RFID

SMART RFID MODULE

YHY521X RFID module

RFID/NFC Reader/Writer Module

User manual

Version 1.0
June, 2018

CONTENT

1. Introduction

This document describes the functionality of the contactless reader/writer YHY521X. It includes the functional and electrical specifications.

2. General description

The YHY521X is a highly integrated reader/writer for contactless communication at 13.56MHz.The YHY521X reader supports ISO14443A/ MIFARE® mode.

The module provides a robust and efficient implementation of a demodulation and decoding circuitry for signals from ISO/IEC 14443A/ MIFARE® compatible cards and transponders. The digital part handles the complete ISO/IEC 14443A framing and error detection(Parity & CRC).

In the master mode, YHY521X will seek the card or data itself and output to host automatically.

In the slave mode, the module just needs only one command to perform one action, such as read or write data from card's block. The user does not need input three steps : request, anticollision and selection. The module will do this function for you automatically. What you need is just to send one command to the module. Then it will send back what you want. Anything is just so simple and so easy. Also, if there is any card goes into the RF field, the red led on the module will light and the SIG pin will change from "1" to "0" to indicate the event.

Host interface : Serial UART(RS232 TTL level).

3. Features

- Can detect UID clone card
- Small size and external antenna
- Auto scan for presence of tags in and out and upload data
- NFC NDEF text commands
- Encrypted EEPROM to store up to 40 groups of keys
- Contactless operating frequency 13.56 MHz
- Supports ISO14443A ,Mifare® Classic1K,Mifare® UltraLight, NTAG213
- RS232(TTL) Interface, baud rate up to 230400bps,default 19200bps
- Typical Operating Distance: 0 ~4cm
- Operating Voltage ： DC 3.3V
- 1 LED indicator

▲ Size: 42mm × 26mm × 6mm

▲ Weight:8g

4. Application information

YHY521X can be use on vending or game machine, secure access, parking, payment, ticketing, leisure, member ship, time & attendance, biometrics, IT-access, Identify, loyalty, Counter, data storage and fast data collection systems.

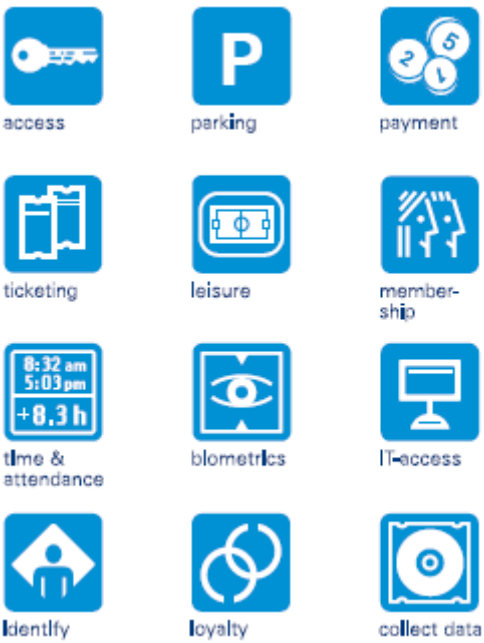

Figure 1. YHY521X Applications

5. Quick reference data

Table 1: Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CC}	Supply voltage	GND=0V	2.7	3.3	3.6	V
I_{HPD}	Hard Power-down Current		-	-	10	uA
I_{ASD}	Antenna Soft-down	V_{CC} =3.3V		15	20	mA
I_{VCC}	Supply Current	V_{CC} =3.3V		43	65	mA
D_{RW}	Read/Write card Distance	V_{CC} =3.3V	0		60	mm
T_{amb}	Operating ambient temperature		-25		+85	℃

6. Ordering Information

Table 2: Ordering Information

Model Number	Name
YHY521X	RFID module

7. Block diagram

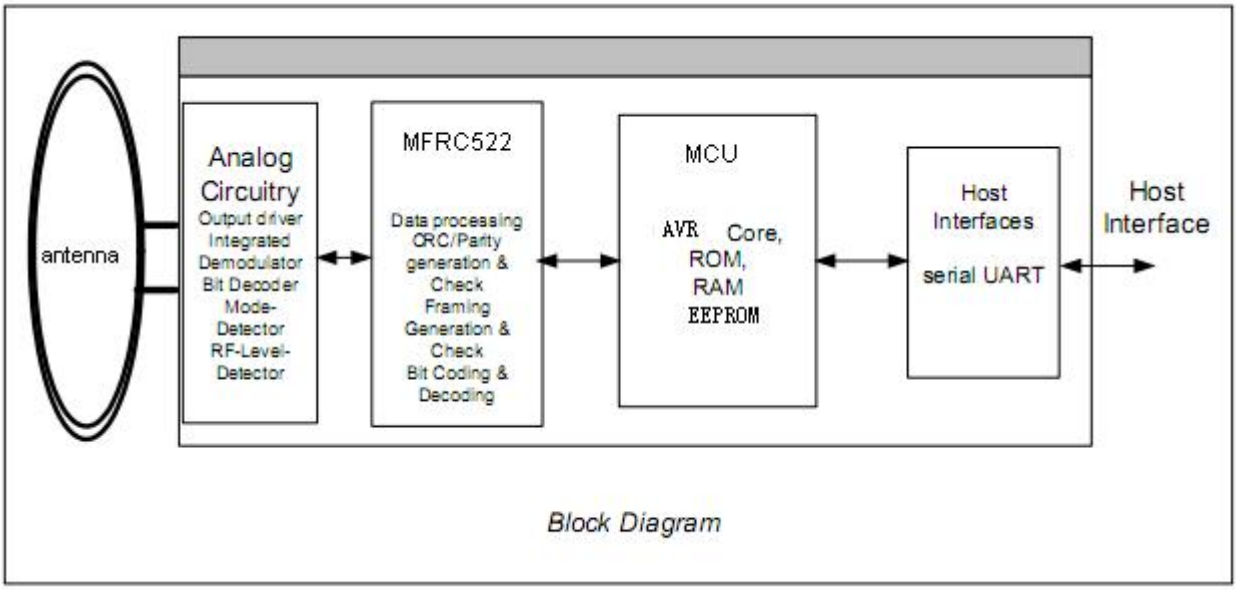

Figure 2. Simplified YHY521X Block diagram

The Analog circuitry and MFRC522 handle the modulation and demodulation RFID signal.

The MCU handles the protocol requirements for the communication schemes including the RF base protocols as well as the protocols for host communication.

