Product Feature

Dual frequency radio base station 125K and 13.56MHz
Support IC/ID card
a) IC card: ISO14443 TYPE A standard/Mifare standard
b) ID card: support EM, TK and compatible ID cards
ID card (125K): read the card ID
IC card (13.56MHz): The chip integrates commands such as automatic card searching, reading, writing, initializing electronic wallet, value adding, devaluing, and checking balance. The user can use the command set to simply operate the card.
Integrated antenna design
Ultra-low static power consumption: ≤30uA
Support serial TTL communication
Ultra-small size, only 62mm×34.5mm

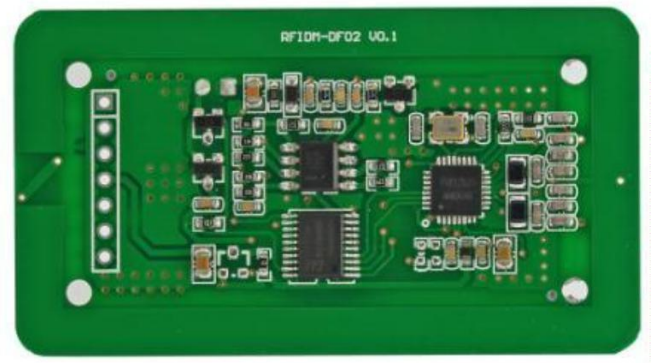
Product Introduce

RFIDM-DF02 read-write module adopts 125K and 13.56MHz non-contact dual radio frequency technology. The user only needs to Dispatch commands through simple instructions to achieve complete operation of the card. This series of reader modules support IC cards: Mifare One S50, S70, FM11RF08 and ID cards: EM4100, TK4100 and compatible cards. RFIDM-DF02 module has strong software and hardware expansion functions, and personalized modules can be customized according to user requirements.

Application

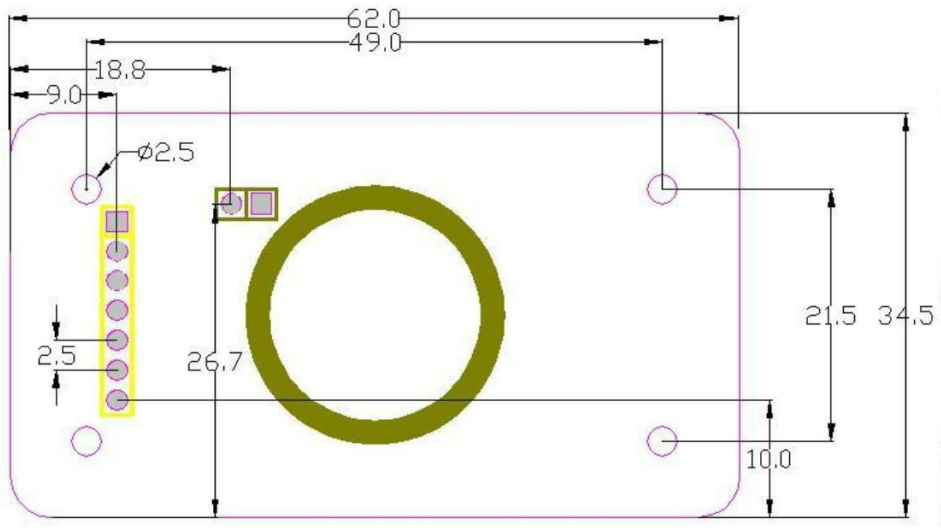
- Tablet PC
- Smart meter for water, electricity and gas
  Transport card reader, desktop card issuer
- Access control & Time Attendance reader
- Hotel readers, card issuers
- Hotel and household door locks
- Automobile electronic induction lock matching
- Safety control of storage box in office/shopping mall/bath center
- Various anti-counterfeiting systems And production process control

Product Picture



Szie Parameters

Unit ：mm



Product NO.

Item No.	Desribtion	Card Type Support
RFIDM-DF02-115200	UART Interface TTL ,Baud Rate 115200	S50,S70,FM11RF08,EM4100,TK4100 and compatible cards

