Bar code scanner communication protocol v2.12

For RTMU86/RTX200/RT820

This protocol support：

Ethernet TCP mode,
WIFI TCP mode,
485,232, TTL mode
(not compliant with Wiegand mode)

Setup different mode via the corresponding option in configuration tool

Note:

After using protocol to send commands to set up the scanner, when the scanner is powered off, the configuration content will be lost. If you want to configure it in the scanner for a long time, you need to use the configuration tool to generate the configuration code and scan the code to configure.

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1. Data transmission protocol

1.1 Request data format(upper–>scanner):

Command head + command word + length word + data filed + check word

Command head: two bytes, Default is 0X55, 0XAA, can be altered via configuration tool.
Command word: one byte.
length word: two bytes, indicate this command start from length word to check words'85 bytes (not include check word),low-order in front.
Data filed: this option can be 0.
Check word: Byte-by-byte XOR value from the command head to the last byte of the data field.

1.2 Response data format(scanner ->upper):

Command head + command word + identifier word+ length word + data field +check

Command head: two bytes, Default is 0x55， 0xAA Command head: one byte.
Identifier word： one byte, 0x00 means response successfully, others means defeated or error.

Length word： two bytes,indicate this command start from length word to check words' bytes (not include check word),low-order in front.

Data filed: this option can be 0.

Check word: Byte-by-byte XOR value from the command head to the last byte of the data field.

2. QR code scanner control request message

2.1 QR、DM、Barcode、NFC settings

Item	Byte	Instruction
Command word	1	0x21
Data field length	2	
Data field	1 or 2	Bit0： 1：enable QR recognition 0：disable QR recognition Bit1： 1：enable DM recognition 0：disable DM recognition Bit2： 1：enable barcode recognition 0：disable barcode recognition Bit3： 1：enable NFC recognition 0：disable NFC recognition
Check word	1	

For example:

55AA21010000DF	Clear all code selection
55AA21010001DE	QR
55AA21010002DD	DM
55AA21010003DC	QR,DM
55AA21010004DB	Barcode
55AA21010005DA	QR,Barcode
55AA21010006D9	DM,Barcode
55AA21010007D8	QR,DM,Barcode
55AA21010008D7	NFC
55AA21010009D6	QR,NFC
55AA2101000FD0	QR,DM,Barcode NFC

When bit2=1, the data length can be 2 bytes (the original data is the first byte in front), and the bar code is represented from bit4~bit15:

bit4: EAN8, bit5: EAN13, bit6: ISBN13, bit7: code39

The second byte：

bit0: code93, bit1: code128, bit2: DATABAR, bit3：BAR_EXP, bit4: pdf417, bit5: itf, bit6: ISBN10, bit7: UPCE

e.g: open EAN8

55 AA 21 02 00 14 00 c8

Note：

Some PC-side test tools send instructions require spaces between each byte, and some can't have spaces, depending on the test tool.

Instruction format with spaces added： 55 AA 21 01 00 00 DF(this format used for TCP & UDP test tool)

Instruction format without spaces: 55AA21010000DF

2.2 Scan code working mode setting

Item	Byte	Instruction
Command word	1	0x22
Data field length	2	
Data field	1	0x01：normal mode(output all scan code content) 0x02：one-shot mode (the same code can be output one time) 0x03：interval mode(The same code at a certain time output only once in the same time interval)
Check word	1	

For example:

55AA22010001DD normal mode

55AA22010002DE one-shot mode

55AA220300030200DF interval mode(2 sec)

2.3 Buzzer and LED action time interval setting after scan code success (Change the interval time in interval mode)

Item	Byte	instruction
Command word	1	0x23
Data field length	2	
Data field	2	Time interval code (milliseconds, range 0~60000), low-order in front 0x00 0x00：0ms 0xF4 0x01：500ms 0xE8 0x03：1000ms 0xD0 0x07：2000ms … 0x60 0xEA：60000ms
Check word	1	

