YET-MF2 UART Reader

User Manual

1. Mifare Standard

- 1024 bytes EEPROM, divided into 16 sectors with 64 bytes on each sector
- 100,000 write endurance cycles
- 10 years data retention
- ISO 14443 A
- 13.56MHz transponder frequency
- 106 kbit baud rate
- Bit-wise anti-collision
- Up to 10 cm operating distance
- 4 byte unique serial number
- Random number generator
- 2 bytes access key per sector
- Individual access condition for each sector
- Purse functionality

2. YET-MF2 Technical Specification

- Power supply: 4.5V~5.5V , 40-100mA
  Core: ARM® 32-bit Cortex™-M0 CPU,
  frequency up to 48 MHz
  Memories   16 Kbytes of Flash memory
                    4   Kbytes of SRAM with HW parity checking
- Interface: UART
- Transmission speed: 19200 bps (2400 ~115200 setting)
- R/W distance of up to 60mm (up to 100mm with bigger antenna size), depending on TAG
- Storage temperature: -60 ºC ~ +150ºC
- Operating temperature: -40 ºC ~ +85 ºC

3. 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: 19200 bps
Data: 8 bits
Stop: 1 bit
Parity: None
Flow control: None

4．**Dimension & Pin Description**

Pin1

Pin4

PIN
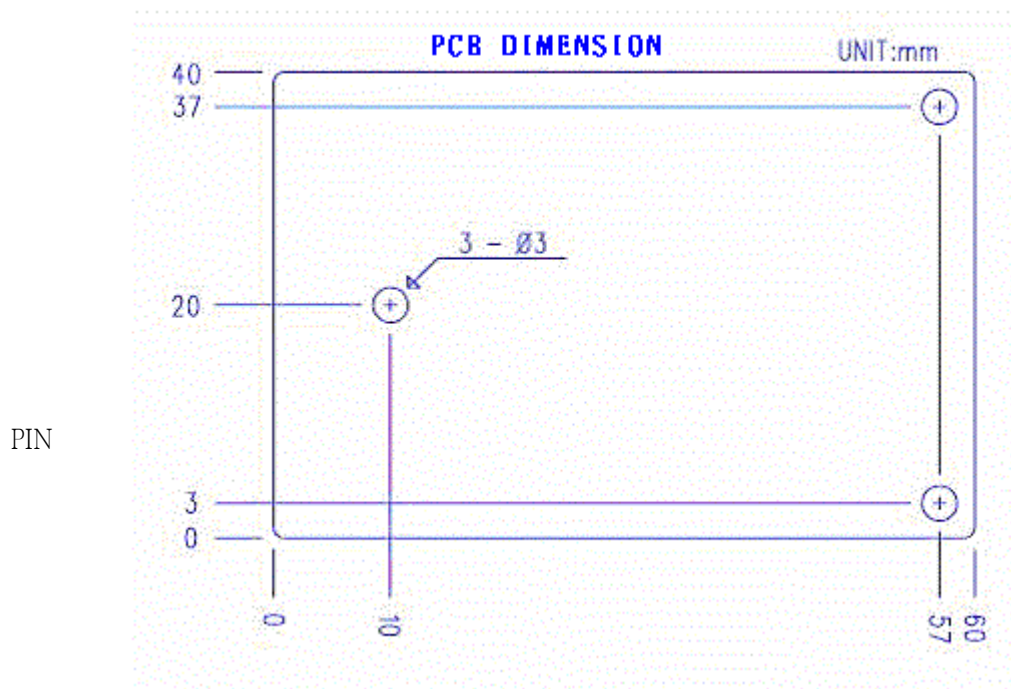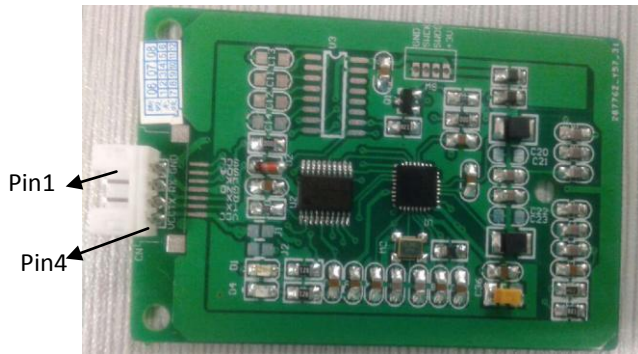
Pin	Name	description
1	GND	GND
2	RxD	UART RXD
3	TXD	UART TXD