8. Pinning information

8.1 Pining

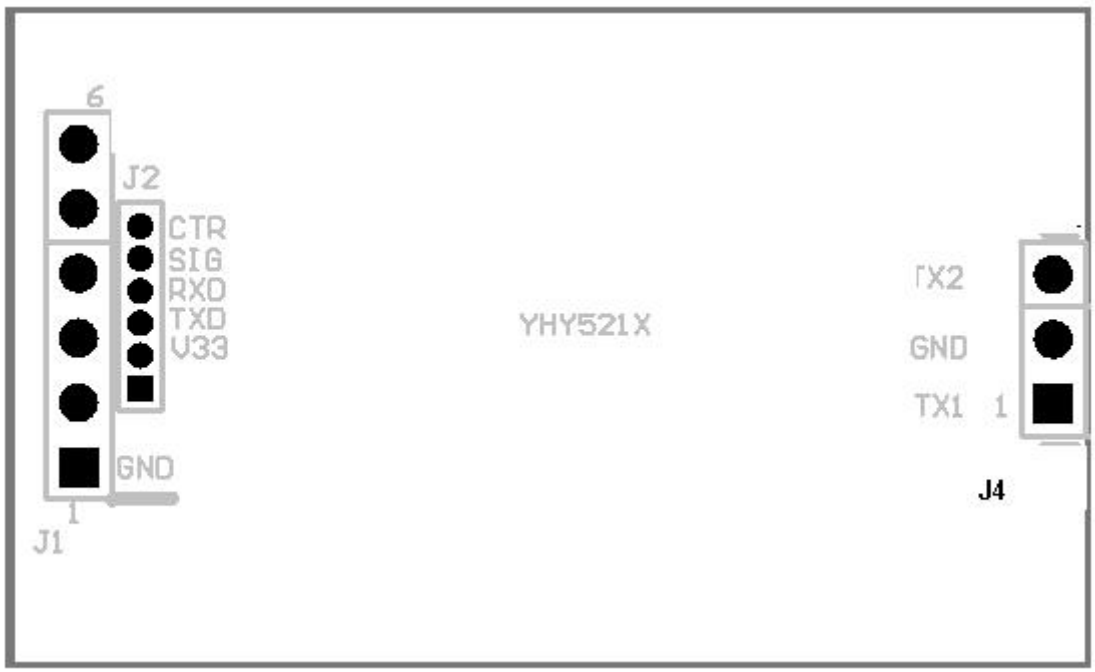

Figure 3 – Pinning configuration

8.2 Pin description

Table 3: J1/2 Pin description

Pin	Symbol	Type	Description
J1-1	GND	PWR	Power supply Ground
J1-2	V_{CC}	PWR	Power supply, 3.3V DC
J1-3	TXD	O	Uart Transmitter
J1-4	RXD	I	Uart Receiver
J1-5	SIG	O	Interrupt output, LOW level indicates card in the field
J1-6	RFU	O	Reserved For Use

J4 used for connect to external antenna.

9. Functional description

YHY521X supports the Reader/Writer mode for ISO/IEC 14443A/MIFARE card.

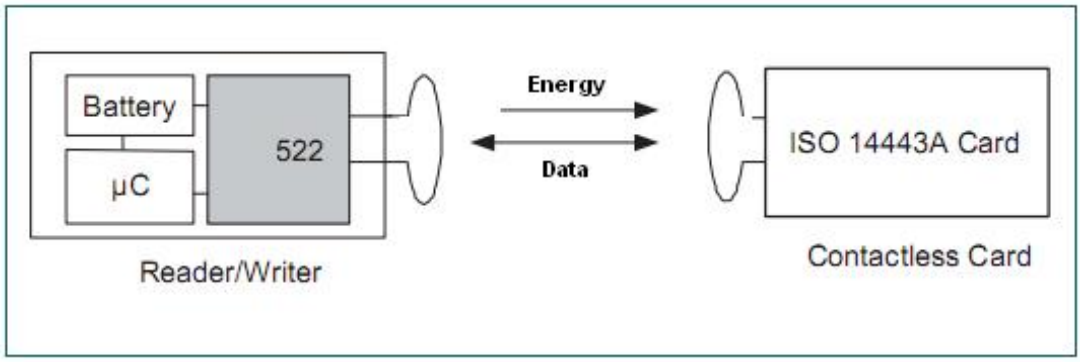

Figure 4 – YHY521X Reader/Writer mode

10. Digital interface

10.1 UART Interface

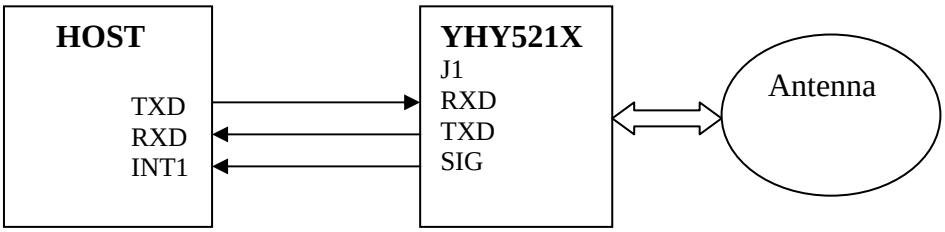

Figure 5 – YHY521X UART interface to host

The YHY521X supports direct interfacing serial UART interface type(J1). It is similar to RS232 with voltage levels according pad voltage supply.

10.2 Slection of the transfer speeds

The default transfer speed is 19200bps(19.2 k bit/s).

To change the transfer speed, the host controller has to write a value for the new transfer speed by the **CONFIG** command, after reset the module, the new speed will active.

Table 5: Selectable transfer speeds

Transfer Speed [kbit/s]	Configure Code
2.4	1
4.8	2
9.6	3
14.4	4
19.2	**5**
38.4	6
57.6	7
115.2	8
230.4	9

10.3 Transfer Protocol

The original setting for the host and YHY521X communicates at 19200bps, N, 8, 1.

In the slave mode, the host first sends the command and the module executes the operation and replies with a response to the command. The host can analyze the reply to check if the operation was successful or if any error occurred during the operation.

10.3.1 Host to YHY521X Transfer Protocol

Table 5. UART frame send by host

Header	Length	Command	Data	CSUM
2 Byte	1 Byte	1 Byte	N Bytes	1 Byte

1. Header: This header has 2 bytes that indicates the beginning of a frame. These 2 bytes should be always 0xAA 0xBB.

2. Length: This byte is used to indicate the length of the payload data. This includes the Length, Command and the Data bytes.

3. Command: This byte is used to instruct the module on what operation to perform.

4. Data: These are parameters for the module to execute the command. For example, for a Read command, the data will be the block number to be read and the authenticated key. For a Write command, this will be the block number and the authenticated key and 16 bytes data to write into the block. For other command, it maybe empty.

5. CSUM: This is the checksum byte. This byte is used on the host as well as the module to check the validity of the packet and to trap any data corruption. This is calculated by **XOR** all the bytes in the packet except the Header and the CSUM byte.

CSUM=Length ⊕ Command ⊕ Data[0] ⊕ Data[1]… ⊕ Data[n-1]

Note: If there is one byte "0xAA" in the packet data from Length to CSUM，please insert one byte "0x00" after "0xAA",but the Length need not change.

Code example:

```
//-------------------------------------------------
if (cSendBuffer[i] == 0xAA)
{
        TI = 0;
        SBUF = 0;
        while (!TI);
}
//-------------------------------------------------
```

10.3.2 YHY521X to Host Transfer Protocol

Table 6. UART frame send by YHY521X

Header	Length	Status	Data	CSUM
2 Byte	1 Byte	1 Byte	N Bytes	1 Byte

1. Header: This header has 2 bytes that indicates the beginning of a frame. These 2 bytes should be always 0xAA 0xBB.

2. Length: This byte is used to indicate the length of the payload data. This includes the Length, Command and the Data bytes

3. Status: This is the status for which the response is being sent back. If ok then the module return the command which host has sent, if failure it return the

ones-complement code. For example, the command is 0x19, then the ones-complement code is 0xe6.

4. Data: This contains the result data if an operation was successful. It may be empty.

5. CSUM: This is the checksum byte. This byte is used on the host as well as the module to check the validity of the packet and to trap any data corruption. This is calculated by **XOR** all the bytes in the packet except the Header and CSUM byte.

CSUM=Length ⊕ Command ⊕ Response[0] ⊕ Response[1] ⊕ … ⊕ Response[n-1]

11. Interrupt Request System

The YHY521X indicates certain events by pin SIG. If activated, the signal on pin SIG maybe used to interrupt the host using its interrupt handling capabilities. This allows the implementation of efficient host software.

In the auto seek mode, if detect a card into the RF field, the SIG pin will output “0”, else it will be “1”.

12. Antenna Power

12.1 Antenna Power

You can send command Antenna-control to close the RF power and this will save some power for the module. After switch off the antenna power, the module will not read the RFID cards anymore until you send the command to switch the antenna power on.

13. External antenna

The YHY521X module needs to connect to an external antenna to read and write the RFID tags.

You can connect it to a PCB antenna or metal coil antenna. Big or small antenna is ok if it can match the RF driver.

