two reasons why:

1. Parameters incorrect: for example, zones(password/ EPC/ TID/ User) to be read do not exist.
2. Tags beyond the area that the RF could cover: distance of accessing to tags is about 60%-70% of tag inventory; in this case, please put the tag closer to the antenna.

◆ **Wrong password:**

Reason why: wrong password is set.

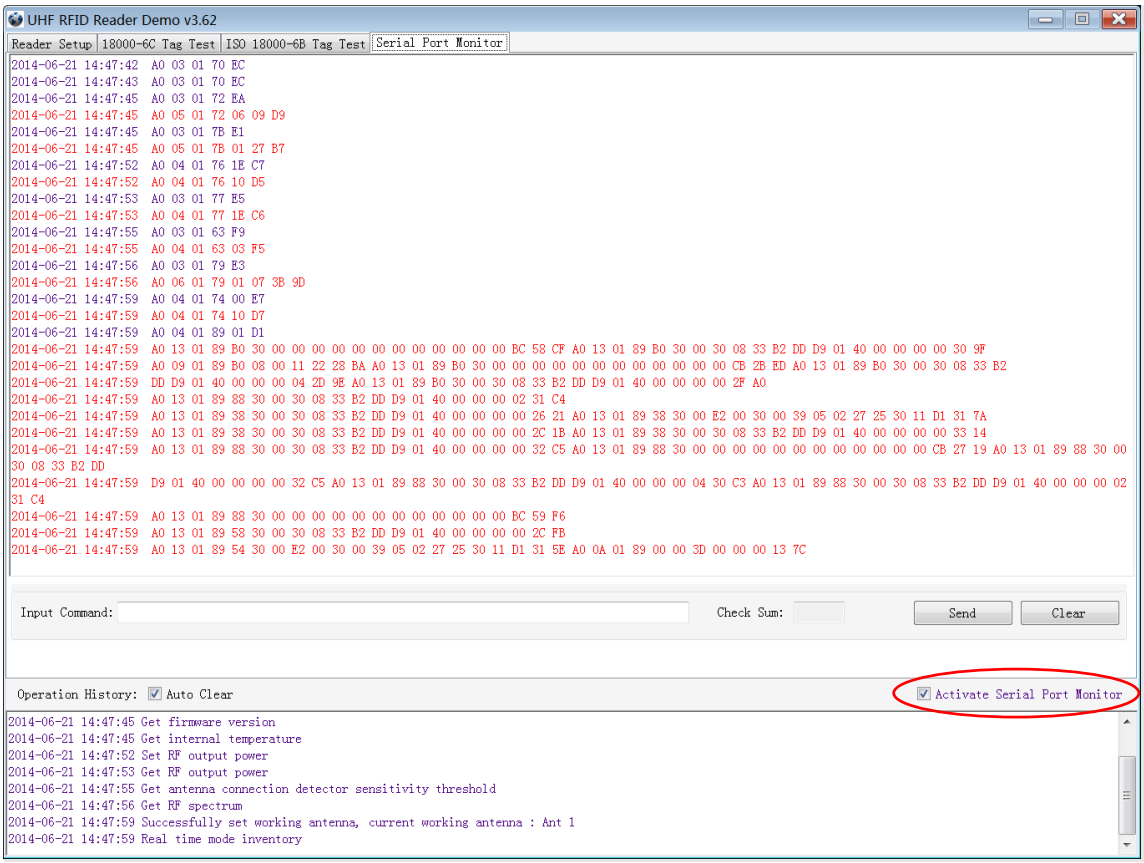
◆ **No tags to be operated:**

Reason why: Tags beyond the area that the RF could cover.

For more information about the operation history returned, please defer to the document: **UHF RFID Reader Serial Interface Protocol V3.1**.

3. Develop your own RFID Application

Most functions of the reader can be operated through the demo. But in practical applications, user might need to develop their own applications. Please defer to the document: **UHF RFID Reader Serial Interface Protocol V3.1.** The reader follows the definition both of the RS - 232 and TCP / IP interface. Demo provides an important function of recording serial transmission, so that users can quickly grasp the content of communication protocol in practice. Please defer to the screenshot below and select **Activate Serial Port Monitor**, all uplink and downlink serial data will be recorded, as illustrated below:

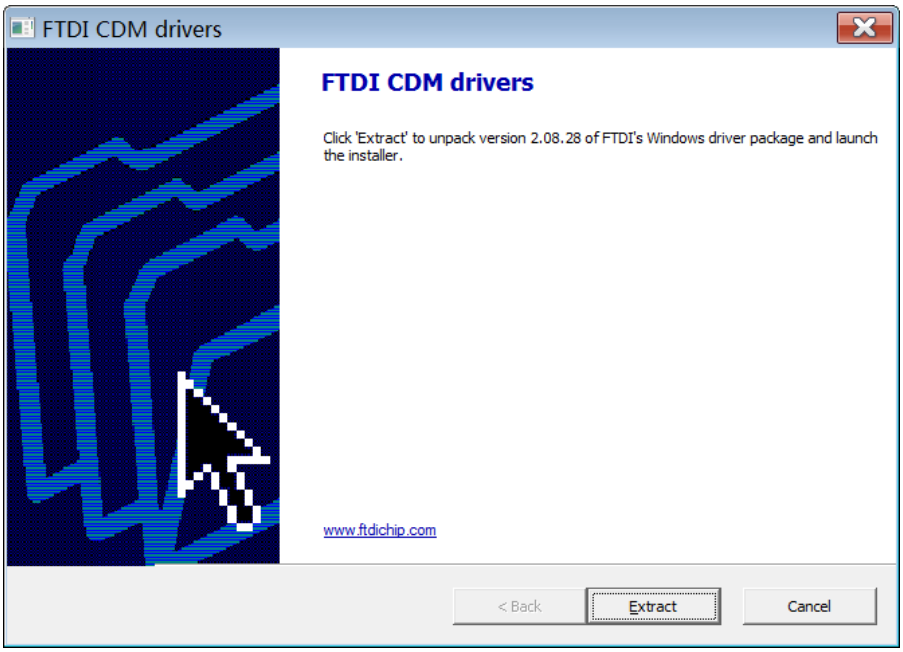


Notes:

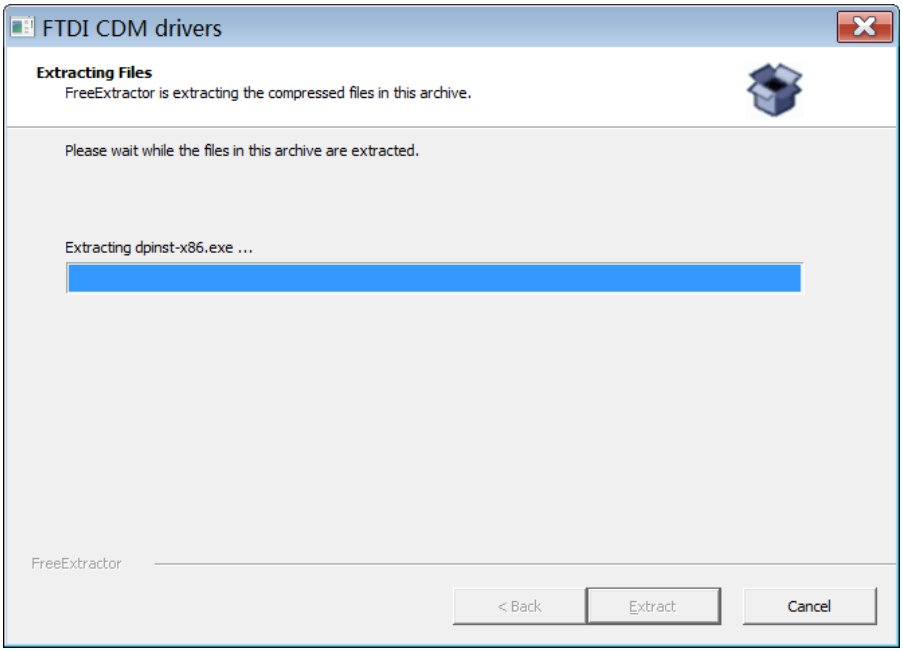
1. Response speed of Demo will slow down after opening the **Activate Serial Port Monitor**. Please turn off this function when it is not needed.
2. Data in violet blue color is sent to the reader by PC, and data in red color is the returned information from reader to PC.
3. Manual **Input Command** is used to debug serial command, which could calculate the checksum automatically.
4. **UHF RFID Reader Serial Interface Protocol V3.1,** this document includes the integral source codes of the demo (Based on C # of .Net platform) to help users develop applications on the reader. Thank you!

4. Installing Driver

1. Open the D-100 Driver folder.
2. Double click on CDM20828_Setup.exe, the following screen displays:



3. Click on Extract:



After installation is complete, we could connect reader to PC successfully.

FCC WARNING

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

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

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

To maintain compliance with FCC’s RF Exposure guidelines, This equipment should be installed and operated with minimum 20cm distance between the radiator and your body: Use only the supplied antenna.