

ACM819

INTEGRATED UHF READER



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I. Overview

1.1 Product Introduction

UHF read-write (Radio Frequency Identification) may the high speed automatic reading in the long-distance range electron label data, its wireless radio frequency work frequency mainly in 864 ~ 868MHz (European frequency band), 902 ~ 928MHz (North America frequency band) between, these frequency bands decided it may according to the antenna's different model steady Read to the electronic tag data within 0~25 meters distance.

1.2 Brief description of the terminology of the profession

Radio frequency power (Rf-power): read-write in the work of the radio frequency power size, in the case of a fixed antenna, the greater the power of the distance it can read the farther.

Lock: After a tag is locked, it is impossible to change the tag's data unless it is unlocked.

Inactivation (Kill): After the tag is inactivated, it will not respond to all the commands of the reader, and the reader cannot read the tag data.

Inventory: Inventory, read-write will automatically enter the inventory state after power on continuously read the tag data.

Read: Read the content of a section of data in the tag.

Write: Modifies the data of the label.

RJ45: i.e. network interface, the current network protocols supported by the device are TCP, UDP and other network transmission protocols.

RS232: Serial port, one of the commonly used serial communication interface standards. Full-duplex mode of operation (sending and receiving data can be done at the same time), but Its transmission distance is relatively short, usually within 3 meters.

RS485: Half-duplex transmission (can only send or receive data at a certain moment), theoretically the maximum transmission distance is 1200m, but it has a lot to do with the transmission line.

Baud Rate: The transmission rate of RS232/RS485, only if the transmission rate and the reception rate of the two sides of the communication are equal.

The following is the only way to communicate properly.

1.3 Basics of Labeling

1.3.1 Label Memory

The tags currently in use on the market are compliant with the EPC Class1 Gen2 standard, which has four areas of memory (or Membank) with the following functions:

Reserved: It mainly stores the Kill Password and Access Password. When inactivating a tag, you need to provide the inactivation password, and the access password is mainly used for reading (Read), writing (Write), locking (Lock) and other operations of the tag, if the password provided is not the same as the password in the reserved area, then the operation of the tag will fail.

EPC (Electronic Product Code): the product electronic code, the general reader Inventory (inventory) work by default to read the data in the memory. The size of a normal EPC label is 128bit, but the 32bit space in front of it stores the fixed information of the label, so it can be modified to use only 96bit (12 bytes).

TID (Transponder ID): TID is a worldwide unique ID of the tag, that is to say, in the global RFID tags, this number is unique and can not be modified, the general size of the TID has 12 bytes (96bit).

User: user area, here the user can store additional data of the user, the general size of the user area is only 64 bytes (512bit).

Special Note: The steps of reading TID and User memory are more complicated than only counting EPC, so if the memory of the inventory is changed to TID or User, it will lead to the reading distance of the reader becoming closer, so it is recommended to test whether the program meets the requirements of the project in the actual application scenario.

1.3.2 Environmental Impacts on Labeling

The following conditions can cause a tag to be read very close or even not be sensed by the reader:

- a. Labeled against the skin of the body.
- b. Labeling is tightly applied to substances of a metallic type.
- c. Labeling in liquids or environments with high humidity.
- d. Obstructed by very thick walls or high-density objects in front of it.

II. Technical specifications

2.1 Product characteristics

ACM819 is a high-performance UHF read-write device. Completely independent intellectual property rights design, combined with its own high-efficiency signal processing algorithms, to achieve rapid read-write processing of electronic tags while maintaining a high read rate; while maintaining a high read rate, to achieve rapid read-write processing of electronic tags.

Can be widely used in industry 4.0 production management, museums, clothing management, tobacco logistics, food and drug management, library management, license plate anti-counterfeiting identification management, vehicle grouping and scheduling management, intelligent parking lot management, port entry and exit vehicle inspection management, warehousing materials in and out of the supervision and identification management, baggage and parcel identification management, branded merchandise anti-counterfeiting management and terminal container management and other wireless radio frequency identification (RFID) system applications. RFID system applications.

2.2 Main functions and technical performance

2.2.1 Main functions

- Complies with EPC CLASS 1 GEN 2 and ISO 18000-6C technical standards for electronic labels;
- Operates as a broad spectrum frequency hopping (FHSS) or fixed frequency transmitter;
- Supports various working modes such as automatic mode, interactive response mode and trigger mode;
- Label displacement speed: $\leq 100\text{km/h}$;
- Directional reading area: refer to the configured antenna orientation map.

2.2.2 Performance parameters

- Model:ACM819
- Type: RFID UHF integrated reader
- Dimension:445*445*70mm
- Weight: 4.5Kg (including packaging)
- Equipment color: milky white
- Protection class: IP-65
- Antenna specification: 12dBi linearly polarized antenna (optional circular polarized antenna)
- Working protocol: Compliant with ISO18000-6B/6C/(GB) Customizable
- Operating frequency: 902 - 928MHz or 865 - 868MHz (can be adjusted according to the requirements of different countries or regions)
- Operating mode: broad spectrum frequency hopping (FHSS) or fixed frequency transmission
- Working modes: Timing, master-slave, trigger, three working modes
- Output power: RF output power 0-30dBm (software adjustable)
- Card reading distance*: 0-25m (depend on tag and environment , distance adjustable)
- Card reading speed: 20 times / 1 second
- Operating voltage/current: +9V~+25V Greater than 2A
- Power consumption: less than 3W / h 1 degree of electricity available for about 15 days
- Working Tip: Buzzer
- Communication interface: RS232, RS485, Wiegand, USB as standard, optional TCP/IP network interface, 4G, Bluetooth, WiFi, etc.
- Development package: SDK development package is provided to support secondary development.

