



QUIO QM-201C-HF Contactless Card Read or Write Module User Manual

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QM-201C-HF Contactless Card Read or Write Module
User Manual



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QM-201C-HF Contactless Card Read or Write Module

Contactless Card Read/Write Module QM-201C-HF

Contactless Card Read/Write Module

QM-201C-HF

User's Manual

(version 1.4)

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Summary

QM-201C-HF contactless card Read/Write module was designed on high integrated reader ICs for contactless communication on 13.56MHz of Philips.QM-201 integrates MF RC500 RF base station . Engineers need not take care how to control MF RC500 RF base station. Just send command to module over IIC or UART.

QM-200 series contactless card Read/Write module support ISO14443-A Mifare One

S50,S70 UltraLight MifarePro,ISO14443-B SR176, ISO15693 ,I CODE SL2 and then other compatible card.

QM-200 Series Module

Type	Card Protocol	Vcc	Interface	Card	supported This Page
QM-201C-I-	15014443-	+5V	IIC,UART(TTL)	Mifare S50,S70, Mifare Pro	I
QM-202-C	ISO14443-A ISO 14443-B	+3.3V-1-5V	IIC,UART(TTL)	Mifare S50,S70, Mifare Pro, ISO14443-B SR176	
QM-203-C	19315693	+3.3V-1-5V	IIC,UART(TTL)	ICode SL2, ISO15693	
QM-204-C	ISO14443-A ISO14443-B ISO15693	+3.3V--+5V	IIC,UART(TTL)	Mifare S50,S70, Mifare Pro, 18014443—B SR176, ICode SL2, ISO15693	

QM-201C-HF Characteristic

☞ Completely operation of Mifare One through simple command set.

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☞ 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.

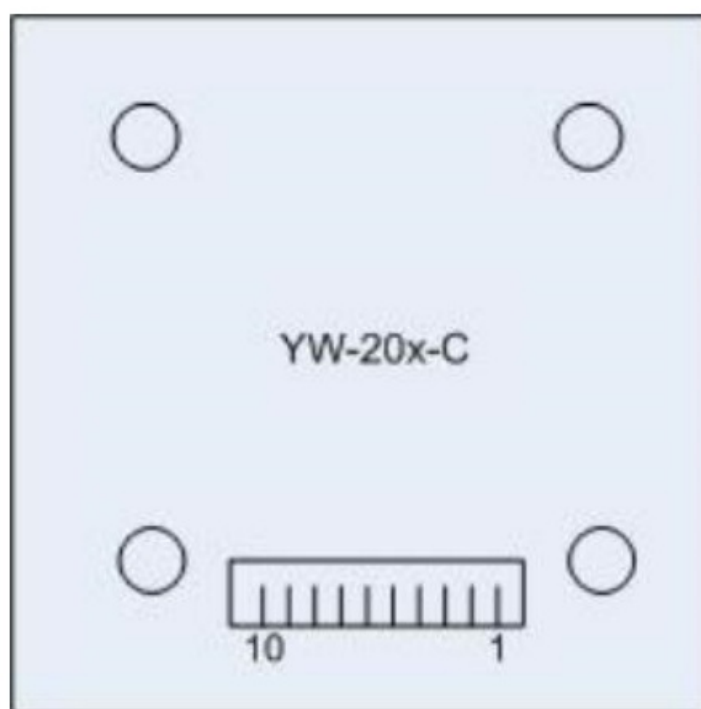
☞ Power supply :+4.5~+5.5V.

