User manual

for

ID01 UHF RFID Reader

Ver.	Data	reviser	Revision Description
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Introduction

ID01 UHF RFID Reader is a remote read-write module of IC card using non-contact UHF technology。The module use 7V power supply and it is easy to communicated by UART、RS485、USB.

Specification

- Max Working current: 200mA
- Max Output Power: 24dBm
- Working Distance: >30cm (effective distance with the antenna, tag and working environment related)
- Interface: UART、USB、RS485
- Support Baud Rate: 9600、19200、38400、57600、115200（kbps）
- Agreement: ISO18000-6C（EPC G2）
- Response time: read: less than 10ms per 8 bytes, write: less than 20ms per byte
- Operating Temperature: -20℃~+65℃
- Size:155mm*100mm

For ID01 UHF RFID Reader-RS485

- red: Input 7V/2A
- black: GND
- green: A end
- yellow: B end

For ID01 UHF RFID Reader-UART

- red: Input 7V/2A
- black: GND
- green: TX end
- yellow: RX end

For ID01 UHF RFID Reader-USB

Connect with USB port

Data transmission mode

1、communication frames format introduction

1）Format definition of Command frames

Data flow direction: host--------->reader

Command frame is the data frame for operating the reader, the format as follow:

Packet Type	Length	Command Code	Device Number	Command Data	.. .	Command Data	Command Data	Checksum
0xa0	n+3	1 byte	1byte	Byte 1		Byte n-1	Byte n	cc

Packet Type is the packet type field, the command frames packet type are fixed at 0xa0;

Length is the packet length field, it indicates the Length field latter frame' bytes;

Command Code is the command codes field;
Device Number is the device number field, when usercode, the device number, is 00, this command will be sent to group;
Command Data is the parameter field of command frames;
Checksum is checksum field, the provisions of checksum range is from packet type field to the last byte of parameter field . It' s need to compute the checksum to detect error after the module receives command frames.

2) Format definition of Response frames of reader command completion
Data flow direction: reader---------->host
Response frame of reader command completion is the data frame with immobilized length, the format as follow:

Packet Type	Length	Command Code	Device Number	Status	Checksum
0xe4	0x04	1 byte	1 byte	1 byte	cc

Packet Type is the packet type field, the command frames packet type are fixed at 0xe4;
Length is the packet length field, it indicates the Length field latter frame' bytes . And it are fixed at 0x04;
Command Code is the command codes field;
Device Number is the device number field, when usercode, the device number, is 00, this command will be sent to group;
Status is the status field, show the status or result after the reader complete the command by PC, the description as follow;
Checksum is checksum field, the provisions of checksum range is from packet type field to the last byte of parameter field . It' s need to compute the checksum to detect error after the module receives command frames.

SN.	value	name	description
1	0x00	ERR_NONE	Command complete
2	0x02	CRC_ERROR	CRC check error
3	0x10	COMMAND_ERROR	Illegal command
4	0x01	OTHER_ERROR	Other error

3) Format definition of Information frames sent by reader
Data flow direction: reader---------->host
Information frame is the data frame sent to host, such as used to send a tag to host, the format as follow:

Packet Type	Data length	Response Code	Device Number	Response Data	...	Response Data	Checksum
0xe0	n+3	1 byte	1 byte	Byte 1		Byte n	cc

Packet Type is the packet type field, the command frames packet type are fixed at 0xe0;
Length is the packet length field, it indicates the Length field latter frame' bytes;
Response Code is the information code field, the value selection determine the type of information;
Device Number is the device number field, when usercode, the device number, is 00, this

command will be sent to group;
Response Data is the field of the parameter in information frames;
Checksum is checksum field, the provisions of checksum range is from packet type field to the last byte of parameter field .It’s need to compute the checksum to detect error after the module receives command frames.

