

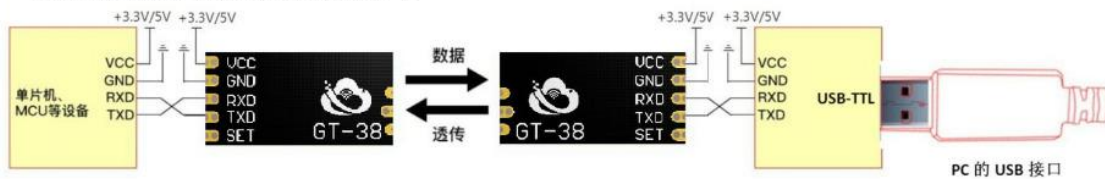
GT-38 SI4438/4463 UART Interface Wireless Communication Module

The GT-38 Wireless serial communication module is a new generation of multi-channel embedded wireless data transmission module. The wireless working frequency band is within the range of 433-458.5 MHz with multiple channels that can be set. The stepping speed is 100KHz with 255 channels. The module's maximum transmit power is 100mW (20dBm), the receiving sensitivity is -116dBm at 5000bps air baud rate and the open distance of communications range is about 1200m.

2.3 Connection between modules



2.4 Module connection to PC



3 : Wireless serial port transparent transmission GT-38

3.1 Serial port transparent transmission

The GT-38 module has four serial port transparent transmission modes, which are represented by FU1, FU2, FU3 and FU4. When using, each mode can only send and receive serial port data, no need to manage the wireless transmission part of the air, but **only in the same air baud rate can communicate with each other!** The system works in FU3 full-speed mode by default. This mode can automatically adjust the air baud rate according to the serial port baud rate, and the communication distance is the farthest at low baud rate.

Different modes cannot transmit data to each other, and the user can select the optimal mode according to the actual situation.

Modules are typically used in two or more connections to transfer data to each other in a half-duplex manner. At the same time, the transparent transmission mode, baud rate, and wireless communication channel must be set to the same. The factory default settings are FU3, 9600bps (8-bit data, no parity, 1 stop bit), and CH100 (443MHz). When using, it is generally not limited to the number of bytes sent continuously to the serial port of the module. However, in view of environmental interference and other factors, when a large amount of data is continuously transmitted at a time, some bytes may be lost. Therefore, the host computer should have mechanisms such as answering and resending to avoid information loss.

3.2 Four serial port transparent transmission modes

When the GT-38 module is shipped from the factory, the serial port transparent transmission mode defaults to FU3. At this time, the module works at full speed and the idle working current is about 16mA. In this mode, the module automatically adjusts the wireless transmission air baud rate according to the serial port baud rate. 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	1000bps		5000bps		10000bps		100000bps	

In order to make the communication distance as far as possible, the serial port baud rate can be set to a low baud rate. If you are transferring large amounts of data for a short period of time, set the serial port baud rate to a high baud rate, but sacrifice the communication distance. The receiver sensitivity of the module under different air baud rates is shown in the following table:

Air baud rate	1000bps	5000bps	15000bps	58000bps	236000bps/250000bps
Wireless receiving sensitivity	-124dBm	-116dBm	-111dBm	-106dBm	-100dBm

In general, the communication distance is reduced by half for every 6 dBm of receiving sensitivity.

When the module "SET" pin is set low, the serial port transparent transmission mode can be set by the AT command (see the introduction in the following section).

The FU1 mode is in the lower power saving mode, and the idle working current of the module is about 3.6 mA. In this mode, the module can also be set as shown in the table above. The eight serial port baud rates are shown, but the air baud rate is unified to 250,000 bps and the communication distance is short.

The FU2 mode is the power saving mode, and the module's idle operating current is about 80μA. In this mode, the module only supports 1200 bps, 2400 bps. And the serial port baud rate of 4800 bps, the air baud rate is unified to 100000bps, and the communication distance is short. Cannot be set to other serial port baud in this moderate. At the same time, when set to FU2 mode in FU1 and FU3 modes, the serial port baud rate exceeding 4800 bps will be automatically reduced to 4800. Bps. In FU2 mode, only a small amount of data is transmitted (each packet is within 64 bytes), and the packet transmission interval should not be too short (preferably In more than 2 seconds), otherwise it will cause data loss.