For example:

55 AA 23 02 00 F4 01 2B time interval(500ms)

2.4 LED behavior configuration after scan code success

Item	Byte	instruction
Command word	1	0x24
Data field length	2	
Data field	3	0：off 1：on bit 0： enable white light bit 1： enable red light bit 2： enable green light bit 3： enable blue light
Check word	1	

For example:

55 AA 24 01 00 00 DA Light off
55 AA 24 01 00 01 DB enable white light
55 AA 24 01 00 02 D8 enable red light
55 AA 24 01 00 04 DE enable green light
55 AA 24 01 00 08 DA enable blue light

55 AA 24 01 00 03 D9 enable red and white light
55 AA 24 01 00 05 DF enable green and white light
55 AA 24 01 00 06 DC enable green and red light
55 AA 24 01 00 03 D9 enable red and white light

2.5 Buzzer behavior configuration after scan code success

Item	Byte	instruction
Command word	1	0x25
Data field length	2	
Data field	1	0：Buzzer OFF 1：Buzzer ON
Check word	1	

For example:

55 AA 25 01 00 01 DA beeper on
(The beeper will automatically turn off after some time,it can be configured via "beeper delay" in configuration tool)
55AA25010000DB beeper off

Note:

0x24 & 0x25 is configuration command, can not and no need to call frequently, after the configuration is success, even restart the device it will remember the status of last time, the same function as "scanning behavior " in configuration tool, if you want active control the beeper and LED light yourself, you need to send 0*24 and 0*25 command or turn off the automatically control in configuration tool, and then

Send 0x04 command to control the device behavior

2.6 device status enquiry

Item	byte	instruction
Command word	1	0x01
Data field length	2	
Data field	0	No
Check word	1	

For example:

Send： 55 AA 01 00 00 FE

Answer : 55 AA 01 00 02 00 55 AA 03

the fourth place 00 shows the device is normal, others means not.

2.7 Get device ID (Need to configure the ID via configuration tool in advance)

Item	byte	instruction
Command word	1	0x02
Data field length	2	
Data field	0	no
Check word	1	

For example:

Send：55 AA 02 00 00 FD

Answer:55 AA 02 00 04 00 **80 00 00 00** 79

The red part represent device id, low order in front， **80000000** represent device id is 128 the fourth place 00 show device is normal, others means not.

2.8 LED light and beeper control

Item	byte	instruction	
Command word	1	0x04	
Data field length	2		
Data field	5	1Byte	switch：0 off，1 enable bit 0： reserved bit 1： enable red light bit 2： enable green light bit 3： enable beeper Bit 4: enable blue light
		1Byte	The times of enable
		1Byte	Duration time (unit 50MS)
		1Byte	Interval time (unit 50MS）
		1Byte	Reserved
Check word	1		

For example：

Each flashing 0x50*50ms (decimal 80ms) interval 0x0A*50 ms (hexadecimal 10)

- *55 AA 04 05 00 02 03 50 0A 00 A5* Control the red light to flash three times for 4 seconds
- *55 AA 04 05 00 08 03 50 0A 00 AF* buzzer sounds three times for 4 seconds
- *55 AA 04 05 00 04 03 50 0A 00 A3* Control the green light to flash three times for 4 seconds
- *55 AA 04 05 00 06 03 50 0A 00 A1* red and green flashes three times for 4 seconds
- *55 AA 04 05 00 0E 03 50 0A 00 A9* The traffic light buzzer will act three times, the time is 4 seconds
- *55 AA 04 05 00 0A 03 50 0A 00 AD* Red light buzzer action, time 4 seconds
- *55 AA 04 05 00 0C 03 50 0A 00 AB* Green light Buzzer action, time 4 seconds

2.9 On and off code scanning function：

Item	byte	Instruction
Command word	1	0x05
Data field length	2	
Data field	1	1 means off,0 means on