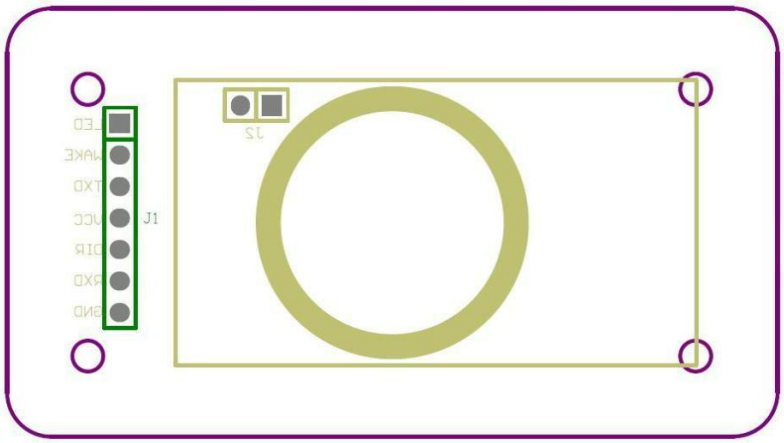
Absolute maximum ratings

Parameter	Rated value	Unit
Supply voltage	-0.3～5.5	V
Working Temperature	-40～+85	℃
Storage Temperature	-50～+100	℃

Technological Parameter

Parameter	Technical Parameters				State
	Min	Typical value	Max	Unit	
Power supply					
Supply voltage	3.3	3.3	5.0	V	
Peak reading current	-	-	60	mA	
Average quiescent current	-	-	30	uA	
Reading Distance	-	-	5	CM	Standard card test
Frequency					
Range	100	125	150	KHz	ID card base station
	-	13.56	-	MHz	IC card base station

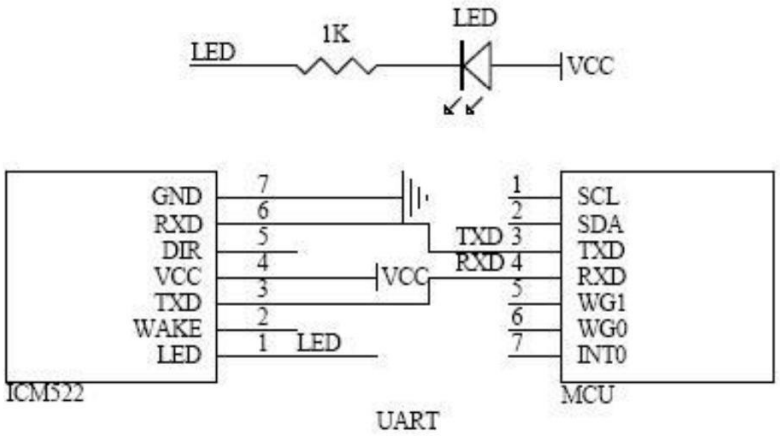
Pin Function Description



Pin	Name	Direction	Description
J1_1	LED	O	Card status indication (High level: no card indication; low level: card indication)
J1_2	WAKE	I	Falling edge trigger wake up after low power sleep
J1_3	TXD	O	TXD serial data output/WG1 Wiegand DATA1/IIC SDA
J1_4	VCC	Pwr/I	DC3.3V/5.0V power input
J1_5	DIR	O	RS485 Direction change
J1_6	RXD	I	RXD serial data input/WG0 Wiegand DATA0/IIC SCL
J1_7	GND	G	Power ground
J2_1	ANT1	O	125KHz Antenna interface 1
J2_2	ANT2	I	125KHz Antenna interface 2

Application Diagram

UART TTL Interface typical circuit



Data communication protocol

UART Interface Protocol

UART Interface：

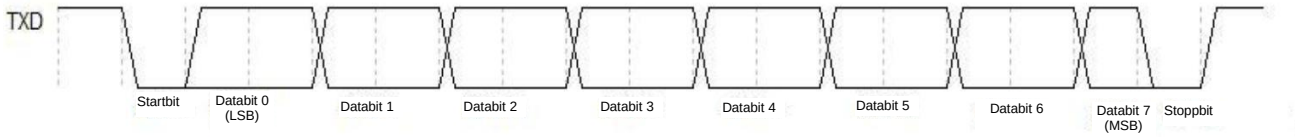
Start bit：1

Data bit：8

Parity bit：None

Stop bit：1

diagram：



Data Format：

Module ground (2 Byte)	length(1 Byte)	command(1Byte)	Data(n Byte)	verify(1 Byte)

Module address: fixed to 0x00 for a module used alone;

For the network version module, it is 0x01~0XFE; 0xFF is broadcast (no answer).

Note: The module address is exactly the same 2 bytes.

