EWM35T-2G4T06SP Product Specifications

2.4GHz ISM band 6dBm 150℃ high temperature resistant wireless transmission module



Chengdu Ebyte Electronic Technology Co.,Ltd.

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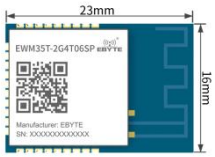
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1 Product Overview

1.1 Product Introduction



The EWM35T-2G4T06SP series is a new generation of 2.4GHz high temperature resistant wireless serial port module designed by Ebyte . It has multiple transmission modes, works in the 2400~2480 MHz frequency band, uses standard stamp hole patch packaging, and has a UART communication interface, which is convenient for users to develop and use . It supports wireless transparent transmission , fixed-point transmission, broadcast transmission , serial port upgrade , communication encryption and other functions, and can provide customized development services .

1.2 Features

- Supports communication key function , greatly improving the security of user data ;
- Support Bluetooth OTA firmware upgrade ;
- Supports RSSI signal strength indication function for receiving data packets , which is used to evaluate signal quality, improve communication networks, and measure distance;
- Supports fixed-point transmission, broadcast transmission, and channel monitoring;
- Support deep sleep, power consumption of the whole machine in this mode is about 3μA;
- Supports the global license-free ISM 2.4 GHz frequency band ;
- Efficient watchdog design ensures stable program operation ;
- Support 100kbytes data continuous transmission;
- Supports data transmission rates of 500Kbps to 1M bps ;
- Support 1.9 ~ 3.8 V power supply, typical 3.3V power supply voltage ;
- The serial port baud rate supports 9600bps ~ 921600 bps;
- PCB onboard antenna ;
- High temperature resistant design, supports long-term use at -40 ~ + 150 ℃ .

1.3 Application Scenario

- Power grid and military applications;
- Automotive industry applications ;
- Metal smelting applications;
- Mineral and oil extraction;
- Smart home and industrial sensors, etc.
- Building automation solutions;
- Wireless industrial remote control;
- Healthcare products;

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2 Specifications

2.1 RF parameters

RF parameters	Parameter Value	Remark
Working frequency band	2400～2480 MHz	Support ISM band
Transmit power	6 dBm	Software adjustable
Receiving sensitivity	-98 dBm	Air rate 500K bps
FIFO	2000 Byte	-
Packet length	30～240 Byte	Software adjustable, default 240Byte
Serial port baud rate	9600～921600 bps	Software adjustable, default 9600bps
Air speed	500Kbps ～ 1M bps	Software adjustable, default airspeed 500Kbps
Modulation	GFSK	-
Communication distance	230m	Clear and open environment , onboard PCB antenna , antenna height 1.5 meters, air rate 500 kbps

2.2 Hardware Parameters

Hardware Parameters	describe	Remark
Communication interface	UART	-
Packaging	SMD	-
Interface	Stamp Holes	Pin spacing 1.27mm
Dimensions	23.0*16.0mm	±0.2mm
Antenna type	PCB onboard antenna	Equivalent impedance is about 50 Ω
Product Net Weight	1.2g	± 0.1 g

2.3 Electrical parameters

Electrical parameters	Minimum	Typical Value	Maximum	unit	Remark
Supply voltage	1.9	3.3	3.8	V	≥ 3.3 V can guarantee output power , exceeding 3.8 V will permanently burn the module
Communication level	-	3. 3	-	V	Using 5V TTL It is recommended to add level conversion, otherwise the module may be damaged
Emission current	-	12	-	mA	3.3V power supply, antenna interface is standard 50 ohm impedance, instantaneous power consumption of transmitting power 10dBm
Receiving	-	7	-	mA	-

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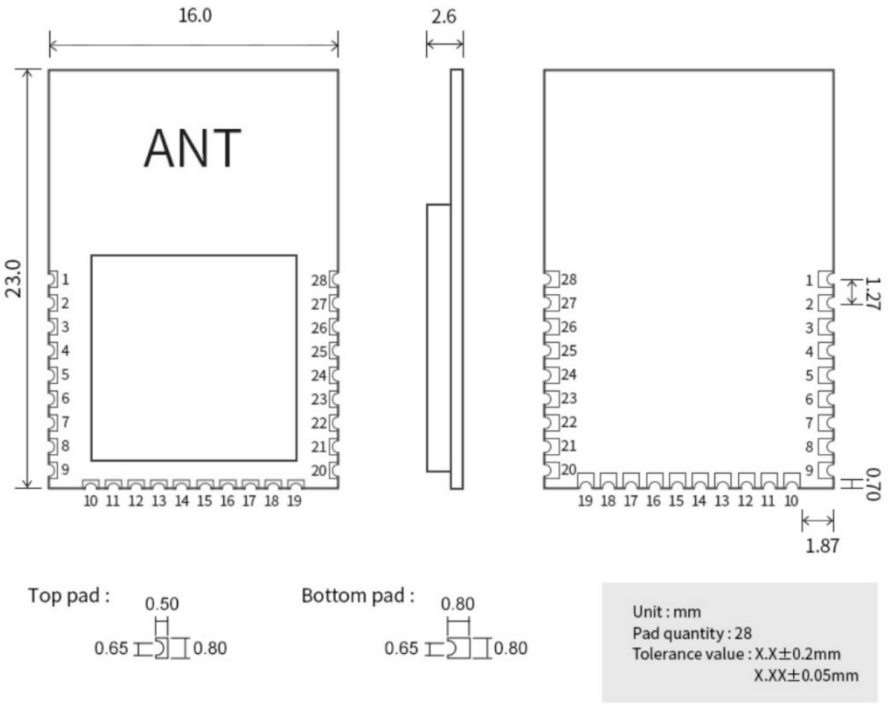
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current					
Sleep current	-	3.0	-	μA	Software shutdown
Operating temperature	-40	20	150	℃	Industrial-grade design
Operating humidity	10	60	90	%	-
Storage temperature	-40	20	150	℃	-