2.2.3 Working environment

- Working Temperature: -10°C~+55°C
- Storage Temperature: -20°C~+75°C
- Working humidity: 20%~95%RH (no frost)

III. Hardware

3.1 Structural shape



The reader volume parameters are:

445mm×445mm×70mm

3.2 Power requirements

Power supply: 12V 2A

3.3 Power supply parameters

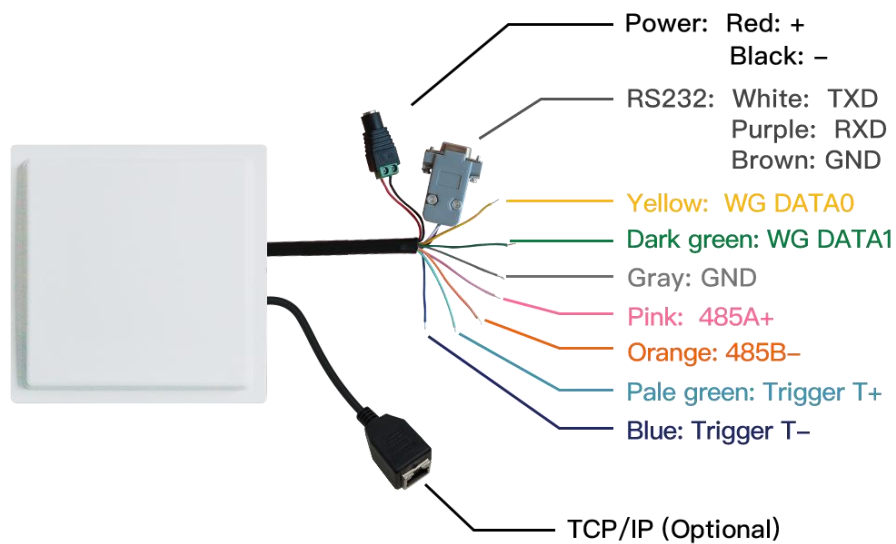
- Limit parameters

sports event	notation	numerical value	unit (of measure)
Supply Voltage	VCC	28	V
operating temperature	T _{OPR}	-10~+55	°C
storage temperature	T _{STR}	-20~+75	°C
Operating humidity	Rh	+20% ~ +95% no frosting	φ

- norm

sports event	notation	minimal	Typical case	greatest	unit (of measure)
Supply Voltage	VCC	9	12	28	V
Operating Current	I _C			1.5	A
operating frequency	F _{REQ}	902		928	MHz

3.4 Line Connection Diagram



Power		RS232			WG		GND	RS485		Trigger	
+9-25V	GND	TXD	RXD	GND	D0	D1		A+	B-	T+	T-
Red	Black	White	purple	Brown	Yellow	Dark green	Gray	Pink	Orange	Pale green	Blue

*Remarks: All ground wires can be used in common.

IV. Installation instructions

4.1 Cautions

In order to ensure the normal and stable operation of the device and the safety of your personal property, please read the following precautions carefully before installing the ACM819 reader device:

1. First check that the ground terminal of the power outlet is connected to earth, and see if the local power supply voltage meets the applicable voltage range of the reader;
2. Check that the unit is tightly connected to the outside;
3. Note the type selection and length limitations of the serial cable.
 - The port cable is a direct connection, not exceeding 10 meters in length.
4. When installing multiple readers, antenna placement and antenna spacing should be appropriate to avoid mutual interference.

4.2 Equipment Connections

4.2.1 Connecting the power adapter

☆ Plug the power cord into an AC power supply outlet, and then plug the other end of the power cord into the reader's power connector and fasten it;

4.2.2 Connecting a PC

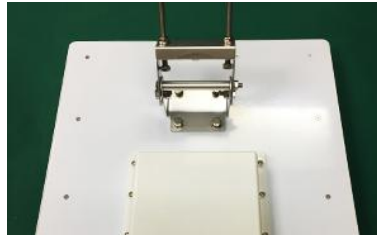
☆ The reader needs to be connected to a special power cord;

☆ RS232 interface is used for short distance communication (not more than 10m), and can be connected to the serial port of PC through DB9 connector to realize the communication between PC and this device;

4.2.3 Installation of equipment

Matching with special poles to meet the use of installation in different environments.

- Step 1: Secure the bracket to the main unit of the reader/writer with "nuts, flat washers and spring washers" as shown below:



- Step 2: Adjust the direction, use "nuts and flat washers, spring washers, clamping code, U-bolts" to fix the reader to the vertical/horizontal bar.

on it, as shown below:



4.3 Receiving and Inspection

Acceptance criteria are given in two main areas: structure and performance.

4.3.1 Structural acceptance

- ☆ Whether the outer body of the reader device is firmly installed and free from looseness;
- ☆ Is the cable securely connected;
- ☆ Are the screws tightened.

4.3.2 Performance acceptance

- ☆ Is the reader working properly;
- ☆ Whether the range of reading and writing is reasonable.