Length: length (1Byte) + command (1Byte) + data (nByte)

Command: valid command (Reference command table)

Data: valid data

Check: length (1Byte) + command (1Byte) + data (nByte) XOR

Return data format：

Command header(1Byte)	length(1Byte)	Success/failure value(1Byte)	Data(n Byte)	verify(1 Byte)

Command header: 0xFE

Length: Length (1Byte) + Command (1Byte) + Data (n Byte)

Success/Failure value: (Reference command table)

Data: If there is data returned, it is valid data

Verify: Length (1Byte) + Command (1Byte) + Data (n Byte) XOR

Command list：

No.	Command name	Dispatch/ return status	Command format					
			Address	Command header	Length	Command	Data	verify
			2BYTE	1BYTE	1BYTE	1BYTE	n BYTE	1BYTE
Module operation command								
1	Set the module to low power consumption state	Dispatch	0x00 0x00	-	0x02	0x01	-	0x03
		Correct return	-	0xFE	0x02	0x01	-	0x03
		Error return	-	0xFE	0x02	0xE0	-	0xE2

2	Antenna and card seek control	Dispatch	0x00 0x00	-	0x03	0x02	**1 byte:** BIT0 Antenna status → BIT0=0 : OFF BIT0=1 : ON BIT1 Automatic card detection → BIT1=0 : OFF BIT1=1 : ON	Actual calculated value
		Correct return	-	0xFE	0x02	0x02	-	0x00
		Error return	-	0xFE	0x02	0xE1	-	0xE3
3	Set auto scan ID	Dispatch	0x00 0x00	-	0x02	0x0C	**1 Byte** : 0 : Turn on automatic card number reading 1 : Turn off automatic card number reading	Actual calculated value
		Correct return	-	0xFE	0x02	0x0C	-	0x0E
		Error return	-	0xFE	0x02	0xEB	-	0xE9
Card operation command								
4	Seek Card	Dispatch	0x00 0x00	-	0x03	0x03	**1 Byte** : 0 : Seek all cards in the reading area 1 : Seek all card in the dormant state	Actual calculated value
		Correct return	-	0xFE	0x07	0x03	**4 Byte** : 4 Byte Card Serial Number **1 Byte** : 01 : IC Card 02: ID Card	Actual calculated value
		Error return	-	0xFE	0x02	0xE2	-	0xE0

5	Read Block	Dispatch	0x00 0x00	-	0x0A	0x04	**1Byte Key identifier:** BIT0 ＝0：A Key ＝1：B Key BIT1 ＝0：Using instruction 6 Byte Key **1 Byte Block No.:** ＝ 0～63（S50） ＝ 0～255（S70） **6ByteKey:**	Actual calculated value
		Correct return	-	0xFE	0x12	0x04	16Byte Data	Actual calculated value
		Error return	-	0xFE	0x02	0xE3	-	0xE1
6	Write Block	Dispatch	0x00 0x00	-	0x1A	0x05	**1Byte Key identifier:** BIT0 ＝0：A Key ＝1：B Key BIT1 ＝0：Using instruction 6 Byte Key **1Byte Block No.:** ＝ 0～63（S50） ＝ 0～255（S70） **6Byte Key:** **16Byte Data:**	Actual calculated value
		Correct return	-	0xFE	0x02	0x05	-	0x07
		Error return	-	0xFE	0x02	0xE4	-	0xE6
7	Purse Initialization	Dispatch	0x00 0x00	-	0x0E	0x06	**1Byte Key identifier:** BIT0 ＝0：A Key ＝1：B Key BIT1 ＝0：Using instruction 6 Byte Key **1Byte Block No.:** ＝ 0～63（S50） ＝ 0～255（S70） **6Byte Key:**	Actual calculated value

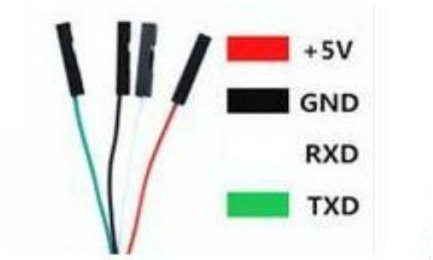
							4 Byte increase value (lower byte first):	
		Correct return	-	0xFE	0x02	0x06	-	0x04
		Error return	-	0xFE	0x02	0xE5	-	0xE7
8	Read Purse	Dispatch	0x00 0x00	-	0x0A	0x07	**1Byte Key identifier:** BIT0 ＝0：A Key ＝1：B Key BIT1 ＝0：Using instruction 6 Byte Key **1 Byte Block No.:** ＝ 0～63（S50） ＝ 0～255（S70） **6ByteKey:**	Actual calculated value
		Correct return	-	0xFE	0x06	0x07	**4 Byte increase value (lower byte first):**	Actual calculated value
		Error return	-	0xFE	0x02	0xE6	-	0xE4
9	Recharge	Dispatch	0x00 0x00	-	0x0E	0x08	**1 Byte Key identifier:** BIT0 ＝0：A Key ＝1：B Key BIT1 ＝0：Using instruction 6 Byte Key **1 Byte Block No.:** ＝ 0～63（S50） ＝ 0～255（S70） **6 Byte Key:** **4 Byte increase**	Actual calculated value

