

# Contactless Card Read/Write Module

## YW-203-C

### User's Manual

(version 1.5)

English

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# 1 Summary

YW-203-C contactless card Read/Write module was designed on high integrated reader ICs for contactless communication on 13.56MHz of Philips. Just send command to module over IIC or UART.

YW-200 series contactless card Read/Write module support ISO14443-A Mifare One S50, S70, UltraLight, MifarePro, ISO14443-B SR176, ISO15693, ICODE SL2 and then other compatible card.

## 2 YW-200-C Series Module

Type	Card Protocol	Vcc	Interface	Card supported	This Page
YW-201-C	ISO14443-A	+5V	IIC,UART(TTL)	Mifare S50,S70, Mifare Pro	
YW-202-C	ISO14443-A ISO14443-B	+5V	IIC,UART(TTL)	Mifare S50,S70, Mifare Pro, ISO14443-B SR176	
YW-203-C	ISO15693	+5V	IIC,UART(TTL)	ICode SL2, ISO15693	✓
YW-204-C	ISO14443-A ISO14443-B ISO15693	+5V	IIC,UART(TTL)	Mifare S50,S70, Mifare Pro, ISO14443-B SR176, ICode SL2, ISO15693	

## 3 YW-203-C Characteristic

☞ Completely operation of Mifare One through simple command set.

☞ Communication Protocol:

1. **UART:** Baud Rate 19200bps.

2. IIC: Max rate 400Kbps.

☞ Auto request card: When the card put into antenna, the pin “CARDIN” will be low.

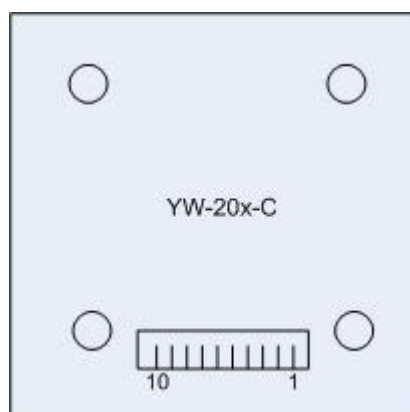
☞ Power supply :+4.5~+5.5V.

☞ Read Card distance 5~10cm. (Depend on the antenna)

☞ You can get C51 source code example with the module.

## 4 Function specification

### 4.1 Pin Function



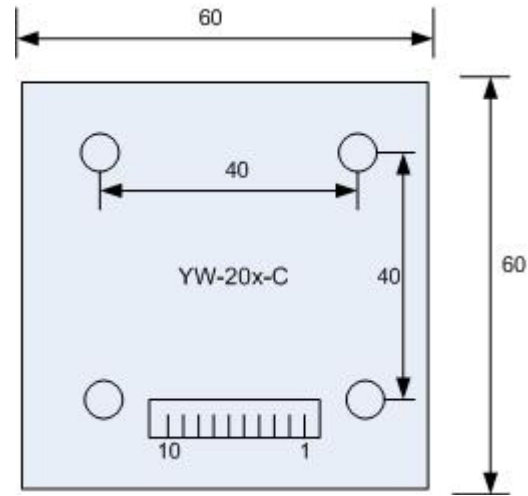
Pic 1

Pin function [Table 1]:

Pin	Function	Description
1	VCC	+5V VCC
2	GND	GND
3	RXD/SCL	UART RXD/ IIC SCL
4	TXD/SDA	UART TXD/ IIC SDA
5	CARDIN	Only Used With M1 Card
6	PORTSEL	Communication Protocol Selector ( 0: IIC, 1: UART )
7	NC	Not Use
8	NC	Not Use
9	NC	Not Use
10	NC	Not Use

Table 1

## 4.2 Dimension



Pic 2

## 5 Protocols

### 5.1 UART Protocols of Commands

Uart Protocols of Commands use data blocks. The format of data block :

#### 1) Format of TXD (MCU → YW-20x-C Module)

	[STX]	[LEN]	[CMD]	[DATA]	[CHK]	[ETX]
Description	0x02	Package Length	Command	The Content of n bytes	Checksum	0x03
Number of Byte	1	1	1	n	1	1

