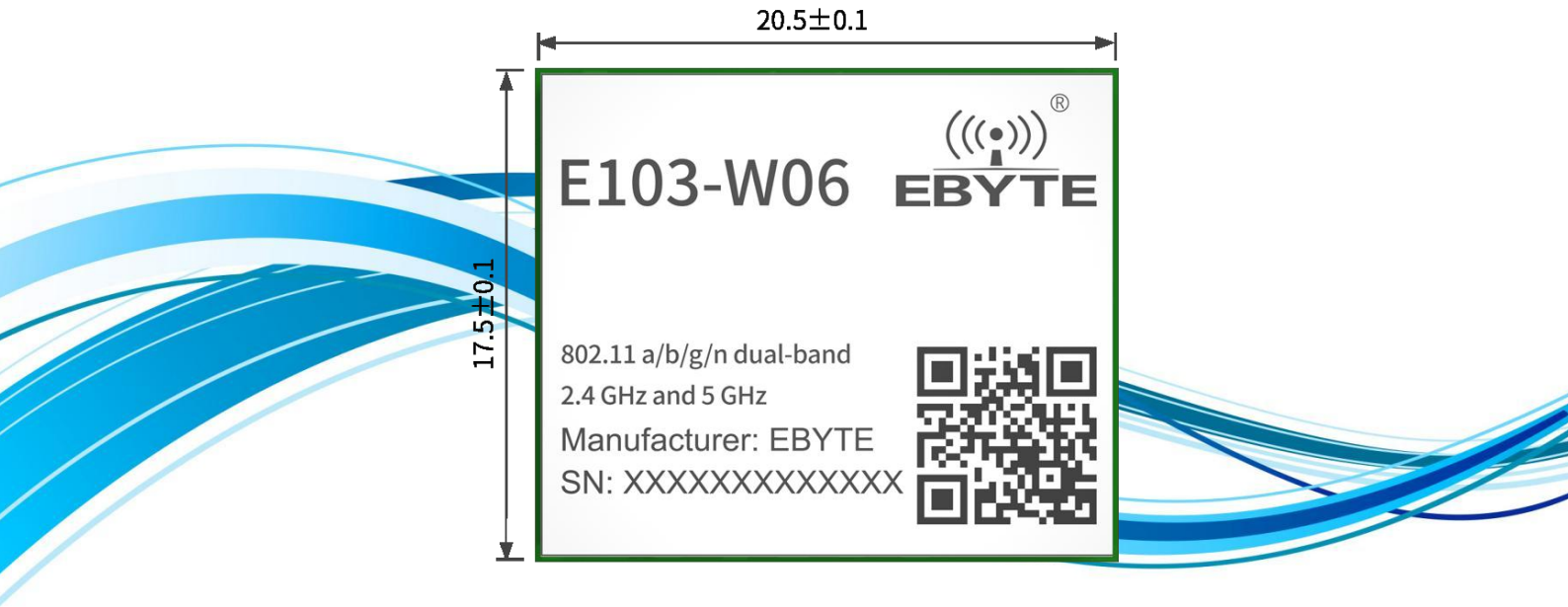
E103-W06 Product Instructions

CC3235SF 2.4G / 5.8G Dual-Band Wi - Fi Serial Port Module



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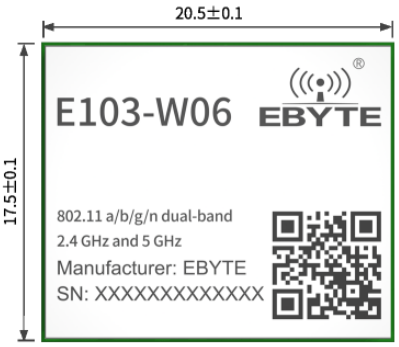
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1.Overview

1.1Introduction



E103-W06 is a high-performance, highly reliable dual-band Wi-Fi module launched by Chengdu Yibite based on TI's third-generation Wi-Fi chip CC3235S. It has a built-in high-performance ARM Cortex-M4 processor and a maximum wireless transmission power of +18dBm. The hardware package is compatible with the original CC3235MODS and CC3235MODSF , and our company's modules are interchangeable with them .