2、Detailed introduction of communication frames

1）EPC tag identification

Host send:

Reply	Data length	Command	Device Number	Checksum
Data0	Data1	Data2	Data3	Data5
A0	03	82	Usercode	Checksum

Test command: A0038200DB

If reader identifies failure, replay: (E40482) header, (00) usercode , (05) Status, (91) Checksum

If success:(E40482)头,(00) usercode , (01) antenna code ID (123400000000000000000010), (37) Checksum

2）EPC tag reading

Host send:

Reply	Data length	Command	Device Number	Memory position	Address	Reading Length	Checksum
Data0	Data1	Data2	Data3	Data4	Data5	Data6	Data7
A0	06	80	Usercode	MemBank	Addr	Length	Checksum

Test command: A0068000010201D6; Start from address 0x02 to read a one byte data.

Introduction of MemBank:

00	Reserved
01	EPC
10	TID
11	User

If the slave identifies failure, replay:E40480, (00) usercode, (05) Status, (93) Checksum

If success: E00880, (00) usercode, 01020112344E

E0 Frame Header;
08 Data length;
80 Command;
00 usercode;
01 Membank type;
02 Address;
01 Reading length;
1234 Read data;
4E Checksum。

3）EPC tag writing using single byte

Host send:

Reply	Data length	command	Device Number	Write Mode	Memory position	Address	Writing Length	Write data	Writing data	Checksum
Data0	Data1	Data2	Data3	Data4	Data5	Data6	Data7	Data8	Data9	Data10
A0	09	81	usercode	Write Mode	MemBank	Addr	01	D1	D2	Checksum

Test command: A009810000010201123 48C;;

If the slave identifies failure, replay:E40480, (00) usercode, (05) Status, (96) Checksum;

If success: E40480, (00) usercode, (00) Status, (9B) Checksum;

Status=00: written success;

Status=other value: written failure;

Addr: Effective range from 0x02 to 0x07

4) EPC tag writing using multiple bytes

Reply	Data length	command	Device Number	Write Mode	Memory position	Address	Writing length	Write data	Write data	Checksum
Data0	Data1	Data2	Data3	Data4	Data5	Data6	Data7	Data8	Data9	Data10
A0	07+ (Length*2)	81	Usercode	WriteMode	MemBank	Addr	Length	D1	D2 (Length)	Checksum

Test command: A0 0B 81 00 01 01 02 02 55 55 AA AA D0

If the slave identifies failure, replay:E0 04 81 (00) usercode (05) Status (96) Checksum

If success: E0 04 81 (00) usercode (00) Status (9B) Checksum

Status=00: written success

Status=other value: written failure

Notes: In Reserved area, addr>=0, and addr+Length<=4, otherwise the parameter error

Notes: In EPC area, addr+Length<=8, and ADDR>=2, otherwise the parameter error

Notes: TID area is read only

Notes: The data area based on the actual situation of the card, the maximum is eight words each time to write

5) Tag lock

Reply	Data length	command	Device Number	Password1	Password2	Password 3	Password 4	LOCK Type	Checksum
Data0	Data1	Data2	Data3	Data4	Data5	Data6	Data7	Data8	Data9
A0	08	A5	Usercode	PW1	PW2	PW3	PW4	LOCK Type	Checksum

LOCK Type introduction:

00: LOCK USER

01: LOCK TID

02: LOCD EPC

03：LOCK ACCESS
04：LOCK KILL
05：LOCK ALL
Other value：No lock
6）Tag unlock

Reply	Data length	command	Device Number	Password1	Password2	Password 3	Password 4	LOCK type	Checksum
Data0	Data1	Data2	Data3	Data4	Data5	Data6	Data7	Data8	Data9
A0	08	A6	Usercode	PW1	PW2	PW3	PW4	UNLOCK Type	Checksum

UNLOCK Type introduction：
00：UNLOCK USER
01：UNLOCK TID
02：UNLOCD EPC
03：UNLOCK ACCESS
04：UNLOCK KILL
05：UNLOCK ALL
Other value：No unlock
For example: Password is 12345678, unlock EPC area
Send A0 08 A6 00 12 34 56 78 02 9C
Returns：E4 04 A6 （00）usercode （00）Status （72）Checksum
Status=00：written success;
Status=other value：written failure;