The FU4 mode is a super long-distance communication mode. The serial port baud rate is fixed at 1200 bps and the air baud rate is 1000 bps. After switching from other modes to FU4, the serial port baud rate will be automatically converted to 1200bps. In this mode, only a small amount of data is transmitted (each packet is less than 32 bytes), and the packet transmission interval should not be too short (preferably more than 2 seconds), otherwise data loss will occur.

Some characteristic reference values for various modes are given below:

mode	FU1	FU2	FU3	FU4	Remarks
Idle current	3.6mA	80μA	16mA	16mA	average value
Transmission delay	15~25mS	500mS	4~80mS	1S	Send 1 byte
Loopback test 1	31mS	Serial porter 9600, send 1 byte			
Loopback test 2	31mS	Serial porter 9600, send 10 bytes			

Note: Loopback measurement delay refers to shorting the TX and RX pins of one module, sending serial port data to another module, from the beginning of sending the serial port data meter to the data of the return of the other module TX pin. time.

4 : Quick test

4.1 USB-TTL is connected to the module



Connect the wireless module GT-38 to the USB-TTL (as shown) and plug it directly into the PC's USB interface to debug the module.

4.2 Communication test first step

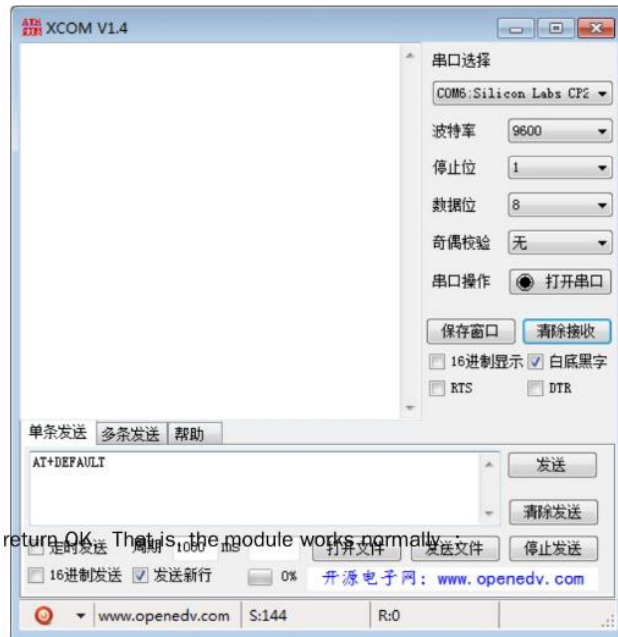
Download a serial port debugging assistant online, such as there is no computer it is recommended to use one (also included in the attached materials)

(https://pan.baidu.com/s/1uiR_iPcdMxYzeQd_RBAEzw)

Second step

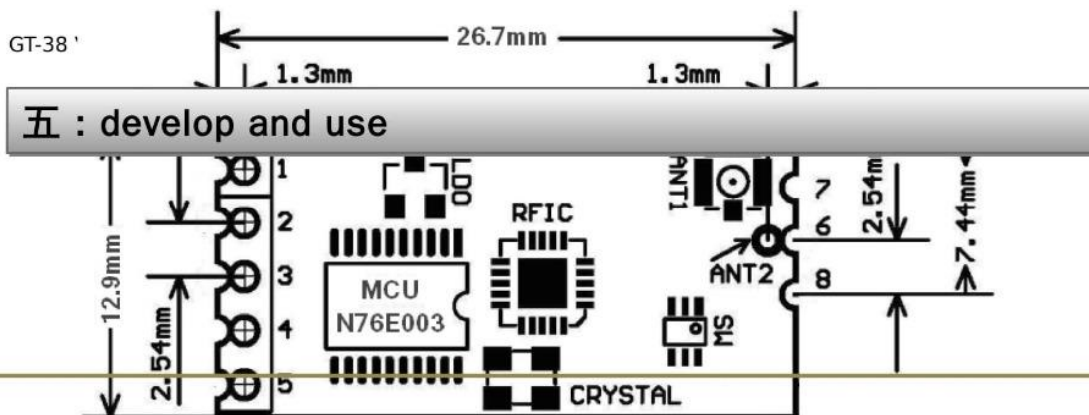
Complete the steps in 4.1 , Instructions :

