# CM-RFM
# User Manual

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CM-RFM is a highly-centralized, half-duplex mircopower, wireless data and high-performance radio frequency module.

CM-RFM provides choice of multiple channels, which can be used to modify online serial rate, transmit power, RF rate and other parameters. The module comes with an RS485 port and an RS232 communication port, an process transparent transmission of traditional serial devices, such as PLC, HMI and instrument, to achieve more long-distance communication. Also, it can program and diagnosis PLC through programming software to achieve program download function.

Application：

★Wireless sensor

★Vehicle management

★Meteorological, remote sensing

★Home Automation

★Wireless meter reading

★Automated data acquisition

★Industrial remote control, telemetry

★POS systems, asset management

★Building area automation and security

★Robot control

Features：

★1-2 km transmission distance（10Kbps,20dBm）

★8 optional communication channels

★Sleep to work Quick Start

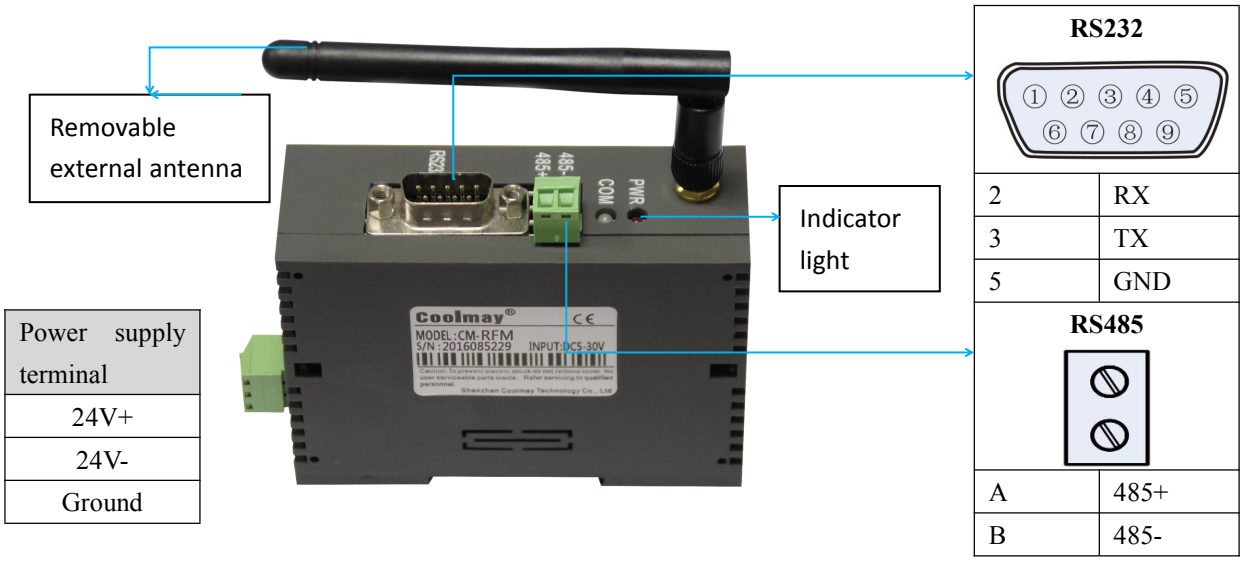
★FSK modulation

★Dual 256bytes data buffer

★Suitable for large data transmission

# 1, Hardware parameters

## 1.1 Module type and appearance




Size:90*32*60mm

Installation: DIN-Rail installation

## 1.2 Indicator light

Indicator lights on CM-RFM, its role as follows:

| Indicator light | Function |
|---|---|
| PWR | Power indicator light |
| COM | After the PLC and the CM-RFM radio module are connected,when the serial port has communication, the COM LED will flash |

The CRM-RFM radio module can be configured with a wide range of communication channels with transmit power up to 100mW (20dBm) while still offering lower power consumption.The module is equipped with dual 256bytes large buffer. When the buffer is empty, the user can transmit 256bytes of data at a time. CM-RFM module

provides standard RS232 and RS485 ports, 1200/2400/4800/9600 / 19200/38400 / 115200bps seven rates, and three interface verification methods.CRM-RFM module RS232 and RS485 port using transparent data transmission, can adapt to standard or non-standard user agreement, the received data is sent data and transmission mode.