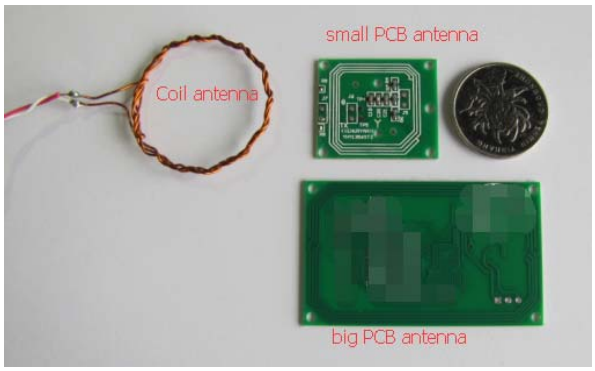

Figure 6 –external antenna

14. YHY521X Command Set

14.1 Commands overview

The commands for the YHY521X include system commands and RFID commands.

The system commands are used for controlling the module settings and save parameters to the EEPROM.

The RFID commands are used to operate the RFID card, such as read or write sector's data.

Table 8: Command list

Code	Command	Description
SYSTEM COMMANDS		
0x04	MConfigure	Configure parameters to the module
0x05	Download_Keys	Download auth keys to the module
0x11	Antenna_Control	Control Antenna on or off
0x13	Sense_Mode	Set Auto Sense Mode
RFID COMMANDS		
0x12	Card_Sleep	Card Sleep(Halt)
0x19	Card_Type	Read Card Type
0x20	Card_ID	Read Card UID
RFID M1 S50 commands		
0x0c	Detect_Clone	Detect a clone card
0x21	Block_Read	Read Data From Card Block, 16 bytes
0x22	Block_Write	Write Data Into Card Block, 16 bytes
0x23	Value_Init	Initialize block data to Value format, 4 bytes
0x24	Value_Read	Read Value, 4 bytes
0x25	Value_Inc	Increase Value, 4 bytes, Low Byte First
0x26	Value_Dec	Decrease Value, 4 bytes, Low Byte First
0x27	Value_Backup	Backup Value to Another Block
0x2a	Sector_Read	Read One Sector
0x2b	Sector_Write	Write One Sector
NFC NTAG213 commands		
0x28	**Pages_Read_UL**	Read out 4 pages of the UL data,
0x29	**Page_Write_UL**	Write in 4 bytes data into 1 page to the UL chip
0x40	**Ntag_Read_Text**	Read NFC text from NTAG chip
0x41	**Ntag_Write_Text**	Write NFC text into NTAG chip
0x42	**Ntag_Read_URL**	Read NFC URL from NTAG chip
0x43	**Ntag_Write_URL**	Write NFC URL into NTAG chip

14.2 Commands and Response

After power on or reset YHY521X, the RED led will flash one time, it means

that YHY521X is ready.

If a Mifare® tag detected by the module, pin SIG will change from “1” to “0” and the red led on board will light till the tag moves out of RF field.

The RED led will flash during data stream exchanging between host and YHY521X.

14.2.1 Detect_Clone

This command will detect the UID clone card, if it is a clone card, it will reply success, else reply failure.

Table 9. Command--:Host →YHY521X

Send	Header	Length	Command	Data	XOR Checksum
	0xAA 0xBB	0x02	0x0c		BCC

Table 10. Response--: YHY521X→Host

Receive	Head	Length	Status	Data	XOR Checksum
Success	0xAA 0xBB	0x02	0x0C		0x0E
Failure	0xAA 0xBB	0x02	0XF3		0Xf1

Table 11 Example

Send	**AA BB 02 0C *0E***	
Description	AA BB	*Head*
	02	*Length*
	0C	*COMMAND*
	0E	*BCC=02 ⊕0C*
Receive(Success)	**AA BB 02 0C *0E***	
Description	AA BB	*Head*
	02	*Length*
	0C	*Status*
	0E	*BCC*
Receive(Failure)	**AA BB 02 F3 *FE***	
Description	AA BB	*Head*
	02	*Length*
	F3	*Error*
	F1	*BCC*

14.2.3 MConfigure

This command will configure parameters to the YHY521X. After Reset YHY521X the configuration will active.

Table 15. Command--:Host →YHY521X

Send	Header	Length	Command	Data	XOR Checksum
	0xAA 0xBB	0x12	0x04	Configure data: 16 bytes	BCC

Configure data: 16 bytes.

Table 16. Configure data

D[0]	D[1]	D[2..7]	D[8]	D[9]	D[10]	D[11]	D[12]	D[13]	D[14]	D[15]
Auto code	Key Type	Key String	Block R	AddrL	RFU	Start Sector	RFU	Auth Mode	RFU	Baud Code

D[0]:Auto code -----

0—Auto function off ,the YHY521X will not auto seek card and the SIG pin is not active.

1—Auto seek card, if there are cards in the RF field, the RED led will light and SIG pin will output low level.

2—Same 1, and it will read the card id and upload to host, and then halt the card.

3—Same 1, and it will read the selected block and upload to host, and then halt the card.

7-- Same 1, and it will read the selected sector and upload to host, and then halt the card.

8-- Same 1, and it will read the NTAG213 NDEF text and upload to host, and then halt the card.

9—Same 1, and it will read the card id when the tag in and out and upload to host, and then halt the card.

D[1]:Key Type -----

0x00 ---Key A

0x01 ---Key B

D[2..7]:Key string -----

Key(6 Bytes) to authenticate the mifare card

D[8]:Block R -----

Define one block of the card to be read.

D[9]: AddrL--- Node address for mode 9.

D[10]:RFU-default 0x00

D[11]:Sector to be scan

D[12]:RFU-default 0x00

D[13]:Auth mode -----

Define the auth mode----

0—Auth directly from host, default mode

1—The YHY521X will use the downloaded keys for authentication card

D[14]:RFU -----

Reserved For future Used. Default 0x60.

D[15]:Baud code -----

See table 5 for the baud rate code.

Table 17. Response--: YHY521X→Host

Receive	Head	Length	Status	Data	XOR Checksum
Success	0xAA 0xBB	0x02	0x04		0x06
Failure	0xAA 0xBB	0x02	0xFB		0xF9

Table 18. Example 1 ---Auto read card id, Auto code=0x02

Send	**AA BB 12 04 02 00 FF FF FF FF FF FF 00 00 00 00 00 00 00 08 1C**	
Description	AA BB	*Head*
	12	*Length*
	04	*COMMAND*
	02	*Auto code—auto read id*
	00..00	*Any data*
	08	*Baud code---115200bps*
	1C	*BCC*
Receive(Success)	**AA BB 02 04 *06***	
Description	AA BB	*Head*
	02	*Length*
	04	*Status*
	06	*BCC*
Receive(Failure)	**AA BB 02 FB *F9***	
Description	AA BB	*Head*
	02	*Length*
	FC	*Error*
	FE	*BCC*

If success then reset the YHY521X to active this function. The reader will read the card id itself when there is a card into the RF field and then output the id to host, at the same time the buzzer would beep one time if it is connecting to a buzzer.

Example 2 *---Auto read card block, Auto code=0x03*

Configure command--: Host →YHY521X

AA BB 12 04 03 00 FF FF FF FF FF FF 00 05 06 03 04 01 60 08 78

Description:

03: Auto code

00 FF FF FF FF FF FF: Auth key A and key string

00: Read block 0

01: Auth mode 1

08: Baud code,115200bps

If success then reset the YHY521X to active this function. The reader will read the card block itself when there is a card into the RF field and then output the block data to host, at the same time the buzzer would beep one time if it is connecting to a buzzer. Below is the output string example.

YHY521X → Host----

AA BB 12 **51 5E C0 E0 7A 04 88 04 00 47 51 35 56 61 10 28 08** EB

Description:

51: Status code

5E C0 E0 7A 04 88 04 00 47 51 35 56 61 10 28 08: Data in the block 0

Example 3 *---Auto Read NTAG213 NFC NDEF text dada, Auto code=0x08*

Configure command--: Host →YHY521X

AA BB 12 04 08 00 FF FF FF FF FF FF 00 00 00 00 00 00 00 05 1B
Description:

08: Auto code

05: Baud code,19200bps

If success then reset the YHY521X to active this function. The reader will read the NFC tag when there is a tag into the RF field and then output the status to host. Below is the output string.