Functionally, the module supports IEEE802.11 a/b/g/n standards and operates in both 2.4G and 5G frequency bands. It supports AP, STA, and Wi-Fi Direct (2.4G band only) modes, along with multiple network transmission protocols including TCP, UDP, HTTP, MQTT, MQTTS, and WEBSOCKET. It also includes built-in mDNS, DNS-SD, and DHCP service packages. It supports WPA2 Personal encryption, and in station mode, it also supports WPA2 Enterprise and WPA3. It meets a variety of high-standard, high-reliability wireless communication scenarios, while also offering power-on transparent transmission and SmartConfig for convenient network configuration. The E103-W06 is an industrial-grade Wi-Fi module that truly combines ease of use with high reliability and performance.

1.2Features

- Support IEEE802.11 a/b/g/n standards
- Dual-band WIFI: can work in 2.4GHz & 5GHz frequency bands
- Supports 3 working modes: AP, STA, and WIFI Direct;
- Support WEP/WPA/WPA2 multiple WIFI security authentication methods;
- Support multiple network communication protocols such as TCP/UDP/HTTP/MQTT;
- Support TSL/SSL secure transmission;
- Supports up to 4 socket connections;
- AP access point supports 4-way STA device connection;
- Support mDNS, DNS-SD, DHCP network service packages;
- Support WEB page parameter configuration;
- Support NTP network time acquisition (on the premise of Internet access);
- Support automatic reconnection after disconnection;
- Support high-speed continuous transmission, up to 3M baud rate continuous transmission;
- Support multiple power consumption mode switching;
- Support WIFI idle connection (LDPS);
- Support M QTT network protocol (Alibaba Cloud, Baidu Cloud, One Net)
- Support WebSocket connection;
- Support HTTP Client

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- Support TCP SERVER/TCP CLIENT, UDP communication mode;
- Support custom registration package and custom heartbeat package functions;
- Support socket distribution protocol;
- AT command configuration;
- Support remote command configuration;
- Support Smartconfig quick network configuration;
- Support transparent multi-channel protocol transmission and broadcast transmission;
- Support pin restoration to default parameters
- Support modebus protocol conversion (RTU and TCP)
- Support static IP address allocation
- Support scanning nearby AP information
- Site mode supports roaming function

1.3Application Scenario

-Medical and healthcare
Multi-parameter patient monitor
Electrocardiogram (ECG)
Hospital electronic bed and bed control system
Telemedicine system
-Building and home automation:
HVAC systems and thermostats
Video surveillance, video doorbells, and low-power cameras
Building security systems and electronic locks
-Smart appliances
-Smart wearables
-Asset tracking
-Factory Automation
-Grid infrastructure

2.Specifications

2.1Limit parameters

Main parameters	performance		Remark
	Minimum	Maximum	
Power supply voltage (V)	0	3.6	Over 3.6 V will permanently burn out the module
Blocking power (dBm)	-	10	The probability of burning is lower when used at close range

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Operating temperature (° C)	-40	+ 85	Industrial grade

