ER302 Communication Protocol

4. ERROR CODE

Error Code	Meaning
1	Baud rate error
2	Port error or Disconnect
10	General error
11	undefined
12	Command Parameter error
13	No card
20	Request failure
21	Reset failure
22	Authenticate failure
23	Read block failure
24	Write block failure
25	Write address failure
26	Write address failure

Note: If the function returns error code 1 or 2, then please run the port init function rf_init_com to reconnect the USB.

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5. Serial Protocol

If you need to development your own programs, you can use this protocol.

5.1. Communication Setting

The communication protocol is byte oriented. Both sending and receiving bytes are in hexadecimal format. The communication parameters are as follows,

Baud rate: 115200 bps (default)
Data: 8 bits
Stop: 1 bit
Parity: None

Flow control: None

5.2. Command Format

Data format		Binary HEX “hexadecimal”				
Data package						
Head	Length	Node ID	Function Code	Data …	XOR	

SEND DATA FORMAT:

	Data length (Byte)		X O R	S U M
Head	02	Fixed: 0xAA , 0xBB		
Length	02	There are several effective bytes that including XOR follows this column.	FF	00
Node ID	02	Destination Node Address Number. xx xx: Low byte first 00 00: Broadcast to each reader.	X	S
Function code	02	It will be transmission ability of each different command. Low byte frist	X	S
Data	00~D0	Data length is not fixed, according to its purpose.	X	S
XOR	01	XOR each byte from Node ID to Last Data byte with 0xFF.		S

RESPOND DATA FORMAT:

	Data length (Byte)		X O R	S U M
Head	02	Fixed: 0xAA, 0xBB		
Length	02	There are several effective bytes that including XOR follows this column.	FF	00
Node ID	02	Destination Node Address Number. xx xx: Low byte first 00 00: Broadcast to each reader.	X	S
Function code	02	It will be transmission ability of each different command. Low byte frist	X	S
Status	1	Reply result, if succeed is 0, other fail.		

Data	00~D0	Data length is not fixed, according to its purpose.	X	S
XOR	01	XOR each byte from Node ID to Last Data byte		S

NOTE: If from "Length" to "XOR" have a data is "AA" then should follow a data "0x00", but length don't changed.

While a command send and after 100ms no reply then consider this command failed.

5.3.0 COMMAND LIST

No.	Meaning	Code
1	Initialize port	0x0101
2	Set device node number	0x0102
3	Read device node number	0x0103
4	Read device Mode	0x0104
5	Set buzzer beep	0x0106
6	Set Led color	0x0107
7	RFU	0x0108
8	Set antenna status	0x010c
9	Mifare Request	0x0201
10	Mifare anticollision	0x0202
11	Mifare Select	0x0203
12	Mifare Hlta	0x0204
13	Mifare Authentication2	0x0207
14	Mifare Read	0x0208
15	Mifare Write	0x0209
16	Mifare Initval	0x020A
17	Mifare Read Balance	0x020B
18	Mifare Decrement	0x020C
19	Mifare Increment	0x020D
20	RF_UL_SELECT	0x0212
21	RF_UL_WRITE	0x0213

5.3.1. Initialize port：0x0101

Function：Set baud rate

Format： AA BB 06 00 00 01 01 "Baud_parameter" "xor Chk"

Baud_parameter：

0 = 4800;

1 = 9600;

2 = 14400;

3 = 19200;

4 = 28800;

5 = 38400;

6 = 57600;

7 = 115200;

Host Send to Reader Example：

Send： AA BB 06 00 00 00 01 01 03 03 //Set Baud Rate as 19200

Respond：AA BB 06 00 bf ff 01 01 00 40

5.3.2．Set device node number：0x0102

Host Send to Reader Example：

Send： AA BB 07 00 00 00 02 01 00 00 03 //Set device node number = 0x00 00

5.3.3．Read device node number：0x0103

Host Send to Reader Example：

Send： AA BB 05 00 00 00 03 01 02 //Read device node number

5.3.4．Read device Mode：0x0104

Function：Read device mode and version

Host Send to Reader Example：

Send： AA BB 05 00 00 00 04 01 05

Respond：AA BB 12 00 52 51 04 01 00 *59 48 59 36 33 32 41 2D 31 32 30 33* 11

"*59 48 59 36 33 32 41 2D 31 32 30 33*" is "YHY632A-1203"

5.3.5．Set buzzer beep：0x0106

Function：Beep

Format： AA BB 06 00 00 00 06 01 Delay XOR

Delay*10ms beep time, XOR is xor check

Host Send to Reader Example：

Send： AA BB 0600 00 0006 01 6463

Respond：AA BB060052 5106010004

5.3.6. Set Led color：0x0107

Host Send to Reader Example：

Send： AA BB 06 00 00 00 07 01 03 05 //Set Red&green LED on

Respond：AA BB 06 00 bf bf 07 01 00 06

Tenth data is LED parameter, function as below:

00 = LED_RED Off, LED_BLUE Off

01 = LED_BLUE On, LED_RED Off

02 = LED_BLUE Off, LED_RED On

5.3.7. Reader working status：0x0108，not use in this device

5.3.8. Antenna status：0x010c

Host Send to Reader Example：

Send： AA BB 06 00 00 00 0c 01 *00* 0D //Set antenna off 。

"*00*" is Antenna status parameter:

00 = Close Filed, 01= Open Filed

5.3.9. Mifare Request：0x0201

Function：Request Type a Card

Format： AA BB 06 00 00 00 01 02 req_code XOR

req_code: Request mode:

req_code: 0x52: request all Type A card In filed

req_code: 0x26: request idle card

Host Send to Reader Example：

Send： AA BB 06 00 000001 0252 51

Respond：AA BB 0800 52 51 01 02 00 *04 00* 04

TagType： 0x4400 = ultra_light

0x0400 = Mifare_One(S50)

0x0200 = Mifare_One(S70)

0x4403 = Mifare_DESFire

0x0800 = Mifare_Pro

0x0403 = Mifare_ProX

5.3.10. Mifare anticollision：0x0202

Function：Card anticollision

Format： AA BB 05 00 00 00 02 02 00

Respond：AA BB 0a0052 51 02 02 00 *46 ff a6 b8* a4

"*46 ff a6b8*" is card serial number

5.3.11．Mifare Select：0x0203

Function：Select card

Format： AA BB 09 00 00 00 03 02 xx xx xx xx XOR

Ninth to twelfth is card serial number 。

Host Send to Reader Example：

Send： AA BB 09 00 00 00 03 02 46 ff a6 b8 a6

Respond：AA BB 07 00 52 51 03 02 00 08 0a

5.3.12．Mifare Hlta：0x0204

Function：Hlta card

Host Send to Reader Example：

Send： AA BB 05 00 0000 04 02 06

Respond：AA BB 06 00 52 51 04 02 00 05

5.3.13．Mifare Authentication2：0x0207

Function：Authenticate Card

Format： AA BB xx 00 00 00 07 02 Auth_mode Block xx xx xx xx xx xx XOR

Auth_mode: Authenticate mode, 0x60: KEY A, 0x61: KEY B

Block: Authenticate block

Host Send to Reader Example：

Send： AA BB 0d 00 00 00 07 02 60 04 ff ff ff ff ff ff 61

Authenticate Block 4, Key A = "FF FF FF FF FF FF"

Respond：AA BB 0600 52 51 07 02 00 06

5.3.14．Mifare Read：0x0208

Function：Read block

Format： AA BB 06 00 00 00 08 02Block XOR

Block = which block want read

Host Send to Reader Example：

Send： AA BB 06 00 00 0008 02 040e

Respond：AA BB 16 00 52 51 08 02 00 00 00 00 00 00 00 00 00 00 00 00 00 12 34 56 78 01

Tenth to sixteenth byte is Data

5.3.15．Mifare Write：0x0209

Function：Write block

Format： AA BB 16 00 00 00 0902 Block D0 D1 D2 D3 D4 D5 D6D7 D8 D9 Da Db Dc Dd De Df XOR

Sample：Write data to Block4

Host Send to Reader Example：

Send： AA BB 16 00 00 00 09 02 04 00 00 00 00 00 00 00 00 00 00 00 00 00 12 34 78 56 07

Respond：AA BB 06 00 52 51 09 02 00 08

5.3.16．Mifare Initval：0x020A

Function：Initialize purse

Format： AA BB 0a 00 00 00 0a 02 Block V0V1V2V3 XOR

5.3.17．Mifare Read Balance：0x020B

Function：Read balance

Format： AA BB 06 00 00 00 0B 02 Block XOR Return four byte balance

5.3.18．Mifare Decrement：0x020C

Function：Decrease balance

Format： AA BB 0a 00 00 00 0c 02 Block V0V1V2V3 XOR

5.3.19．Mifare Increment：0x020D

Function：Increase balance

Format： AA BB 0a 00 00 00 0D02 Block V0V1V2V3 XOR

5.3.20．RF_UL_SELECT：0x0212

Function：Ultra Light select

Format： AA BB 05 00 00 00 12 02 10

5.3.21．RF_UL_WRITE：0x0213

Function：Ultra Light Write page

Format：AA BB 0A 00 00 00 13 02 page b0 b1 b2 b3 XOR

Example for NFC commands:

1)Request:

Send: AA BB 06 00 000001 02 52 51
Reply: AA BB 08 00 FF FF 01 02 00 44 00 47
2)Ul_Select:
Send: AA BB 05 00 00 00 12 02 10
Reply success: AA BB 0D 00 FF FF 12 02 00 04 A2 31 2A C5 29 80 C1
Reply failure: AA BB 06 00 FF FF 12 02 0A 1A
3)UlWrite:
Send: AA BB 0A 00 00 00 13 02 *08* 31 32 33 34 1D
Reply success : AA BB 06 00 FF FF 13 02 00 11

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