Table 2

- a) Asynchronism half duplex, 1 Start bit + 7 Data bits + 1 Stop bit.
- b) The default transfer speed is 19200 bit/s.
- c) Block Header STX=0x02, Block End ETX=0x03. From header to end, but not include the header STX and the end ETX, if there is 0x02, 0x03

- or 0x10 , then must add 0x10 before it.
- d) Block Header STX=0x02.
- e) Package Length: the byte from Length itself to Checksum, but not include the added byte 0x10 due to 0x02, 0x03 or 0x10.
- f) Command: Refer to the Command List.
- g) The Content of n bytes: the parameter.
- h) CheckSum: XOR result from [Length] to then last byte of [Content], but not include the added byte 0x10 due to 0x02, 0x03 or 0x10.
- i) Block End ETX=0x03.

**Example:**

CMD: 0x10, DATA:0x00

Block Header:0x02.

LEN:0x04(=1Byte (Len) +1Byte (CMD)+1Byte (DATA)+1Byte (CHK))

CMD:0x10, 0x10. (Add 0x01 before 0x10)

DATA:0x00.

CHECKSUM:0x14(=0x04^0x10^0x00)

Package Send:0x02, 0x04, 0x10, 0x10, 0x00, 0x14, 0x03.

**2) Respond Format (YW-20x-C module → MCU)**

	[STX]	[LEN]	[CMD]	[STATUS]	[DATA]	[CHK]	[ETX]
Content	0x02	Package Length	Command	0x00: Success 0xFF: Fail	The Content of n bytes	CheckSum	0x03
Num of Byte	1	1	1	1	n	1	1

Table 3

- a) Asynchronism half duplex, 1 Start bit + 7 Data bits + 1 Stop bit.
- b) The default transfer speed is 19200 bit/s.
- c) Block Header STX=0x02, Block End ETX=0x03. From header to end , but not include the header STX and the end ETX, if there is 0x02, 0x03

- or 0x10 , then must add 0x10 before it.
- d) Block Header STX=0x02.
- e) Package Length: the byte from Length itself to Checksum, but not include the added byte 0x10 due to 0x02, 0x03 or 0x10.
- f) Command: Refer to the Command List. When the MCU send the command to the module, the module send back this command to the MCU.
- g) Status: Operation result. Success: 0x00. Fail: 0xFF.
- h) During the communication, command content.
- i) CheckSum: XOR result from [Length] to then last byte of [Content], but not include the added byte 0x10 due to 0x02, 0x03 or 0x10.
- j) Block End ETX=0x02.

## 5.2 IIC Protocol

### 1) Format of TXD(MCU → YW-20x-C Module)

	[Address of module] (W/R)	[LEN]	[CMD]	[DATA]	[CHK]
Content	Write: 0xA0	Package Length	Command	The Content of n bytes	CheckSum
	Read: 0xA1				
Num of Byte	1	1	1	n	1

Table 4

- a) Address of module (W/R):
- b) When Write to module, the Address is 0xA0.
- c) When Read from module, the Address is 0xA1.
- d) Package Length: the byte from Length itself to Checksum.
- e) Command: Refer to the Command List.
- f) The Content of n bytes: the parameter.
- g) CheckSum: XOR result from [Length] to then last byte of [DATA].

2) Respond Format(YW-20x-Cmodule → MCU)

	[LEN]	[CMD]	[STATUS]	[DATA]	[CHK]
Content	Package Length	Command	0x00:Success 0xFF: Fail	The Content of n bytes	Checksum
Num of Byte	1	1	1	n	1

Table 5

- h) Package Length: the byte from Length itself to Checksum.
- i) Command: Refer to the Command List.
- j) Status: Operation result. Success: 0x00. Fail: 0xFF.
- k) The Content of n bytes: the parameter.
- l) CheckSum: XOR result from [Length] to then last byte of [DATA].

### 5.3 Switch of Uart and IIC

YW-20x-C Contactless card read/write module support UART and IIC, they can be switched by the port PORTSEL

PORTSEL = 1(High), UART is selected.

PORTSEL = 0(Low), IIC is selected.