V. Software Demo Instructions

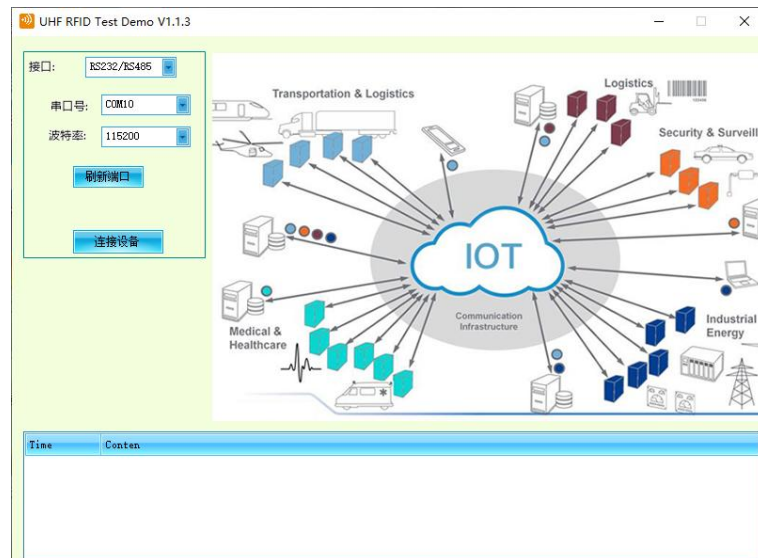
5.1 Functional Description of the Software DEMO

Through the Demo on the PC, we can communicate with the device through the network or serial (RS232) hardware interface, send inventory commands to read and display the tag data, set the parameters, write to the tag and other simple operations. In the actual application scenario, the user can set up the parameters of the reader to meet the requirements before installation and use.

5.2 Connecting DEMO

Before connecting the Demo to the PC you need to prepare the necessary hardware for connecting the device, such as one of the RS232 serial ports and a network cable. If the purchased device does not have a network port or other interface, and the PC does not have an RS232 interface you need to purchase a USB to RS232 adapter cable from .

5.2.1 Connecting the DEMO via the serial port



The interface after opening the Demo program is shown in the figure, and its serial port operation steps are as follows:

- a. Select "RS232/RS485" for "Interface";

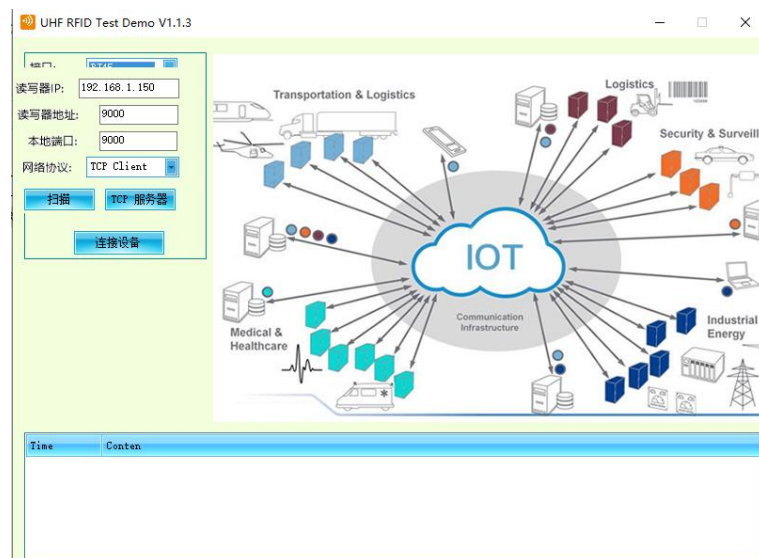
b. " **Serial port number** " select the corresponding serial port number (if the connection fails to switch other serial port number to try);

c. " **Baud rate** " indicates the transmission rate of the serial port, the default rate of the device is 115200;

d. Click the " **Connect Device** " button, the right side will show the function interface after successful connection.

The function of the " **Refresh Port** " button is to refresh the serial port number. Dynamically inserting a serial port after the program has been opened requires you to click the " Refresh Port " button to display the new serial port number in the " Serial Port Number " option. The " Refresh Port " button is for refreshing the serial port number.

5.2.2 Connecting the DEMO via RJ45 (network cable)



Do the following after connecting the device and PC to the same LAN:

a. " **Interface** " select " RJ45 "

b. " **Reader IP** " Enter the " IP of the reader ".

c. " **Reader Address** " Network port on which the reader receives data

d. " **Local Port** " is the local network port for sending and receiving data, can be set to 0 to let the system assign it automatically.

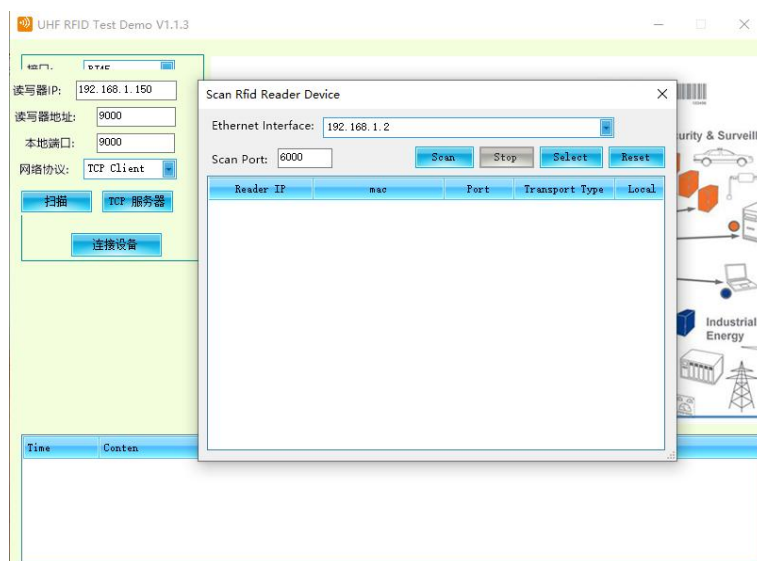
e. " **Network Protocol** " select " TCP Client (if you are not familiar with the network) "

f. Click on the "Connect Device" button

" TCP Server " is mainly used for Demo as a TCP server side of the application show, if the network of the basic completely do not understand do not recommend testing this function.