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

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

Function specification

4.1 Pin Function

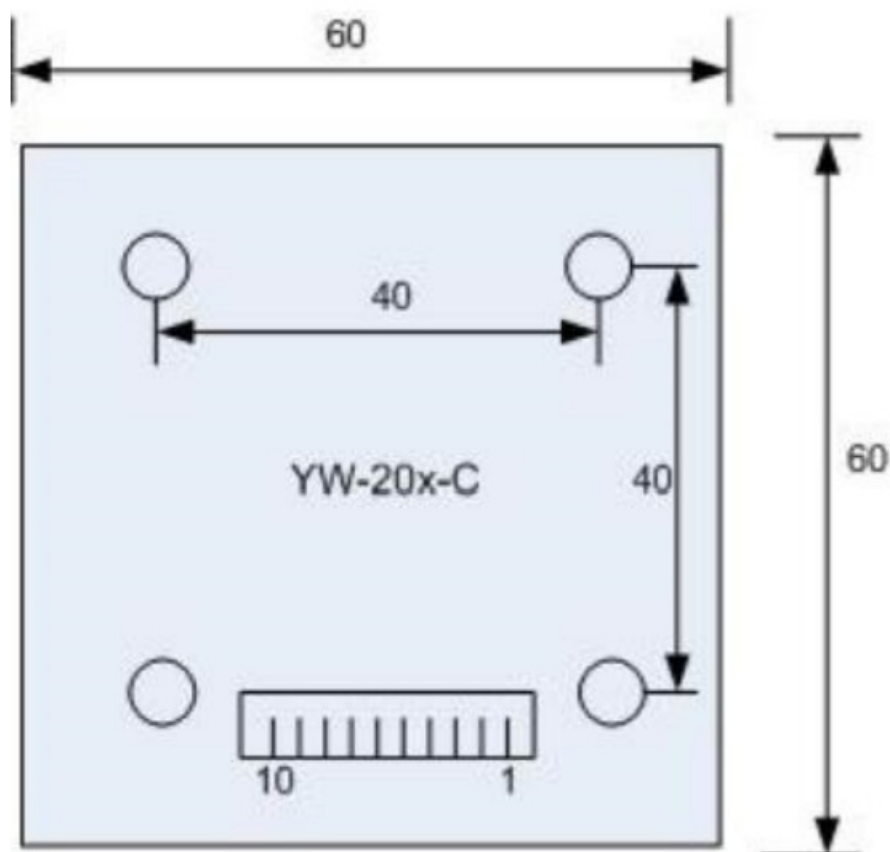


Pic 1

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	Card In/Out Indicate(Only when auto request) 0:Card In. 1:Card Out.
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

4.2 Dimension



Pic 2

Protocols

5.1 UART Protocols of Commands

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

1) Format of TXD MCU → QM-201C-HF Module

	[SIX]	[LEN]	[CMD]	[DATA]	[CHK]	[ETX]
Description	0x02	Package Length	Commad	The Content of bytes	CheckSum	0x03
Number of Byte	1	1	1	n	1	1

Table 2

- Asynchronism half duplex, 1 Start bit + 7 Data bits + 1 Stop bit.
- The default transfer speed is 19200 bit/s.
- 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.
- Block Header STX=0x02.
- Package Length: the byte from Length itself to Checksum, but not include the added byte 0x10 due to 0x02,0x03 or 0x10.
- Command: Refer to the Command List.
- The Content of n bytes: the parameter.
- CheckSum: XOR result from [Length] to then last byte of [Content], but not include the added byte 0x10 due to 0x02,0x03 or 0x10.
- Block End ETX=0x02.

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 QM-201C-HFmodule → MCU

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

Table 3

- Asynchronism half duplex, 1 Start bit + 7 Data bits + 1 Stop bit.
- The default transfer speed is 19200 bit/s.
- 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.
- Block Header STX=0x02.
- Package Length: the byte from Length itself to Checksum, but not include the added byte 0x10 due to 0x02,0x03 or 0x10.
- Command: Refer to the Command List.When the MCU send the command to the module, the module send back this command to the MCU.
- Status: Operation result. Success: 0x00. Fail: 0xFF.
- During the communication, command content.
- CheckSum: XOR result from [Length] to then last byte of [Content], but not include the added byte 0x10 due to 0x02,0x03 or 0x10.
- Block End ETX=0x02.

5.2 IIC Protocol

- Format of TXD(MCU → QM-201C-HF 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(QM-201C-HFmodule → 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

QM-201C-HF 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.

Command List

	[CMD Name]	[Dir]	[LEN]	[CMD]	[STATUS and DATA]	[Description]
System Command						
1	Module Setting	Send	0x04	0x01	0x00	4 combination with bit() and bit1: Antenna Status (BIT0) 0: Turn off Antenna 1: Turn on Antenna
					0x01	
					0x02	