（1）Kill EPC tag

Reply	Data length	command	Device Number	RFU	Password1	Password2	Password3	Password4	Checksum
Data0	Data1	Data2	Data3	Data4	Data5	Data6	Data7	Data8	Data9
A0	08	86	Usercode	00	PW1	PW2	PW3	PW4	Checksum

Test command：A0 08 86 00 00 12 34 56 78 BE
Returns：E4 04 86 (00) usercode (00) Status (92) Checksum
Status = 00：written success
Status = other value：written failure

（2）initialize EPC tag

Reply	Data length	command	Device Number	Checksum
Data0	Data1	Data2	Data3	Data4
A0	03	99	Usercode	Checksum

Test command：A0 03 99 00 C4
Returns：E4 04 99 (00)usercode (00)Status (7F)Checksum
Status = 00：written success;
Status = other value：written failure;

（3）read the software version of reader

Reply	Data length	command	Device Number	Checksum
Data0	Data1	Data2	Data3	Data4
A0	03	6A	Usercode	Checksum

Test command：A0 03 6A 00 F3

Returns： （E0 05 6A）Header， （00）usercode（ 05 56 ）Ver.，（56）Checksum

（4）Reset command frames of reader

Reply	Length	Command Code	Device Number	Checksum
A0	03	65	00	Checksum

After reader receives this command frames, return command completion frames first, reset then.

Test command：A0 03 65 00 F8

Returns：E4 04 65 usercode Status Checksum

Status=00：success

Status=other value：failure；

（5）stop reading tag

Reply	Length	Command Code	Device Number	Checksum
Data0	Data1	Data2	Data3	Data4
A0	03	A8	Usercode	Checksum

Test command:A0 03 A8 00 B5

Returns：E0 04 A8 usercode Status Checksum

Status=00：success

Status = other value：failure；

Notes：EPC tag operate in word; ISO18000-6B in byte

（6）restart tag identification function（effective in multi-tag mode）

Reply	Length	Command Code	Device Number	Checksum
Data0	Data1	Data2	Data3	Data4
A0	03	FC	Usercode	Checksum

Test command：A0 03 FC 00 61

Returns：E0 04 FC usercode Status Checksum

Status=00：success

Status= other value：failure；

（7）restart access data（effective in multi-tag mode）

Reply	Length	Command Code	Device Number	Checksum
Data0	Data1	Data2	Data3	Data4
A0	03	FF	Usercode	Checksum

Test command：A0 03 FF 00 5E

Returns：E0 04 FF 00 02 1B 00 00 12 34 AA AA 00 00 00 00 55 55 AA AA 01 67 FF 00 00 E2 00 05 11 11 18 02 73 00 00 02 9C 01 CB FF

The ‘12 34 AA AA 00 00 00 00 55 55 AA AA’ and ‘E2 00 05 11 11 18 02 73 00 00 02 9C ‘ are ID code。

（8）fast write tag

Reply	Data Length	Command Code	Device Number	Word length	Write data1	Write data2	Write data3	Write data4	Checksum
Data0	Data1	Data2	Data3	Data4	Data5	Data6	Data7	Data（4+2*WordLength）	Data（5+2*WordLength）
A0	4+2*WordLength	9C	Usercode	WordLength	D1	D2	D3	D（leng*2）	Checksum

For example: Write 2 words(1234 5678)in EPC area address 4,5

Orders：A0 08 9C 00 02 12 34 56 78 A6

Returns：E0 04 9C usercode Status Checksum

Status=00：success

Status=other value：failure;

（9）access data（effective in multi-tag mode）

Reply	Data Length	Command Code	Device Number	Checksum
Data0	Data1	Data2	Data3	Data4
A0	03	A6	Usercode	Checksum

Test code： A0 03 A6 00 B7

Returns：E0 04 A6 (00) usercode (01)TagCount (71)checksum

TagCount： sum of label data, if not, label for data 0;

Then upload label data.

（10）Designated EPC, read TID area

Reply	Data Length	Command Code	Device Number	EIP ID			Checksum
Data0	Data1	Data2	Data3	Data	。。。	Data15	Data16
A0	0F	AA	Usercode	00	。。。	72	D7

D4…D15 respectively is 00 02 25 56 52 65 85 74 12 36 65 72, is designated the EPC ID, a total of 12 bytes.