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3 Mechanical dimensions and Pin definition



Pin number	Name	Function	Remark
1	PB04	I/0	GPIO
2	PB0 3	I/0	GPIO
3	PB0 2	I/0	GPIO
4	PB0 1	I/0	GPIO
5	P B00	I/0	GPIO
6	PA0 0	I/0	GPIO
7	PA0 1	SWCLK	Burning pin
8	PA0 2	SWDIO	Burning pin
9	PA03	I/0	GPIO
10	PA08	I/0	GPIO
11	PA0 7	I/0	GPIO
12	PA0 6	RTS	(Standard hardware flow control Require To Send) The module outputs a signal, which is high Indicates that the module serial port is busy and the MCU is not allowed to send data to the module serial port. When it is low, data can be sent to the module .
13	PA0 5	CTS	(Standard Hardware Flow Control Clear To Send) Module input signal, high time table it indicates that the MCU serial port is busy and the module will not send data to the MCU serial port. When it is low, it can send data to the MCU .
14	PA0 4	SLEEP	Low power control pin , turn on the low power pin control function,

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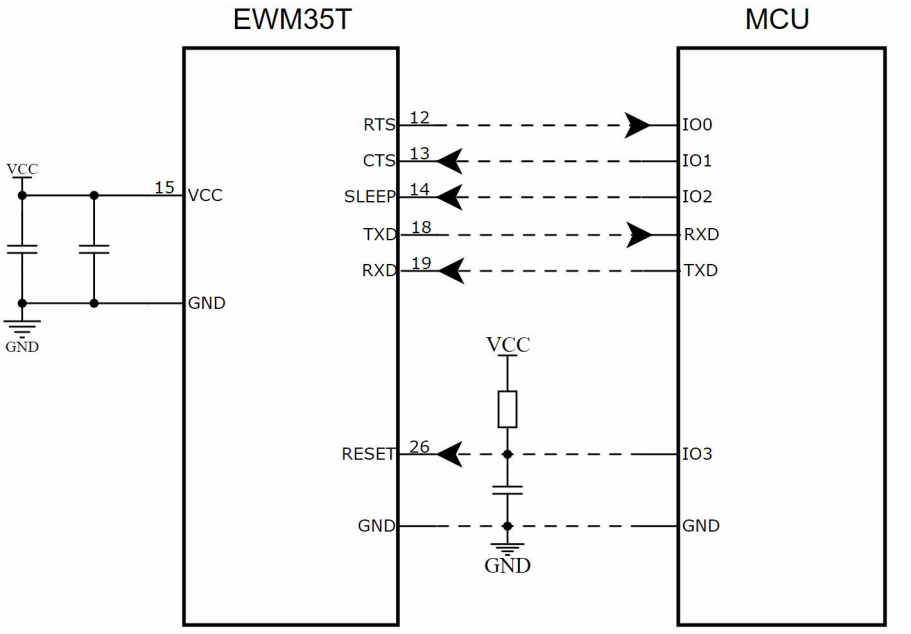
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			pull low the low power pin to wake up the module, pull high the low power pin to put the module to sleep,
15	VCC	-	Positive power supply, 1.71~3.8V, 3.3V recommended
16	PD03	I/0	GPIO
17	PD02	I/0	GPIO
18	P C 0 0	TXD	Serial port output pin
19	P C01	RXD	Serial port receiving pin
20	PC0 2	I/0	GPIO
21	PC0 3	I/0	GPIO
22	PC0 4	I/0	GPIO
23	PC0 5	I/0	GPIO
24	PC0 6	I/0	GPIO
25	PC0 7	I/0	GPIO
26	RESET	I	Module reset pin, low level is effective, internal pull-up
27	GND	--	Module Ground
28	GND	--	Module Ground

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4 Recommended connection diagram