		4	VC	4.5-5.5V

YET-MF2:   4.5~5.5V

Character

Parameter	Min	Type	Max	Units
YET-MF2 voltage	4.5	5.0	5.5	V
Current(Working)	40		60	ma
Current(Sleep)		<10		microamp
Initialization time	50		200	MS
Opertating temperature	-25		+85	℃
Storage temperature	-40		+125	℃

5. UART Setting & Command Protocol

UART Setting :

Transmission rate	Default 19200，N，8，1			
Data format	Binary HEX "hexadecimal"			
Data package				
Head	Length	Node ID	Function Code	Data …	XOR	

COMMAND Format :

	Data length (Byte)			
Head	02	Fixed: 0xAA , 0xBB		
Length	02	There are several effective bytes that including XOR follows this column.		
Node ID	02	Destination Node Address Number. xx xx: Low byte first 00 00: Broadcast to each reader.		
Function	02	It will be transmission ability of each different		

code		command . Low byte frist		
Data	00~D0	Data length is not fixed, according to its purpose.		
XOR	01	XOR each byte from Node ID to Last Data byte with 0xFF.		

REPLY DATA FORMAT :

	Data length (Byte)			
Head	02	Fixed: 0xAA , 0xBB		
Length	02	There are several effective bytes that including XOR follows this column.		
Node ID	02	Destination Node Address Number. xx xx: Low byte first 00 00: Broadcast to each reader.		
Function code	02	It will be transmission ability of each different command . Low byte frist		
Status	1	Reply result , if succeed is 0 ,other fail .		
Data	00~D0	Data length is not fixed, according to its purpose.		
XOR	01	XOR each byte from Node ID to Last Data byte		

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 .

Command List ：

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   **(Ignore)**
6、 **Set Led color :**   0x0107
7、 **Set reader working status   :**   0x0108   **(Ignore)**
8、 **Reset Reader :**   0x010B

9、 **Set antenna status** 。   **0x010c**

10、   **Get Reader Reset Status :**   **0x010D**

11、   Set Reader to Sleep Mode :   0x0112

12、   **Mifare Request ,**   **0x0201**

13、   **Mifare anticollision ,**   **0x0202:**

14、   **Mifare Select**   **0x0203:**

15、   **Mifare Hlta ,**   **0x0204:**

16、   **Mifare Select Card**   **0x0205:**

17、   **Mifare Authentication1**   **0x0206 :**

14、   **Mifare Authentication2**   **0x0207:**

15、   **Mifare Read**   **0x0208:**

16、   **Mifare Write**   **0x0209:**

17、   **Mifare Initval**   **0x020A:**

18、   **Mifare Read Balance**   **0x020B:**

19、   **Mifare Decrement**   **0x020C:**

20、   **Mifare Increment**   **0x020D:**

21、   **Mifare Restore**   **0x020E:**

22、   **Mifare Backup**   **0x020F:**

23、   **Mifare UltraLight Anticoll**   **0x0212:**

24、   **Mifare UltraLight Write**   **0x0213:**

25、   **Write key store in RC500 EEPROM**

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1. **Initialize port ：0x0101**

Function： set baud rate

Format ： aa bb 06 00 00 01 01 "Baud_para" "xor Chk"

Baud_parameter ：

    0 = 4800;

    1 = 9600;

    3 = 19200;

    4 = 28800;

    5 = 38400;

    6 = 57600;

    7 = 115200;

sample ：Host To Reader;

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

2. **Set device node number : 0x0102 (Ingore)**

    Aa bb 07 00 00 00 02 01 00 00 03   set device node number = 0x00 00

3. **Read device node number : 0x0103 (Ingore)**

Aa bb 05 00 00 00 03 01 02   Read device node number.