					0x03		Auto Request (BITI) 0: Turn off Auto Request 1: Turn on Auto Request	
		Recurn	Ox04	Ox01	0x00		Status: Ox00: Success OxFF: Fail	
					OxFF			
2	Power Se tting		0x03	0x02				
		Recurn	0x04	0x02	Ox00		Status: Ox00 -Success OxFF: Fail	
					OxFF			
Contact less card Command								
1	Request Card		(kW	Ox10	Ox00		Request card modes Ox00: request all card in antenna area °set: r equest card that have not halted in antenna area	
					Ox01			
		Recurn	108	oxio	0x00	Serial I No	Status: Ox00: Request success + Card Serial No(4 b ytes). OxFF: Request Fail.	
			0x04		OxFF			
4	Read Block	Send	OxOB	Ox11	8Byte		Key Set(1Byte)+Block No(1Byte) 4 Key (6Byte s) a.Key Set (1Byte) t Select Key A. B(BITIB ->O:Key A: 1:Key B K ey lIode(BITI)-> O:Use key passed. 1:Use key downloaded. b.Index of Key Downloaded(BITe11117) ->O' 31	
		Recurn	0x14	Oat I	0x00	Data	Ox00: Success. 16 bytes of data return.	
			0x04		OxFF		OxFF: Fail	
S	Mile Block	Send	OxIB	Ox12	24bytes		Key set (1Byte) +Block %(illy te) + Key (011y tes)+ Data (16Bytes) a. Key Set (1Byte): Select Key A. B(BITO)->O:Key A: 1:Key B	

							->0'31
		,117	II	0x12	Ox00		Status: Ox00: Success OxFF: Fail
					OxFF		
6	Read Sector	Send	OxOB	0x13	Kbytes		Key Set (IByte) + Index of Sector (IByte) +Key (6Bytes) a.Key Set (IByte): Select Key A.B(BITO)->O:Key A:l:Key B Key lIode(BITl)-> O:Use key passed. l:Use key downloaded. b.Index of Key Downloaded(BIT2-BIT7) -4'31
		Rawn	0x44	Ox113	Ox00	Data	Ox00: success. Mbytes of data return.
			0x04	0x13	OxFF		OxFF: Fail
7	Initialize purse	Send	OxOF	4	I2Bytes		Key Set (IByte) +I ndex of Block (IByte)+ Key (6Bytes) +Purse Initial Value (4aytes. LSB) a.Key Set (IByte) l Select Key A,BWITC0->O:Key A; l:Key B Ke y Mode(BITl)-> O:Use key passed. l:Use key downloaded. b. Index of Key Downloaded(13112% BITD ->C31
		Rawn	0x04	0x14	Ox00		Slaws: Ox00: Success OxFF: Fail
					OxFF		
8	131	Send	OxOB	0x15	SBytes		Key Set (IByte)+Index of Block(IByte)+ Key (BBytes) a.Key Set(IByte)i Select Key A.B(BITO)->0:1Cey A;l:Key B Ke y Node (BITl)-> O:Use key passed. l:Use key downloaded. b. Index of Key Downloaded(BITfllIM ->O'31
		Recurrn	0x08	0x15	Ox00	Data	040: Success. abytcS of purse valuellSBI

			0x04		0xFF	0xFF: Fail
--	--	--	------	--	------	------------

9	doarnent	Send	0x0F	0x16	12Bytes	Key Set (1Byte)+ Index of Block(1Byte)+ Key (6Bytes) + value of decrement (-Myles, LSB) a.Key Set (1Byte1: Select Key A.B(BITC)-)0:Key A:1:Key B Key I lode(BITl)-> 0:Use key passed. 1:Use key downloaded. b.Index of Key Dom loaded (BITaM) ->0'31
		Return	4	0x16	0x00	Status: 0x00: Success 0xFF: Fail
					0xFF	
10	Increment	Send	0x0F	0x17	12Bytes	Key Set (1Byte)+Index of Block(1Byte)+ Key (6Byte) + value of Increment (4Bytes. LSB) a.Key Set (-Byte): Select Key A.B(BIT0)->0:Key A:1:Key B Key I lode(BITl)-) 0:Use key passed. 1:Use key downloaded. b.Index of Key Downloaded (BITeBIT7) ->0'31
		i -	0x04	0x17	Status:	0x00: Success 0xFF: Fail
					0xFF	
11	Purse backup	Send	0x0C	0x18	9Bytes	Key Set (1Byte)+ Index of Block(1Byte)+ Index of Block Backup(1Byte) +Key (6Byte) a.Key Set (1Byte): Select Key A.B(BIT0)->0:Key A:1:Key B Key I lode(BITl)-> 0:Use key passed. 1:Use key downloaded. b.Index of Key Downloaded(BIT2.13ITD ->0'31 ps: the index of block and the backup block must be in the sae sector.
					0x00	Status:

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 0F 03
7.12 write RC500EEPROM
Send 02 15 1C 00 70 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
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

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