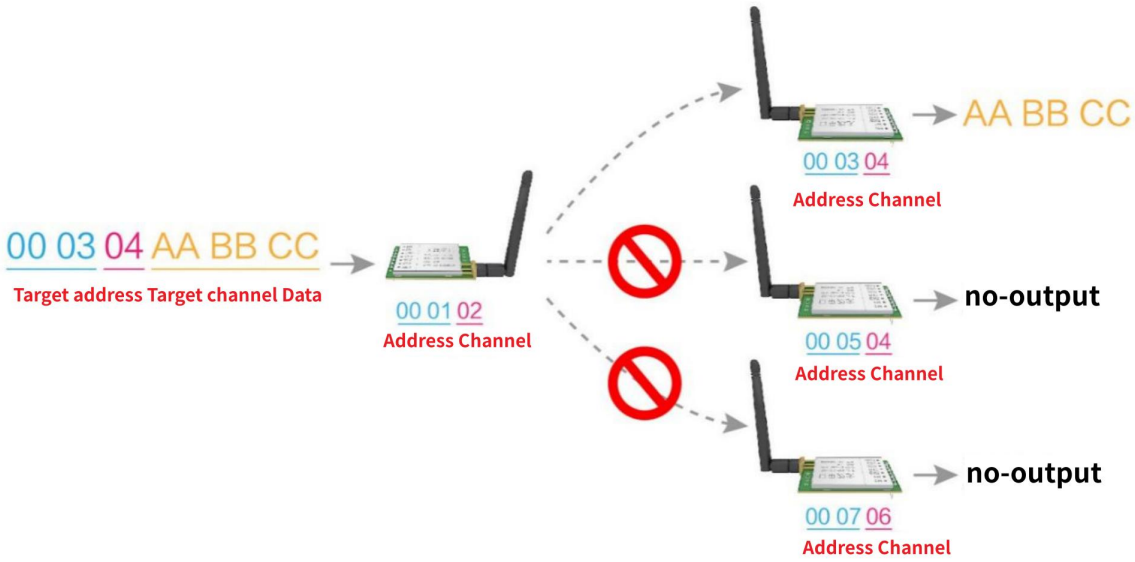


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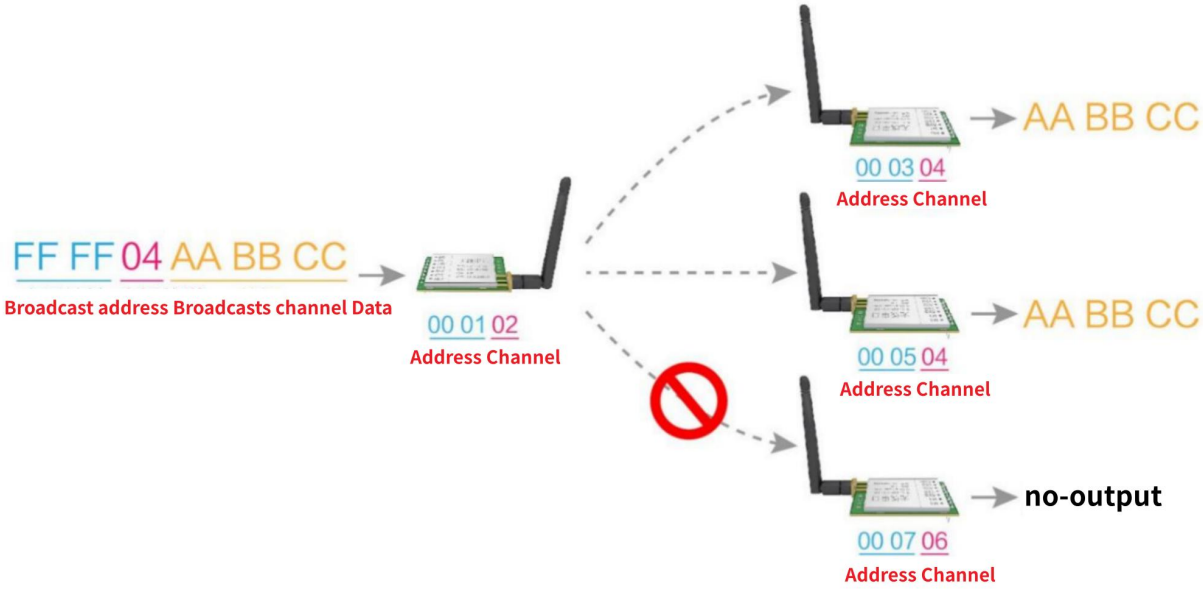
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5 Functional Details

5.1 Fixed - point launch



5.2 Broadcast transmission



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5.3 Broadcast Address

- For example: Set the module A address to 0xFFFF (i.e. 255, 255) and the channel to 0x04.
- When module A is used as a transmitter (same mode, transparent transmission), all receiving modules under channel 0x04 can receive data, thus achieving the purpose of broadcasting.

5.4 Listening address

- For example: Set the module A address to 0xFFFF (i.e. 255, 255) and the channel to 0x04.
- When module A is used as a receiver, it can receive all the data under channel 0x04 to achieve the purpose of monitoring.

5.5 Module Reset

- After the module is powered on, it will perform hardware self-check and initialization , and set the working mode according to user parameters;
  The module is in transparent transmission mode by default when it is powered on. The mode setting is not saved when the power is off, so transparent ink is the starting point for the normal operation of the module.

5.6 Detailed explanation of some functions

- Buffer :
  1、internal 2000- byte buffer is written to the wireless chip (automatically packetized);
  2、If the user continuously sends data less than 2000 bytes, there will be no overflow . The module will automatically divide the data into packets according to the maximum packet length of 240 bytes .
- through AT commands :
  1、The module detects the AT command to switch mode ;
  2、Respond to commands in the current configuration and mode ;
  3、Exit the current task mode, then determine the new mode based on the mode flag , and reconfigure the serial port or RF parameters ;
  4、Enter the new mode task and complete the mode switch. Note that the mode switch time will vary between different modes.
- Sleep mode flow :
  1、The sleep function is disabled by default and needs to be enabled in the configuration mode to enable the sleep pin function ;
  2、After turning on the sleep function in the configuration mode, in order to prevent the system from sleeping immediately after switching to a new mode, the sleep pin needs to be pulled low when configuring the sleep function ;
  3、When the sleep function is enabled, the switching mode takes effect immediately, the pin is pulled high to enter sleep, and pulled low to wake up the module ;
  4、After waking up the module, the module will go through a reset process to reinitialize the hardware parameters.
  5、The sleep function is not affected by the AT switch command. Whether in transmission mode or configuration mode, when the sleep function is turned on and takes effect, the pin is pulled high to enter sleep mode .

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Note :

Serial number	Precautions
1	Since there is no pin to detect whether the mode switching is completed, it is recommended that customers delay appropriately according to actual needs to ensure that the mode switching is completed.
2	In fixed-point sending mode, the length of each data packet is recommended not to exceed the sub-packet length (default 240) bytes.
3	After the AT command mode is switched and the command is responded, the module does not switch to the target mode at this time. It is recommended to delay appropriately
4	From sleep to wake-up, the module will go through a reset process.