4. **Read device Mode : 0x0104**

   function： read device mode and version
   Host to Reader : aa bb 05 00 00 00 04 01 05
   Respond: aa bb 12 00 00 00 04 01 00 43 52 30 33 30 4c 52 2d 31 32 30 33 14

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。
   Sample ：Host to Reader : aa bb 06 00 00 00 06 01 64 63
         Respond ： aa bb 06 00 52 51 06 01 00 04

6. **Set Led color : 0x0107**

   Host To Reader;
   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 :
   0 = LED_RED Off ， LED_GREEN Off
   1 = LED_RED On ， LED_GREEN = Off
   2 = LED_GREEN Off ， LED_RED On
   3 = LED_GREEN On ， LED_RED ON

7. **Set reader working status : 0x0108   not use in this device。**

8. **Reset Reader : 0x010B**
   Reader should Reset by Watchdog after receive this command, no respond from Reader
   Host To Reader : aa bb 05 00 00 00 0b 01 0a

9. **Set antenna status 。0x010c**
   Host To Reader;
   aa bb 06 00 00 00 0c 01 00 0D   //set antenna off。
   Tenth data is Antenna status parameter ； 0 = Close Filed   1= Open Filed.

9. **Request Reader Status , 0x010D**
   Request Reader RFID CHIP Reset status ,
   HOST to Reader : aa bb 05 00 00 00 0d 01 0c
   Respond: aa bb 06 00 00 00 0d 01 00 0c Reset RFID ok
               Aa bb 06 00 00 00 0d 01 01 0d   Reset Fail

10. **Set Reader to Sleep MODE , 0x0112**
    Function : After receive this command Reader should turn to SLEEP mode , no respond ;
    Reader & RFID chip are not working after Wake pin Low active or Power On .
    Host To Reader : aa bb 05 00 00 00 12 01 13

11. **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

sample：Host To Reader:

　　　　aa bb 06 00 00 00 01 02 52 51

　　　　Respond : aa bb 08 00 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

12.　Mifare anticollision ,   0x0202:

Function ：card   anticollision

Format ： aa bb 05 00 00 00 02 02 00

Respond ：　aa bb 0a 00 52 51 02 02 00 46 ff a6 b8 a4

"46 ff a6 b8" is card serial number.

13.　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 。

Sample ： Host to Reader : 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

14.　Mifare Hlta ,   0x0204:

Function ：Hlta card

Host to reader ：aa bb 05 00 00 00 04 02 06

Respond   ：aa bb 06 00 52 51 04 02 00 05

15.　Mifare Select Card   0x0205 :

Function ：Mifare Request + Mifare Anticollision + Select

If ok respond SNR of cards

Host to Reader :   aa bb 05 00 00 00 05 02 07

Respond   :   aa bb 0a 00 00 00 05 02 00 46 ff a6 b8 a0

46 ff a6 b8   Mifare SNR

16.　Mifare Authentication1   0x0206 :

Function ：authenticate Card (Key Stroe in RC500)

Format　：aa bb xx 00 00 00 06 02 Auth_mode　Block　KeyEE　CHK

　　　　Auth_mode=**Authenticate mode**,0x60: Key A ,0x61: Key B

　　　　Block=　Authenticate block

　　　　KeyEE =　Key store in RC500 EEPROM group,　from 0 to 31 total 32 。

Sample　：Host to Reader : aa bb 08 00 00 00 06 02 60 04 01 61

　　　　Authenticate　Block 4　Key = "group　01 "

　　　　Respond : aa bb 06 00 11 12 06 02 00 07

17.　**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

Sample　：Host to Reader : 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 06 00 52 51 07 02 00 06