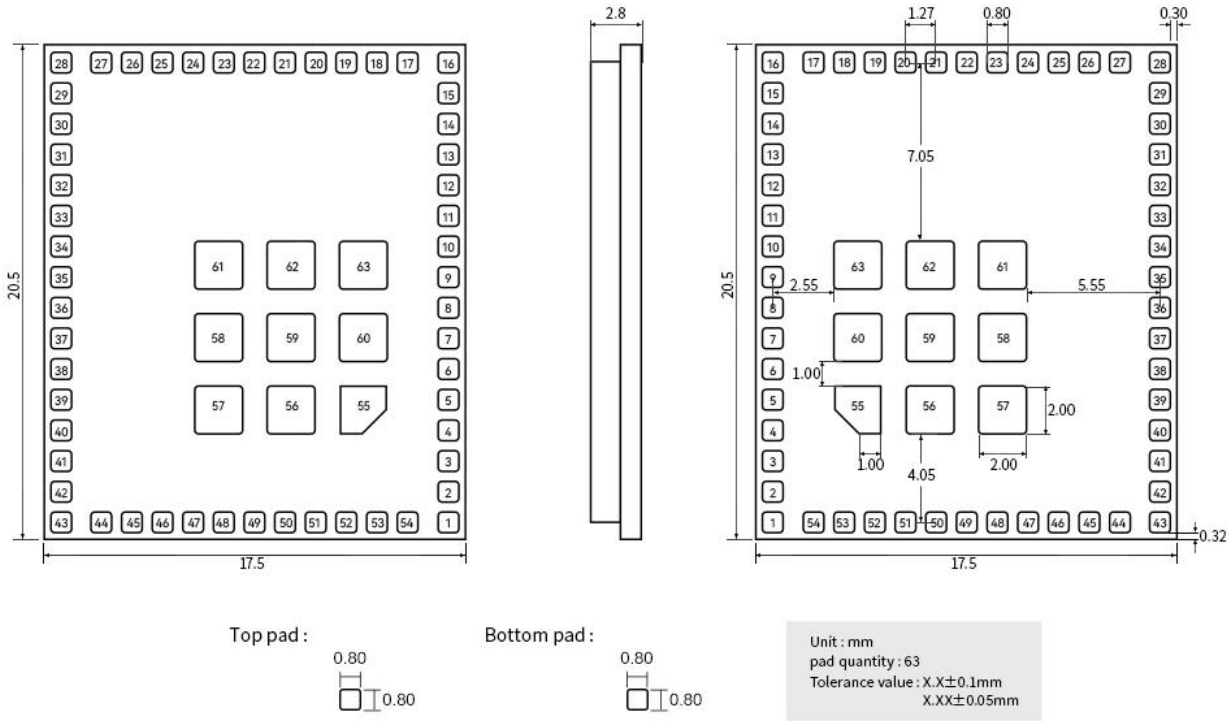
2.2Working parameters

Main parameters		performance			Remark
		Minimum	Typical values	Maximum	
Operating voltage (V)		2.3	3.3	3.6	Recommended 3.3V power supply
Communication level (V)			3.3		-
Operating temperature (° C)		-40	-	+ 85	Industrial-grade design
Operating frequency band (Hz)		2.412G	2.442G	2.472G	Support 2.4G frequency band
		5.180G	5.550G	5.825G	Support 5G frequency bands
Power consumption	Maximum transmit power (dBm)	16	18	18.5	Test 2.412GHz
		16	18	18.5	Testing 5.18GHz
	Emission current (mA)	-	276mA	-	Instantaneous power consumption (2.412GHz), DSSS 1Mbps
		-	183mA	-	Instantaneous power consumption (5.18GHz), OFDM 6Mbps
	Receive current (mA)	-	78mA	-	power consumption when receiving (2.412GHz)
		-	83mA	-	power consumption when receiving (5.18GHz)
	Sleep current (μA)	-	18 uA	-	Hibernation
		-	18 uA	-	Low-power deep sleep (LPDS)
	WiFi version	-	802.11	-	a/b/g/n
	RF interface	-	pads	-	Pad size 0.81mm*0.81mm, 50 Ω characteristic impedance

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3.Mechanical dimensions and pin definitions



Pin number	Pin Name	Pin Type	Corresponding pin number of CC3235S	Pin Purpose
1	GND	-	-	Ground wire, connected to the power reference ground
2	GND	-	-	Ground wire, connected to the power reference ground
3	INDICATE	-	1	Abnormal indication, abnormal : high , normal: low. (GPIO10 of CC3235)
4	S_LINK	-	2	Socket connection indication, connected: high, disconnected: low. (GPIO11 of CC3235)
5	GPIO14	I/O	5	Restore factory settings pin, low level is valid. Keep low level for about

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				3 seconds when power is turned on. No need to restart again.
6	GPIO15	I/O	6	General IO port
7	GPIO16	I/O	7	General IO port
8	GPIO17	I/O	8	General IO port
9	GPIO12	I/O	3	General IO port
10	GPIO13	I/O	4	WAKEUP wake - up pin
11	GPIO22	I/O	15	General IO port
12	JTAG_TDI	I/O	16	JTAG emulation pin, JTAG TDI input; do not connect if not used
13	FLASH_SPI_MISO	I	-	External serial FLASH programming interface: SPI data input
14	FLASH_SPI_nCS_IN	I	-	External serial FLASH programming interface: SPI chip select (active low)
15	FLASH_SPI_CLK	I	-	External serial FLASH programming interface: SPI clock
16	GND	-	-	Ground wire, connected to the power reference ground
17	FLASH_SPI_MOSI	O	-	External serial FLASH programming interface: SPI data output
18	JTAG_TDO	I/O	17	JTAG emulation pin, JTAG TDO output; do not connect if not used
19	GPIO28	I/O	18	General IO port
20	NC	I/O	-	Do not connect the pins, users do not need to care
twenty one	JTAG_TCK	I/O	19	JTAG emulation pin, JTAG TCK input; do not connect if not used; the module has a built-in 100K pull-down resistor.
twenty two	JTAG_TMS	I/O	20	JTAG emulation pin, JTAG TMS input; leave it unconnected if not used.
twenty three	SOP2	-	twenty one	The SOP2 pin has a built-in 100K pull-down resistor; when in use, an external 10K pull-up resistor is required to pull the pin level high.
twenty four	SOP1	-	34	The SOP1 pin has a built-in 100K pull-down resistor; when in use, an external 10K pull-up resistor is required to pull the pin level high.
25	GND	-	-	Ground wire, connected to the power reference ground
26	GND	-	-	Ground wire, connected to the power reference ground
27	GND	-	-	Ground wire, connected to the power reference ground
28	GND	-	-	Ground wire, connected to the power reference ground
29	GND	-	-	Ground wire, connected to the power reference ground
30	GND	-	-	Ground wire, connected to the power reference ground
31	RF_ABG	I/O	31	2.4G/5G RF input and output
32	GND	-	-	Ground wire, connected to the power reference ground
33	NC	-	-	Do not connect the pins, users do not need to care
34	SOP0	-	35	The SOP0 pin has a built-in 100K pull-down resistor; when in use, an