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6 Working Mode

The module has two working modes, which are switched by AT commands ; the details are shown in the following table:

Mode (0-1)	Mode Introduction	Remark
0 Transfer Mode	Serial port is open, wireless is open, wireless transmission is possible	none
1Configuration Mode	Users can access the registers through the serial port to control the working status of the module	rate 9600 8N1 configuration

The module has two working states , which are controlled by the low-power pin . It takes effect when the low-power pin function is turned on. The details are shown in the following table:

state	Status Introduction	Remark
wake	Low power pin pulled low to stay in wake-up state	none
Hibernation	Low power pin pulled high to maintain sleep state	none

6.1 Mode Switching

Serial number	Remark
1	● Users can set the mode and query the module working mode through AT commands; ● Respond to mode commands in the current configuration and mode ; ● After the AT command mode is switched and the command is responded, the module does not switch to the target mode at this time; ● If the module has serial port data that has not been transmitted wirelessly, it can enter a new working mode only after the transmission is completed; ● If the module receives wireless data and sends data out through the serial port, it needs to finish sending before entering the new working mode;
2	● For example, if a user continuously inputs a large amount of data and switches modes at the same time, the mode switching command and the unprocessed data may be stuck together, causing the command to be processed as data. ● Therefore, the general recommendation is to switch modes when the module is idle .
3	● When the module wake-up state is switched to sleep state , if there is data that has not been processed; ● state only after processing these data (including receiving and sending) . This feature can be used for fast sleep, thus saving power consumption; for example: the transmitting module works in mode 0, the user initiates the serial port data "12345", and then there is no need to wait for the module to be idle, the sleep control pin can be directly pulled high to switch to sleep mode, and the user's main MCU will sleep immediately. The module will automatically send all user data wirelessly and then automatically enter sleep mode; ● This saves MCU working time and reduces power consumption.

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6.2 Transmission mode (mode 0)

type	The module works in mode 0
emission	The user can input data through the serial port, and the module will start wireless transmission.
take over	The module's wireless receiving function is turned on, and after receiving wireless data, it will be output through the serial port TXD pin.

6.3 Configuration Mode (Mode 1)

type	The module works in mode 1
emission	The radio frequency is turned off, and only serial port interaction is possible
take over	The radio frequency is turned off, and only serial port interaction is possible

6.4 Hibernation

type	Enable the low power pin function and pull the pin high
emission	Unable to transmit wireless data.
take over	Unable to receive wireless data.
Notice	When entering other modes from sleep mode, the module will reconfigure parameters.

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7 AT Commands

- The instructions involved have three functions (types): query (query instructions), setting (parameter setting instructions) and operation (operation instructions).
- Different modes support different commands. All commands end with a carriage return and line feed, that is, "\r\n" at the end.
- If there is a command error or a command parameter error, “=ERR\r\n” will be returned .
- **In configuration mode (mode 1), the serial port fixed parameters are 9600, 8N1 . The parameter configuration command takes effect after the mode is switched and is saved after power failure.**

7.1 General instructions

This type of command is supported in both transfer mode and configuration mode .

1、AT+MODE , mode switching command

	Query	**set up**
instruction	AT+MODE=?\r\n	AT+MODE=<mode>\r\n
return	① AT+MODE=<mode>\r\n ② =ERR\r\n	① =OK\r\n ② =ERR\r\n
Parameter Description	none	mode: configured operation mode 0~1
Return Description	① mode: Current operating mode mode=0, indicates the transmission mode mode=1, indicates configuration mode ② “=ERR\r\n”: Command error	“=OK\r\n”: Setting successful “=ERR\r\n”: Command error
Remark	Mode switching starts switching modes after answering mode=0, indicates transmission mode mode=1, indicates configuration mode When the module is powered on or restarted, mode=0 is the default, i.e. the transmission mode.	

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7.2 Configuration mode specific instructions

These commands are only supported in configuration mode .

1、AT+HELP , help command , query all AT commands

type	Query
instruction	AT+HELP=?\r\n
return	① Output all supported commands ② =ERR\r\n
Parameter Description	none
Return Description	① All supported commands ② “=ERR\r\n”: Command error
Remark	Output all supported commands, with "\r\n" between commands

2、AT+DEVTYPE, module model query command

type	Query
instruction	AT+DEVTYPE =?\r\n
return	① AT+DEVTYPE =<devtype>\r\n ② =ERR\r\n
Parameter Description	none
Return Description	① devtype: module model ② “=ERR\r\n”: Command error
Remark	Complete response: " AT+DEVTYPE = EWM35T-2G4T06SP /SX\r\n "

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3、AT+FWCODE, module firmware version query command

type	Query
instruction	AT+ FWCODE =?\r\n
return	① AT+ FWCODE =<fwcode>\r\n ② =ERR\r\n
Parameter Description	none
Return Description	① fwcode: module firmware version ② “=ERR\r\n”: Command error
Remark	none

4、AT+ADDR, module data transmission address configuration command

type	Query	set up
instruction	AT+ADDR=?\r\n	AT+ADDR=<addh>,<addl>\r\n
return	① AT+ADDR=<addh>,<addl>\r\n ② =ERR\r\n	① =OK\r\n ② =ERR\r\n
Parameter Description	none	① addh: module address high byte, 0~255 ② addh: module address low byte, 0~255
Return Description	① addh: module address high byte, 0~255 ② addh: module address low byte, 0~255③ “=ERR\r\n”: Command error	① “=OK\r\n”: Setting successful ② “=ERR\r\n”: Command error