Scanning devices: What if I don't know the server IP and port information?

The " Scan " button provides the function of scanning for readers and writers on the LAN, if multiple readers and writers are connected to the same LAN then they can be searched out by this function.



Enter the scanning interface and click the "Scan" button, after scanning the device information, select the line and click the "Select" button, the IP address and port of the device will be automatically filled into the network connection information.

5.3 Demonstration of the INVETORY function



“ 清空 ” : Clear the read tag data.

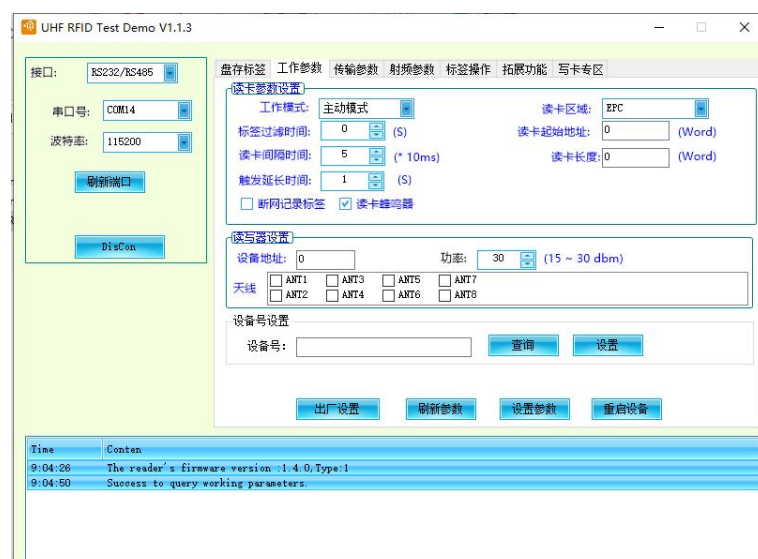
"Start": the reader starts the inventory.

" Stop " : The reader stops counting.

" Active Read ": The reader automatically stops counting after it has counted once.

5.4 Setting the working parameters

The operating parameters mainly provide settings for inventory-related parameters or functions such as the power of the reader.



5.4.1 INVENTORY MODE

Inventory mode is divided into passive mode (Passive Mode), active mode (Active Mode), trigger mode (Trigger Mode).

Passive mode: the device will not actively inventory tags after power on, the device receives the command to inventory once, then read the tags once and upload the read tag data and then stop.

Active Mode: The device will automatically count when it is powered on, or it will keep counting after receiving the "Inventory" command until it receives the "Stop" command.

Trigger Mode: The device will remain stationary even after power up until a low level signal is received on the Trigger+ line, and will not stop counting until the low level signal disappears.

5.4.2 TAG FILTER TIME

During inventory the reader counts the tags and then filters the duplicates before uploading them, in seconds.

For example, if the filter time is set to 60, and label A is counted and uploaded at the 0th second, then the data counted at will be discarded and not uploaded again within 60s.

5.4.3 Inventory interval time (INTERVAL TIME)

In active mode, the reader will continuously count tags. The count interval is the time interval between the first and second counts of the device in 10ms, which determines the speed of counting. The faster the counting speed, the higher the heat generation of the device, the default value is 5.

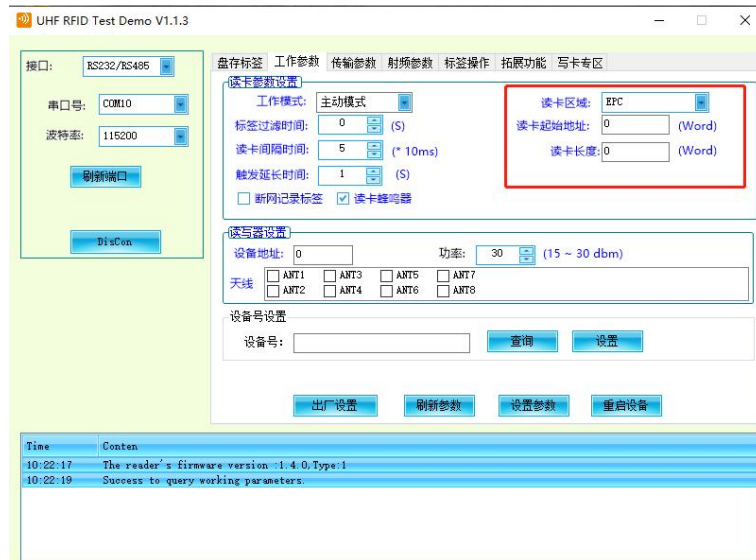
5.4.4 TRIGGER TIME

In Trigger mode, the Trigger+ receives a low level signal to start the inventory, and after the signal disappears, the inventory continues for a further period of time, which is determined by the Trigger Time parameter in seconds.