18.　**Mifare Read**　　　　　0x0208:

Function　：Read block

Format　：aa bb 06 00 00 00 08 02 Block XOR

　　　　Block = which block want read

Sample　：Host to Reader : aa bb 06 00 00 00 08 02 04 0e

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。

19.　**Mifare Write**　　　　　0x0209:

Function　：　write　block

Format　：　aa bb 16 00 00 00 09 02 Block

　　　　　　　　　D0 D1 D2 D3 D4 D5 D6 D7 D8 D9 Da Db Dc Dd De Df XOR

Sample　：　write data to Block4

　　Host to Reader

　　　aa bb 16 00 00 00 09 02 04 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

20　**Mifare Initval**　　　　0x020A:

Function　：　initialize purse

Format　：　aa bb 0a 00 00 00 0a 02 Block V0 V1 V2 V3 XOR

21.　**Mifare Read Balance**　　0x020B:

Function　：read balance

Format　：aa bb 06 00 00 00 0B 02 Block XOR

　　　　Return four byte balance .

22　**Mifare Decrement**　　　0x020C:

Function　：　decrease balance

Format　：aa bb 0a 00 00 00 0c 02 Block V0 V1 V2 V3 XOR

23.　**Mifare Increment**　　　　0x020D:

Function ：increase balance

Format ：aa bb 0a 00 00 00 0D 02 Block V0 V1 V2 V3 XOR

24. Mifare Restore   0x020E:

Function ：Restore a mifare_one block data to buffer

Format ：aa bb 06 00 00 00 0E 02 Block XOR

25 Mifare Transfer   0x020F Function ：

Transfer buffer data to a block Format   ：aa
bb 06 00 00 00 0F 02 Block XOR

26. Mifare Backup   0x020F

Function ：Backup a block to another block in same sector .

Format ：aa bb 07 00 00 00 0F 02 BlockSource BlockTarget   XOR

27. Mifare UltraLight Anticoll   0x0212:

Function ：UltraLight anticollision ,respond ultralight ID。

Format ：aa bb 05 00 00 00 12 02 CHK

Sample ：Host to Reader: aa bb 05 00 00 00 12 02 10

Respond   ：aa bb 0d 00 52 51 12 02 00 *04 1f ae 11 14 7a 00* d9

'04 1f ae 11 14 7a 00' is card serial number .

28. Mifare UltraLight Write   0x0213:

Function ： write mifare Ultralight

Format ： aa bb 0a 00 00 00 13 02 Page D0 D1 D2 D3 XOR

Page   which page want write data ；

D0…D3 data ；

XOR   xor check。

Sample ： Host to Reader : aa bb 0a 00 00 00 13 02 04 88 88 88 88 15

Respond: aa bb 06 00 52 51 13 02 00 12

29. Write key store in RC500 EEPROM 。

Format ：aa bb xx 00 00 00 16 02 Auth_mode   group   xx xx xx xx xx xx   XOR

Auth_mode= 0x60: KEY A ,0x61:   KEY B (ignore in this command)

Group = 0—31 ，write RC500 Eeprom Address from 0x80 to 0x1FF ， total 32

group。

"xx xx xx xx xx xx " = KEY should be writed to   EEPROM。

Sample ：Host to Reader : aa bb 0d 00 00 00 16 02 60 01 ff ff ff ff ff ff 75

Write   group 01   Key = "FF FF FF FF FF FF"

Respond : aa bb 06 00 11 12 16 02 00 17

FCC Warning Statement

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

‑ Reorient or relocate the receiving antenna.
‑ Increase the separation between the equipment and receiver.
‑ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
‑ Consult the dealer or an experienced radio/TV technician for help.

This device complies with part 15 of the FCC Rules.Operation is
Subject to the following two conditions: (1) This device may not
Cause harmful interference,and (2) This device must accept any
Interference received,including interference that may cause
Undesired operation