HC-12 module has three serial transmission mode, with FU1, FU2 and FU3 said. Use, the various modes are just send and receive serial data can be, do not control the air wireless transmission part. The system defaults to FU3 full-speed mode, which can automatically adjust the baud rate according to the serial baud rate and the farthest communication distance at low baud rate. Different modes are not mutually data, the user can choose the optimal mode according to the actual situation.

When used, it is not limited to the number of bytes sent continuously to the module serial port. But in view of environmental interference and other factors, a continuous transmission of large amounts of data, it may lose some bytes. Therefore, the host computer is best to have a response and retransmission and other mechanisms to avoid loss of information.

1: FU1

This mode is more power-saving mode, then the module's idle operating current is about 3. 6mA. In this mode, the module can also set the following table as shown in the eight serial baud rate, but the airborne baud rate of 250000bps.

2: FU2

This mode is power saving mode, where the module's idle operating current is about 80μA. In this mode, the module is only supported

1200 bps, 2400 bps and 4800 bps serial baud rate, the airborne baud rate of 250000bps. Set to other

Serial port baud rate, the module can not communicate properly. At the same time, when the FU1 mode is set to FU2 mode in FU1 and FU3 modes, the serial baud rate exceeding 4800 bps will be automatically reduced to 4800 bps. (Detected by this mode, when the transmission of data when there is a little BUG, temporarily do not recommend users to use FU2 mode, we will modify the first time BUG, update procedures.

3: FU3

These modules operate at full speed, idle work as current is about 16mA. In this mode, the module will automatically adjust the wireless baud rate according to the serial baud rate, the corresponding relationsh

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

In order to make the communication distance as far as possible, you can set the serial baud rate to low baud rate. If the transfer of large amounts of short-term data, put the baud rate is set high baud rate, but at the expense of the communication distance.

The receiver sensitivity of the module under different airborne baud rates is shown in the following table:

Airborne baud rate	5000bps	15000 bps	58000bps	236000bps
Wireless reception sensitivity	-117dBm	-112dBm	-107dBm	-100dBm

In general, the reception sensitivity is reduced by half by 6 dB for each reception sensitivity.

Here are some of the characteristics of the model reference value:

mode	FU1	FU2	FU3	Remarks
Free current	3.6mA	80uA	16mA	average value
Transmission delay	4 ~ 80mS	500mS	4 ~ 80mS	Send a byte
Loop test	31mS			Serial baud rate 9600, send a byte
Loopback test	31mS			Serial baud rate of 9600, made ten bytes

Note: loopback delay refers to the short circuit of a module TX and RX pin, the serial port data to another module, from the beginning to send the serial data meter to another module TX pin appears to return the data of this section time.

The module parameter sets the AT command

AT command is used to set the parameters of the module and switch the function of the module, set the need to exit the settings before the entry into force. The same time, modify parameters and functions, power-down is not lost.

(1) instruction mode entry

The first entry mode - normal use (already powered), the fifth pin "SET" set low;

The second entry mode - power off, the fifth pin "SET" first low and then re-power.

Both methods can make the module into AT command mode, release ("SET" pin is not connected low) exit means the command mode. After exiting the instruction mode, if the module function is changed, the corresponding function state is cut.

The second way fixed to 9600, N, 1 serial port format into the AT.

(2) Instruction instructions

① **AT**

Test instructions

example:

   Sent to the module command "AT", the module returns "OK".

② **AT + Bxxxx**

Change the serial baud rate command. The baud rate can be set to 1200bps, 2400bps, 4800bps, 9600bps, 19200bps, 38400bps, 57600bps and 115200bps. Factory default is 9600bps.

example:

Set the module serial port baud rate of 19200bps, please send the module command "AT + B19200", the module returns

"OK + B19200".

③ **AT + Cxxx**

Change the wireless communication channel, from 001 to 127 optional (more than 100 after the wireless channel, communication distance is not guaranteed). The wireless channel defaults to 001 and operates at 433.4 MHz. The channel step is 400 kHz and the operating frequency of channel 100 is 473.0 MHz.

example:

Set the module to channel 21, please send the module command "AT + C021", the module returns "OK + C021".

After exiting the instruction mode, the module operates on channel 21 and operates at 441.4 MHz.

Note: Since the wireless receiver sensitivity of the HC-12 module is high, when the baud rate is greater than 58000 bps, five adjacent channels must be used. When the airborne baud rate is not greater than 58000 bps, if the short distance (10 meters or less) communication, but also need to stagger 5 adjacent channel use.

④ **AT + FUx**

Change the module serial transmission mode, there are FU1, FU2 and FU3 three modes.Module The default mode is FU3, dies serial transparent transmission mode block must be set to the same communication. For details, please refer to the "Wireless Serial Transparency"section above.

   example:

Sent to the module command "AT + FU1", the module returns "AT + OK".

⑤ AT + Px

Set the module's transmit power level, x can take 1-8, corresponding module transmission power is as follows:

X value	1	2	3	4	5	6	7	8
Module Transmit Power (dBm)	-1	2	5	8	11	14	17	20

The default is set to 8, the maximum transmit power, the farthest communication distance.Transmit power level is set to 1, the transmit power is small. In general, the transmission power for each drop 6dB, communication distance will be reduced by half. example:

Sent to the module command "AT + P 5", the module returns "OK + P5". After exiting the instruction mode, the module transmit power is +11 dBm .