

HR-1000 Mini Power RF Module

User Manual



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Respectable Customers:

Thank you for you to use our HR-1000 module, before using the product well, please read the user's manual carefully, our HR-1000 module with ISM frequency band will be easily to use. Any question in technics, you can contact us. Tel: 86 755 81782516 Cell: 86 15813856667

一、HR-1000 Features

1.Low power transmission

The transmission power is 10mW (10dB), Receiving sensitivity: -110dbm

Size: 38mm*25mm*6mm.

2. Low power consumption

Receiving current<10mA, transmission current<35mA, sleeping current (the user should asked for it before order) <3uA.

3. ISM frequency band, not requiring on application of frequency point

Carrier frequency: 428--433MHz, also capable of 868/915MHz.

4. High anti-jamming and low BER (Bit error Rate)

Based on the FSK modulation mode, it adopts the efficient communication protocol. The actual bit error rate of $10^{-5} \sim 10^{-6}$ can be achieved when channel bit error rate is 10^{-2} .

5. Long transmission distance

Within the range of visibility, when the antenna height is greater than 1m, the reliable transmission distance is (BER= $10^{-3}/1200\text{bps}$) >150m, (BER= $10^{-3}/9600\text{bps}$) >100m

6. Transparent data transmission

Transparent data interface is offered, which can be fit for nonstandard user protocol. Any false data generated in the air can be filtrated automatically (What has been received is exactly what has been transmitted). Receiving and dispatching switching time<10ms.

7. Interface

HR-1000 supply standard MCU TTL interface

8. Multi-channels and Multi-speeds

The HR-1000 module provides 8 channels to meet many kinds of communication combination mode of the users. The HR-1000 Module can provide many kinds of correspondence baudrate such as 1200bps, 2400bps, 4800bps, 9600bps, 19200bps and so on.

The wireless transmission speed and the connection baudrate are proportional, to satisfies the customer equipment of different baudrate.

9. High speed wireless communication and Large data buffer

When the RF baudrate is bigger than the COM baudrate , may transmit infinitely data continuously, and when the RF baudrate is smaller than or was equal to the COM baudrate ,may transmit 255 bytes data.

10. Intelligent data control and the user doesn't need to prepare excessive programs

Even for semi duplex communication, the user doesn't need to prepare excessive programs, only receiving/transmitting the data from the interface. HR-1000 will automatically complete the other operations, such as transmission/receiving conversion in the air, control, etc.

11. High reliability, small and light

Single chip radio-frequency integrated circuit and single chip MCU are used for lessened peripheral circuits, high reliability, and low failure rate.

12. Watchdog monitor

Watchdog monitors the inner function, so it can change the traditional product structure and improve the product reliability.

13. Matched antenna

HR-1000 uses PC edition antenna which is easily inserted in mini-products

二、 Application Scope of HR-1000

- * Water、Electricity、Gas Meter AMR Automatic Meter Reading
- * Wireless alarm and security systems
- * Home automation

- * Low power telemetry
- * Wireless conference voting system;
- * Sports training & competition;
- * Wireless dishes ordering;
- * Wireless POS, PDA wireless smart terminal;
- * Electronic bus station and intelligent traffic;
- * RF transmitter Wireless electronic display screen and queuing machine;
- * Wireless telemetry Charging for parking, parking lot;
- * Wireless modem Automobile inspection and four-wheel orientation;
- * Wireless sensor Industrial wireless remote control and air conditioning remote controller;
- * Observation and predication of oil well and hydrological information;
- * Point to multi-point wireless network, wireless on-the-spot bus and automatic data collection system;

三、 Application Method of HR-1000

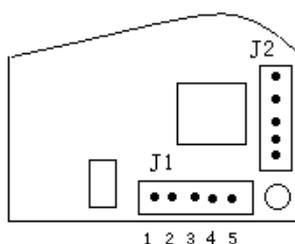
1、 Power source choice:

The HR-1000 is direct-current power supply, the voltage is +5V, the typical voltage is +5V, the electric current is bigger than 35mA. The user need to order if they use 3V Power supply.