## 6 Command List

	[CMD Name]	[Dir ]	[LEN ]	[CMD ]	[STATUS and DATA]	[Description]
<b>System Command</b>						
1	Module Setting	Send	0x04	0x01	0x00	4 combination with bit0 and bit1: Antenna Status (BIT0) 0: Turn off Antenna 1: Turn on Antenna Auto Request (BIT1) Not Used
					0x01	
					0x02	
					0x03	



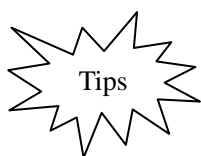
		Return	0x04	0x01	0x00	Status: 0x00: Success 0xFF: Fail			
2	Power Setting	Send	0x03	0x02					
		Return	0x04	0x02			0x00	Status: 0x00: Success 0xFF: Fail	
2	Work Mode Setting	Send	0x04	0x05	0x31				
		Return	0x04	0x05	0x00	Status: 0x00: Success 0xFF: Fail			
					0xFF				
<b>RFID card Command (ISO15693)</b>									
	Inventory	send	0x03	0x50					
		return	0x04	0x50			0x00	Data	Data: DSFID(1Byte)+UID(8Byte)
			0x04	0x50			0xFF		0xFF: Fail
	Stay quiet	send	0x0B	0x51	Data	Data: UID(8Bytes)			
		return	0x04	0x51	0x00	Status: 0x00: Success 0xFF: Fail			
			0x04	0x51	0xFF				
	Select	send	0x0B	0x52	Data	Data: UID(8Bytes)			
		return	0x04	0x52	0x00	Status: 0x00: Success 0xFF: Fail			
			0x04	0x52	0xFF				

	Reset To Ready	send	0x0C	0x53	Data		Data: Mode(1Byte)+UID(8Bytes) 1: Mode Bit0: Select_Flag 0: opration to fixed rfid UID,BIT1=1 1: opration to selected RFID card, BIT1=0,Select command before this. BIT1: Address_flag 0: UID is invalidated 1: Select RFID card UID
		return	0x04	0x53	0x00		Status: 0x00: Success 0xFF: Fail
			0x04	0x53	0xFF		
	Read Block	send	0x0E	0x54	Data		Data: Mode(1Byte)+UID(8Bytes)+start block(1Byte)+number of block(1Byte) Mode:refer to [Reset To Ready] Command
		return	0x04+n	0x54	0x00	Data	Data: BlockData(nBytes)
			0x04	0x54	0xFF		0xFF: Fail
	Write Block	send	0x0D+n	0x55	Data		Data: Mode(1Byte)+UID(8Bytes)+start block(1Byte)+Data of block(n Byte) Mode:refer to [Reset To Ready] Command
		return	0x04	0x55	0x00		Status: 0x00: Success 0xFF: Fail
			0x04	0x55	0xFF		
	Lock Block	send	0x0D	0x56	Data		Data: Mode(1Byte) + UID(8Bytes) + block Index (1Byte) Mode:refer to [Reset To Ready] Command

		return	0x04	0x56	0x00	Status: 0x00: Success 0xFF: Fail	
			0x04	0x56	0xFF		
	Write AFI	send	0x0D	0x57	Data	Data: Mode(1Byte) + UID(8Bytes) + AFI (1Byte) Mode:refer to [Reset To Ready] Command	
		return	0x04	0x57	0x00	Status: 0x00: Success	
			0x04	0x57	0xFF	0xFF: Fail	
	Lock AFI	send	0x0C	0x58	Data	Data: Mode(1Byte) + UID(8Bytes) Mode:refer to [Reset To Ready] Command	
		return	0x04	0x58	0x00	Status: 0x00: Success	
			0x04	0x58	0xFF	0xFF: Fail	
	Write DSFID	send	0x0D	0x59	Data	Data: Mode(1Byte) + UID(8Bytes) + DSFID (1Byte) Mode:refer to [Reset To Ready] Command	
		return	0x04	0x59	0x00	Status: 0x00: Success	
			0x04	0x59	0xFF	0xFF: Fail	
	Lock DSFID	send	0x0C	0x5A	Data	Data: Mode(1Byte) + UID(8Bytes) Mode:refer to [Reset To Ready] Command	
		return	0x04	0x5A	0x00	Status: 0x00: Success	
			0x04	0x5A	0xFF	0xFF: Fail	
	Get System Information	send	0x0C	0x5B	Data	Data: Mode(1Byte) + UID(8Bytes) Mode:refer to [Reset To Ready] Command	
		return	0x04+n	0x5B	0x00	Data	Data: SystemInfo n byte
			0x04	0x5B	0xFF	0xFF: Fail	
	Get Multiple Block Security	send	0x0E	0x5C	Data	Data: Mode(1Byte)+UID(8Bytes)+start block(1Byte)+Number of block(1Byte) Mode:refer to [Reset To Ready] Command	