							value (lower byte first):	
		Correct return	-	0xFE	0x02	0x08	-	0x0A
		Error return	-	0xFE	0x02	0xE7	-	0xE5
10	Deduction	Dispatch	0x00 0x00	-	0x0E	0x09	**1 Byte Key identifier:** BIT0 ＝0：A Key ＝1：B Key BIT1 ＝0：Using instruction 6 Byte Key **1 Byte Block No.:** ＝ 0～63（S50） ＝ 0～255（S70） **6 Byte Key:** **4 Byte increase value (lower byte first):**	Actual calculated value
		Correct return	-	0xFE	0x02	0x09	-	0x0B
		Error return	-	0xFE	0x02	0xE8	-	0xEA
11	Backup Purse	Dispatch	0x00 0x00	-	0x0B	0x0A	**1 Byte Key identifier:** BIT0 ＝0：A Key ＝1：B Key BIT1 ＝0：Using instruction 6 Byte Key **1 Byte current purse block number:** **1Byte Backup**	Actual calculated value

							purse block number : ＝ 0～63（S50） ＝ 0～255（S70） **6 Byte Key:Backup purse spans sectors , the current purse block number key and backup purse block number must be the same**	
		Correct return	-	0xFE	0x02	0x0A	-	0x08
		Error return	-	0xFE	0x02	0xE9	-	0xEB
12	Card Sleep	Dispatch	0x00 0x00	-	0x02	0x0B		0x09
		Correct return	-	0xFE	0x02	0x0B	-	0x09
		Error return	-	0xFE	0x02	0xEA	-	0xE8

Serial debugging example:

Correctly connect the USB-to-serial TTL cable, TXD, RXD, and GND.



Data Format introduce ：

Length ：Length (1Byte) + Command(1Byte) + Data(nByte)

Command：Valid command(Reference command table)

Data：Valid Data

verify：Length(1Byte) + command (1Byte) + Data(nByte) XOR

Reading card serial number: note: For card operation, the card must be close to the module antenna, otherwise an error will be returned!

Dispatch:00 00 03 03 00 00 //Seek card command

Module ground (2Byte)	Length (1Byte)	Command (1Byte)	Data(nByte)	Verify (1Byte)
00 00	03	03	00	00

Correct return:FE 07 03 xx xx xx xx xx xx //back 4Byte card number 、 card type 、 verify

Error return: FE 02 E2 E0

Command head (1Byte)	Length (1 Byte)	Success/failure value (1Byte)	Data(n Byte)		Verify (1Byte)
			Read 4Byte card serial number	Car type 01：IC卡 02：ID卡	
FE	07	03	xx xx xx xx	xx	xx
FE	02	E2	-	-	E0

Reading IC Card (or block): Note:For card operation, the card must be close to the module antenna, otherwise an error will be returned!

Dispatch: Dispatch: 00 00 0a 04 00 01 ff ff ff ff ff ff 0f //Reading Block command (No.1)

Module ground(2 Byte)	Length (1 Byte)	Command (1Byte)	Data(nByte)			Verify (1Byte)
			Key Identify	Block number	Key	
00 00	0a	04	00	01	ff ff ff ff ff ff	0f

Correct return:FE 12 04 xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx //Back 16Byte block Data+Verify

Error return: FE 02 E3 E1

Command head (1Byte)	Length (1Byte)	Success/failure value (1Byte)	Data(nByte)	Verify (1Byte)
			Reading Card block 1 -16Byte Data	
FE	12	04	xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx	xx
FE	02	E3	-	E1

Reading IC Card (or block): Note:For card operation, the card must be close to the module antenna, otherwise an error will be returned!

Dispatch: Dispatch: 00 00 1a 05 00 01 ff ff ff ff ff ff 00 11 22 33 44 55 66 77 88 99 aa bb cc dd ee ff 1e //Write block command (No.1)

Module ground(2Byte)	Length (1Byte)	Command (1Byte)	Data(nByte)				Verify (1Byte)
			Key identify	Block number	Key	Reading Card block 1-16Byte Data	
00 00	0a	05	00	01	ff ff ff ff ff ff	00 11 22 33 44 55 66 77 88 99 aa bb cc dd ee ff	1e

Correct return: FE 02 05 07

Error return: FE 02 E3 E1

Command head	Length (1Byte)	Success/failure value (1Byte)	Data (n Byte)	Verify (1Byte)

(1Byte)				
FE	02	05	-	07
FE	02	E4	-	E6