The power source can share a power supply with other equipment, but must choose the power source with good ripple coefficient, and we suggest don't use the switching power supply, if must use, please note mutual disturbance between the turn-on frequency of the switching power supply and the broadcasting station frequency. In order to prevent the breakdown of static electricity or the strong electric, when the system equipment been used, then needs to earth it reliably, at the same time must isolate the city electricity completely.

2、 The definition of HR-1000 Interface

The range between pins is 2.0mm



HR-1000 interface drawing

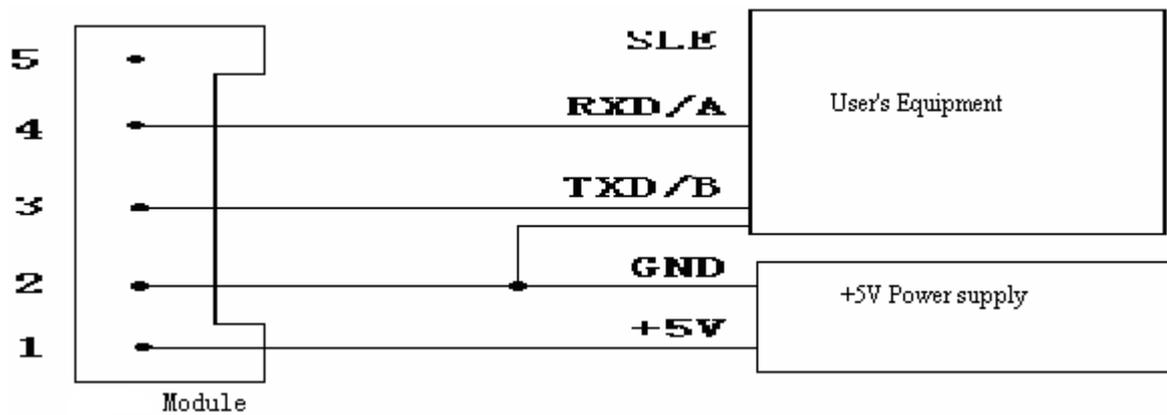
The user interface under the standard disposition, which is plastic plug, the gap faces below , from left to right, is 1,2,3,4,5.

The definition of each pin are as follows:

Pin	Pin Definition	Specification	User terminal	Level	Note
1	VCC	+5±0.5V	+5V	DC5V	TTL 3V The user need to choose

2	GND	Power source terminal place	DGND/AGND	Ground	
3	RXD	Serial data receiving end	TXD		Use sending
4	TXD	Serial data sending end	RXD		Use receiving
5	SLE	Sleep control input end		TTL	User can choose sleeping function or not

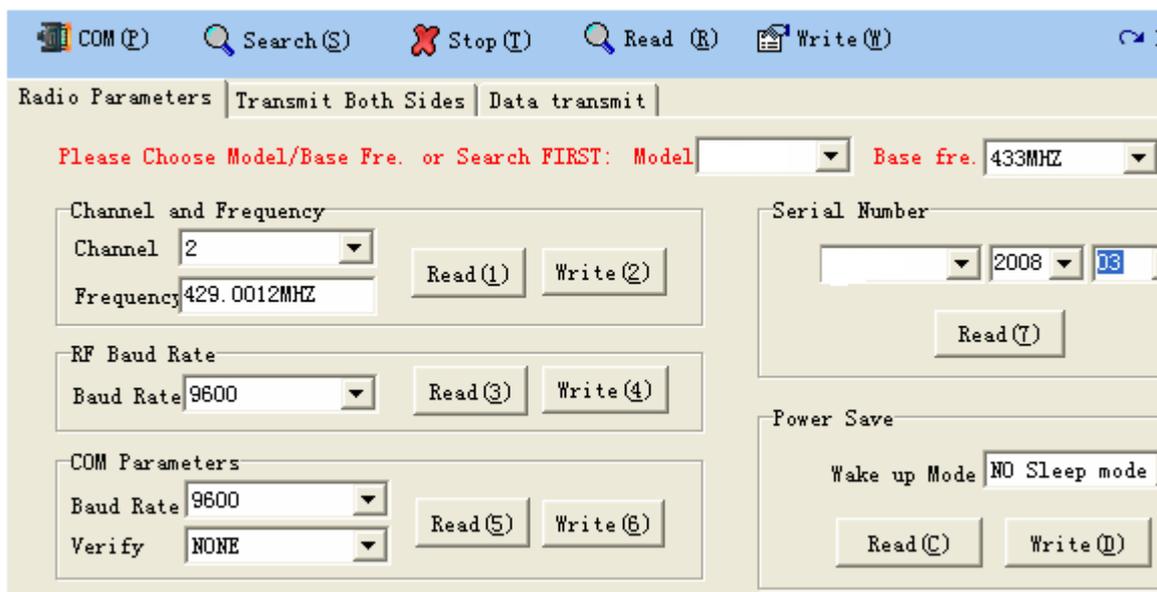
Demonstration of HR-1000 connecting Equipment of User



