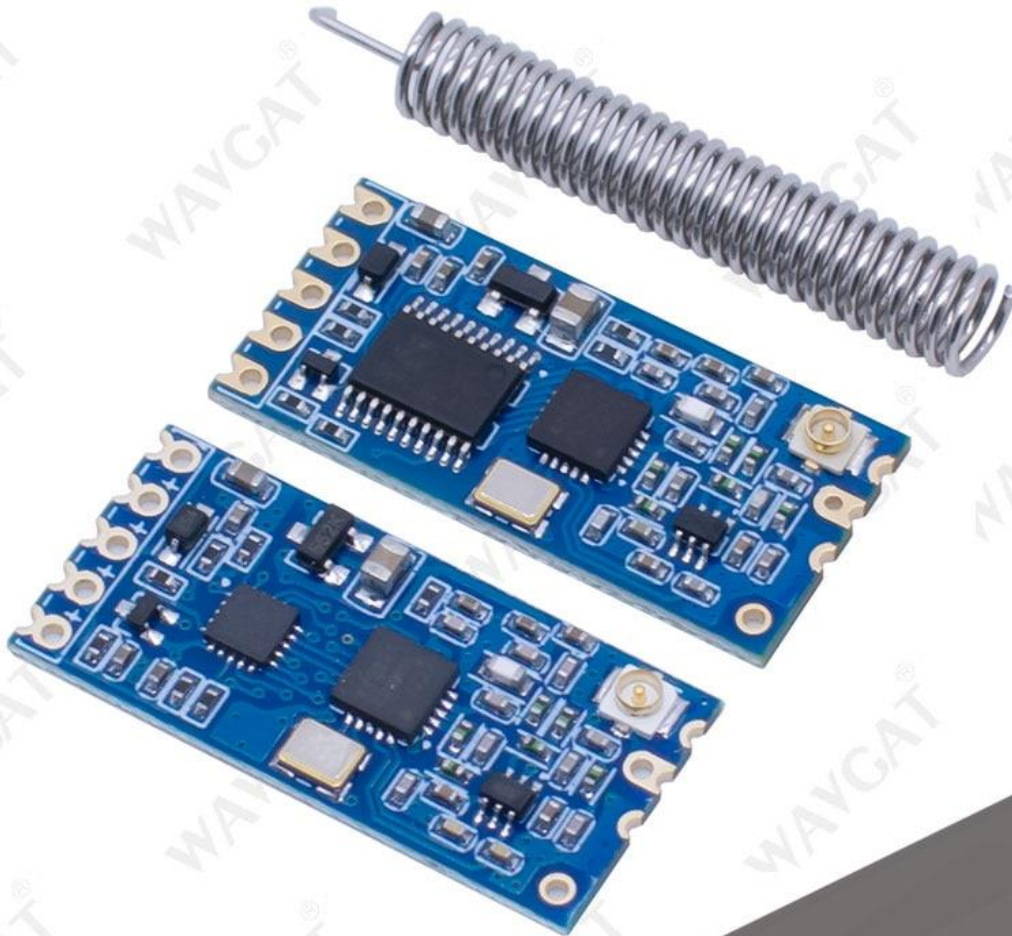
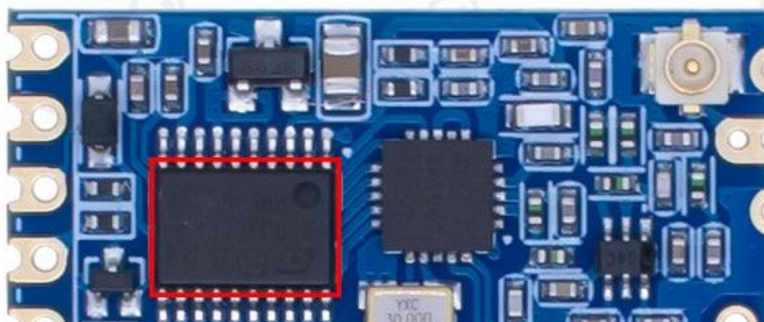