	status	return	0x04+n	0x5C	0x00	Data	Data: Security status(nBytes)
			0x04	0x5C	0xFF		0xFF: Fail

Table 6



**Turn on the antenna before the operation of contactless card.**

## 7 Command test sample

Samples below are based on uart protocol, and the card is M1 Card.

### 7.1. request card

Send: 02 04 10 10 00 14 03

Receive: 02 08 10 10 00 4D 56 A2 57 F6 03

### 7.2. read block

Send: 02 0B 11 00 3E FF FF FF FF FF FF 24 03

Receive: 02 14 11 00 00 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 04 03

### 7.3. write block

Send: 02 1B 12 00 3E FF FF FF FF FF FF 00 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 36 03

Receive: 02 04 12 00 16 03

### 7.4. download key

Send: 02 0A 1A 00 FF FF FF FF FF FF 10 10 03

Receive: 02 0A 1A 00 FF FF FF FF FF FF 10 10 03

### 7.5. initial purse

Send: 02 0F 14 00 3D FF FF FF FF FF FF 01 00 00 00 27 03

Receive: 02 04 14 00 10 10 03

### 7.6. read purse

Send: 02 0B 15 00 3D FF FF FF FF FF FF 23 03

Receive: 02 08 15 00 10 02 00 00 00 1F 03

**7.7. increment of purse**

Send: 02 0F 16 00 3D FF FF FF FF FF FF 01 00 00 00 25 03

Receive: 02 04 16 00 12 03

**7.8. decrement of purse**

Send: 02 0F 17 00 3D FF FF FF FF FF FF 01 00 00 00 24 03

Receive: 02 04 17 00 13 03

**7.9. purse backup**

**7.9.1 initial purse 1**

Send: 02 0F 14 00 3D FF FF FF FF FF FF 01 00 00 00 27 03

Receive: 02 04 14 00 10 10 03

**7.9.2 initial purse 2**

Send: 02 0F 14 00 3C FF FF FF FF FF FF 05 00 00 00 22 03

Receive: 02 04 14 00 10 10 03

**7.9.3 purse backup from 1 to 2**

Send: 02 0C 18 00 3D 3C FF FF FF FF FF FF 15 03

Receive: 02 04 18 00 1C 03

**7.9.4 read purse 2**

Send: 02 0B 15 00 3C FF FF FF FF FF FF 22 03

Receive: 02 08 15 00 FF 04 00 00 E6 03

**7.10. card halt**

Send: 02 10 03 19 1A 03

Receive: 02 04 19 00 1D 03

**7.11. read RC500EEPROM**

Send: 02 06 1B 00 70 10 10 7D 03

Receive: 02 14 1B 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0F 03

**7.12. write RC500EEPROM**

Send: 02 15 1C 00 70 FF FF FF FF FF FF FF FF FF FF FF FF FF FF 79 03

Receive: 02 04 1C 00 18 03

**7.13. module IDLE**

Send: 02 10 03 10 02 01 03

Receive: 02 04 10 02 00 06 03

**7.14. module set**

Contactless Card, RFID...

<http://www.youwokeji.com.cn>

Send: 02 04 01 00 05 03(turn off antenna)

Receive: 02 04 01 00 05 03

Send: 02 04 01 01 04 03(turn on antenna)

Receive: 02 04 01 00 05 03

## 8 Order

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