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Remark	After the parameters are set, the switching mode takes effect; the default values of addl and addh are 0

5、AT+UART, module serial port parameter configuration command

type	Query	set up
instruction	AT+UART =?\r\n	AT+UART =<baud>,<stopbit>,<parity>\r\n
return	① AT+UART =<baud>,<stopbit>,<parity>\r\n ② =ERR\r\n	① =OK\r\n ② =ERR\r\n
Parameter Description	none	① baud: serial port baud rate, 0~ 8 ② stopbit: serial port stop bit, 0~2 ③ parity: serial port check bit, 0~2
Return Description	① baud: serial port baud rate, 0~ 8 ② stopbit: serial port stop bit, 0~2 ③ parity: serial port check bit, 0~2 ④ "=ERR\r\n": Command error	① "=OK\r\n": Setting successful ② "=ERR\r\n": Command error

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Remark	After the parameters are set, the switching mode takes effect; default parameters, baud = 0 , stopbit = 0, parity = 0 baud=0, baud rate 9600 bps stop=0, 1 stop bit parity=0, no parity baud=1, baud rate 14400 bps stop=2, 1.5 stop bits parity=1, even parity baud=2, baud rate 19200 bps stop=2, 2 stop bits parity=2, odd parity baud = 3 , baud rate 38400 bps baud = 4 , baud rate 57600 bps baud = 5 , baud rate 115200 bps baud = 6 , baud rate 230400 bps baud = 7 , baud rate 460800 bps baud = 8 , baud rate 921600 bps

6、AT+RATE, module data transmission speed configuration command

type	Query	set up
instruction	AT+RATE =?\r\n	AT+RATE =<rate>\r\n
return	① AT+RATE =<rate>\r\n ② =ERR\r\n	① =OK\r\n ② =ERR\r\n
Parameter Description	none	① rate: RF airspeed, 0~ 1
Return Description	① rate: RF airspeed, 0~ 1 ② “=ERR\r\n”: Command error	① “=OK\r\n”: Setting successful ② “=ERR\r\n”: Command error
Remark	After the parameter is set, the switching mode takes effect; the default parameter rate=0 rate=0, means 500Kbps rate=1, means 1Mbps	

7、AT+POWER, module RF transmission power configuration command

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type	Query	set up
instruction	AT+POWER =?\r\n	AT+POWER =<power>\r\n
return	① AT+POWER =<power>\r\n ② =ERR\r\n	① =OK\r\n ② =ERR\r\n
Parameter Description	none	① power: RF power, 0~ 9
Return Description	① power: RF power, 0~ 9 ② "=ERR\r\n": Command error	① "=OK\r\n": Setting successful ② "=ERR\r\n": Command error
Remark	After the parameter is set, the switching mode takes effect; the default parameter power = 5 (6dbm)	

8、AT+CHANNEL, module RF transmission channel configuration command

type	Query	set up
instruction	AT+CHANNEL =?\r\n	AT+CHANNEL =<channel>\r\n
return	① AT+CHANNEL =<channel>\r\n ② =ERR\r\n	① =OK\r\n ② =ERR\r\n
Parameter Description	none	① channel: RF channel, 0~ 80
Return Description	① channel: RF channel, 0~ 80 ② "=ERR\r\n": Command error	① "=OK\r\n": Setting successful ② "=ERR\r\n": Command error
Remark	After the parameter is set, the switching mode takes effect; the default parameter channel=0 RF frequency = 2400 + channel, unit: MHz	

9、AT+TRANS, module data transmission mode configuration command

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type	Query	set up
instruction	AT+TRANS =?\r\n	AT+TRANS =<trans>\r\n
return	① AT+TRANS =<trans>\r\n ② =ERR\r\n	① =OK\r\n ② =ERR\r\n
Parameter Description	none	① trans: transmission mode, 0~1
Return Description	① trans: transmission mode, 0~1 ② "=ERR\r\n": Command error	① "=OK\r\n": Setting successful ② "=ERR\r\n": Command error
Remark	After the parameter is set, the switching mode takes effect; the default parameter trans=0 trans=0, means general transmission trans=1, indicates fixed-point transmission	

10、AT+ PACKET , module data transmission sub-packet length configuration command

type	Query	set up
instruction	AT+ PACKET =?\r\n	AT+ PACKET =<packet>\r\n
return	① AT+ PACKET =<trans>\r\n ② =ERR\r\n	① =OK\r\n ② =ERR\r\n
Parameter Description	none	① packet: packet length, 30 ~ 240
Return Description	① packet: packet length, 30 ~ 240 ② "=ERR\r\n": Command error	① "=OK\r\n": Setting successful ② "=ERR\r\n": Command error
Remark	After the parameter is set, the switching mode takes effect; the default parameter packet = 240	

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11、AT+DRSSI, module data packet RSSI configuration command

type	Query	set up
instruction	AT+DRSSI =?\r\n	AT+DRSSI =<drssi>\r\n
return	① AT+DRSSI =<drssi>\r\n ② =ERR\r\n	① =OK\r\n ② =ERR\r\n
Parameter Description	none	① drssi: Data packet RSSI switch, 0~1
Return Description	① drssi: Data packet RSSI switch, 0~1 ② "=ERR\r\n": Command error	① "=OK\r\n": Setting successful ② "=ERR\r\n": Command error
Remark	After the parameters are set, the switching mode takes effect; the default parameter drssi=0 drssi=0, means turning off the RSSI (signal strength of received data) data output of received data packets drssi=1, means to start the RSSI (signal strength of received data) data output of received data packet, which will be output at the end of the data packet	