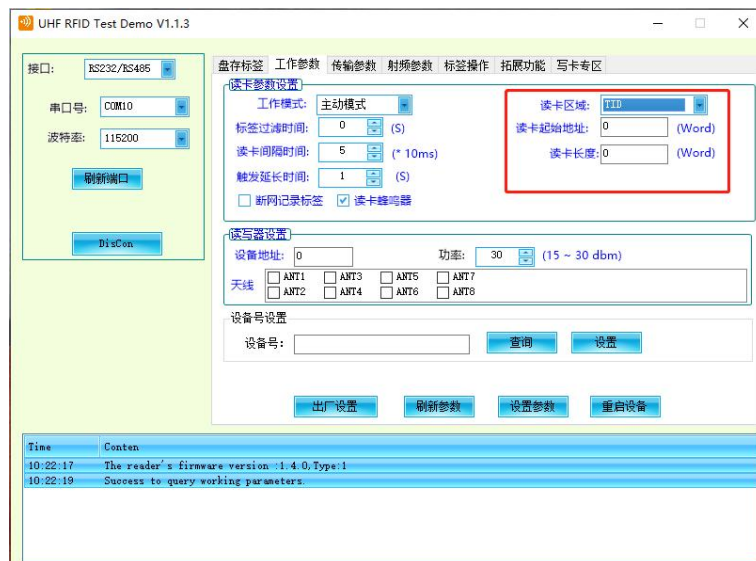
5.4.5 Inventory Area (INVENTORY AREA)

Inventory Area specifies which area of the tag memory is to be read by the reader during the inventory. Used in conjunction with the "Start Address" and "Length" parameters, if incorrect information is filled in, it will result in a failure of the inventory, the following are some suggestions for setting:

a. Inventory EPC only:



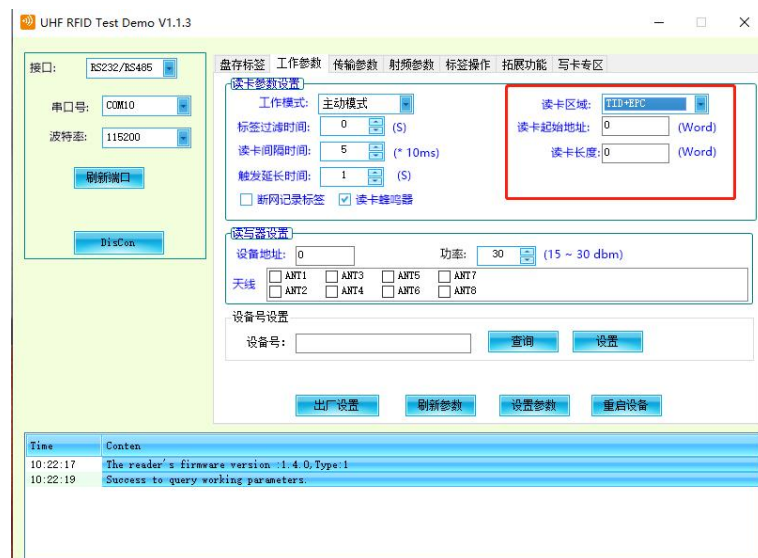
b. Inventory only TID.



c. Inventory user areas only:

Select User for "Read Area", the values of "Read Start Address" and "Read Length" can be changed according to your requirement, because the size of user area by default is only 64 bytes(32 Word), so the sum of "Read Start Address" and "Read Length" cannot exceed 32. Since the default size of the User Area is only 64 bytes (32 Word), the sum of the " Read Start Address " and " Read Length " can not be more than 32.

d. Inventory of TID and EPC



e. Inventory User+EPC

Select "User+EPC" for " Read Area", " Read Start Address" and " Read Length". The " Read Start Address " and " Read Length " are the same as above C rule.

5.4.6 Record function (RECORD)

Enable Record: Enable the record function of the reader/writer. During inventory, the reader can store the tag data from the inventory in the reader (up to 20,000 records if only EPC or TID is inventoried) and then the upper host can send commands to export the tag data from the inventory. It is recommended to use this function together with the tag filtering time to prevent frequent write operations to the Flash to protect components.

Note: This function requires the addition of additional components, if there is a need to use this function, please clearly mention the need for this function to the sales staff before purchase.

5.4.7 Beeper (BUZZER)

Whether or not the buzzer goes off after inventorying the tags.

5.4.8 Device address (DEVICE ADDRESS)

A host can remotely control multiple read-write devices through RS485, these read-write devices are connected to the same data line, so these read-write devices can not send data at the same time, so each device has an address, when the host sends a command, only if the address in the command is the same as the address of the device, the device will respond to the command. When the host sends a command, the device will respond to the command only if the address in the command matches the address of the device. The default value is 0, and all devices will respond to the command with an address of 0.

5.4.9 Power (POWER)

This is the radio frequency power (RF -Power), which determines the reading distance of the device, and should not exceed a maximum of 30dbm.

5.4.10 Antennas (ANTENNA)

Only devices in multichannel can select which antennas work based on the antennas, for non-multichannel devices this parameter can be ignored.

5.4.11 Button Functions

“ 出厂设置 ” : parameters when the device is restored to factory defaults.