Host send：A0 0F AA 00 00 02 25 56 52 65 85 74 12 36 65 72 5B

If the slave identifies success, replay：E0 0C AA 00 00 01 3B F4 00 01 26 74 92 0D

E2 00 34 12 01 36 F4 00 is designated the EPC TID area, a total of 8 bytes.

If failure, replay：E4 04 AA usercode Status Checksum（如 E4 04 AA 00 05 69）

（11）write tag by multi-byte

(a0 XX AB ReaderAddr memtype startaddr wordlength d0 d1 d2 d3 d4 d5 d6 d7 checksum)

Reply	Data Length	Command Code	Device Number	Memory position	Address	Word length	Write data	Write data	checksum

Data0	Data1	Data2	Data3	Data4	Data5	Data6	Data7	Datan-1	Datan
A0	06+（WordLength*2）	AB	Usercode	MemBank	Addr	WordLength	D1	D（2*Word Length）	Checksum

Test code: A0 0E AB 00 03 00 04 11 11 22 22 33 33 44 44 4C

If the slave identifies failure, replay:E0 04 AB (00)usercode (05)Status (17) Checksum

If success, replay: E0 04 AB (00) usercode (00) Status (1C) Checksum

Status=00: written success

Status=other value: written failure

Notes: In Reserved area, addr>=0, and addr+Length<=4, otherwise the parameter error;

Notes: In EPC area, addr+Length<=8, and ADDR>=2, otherwise the parameter error;

Notes: TID area is read only;

Notes: The data area based on the actual situation of the card, the maximum is eight words each time to write;

Notes: a word = 2 bytes;

(12) control the BUZZER

Reply	Data Length	Command Code	Device Number	Buzzer control	Checksum
Data0	Data1	Data2	Data3	Data4	Data5
A0	04	B0	Usercode	BuzzerCtrl	Checksum

BuzzerCtrl=0: close beep sound when reading tag;

BuzzerCtrl=1: open beep sound when reading tag;

BuzzerCtrl>=2: sound beep once;

Test code: A0 04 B0 00 00 AC;

Slave returns: E0 04 B0 (00) usercode 00 68

E4 Frame header of response frame of reader command completion

04 Data length

B0 Buzzer control command

00 usercode Device Number

00 Status, 00 means control successful

68 Checksum

(13) control the RELAY

Reply	Data Length	Command Code	Device Number	Relay control	Checksum
Data0	Data1	Data2	Data3	Data4	Data5
A0	04	B1	Usercode	RelayOnOff	Checksum

RelayOnOff =0: close relay;

RelayOnOff =1: open relay;

Test code: A0 04 B1 00 00 AB;

Slave returns: E0 04 B1 (00) usercode 00 67

E4 Frame header of response frame of reader command completion

04 Data length

B1 Relay control command

00 usercode Device Number

00 Status, 00 means control successfully

67 Checksum

（14）Set baud rate

Reply	Data Length	Command Code	Device Number	Baud rate paraeter	Checksum
Data0	Data1	Data2	Data3	Data4	Data5
A0	04	A9	Usercode	SelectBaud	Checksum

Baud rate Setting command are A9

SelectBaud parameter are:

00 9600

01 19200

02 38400

03 57600

04 115200

Send command: a0 04 a9 00 04 af ;//set to 115200

The correct response when setting successful are : E4 04 A9 00 00 6F

Send command: a0 04 a9 00 00 b3 ;//set to 9600

The correct response when setting successful are: E4 04 A9 00 00 6F

Notes: If baud rate setting command set success, the return will still use the current baud rate to response, but next time the communication will reply with new baud rate;

3、The communication protocol of setting Reader parameter

1）stop working

Reply	Data Length	Command Code	Device Number	Checksum
Data0	Data1	Data2	Data3	Data4
0xa0	0x03	0x50	Usercode	Checksum（0x0e）

Send command: A0 03 50 00 D

Slave returns: (E4 04 50)header, (00) usercode (00) Status, (C8) Checksum

Status=00: success;