AA BB 1E 40 31 53 69 6E 67 6C 65 4C 69 6E 65 31 32 33 34 35 36 37 38 39 FE 04 A7 B3 02 09 40 80 6F

Description:

40: Status code

31 53 69 6E 67 6C 65 4C 69 6E 65 31 32 33 34 35 36 37 38 39：*Ascii code of the* "1SingleLine123456789"
FE: End of this text
04 A7 B3 02 09 40 80： *UID of this tag*

Auto scan commands：
AA BB 12 04 01 00 FF FF FF FF FF FF 00 00 00 00 00 00 00 05 12// Auto mode 1,baud 19200
AA BB 12 04 02 00 FF FF FF FF FF FF 00 00 00 00 00 00 00 05 11// Auto mode 2, scan UID
AA BB 12 04 02 00 FF FF FF FF FF FF 00 00 00 00 00 00 00 03 17 // Scan UID, baud 9600
AA BB 12 04 03 00 FF FF FF FF FF FF 00 00 00 00 00 00 00 05 10//Auto mode 3, scan block
AA BB 12 04 07 00 FF FF FF FF FF FF 00 00 00 01 00 00 00 05 15// Auto mode 7, scan sector1

AA BB 12 04 08 00 FF FF FF FF FF FF 00 00 00 00 00 00 00 05 1B// Auto mode 8, NFC scan
Scan data example:
, get nfc text (1SingleLine123456789):
AA BB 1E 40 31 53 69 6E 67 6C 65 4C 69 6E 65 31 32 33 34 35 36 37 38 39 FE 04 A7 B3 02 09 40 80 6F
--------:
40： *Status code*
31 53 69 6E 67 6C 65 4C 69 6E 65 31 32 33 34 35 36 37 38 39： *NFC text* (1SingleLine123456789) *ascii code*
FE:NFC end code
04 A7 B3 02 09 40 80： *UID*

AA BB 12 04 09 00 FF FF FF FF FF FF 00 02 00 00 00 00 00 05 18 // Auto mode 9，
----------mode: 9, node address: 02, baud:19200.
Scan data example:

AA BB 08 60 02 *01* 40 9C 48 61 9E , '*01*':Enter RF field, node: 02, UID: 40 9C 48 61;
AA BB 08 60 02 *00* 40 9C 48 61 9F , '*00*':Left RF field, node: 02, UID: 40 9C 48 61;
AA BB 0B 60 02 *01* 04 A7 B3 02 09 40 80 B3 , '*01*':Enter RF field, node: 02, UID: 04 A7 B3 02 09 40 80;
AA BB 0B 60 02 *00* 04 A7 B3 02 09 40 80 B2, '*00*':Left RF field, node: 02, UID: 04 A7 B3 02 09 40 80;

14.2.4 Download_Keys

This command can load up to 40 groups keys to the YHY521X's EEPROM, all the data stored in the EEPROM is encrypted. When **auth mode** is **1**, the reader will use the EEPROM's key to auth the card. After reset this keys will active.

Table 19. Command--: Host →YHY521X

Send	Header	Length	Command	Data	XOR Checksum
	0xAA 0xBB	0x09	0x05	7 bytes Sector: 1 byte Keys: 6 bytes	BCC

Sector: 0—0x27 (mifare 4 k card has 40 sectors)

Keys: KeyA or KeyB, default FF FF FF FF FF FF.

Table 20. Response--: YHY521X→Host

Receive	Head	Length	Status	Data	XOR Checksum
Success	0xAA 0xBB	0x02	0x05		0x07
Failure	0xAA 0xBB	0x02	0xFA		0xF8

Table 21. Example

Send	**AA BB 09 05 01 FF FF FF FF FF FF 0D**	
Description	AA BB	*Head*
	09	*Length*
	05	*COMMAND*
	01	*Sector 01*
	FF FF FF FF FF FF	*Key*
	0D	*BCC*
Receive(Success)	**AA BB 02 03 *01***	
Description	AA BB	*Head*
	02	*Length*
	05	*Status*
	07	*BCC*
Receive(Failure)	**AA BB 02 FC *FE***	
Description	AA BB	*Head*
	02	*Length*
	FA	*Error*

	F8	*BCC*

14.2.7 Antenna_Control

This command set the antenna power on or off .

Table 28. Command--:Host →YHY521X

Send	Header	Length	Command	Data	XOR Checksum
	0xAA 0xBB	0x03	0x11	Switch:1Byte	BCC

Switch----
0x00: antenna soft power-down
0x03: antenna soft power-on

Table 29. Response--: YHY521X→Host

Receive	Head	Length	Status	Data	XOR Checksum
Success	0xAA 0xBB	0x02	0x11		0x13
Failure	0xAA 0xBB	0x02	0xEE		0xEC

Table 30. Example

Send	**AA BB 03 11 00 12**	
Description	AA BB 03 11 00 *12*	*Head* *Length* *COMMAND* *antenna soft power-down* *BCC*
Receive(Success)	**AA BB 02 11 *13***	
Description	AA BB 02 11 *13*	*Head* *Length* *Status* *BCC*
Receive(Failure)	**AA BB 02 EE *EC***	
Description	AA BB 02 EE *EC*	*Head* *Length* *Error* *BCC*

14.2.8 Sense_Mode

This command can change the auto sense mode any time during the YHY521X working, it needs no reset operation.

Table 31. Command--:Host →YHY521X

Send	Header	Length	Command	Data	XOR Checksum
	0xAA 0xBB	0x03	0x13	Auto code:1Byte	BCC

Auto code -----

0—Auto function off ,the YHY521X will not auto seek card and the SIG pin is not active.

1—Auto seek card, if there are cards the RED led will light and SIG pin output low level.

2—Same 1, and it will read the card id and upload to host, and then halt the card.

3—Same 1, and it will read the selected block and upload to host, and then halt the card.

Table 32. Response--: YHY521X→Host

Receive	Head	Length	Status	Data	XOR Checksum
Success	0xAA 0xBB	0x02	0x13		0x11
Failure	0xAA 0xBB	0x02	0xEC		0xEE

Table 33. Example

Send	**AA BB 03 13 00 *10***	
Description	AA BB	*Head*
	03	*Length*
	13	*COMMAND*
	00	*Auto off*
	10	*BCC*
Receive(Success)	**AA BB 02 13 *11***	
Description	AA BB	*Head*
	02	*Length*
	13	*Status*
	11	*BCC*
Receive(Failure)	**AA BB 02 EC *EE***	
Description	AA BB	*Head*
	02	*Length*
	EC	*Error*
	EE	*BCC*

14.2.15 Card_Sleep

This command sets the Card into sleeping. After successfully operation the card will be halt. Reactivate the card need to remove the card from antenna area and put the card into antenna area again. Or reset the YHY521X to repower the card.

Table 51. Command--:Host →YHY521X

Send	Header	Length	Command	Data	XOR Checksum
	0xAA 0xBB	0x02	0x12		0x10

Table 52. Response--: YHY521X→Host

Receive	Head	Length	Status	Data	XOR Checksum
Success	0xAA 0xBB	0x02	0x12		0x10
Failure	0xAA 0xBB	0x02	0x ED		0xEF

Table 53. Example

Send	**AA BB 02 12 *10***	
Description	AA BB	*Head*
	02	*Length*
	12	*COMMAND*
	10	*BCC*
Receive(Success)	**AA BB 02 12 *10***	

Description	AA BB	*Head*
	02	*Length*
	12	*Status*
	10	*BCC*
Receive(Failure)	**AA BB 02 ED *EF***	
Description	AA BB	*Head*
	02	*Length*
	ED	*Error*
	EF	*BCC*

14.2.16 Card_Type

This command reads card type.

