

915MHZ LORA MODULE Manual

Version 1.0

Shanghai Coremoon Electronic & Technology Co., Ltd

Tel: 021-50878035

Fax: 021-50878035

Mail: wl_coremoon@163.com

Website: www.coremoon.cn

Add: No.165, Lane 111 , Sunjiang Road, Pudong New area, Shanghai

1. Product description

At present, most foreign countries use 915MHz frequency band for data transmission, 915MHZ LORA MODULE is a module developed for foreign markets , The module uses SX1276 wireless spread spectrum chip.

SX1276 is a high performance, low power, long distance micro power wireless transmission module, Internal automatic spread spectrum computing and preamble CRC error correction, Do not change any data and protocol of the user, Using half duplex transparent transmission mechanism, Realize serial wireless receive and send instead of cable transmission function, It is suitable for low power applications such as data acquisition.

RF chip based on spread spectrum frequency hopping technology, The stability, anti-interference ability and receiver sensitivity are beyond the existing GFSK module, Configuration of low power high speed processor, data processing ability, operation speed has been improved.

The user can configure the module's working frequency, serial port rate, spread spectrum factor, spread spectrum bandwidth and other parameters flexibly according to the actual needs of the PC software configured by the company, and the operation is simple, It's very convenient to use.

The module adopts double crystal vibration mode to ensure that the module can work properly in harsh environment.

1.1 Product appearance drawing

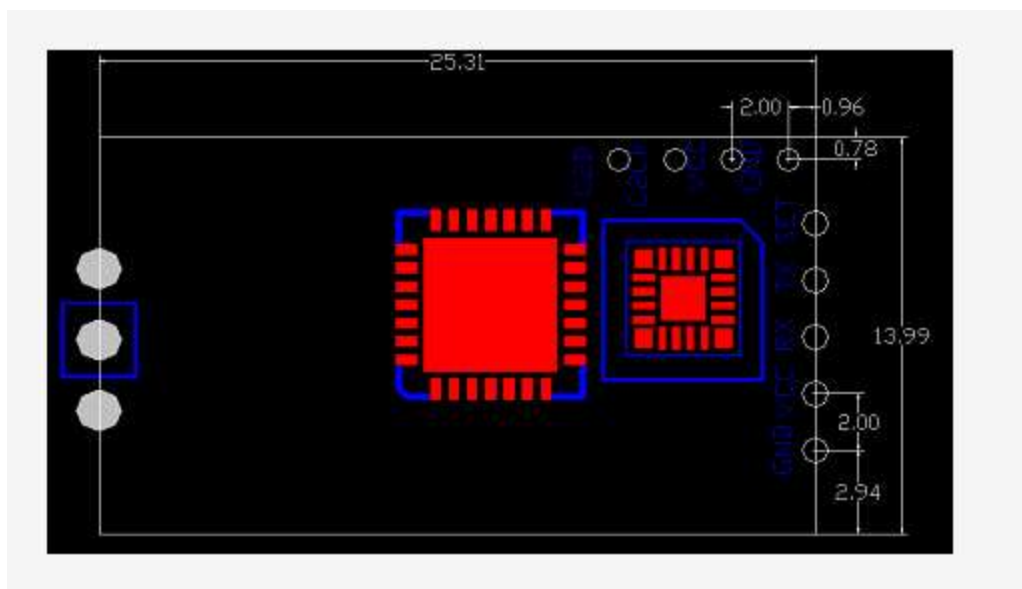


1.2 Technical parameter

Type	Index name	Wireless module
RF	Modulation mode	LoRaTM spread spectrum
	Frequency range	902-928MHz
	Transmitting power	>18dBm
	Receiving sensitivity	-143dBm (50bps)

	Transmission speed	Spread spectrum factor (SF) and bandwidth (BW) setting
	Transmission distance	2500-4000 Meter
	Antenna connection	External SMA antenna, spring antenna, sucker
Data interface	Data interface	TTL electrical level
	Serial port signal	TxD, RxD
	Serial port speed	1200 ~115200 bps
	Serial port check	None, Even, Odd
	Data bit	8
Power consumption	Input voltage	DC 3.3V
	Maximum emission current	$\leq 140\text{mA}$ (20dBm)
	Maximum receiving current	$< 16\text{mA}$
Work environment	Working temperature	$-40^{\circ}\text{C} \sim 85^{\circ}\text{C}$

