



# VUP\_RFID Reader

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## RS-Q410PF User Manual

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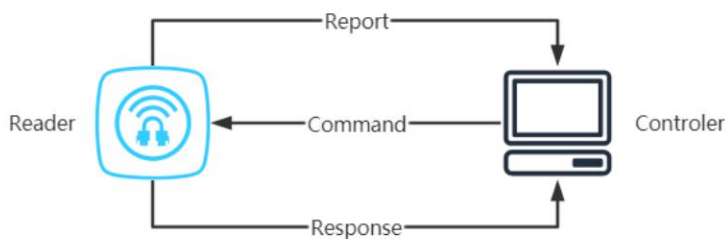
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# 1. Letter of agreement

## 1.1 Overview

In the application system, the reader/writer can be connected to the controller (or PC ) in the application system through Ethernet, RS232, and RS485 .

The reader/writer receives the command from the controller and returns the command execution result to the controller . In addition, the reader/writer also supports automatic work. At this time, the data automatically read by the reader/writer or the status of the reader/writer will be automatically reported to the controller, as shown in the figure below.



the data packet sent from the controller to the reader-writer **a command packet** , and the data packet sent from the reader-writer to the controller **a return packet** . The data packets actively reported by the reader and writer to the controller are called **status packets** . Please see Section 1.1.2 for the command packet format, Section 1.1.3 for the return packet format, and Section 1.1.4 and Chapter 1.7 for the status packet format.

When controlling the reader through Ethernet, you can use UDP or TCP protocol to communicate with the reader. Please see Chapter 1.2 for detailed introduction.

## 1.1.1 Protocol document specifications

In order to simplify the document, the commands in the document omit the Header, Length, Address, and Check parts of the protocol, and only retain the Cmd and Param parts.

The data in the document is expressed directly as numbers in decimal format without any suffix, while in hexadecimal format H is added as a suffix after the number. For example 11 32 53 these are decimal and 21H 34H 67H these represent hexadecimal.

## 1.1.2 Command package format

| Header | Length  | Address | C md   | Param  | Check  |
|--------|---------|---------|--------|--------|--------|
| 1 Byte | 2 bytes | 1Byte   | 1 Byte | N Byte | 1 Byte |

As shown above, the command package consists of 6 parts .

Header: 1 byte, header, fixed to 40H .

Length: 2 bytes, the effective length of the packet. The length is the total number of bytes of the last 4 parts (Address+Cmd+ Param + Check ) . Send the high byte first, then the low byte. For example: when the length is 270 bytes, the sending sequence is 01H 0EH.

Address: 1 byte, used to specify the RS485 address of the device to be controlled. This field is only valid during RS485 communication. When RS485 communication is not used, just send 1 byte of data at will. When using RS485 communication, set this parameter to 0 or 255 to indicate a broadcast command. All readers and writers connected to the RS485 bus will execute the broadcast command, but will not return a response to the host computer.

C md: 1 byte , command code.

Param : A number of bytes, command parameters, whose length changes with the command .

Check : 1 byte, checksum. Header+Length+Address+Cmd+Param is summed and then inverted plus 1.

### 1.1.3 Return packet format

| Header | Length  | Address | C md   | Param  | Check  |
|--------|---------|---------|--------|--------|--------|
| 1 Byte | 2 bytes | 1Byte   | 1 Byte | N Byte | 1 Byte |

As shown above, the return package also consists of 6 parts .

Header: 1 byte, header. When the command execution is successful, it is FOH. When the command execution fails, it is F4H .

Length : 2 bytes , the effective length of the packet . The length is the total number of bytes of the last 4 parts (Address+Cmd+ Param + Check ) . Send the high byte first, then the low byte.

For example: when the length is 270 bytes, the sending sequence is 01H 0EH.

Address: 1 byte, the RS485 address of the device.

C md: 1 byte , command code. The same as the received command code, indicating that the returned packet is a response to the command .

Param : A number of bytes, return parameters . If there is an execution error , a 1-byte error code will be returned. If the execution is successful, the length will vary depending on the command.

Check : 1 byte, checksum. Header+Length+Address+Cmd+Param is summed and then inverted plus 1.

### 1.1.4 Status packet format

actively reported from the reader to the controller are called **status packets** , and the host does not need to return a response to the status packets. All status packets have **F1H** as the header .

| Header | Length  | Address | C md   | Param  | Check  |
|--------|---------|---------|--------|--------|--------|
| 1 Byte | 2 bytes | 1Byte   | 1 Byte | N Byte | 1 Byte |

As shown above, the return package also consists of 6 parts .

Header: 1 byte, header. Fixed to F1H .

Length : 2 bytes , the effective length of the packet . The length is the last 4 parts

( Address+Cmd+ Param +

Check ) the total number of bytes. Send the high byte first, then the low byte. For example: when the length is 270 bytes, the sending sequence is 01H 0EH.

C md: 1 byte , status code.

Param : several bytes, status parameter, its length changes with the command .

Check : 1 byte, checksum. Header+Length+Address+Cmd+Param is summed and then inverted plus 1.

### 1.1.5 Checksum calculation method (C language)

```
unsigned char CheckSum(unsigned char *uBuff, unsigned char uBuffLen)
```

```
{  
    unsigned char  
    i,uSum=0;  
    for(i=0;i<uBuffLen;i++) {  
        uSum = uSum + uBuff[i];  
    }  
    uSum = (~uSum) + 1;  
    return uSum;  
}
```

## 1.1.6 error code

When the command execution fails, the header of the returned package is F4H, its return data part ( Param ) is an error code of 1 byte. Please see the table below for the error code meanings.

| ERROR CODE | WRONG REASON                                  |
|------------|-----------------------------------------------|
| 00H        | 0X00 SUCCESSFUL                               |
| 01H        | 0X01 UNSUPPORTED FUNCTION CODE                |
| 02H        | 0x02 Register address error                   |
| 03H        | 0x03 Data range error                         |
| 04H        | 0x04 writing failed                           |
| 05H        | 0x05 Confirm                                  |
| 06H        | 0x06 Server busy                              |
| 07H        | 0x07 reserved                                 |
| 08H        | 0x08 Storage parity error                     |
| 09H        | 0x09 reserved                                 |
| 0AH        | 0x0A Unavailable gateway path                 |
| 0BH        | 0x0B Gateway target device failed to respond  |
| 0CH        | 0x0C modbus access length error               |
| 0DH        | 0x0D This configuration item is not supported |
| 0EH        | 0x0E Relay function error                     |
| 0FH        | 0x0F card reading mode error                  |
| 10H        | 0x10 Tag type error                           |
| 11H        | 0x11 The reporting interface is not supported |
| 12H        | 0x12 This reporting mode is not supported     |
| 13H        | 0x13 tag matching failed                      |
| 14H        | 0x14 reserved                                 |
| 15H        | 0x15 reserved                                 |
| 16H        | 0x16 Parameter error                          |

|     |                                                                                                  |
|-----|--------------------------------------------------------------------------------------------------|
| 17H | 0x17 The operated module returns failure.                                                        |
| 18H | 0x18 no label                                                                                    |
| 19H | 0x19 Checksum error                                                                              |
| 1AH | 0x1A This command is not supported                                                               |
| 1BH | 0x1B This antenna is not supported                                                               |
| 1CH | 0x1C filter or alarm length is out of range                                                      |
| 1DH | 0x1D access area out of range                                                                    |
| 1EH | 0x1E address or length is not a multiple of 2                                                    |
| 1FH | 0x1F The read length is out of range                                                             |
| 20H | 0x20 writing length is not an integer multiple of 2                                              |
| 21H | 0x21 reserved                                                                                    |
| 22H | 0x22EPC length is not an integer multiple of 2                                                   |
| 23H | 0x23 Power out of range                                                                          |
| 24H | 0x24 When setting the baud rate, the specified interface number is wrong.                        |
| 25H | 0x25 When setting the baud rate, the baud rate is out of range                                   |
| 26H | 0x26 When setting the 485 address, the 485 address is out of range                               |
| 27H | 0x27 Hardware not supported                                                                      |
| 28H | 0x28 This relay is not supported                                                                 |
| 29H | 0x29 The relay is in automatic control state. Please turn off the automatic control relay first. |
| 2AH | 0x2A reserved                                                                                    |
| 2BH | 0x2BTID or USER area length error                                                                |
| 2CH | 0x2CTID or USER area address error                                                               |
| 2DH | 0x2D requires switching the reader to command mode                                               |
| 2EH | 0x2E protocol error, only supports UDP or TCP reporting                                          |
| 2FH | 0x2FRRFID module returns error                                                                   |

|     |                                                                                           |
|-----|-------------------------------------------------------------------------------------------|
| 30H | 0x30 reserved                                                                             |
| 31H | 0x31 The frame length field does not match the total frame length.                        |
| 32H | 0x32 The parameter length is inconsistent with the allowed length of the command.         |
| 33H | 0x33 This road does not support custom reporting.                                         |
| 34H | 0x34 The length of the reported parameter exceeds the range.                              |
| 35H | 0x35 illegal data frame                                                                   |
| 36H | 0x36 reserved                                                                             |
| 37H | 0x37 Key error (used in Boot, please do not modify it)                                    |
| 38H | 0x38 reserved                                                                             |
| 39H | 0x39 File writing error (used in Boot, please do not modify)                              |
| 3AH | 0x3A write address error (used in Boot, please do not modify)                             |
| 3BH | 0x3B reserved                                                                             |
| 3CH | 0x3C other unknown errors                                                                 |
| 3DH | 0x3D reserved                                                                             |
| 3EH | 0x3E reserved                                                                             |
| 3FH | 0x3F reserved                                                                             |
| 40H | 0x40Flash erase failed                                                                    |
| 41H | 0x41 This register does not support this command code                                     |
| 42H | 0x42 Bootloader does not support flag bit operations (used in Boot, please do not modify) |
| 43H | 0x43 is currently in APP mode                                                             |
| 44H | 0x44 Frequency range error                                                                |
| 45H | 0x45 band area error                                                                      |
| 46H | 0x46 This trigger is not supported                                                        |
| 47H | 0x47 Wiegand output is not supported                                                      |
| 48H | 0x48 switch value can only be 0 or 1                                                      |

|     |                                                                                       |
|-----|---------------------------------------------------------------------------------------|
| 49H | 0x49 When RFID sets the power, the module returns an error                            |
| 4AH | 0x4ARFID When setting the frequency band, the module returns an error                 |
| 4BH | 0x4BRFID When setting the antenna, the module returns an error                        |
| 4CH | 0x4C buzzer parameter error                                                           |
| 4DH | 0x4D reserved                                                                         |
| 4EH | 0x4E trigger level error                                                              |
| 4FH | 0x4F reserved                                                                         |
| 50H | 0x50 Relay status error                                                               |
| 51H | 0x51 High frequency reader/writer can only select EPC (UID)                           |
| 52H | 0x52 reserved                                                                         |
| 53H | 0x53 reserved                                                                         |
| 54H | 0x54 reserved                                                                         |
| 55H | 0x55 reserved                                                                         |
| 56H | 0x56 reserved                                                                         |
| 57H | 0x57 The number of configurations exceeds the maximum range supported by the hardware |
| 58H | 0x58 needs to enable automatic work                                                   |
| 59H | 0x59 Wrong reader model                                                               |
| 5AH | 0x5A reserved                                                                         |
| 5BH | 0x5B reserved                                                                         |
| 5CH | 0x5C reserved                                                                         |
| 5DH | 0x5D module assembly failed, the assembly position is occupied                        |
| 5EH | 0x5E This module is not installed and this parameter cannot be set and obtained.      |
|     |                                                                                       |