- ① Use USB-TTL connection module and computer ;
- ② If you do not know the module baud rate, you can enter the debug mode. (set the SET pin low) to send AT+RB, return OK+BXXX , the factory default baud rate is 9600 ;
- ③ Enter debug mode to send AT (with line feed), return OK . That is, the module works normally ;
- ④ For other AT commands, please refer to 6.3



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Pin	definition	I/O direction	Description
1	VCC	Power input, DC3.2V-5.5V, requires a load capacity of not less than 200mA.	Note: If the module is to be in the transmitting 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 module's built-in LDO heating.
2	GND	Public place	--
3	RXD	Input, internal 3.3k pull-up resistor	URAT input port, TTL level, internal serial high speed diode
4	TXD	Output	URAT output port, TTL level, internally connected 200Ω resistor
5	SET	Input, internal 10k pull-up resistor	Parameter setting control pin, active low, internal connected 1kΩ resistor
6	ANT	RF input / output	433MHz antenna pin
7	GND	Public place	--
8	GND	Public place	--
ANT1	ANT	RF input / output	IPEX20279-001E-03 antenna socket
ANT2	ANT	RF input / output	433MHz spring antenna welding hole

Note:

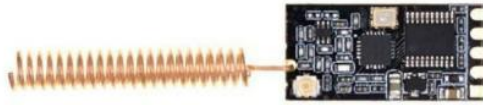
Pins 1–6 each have two pads, and the outer half-hole pads are used for patch bonding. Pin 6 on the inside of the pad ANT2 For module patch soldering, you can hand solder spring antenna. Pins 1–5 The round hole pads on the inside are used to solder 2.54mm pitch pins, which can be directly inserted into the user's PCB row.



ANT1: IPEX20279-001E-03 天线插座

建议：在金属密闭空间，可使用天线座，将天线引接到开阔的环境下。

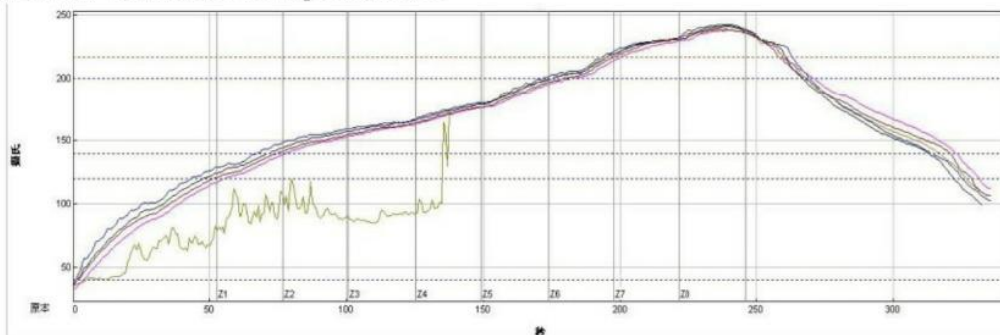




5.2 Embedding method

The GT-38 module integrates welded string holes and patch stamps, allowing users to select SMD patches or pin-embedded applications for their needs.

Patch furnace temperature



It is recommended that the manufacturer of the first large-scale patch production first pass 20~30 modules to check whether the furnace temperature is suitable.

It is recommended that the temperature of the SMT boiler should not exceed the temperature of the reference picture, the secondary patch should be reduced by about 5 degrees, and the temperature can be lowered appropriately in the summer.