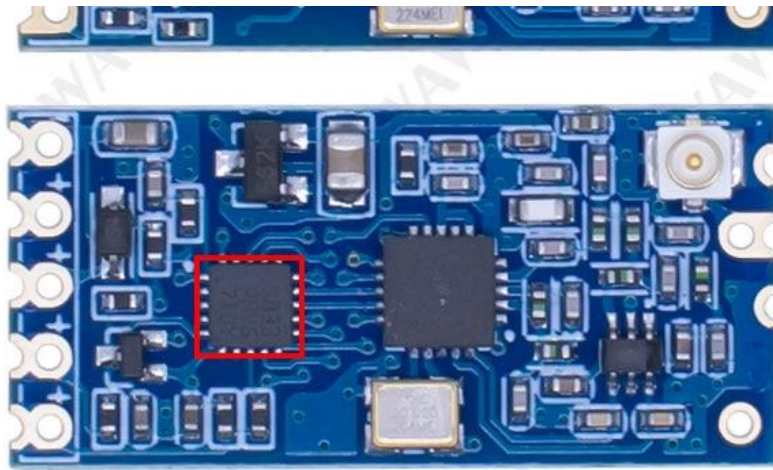
HC-12 wireless transceiver 433 serial port module

✓ Wireless 433MHz transceiver data transmission module



Product introduction





Two STM8S due to different packaging, pin layout and appearance, resulting in changes in the shape of the module, single-chip microcomputer internal wafer completely the same, the module function unchanged

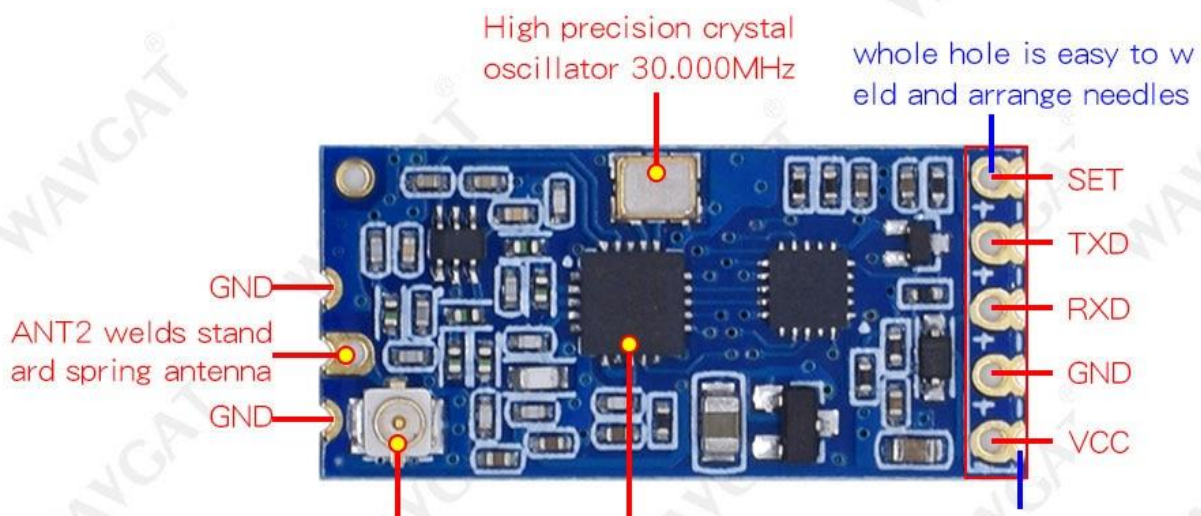
- HC-12 wireless serial communication module is a new generation of multi-channel embedded wireless data transmission module. The wireless working frequency band is 433.4-473.0 MHz, multiple channels can be set, and the step is 40 kHz, 100 in total. The maximum transmitting power of the module is 100 mW (20 dBm), the receiving sensitivity is -116 dBm at the air baud rate of 5000 bps, and the communication distance is 1000 meters in the open area.
- The module adopts the stamp hole packaging mode, which can be patched and welded. The module size is 27.4 mm * 13.2 mm * 4 mm (including the antenna cap, excluding the spring antenna), which is very convenient for customers to embed into the application system. There is PCB antenna base ANT1 on the module. Users can use external antenna in 433 MHz frequency band through coaxial line. Antenna welding hole ANT2 is also provided in the module, which is convenient for users to weld the spring antenna. Users can choose one of the antennas according to their requirements.
- The module contains MCU, the user does not need to program the module in addition, all kinds of pass-through mode just send and receive serial port data, easy to use. The module adopts a variety of serial port pass-through mode, the user can choose according to the use of AT instruction. The average working current of the four modes FU1, FU2, FU3 and FU4 under idle state is 3.6 mA, 80 μ A, 16 mA and 16 mA respectively, and the maximum working current is 100 mA (under full power emission state).