Note: 1、 The standard products without taking sleeping function, please inform us before shipped if needing RF Module taking sleeping function. If taking sleeping function, high level asleep, low level awaken.

2、 The volt of standard products is 5V, please inform us before shipped if needing 3V.

3. Using testing software to check and set parameters



- A. Connecting a converter from RS232 to TTL interface between HR-1000 module and PC, and link with power, choose your needed interface.
- B. Radio test, when testing radio (software can indicate successful test), then single data can be read or set
- C. When you choose your needed data, need to set, after finished setting, continue to read, and check the data of module whether you need.

Note: 1、 Two or multi modules can communicate, the frequency and baud rate must be same of all modules
2、 Modules and user equipment can communicate, the parameters of modules and user equipment must be same.

The following table is HR-1000 module 1~4 channel frequency parameter:

Num channel	Frequency
1	428.0028MHZ
2	429.0012MHZ
3	433.3020MHZ
4	433.9164MHZ

4. Sleep function;

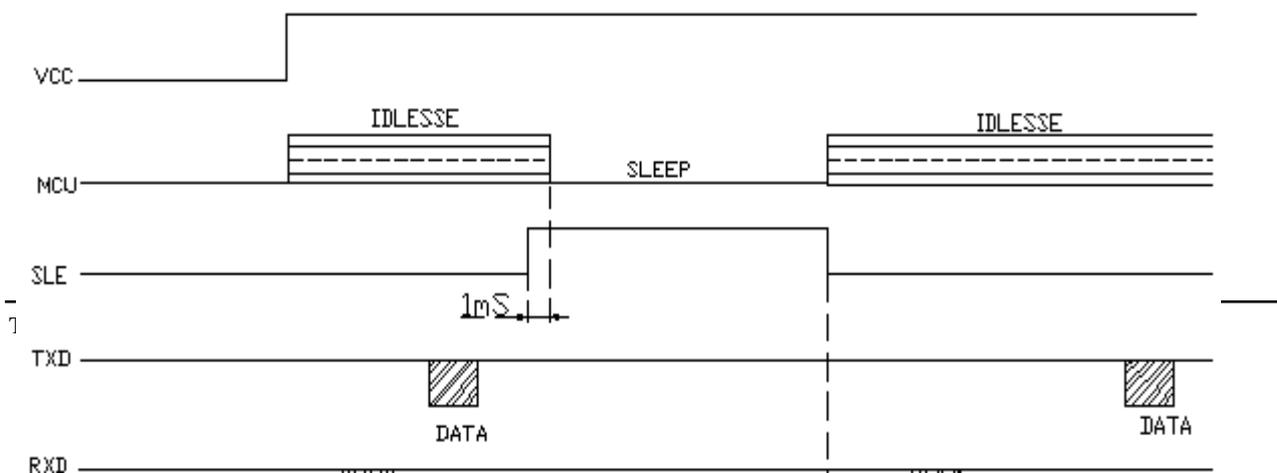
HR-1000 consists of sleeping and awoken editions, sleeping edition is current 15uA, HR-1000 sleeping function is hardware wake, hardware wake via pin5 input high level into sleeping, input low level into wake

If the HR-1000 module taking sleeping function, but user does not to use sleeping function, user can make pin5 of HR-1000 connect ground.