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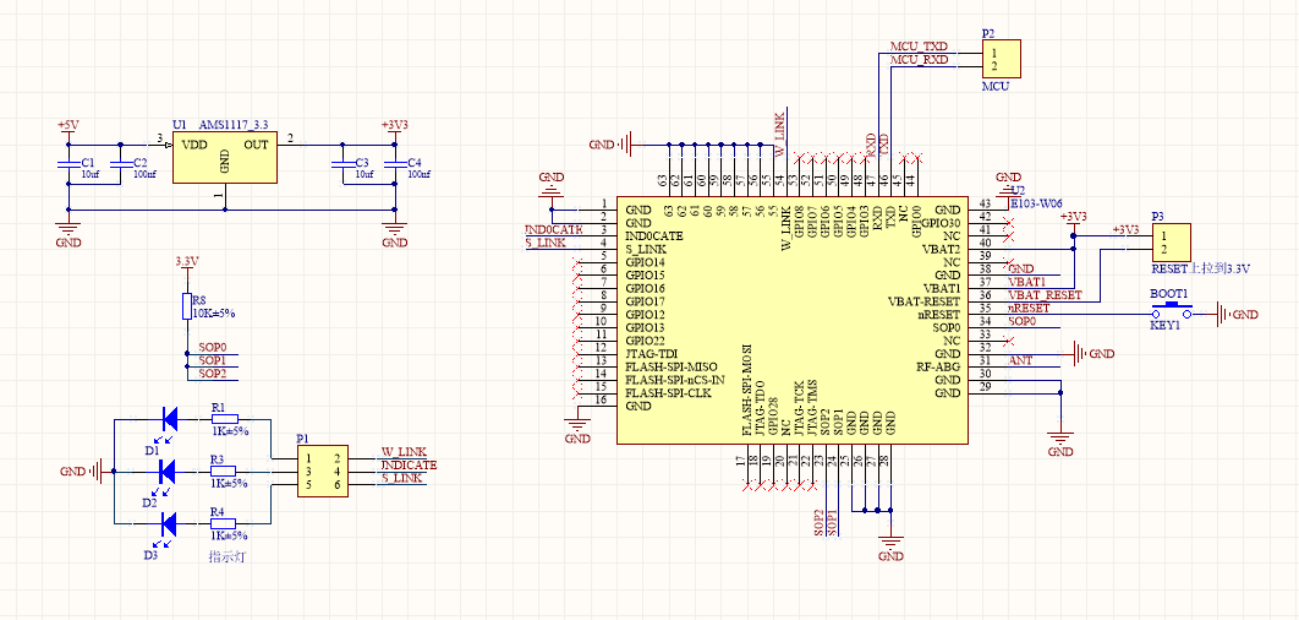
				external 10K pull-up resistor is required to pull the pin level high.
35	nRESET	I	32	The nRESET pin has a built-in 100K pull-up resistor to the VBAT_RESET pin. Note: VBAT_RESET is not connected to VBAT1 or VBAT2 inside the module. The following connection methods are recommended: 1. Connect nRESET to a switch, external controller, or host only if nRESET is expected to be in a defined state under all operating conditions. Leave VBAT_RESET unconnected to save power. 2. If nRESET is not expected to be in a defined state under all operating conditions, connect VBAT_RESET to the module's main power supply (VBAT1 and VBAT2). Due to the internal pull-up resistors, leakage current is expected to be (3.3 V/100 k Ω) mA.
36	VBAT_RESET	-	-	
37	VBAT1	Power	37, 39	Module power supply positive reference, voltage range 2.3 V to 3.6 V. Note: The module is not connected to VBAT2 internally, and needs to be shorted with Pin 40 VBAT2 when in use; see the recommended connection diagram in Chapter 4 for details.
38	GND	-	-	Ground wire, connected to the power reference ground
39	NC	-	-	Do not connect the pins, users do not need to care
40	VBAT2	Power	10, 44, 54	Module power supply positive reference, voltage range 2.3 V to 3.6 V. Note: The module is not connected to VBAT1 internally, and needs to be shorted with Pin 37 VBAT1 when in use; see the recommended connection diagram in Chapter 4 for details.
41	NC	-	-	Do not connect the pins, users do not need to care
42	GPIO30	I/O	53	General IO port
43	GND	-	-	Ground wire, connected to the power reference ground
44	GPIO0	I/O	50	General IO port
4 5	NC	-	-	Do not connect the pins, users do not need to care
4 6	TX D	-	55	TTL serial port output, connected to the external RXD input pin (GPIO1 of CC3235)
47	RXD	-	57	TTL serial port input, connected to the external TXD output pin (GPIO2 of CC3235)
48	GPIO3	I/O	58	General IO port
49	GPIO4	I/O	59	General IO port
50	GPIO5	I/O	60	General IO port
51	GPIO6	I/O	61	General IO port
52	GPIO7	I/O	62	General IO port
53	GPIO8	I/O	63	General IO port
54	W_LINK	-	64	Wi-Fi connection indication, connected: high, disconnected: low. (GPIO9 of CC3235)
55	GND	-	-	Ground wire, connected to the power reference ground
56	GND	-	-	Ground wire, connected to the power reference ground
57	GND	-	-	Ground wire, connected to the power reference ground
58	GND	-	-	Ground wire, connected to the power reference ground