Status= other value: failure

2）query multiple reader setting parameter simultaneously

Reply	Data Length	Command Code	Device Number	count of queried parameter	Query the specified high address of parameter	Query the specified low address of parameter	Checksum
Data0	Data1	Data2	Data3	Data4	Data5	Data6	Data7
0xA0	0x06	0x63	Usercode	Length	Parameter address	Parameter address	Checksum

Test code: A0 06 63 00 05 00 20 D2 （Product ID check）

Slave returns: (E0 0B 63) header, (00) usercode, 05 00 20, (38 32 32 30 FF)parameter ,

(C2) Checksum

3) query single reader setting parameter

Reply	Data Length	Command Code	Device Number	count of queried parameter	Query the specified high order address of parameter	Query the specified low order address of parameter	Checksum
Data0	Data1	Data2	Data3	Data4	Data5	Data6	Data7
0xA0	0x05	0x61	Usercode	Length	Parameter address	Parameter address	Checksum

Test code: A0 05 61 00 00 65 95 (power check)

Slave returns: (E0 06 61), (00) usercode, 00 65, (96) parameter (BE) Checksum

4) set multiple reader setting parameter simultaneously

Reply	Data Length	Command Code	Device Number	count of queried parameter	Query the specified high order address of parameter	Query the specified low order address of parameter	Command			Check sum
Data0	Data1	Data2	Data3	Data4	Data5	Data6	Data7	...	Data E	Data F
0xA0	0x06+Length	0x62	Usercode	Length	Parameter address	Parameter address	01	...	01	Check sum

Data 7…Data E 分别是 01 04 10 40 00 01 02 01

Host send: A0 0E 62 00 08 00 92 01 04 10 40 00 01 02 01 FD (set frequency)

Slave returns: E4 04 62 (00) usercode (00) Status, (B6) Checksum

Status=00: success;

Status=other value: failure

5) set single reader setting parameter

Reply	Data Length	Command Code	Device Number	Query the specified high order address of parameter	Query the specified low order address of parameter	parameter need to be set	Checksum
0xA0	6	0x60	00	Parameter address(MSB)	Parameter address(LSB)	Parameter value	Checksum

Parameter address(MSB) is the high order address of parameter in EEPROM

Parameter address(LSB) is the low order address of parameter in EEPROM

Parameter value is the parameter need to be set

After receiving the command frame, the reader will write the setting parameter into EEPROM ,and returns the command completion frame

Test code：A0 06 60 00 00 65 96 FF （set power）

Slave returns： （E4 04 60）header，（00）usercode （00）Status，（B8）Checksum

Status=00：success；

Status= other value：failure

Arduino sample code

```
unsigned char StopReadCode[5] = {0xA0,0x03,0xA8,0x00,0xB5};//Stop reading the label code
unsigned char ResetCode[5]={0xa0,0x03,0x65,0x00,0xf8};//Reset code
unsigned char StopReadCodeCB[6]={0xe4,0x04,0xa8,0x00,0x00,0x74};//Stop reading code success and return the value
unsigned char ResetCodeCB[6]={0xe4,0x04,0x65,0x00,0x00,0xb3};//Reset code success and return the value
unsigned char data[6]={};
void setup()
{
  Serial.begin(9600);
}

void loop()
{
  int i;
  int n=1;
  delay(2000);
  while(n)
  {
    Serial.write(StopReadCode,5);
    if(Serial.available())
    {
      for(i=0;i<6;i++)
      {
        data[i]=Serial.read();
        delay(1);
      }
      for(i=0;i<6;i++)
      {
        if(data[i]==StopReadCodeCB[i])
          n=0;
        else
          n=1;
      }
    }
    delay(50);
  }
  n=1;
  while(n)
  {
    Serial.write(ResetCode,5);
    if(Serial.available())
```

```
    {
      for(i=0;i<6;i++)
      {
        data[i]=Serial.read();
        delay(1);
      }
      for(i=0;i<6;i++)
      {
        if(data[i]==ResetCodeCB[i])
          n=0;
        else
          n=1;
      }
    }
    delay(50);
  }
  While(1);
}
```