12、AT+LPWR, module low power consumption function configuration command

type	Query	set up
instruction	AT+LPWR =?\r\n	AT+LPWR =<lpwr>\r\n
return	① AT+LPWR =<lpwr>\r\n ② =ERR\r\n	① =OK\r\n ② =ERR\r\n
Parameter Description	none	① lpwr: Enable low power pin, 0~1
Return Description	① lpwr: Enable low power pin, 0~1 ② "=ERR\r\n": Command error	① "=OK\r\n": Setting successful ② "=ERR\r\n": Command error

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Remark	After the parameter is set, the switching mode takes effect; the default parameter lpwr=0 lpwr=0, means turning off the low power SLEEP pin lpwr=1 means turning on the low power pin. After turning on this function, pull the SLEEP pin high to enter low power mode, and pull it low to maintain normal working state. When exiting low power , please note that the SLEEP pin is pulled high by default.

13、AT+IAP, enter the module IAP upgrade status command

type	operate
instruction	AT+IAP
return	① =OK\r\n ② =ERR\r\n
Parameter Description	none
Return Description	① “=OK\r\n”: The command is correct ② “=ERR\r\n”: Command error
Remark	After the command is correct, it will enter the upgrade state , the module will automatically restart and start the Bluetooth protocol stack, and connect the module to the mobile phone APP Bluetooth for OTA upgrade

14、AT+RESET, module reset and restart command

type	operate
instruction	AT+RESET
return	① =OK \r\n ② =ERR\r\n

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Parameter Description	none
Return Description	① “ =OK\r\n ” : The command is correct ② “=ERR\r\n”: Command error
Remark	After the command is correct, save the parameters in the current configuration mode and perform a reset and restart

15、AT+DEFAULT, module restores default parameter value command

type	operate
instruction	AT+DEFAULT
return	① =OK\r\n ② =ERR\r\n
Parameter Description	none
Return Description	① “=OK\r\n”: The command is correct ② “=ERR\r\n”: Command error
Remark	After the command is correct, the configuration parameters will be restored to the default parameters and will take effect after switching the mode.

7.3 Factory default parameters

Module Model	Factory default parameter values						
	frequency	address	Channel	Air speed	Baud rate	Serial port format	Transmit power
E35-2G4T10S/SX	2400 MHz	0,0	0	500K bps	9600	8N1	6 dBm

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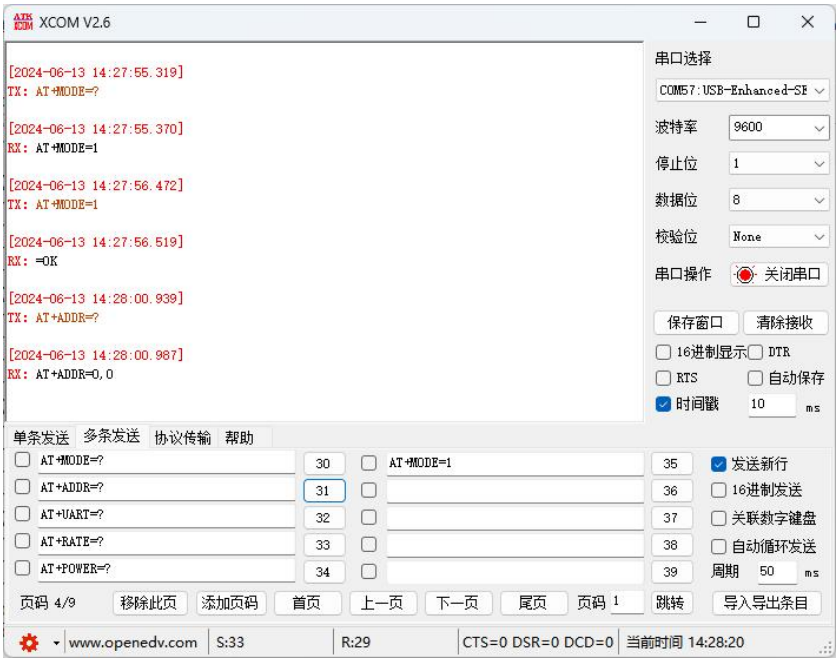
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7.4 Instruction Examples

Commonly used instructions are basic instructions to be used during use. Through the operation of these instructions, the basic parameters of the module can be configured and communication can be achieved.

instruction	illustrate
AT+MODE	Working mode operation
AT+ADDR	Module data transmission address
AT+UART	Module serial port
AT+RATE	Module data transmission speed
AT+POWER	Module RF transmission power
AT+CHANNEL	Module RF transmission channel

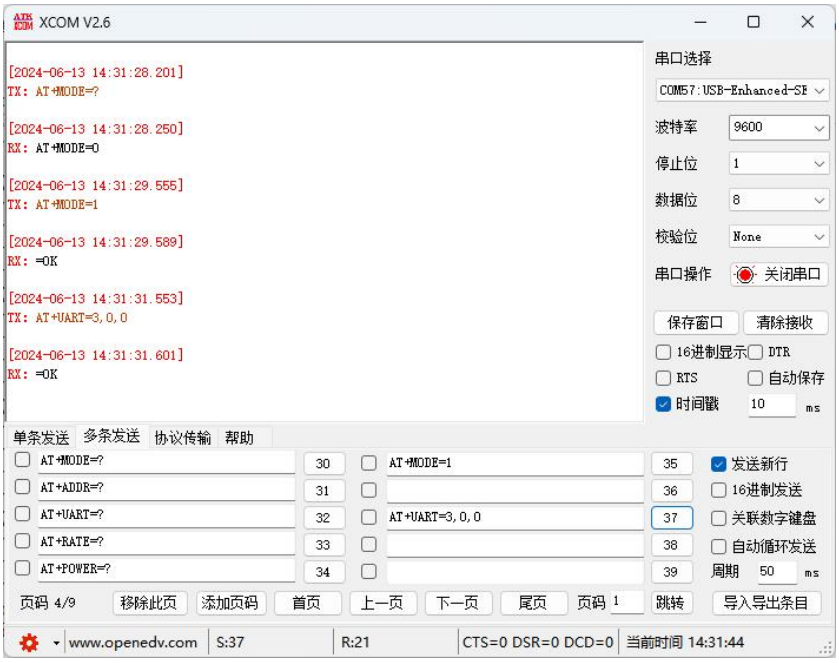
The following example uses AT commands to query the mode, switch the mode to configuration mode, and query the module address:



The following example uses AT commands to query the mode and switch the mode to the configuration mode, and configures the serial port parameters to 9600 8N1. Note that the parameter configuration command will take effect and be saved only after the mode is switched:

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8 Host Computer Configuration Instructions

- The figure below shows the configuration host computer display interface. Users can switch to command mode through the host computer to quickly configure and read parameters on the host computer.



- In the configuration of the host computer, the module address, communication channel and key are all in decimal display mode; the value range of each parameter is:

  Module address high : 0～ 255, default 0

  Module address low : 0～ 255, default 0

  Communication channel: 0~8 0, default 0

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9 Hardware Design

- It is recommended to use a DC regulated power supply to power the module. The power supply ripple coefficient should be as small as possible and the module should be reliably grounded.
- Please pay attention to the correct connection of the positive and negative poles of the power supply. Reverse connection may cause permanent damage to the module.
- Please check the power supply to ensure that it is within the recommended power supply voltage. If it exceeds the maximum value, the module will be permanently damaged.
- Please check the stability of the power supply. The voltage should not fluctuate greatly or frequently.
- When designing the power supply circuit for the module, it is often recommended to retain more than 30% margin, which is conducive to long-term stable operation of the whole machine;
- The module should be kept as far away as possible from parts with large electromagnetic interference, such as power supplies, transformers, and high-frequency wiring;
- High-frequency digital routing, high-frequency analog routing, and power routing must avoid the bottom of the module. If it is necessary to pass under the module, assuming that the module is soldered on the Top Layer, ground copper should be laid on the Top Layer of the module contact part (all copper should be laid and well grounded), and it must be close to the digital part of the module and routed on the Bottom Layer ;
- Assuming the module is soldered or placed on the Top Layer, it is also wrong to randomly route the wires on the Bottom Layer or other layers, which will affect the module's spurious signal and receiving sensitivity to varying degrees ;
- If there are devices with large electromagnetic interference around the module, it will also greatly affect the performance of the module. It is recommended to keep them away from the module according to the intensity of the interference. If possible, appropriate isolation and shielding can be performed.
- If there are traces with large electromagnetic interference around the module (high-frequency digital, high-frequency analog, power traces), it will also greatly affect the performance of the module. It is recommended to keep them away from the module according to the intensity of the interference. If possible, appropriate isolation and shielding can be performed.
- If the communication line uses 5V level, a 1k-5.1k resistor must be connected in series (not recommended, there is still a risk of damage) ;
- Try to stay away from some TTL protocols whose physical layer is also 2.4GHz, such as USB3.0;
- The antenna installation structure has a great impact on the module performance. Make sure the antenna is exposed and preferably vertically upward;
- When the module is installed inside the case, you can use a high-quality antenna extension cable to extend the antenna to the outside of the case;
- The antenna must not be installed inside a metal shell, as this will greatly reduce the transmission distance.

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10 Frequently Asked Questions

10.1 The transmission distance is not ideal

- When there is a straight-line communication obstacle, the communication distance will be attenuated accordingly ;
- Temperature, humidity, and co-channel interference can increase the communication packet loss rate ;
- The ground absorbs and reflects radio waves, so the test results are poor when close to the ground ;
- Seawater has a strong ability to absorb radio waves, so the test effect at the seaside is poor ;
- If there are metal objects near the antenna, or the antenna is placed in a metal shell, the signal attenuation will be very serious ;
- The power register is set incorrectly, or the air rate is set too high (the higher the air rate, the closer the distance) ;
- The power supply voltage at room temperature is lower than the recommended value. The lower the voltage, the lower the power output .
- The antenna used does not match the module well or the antenna itself has quality issues.

10.2 Module is easily damaged

- Please check the power supply to ensure that it is within the recommended power supply voltage. If it exceeds the maximum value, the module will be permanently damaged .
- Please check the stability of the power supply. The voltage should not fluctuate greatly or frequently .
- Please ensure anti-static operation during installation and use, as high-frequency components are sensitive to static electricity ;
- Please ensure that the humidity is not too high during installation and use, as some components are humidity sensitive devices ;
- If there is no special requirement, it is not recommended to use it at too high or too low temperature.

10.3 The bit error rate is too high

- There is interference from the same frequency signal nearby. Stay away from the interference source or change the frequency or channel to avoid interference.
- An unsatisfactory power supply may also cause garbled characters, so the reliability of the power supply must be ensured;
- Extension cables or feeder cables that are of poor quality or are too long can also cause a high bit error rate.