Table 54. Command--:Host →YHY521X

Send	Header	Length	Command	Data	XOR Checksum
	0xAA 0xBB	0x02	0x19		0x1B

Table 55. Response--: YHY521X→Host

Receive	Head	Length	Status	Data	XOR Checksum
Success	0xAA 0xBB	0x04	0x19	Card type: 2Bytes	BCC
Failure	0xAA 0xBB	0x02	0x E6		0xE4

Card type:
0x0400---Mifare 1k card(s50)
0x0200---Mifare 4k card(s70)
0x4400---UL(NTAG2XX)

Table 56. Example

Send	**AA BB 02 19 *1B***	
Description	AA BB	*Head*
	02	*Length*
	19	*COMMAND*
	1B	*BCC*
Receive(Success)	**AA BB 04 19 04 00 *19***	
Description	AA BB	*Head*
	04	*Length*
	19	*Status*
	04 00	*Card TYPE 04 00: S50 Card; 02 00: S70 Card*
	19	*BCC*
Receive(Failure)	**AA BB 02 E6 *E4***	
Description	AA BB	*Head*
	02	*Length*
	E6	*Error*
	E4	*BCC*

14.2.17 Card_ID

This command read the mifare card UID.

Table 57. Command--:Host →YHY521X

Send	Header	Length	Command	Data	XOR Checksum
	0xAA 0xBB	0x02	0x20		0x22

Table 58. Response--: YHY521X→Host

Receive	Head	Length	Status	Data	XOR Checksum
Success	0xAA 0xBB	0x06	0x20	Card ID: 4Bytes	BCC
Failure	0xAA 0xBB	0x02	0x DF		0xDD

Table 59. Example

Send	**AA BB 02 20 *22***	
Description	AA BB 02 20 *22*	*Head* *Length* *COMMAND* *BCC*
Receive(Success)	**AA BB 06 20 *92 BF 72 59* *20***	
Description	AA BB 06 20 *92 BF 72 59* *20*	*Head* *Length* *Status* *Card ID* *BCC*
Receive(Failure)	**AA BB 02 DF *DD***	
Description	AA BB 02 DF *DD*	*Head* *Length* *Error* *BCC*

14. 2. 18 Block_Read

This command reads data from the appointed block. One block has 16 bytes.

Table 60. Command--:Host →YHY521X

Send	Header	Length	Command	Data	XOR Checksum
	0xAA 0xBB	0x0A	0x21	Block Info: 8 bytes	BCC

Block Info: Key type +Block number + Key

Key type: 1 byte, 0x00—Key A, 0x01—Key B.

Block number: 1 byte, 0x00..0xff (0..255) (*)

Key: 6 bytes, default “FFFFFFFFFFFF”

(*)Note: If auth mode is “1”, then this key is not active, it can be any 6 data bytes.

Table 61. Response--: YHY521X→Host

Receive	Head	Length	Status	Data	XOR Checksum
Success	0xAA 0xBB	0x12	0x21	Block data: 16Bytes	BCC
Failure	0xAA 0xBB	0x02	0x DE		0xDC

Table 62. Example

Send	**AA BB 0A 21 00 08 FF FF FF FF FF FF 23**	
Description	AA BB	*Head*
	0A	*Length*
	21	*COMMAND*
	00	*Authenticate with Key A*
	08	*Read Block 08(Sector 02,1st block)*
	FF FF FF FF FF FF	*Keys*
	23	*BCC*
Receive(Success)	**AA BB 12 21 00 11 22 33 44 55 66 77 88 99 AA 00 BB CC DD EE FF 23 (*)**	
Description	AA BB	*Head*
	12	*Length*
	21	*Status*
	00 .. FF	*16 Bytes Data of Block 08*
	23	*BCC*
Receive(Failure)	**AA BB 02 DE DC**	
Description	AA BB	*Head*
	02	*Length*
	DE	*Error*
	DC	*BCC*

**If receive one block data include 'AA',then the '00' will be added behind 'AA', but the length does not add 1.*

14. 2. 19 Block_Write

This command writes 16 bytes data to the appointed card's block.

Table 63. Command--:Host →YHY521X

Send	Header	Length	Command	Data	XOR Checksum
	0xAA 0xBB	0x1A	0x22	Block Info: 24 bytes	BCC

Block Info: Key type +Block number + Key + BData

Key type: 1 byte, 0x00—Key A, 0x01—Key B.

Block number: 1 byte, 0x01..0xff (1..255)

Key: 6 bytes, default "FFFFFFFFFFFF" (*)

BData: 16 bytes data to be write into card

(*)Note: If auth mode is "1", then this key is not active, it can be any 6 data bytes.

Table 64. Response--: YHY521X→Host

Receive	Head	Length	Status	Data	XOR Checksum
Success	0xAA 0xBB	0x02	0x22		0x20
Failure	0xAA 0xBB	0x02	0xDD		0xDF

Table 65. Example

Send	**AA BB 1A 22 00 08 FF FF FF FF FF FF 00 11 22 33 44 55 66 77 88 99 AA 00 BB CC DD EE FF 30 (*)**	
Description	AA BB	*Head*

	1A	*Length*
	22	*COMMAND*
	00	*Key type A*
	08	*Write Block 08(Sector 02,1st block)*
	FF FF FF FF FF FF	*Authenticate with Key A*
	00 ..FF	*16 bytes data*
	30	*BCC*
Receive(Success)	**AA BB 02 22 *20***	
Description	AA BB	*Head*
	02	*Length*
	22	*Status*
	20	*BCC*
Receive(Failure)	**AA BB 02 DD *DF***	
Description	AA BB	*Head*
	02	*Length*
	DD	*Error*
	DF	*BCC*

**If write one block data include 'AA', then the '00' will be added behind 'AA', but the length does not add 1.*

14. 2. 20 Value_Init

This command initializes block as value format. It needs to perform this command before any block to be use as value format.
Below is the description of value block.

DATA BLOCKS

All sectors contain 3 blocks of 16 bytes for storing data (Sector 0 contains only two data blocks and the read-only manufacturer block).

The data blocks can be configured by the access bits as

- read/write blocks for e.g. contactless access control or
- value blocks for e.g. electronic purse applications, where additional commands like increment and decrement for direct control of the stored value are provided.

An authentication command has to be carried out before any memory operation in order to allow further commands.

Value Blocks

The value blocks allow to perform electronic purse functions (valid commands: *read, write, increment, decrement, restore, transfer*).
The value blocks have a fixed data format which permits error detection and correction and a backup management.
A value block can only be generated through a *write* operation in the value block format:

- Value: Signifies a signed 4-byte value. The lowest significant byte of a value is stored in the lowest address byte. Negative values are stored in standard 2´s complement format. For reasons of data integrity and security, a value is stored three times, twice non-inverted and once inverted.
- Adr: Signifies a 1-byte address, which can be used to save the storage address of a block, when implementing a powerful backup management. The address byte is stored four times, twice inverted and non-inverted. During *increment, decrement, restore* and *transfer* operations the address remains unchanged. It can only be altered via a *write* command.

Byte Number	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Description	Value				Value				Value				Adr	$\overline{\text{Adr}}$	Adr	$\overline{\text{Adr}}$

Table 66. Command--:Host →YHY521X

Send	Header	Length	Command	Data	XOR Checksum
	0xAA 0xBB	0x0E	0x23	Value Info: 12 bytes	BCC

Value Info: Key type +Block number + Key + Value

Key type: 1 byte, 0x00—Key A, 0x01—Key B.

Block number: 1 byte, 0x01..0xfe (1..254)

Key: 6 bytes, default "FFFFFFFFFFFF" (*)

Value: 4 bytes value to be write into card, low byte first

(*)Note: If auth mode is "1", then this key is not active, it can be any 6 data bytes.

Table 67. Response--: YHY521X→Host

Receive	Head	Length	Status	Data	XOR Checksum
Success	0xAA 0xBB	0x02	0x23		0x21
Failure	0xAA 0xBB	0x02	0xDC		0xDE

Table 68. Example

Send	**AA BB 0E 23 00 09 FF FF FF FF FF FF 01 00 00 00 25**	
Description	AA BB	*Head*
	0E	*Length*
	23	*COMMAND*
	00	*Key type A*
	09	*Init Block 09(Sector 02,2nd block)*
	FF FF FF FF FF FF	*Authenticate with Key A*
	01 00 00 00	*4 bytes value*
	25	*BCC*
Receive(Success)	**AA BB 02 23 21**	
Description	AA BB	*Head*
	02	*Length*
	23	*Status*
	21	*BCC*
Receive(Failure)	**AA BB 02 DC DE**	
Description	AA BB	*Head*
	02	*Length*
	DC	*Error*
	DE	*BCC*

14.2.21 Value_Read

This command reads value from the appointed block.