For example:

55 aa 05 01 00 01 fa off code scanning function

55 aa 05 01 00 00 fb open code scanning function

2.10 Open key value reporting function

Item	Byte	instruction
Command word	1	0x06
Data field length	2	
Data field	1	Byte 1 : 0x01 ON 0x00 OFF
Check word	1	

For example:

55 AA 06 01 00 01 F9 Turn on the key value reporting function:

55 AA 06 01 00 00 F8 Turn off the key value reporting function:

2.11 Relay control

Item	Byte	instruction
Command word	1	0x2a
Data field length	2	
Data field	2	Byte 1 : 0x01 ON 0x00 OFF Byte 2 ： Duration (unit: 50MS) 0x00: Default time
Check word	1	

For example:

55 aa 2a 02 00 01 02 d4 Relay ON 100ms

55 aa 2a 02 00 00 02 d5 Relay OFF

3. QR code scanner scanning feedback message

3.1 Get scanning feedback under command mode (QR code & NFC)

Item	byte	instruction
Command word	1	0x30
Data field length	2	
Data field	Uncertain length	
Check word	1	

Under command mode:

If there is no data then back： 55 aa 30 00 00 00 cf

If there is QR code scanning data or card swiping data then back to the result；

For example：

QR code scanning result：

01DG50KXYAVQEFDgMGDAE/7kGFJto1xiar

Back：

55 AA 30 00 22 00 30 31 44 47 35 30 4B 58 59 41 56 51 45 46 44 67 4D 47 44 41 45 2F 37 6B 47 46 4A 74 6F 31 78 69 61 72 9C

3.2 Scan result upload mode

Item	Byte	Instruction
Command word	1	0x31
Data field length	2	
Data field	2	0: Command mode 1: Active mode 1byte 0x00: Command mode 0x01: Active reporting mode 2byte: In command mode, waiting timeout time, unit: 50MS 0x00 : 50MS 0x01: 50 * 2 MS
Check word	1	

For example：

55 AA 31 01 00 01 CE Active mode

55 AA 31 01 00 00 CF CMD mode

55 AA 31 02 00 00 0a C6 Set to command mode, wait for the timeout interval to be 10*50ms

2 White list setting

Note: The white list stores the NFC positive sequence card number without prefix and suffix

4.1 setting admin password：

Item	Byte	Instruction
Command word	1	0x40
Data field length	2	
Data field	32	Defaulted 1234567887654321
Check word	1	

For example：

setting the password as 1996049520111111

55 AA 40 20 00 31 32 33 34 35 36 37 38 38 37 36 35 34 33 32 31 31 39 39 36 30 34 39 35 32 30 31 31 31 31 31 31 a2

Note:

A. **This password can be used to open the scan code edit white list function**

Scan certain QR code via scanner, can open the edit white list function, after that all the card swiped will be added to white list automatically, or delete from white list automatically

B. **If this function need to be ended, need to scan the end code**

C. **For more details see < white list configure admin tool >**

D. **If this function is needed,the initial password must be changed via this command, the initial password can not used to open the scan code edit white list function.**

4.2 enable white list function

Item	Byte	Instruction
Command word	1	0x41
Data field length	2	
Data field	1	0： off the white list filter function (default) 1: open the white list filter function
Check word	1	

For example：

55 AA 41 01 00 00 bf off the white list filter function

55 AA 41 01 00 01 be open the white list filter function

4.3 add white list card number

Item	Byte	Instruction
Command word	1	0x42
Data field length	2	
Data field	8	store unsigned long data（card number）
Check word	1	

For example：

55 AA 42 08 00 09 09 00 00 00 00 00 00 b5

Add the card with the card number 2312 to the white list

4.4 delete white list card number

Item	Byte	Instruction
Command word	1	0x43
Data field length	2	
Data field	8	Store unsigned long data
Check word	1	

For example：

55 AA 43 08 00 09 09 00 00 00 00 00 00 b4

Delete card with card number 2312 from white list

4.5 delete all white lists

Item	Byte	Instruction
Command word	1	0x44
Data field length	2	

Data field	0	No
Check word	1	

For example：

55 AA 44 00 00 bb　　All white lists on the card will be deleted at one time, use with caution

5. NFC module option (only for RTX200 series)

RTMU86 can only read NFC Card UID number, and RTX200 can read both UID and content from card sector.