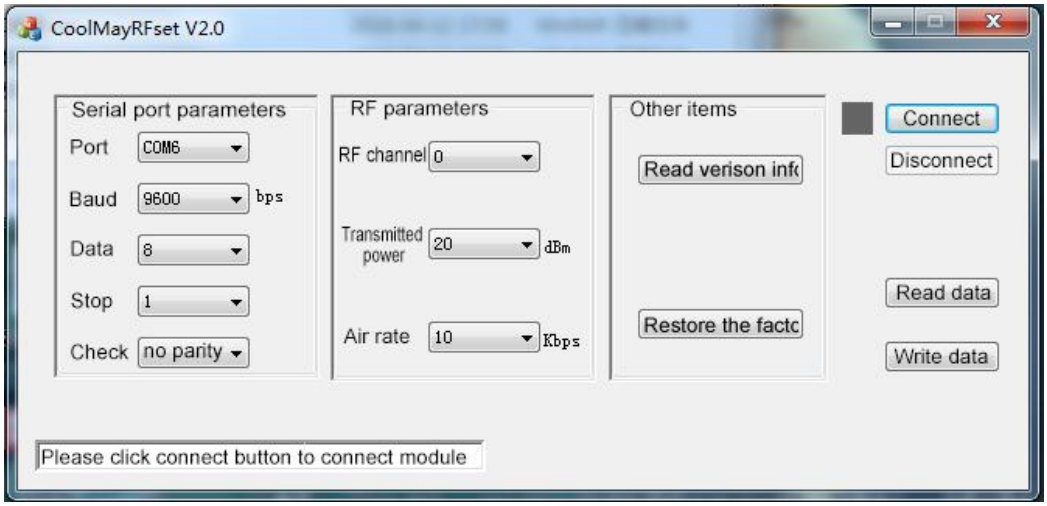
CM-RFM module uses serial port to set internal communication parameters. It has rich and convenient software programming option, including frequency, air speed, serial port rate, and verification mode. Users can use the serial port assistant to send commands to dynamically modify.

## 2, CM-RFM module parameters

CM-RFM is flexible enough to set different options depending on the user's needs.

| Setting | options | Default |
|---|---|---|
| **Serial port speed** | 1200,2400,4800,9600,19200,38400,115200bps | 9600bps |
| **Serial data bits** | 8bits | 8bit |
| **Serial port stop bit** | 1bit,2bits | 1bit |
| **Serial parity bit** | Even (None), even parity (Even), even parity (Odd) | No parity |
| **RF Send and receive channels** | Channel 0,1,2,3,4,5,6,7 | Channel 0 |
| **RF Airborne rate** | 1Kbps,10Kbps,19.2Kbps,38.4Kbps,50Kbps,100Kbps | 10Kbps |

Users can connect to RS232 or RS485 on the product via USB to RS232 or USB to RS485 and connect with the computer. Use serial port assistant to serialize the serial port baud rate, serial port verification, send/receive frequency, air speed, output power and other parameters of the RF module. Settings, it should be noted that if the input setting command is incorrect, the module will not make any response or return ERROR! prompt, please refer to the CM-RFM RF module AT command set for the specific setting method.




Setting CM-RFM radio module parameters

## 3, CM-RFM Specification

| RF parameters | |
|---|---|
| Operating frequency range | 430-450Mhz |
| Modulation | GFSK |
| Channel spacing | 150kHz |
| Transmission power | The maximum 20dBm(100mw), there are 9 powers available to choose |
| Receiver sensitivity | -114dBm(@10Kbps,dev=25kHz,BER<0.1%) |
| Transmission power | 1-100Kbps |
| Transmission distance | 1-2 kilometers@10Kbps,20dBm,open space |
| **Serial port parameters** | |
| UART Baud rate | 1200-115200bps |
| UARTdata bit | 8bits |
| UART stop bit | 1bit,2bits avaliable |
| UART parity bit | No parity, odd parity, even parity |
| UART Cache space | Dual 256bytes |
| **Power consumption characteristics** | |
| VCC Power supply input voltage | 5V~30V |
| Emission current | ≦100mA@100mw |
| Receive Electric | ≦25mA@10Kbps |
| Sleep current | ≦100uA |
| **Working environment requirements** | |
| Working temperature | -30℃ - 85℃ |

| | |
|---|---|
| Working humidity | 10%～90%（No condensation） |
| **Dimensions** | |
| Size | 90mm*60mm*32mm |

## 4, Attentions of CM-RFM

Considering the complexity of over-the-air transmission and the inherent characteristics of wireless data transmission, the following issues should be considered.

### 4.1Data delay in wireless communication

Since the wireless communication transmitting end receives a certain amount of data from the terminal device, or waits for a certain time to start transmitting without new data, there is a delay of several tens to hundreds of milliseconds from the wireless communication transmitting end to the wireless communication receiving end (specific The delay is determined by the serial port rate, the air rate, and the size of the data packet. In addition, it takes a certain amount of time from the wireless communication receiving end to the terminal device, but the delay time is fixed under the same conditions.

### 4.2 Data flow controlling

Although the CM-RFM module has a large-capacity buffer of 256 bytes, if the serial port rate of the sender is greater than or equal to the air rate, the serial port rate of the receiver is less than or equal to the air rate, there is a problem of data traffic, and data loss may occur due to data overflow. The phenomenon. In this case, the sender needs to delay the transmission of data packets, and the above problems will not occur.