### 1.1.7 Agreement example

Get the RS485 address of the reader/writer , the command package is : 40 H 00H 03H 01H 04H B8H \_ \_ \_  
\_ in:

|     |                                   |
|-----|-----------------------------------|
| 40H | BOOT CODE                         |
| 00H | Packet effective length high byte |
| 03H | Packet effective length low byte  |
| 01H | Reader address                    |
| 04H | command code                      |
| B8H | Checksum                          |

If the reader/writer executes successfully, it returns : F0 H 00 H 04 H 01 H 04 H 01 H 06 H

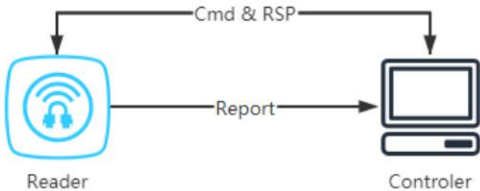
If the reader/writer fails to execute, it may return : F4 H 00 H 03 H 01 H 04 H 19 H EB H

### 1.2 Communication interface description

This chapter describes the data interaction mechanism of each hardware interface between the host and the reader/writer, so that users can quickly understand how to control the work of the reader/writer. Generally, the reader/writer is used as a slave, waiting for commands from the host. Please refer to Chapter 1.1 for the format of commands and responses.

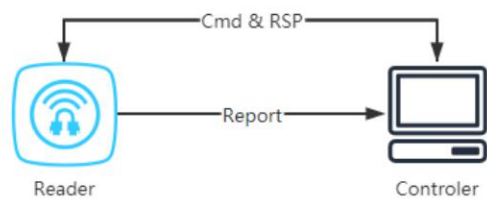
#### 1.2.1 RS232

When using RS232 to control the reader, the reader waits for RS232 commands from the host and returns the response to the host. If RS232 automatic reporting is enabled (can be set using the 29H command), the data from the automatic card reading will be reported to the host in the status packet format. For the automatic reporting format, please refer to the status packet format description in Section 1.1.4 and Chapter 1.7. The 01H instruction.



### 1.2.2 RS485

When using RS485 to control the reader/writer, the reader/writer waits for the RS485 command from the host and returns the response to the host. If RS485 automatic reporting is enabled, the data from the automatic card reading will be reported to the host in the status packet format. For the automatic reporting format, please refer to the status packet format description in Section 1.1.4 and the 01H command in Section 1.7.



### 1.2.3 Ordinary network port

When using the RJ45 ordinary network port to control the reader/writer, the reader/writer supports three Sockets, namely UDP Server, UDP Client, and TCP Server/Client.

The user uses the 27H command to control the mode in which the ordinary network port of the reader/writer works. UDP Server is supported by default and can be used without enabling it. The other three modes need to be turned on or off through the 27H command.

| MODEL      | SETTING METHOD                   |
|------------|----------------------------------|
| UDP SERVER | NO SETUP REQUIRED                |
| UDP CLIENT | 27H COMMAND, OPEN UDP REPORTING  |
| TCP SERVER | 27H COMMAND, CLOSE TCP REPORTING |
| TCP CLIENT | 27H COMMAND, OPEN TCP REPORTING  |

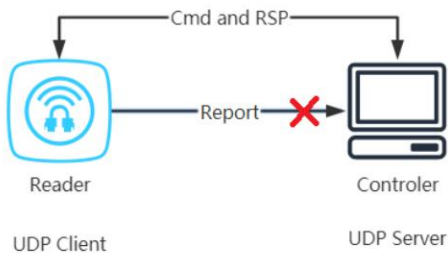
These modes are introduced below.

## 1、UDP Server/Client

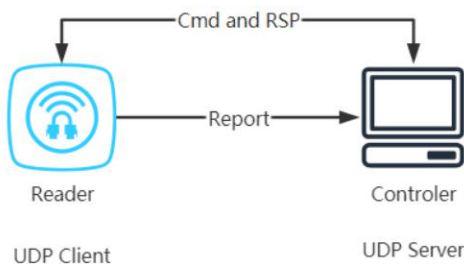
Whether the reader or writer acts as a UDP Server or a UDP Client, it will be bound to port 1969 by default. The host sends data to this port to control the reader and writer, and the reader/writer responds, as shown in the figure below.



If the user turns off the UDP reporting function through the 27H command. At this time, the data automatically read from the card will not be reported to the controller through UDP, as shown in the figure below.

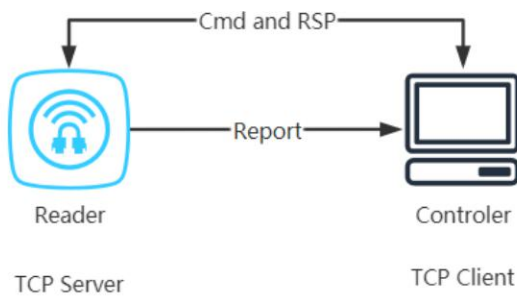


If the user sets the IP address and port of the UDP Server through the 27H command and enables the UDP reporting function, in addition to responding to the data from the controller, the reader/writer will also automatically read the card data through the status packet (Report) The format is reported to the UDP Server, as shown in the figure below. For the format of automatic reporting, please refer to the status packet format description in Section 1.1.4 and the 01H command in Section 1.7.



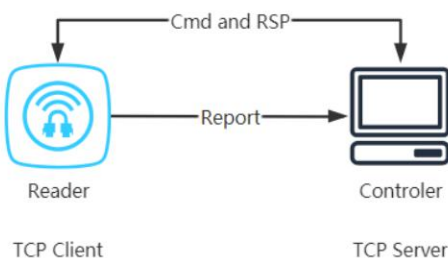
## 2、TCP Server

When the user uses the 27H command to turn off TCP reporting, the reader acts as a TCP Server and listens to port 1969 by default. The controller should connect to the reader as a TCP Client. There is only one TCP connection at the same time. After the connection is successful, data interaction can be carried out. The data read in automatic mode will be reported to this TCP connection. For the format of automatic reporting, please refer to the status packet format description in Section 1.1.4 and the 01H command in Section 1.7.



## 3、TCP Client

When the user uses the 27H command to set the IP address and port number of the server to which the reader/writer wants to connect, and enables TCP reporting, the reader/writer acts as a TCP Client. At this time, the host should act as a TCP Server and wait for the connection of the reader/writer. After the connection is successful, it can send instructions to the reader/writer. If the TCP Client is enabled to report automatically, the data of the automatic card reading will be in the format of the status packet (Report). Report to this TCP connection, otherwise it will not be reported, as shown in the figure below. For the format of automatic reporting, please refer to the status packet format description in Section 1.1.4 and the 01H command in Section 1.7.



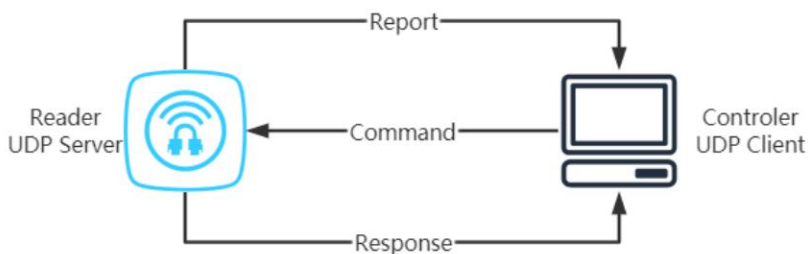
## 1.2.4 Super network port/WIFI/4G

When using the super network port module or WIFI module, the network port only supports one mode of TCP Server, TCP Client, UDP Server, and UDP Client. That is, only one mode can be selected from the four modes and cannot be used at the same time. . When the network port used is a 4G module, the reader only supports one of the UDP Client and TCP Client modes, that is, you can only choose one of the two modes for use, and cannot use them at the same time.

Note: Super network port, WIFI and 4G do not support broadcast packets, so when using these interfaces to connect readers and writers, the device cannot be identified through broadcast packets.

### 1、UDP Server

When the reader/writer acts as a UDP Server, the user host uses UDP Client to connect to the reader/writer. Every time the reader/writer receives a UDP data packet from the host, it changes the target IP to the data source IP and port number. When sending data, it sends it to the IP and port number of the latest communication. The data automatically read by the reader and writer will be reported to the IP and port of the latest communication through the format of the status packet. If there is no recent communication IP and port, no data will be returned and reported. Therefore, this method is more suitable for the scenario of command card reading, but not suitable for the scenario of automatic work of the reader/writer.



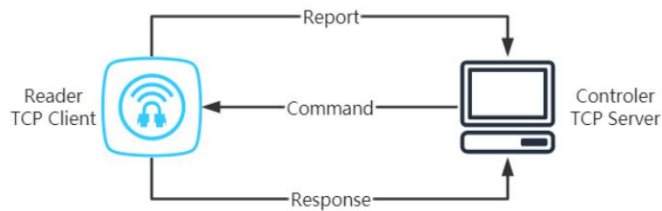
### 2、UDP Client

When the reader/writer acts as a UDP Client, the user host uses the UDP Server to connect to the reader/writer, and needs to specify the target IP and port to which the reader/writer wants to connect (4DH/4FH/51 command). The reader's response data and automatically reported data are sent to this specified IP and port.