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59	GND	-	-	Ground wire, connected to the power reference ground
60	GND	-	-	Ground wire, connected to the power reference ground
61	GND	-	-	Ground wire, connected to the power reference ground
62	GND	-	-	Ground wire, connected to the power reference ground
63	GND	-	-	Ground wire, connected to the power reference ground

4.Recommended connection diagram



Notice:

1、 The power supply must be between 2.3V and 3.6V. To ensure stable operation of the module, it is recommended to use an external LDO with a power supply capacity greater than 500mA.

2、 Pin 40 VBAT2 and Pin 37 VBAT1 inside the module are not connected. They need to be short-circuited with Pin 37 VBAT1 when used .

3、 Connect the RXD/TXD of E103-W06 to the MCU_TXD/MCU_RXD of the external MCU respectively.

4、 The nRESET pin has a built-in 100K pull-up resistor to the VBAT_RESET pin. Note: Internally, VBAT_RESET is not connected to VBAT1 or VBAT2. The module must be connected to VBAT1 or VBAT2 during operation; otherwise, it will not function properly. To reduce overall power consumption during low-power operation, disconnect VBAT_RESET and connect it to N BAT1 or VBAT2 during operation .

5、 If you need to use the data transmission function of this module, you need to connect the SOP1 pin to a 10K pull-up resistor and SOP0 and SOP2 to pull-down resistors when powering on (the SOP0 and SOP2 are already connected to pull-down resistors inside the module, so no further processing is required here). Otherwise, it will not work properly.

6、 If secondary development is required, please refer to the relevant development manual of CC3235SF for the connection method of SOP0 , SOP1 and SOP2 pins and select the mode yourself.

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5.Functional Description

The working mode of this module is divided into three levels: working role; transmission mode; service category. From the role of Wi -Fi layer, it can be divided into Access Point is commonly known as AP access point, Station is commonly known as site , WiFI-Direct is also called P2P or Wi- Fi direct connection; in terms of transmission mode, it is divided into single-mode transparent transmission and protocol transmission; in terms of service category, it is divided into TCP Server , TCP Client , UDP , MQTT , and HTPP client.

5.1Job Role

Job roles are defined from the perspective of the WiFi physical layer.

5.1.1Access Point (AP mode)

Access Point mode, also known as AP mode , is similar to a router, allowing wireless devices to connect and establishing TCP /IP- based server, client, and UDP communications . This mode supports up to four stations and a maximum of four TCP sockets . To configure the module to operate in the AP role, use the command AT +MODE=1 , where x,x sets the first bit to 1.