5.1 set NFC module into command read-write mode

NFC module have 3 working modes,

Mode 1: always in command mode	Mode 2: always in active upload mode	Mode3: the device will active upload card number first, and then change into command mode automatically, the users can do card reading and writing operations

Note：

If the NFC switch has been turn on, can swipe card to test directly

If the NFC switch not turn on, need to use the configuration tool to open, and then restart,in this case the corresponding card swiping command in this protocol can be used

Data sending format：

Item	Byte	instruction
Packet head	2	Default 0x55 0xAA
Command word	1	0x53
Data field length	2	1 fixed
Data field	1	0x01： module enter command mode 0x00： module quit command mode
Check word	1	

Open command mode: 55 AA 53 01 00 01 ac
Off command mode: 55 AA 53 01 00 00 ad

In mode 3, after the device upload the card number, it will enter into command mode automatically, and then this card can be read and write. When finish read and write, it need to send command to turn off command mode, or the next time can not upload card number when swipe card

Answer data format：

Item	Byte	Instruction
Packet head	2	Defaulted 0x55 0xAA
Command word	1	0x53
Data field length	1	0x00： success Others: fail or no card
Data field	2	Length is 0
Check word	1	

Note：
only in command mode,NFC will response operation like read and write, and only when the command mode was turned off, it will upload card number actively when swiping card

5.2 read Mifare One card's data via NFC module

Send data format：

Item	Byte	Instruction		
Packet head	2	Defaulted 0x55 0xAA		
Command word	1	0x51		
Data field length	2	8 fixed		
Data field		Key type	1Byte	0x60 indicate A Key authentica 0x61 indicate B Key authentication；
		Block number	1Byte	S50 card is 0~63 S70 card is 0 ~255（no）
		key	6Byte	
Check word	1			

E.: 55 AA 51 08 00 60 21 000000FFFFFF 18 E.: 55 AA 51 08 00 60 25 000000FFFFFF 1C
(Read the specific test card 6th sector 02 block）

Answer data format:

Item	Instruction
Packet head	Defaulted 0x55 0xAA
Command word	0x51
Identification word	0x00: success Others: fail or no card
Data field length	If successful, the length is 16, and the length of the failure is 0.
Data field	Return block data
Check word	

Failed or no card: 55 AA 51 FF 00 00 51
Success : 55 AA 51 00 10 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 BE

5.3 write data to a certain block of Mifare One card via NFC module

Data sending format:

Item	Byte	Instruction		
Packet head	2	Defaulted 0x55 0xAA		
Command word	1	0x52		
Data field length	2	Fixed 24(0x18)		
Data field	24	Key type	1Byte	0x60 indicate A Key authentica 0x61 indicate B Key authenticat
		Block number	1Byte	S50 card is 0~63 S70 card is 0 ~255（no）
		key	6Byte	
		Data	16Byte	Write data
Check word	1			

For example:
55 AA 52 18 00 60 20 000000ffffff 333435363738394041424344454647 48 70
55 AA 52 18 00 60 25 000000ffffff 123456789012345678901234567890 12 85
（Write a specific test card 6th sector 02 block123456789012345678901234567890 12）

Data answer format：

Item	Byte	Instruction
Packet head	2	Defaulted 0x55 0xAA
Command word	1	0x52
Identification word	1	0x00：success others: fail or no card
Data field	2	Fixed 0
Check word	1	