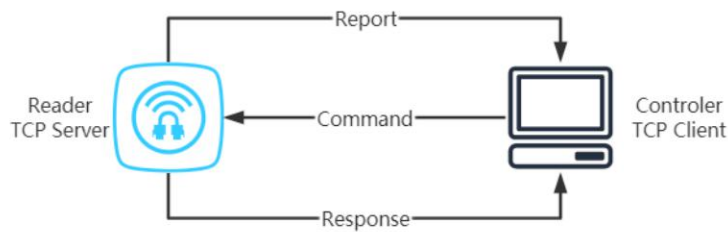
### 3、TCP Client

When the reader/writer acts as a TCP Client, the user host uses the TCP Server to connect to the reader/writer, and needs to specify the target IP and port to which the reader/writer wants to connect (4DH/4FH/51 command). The reader's response and automatically reported data are sent to this specified IP and port.



### 4、TCP Server

When the reader/writer acts as a TCP Server, the user host uses TCP Client to connect to the reader/writer, and there is only one TCP connection at the same time. The response of the reader and writer and the data of automatic card reading are sent to this TCP Client.



## 1.3 Basic commands

### 01H Set baud rate

Function: Set the baud rate of RS232 or RS485 interface .

Command code: 01H

Command package: 2 parameters.

Parameter 1: 1 byte, interface type. 00H--RS232, 01H--RS485

Parameter 2: 1 byte, baud rate code. Please see the table below for the actual baud rate corresponding to the code:

| CODE | BAUD RATE |
|------|-----------|
| 00H  | 9600      |
| 01H  | 19200     |
| 02H  | 38400     |
| 03H  | 57600     |
| 04H  | 115200    |

Return package: no parameters.

### 02H Get baud rate

Function: Get the baud rate of RS232 or RS485 interface .

Command code: 02H

Command package: 1 parameter.

Parameter 1: 1 byte, interface type. 00H--RS232, 01H--RS485

Return package: 1 parameter.

Parameter 1: 1 byte, baud rate. See table above.

## **03H Set RS485 address**

Function: Set the RS485 address of the reader.

Command code: 03H

Command package: 1 parameter.

Parameter 1: 1 byte, address. 1-254, cannot be set to 0 and 255, this is the broadcast address.

Return package: no parameters.

## **04H Get RS485 address**

Function: Get the RS485 address of the reader.

Command code: 04H

Command package: no parameters.

Return package: 1 parameter.

Parameter 1: 1 byte, address.

## **05H Get version number**

Function: Get the hardware, software, protocol and module version number of the reader.

Command code: 05H

Command package: no parameters.

Return package: 1 parameter.

Parameter 1: Several bytes, the format is: " HW:xxxx,SW:xxxx,PROT:xxxx,MD:xxxx "

For example " HW:1.0,SW:2.0,PROT:1.0,MD:6xBT V6.9 "

## 06H Set relay status

Function: Set the relay status. This command is only allowed to be called when the relay is not used for automatic control. In order to protect Flash, the relay status will not be saved when power is lost.

Command code: 06H

Command package: 2 parameters.

Parameter 1: 1 byte, relay number. 1,2,3...

Parameter 2: 1 byte, relay status. 0--disconnect, 1--pull-in

Return package: no parameters.

## 08H Get relay status

Function: Get the relay status of the reader/writer. This command is only allowed to be called when the relay is not used for automatic control.

Command code: 08H

Command package: 1 parameter.

Parameter 1: 1 byte, relay number. 1,2,3...

Return package: 1 parameter.

Parameter 1: Relay status. 0--disconnect, 1--pull-in.

## 0BH Set buzzer

Function: Turn on/off the buzzer.

Command code: 0BH

Command package: 1 parameter.

Parameter 1: 1 byte, buzzer switch. 00H--off, 01H--on.

Return package: no parameters.

## 0CH Get buzzer

Function: Get the buzzer on status.

Command code: 0CH

Command package: no parameters.

Return package: 1 parameter.

Parameter 1: 1 byte, buzzer switch. 00H--off, 01H--on.

## 0DH Set card reading mode

Function: Set the card reading mode of the reader.

Command code: 0DH

Command package: 1 parameter.

Parameter 1: 1 byte, card reading mode. See table below.

| CODE | FUNCTION                                        |
|------|-------------------------------------------------|
| 00H  | COMMAND MODE: THE READER WILL NOT ACTIVELY READ |

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          | THE CARD, BUT THE CONTROLLER WILL SEND COMMANDS TO CONTROL THE CARD READING TIMING.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 01H<br>- | AUTOMATIC MODE (CONTINUOUS CARD READING): THE READER/WRITER CONTINUOUSLY READS CARDS AUTOMATICALLY.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 02H      | AUTOMATIC MODE (SWITCH TRIGGER CARD READING): WHEN THE TRIGGER IO OF THE READER/WRITER MEETS THE TRIGGER CONDITIONS, THE CARD WILL BE READ FOR A PERIOD OF TIME. THE TRIGGER LEVEL AND CARD READING TIME CAN BE SET THROUGH THE 2FH COMMAND. THE STATE MACHINE IS AS FOLLOWS:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 03H      | <p>AUTOMATIC MODE (TWO-WAY TRIGGER CARD READING): WHEN TRIGGER 1 OF THE READER IS TRIGGERED, IT STARTS READING THE CARD AND STORES IT, AND STOPS READING THE CARD AFTER TRIGGER 2 IS TRIGGERED OR TIMES OUT. OR, WHEN TRIGGER 2 OF THE READER IS TRIGGERED, IT STARTS READING THE CARD AND STORES IT, AND STOPS READING THE CARD AFTER TRIGGER 1 IS TRIGGERED OR TIMES OUT. THE STATE MACHINE OF THIS MODE IS SHOWN IN THE FIGURE BELOW:</p> <p>NOTE: IN THIS MODE, THE REPORTING CONDITIONS SET BY THE 37H COMMAND ARE INVALID. THE CARDS READ AFTER THE TRIGGERING STARTS WILL BE STORED FIRST, AND WILL BE REPORTED DIRECTLY AND UNIFORMLY AFTER THE TRIGGERING ENDS. IF A TRIGGER TIMEOUT OCCURS, THIS ROUND OF TRIGGERING IS CONSIDERED INVALID, SO CARDS READ DURING THIS PERIOD SHOULD NOT BE REPORTED.</p> |

Return package: no parameters.

## 0EH Get card reading mode

Function: Set the card reading mode of the reader.

Command code: 0EH

Command package: no parameters.

Return package: 1 parameter.

Parameter 1: 1 byte, card reading mode. See table above.

## 0FH Set output power

Function: Set the output power.

Command code: 0FH

Command package: 2 parameters.

Parameter 1: 1 byte, antenna number. 1,2,3,4...

Parameter 2: 1 byte, power value. Range 0–33dbm. This range may be different for different models, please refer to the table bReturn package: no parameters.

## 10H Get output power

Function: Get the output power.

Command code: 10H

Command package: 2

parameters.

Parameter 1: 1 byte, antenna number. 1,2,3,4...

Return package: 1 parameter.

Parameter 1: 1 byte, power value.

## 13H Set frequency band frequency point

Function: Set frequency point parameters. This command is subdivided into 3 commands according to the parameter Region value. For the actual frequency corresponding to the frequency point in the command, please see the frequency parameter correspondence table.

Command code: 13H

Command package 1: 3 parameters.

Parameter 1: 1 byte, frequency band area. 1--FCC, 2--ETSI, 3--CHN.

Parameter 2: 1 byte, starting frequency point. FCC range 0-52, ETSI range 0-6, CHN range 0-10.

Parameter 3: 1 byte, end frequency point. FCC range 0-52, ETSI range 0-6, CHN range 0-10.

Note: The starting frequency point cannot be greater than the ending frequency point.

Command package 2: 4 parameters.

Parameter 1: 1 byte, frequency band area. Fixed to 04H.

Parameter 2: 1 byte, frequency interval. The unit is 10KHz.

Parameter 3: 1 byte, the number of frequency points. This parameter must be greater than 0.

Parameter 4: 3 bytes, starting frequency point. The unit is 10KHz, the hexadecimal number is high-order first. For example, 915000KHz will send 0DH F6H 38H.

Command package 3: 1 parameter.

Parameter 1: 1 byte, frequency band area. 5--FCC full frequency, 6--ETSI full frequency, 7--CHN full frequency.

Return package: no parameters.

ETSI frequency parameter correspondence table

| Freq<br>uenc<br>y | Correspondin<br>g frequency |
|-------------------|-----------------------------|
| 0                 | 865.00MHz                   |
| 1                 | 865.50MHz                   |
| 2                 | 866.00MHz                   |
| 3                 | 866.50MHz                   |
| 4                 | 867.00MHz                   |
| 5                 | 867.50MHz                   |
| 6                 | 868.00MHz                   |

FCC frequency parameter correspondence table

| Frequ<br>ncy | Correspond<br>ing frequency | Frequen<br>cy   | Correspon<br>ding frequency | Frequ<br>ency | Correspondi<br>ng frequency |
|--------------|-----------------------------|-----------------|-----------------------------|---------------|-----------------------------|
| 0            | 902.00MHz                   | 20              | 912.00MHz                   | 40            | 922.00MHz                   |
| 1            | 902.50MHz                   | twenty<br>one   | 912.50MHz                   | 41            | 922.50MHz                   |
| 2            | 903.00MHz                   | twenty<br>two   | 913.00MHz                   | 42            | 923.00MHz                   |
| 3            | 903.50MHz                   | twenty<br>three | 913.50MHz                   | 43            | 923.50MHz                   |
| 4            | 904.00 MHz                  | 24              | 914.00 MHz                  | 44            | 924.00 MHz                  |
| 5            | 904.50 MHz                  | 25              | 914.50 MHz                  | 45            | 924.50 MHz                  |
| 6            | 905.00 MHz                  | 26              | 915.00 MHz                  | 46            | 925.00 MHz                  |
| 7            | 905.50 MHz                  | 27              | 915.50 MHz                  | 47            | 925.50 MHz                  |
| 8            | 906.00 MHz                  | 28              | 916.00 MHz                  | 48            | 926.00 MHz                  |
| 9            | 906.50 MHz                  | 29              | 916.50 MHz                  | 49            | 926.50 MHz                  |
| 10           | 907.00 MHz                  | 30              | 917.00 MHz                  | 50            | 927.00 MHz                  |
| 11           | 907.50 MHz                  | 31              | 917.50 MHz                  | 51            | 927.50 MHz                  |
| 12           | 908.00 MHz                  | 32              | 918.00 MHz                  | 52            | 928.00 MHz                  |
| 13           | 908.50 MHz                  | 33              | 918.50 MHz                  |               |                             |
| 14           | 909.00 MHz                  | 34              | 919.00MHz                   |               |                             |
| 15           | 909.50MHz                   | 35              | 919.50MHz                   |               |                             |
| 16           | 910.00MHz                   | 36              | 920.00MHz                   |               |                             |
| 17           | 910.50MHz                   | 37              | 920.50MHz                   |               |                             |
| 18           | 911.00MHz                   | 38              | 921.00MHz                   |               |                             |
| 19           | 911.05MHz                   | 39              | 921.50MHz                   |               |                             |

CHN frequency parameter correspondence table

| Frequency | Corresponding frequency |
|-----------|-------------------------|
| 0         | 920.00MHz               |
| 1         | 920.50MHz               |
| 2         | 921.00MHz               |
| 3         | 921.50MHz               |
| 4         | 922.00MHz               |
| 5         | 922.50MHz               |
| 6         | 923.00MHz               |
| 7         | 923.50MHz               |
| 8         | 924.00MHz               |
| 9         | 924.50MHz               |
| 10        | 925.00MHz               |

## 14H Get frequency band frequency point

Function: Get frequency point parameters. This command is subdivided into 3 return packets according to the returned Region value. Returns the actual frequency corresponding to the frequency point in the packet. Please see the frequency parameter correspondence table.