1.3 Appearance size chart



1.4 Module pin definition

The wireless data transmission module provides TTL serial port data interface, which is convenient for users to install and use. The specific pin is as follows:

Identification	Function	Remarks
GND	Power ground	
VCC	Power	3.3V

RX	TTL RX	Data receiving, receiving customer TX
TX	TTL TX	Data sending, receiving customer RX
RST	Reset pin	Low electrical level effective

Remarks:

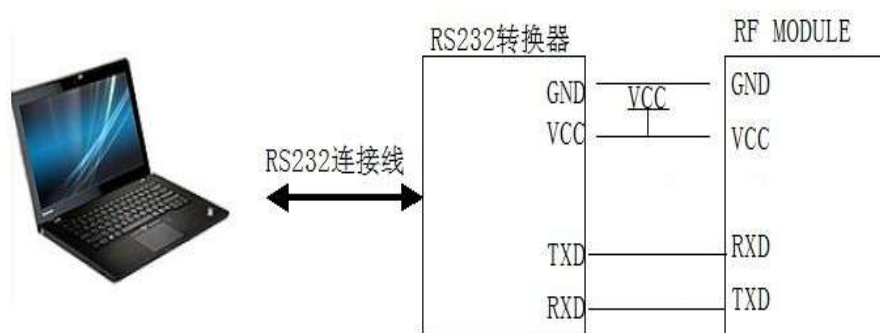
SCM pins are 3.3V level, if the user is 5V MCU, in order to stabilize, it is recommended to do level conversion

2. AT instruction configuration

The modules are very flexible, and different options can be set according to the user's needs. .

The module can be sent directly through the user's SCM command setting
Module and computer connection method

1. Confirm the module interface electrical level, TTL
2. Connect the computer serial port to the corresponding module and then connect it to the module



2.1 Instruction specification

In order to facilitate the customer to change the module information at any time, the module uses the AT instruction to provide the on-line disposition function, may save the user the massive time

AT instruction structure:

Query instruction:

AT+REQ_XXX=?

Configuration instruction:

AT+CFG_XXX=YY

Response instruction:

AT+ACK_XXX=YY

Write in FLASH instruction:

AT+CFG_WR=?

Write in FLASH Successful reply:

AT+CFG_WR=OK

Serial	Query parameter category	AT instruction
1	Working frequency band	AT+REQ_FREQ=?
2	Baud rate of wireless transmission	AT+REQ_BITRATE=?

3	Radio transmitting power	AT+REQ_RFPOWER=?
4	Serial port baud rate	AT+REQ_UARTBAUD=?
5	Serial port check	AT+REQ_UARTPARITY=?

2.1.1 Query instruction

2.1.2 Configuration instruction

Serial	Configurati on parameter	AT 指令	备注	举例
1	Working frequency band	AT+CFG_FREQ=?	default 0	AT+CFG_FREQ=0
2	Wireless transmission rate	AT+CFG_BITRATE=?	default 2.6K	AT+CFG_BITRATE=2
3	Radio transmitting power	AT+CFG_RFPOWER=?	default 20dBm,	AT+CFG_RFPOWER=7
4	Serial port baud rate	AT+CFG_UARTBAUD=?	default 9600,	AT+CFG_UARTBAUD=3
5	Serial port check	AT+CFG_UARTPARITY=?	Default even parity check	AT+CFG_UARTPARITY=2

2.1.2.1 Instruction specification

AT+CFG_UARTBAUD=5

1:1200,
2:2400,
3: 4800,
4:9600,
5:19200,
6:38400,
7:57600,
8:115200

AT+CFG_FREQ=0

Operation frequency band=914000000L+0*1500000L

If= 1 then 914000000L+1*1500000L

AT+CFG_BITRATE=2

0:0.81K,
1:1.46K,
2:2.6K,
3:4.56K,
4:9.11K

AT+CFG_RFPOWER=7

2:5dbm,

3:8dbm,

4:11dbm,

5:14dbm,

6:17dbm,

7:20dbm

AT+CFG_UARTBIT=4

0:7 bit data bit

1:8 bit data bit

4:9 bit data bit

2.1.3 Response instruction

Through the serial port to send query and configuration instructions, if the operation is successful, the module will return the corresponding response instructions

Example:

Query instruction: AT+REQ_BITRATE=?