Table 69. Command--:Host →YHY521X

Send	Header	Length	Command	Data	XOR Checksum
	0xAA 0xBB	0x0A	0x21	Value Info: 8 bytes	BCC

Value Info: Key type +Block number + Key

Key type: 1 byte, 0x00—Key A, 0x01—Key B.

Block number: 1 byte, 0x01..0xfe (1..254) (*)

Key: 6 bytes, default "FFFFFFFFFFFF"

(*)Note: If auth mode is "1", then this key is not active, it can be any 6 data bytes.

Table 70. Response--: YHY521X→Host

Receive	Head	Length	Status	Data	XOR Checksum
Success	0xAA 0xBB	0x06	0x24	Value: 4Bytes	BCC
Failure	0xAA 0xBB	0x02	0x DB		0xD9

Table 39. Example

Send	**AA BB 0A 24 00 09 FF FF FF FF FF FF 27**	
Description	AA BB	*Head*
	0A	*Length*
	24	*COMMAND*
	00	*Authenticate with Key A*
	09	*Read Block 09(Sector 02,2nd block)*
	FF FF FF FF FF FF	*Keys*
	27	*BCC*
Receive(Success)	**AA BB 06 24 01 00 00 00 23**	
Description	AA BB	*Head*
	06	*Length*
	24	*Status*
	01 00 00 00	*4 Bytes value*
	23	*BCC*
Receive(Failure)	**AA BB 02 DB D9**	
Description	AA BB	*Head*
	02	*Length*
	DB	*Error*
	D9	*BCC*

14.2.22 Value_Inc

This command perform value increment.

Table 71. Command--:Host →YHY521X

Send	Header	Length	Command	Data	XOR Checksum
	0xAA 0xBB	0x0E	0x25	Value Info: 12 bytes	BCC

Value Info: Key type +Block number + Key + Value

Key type: 1 byte, 0x00—Key A, 0x01—Key B

Block number: 1 byte, 0x01..0xfe (1..254)

Key: 6 bytes, default "FFFFFFFFFFFF" (*)

Value: 4 bytes value to increment, low byte first

(*)Note: If auth mode is "1", then this key is not active, it can be any 6 data bytes.

Table 72. Response--: YHY521X→Host

Receive	Head	Length	Status	Data	XOR Checksum
Success	0xAA 0xBB	0x02	0x25		0x27
Failure	0xAA 0xBB	0x02	0xDA		0xD8

Table 73. Example

Send	**AA BB 0E 25 00 09 FF FF FF FF FF FF 01 00 00 00 23**	
Description	AA BB	*Head*
	0E	*Length*
	23	*COMMAND*
	00	*Key type A*
	09	*Block 09(Sector 02,2nd block)*
	FF FF FF FF FF FF	*Authenticate with Key A*
	01 00 00 00	*4 bytes value*
	23	*BCC*
Receive(Success)	**AA BB 02 25 27**	
Description	AA BB	*Head*
	02	*Length*
	25	*Status*
	27	*BCC*
Receive(Failure)	**AA BB 02 DA D8**	
Description	AA BB	*Head*
	02	*Length*
	DA	*Error*
	D8	*BCC*

14. 2. 23 Value_Dec

This command perform value decrement.

Table 74. Command--:Host →YHY521X

Send	Header	Length	Command	Data	XOR Checksum
	0xAA 0xBB	0x0E	0x26	Value Info: 12 bytes	BCC

Value Info: Key type +Block number + Key + Value

Key type: 1 byte, 0x00—Key A, 0x01—Key B

Block number: 1 byte, 0x01..0xfe (1..254)

Key: 6 bytes, default “FFFFFFFFFFFF” (*)

Value: 4 bytes value to decrement, low byte first

(*)Note: If auth mode is “1”, then this key is not active, it can be any 6 data bytes.

Table 75. Response--: YHY521X→Host

Receive	Head	Length	Status	Data	XOR Checksum
Success	0xAA 0xBB	0x02	0x26		0x24
Failure	0xAA 0xBB	0x02	0xD9		0xDB

Table 76. Example

Send	**AA BB 0E 26 00 09 FF FF FF FF FF FF 01 00 00 00 20**	
Description	AA BB	*Head*
	0E	*Length*
	23	*COMMAND*
	00	*Key type A*

	09	*Block 09(Sector 02,2nd block)*
	FF FF FF FF FF FF	*Authenticate with Key A*
	01 00 00 00	*4 bytes value*
	20	*BCC*
Receive(Success)	**AA BB 02 26 24**	
Description	AA BB	*Head*
	02	*Length*
	26	*Status*
	24	*BCC*
Receive(Failure)	**AA BB 02 D9 *DB***	
Description	AA BB	*Head*
	02	*Length*
	D9	*Error*
	DB	*BCC*

14. 2. 24 Value_Backup

This command will backup one block value to another block in the same Sector.

Table 77. Command--:Host →YHY521X

Send	Header	Length	Command	Data	XOR Checksum
	0xAA 0xBB	0x0B	0x27	Backup Info: 9 bytes	BCC

Backup Info: Key type + Key + Source block + Target block

Key type: 1 byte, 0x00—Key A, 0x01—Key B

Key: 6 bytes, default “FFFFFFFFFFFF” (*)

Source block: 1 byte

Target block: 1 byte

(*)Note: If auth mode is “1”, then this key is not active, it can be any 6 data bytes.

Table 78. Response--: YHY521X→Host

Receive	Head	Length	Status	Data	XOR Checksum
Success	0xAA 0xBB	0x02	0x27		0x25
Failure	0xAA 0xBB	0x02	0xD8		0xDA

Table 79. Example

Send	**AA BB 0B 27 00 *FF FF FF FF FF FF* 09 *0A* 2F**	
Description	AA BB	*Head*
	0B	*Length*
	27	*COMMAND*
	00	*Key type A*
	FF FF FF FF FF FF	*Authenticate with Key A*
	09	*Source Block 9(Sector 02,2nd block)*
	0A	*Target Block 10(Sector 02,3rd block)*
	2F	*BCC*
Receive(Success)	**AA BB 02 27 25**	

Description	AA BB 02 27 25	Head Length Status BCC
Receive(Failure)	AA BB 02 D9 DB	
Description	AA BB 02 D8 DA	Head Length Error BCC

14. 2. 25 Sector_Read

This command reads data from the appointed sector. One sector has 3 blocks(48 bytes, sector 0 to 31) . This command would not read the tailor block.

Table 80. Command--:Host →YHY521X

Send	Header	Length	Command	Data	XOR Checksum
	0xAA 0xBB	0x0A	0x2A	Sector Info: 8 bytes	BCC

Sector Info: Key type + Sector number + Key

Key type: 1 byte, 0x00—Key A, 0x01—Key B.

Sector number: 1 byte, 0x00..0x1F (0..31) (*)

Key: 6 bytes, default "FFFFFFFFFFFF"

(*)Note: If auth mode is "1", then this key is not active, it can be any 6 data bytes.