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11 Welding Operation Instructions

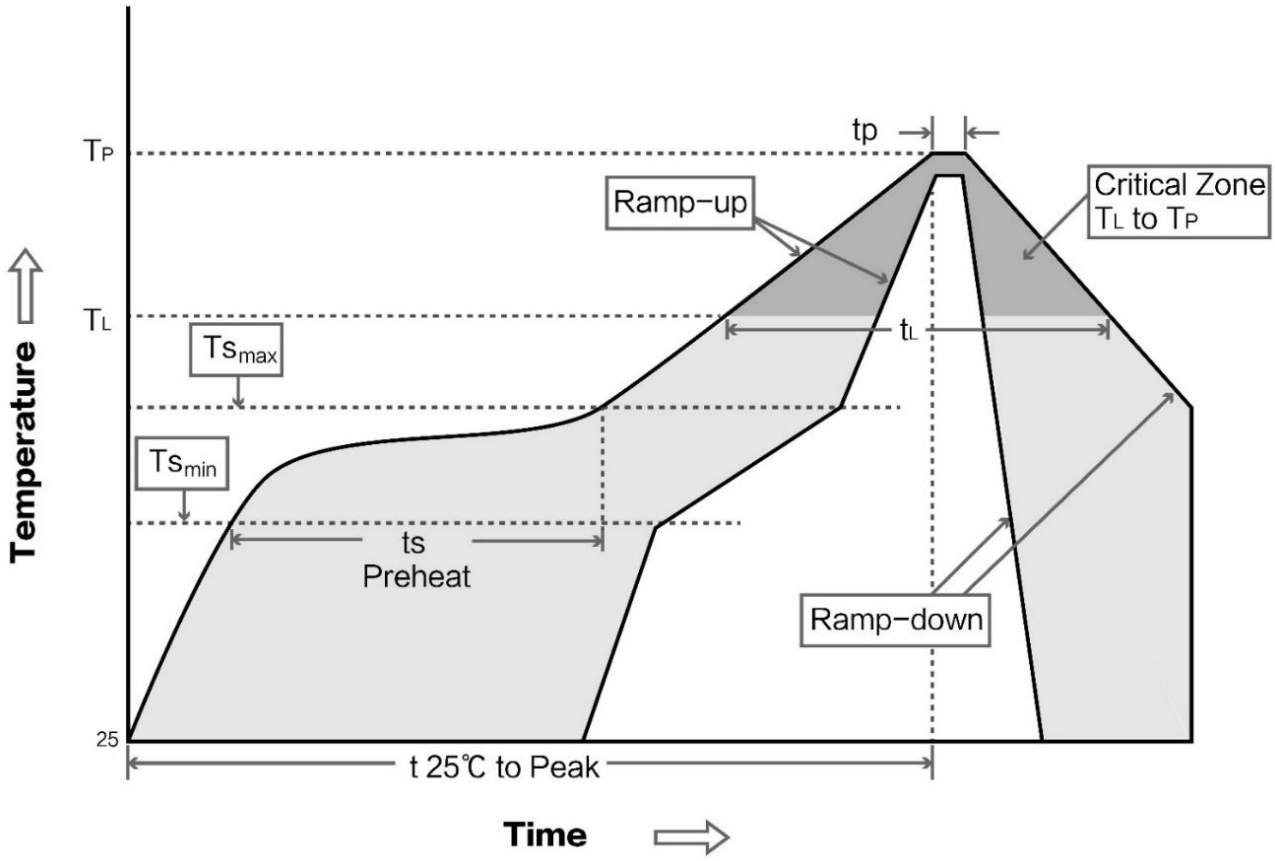
11.1 Reflow temperature

Profile Feature	Curve characteristics	Sn-Pb Assembly	Pb-Free Assembly
Solder Paste	Solder Paste	Sn63/Pb37	Sn96.5/Ag3/Cu0.5
Preheat Temperature min (Tsmin)	Minimum preheating temperature	100 ℃	150 ℃
Preheat temperature max (Tsmax)	Maximum preheating temperature	150 ℃	200 ℃
Preheat Time (Tsmin to Tsmax)(ts)	Warm-up time	60-120 sec	60-120 sec
Average ramp-up rate(Tsmax to Tp)	Average ascent rate	3 ℃ /second max	3 ℃ /second max
Liquid Temperature (TL)	Liquidus temperature	183 ℃	217 ℃
Time(tL)Maintained Above(TL)	Time above liquidus	60-90 sec	30-90 sec
Peak temperature (Tp)	Peak temperature	220-235 ℃	230-250 ℃
Aveage ramp-down rate（Tp to Tsmax）	Average descent rate	6 ℃ /second max	6 ℃ /second max
Time 25 ℃ to peak temperature	Time from 25 ℃ to peak temperature	6 minutes max	8 minutes max

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11.2 Reflow Oven Curve



12 Related Models

Product Model	Carrier frequency Hz	Transmit power dBm	Test distance km	Package	Product size mm	Communication interface
E22-230T22S	230M	twenty two	5	Patches	16*26	TTL
E22-230T30S	230M	30	10	Patches	20*40.5	TTL
E22-400T22S	433/470M	twenty two	5	Patches	16*26	TTL
E22-400T30E	433/470M	30	10	Patches	20*40.5	TTL
E22-900T22S	868 / 915M	twenty two	5	Patches	16*26	TTL
E22-900T30S	868 / 915M	30	10	Patches	20*40.5	TTL
E22-400M22S	433/470M	twenty two	7	Patches	14*20	SP
E22-400M30S	433/470M	30	12	Patches	24*38.5	SP
E22-900M22S	868 / 915M	twenty two	7	Patches	14*20	SP

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E22-900M30S	868 / 915M	30	12	Patches	24*38.5	SP

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Revision History

Version	Revision Date	Revision Notes	Maintainer
1.0	2024.11.25	First edition	Bin

About us

Hot line:4000 330 990

Technical support: support@cdebyte.com

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