Command code: 14H

Command package: no parameters.

Return package 1: 3 parameters.

Parameter 1: 1 byte, frequency band area. 1--FCC, 2--ETSI, 3--CHN.

Parameter 2: 1 byte, starting frequency point. FCC range 0-52, ETSI range 0-6, CHN range 0-10.

Parameter 3: 1 byte, end frequency point. FCC range 0-52, ETSI range 0-6, CHN range 0-10.

Return package 2: 4 parameters.

Parameter 1: 1 byte, frequency band area. Fixed to 04H.

Parameter 2: 1 byte, frequency interval. The unit is 10KHz.

Parameter 3: 1 byte, the number of frequency points. This parameter must be greater than 0.

Parameter 4: 3 bytes, starting frequency point. The unit is 10KHz, the hexadecimal number is high-order first. For example, 915000KHz will send 0DH F6H 38H.

Return package 3: 1 parameter.

Parameter 1: 1 byte, frequency band area. 5--FCC full frequency, 6--ETSI full frequency, 7--CHN full frequency.

## **17H Restore reader/writer to factory settings**

Function: Restore the factory settings of the reader.

Command code: 17H

Command package: no parameters.

Return package: no parameters.

## **18H Restart reader/writer**

Function: Restart the reader.

Command code: 18H

Command package: no parameters.

Return package: no parameters.

## **19H Restore WIFI factory settings**

Function: When the WIFI module needs to be reconfigured, send this command to make the WIFI

module work in STA mode to facilitate reconfiguration of the WIFI module. This command takes a long time, about 5 seconds.

Command code: 19H

Command package: no parameters.

Return package: no parameters.

## **1BH Set reader time**

Function: Set the time of the reader's internal real-time clock.

Command code: 1BH

Command package: 1 parameter.

Parameter 1: 6 bytes, the time to be set. They are: year, month, day, hour, minute and second.

Return package: no parameters.

## **1CH Get reader time**

Function: Get the time of the reader's internal real-time clock.

Command code: 1CH

Command package: no parameters.

Return package: 1 parameter.

Parameter 1: 6 bytes, time. They are: year, month, day, hour, minute and second.

## **1FH Set tag filter**

Function: This command is used to set the function of the tag filter. When the reader/writer recognizes the EPC or UID of the tag, if the filtering function is enabled, it will first match the filter in bytes. If it cannot match, the tag will be discarded.

Command code: 1FH

Command package: 4 parameters.

Parameter 1: 1 byte, whether to enable the filter. 0--off, 1--on.

Parameter 2: 1 byte, mask address Addr, range 0-63.

Parameter 3: 1 byte, mask length Len, maximum 64.

Parameter 4: Lens bytes, mask data.

Note: Because the maximum EPC length that the reader/writer can recognize is 512Bit. So the length of Addr + Len should not exceed 64.

Return package: no parameters.

## 20H Get tag filter

Function: Get the content of the tag filter.

Command code: 20H

Command package: no parameters.

Return package: 4 parameters.

Parameter 1: 1 byte, whether to enable the filter. 0--disabled, 1--enabled.

Parameter 2: 1 byte, mask address Addr, range 0-63.

Parameter 3: 1 byte, mask length Len, maximum 64.

Parameter 4: Lens bytes, mask data.

## 23H Set RJ45 local network parameters

Function: This command is used to set the network address of the reader/writer Ethernet. Including IP address and subnet mask. Default gateway, port number. The reader/writer will automatically restart after executing this command. The restart time is about 2 seconds.

Command code: 23H

Command package: 4 parameters.

Parameter 1: 4 bytes, IP address. For example, 192.168.0.213 is C0H A8H 00H D5H

Parameter 2: 4 bytes, mask. For example, 255.255.255.0 is FFH FFH FFH 00H

Parameter 3: 4 bytes, gateway. For example, 192.168.0.1 is C0H A8H 00H 01H

Parameter 4: 2 bytes, listening port (common to TCP/UDP). For example, 1969 is 07H B1H

Return package: no parameters.

## 24H Get RJ45 local network parameters

Function: This command is used to obtain the Ethernet network address of the reader/writer. Including IP address and subnet mask. Default gateway, port number.

Command code: 24H

Command package: no parameters.

Return package: 4 parameters.

Parameter 1: 4 bytes, IP address. For example, 192.168.0.213 is C0H A8H 00H D5H

Parameter 2: 4 bytes, mask. For example, 255.255.255.0 is FFH FFH FFH 00H

Parameter 3: 4 bytes, gateway. For example, 192.168.0.1 is C0H A8H 00H 01H

Parameter 4: 2 bytes, listening port (common to TCP/UDP). For example, 1969 is 07H B1H

## 27H Set RJ45 remote network parameters

Function: This command is used to set the target IP address and port number reported during automatic card reading. When the reader/writer recognizes the tag, if the reported hardware interface is RJ45, it will report the tag to the host IP and port set by this command. This command will cause the reader to restart automatically.

Command code: 27H

Command package: 6 parameters.

Note: This command is backward compatible. You can send only parameters 1, 2, and 3, or all parameters.

Parameter 1: 4 bytes, UDP Server IP, indicating which UDP server to report to.

Parameter 2: 2 bytes, UDP Server Port, reporting port, high byte first, low byte last.

Parameter 3: 1 byte, whether to enable UDP reporting, 0--no, 1--yes.

Parameter 4: 4 bytes, TCP Server IP, indicating which TCP server to report to.

Parameter 5: 2 bytes, TCP Server Port, reporting port, high byte first, low byte last.

Parameter 6: 1 byte, whether to enable TCP reporting, 0--no, 1--yes. If TCP reporting is enabled, the reader will switch to TCP Client mode, otherwise, the reader will operate as TCP Server mode.

Return package: no parameters.

## 28H Get RJ45 remote network parameters

Function: This command is used to obtain the host IP address and port number reported during automatic card reading. When the reader/writer recognizes the tag, if the RJ45 method is used for reporting, the tag will be reported to the host IP and port set by this command.

Command code: 28H

Command package: no parameters.

Return package: 3 parameters.

Note: This command is backward compatible and can only return parameters 1, 2, and 3, or all parameters.

Parameter 1: 4 bytes, UDP Server IP, indicating which UDP server to report to.

Parameter 2: 2 bytes, UDP Server Port, reporting port, high byte first, low byte last.

Parameter 3: 1 byte, whether to enable UDP reporting, 0--no, 1--yes.

Parameter 4: 4 bytes, TCP Server IP, indicating which TCP server to report to.

Parameter 5: 2 bytes, TCP Server Port, reporting port, high byte first, low byte last.

Parameter 6: 1 byte, whether to enable TCP reporting, 0--no, 1--yes.

## **25H Set MAC address**

Function: Set the MAC address of the reader .

Command code: 25H

Command package: 1 parameter.

Parameter 1: 6 bytes, MAC address.

Return package: no parameters.

## 26H Get MAC address

Function: Get the MAC address of the reader.

Command code: 26H

Command package: no parameters.

Return package: 1 parameter.

Parameter 1: 6 bytes, MAC address.

## 31H Set tag alarm

Function: This command is used to set the function of the tag alarm. When the reader recognizes the EPC or UID of the tag, if the alarm function is turned on, it will match the alarm in byte units. If it matches, the relay will be triggered to close (the corresponding relay needs to be set for alarm purposes) .

Command code: 31H

Command package: 4 parameters.

Parameter 1: 1 byte, whether to enable the alarm. 0--disabled, 1--enabled.

Parameter 2: 1 byte, mask address Addr, range 0-63.

Parameter 3: 1 byte, mask length Len, maximum 64.

Parameter 4: Lens bytes, mask data.

Note: Because the maximum EPC length that the reader/writer can recognize is 512Bit. So the length of Addr + Len should not exceed 64.

Return package: no parameters.

## 32H Get tag alarm

Function: Get the content of the tag alarm.

Command code: 32H

Command package: no parameters.

Return package: 4 parameters.

Parameter 1: 1 byte, whether to enable the alarm. 0--disabled, 1--enabled.

Parameter 2: 1 byte, mask address Addr, range 0-63.

Parameter 3: 1 byte, mask length Len, maximum 64.

Parameter 4: Lens bytes, mask data.

## 33H Set reader ID

Function: Set reader ID.

Command code: 33H

Command package: 1 parameter.

Parameter 1: ASCII code of up to 24 bytes.

Return package: no parameters.

## 34H Get reader ID

Function: Get the reader ID.

Command code: 34H

Command package: no parameters.

Return package: 1 parameter.

Parameter 1: ASCII code of up to 24 bytes.

## **35H Set reader name**

Function: Set the reader name.

Command code: 35H

Command package: 1 parameter.

Parameter 1: ASCII code of up to 24 bytes.

Return package: no parameters.

## **36H Get reader name**

Function: Get the reader name.

Command code: 36H

Command package: no parameters.

Return package: 1 parameter.

Parameter 1: ASCII code of up to 24 bytes.

## **39H Set heartbeat packet**

Function: The reader supports the custom heartbeat packet function and sends heartbeat packets to the connected host computer at regular intervals. The user can set the heartbeat packet function through this command.

Command code: 39H

Command package: 3 parameters.

Parameter 1: 1 byte, whether to enable heartbeat packets. 0--Disable, 1--Enable.

Parameter 2: 1 byte, heartbeat packet interval.

Parameter 3: Up to 24 bytes, ASCII code of heartbeat data.