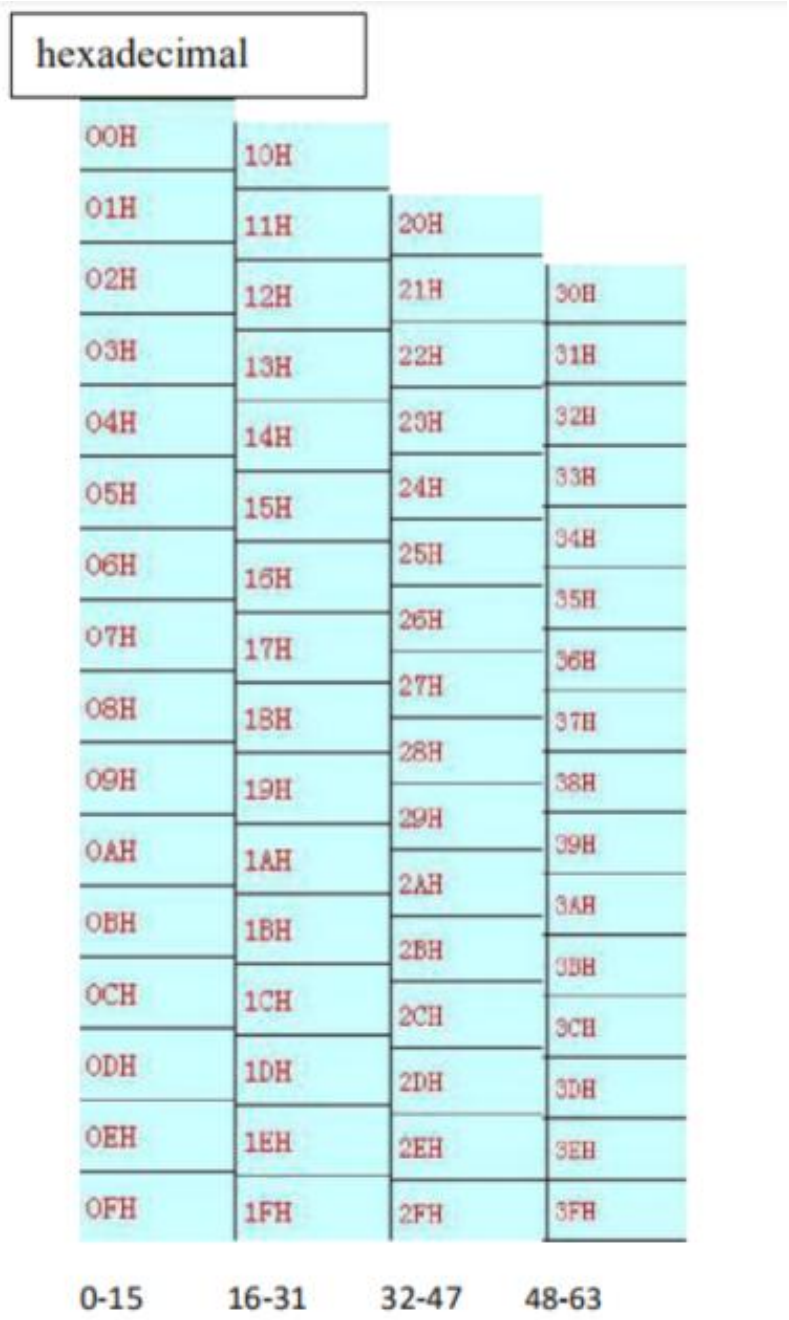
fail or no card：55 AA 52 FF 00 00 52
success：55 AA 52 00 00 00 AD

Note:

Be careful when writing the key block (the last block of each sector), otherwise it may cause the sector to fail. Please refer to the card manual for specific usage precautions.。

The debugging assistant sends the hexadecimal number and the block number to 64 blocks, which are:
(can be replaced with the red number above)

Appendix



For any further technical support, please contact: support@rtscan.net