Response instruction: AT+ACK_BITRATE =2

Configuration instruction: AT+CFG_BITRATE =2

Response instruction: AT+ACK_BITRATE =2

Remarks:

1. The module is successfully configured by the AT instruction After return response instruction, The module configures the corresponding modules, But not write to the flash, if you need write to flash, then write the flash command through AT

Instruction AT+CFG_WR=?, After write flash successful , then return to AT+CFG_WR=OK

3. Antenna selection

Antenna is an important part of the communication system, and its performance directly affects the index of the communication system. The user must pay attention to the performance of the antenna in the selection of the antenna, Generally, there are two aspects:

(1) Antenna type——Does the radio coverage of the antenna meet the system design requirements?:

(2)Electrical performance——If the frequency bandwidth, gain, impedance and rated power of the antenna are in accordance with the system design requirements, general requirements, Generally requires the antenna band 902-928mhz, gain -1dbm.

only the helical antenna with -1 dBi gain is approved with the device



4. Fault description

Here are the common problems with the module:

Fault phenomenon	Failure cause	Solution
The transmission distance is not far	The environment is complex and there are many obstacles	In the open environment, high antenna or lead to outdoor
	The weather is bad, such as fog and haze, rain and snow, dust and so on	Avoiding using in bad weather, or change high power modules
	Antenna mismatch, antenna gain is small	Select the matched antenna and use the high gain antenna as much as possible
	The transmission rate is too fast	Reduce communication speed, including serial port rate and air speed
	There may be same frequency or strong magnetic or power interference	Change channel or away from interference source
Cant communication	Incorrect connection	According to the right wiring diagram on the manual
	Bad contact	Reconnect the power line, Signal line and weld as much as possible
	The electrical level mismatch between the module and the device	Match TTL/RS232/RS485 interface
	The module does not match the device parameters	Reconfigure parameters, baud rate, checksum, etc.

	Parameter mismatch between the receiving and sending	Reconfigure parameters, frequency, channel, air speed, etc.
	The data throughput is too big	Sub packet transmission or replacement of higher performance modules
	Module electrical level switch chip burned	Change to RS232、RS485 chip
	Main module has been damaged	Changed to new module
	User equipment damage	After successful by wire test communication then change to wireless module
The bit error rate is too high	Nearby frequency signal interference	Avoid interference sources or change frequency and channel avoidance
	The antenna system doesn't match well	Change to better antenna system
	Incorrect setting of serial port or air baud rate	The device and module serial speed are consistent, and the module air speed is consistent
	The communication rate is too large	Communicate as low as possible, especially at air speed
	Power ripple is too large	Change to the stable power supply
	The interface cable is too long	Change to better cable or shorten the length of the cable

5. Matters needing attention

- (1) If the power supply within the required range, Special requirements to 3.3V power supply, The power supply voltage not exceed this voltage, Otherwise it will burnout the module
- (2) This module is not waterproof, lighting protection, Pay attention to waterproof and lighting protection
- (3) Don't reverse connection the positive and negative of power supply, otherwise it will burnout module
- (4) The module should be installed in prevent static interference environment, The antenna part is best not to contact with metal objects.
- (5) When install the module, The antenna position shouldn't be too close to the MCU of the product to prevent interference.
- (6) When power supply,, Confirm the ground wire of the module is connected with ground wire of your product.
- (7) In normal operation, Please do not touch the module and antenna part, so as to achieve the best transmission effect.

6. Application situation

Wireless access control check on work attendance Wireless Power measurement



and control Petrochemical wireless measurement and control Wireless
measurement and control of oil field Wireless computer room monitoring
etc

Tel: 021-50878035

Fax: 021-50878035

Mail: wl_coremoon@163.com

Website: www.coremoon.cn

Add: No.165, Lane 111 , Sunjiang Road, Pudong New area, Shanghai

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.

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.

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

This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure complia