Return package: no parameters.

## **43H Get heartbeat packet**

Function: Get heartbeat packet parameters.

Command code: 43H

Command package: no parameters.

Return package: 3 parameters.

Parameter 1: 1 byte, whether to enable heartbeat packets. 0--Disable, 1--Enable.

Parameter 2: 1 byte, heartbeat packet interval. Unit: seconds.

Parameter 3: Up to 24 bytes, ASCII code of heartbeat data.

## **4DH Set WIFI parameters**

Function: Set the parameters of the WIFI module. This command takes 3-4 seconds, mainly because the WIFI module configuration takes time.

Command code: 4DH

Command package: 10 parameters.

Parameter 1: 1 byte, WIFI working mode.

0--UDP Server, 1--TCP Server, 2--UDP Client, 3--TCP Client.

Parameter 2: 4 bytes, local\_ip, local IP address.

Parameter 3: 4 bytes, mask, subnet mask.

Parameter 4: 4 bytes, gateway, default gateway.

Parameter 5: 2 bytes, local or remote port. Port number, high byte first, low byte last.

If you are working as a server, this port refers to the local listening port local port.

If you are working as a client, this port refers to the remote port remote port to be connected.

Parameter 6: 4 bytes, remote\_ip, indicating the server address to be connected.

If you are a client, you need to configure this parameter to indicate which server you want to connect to. If you are a client, just send any 4 bytes.

Parameter 7: 1 byte, indicating the length n of the WIFI name to be connected, with a maximum length of 32 bytes.

Parameter 8: n bytes, indicating the ASCII code of the WIFI name to be connected.

Parameter 9: 1 byte, indicating the password length p to connect to WIFI, with a maximum length of 64 bytes.

Parameter 10: p bytes, indicating the ASCII code of the WIFI password to be connected. Return package: no parameters.

## 4EH Get WIFI parameters

Function: Get the parameters of the WIFI module.

Command code: 4EH

Command package: no parameters.

Return package: See the command package parameters of 4DH.

## **4FH Set super network port parameters**

Function: Set the parameters of the super network port. This command takes 3-4 seconds, mainly because the module configuration takes time.

Command code: 4FH

Command package: 6 parameters.

Parameter 1: 1 byte, network port mode.

0--UDP Server, 1--TCP Server, 2--UDP Client, 3--TCP Client.

Parameter 2: 4 bytes, IP address.

Parameter 3: 4 bytes, subnet mask.

Parameter 4: 4 bytes, default gateway.

Parameter 5: 2 bytes, port number, high byte first, low byte last.

If you are working as a server, this port refers to the local listening port local port.

If you are working as a client, this port refers to the remote port to be connected.

Parameter 6: 4 bytes, remote\_ip, indicating the server address to be connected.

If you are a client, you need to configure this parameter to indicate which server you want to connect to.

If you are a client, just send any 4 bytes.

Return package: no parameters.

## **50H Get super network port parameters**

Function: Get the parameters of the super network port module.

Command code: 50H

Command package: no parameters.

Return package: See the command package parameters of 4FH.

## **51H Set 4G parameters**

Function: Set the parameters of the 4G module. This command takes 3-4 seconds, mainly because the module configuration takes time. 4G modules are generally used as clients, so you only need to set the IP address (domain name) and port of the server.

Command code: 51H

Command package: 4 parameters.

Parameter 1: 1 byte, transmission mode. 0--UDP Client, 1--TCP Client.

Parameter 2: 2 bytes, port, high byte first, low byte last.

Parameter 3: 1 byte, IP address or domain name length n.

Parameter 4: n bytes, the ASCII code of the IP address or domain name, a maximum of 64 bytes is supported.

Return package: no parameters.

## 52H Get 4G parameters

Function: Get 4G parameters.

Command code: 52H

Command package: no parameters.

Return package: See the command package parameters of 51H.

## 60H Get GPI status

Function: Get GPI status through this command.

Command code: 60H

Command package: 1 parameter.

Parameter 1: 1 byte, specifying the GPI number to be obtained. Numbering starts from 1, 1.2.3...

Return package: 1 parameter.

Parameter 1: 1 byte, GPI level. 0--low level, 1--high level.

## 1.4 Auto mode related commands

If the user only needs to identify the tag and does not need to perform reader/writer operations on the tag, it is recommended to use the 0DH command to configure the reader/writer in automatic mode. At this time, the reader will automatically identify the tag and report it. When users use this development method, they only need to simply configure the reader and writer, and then parse the data reported by the reader/writer.

### 09H Set relay automatic control parameters

Function: The reader uses this command to set parameters related to the automatic control relay function. It can be set to activate the relay when the tag is recognized, which is suitable for some simple scenarios that require alarm. It can also be set to close the relay when a tag that meets the alarm condition is read. This command needs to be used in conjunction with the 31H command. The pickup time of the relay can also be set through this command.

Command code: 09H

Command package: 3 parameters.

Parameter 1: 1 byte, relay number. 1,2,3...

Parameter 2: 1 byte. Purpose of relay.

| CODE  | FUNCTION                                                                                                                                                |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| 00H   | No automatic control relay                                                                                                                              |
| 01H _ | When the tag is read, the relay is activated, and when the tag is not read within the specified time, the relay is disconnected.                        |
| 02H   | When a tag that meets the alarm condition is read, the relay is turned on.<br>When a tag that meets the alarm condition is not read after the specified |

|  |                                |
|--|--------------------------------|
|  | time, the relay is turned off. |
|--|--------------------------------|

Parameter 3: 1 byte. Pick-up time. Unit: seconds.

Return package: no parameters.

## 0AH gets relay automatic control parameters

Function: Get the parameters of the specified relay.

Command code: 0AH

Command package: 1 parameter.

Parameter 1: 1 byte, relay number. 1,2,3...

Return package: 2 parameters.

Parameter 1: 1 byte. Purpose of relay. See table above.

Parameter 2: 1 byte. Pick-up time. Unit: seconds.

## 15H Set automatic polling antenna

Function: If it is a reader/writer that supports multiple antennas, you can use this command to set the antenna to be polled when automatically reading the card. After the reader/writer configures the polling antenna, it will automatically poll each selected antenna one by one.

Command code: 15H

Command package: 1 parameter.

Parameter 1: Several bytes, antenna number. 1,2,3,4...

For example: to select automatic polling antennas 1,3,4, the parameters are 3 bytes,

respectively 01H 03H 04H

Return package: no parameters.

## 16H Get automatic polling antenna

Function: Get the antenna polled when automatically reading the card.

Command code: 16H

Command package: no parameters.

Return package: 1 parameter.

Parameter 1: Several bytes, antenna number. 1,2,3,4...

For example: the automatic polling antenna is 1, 3, 4, then the parameters are 3 bytes, respectively 01H 03H 04H

## 21H Set the automatic reading tag type

Function: Set the tag types that can be read when automatically reading the card.

Command code: 21H

Command package: 1 parameter.

Parameter 1: 1 byte, identifiable tag type, bitmap format. See table below:

| BIT<br>NUMB<br>ER | FUNCTION                                                                                                                                       |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| BIT0              | WHETHER TO READ ISO18000-6B TAGS. 0--DO NOT READ THE SIGNATURE, 1--READ.<br><br>THIS FEATURE IS MUTUALLY EXCLUSIVE WITH THE TEMPERATURE LABEL. |

|      |                                                                                                                                                                                                                             |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BIT1 | WHETHER TO READ ISO18000-6C LABELS. 0--DO NOT READ THE SIGNATURE, 1--READ.<br><br>THIS FEATURE IS MUTUALLY EXCLUSIVE WITH THE TEMPERATURE LABEL.                                                                            |
| BIT2 | WHETHER TO READ THE TEMPERATURE TAG, 0--DO NOT READ, 1--READ.<br><br>THIS FUNCTION IS MUTUALLY EXCLUSIVE WITH 6B AND 6C TAGS. THIS FUNCTION REQUIRES THE RADIO FREQUENCY MODULE VERSION TO BE GREATER THAN OR EQUAL TO 8.2. |

Return package: no parameters.

## 22H Get the automatically read tag type

Function: Get the tag types that can be read during automatic card reading .

Command code: 22H

Command package: no parameters.

Return package: 1 parameter.

Parameter 1: 1 byte, identifiable label type, bitmap format. See table above.

## 29H Set the reported hardware interface

Function: The reader supports multiple hardware interfaces to report tag data. This command can be used to set which hardware interface to use for reporting.

Command code: 29H

Command package: 2 parameters.

Parameter 1: 1 byte, hardware interface number. The meaning of the numbers is shown in the

table below:

| CODE | CORRESPOND<br>ING INTERFACE |
|------|-----------------------------|
| 00H  | RS232                       |
| 01H  | RS485                       |
| 02H  | RJ45                        |
| 03H  | WIEGAND 26                  |
| 04H  | WIEGAND 34                  |
| 05H  | WIFI                        |
| 06H  | 4G                          |

Parameter 2: 1 byte, whether to enable reporting of this interface. 0--off, 1--on.

Return package: no parameters.

## 2AH Gets the reported hardware interface

Function: The reader supports multiple hardware interfaces to report tag data. This command can be used to obtain which hardware interface is used for reporting.

Command code: 2AH

Command package: 1 parameter.

Parameter 1: 1 byte, hardware interface number, see the table above. Indicates which interface to obtain the reporting function.

Return package: 1 parameter.

Parameter 1: 1 byte, whether the reporting function of this interface is enabled. 0--off, 1--on.

## 2BH Set automatic reporting fields

Function: When the reader/writer works automatically, after identifying the tag, it will report the tag to the controller. The reported content can be selected through this command. The fields that can be selected include EPC (UID), TID, USER, RSSI, timestamp, tag type, IP address and other fields. When you choose to report USER or TID, you need to set the starting address and length of reading. You can also set custom fields through this command. When a custom reporting field is selected, the user needs to set custom content through the 1AH command. It is worth noting that reading TID and USER is only suitable for scenarios with a small number of tags. The recognition rate is not high with multiple tags. The more tags, the longer the recognition will take.

Command code: 2BH

Command package: 5 parameters.