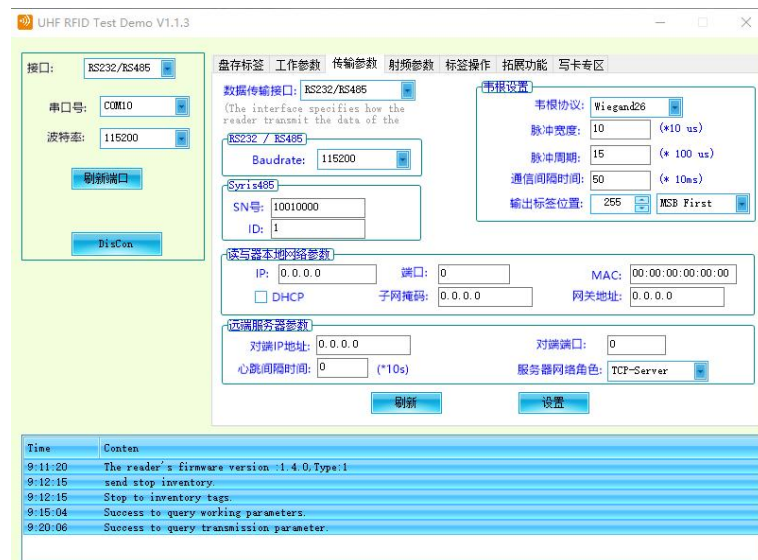
" Refresh Parameters " : Queries the operating parameters of the reader.

“ 设置参数 ” : Set the parameters of the reader/writer.

" Reboot Device " : Reboot the reader.

5.5 Transmission parameters

Transmission parameters determine some parameters of the reader/writer transmission data, such as the network address of the reader/writer, the network address of the received data, the transmission rate of RS232/RS485, the output parameters of Wiegand, and the information of Syris485.



5.5.1 Label transfer interface (INTERFACE)

Although the device supports a large number of transmission interfaces, if all interfaces are output after the data is counted, the efficiency of the inventory will be affected, so the user needs to select the required output interface according to the actual situation.

RS232/RS485 : Inventoried data is sent via RS232 and RS485 interfaces.

Wiegand : The inventory data is output through Wiegand interface, Wiegand is mainly used for access control and is an international standard protocol.

RJ45 : Inventoried tag data is transmitted through the network port.

Syris485 : The data counted will be transmitted using the Syris485 protocol interface, which is one of the internationally recognized access control protocols, via RS485.

4G : The label data counted is transmitted through 4G module, due to the special characteristics of 4G module, currently 4G only supports TCP client.

5.5.2 Baud rate (BAUD RATE)

RS232/RS485 transmission rate, currently supported baud rates are 9600, 19200, 38400, 57600, 115200.

115200 is the default baud rate.

5.5.3 SYRIS485 parameters

Module SN, Module ID: SN number and ID number required by the Sysris485 protocol.

5.5.4 WIEGAND parameters

Verify that Wiegand is selected for the interface parameter before using Wiegand.

韦根协议:

Wigan Protocol: The Wiegand protocol currently supports Wiegand26, Wiegand34, Wiegand32 and other protocols.

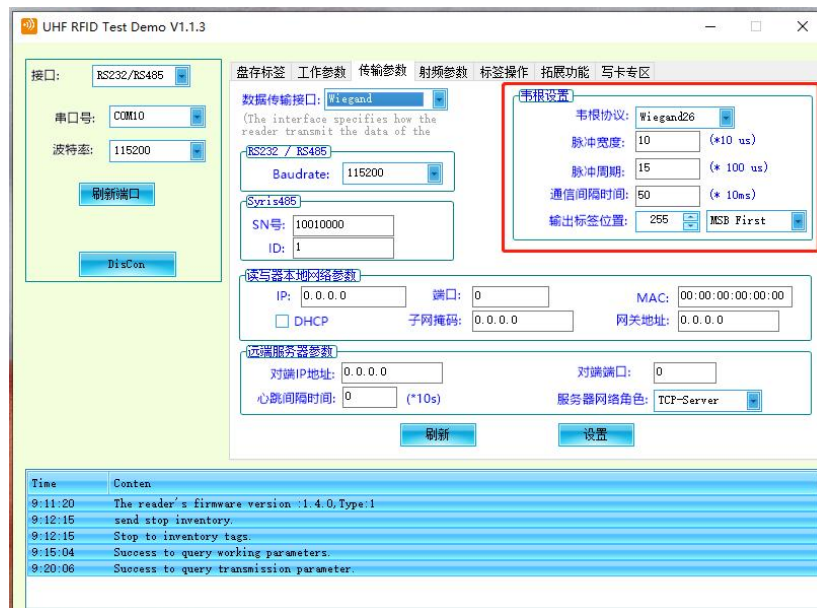
Pulse Width: Wiegand signal pulse width in 10us.

Pulse Period: Wiegand signal pulse period in 100us.

Communication Interval: There needs to be an interval time between two tags' data output through Wiegand, otherwise some Wiegand controllers will treat it as an error signal, unit 10ms.

Output Label Position: the start position of the signal output by Wiegand, if set to 0 the end byte will be output automatically.

MSB LSB: The direction of the Wiegand output, whether it is from the high field as the start output or the low field as the start output. The default Wiegand parameters are as follows:



Here are some notes on the output locations. A typical EPC label has 12 bytes, so the locations are as follows:

MSB First: MSB ----->LSB

LSB First: MSB <-----LSB

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

The 12 spaces here represent the 12 bytes of EPC storage, and the values inside correspond to the output locations.

5.5.5 Remote host receiving address

The address of the host from which the reader receives the tag data as it is transmitted across the network.