Warm prompt

1. Default idle current :16mA(the idle current of the module is different in different modes, a total of 4 modes)
2. Default working mode :FU3, baud rate 9600bps, communication channel CHO01(433.4MHz)
3. Default communication distance: 600m for open field test (the maximum communication distance can be adjusted to 1000m, and the baud rate in the air can be 5000bps. For specific data, please refer to the communication distance measurement in the baby details)
4. The power supply voltage is 3.2V~5.5V(If the module needs to work in the transmitting state for a long time, it is recommended to connect 1 N4007 diode in series when the power supply voltage exceeds 4.5V, which can avoid the heating of the built-in LDO in the module)
5. Operating frequency (433.4-473.0MHz, with 100 communication channels) Max. 100mW transmitting power (adjustable)
6. The HC-12 module does not communicate with the mobile phone (there is no 12 module or protocol in the mobile phone), so at least 2 modules are required, which are the receiving end and the sending end respectively. Please take 2 or more modules when placing an order.

Product parameters

Name	Parameter value	Name	Parameter value
Model	Hc-12	Module size	27.4*13.2*4mm
Chip package	Si4438	Working frequency band	433.4~473.0mhz
Communication interface	Uart3.3v/5v ttl level	Antenna interface	Spring antenna/antenna socket
Working voltage	3.2~5.5v	Sleep current	22μa
Communication level	3.3v/5v level	Working humidity	10%~90%
Transmission power	20dbm(max)	Working temperature	-25°C~+75°C
Reference range	1000m	Storage temperature	-40°C~+85°C



Pin definition

Pin	Define	I/o direction	Instructions
1	Vcc		Power input, dc3.2v-5.5v, load capacity is not less than 200ma.(note: If the module is to work in the emitting state for a long time, it is recommended to connect a 1n4007 diode in series when the power supply voltage exceeds 4.5v to avoid the heating of the built-in ldo in the module.)
2	Gnd		Public land
3	Rxd	Input, internal 3.3k pull-up resistor	Urat input port, ttl level, internal high-speed diode has been connected in series
4	Txd	Output	Urat outlet, ttl level, internal has concatenated 200 ω resistance
5	Set	Input, internal 10k pull-up resistor	Parameter control, low level, effective internal are concatenated ω 1 k resistor
6	Ant	Rf input/output	433mhz antenna pin
7	Gnd		Public land
8	Gnd		Public land
9	Nc		Connectionless, for fixing, compatible with hc-11 module pin position
Ant1	Ant	Rf input/output	lpex20279-001e-03 antenna socket
Ant2	Ant	Rf input/output	433mhz spring antenna welding hole

Note: Pins 1-6 each have two pads, the outer half hole pad is used for patch welding. Pin 6 on the inside of the pad Ant2 for module patch welding, you can hand welding spring antenna. The circular hole pads on the inside of pins 1-5 are used to solder the 2.54mm spacing row pins, which can be inserted directly into the user PCB row seat.

Product features

When HC-12 module leaves the factory, the serial port pass-through mode defaults to FU3. At this time, the module works at full speed and the idle working power is about 16mA. In this mode, the module will automatically adjust the air baud rate of wireless transmission according to the baud rate of serial port, and the corresponding relationship is shown in the following table:

Serial port baud rate	1200 bps	2400 bps	4800 bps	9600 bps	19200 bps	38400 bps	57600 bps	115200 bps
Wireless air baud rate	5000bps		15000bps		58000bps		236000bps	

In order to make the communication distance as long as possible, the serial port baud rate can be set to low baud rate. If it is a short time to transmit large star data, set the serial p

port baud rate to high baud rate, but sacrifice the communication distance. Receiving sensitivity of modules under different air baud rates is shown in the following table:

Serial port baud rate	500bps	5000bps	15000bps	58000bps	236000bps/250000bps
Wireless air baud rate	-124dBm	-116dBm	-111dBm	-106dBm	-100dBm

- Generally speaking, communication distance will be reduced by half for every 6 dB decrease in receiving sensitivity.