Parameter 1: 4 bytes form a 32-bit data, and the reporting field selects a bitmap. Send high byte first.

| BIT<br>NUMBER | FIELD                                  |
|---------------|----------------------------------------|
| BIT0          | EPC(UID), SELECTED BY<br>DEFAULT       |
| BIT1          | TID, NOT SELECTED BY<br>DEFAULT        |
| BIT2          | USER, NOT SELECTED BY<br>DEFAULT       |
| BIT3          | RSSI VALUE, SELECTED BY<br>DEFAULT     |
| BIT4          | TIMESTAMP, SELECTED BY<br>DEFAULT      |
| BIT5          | LABEL TYPE, SELECTED BY<br>DEFAULT     |
| BIT6          | IP ADDRESS, SELECTED<br>BY DEFAULT     |
| BIT7          | ANTENNA NUMBER,<br>SELECTED BY DEFAULT |

|       |                                            |
|-------|--------------------------------------------|
| BIT8  | DEVICE ID                                  |
| ...   | RESERVE                                    |
| BIT26 | CUSTOM FIELD 4, NOT<br>SELECTED BY DEFAULT |
| BIT27 | CUSTOM FIELD 3, NOT<br>SELECTED BY DEFAULT |
| BIT28 | CUSTOM FIELD 2, NOT<br>SELECTED BY DEFAULT |
| BIT29 | CUSTOM FIELD 1, NOT<br>SELECTED BY DEFAULT |
| BIT30 | CUSTOM FIELD 0, NOT<br>SELECTED BY DEFAULT |
| BIT31 | RESERVE                                    |

Parameter 2: 1 byte, the starting address of the TID area, which must be an integer multiple of 2.

Parameter 3: 1 byte, the length of the TID area, which must be an integer multiple of 2.

Parameter 4: 1 byte, the starting address of the USER area, which must be an integer multiple of

2.

Note: Parameters 2-3 are only valid when the TID area is selected, and parameters 4-5 are only valid when the USER area is selected. The total length of the TID area and USER area must not exceed 64 bytes, and the length of the TID or USER area cannot be 0.

Return package: no parameters.

## 2CH Get the automatically reported fields

Function: When the reader/writer works automatically, after identifying the tag, it will report the tag to the controller. The reported content can be obtained through this command.

Command code: 2CH

Command package: no parameters.

Return package: 5 parameters.

Parameter 1: 4 bytes form a 32-bit data, and the reporting field selects a bitmap. Send high byte first. See table above.

Parameter 2: 1 byte, starting address of TID area.

Parameter 3: 1 byte, TID area length. Maximum 6 bytes.

Parameter 4: 1 byte, starting address of USER area.

Parameter 5: 1 byte, USER area length. Maximum 6 bytes.

## **1AH Set up automatic reporting content**

Function: When the reader works automatically, when a tag is recognized, it will automatically report the tag to the controller. At the same time, the reader and writer also reserves some custom fields for users to set, and users can set them according to their needs.

Command code: 1AH

Command package: 2 parameters.

Parameter 1: 1 byte, custom field number. Starting from 0, up to 5 custom fields are supported.

Parameter 2: ASCII code of up to 24 bytes, used to specify the content of the custom field of this path.

Return package: no parameters.

## 44H Get automatically reported content

Function: Get the content of the custom field during automatic reporting.

Command code: 43H

Command packet: 1 byte, reporting field number. Starting from 0, up to 5 reports are supported. Return

package: 1 parameter.

Parameter 1: Up to 24 bytes, the ASCII code of the custom reporting field data for this channel.

## 37H Set automatic reporting conditions

Function: This command is used to set the conditions for label automatic reporting. **Note that this function is invalid in bidirectional trigger mode.**

Command code: 37H

Command package: 2 parameters.

Parameter 1: 1 byte, reporting mode. See table below:

| CODE | FUNCTION                                                                                                                                                                                     |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 00H  | REPORT WHEN THE INVENTORY IS COMPLETED: AFTER THE READER TAKES ONE ROUND OF INVENTORY, IT REPORTS THE TAGS COUNTED IN THIS ROUND.                                                            |
| 01H  | SCHEDULED REPORTING (ALL TAGS): THE READER/WRITER PERFORMS INVENTORY WITHIN THE SCHEDULED TIME, AND WHEN THE SCHEDULED TIME IS UP, THE TAGS INVENTORIED DURING THIS PERIOD WILL BE REPORTED. |
| 02H  | SCHEDULED REPORTING (SINGLE LABEL): SCHEDULED REPORTING FOR A SINGLE LABEL. FOR EXAMPLE, IF THE REPORTING INTERVAL IS SET TO 5 SECONDS, IF LABEL A IS READ IN THE FIRST SECOND,              |

|     |                                                                                                                                                                                                                                          |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | THE LABEL WILL BE REPORTED IMMEDIATELY, BUT IF LABEL A IS READ AGAIN IN THE NEXT 5 SECONDS, THE LABEL WILL NOT BE REPORTED AGAIN. WHEN THE TIME EXCEEDS 5 SECONDS AND TAG A IS RECOGNIZED AGAIN, IT WILL BE REPORTED IMMEDIATELY.        |
| 03H | PASSIVE REPORTING: THIS METHOD IS USED FOR MODBUS AND PROFINET PROTOCOLS.                                                                                                                                                                |
| 04H | REAL-TIME REPORTING: THE READER/WRITER REPORTS WHILE TAKING INVENTORY. NOTE: IN THIS MODE, FOR RFID MODULES, ONLY THE EPC OR UID OF THE LABEL CAN BE REPORTED. FOR THE RFID MODULE, EPC, TID, AND USER CAN BE REPORTED AT THE SAME TIME. |

Parameter 2: 1 byte, reporting time interval. Unit: seconds.

Return package: no parameters.

## 38H Get automatic reporting conditions

Function: When the reader/writer is working automatically, you can use this command to obtain the timing of tag reporting.

Command code: 38H

Command package: no parameters.

Return package: 2 parameters.

Parameter 1: 1 byte, reporting mode.

Parameter 2: 1 byte, reporting time interval. Unit: seconds.

## 2DH Set Wiegand parameters

Function: When the reader/writer supports the Wiegand interface, you can use this command to set the time parameters of the Wiegand output.

Command code: 2DH

Command package: 2 parameters.

Parameter 1: 1 byte, Wiegand pulse width. Unit: 10us

Parameter 2: 1 byte, Wiegand pulse interval. Unit: 10us

Return package: no parameters.

## **2EH Get Wiegand parameters**

Function: When the reader/writer supports the Wiegand interface, you can use this command to obtain the time parameter of the Wiegand output.

Command code: 2EH

Command package: no parameters.

Return package: 2 parameters.

Parameter 1: 1 byte, Wiegand pulse width. Unit: 10us

Parameter 2: 1 byte, Wiegand pulse interval. Unit: 10us

## **2FH Set trigger conditions**

Function: When the reader works in trigger mode (including switch trigger mode and channel gate trigger mode), use this command to set the trigger conditions.

Command code: 2FH

Command package: 3 parameters.

Parameter 1: 1 byte, select the trigger number to be set. Numbering starts from 1, 1.2.3...

Parameter 2: 1 byte, trigger level. 0--low level, 1--high level.

Parameter 3: 1 byte, the duration to trigger card reading. Unit: seconds.

If it is a switch trigger mode, it indicates how long the card will be read after triggering. For example, if set to 3 seconds, it means that when the trigger condition is met, the card reading will last for 3 seconds.

If it is a two-way trigger mode, it indicates the trigger timeout. For example, if set to 3 seconds, it means that card reading starts after trigger 1 is triggered and stops until trigger 2 is triggered, or it times out and stops after 3 seconds. When triggering stops due to timeout, this round of triggering is considered invalid, and the read tags should not be reported.

Return package: no parameters.

## 30H Get trigger conditions

Function: When the reader/writer works in trigger mode, this command is used to obtain the trigger conditions.

Command code: 30H

Command package: 1 parameter.

Parameter 1: 1 byte, specifying the trigger number to be obtained. Numbering starts from 1, 1.2.3...

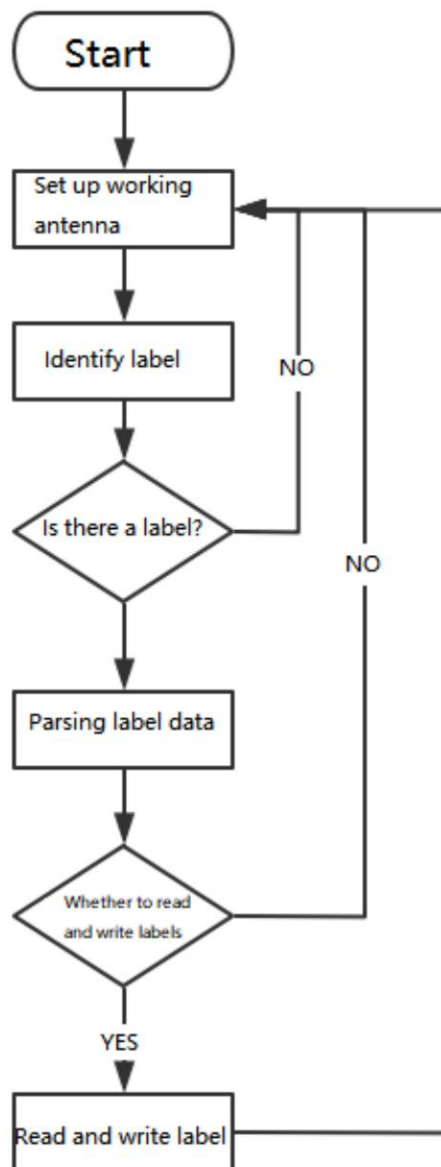
Return package: 2 parameters.

Parameter 2: 1 byte, trigger level. 0--low level, 1--high level.

Parameter 3: 1 byte, trigger duration. Unit: seconds.

## 1.5 UHF protocol command

If the user needs to perform operations such as tag read/write locking, they need to use the ODH command to configure the reader/writer in command mode. At this point, the reader/writer does not automatically recognize the label, but is completely controlled by the user. When users use this development method, they generally follow the following development process.



### 3AH Switching the working antenna

Function: If the user controls the operation of the reader/writer through command mode, when switching the working antenna, this command is used to switch.

Command code: 3AH

Command package: 1 parameter.

Parameter 1:1 bytes, antenna number. 1.2.3

Return package: No parameters.

## 80H Identify 6C tags

Function: When the reader/writer is working in command mode, the control machine can use this command to identify the 6C tag ID that exists within the antenna radiation field range. This instruction is a one-to-many instruction, meaning that a command has multiple return packets.

Command code: 80H

Command package: 4 parameters.

Description: The starting address and length must be an integer multiple of 2. If mem is EPC, the starting address and length are invalid, just pass 0. If the tag does not have an access password set, simply pass 0.