Remote Port: The IP address of the host network receiving the tag data.

Local Port: The port of the host address where the data is received.

Heartbeat packet: Heartbeat packet, the network in a long time without transmitting data, then some of the resources of the network will be released and lead to the failure of the transmission of data, the need to read and write to the network at regular intervals to send any data to keep the network resources are not released.

Host Network Protocol: The role of the host receiving data in the network transmission. In TCP protocol, the reader/writer will automatically connect to the address of Remote IP and Remote Port in the role of TCP client, so this parameter is mainly for UDP transmission protocol.

5.5.6 4G transmission

If your reader has a 4G module and you want to use 4G transmission, you only need to select 4G in the interface parameter, i.e. .

5.6 Advanced parameters

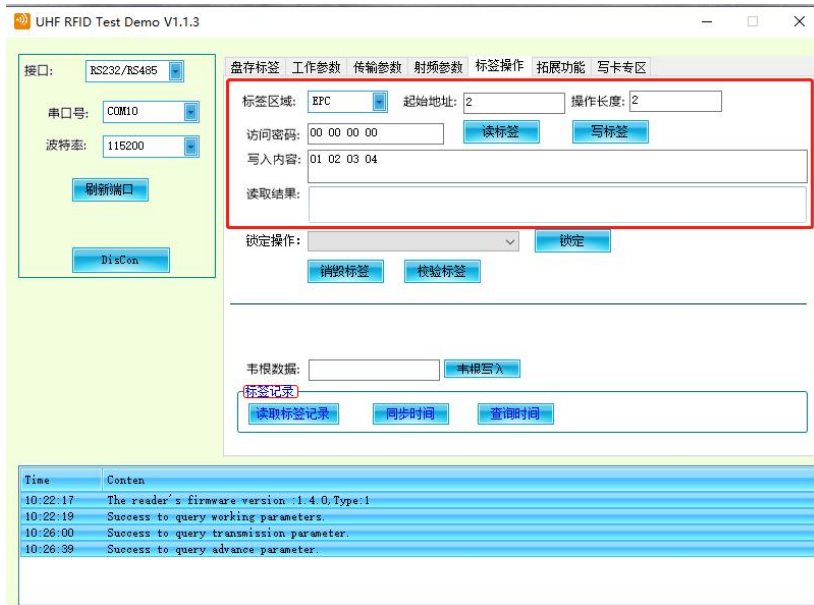
The advanced parameters are used for the RFID air interface protocol. It is not recommended to modify the parameters here for non-professionals, except to set the RF frequency according to your country.

5.5.1 Radio Frequency (REGION)

This parameter provides a geographical frequency selection, if the frequency of the reader is not compatible with the frequency of the local country it will lead to a poor reading, the setup will be a legal risk.

5.7 Labeling Operations

The function of the tag operation is mainly to read a certain area and write the content of a certain area to the tag.



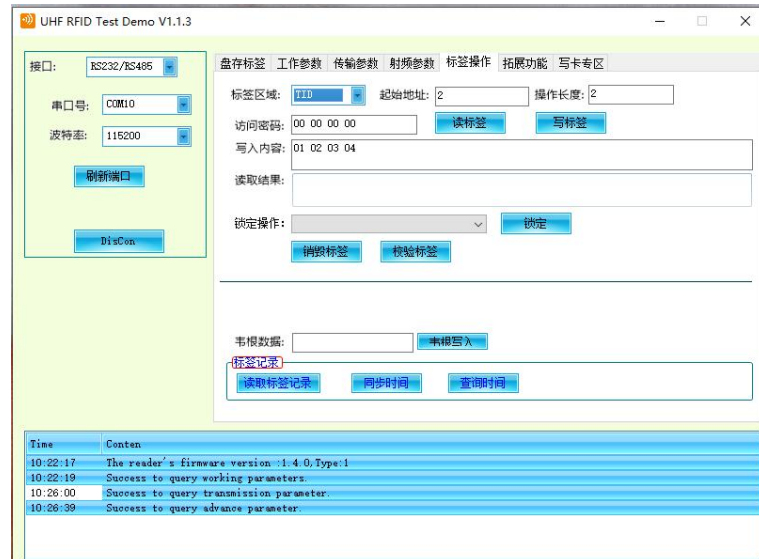
Read and write operations are word (Word) as a unit, a word contains 2 bytes (Byte), each byte can store 2 characters (Char) hexadecimal number, these characters by 0~9, A~F combination, for example, A1, FF, B3, 06 can be expressed as a byte (Byte) of data, byte to byte space between.

1 Word = 2 Byte = 4 Char (Hex)

Generally the size of EPC memory is 8 words, the first 2 words are used to store extra information, so the write address of EPC starts from 2, and the sum of write address and length should not exceed 7. TID can not be modified, its memory size is 6 words, the starting address is 0, when reading TID, the sum of Address and Length should not exceed 5. The size of User area is usually 32 words, the address starts from 0, the Length and Address of read/write parameters should not exceed 32.