Table 81. Response--: YHY521X→Host

Receive	Head	Length	Status	Data	XOR Checksum
Success	0xAA 0xBB	Len	0x2A	Sector data: 49 Bytes	BCC
Failure	0xAA 0xBB	0x02	0xD5		0xD7

Len:-----

0x33 (51)—if sector is 0-31

Sector data: Sector number(1 byte) + Blocks data(48 Bytes)

Table 82. Example

Send	AA BB 0A 2A 00 01 FF FF FF FF FF FF 21	
Description	AA BB 0A 2A 00 01 FF FF FF FF FF FF 21	Head Length COMMAND Authenticate with Key A Read Sector 01 Keys BCC
Receive(Success)	AA BB 33 2A 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 18	

Description	AA BB	*Head*
	33	*Length*
	2A	*Status*
	01	*Sector 01*
	00 .. 00	*48 Bytes Data of Sector 01*
	18	*BCC*
Receive(Failure)	**AA BB 02 D5 *D7***	
Description	AA BB	*Head*
	02	*Length*
	D5	*Error*
	D7	*BCC*

14. 2. 26 Sector_Write

This command writes 48/240 bytes data to the appointed sector.
One sector has 3 blocks(48 bytes, sector 0 to 31) .This command can not write the tailor block and sector 0, sector 0 include block 0 which is read only.

Table 83. Command--:Host →YHY521X

Send	Header	Length	Command	Data	XOR Checksum
	0xAA 0xBB	Len	0x2B	Write Info: 48 bytes	BCC

Len:-----
0x3A (58)—if sector is 0-31

Write Info: Key type +Sector number + Key + SData

Key type: 1 byte, 0x00—Key A, 0x01—Key B.

Sector number: 1 byte, 0x01..0x1F (1..31)

Key: 6 bytes, default "FFFFFFFFFFFF" (*)

SData: 48 Bytes data to be write into card

(*)Note: If auth mode is "1", then this key is not active, it can be any 6 data bytes.

Table 84. Response--: YHY521X→Host

Receive	Head	Length	Status	Data	XOR Checksum
Success	0xAA 0xBB	0x02	0x2B		0x29
Failure	0xAA 0xBB	0x02	0xD4		0xD6

Table 85. Example

Send	**AA BB 3A 2B 00 01 *FF FF FF FF FF FF* 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 22 22 22 22 11 22 22 22 22 22 22 11 22 22 22 22 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 *10***	
Description	AA BB	*Head*
	3A	*Length*
	2B	*COMMAND*
	00	*Key type A*
	01	*Write Sector 01*
	FF FF FF FF FF FF	*Authenticate with Key A*

	11 ..33	48 bytes data
	10	BCC
Receive(Success)	**AA BB 02 22 20**	
Description	AA BB	Head
	02	Length
	2B	Status
	29	BCC
Receive(Failure)	**AA BB 02 DD DF**	
Description	AA BB	Head
	02	Length
	D4	Error
	D6	BCC

----------UL commands----------

14.2.27 Pages_Read_UL

This command reads 4 continuous pages data from the appointed start page.

Table 86. Command--:Host →YHY521X

Send	Header	Length	Command	Data	XOR Checksum
	0xAA 0xBB	0x03	0x28	Start page	BCC

Table 87. Response--: YHY521X→Host

Receive	Head	Length	Status	Data	XOR Checksum
Success	0xAA 0xBB	0x12	0x28	4 pages data: 16Bytes	BCC
Failure	0xAA 0xBB	0x02	0xD7		0xD5

Table 88. Example

Send	**AA BB 03 28 03 28**	
Description	AA BB	Head
	03	Length
	28	COMMAND
	03	Start page
	28	BCC
Receive(Success)	**AA BB 12 28 00 11 22 33 44 55 66 77 88 99 AA 00 BB CC DD EE FF 3A (*)**	
Description	AA BB	Head
	12	Length
	28	Status
	00 .. FF	16 Bytes Data
	3A	BCC
Receive(Failure)	**AA BB 02 D7 D5**	
Description	AA BB	Head
	02	Length
	D7	Error
	D5	BCC

**If receive one block data include 'AA',then the '00' will be added behind 'AA', but the length does not add 1.*

14.2.28 Page_Write_UL

This command write 4 bytes data into one page of the UL chip.

Table 89 Command--:Host →YHY521X

Send	Header	Length	Command	Data	XOR Checksum
	0xAA 0xBB	0x07	0x29	Page Info: 5 bytes	BCC

Page Info: 1byte(page address)+4 bytes data

Table 90. Response--: YHY521X→Host

Receive	Head	Length	Status	Data	XOR Checksum
Success	0xAA 0xBB	0x02	0x29		0x2B
Failure	0xAA 0xBB	0x02	0xD6		0xD4

Table 91. Example

Send	**AA BB 07 29 08 *01 00 00 00* 27**	
Description	AA BB	*Head*
	07	*Length*
	29	*COMMAND*
	08	*Page 08*
	01 00 00 00	*4 bytes*
	27	*BCC*
Receive(Success)	**AA BB 02 29 *2B***	
Description	AA BB	*Head*
	02	*Length*
	29	*Status*
	2B	*BCC*
Receive(Failure)	**AA BB 02 D6 *D4***	
Description	AA BB	*Head*
	02	*Length*
	D6	*Error*
	D4	*BCC*

14.2.29 Ntag_Read_Text

This command will read the NTAG213 NDEF text data.Send command “aabb03130010” to switch off the auto scan, then send ”AA BB 02 20 22”to get the UID of the tag, at last you can send this command to read the NDEF data.

Table 92. Command--:Host →YHY521X

Send	Header	Length	Command	Data	XOR Checksum
	0xAA 0xBB	0x02	0x40	-	0x42

Table 93. Response--: YHY521X→Host

Receive	Head	Length	Status	Data	XOR Checksum
Success	0xAA 0xBB	Len	0x40	Text	BCC
Failure	0xAA 0xBB	0x02	0xBF	-	0xBD

Table 94. Example

Send	**AA BB 02 40 42**	
Description	AA BB 02 40 *42*	*Head* *Length* *COMMAND* *BCC*
Receive(Success)	**AA BB 0C 40** 30 31 32 33 34 35 36 37 38 39 4D	
Description	AA BB 0C 40 *30 .. 39* *4D*	*Head* *Length* *Status* *"0-9" ascii代码* *BCC*
Receive(Failure)	**AA BB 02 BF BD**	
Description	AA BB 02 BF *BD*	*Head* *Length* *Error* *BCC*

14. 2. 30 Ntag_Write_Text

This command can write the NDEF text data into the NTAG213 chip.

Table 95 Command--:Host →YHY521X

Send	Header	Length	Command	Data	XOR Checksum
	0xAA 0xBB	Len1	0x41	Data	BCC

Data=Lock+Len2+Text

Lock: 00-rewrite, 01-Lock(read only)

Len2: length of the text, up to 58 bytes；

Text: NFC NDEF ascii code.

Table 96. Response--: YHY521X→Host

Receive	Head	Length	Status	Data	XOR Checksum
Success	0xAA 0xBB	0x02	0x41		BCC
Failure	0xAA 0xBB	0x02	0xBE		0xBC

Table 97. Example

Send	**AA BB 0E 41 00 0a 30 31 32 33 34 35 36 37 38 39 44**	
Description	AA BB 0E 41 00 0a	*Head* *Length* *COMMAND* *Unlock* *Text length*

	30..39	*"0..9"*
	44	*BCC*
Receive(Success)	**AA BB 02 41 *43***	
Description	AA BB	*Head*
	02	*Length*
	41	*Status*
	43	*BCC*
Receive(Failure)	**AA BB 02 BE BC**	
Description	AA BB	*Head*
	02	*Length*
	BE	*Error*
	BC	*BCC*

14.2.31 Ntag_Read_URL

This command will read the NTAG213 NDEF URL data. Send command "aabb03130010" to switch off the auto scan, then send "AA BB 02 20 22"to get the UID of the tag, at last you can send this command to read the NDEF URL data. For example, the URL is 'ehuoyan.com', then it will be shownas '56F79616E2E636F6D'. before this string, it will be use a hex code, for example, 0x01 means 'http://www'. Please reference below list for more details.

Table 98.

Decimal	Hex	Protocol
0	0x00	N/A. No prepending is done, and the URI field contains the unabridged URI.
1	0x01	http://www.
2	0x02	https://www.
3	0x03	http://
4	0x04	https://
5	0x05	tel:
6	0x06	mailto:
7	0x07	ftp://anonymous:anonymous@
8	0x08	ftp://ftp.
9	0x09	ftps://

At last, you can send this command to reset the scan 'aabb03130212'.