Parameter 1: One byte, select the area mem for listing labels.

| code | Area     |
|------|----------|
| 00H  | password |
| 01H  | EPC      |
| 02H  | TID      |
| 03H  | User     |

Parameter 2: 1 byte, starting address addr. Unit: Bytes.

Parameter 3: 1 byte, length len. Unit: Bytes.

Parameter 4: 4 bytes, access password.

Return package: 4 parameters/no parameters.

Description: This instruction has multiple return packets. Every time a label is recognized, a return package is returned. After all label returns are completed, an empty package is returned to indicate that all label returns are complete. If the specified mem is not an EPC area, it will be accompanied by the data read from the selected area, namely parameter 3 and parameter 4.

Parameter 1: 1 bytes, EPC length epclen. Unit: Bytes.

Parameter 2: epclen bytes, representing the EPC number of the tag.

Parameter 3: 1 byte, data length datalen. Unit: Bytes.

Parameter 4: datalen bytes, specifying the data for the region.

Example: (The following data are all hexadecimal, omitting the suffix H)

Assuming that the label is listed with the specified member as the USER area, starting from address 0, list 6 bytes. If 2 labels are identified:

"EPC: 11112222, user: 55556666

Epc: 33334444, user: 77778888

Then three return packets are returned, and the parameters for each return packet are as

follows:

Return Package 1: F0 xx xx xx 80 04 11 11 22 04 55 66 66 check

Return Package 2: F0 xx xx xx 80 04 33 33 44 04 77 88 88 check

Return Package 3: F0 xx xx xx 80 check

## 81H Read 6C label

Function: Read a block of data at the beginning of the specified address in the specified data area on the specified label.

Command code: 81H

Command package: 6 parameters.

Description: The starting address and length must be an integer multiple of 2. If the tag does not have an access password set, simply pass 0. If writing an EPC area, it usually starts at address 2. If you want to rewrite the EPC length, you can start at byte 2. Its high 5bit is the PC value, indicating the length of the EPC. For example, if the content of the second byte is 0x30, its binary is 0011 0000, and its high 5bit is 00110, which is 0x06, then the length of the EPC is  $6 * 2$  bytes, which is 12 bytes, 96bit.

Parameter 1: One byte, select the label area mem. Refer to the 80H command.

Parameter 2: 1 byte, starting address addr. Unit: Bytes.

Parameter 3: 1 byte, read length len. Unit: Bytes.

Parameter 4: 4 bytes, access password.

Parameter 5: 1 byte, target label EPC length, epclen. Unit: Bytes.

Parameter 6: epclen bytes, EPC number of the target label.

Return package: 1 parameter.

Parameter 1: len bytes, read data.

## 82H Write 6C label

Function: Write a block of data at the beginning of the specified address in the specified data area on the specified label.

Command code: 82H

Command package: 6 parameters.

Description: The starting address and length must be an integer multiple of 2. If the label does not have an access password set, simply pass 0.

Parameter 1: One byte, select the label area mem. Refer to the 80H command.

Parameter 2: 1 byte, starting address addr to be written. Unit: Bytes.

Parameter 3: 1 byte, length len to be written. Unit: Bytes.

Parameter 4: 4 bytes, access password.

Parameter 5: 1 byte, target label EPC length epclen. Unit: Bytes.

Parameter 6: epclen bytes, EPC number of the target label.

Parameter 7: len bytes, data to be written.

Return package: No parameters.

## 83H Lock 6C label

Function: Write a block of data at the beginning of the specified address in the specified data area on the specified label.

Command code: 83H

Command package: 6 parameters.

Explanation: If the tag does not have an access password set, simply pass 0.

Parameter 1: One byte, select the region membank for listing labels.

| code | area                  |
|------|-----------------------|
| 01H  | USER                  |
| 02H  | TID                   |
| 03H  | EPC                   |
| 04H  | Visit password area   |
| 05H  | Destroy password area |

Parameter 2: 1 byte, lock type LockType.

| code | area                  |
|------|-----------------------|
| 00H  | open                  |
| 01H  | lock                  |
| 02H  | permanent development |
| 03H  | permanent lock        |

Parameter 3: 4 bytes, access password.

Parameter 4: 1 byte, target label EPC length epclen. Unit: Bytes.

Parameter 5: epclen bytes, EPC number of the target label.

Return package: No parameters.

## 84H Destroy 6C label

Function: Destroy a tag.

Command code: 84H

Command package: 3 parameters.

Explanation: If the label does not have a destruction password set, simply pass 0.

Parameter 1: 4 bytes, destroy password.

Parameter 2: 1 byte, target label EPC length epclen. Unit: Bytes.

Parameter 3: epclen bytes, EPC number of the target label.

Return package: No parameters.

## 85H EPC for writing 6C tags

Function: Write the EPC number of the label and automatically modify the EPC length of the label.

Command code: 85H

Command package: 5 parameters.

Explanation: The EPC length must be an integer multiple of 2. If the tag does not have an access password set, simply pass 0.

Parameter 1: 4 bytes, access password.

Parameter 2: 1 byte, original label EPC length oldlen. Unit: Bytes. If the parameter is 0, randomly write a label.

Parameter 3: oldlen bytes, original EPC number.

Parameter 4: 1 byte, new EPC length newlen. Unit: Bytes.

Parameter 5: newlen bytes, new EPC number.

Return package: No parameters.

## 86H Identify 6C tags and return RSSI

Function: When the reader works in command mode, the control machine can use this command to identify the 6C tag ID existing in the antenna radiation field range and return its signal strength. This instruction is a one-to-many instruction, that is, one command has multiple return packages.

Command code: 86H

Command package: no parameters.

Return package: 3 parameters/no parameters.

Description: This command has multiple return packages. Each time a tag is recognized, a return packet is returned. After the return of all tags is completed, an empty packet is returned to indicate that the return of all tags is completed.

Parameter 1: 1 byte, EPC length epclen. Unit: Bytes.

Parameter 2: 1 byte, the signal strength RSSI of the tag, which is of type int8\_t.

Parameter 3: epclen bytes, indicating the EPC number of the tag.

Example:

Assume that 2 tags are recognized when listing tags:

"epc:11112222,rssi:-46" //The hexadecimal number of -46 is D2H

"epc:33334444,rssi:-39" //The hexadecimal number of -39 is D9H

Then 3 return packages are returned, and the parameters of each return package are as follows:

(The following data are all in hexadecimal, and the suffix H is omitted)

Return package 1: F0 xx xx xx 86 04 D2 11 11 22 22 check

Return package 2: F0 xx xx xx 86 04 D9 33 33 44 44 check

Return package 3: F0 xx xx xx 86 check

## 90H List 6B labels

Function: List 6B labels.

Command code: 90H

Command package: No parameters.

Return package: 1 parameter/no parameter.

Description: This instruction has multiple return packages, with each label returning one return package. After all label returns are completed, returning an empty package indicates that all label returns are complete.

Parameter 1: 8 bytes, UID.

Example: (The following data are all hexadecimal, omitting the suffix H)

Assuming two labels are identified after listing them:

UID: 0102030405060708

UID: 0102030405060709

Then three return packets are returned, and the parameters for each return packet are as follows:

Return Package 1: F0 xx xx xx 90 01 02 03 04 05 06 07 08 check

Return Package 2: F0 xx xx xx 90 01 02 03 04 05 06 07 09 check

Return Package 3: F0 xx xx xx 90 check

## 91H Read 6B label

Function: Read 6B tags.

Command code: 91H

Command package: 3 parameters.

Parameter 1: 8 bytes, UID.

Parameter 2: 1 byte, read address.

Parameter 3: 1 byte, read length len.

Return package: 1 parameter.

Parameter 1: len bytes, read data.

## 92H Write 6B label

Function: Write 6B labels.

Command code: 92H

Command package: 4 parameters.

Parameter 1: 8 bytes, UID.

Parameter 2: 1 byte, write address.

Parameter 3: 1 byte, write length len.

Parameter 4: len bytes, data to be written.

Return package: No parameters.

## **93H Lock 6B label**

Function: Lock the 6B label.

Command code: 93H

Command package: 2 parameters.

Parameter 1: 8 bytes, UID.

Parameter 2: 1 byte, lock address.

Return package: No parameters.

## **1.6 High frequency protocol command**

### **70H List high-frequency tags**

Function: When the reader is working in command mode, the control machine can use this command to list high-frequency tags within the antenna recognition range. This instruction is a one-to-many instruction, meaning that a command has multiple return packets.

Command code: 70H

Command package: No parameters.

Return package: 3 parameters/no parameters.

Description: This instruction has multiple return packets. Every time a label is recognized, a return package is returned. After all label returns are completed, an empty package is returned to indicate that all label returns are complete.

Parameter 1: 1 bytes, high-frequency label type, as shown in the table below.

| code | Label<br>communication<br>protocol |
|------|------------------------------------|
| 41H  | Type-A<br>(ISO-14443A)             |
| 42H  | Type-B                             |
| 46H  | Type-F                             |
| 56H  | Type-V<br>(ISO-15693)              |

Parameter 2: 1 byte, label length len, unit: bytes.

Parameter 3: len bytes, label content.

Example: (The following data are all hexadecimal, omitting the suffix H)

Assuming two 15693 tags are identified when listing the tags, their UIDs are:

"UID1: 11112222 "

UID2: 33334444

The reader/writer will return three return packets, each of which is as follows:

Return Package 1: F0 xx xx xx 70 56 04 11 22 22 check//Label 1

Return Package 2: F0 xx xx xx 70 56 04 33 33 44 44 check//Label 2

Return package 3: F0 xx xx xx 70 check//End package

## **71H Read 15693 tags (4 bytes)**

Function: Read 15693 label data blocks, 1 data block with 4 bytes.

Command code: 71H

Command package: 4 parameters.

Parameter 1: 1 bytes, label UID length len, unit: bytes. If there is only one label near the antenna and len can be set to 0, there is no need to send parameter 2.

Parameter 2: len bytes, label UID.

Parameter 3: 1 byte, starting from which data block to read and numbering from 0.

Parameter 4: 1 byte, number of read data blocks.

Return package: 1 parameter.

Parameter 1: Several bytes, returning the content of the read data block.

## 72H Write 15693 tags (4 bytes)

Function: Write 15693 label data blocks. This instruction is used to write a single label data block, with 1 data block and 4 bytes.

Command code: 72H

Command package: 4 parameters.

Parameter 1: 1 bytes, label UID length len, unit: bytes. If there is only one label near the antenna and len can be set to 0, there is no need to send parameter 2.

Parameter 2: len bytes, label UID.

Parameter 3: 1 byte, write data block address.

Parameter 4: 4 bytes, write data.