The detailed drawing as follow:

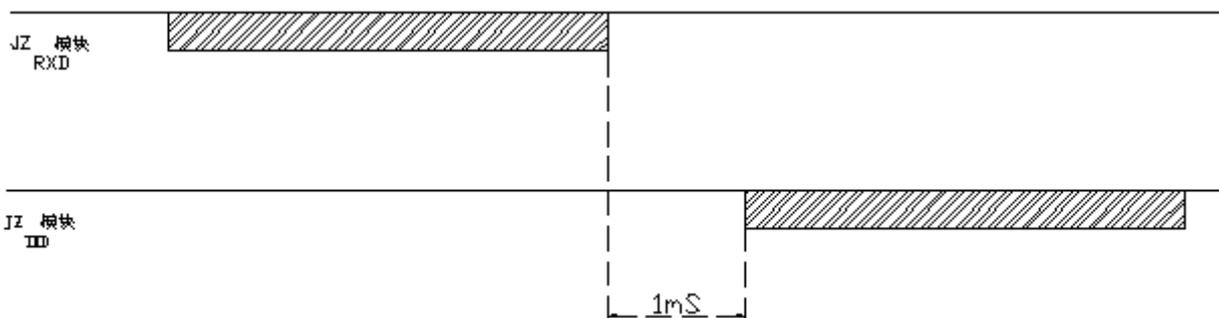
The working state of module convert to sleeping state, need to convert SLE pin low level to high level, when the module is not working, MCU about 1ms will be into sleeping state, when HR-1000 is transmitting and receiving, HR-1000 will be into sleeping after completing data transmitting and receiving.

Module convert sleeping state to working state, have to put SLE pin from high level to low level, MCU will work after several ms, in order to get stable data, user need to delay 60ms, then can transmit data.



5. Module transmitting and receiving convert

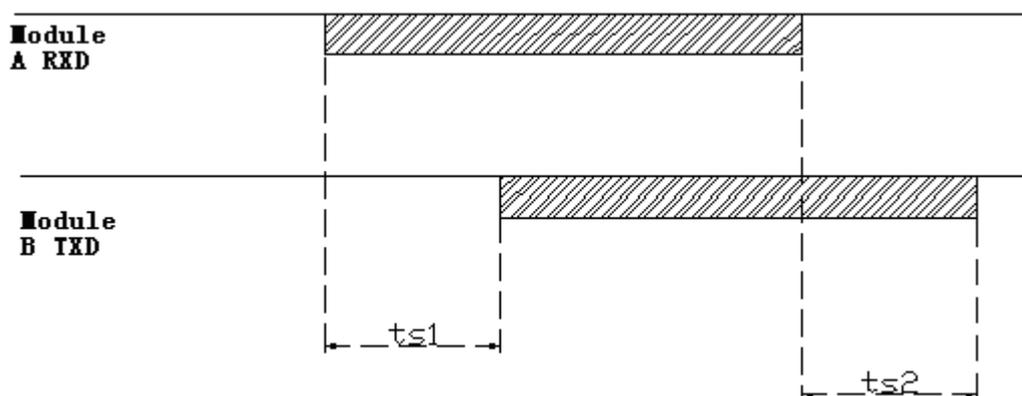
User equipment finish receiving data, and it will take 1ms to convert to transmitting data.



6. From A Module transmitting to B Module receiving

User have to consider the time transmitting and receiving will be delayed, we add FEC and other code rules so as to make transmission reliable, the delayed time depends on the air baud rate of two modules communicate, the following as:

Air baud rate (bps)	Time ts1 (ms)	Air baud rate (bps)	Time ts1 (ms)
19200	17	2400	76
9600	24	1200	152
4800	43		