### 4.3 Error control

The CM-RFM module has strong anti-interference ability, and it already contains powerful error correction capability in coding. However, under extremely harsh conditions or the field strength of the receiving ground is already in the critical state of receiving by the CM-RFM RF module, it is inevitable that there will be no reception or packet loss. At this point, the customer can increase the development of the link layer protocol of the system, such as adding packet retransmission and other functions, which can greatly improve the reliability and flexibility of the wireless network.

## 4.4 FAQ

| | |
|---|---|
| **The device can not be communicated normally** | 1. Communication protocols at both ends are inconsistent. For example, the baud rate and parity are inconsistent. |
| | 2.Both ends of the frequency, air baud rate are all inconsistent. |
| | 3.Power supply is not connected properly |
| | 4.The communication distance is out of range, or the antenna is in poor contact |
| | 5.The module has already been damaged |
| **The close distance of communication** | 1.Poor power-driven capacity |
| | 2.Power ripple is too large |
| | 3.Poor antenna contact or incorrect antenna type |
| | 4.Receiving environment is poor, such as building-intensive, a strong source of interference |
| | 5.The same frequency will interfere |
| **Recevie wrong data** | 1.Interface is not properly configured |
| | 2.Poor interface connection |
| | 3.The interface cable is too long |
| | 4.Baud rate is not set correctly |

# 5. Attentioned problems of AT command setting

1、Only when you input %%AT+MODE=START command can into the AT command mode。

2、When sending the AT command by the serial assistant, remember not to tick the Send new line option

3、After setting parameters %% AT + MODE = END must be used exit AT command mode, or let the module re-power on. Otherwise, the configured parameters do not take effect。

4、The factory defaulted setting is as below

RF module channel：0

RF module power：20dBm

RF module Airborne rate：10Kbps

Module serial port parameters: 9600Kbps, 8 data bits, 1 stop bit, no parity

## 6.AT instruction set of CM-RFM

1,%%AT+MODE=START

Enter into AT command mode

Return:start

2,AT+CH=<para>

Set frequency channel of the transparent module，para channel range 0~7。
Example: AT+CH=0
Choose communication channel 0

Return：OK!

3,AT+CH

Obtains the current frequency channel of the transparent module
Example: AT+CH

Return：RF CH IS :0

4,AT+CH=?

Get RF channel input parameter prompts
Example: AT+CH=?

Return：AT+CH=0~7

5,AT+POWER=<para>

Set the frequency channel of the transparent module，para range 0~9 .

-40dBm

-16dBm

-10dBm

-5dBm

0dBm

5dBm

10dBm

15dBm

18dBm

20dBm

Example: AT+POWER=9
Configure the RF power to 20dBm

Return：OK!

6,AT+POWER

Obtain the current power value of the transparent module。
Example: AT+POWER

Return：RF POWER IS:20dBm

7,AT+POWER=?
Get RF power input parameter prompts
Example: AT+POWER=?

Return:AT+POWER=0~9

8,AT+RFRATE=<para>

Set the transponder module airspeed , para value : 1K,10K,19.2K,38.4K,50K,100K

Respectively：0~5

Example: AT+RATE=10
Configure the wireless data transmission rate to 10Kbps

Return：OK!

9,AT+RFRATE

Get the current RF air-rate configuration value for the transparent module
Example: AT+RFRATE

Return: RF RATE IS:10Kpsb

10,AT+RFRATE=?

Get the RF air rate configuration parameter prompt for the Transparent module
Example:AT+RFRATE=?

Return: AT+RFRATE=1/10/19.2/38.4/50/100

11,AT+UART=<para1>,<para2>,<para3>

Set the serial port parameters of the transparent module
Para1:Serial baud rate,1200，2400，4800，9600，19200，38400，115200
Para2:Stop bit，Value 1，2
Para3:check digit，the values N (even parity), E (odd parity), D (even parity)
Example: AT+UART=9600,1,N
Configured the baud rate of the serial interface is 9600,8 bits of data(Data bits are fixed to 8 bits), 1 stop bit, no parity.
Return: OK!

12,AT+UART

Obtains the current serial port parameters of the transparent module
Example: AT+UART

Return：UART PARA IS:9600,1,None

13,AT+UART=?

Obtain parameters of the transmission module serial port configuration parameters
Example: AT+UART=?

Return：AT+UART=1200/2400/4800/9600/19200/38400/115200,1/2,N/E/D

14,AT+VER

Obtain current firmware version information of passthrough module
Example:AT+VER=?

Return：Silicontra Software V1.0.0　　Hardware V1.0

15,AT+ALL

Obtain all the current configuration parameters of the passthrough module at one time
Example:AT+ALL

Return: RF CH IS 0
RF POWER IS:20dBm
RF RATE IS:10Kbps
UART PARA IS:9600,1,None

16,AT+FACTORY

The configuration parameters of the passthrough module are all restored to the factory configuration
Example:AT+FACTORY

Return:Factory　Reset!

17,%%AT+MODE=END

After setting parameter and entering this command, exiting AT command mode, and triggering a system reset, which will let settled parameters to take effect
Return:End!