Return package: No parameters.

## 76H Write 15693 label multiple blocks (4 bytes)

Function: Write 15693 label data blocks. This instruction can write multiple blocks, with 1 data block and 4 bytes.

Command code: 76H

Command package: 5 parameters.

Parameter 1: 1 bytes, label UID length len, unit: bytes. If there is only one label near the antenna

and len can be set to 0, there is no need to send parameter 2.

Parameter 2: len bytes, label UID.

Parameter 3: 1 byte, indicating which block to start writing from.

Parameter 4: 1 byte, indicating how many blocks of data to write,  $n \geq 0$ .

Parameter 5:  $n * 4$  bytes, representing the written data.

Return package: No parameters.

## 78H Read ISO15693 RFID tag

Function: read ISO15693 Protocol RFID data block

Command code: 78H

Command package: 5 parameters.

Parameter 1: 1 byte, label UID length len, unit: byte. If there is only one tag near the antenna, len can be set to 0, and parameter 2 does not need to be sent.

Parameter 2: len bytes, tag UID.

Parameter 3: 1 byte, which data block to start reading from, starting from 0.

Parameter 4: 1 byte, the number of read data blocks n.

Parameter 5: 1 byte, indicating how many bytes m are in a data block. Some tags are 4 bytes per block, some are 8 bytes per block, and some are 32 bytes per block. It needs to be determined according to the data manual of the tag chip.

Return package: 1 parameter.

Parameter 1:  $n * m$  bytes, returns the read data block content.

## 79H Write ISO15693 Protocol RFID tag data block

Function: Write ISO15693 RFID tag data block

Command code: 79H

Command package: 6 parameters.

Parameter 1: 1 byte, label UID length len, unit: byte. If there is only one tag near the antenna, len can be set to 0, and parameter 2 does not need to be sent.

Parameter 2: len bytes, tag UID.

Parameter 3: 1 byte, indicating which block to start writing from.

Parameter 4: 1 byte, indicating how many pieces of data to write,  $n \geq 0$ .

Parameter 5: 1 byte, indicating how many bytes m there are in a block. Some tags are 4 bytes per block , some are 8 bytes per block , and some are 32 bytes per block . It needs to be determined according to the data manual of the tag chip.

Parameter 6:  $n \times m$  bytes, indicating the written data.

Return package: no parameters.

## 73H Read 14443A label

Function: Read 14443A label data blocks, with one data block consisting of 4 bytes.

Command code: 73H

Command package: 4 parameters.

Parameter 1: 1 byte, label UID length len, unit: bytes. If there is only one label near the antenna and len can be set to 0, there is no need to send parameter 2.

Parameter 2: len bytes, label UID.

Parameter 3: 1 byte, starting from which data block to read and numbering from 0.

Parameter 4: 1 byte, read the number of data blocks n.

Return package: 1 parameter.

Parameter 1: Several bytes, returning the content of the read data block.

## 74H Write 14443A label

Function: Write 14443A label data blocks, with one data block consisting of 4 bytes. It should be noted that not all label chip areas are writable. For example, for NAT213 chips, blocks 0-3 are the factory parameters of the chip, so these areas are not writable.

| Page Adr |     | Byte number within a page |          |            |            | Description                             |
|----------|-----|---------------------------|----------|------------|------------|-----------------------------------------|
| Dec      | Hex | 0                         | 1        | 2          | 3          |                                         |
| 0        | 0h  | serial number             |          |            |            | Manufacturer data and static lock bytes |
| 1        | 1h  | serial number             |          |            |            |                                         |
| 2        | 2h  | serial number             | internal | lock bytes | lock bytes |                                         |
| 3        | 3h  | Capability Container (CC) |          |            |            | Capability Container                    |
| 4        | 4h  | user memory               |          |            |            | User memory pages                       |
| 5        | 5h  |                           |          |            |            |                                         |
| ...      | ... |                           |          |            |            |                                         |
| 38       | 26h |                           |          |            |            |                                         |
| 39       | 27h |                           |          |            |            |                                         |
| 40       | 28h | dynamic lock bytes        |          |            | RFUI       | Dynamic lock bytes                      |
| 41       | 29h | CFG 0                     |          |            |            | Configuration pages                     |
| 42       | 2Ah | CFG 1                     |          |            |            |                                         |
| 43       | 2Bh | PWD                       |          |            |            |                                         |
| 44       | 2Ch | PACK                      |          | RFUI       |            |                                         |

Command code: 74H

Command package: 4 parameters.

Parameter 1: 1 bytes, label UID length len, unit: bytes. If len is 0, there is no need to send parameter 2, and the reader/writer randomly accesses a 14443A label.

Parameter 2: len bytes, label UID.

Parameter 3: 1 byte, write data block address.

Parameter 4: 4 bytes, write data.

Return package: No parameters.

## 75H Select 14443A label sector

Function: Select the 14443A label sector, which defaults to the 0th sector. Some 14443A tags only have one sector and need to refer to the specifications of the tag chip.

Command code: 75H

Command package: 3 parameters.

Parameter 1: 1 bytes, label UID length len, unit: bytes. If there is only one label near the antenna and len can be set to 0, there is no need to send parameter 2.

Parameter 2: len bytes, label UID.

Parameter 3: 1 byte, sector number, starting from 0.

Return package: No parameters.

## **77H Write multiple blocks of 14443A tags**

Function: Write 14443A label data blocks, one data block is 4 bytes, and this instruction can write multiple blocks.

Command code: 77H

Command package: 5 parameters.

Parameter 1: 1 bytes, label UID length len, unit: bytes. If there is only one label near the antenna and len can be set to 0, there is no need to send parameter 2.

Parameter 2: len bytes, label UID.

Parameter 3: 1 byte, indicating which block to start writing from.

Parameter 4: 1 byte, indicating how many blocks of data to write,  $n \geq 0$ .

Parameter 5:  $n * 4$  bytes, representing the written data. 1 block contains 4 bytes, while n blocks represent  $4 * n$  bytes.

Return package: No parameters.

## 1.7 Status package

The data packet actively reported from the reader to the controller is called a status packet, and the host does not need to return a response to the status packet. All status packets are headed with F1H. The status packet is used by the reader to actively inform the controller of some data, such as automatically recognized label data, battery level, heartbeat, etc.

### 01H Automatic card reading data packet

Function: When the reader and writer automatically work, after recognizing the label, this status packet informs the control machine of the recognized label. According to the different card reading modes of the reader and writer, the reported parameters also vary, but they are all reported using JSON format. The main difference is that the triggered status is reported in the trigger mode.

Status code: 01H

Report parameters: The report parameters are in JSON format, and the JSON fields can be selected through the 2BH command. The meaning of each field in JSON is shown in the table below.

| field | significance                                                                                                                                                                          |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ant   | Indicates the antenna number that recognizes the tag, 1,2,3,4...                                                                                                                      |
| FIN   | Indicates which channel was triggered in the switch triggering mode, and its value may be [1,2,3]. This field is only reported in switch triggered mode.                              |
| Door  | Indicates the triggering direction in channel gate mode, from trigger 1 to trigger 2 as In, and from trigger 2 to trigger 1 as Out. This field is only reported in channel gate mode. |
| IP    | Indicates the IP address of the reader/writer                                                                                                                                         |
| EPC   | EPC or UID number representing the label                                                                                                                                              |

|         |                                                                                                                                       |
|---------|---------------------------------------------------------------------------------------------------------------------------------------|
| TID     | The TID number representing the label                                                                                                 |
| USER    | USER area data representing labels                                                                                                    |
| ID      | Indicates the device ID of the reader/writer                                                                                          |
| RSSI    | Indicates the signal strength of the label                                                                                            |
| TS      | Indicates the timestamp that recognized the label                                                                                     |
| TagType | Represents the type of label. 0x01--6C<br>0x02--6B<br>0x41--TypeA(ISO-14443A)<br>0x42--TypeB<br>0x46--TypeF<br>0x56--TypeV(ISO-15693) |
| Custom1 | Represents user defined field 1                                                                                                       |
| Custom2 | Represents user defined field 2                                                                                                       |
| Custom3 | Represents user defined field 3                                                                                                       |
| Custom4 | Represents user defined field 4                                                                                                       |
| Custom5 | Represents user defined field 5                                                                                                       |
| Temp    | When reading temperature labels, this field will be reported as a floating point number, indicating the label temperature             |

Example:

{"Ant": 1,/\* Identify the antenna number of the tag\*/

FIN: [1,2,3],/\* Trigger state\*/

Door: In,/\* Channel door direction\*/

IP: "192.168.0.255",/\* IP address of the reader/writer\*/

EPC ":" E00000001 ", EPC number of/\* tag\*/

TID: "E2003412",/\* TID number of the label\*/

"USER": "12345678",/\* labeled USER area data\*/

ID: "20190909",/\* Device ID of the reader/writer\*/

RSSI: -20,/\* Signal strength of the tag\*/

TS ": 1605684444,/\* timestamp when tag is recognized\*/

TagType: 1,/\* Tag type; 1-6C, 2-6B\*/

Customim1: 0a0b0c0d,/\* User defined field 1\*/

'Custom 2': '0a0b0c0d',/\* User defined field 2\*/

'Custom': '0a0b0c0d',/\* User defined field 3\*/

Customim4 ":" 0a0b0c0d ",/\* User defined field 4\*/

Customim5 ":" 0a0b0c0d ",/\* User defined field 5\*/

'Temp': 32.7/\* Temperature \*/}

## 02H UDP Broadcast Package

Function: The reader/writer regularly sends UDP broadcast packets to port 4444 in the local area network for device discovery and connection.

Status code: 02H

Reporting parameters: The reporting parameters are in JSON format, as follows.

{"IP": "192.168.0.122",/\* IP address of the reader/writer\*/

Port ": 1969,/\* port number of the reader/writer\*/

"DeviceType": "reader",/\* Device model of the reader/writer: The reader/writer model that can be set for customers\*/

ID: "1234567890",/\* Device ID number of the reader/writer\*/

RS485: 100,/\* reader/writer 485 address\*/

RS232Baud: 115200,/\* reader/writer 232 baud rate\*/

RS485Baud: 115200,/\* reader/writer 485 baud rate\*/

```
'ti': 0/* Internal management motherboard model of the company*/
```

```
}
```

## 03H Heartbeat

Function: The reader/writer regularly sends heartbeat packets to the connected link, and the content of the heartbeat packet is user-defined.

Status code: 03H

Reporting parameters: The reporting parameters are in JSON format, as follows.

```
{ "heartbeat": "12345678" }
```