7. Interoperable Model

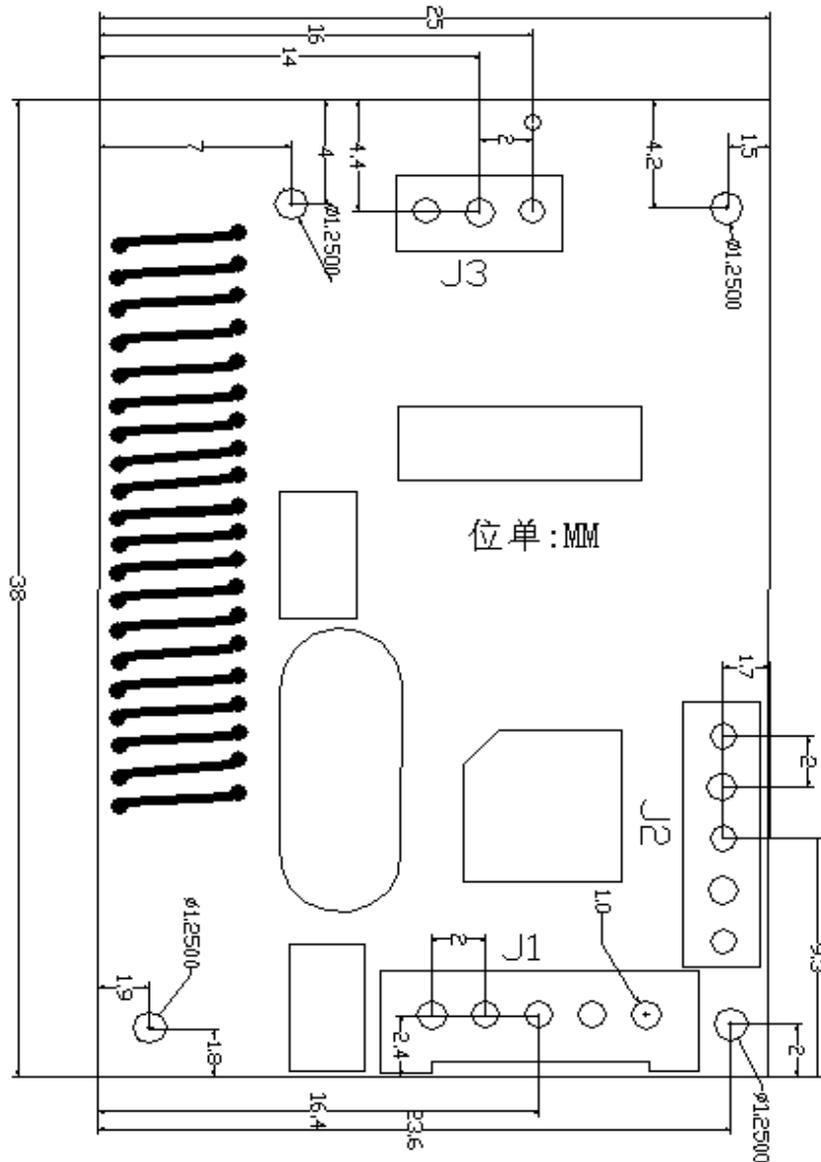
HR-1000 module can communicate HR-1005 module, you will only need to note:

- A. Choose one of the channels of modules 2~4 channels.
- B. The air baud rates must be same
- C. Confirm access interface connected well

8. Installation method

When you are installing, don't let antenna get close to MCU, fuse, electric board with copper, and equipment power.

Outer Size picture:



9. HR-1000 Ordinary parameter

- Channel: 2 channels
- Serial date rate: 9600bps
- Serial parity bit: 8N1
- Air date rate: 9600bps

四、HR-1000 Technical direction

The detailed technical direction

Modulation: FSK

Working frequency: 433MHz

Transmitting power: 10mW(10 dB)

Receiving sensitivity: -110dBm

Transmitting current: <35mA,

Receiving current: <11mA

Sleeping current: <15uA

Channel speed rate: 1200/2400/4800/9600 Bit/s The user can set.

Interface speed rate: 1200/2400/4800/9600 Bit/s The user can set.

Interface: TTL

Interface data format: 8E1/8N1/8O1

Working Power Supply: DC 3.6-5.5V or 2.7~3.3V

Working temperature: -20℃~65℃

Working humidity: 10%~90% The relative humidity, does not have the condensation

Outside Size: 38mm×25mm×6mm

Inter-Communication: HR-1005

Note: We retained without notice at any time updates on the power of final interpretation of this statement and the right to amend!