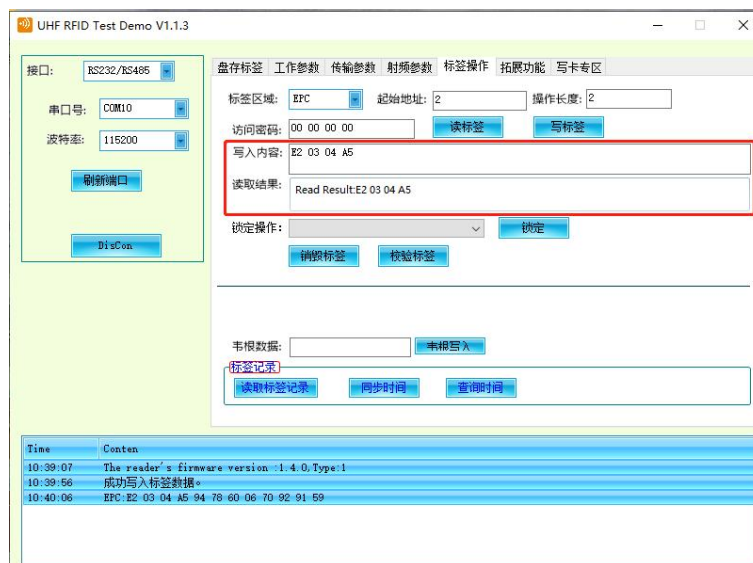
5.6.1 Reading tags

Take reading the data of TID as an example, the following is the result of reading the TID starting address of 0 and the length of 2 words, and the data read is E2 80 11 05.

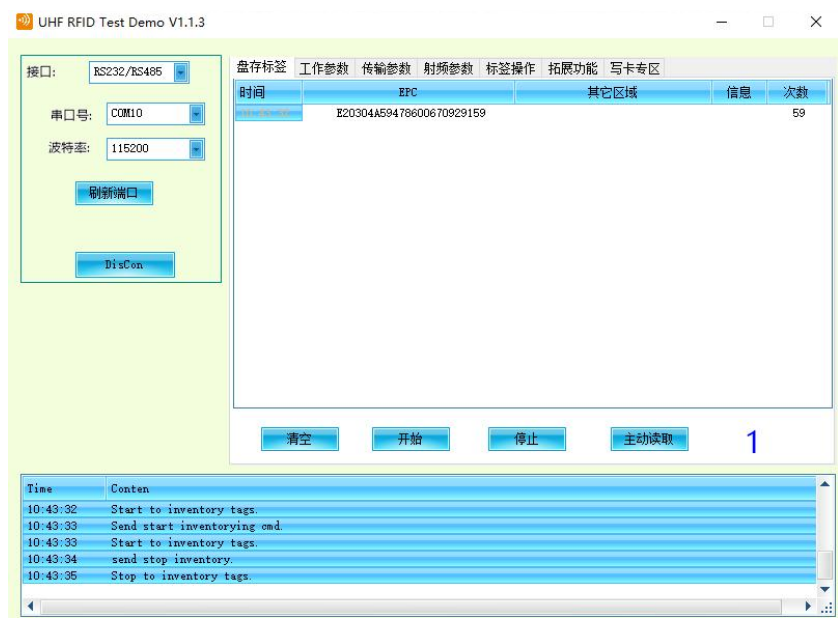


5.6.2 Writing labels

The write start address in EPC memory is 2, 2 words in length, and the write is: E2 03 04 A5.



Write successfully will be prompted below to successfully write the label, after the modification we look at the inventory of such labeled data:



The results of the inventory EPC show the beginning 2 words of the data as E20304A5, which is consistent with the previous revision.

5.6.3 WIEGAND Writing

This feature is written into the tag based on the root parameter of the reader and is not available for all Wiegand controllers.

VI. Frequently asked questions

6.1 No data when DEMO connects to a successful inventory

Troubleshooting : Make sure that the Interface option in the transmission parameters corresponds to the connection method you are using.

6.2 Failure to connect to DEMO

1. If you are using a serial port, please make sure that your computer's serial port can be used normally locally, or try another serial port number; if you ever need to change the baud rate, please try another baud rate.

2. If the connection via RJ45 fails, then scan the device via "Scan" function to see if it exists in the LAN, if it exists, then refer to 3.2.2 for operation. If it does not exist, the possible reason is that the router has blocked the broadcast function of scanning, and the device cannot get the IP address, you can use the computer to connect the device directly through the network cable to set up the network parameters and then put the device into the network to use.

VII. Packaging accessories and transportation and storage

7.1 Packaging



Figure 7-1 Package Dimensions

External dimensions of the packaging box: 600*480*110mm

Total weight (including packaging): 4.5kg

7.2 Annexes

In order to facilitate future storage and transportation, please keep the packing box and packing materials properly after unpacking the reader. In addition to the reader, the box also includes accessories required for the use of the product, please follow the packing list to confirm whether the product and accessories are complete, if there is any discrepancy or damage, please contact the after-sales service in time. The specific packing list is shown in Table 8-1:

No.	Item	Unit	Qty	Note
1	ACM819 UHF Reader	Pc	1	Standard
2	Power supply	Set	1	Standard
3	Mounting accessories	Set	1	Standard
4	Warranty card	Pc	1	Standard
5	Certificate of conformity	Pc	1	Standard

Table 7-1 Packing List

7.3 Storage requirements

Long-term storage of the reader should have the following conditions:

- ☆ Ambient temperature: -40°C~+85°C
- ☆ Relative humidity: 5% RH~90%RH

VIII. After-sales service

To our customers

As we aim to continuously update our products, this instruction manual may differ from the actual equipment supplied in terms of product characteristics, composition and design, and we will provide corrections to the attached pages in a timely manner. If we are unable to provide the corrected pages in time, please consult the after-sales service.