- At the low level of the module "SET" foot, the serial port pass-through mode can be SET by the AT command (see the introduction in the following section).

- FU1 mode is a power-saving mode, and the idle working current of the module is about 3.6mA. In this mode, the module can also set 8 kinds of serial port baud rates as shown in the above table, but the air baud rate is unified at 250000bps, and the communication distance is short.

- FU2 mode is power-saving mode, and the idle working current of the module is about 80uA at this time. In this mode, the module only supports the serial port baud rate of 1200bps, 2400bps and 4800bps, and the air baud rate is unified to 250000bps, and the communication distance is short. This mode cannot be set to other serial port baud rate. At the same time, when set to FU2 mode in FU1 and FU3 mode, the baud rate of serial ports over 4800bps will be automatically reduced to 4800bps. In FU2 mode, only a small amount of data is suitable for transmission (each packet is less than 20 bytes), and the packet sending time interval should not be too short (preferably more than 2 seconds), otherwise data will be lost.

- FU4 mode is ultra-long distance communication mode, the serial port baud rate is fixed at 1200bps, and the air baud rate is 500bps. After switching from other modes to FU4, the serial port baud rate will automatically switch to 1200bps. In this mode, only a small amount of data is suitable for transmission (each packet is less than 60 bytes), and the interval of packet transmission should not be too short (preferably more than 2 seconds), otherwise data will be lost.

Some characteristic reference values for the various modes are given below

Model	Fu1	Fu2	Fu3	Fu4	Note
Idle current	3.6ma	80µa	16ma	16ma	Average
Transmission delay	15~25ms	500ms	4~80ms	1s	Send 1 byte
Go back to test 1	31ms				Serial port port 9600, send 1 byte

Note: The loop back test delay refers to the period of time when the TX and RX pins of one module are short-connected and the serial port data is sent to another module, from the beginning of sending the serial port data meter to the occurrence of the data returned from the TX pin of the other module.

AT instructions

At instruction setting and introduction

The AT instruction is used to set the parameters of the module and switch the functions of the module. After setting, it can only take effect after exiting the setting state. At the same time, parameters and function modification, power will not be lost.

Enter set AT mode method:

The first access method ---- in normal use (has been powered on), the 5th pin "SET" low level;

The second access method ---- power off, the 5th pin "SET" first SET the low level and then power on again.

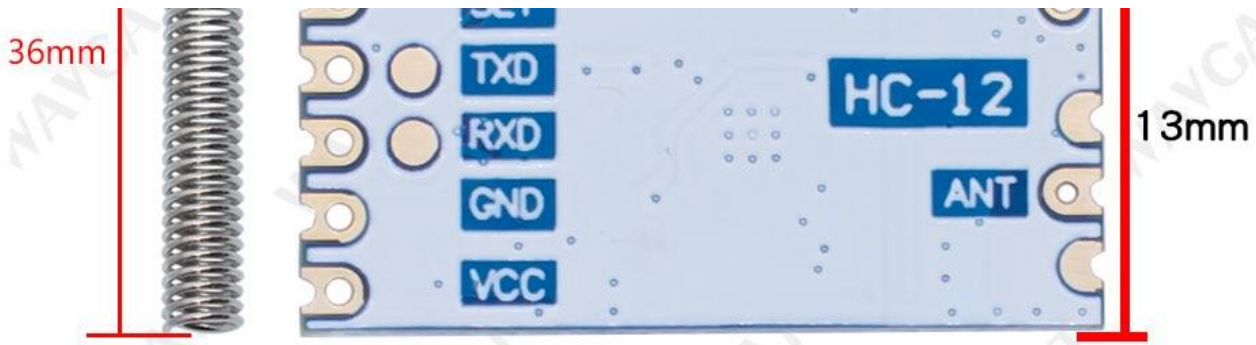
AT instruction set:

Serial number	At instruction (x denotes parameter)	Response	Role
1	At	Ok	Test whether the module is normal
2	At+bxxxx	Ok+bxxxx	Change the serial port baud rate
3	At+cxxxx	Ok+setname	Change the channel of wireless communication
4	At+fux	Ok+fux	Change module serial pass-through mode
5	At+px	Ok+px	Set the transmitting power level of the module
6	At+ry	Ok+(parameter specified by y)	Gets a single parameter for the module
7	At+rx	Ok+ parameters	Gets all the parameters of the module
8	At+v	Www.hc01.com hc-12_v2.6	Query module firmware version information
9	At+sleep	Ok+sleep	Go into sleep mode
10	At+default	Ok+sleep	Factory data reset

Product hardware

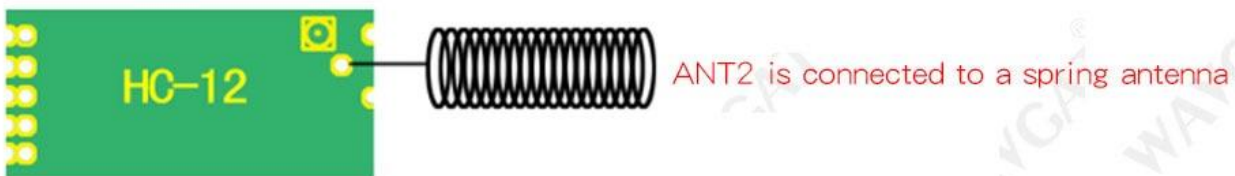
Note: Manual measurement, if there is any error, please understand



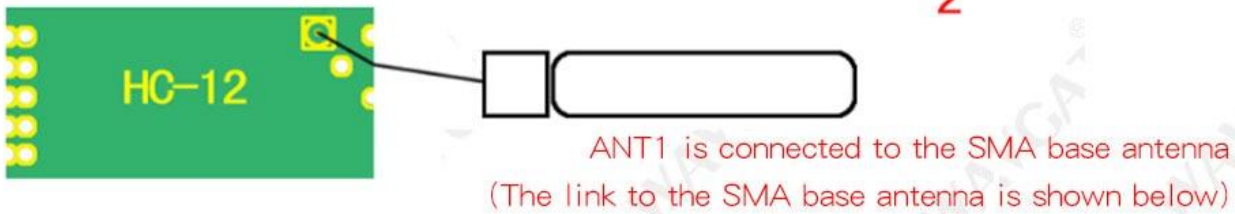


Weight: 1g

In a variety of tall buildings on the ground floor straight test distance is half 250 meters, in the indoor can cover a building, there are a small number of dead corners, can not wear reinforced floor.



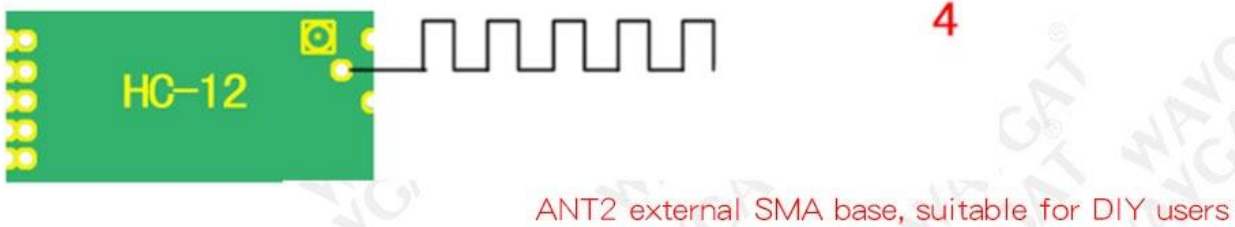
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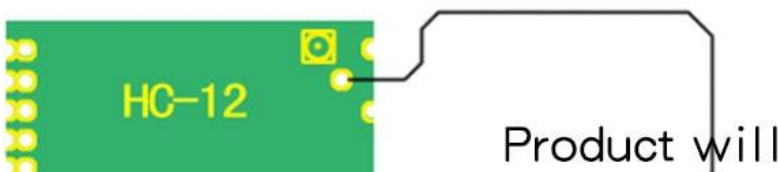
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4



5



ANT2 external SMA base, suitable for DIY users

Product hardware