Table 99. Command--:Host →YHY521X

Send	Header	Length	Command	Data	XOR Checksum
	0xAA 0xBB	0x02	0x42	-	0x40

Table 100. Response--: YHY521X→Host

Receive	Head	Length	Status	Data	XOR Checksum
Success	0xAA 0xBB	Len	0x40	URL	BCC
Failure	0xAA 0xBB	0x02	0xBD	-	0xBF

Table 101. Example

Send	**AA BB 02 42 40**	
Description	AA BB 02 42 *40*	*Head* *Length* *COMMAND* *BCC*
Receive(Success)	**AA BB 0E 42** *01 65 68 75 6F 79 61 6E 2E 63 6F 6D 63*	
Description	AA BB 0E 42 01 *65 .. 6D* *63*	*Head* *Length* *Status* http://www. *ehuoyan.com* *BCC*
Receive(Failure)	**AA BB 02 BD *BF***	
Description	AA BB 02 BD *BF*	*Head* *Length* *Error* *BCC*

14. 2. 32 Ntag_Write_URL

This command can write the NDEF URL data into the NTAG213 chip. For example to write 'http://www.ehuoyan.com/', the red string will replace by '0x01', else will translate to ascii code string '*6568756F79616E2E636F6D*'. *At the same time, you can LOCK this tag.*

Table 102 Command--:Host →YHY521X

Send	Header	Length	Command	Data	XOR Checksum
	0xAA 0xBB	Len1	0x43	Data	BCC

Data=Lock+Len2+URL Pre+URL End

Lock: 00-writable, 01-lock

Len2: Length of the web, max length is up to 130 bytes.

Table 103. Response--: YHY521X→Host

Receive	Head	Length	Status	Data	XOR Checksum
Success	0xAA 0xBB	0x02	0x43		BCC
Failure	0xAA 0xBB	0x02	0xBC		0xBE

Table 104. Example

Send	**AA BB 10 43 00 0b 01 6568756F79616E2E636F6D 77**	
Description	AA BB	*Head*
	10	*Length*
	43	*COMMAND*
	00	*Unlock*
	0B	*URL Tail length*
	01	*URL head code*
	65..6d	*"ehuoyan.com"*
	77	*BCC*
Receive(Success)	**AA BB 02 43 *41***	
Description	AA BB	*Head*
	02	*Length*
	43	*Status*
	41	*BCC*
Receive(Failure)	**AA BB 02 BC BE**	
Description	AA BB	*Head*
	02	*Length*
	BC	*Error*
	BE	*BCC*

---

15. Electrical Characteristics

15.1 Operating Condition

Table 86: Operating Condition Range

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
Tamb	Ambient Temperature	-	-25	+25	+85	°C
V_{CC}	DC Supply Voltages	GND = 0V	2.7	3.3	3.6	V
RD	Reading Distance	V_{CC} =3.3V	0	50	60	mm
WD	Writing Distance	V_{CC} =3.3V	0	40	50	mm

15.2 Current Consumption

Table 87: Current Consumption

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
I_{VCC}	Supply Current V_{CC}=2.7V-3.6V	Continuous read or write		43	65	mA
		Antenna Soft Power Down		15	20	mA
		Module Hard Power Down		-	10	μA

16. Package outline

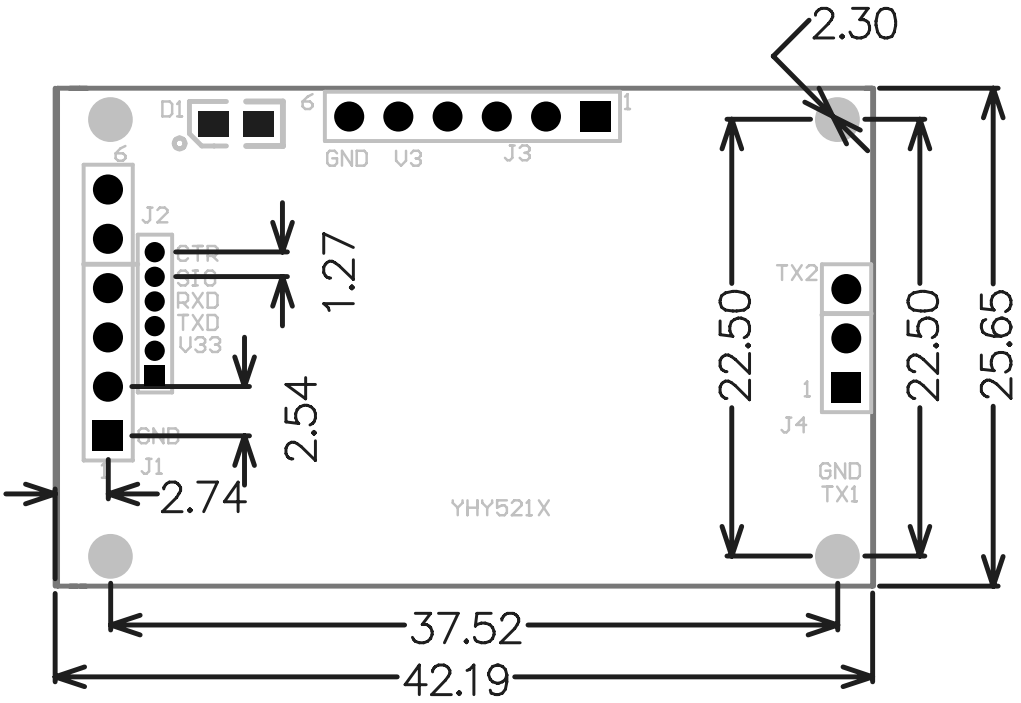

Figure 8– YHY521X Top view

Figure 9– YHY521X Side View

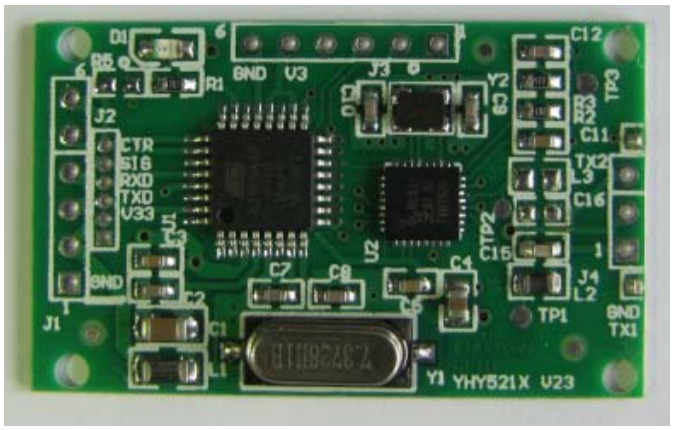

Figure 10– YHY521X top view

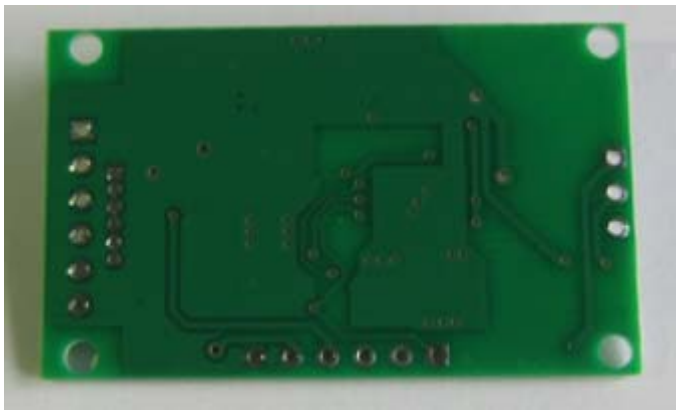

Figure 11– YHY521X back view

---

17. Contact information

To obtain information about EHUOYAN Inc sales and technical information, please reference the following information.

Contact Information:

Ehuoyan Co.,Ltd.

Tel: +86-010-80128328

email: info@ehuoyan.com

Web Site : http://www.ehuoyan.com/