5.1.2Station (STA mode)

State mode, abbreviated as STA , does not provide connectivity in this role and can only connect to an access point or router. In this state, the module supports TCP server, TCP client, and UDP, with up to four sockets. It also supports MQTT, Web Socket , and HTTP client . To configure the module in the STA role, use the command AT + MODE = 2,x,x with the first bit set to 2 .

5.1.3Wi -Fi Direct (P2P mode)

WiFi Direct mode, also known **as P2P ,** establishes a point-to-point connection without requiring a router . Similar to Bluetooth, but with significantly higher transmission rates, it allows for a much faster connection. The command " AT+MODE=3, x , x" sets the first bit to 3 to configure the module for WiFi Direct mode.
in the P2P mode : Client and GroupOwner.

5.2Transmission Mode

Specifically, the transmission mode refers to the number of sockets supported by the module under the TCP /IP protocol. When only one socket is supported, it is defined as single-mode transparent transmission. When multiple sockets are supported, it is defined as protocol transmission. It should be noted that the transmission mode parameter does not apply to Wi-Fi Direct .

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5.2.1Transparent transmission

Transparent transmission means that when only one socket is supported, data from both the serial port and the network is sent directly without any formatting. The command A T+MODE=x.1, where the second bit of x is set to 1, configures the module to work in transparent transmission mode.

5.2.2Protocol transmission

When supporting multiple sockets, in order to distinguish the source and destination of data, we define it as protocol transmission, which includes designated sending and broadcast sending.

5.2.2.1Specify Send

Designated sending means that the data packet input to the serial port contains a unique socked ID number, and the module transmits the data to the corresponding socket connection based on this ID number .

Fixed head	Socket ID	data
3 Byte	1 Byte	N Byte

Fixed header: 0x AA 0xFE 0x 55

Socket ID:

0x00, indicating that the Socket 0 link is found

0x01, indicating that the Socket 1 link is found

0x02, indicating that the Socket 2 link is found

0x03, indicating that Socket 3 link is found

Data : Application Payload

For example: AA FE 55 0 0 AA BB CC In protocol transmission mode, send AA BB CC to Socket 0 through the serial port

5.2.2.2Broadcast Send

When the Socket ID is 0xff , it means broadcast. If four connections are established, the data will be sent to the four sockets at the same time. Otherwise, the data will be sent to the established connection.

5.2.2.3Agreement Receiving

Fixed head	Socket ID	length	data
3 Byte	1 Byte	2Byte	N Byte

Fixed Header:

0xAA 0xFE 0x55

Socket ID:

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0x00, indicating that the Socket 0 link is found
0x01, indicating that the Socket 1 link is found
0x02, indicating that the Socket 2 link is found
0x03, indicating that Socket 3 link is found

length:

Actual length of application data, range: 0~ 1000

data :

Application Payload

For example : AA FE 55 0 0 00 03 11 22 33 In protocol mode, the 3-byte data received from Socket0 is: 0x11 0x22 0x33

Use the command AT+MODE=x,2,x to set the second bit to configure the module to work in protocol transmission mode.

5.3Service Model

Service mode refers to the network protocols supported by the module and its role within those protocols, often referred to as server and client. UDP , MQTT , HTTP client , Web Socket , and other protocols are all categorized under this mode. Note that the service mode has no effect on the WiFi-Direct (P2P) role. Service mode includes the following:

5.3.1TCP server

work as TCP server , use the command: AT+MODE= x ,x,1 to set the third bit to configure the module to work in TCP server mode.

5.3.2TCP client

To make the module work as TCP client , use the command: AT+MODE= x ,x,2 to set the third bit to configure the module to work in TCP client mode.

5.3.3UDP

UDP mode , there is no distinction between server and client. Use the command: AT +MODE= x ,x,3 to set the third bit to configure the module to operate in UDP mode. In addition, there is no concept of connection in UDP mode , so the S_LINK pin is not operated in the status indication .

5.3.4MQTT /MQTTS

MQTT mode, the module supports IoT platforms such as Alibaba Cloud, Baidu Cloud, and OneNet , as well as standard MQTT3.1. Simply enter the service parameters created on the platform into the module to communicate, or enter your own MQTT server URL and username and password. MQTT is currently not supported on the platform and is suitable for standard MQTT3.1 servers.

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5.3.4.1Alibaba Cloud

For network communication based on the Alibaba Cloud platform, you need to log in to Alibaba Cloud to obtain relevant parameters, mainly including product secret key, device name, client ID and other information. For details, see Chapter 7 Alibaba Cloud Configuration Tutorial.

5.3.4.2Baidu Cloud

For network communication based on Baidu Cloud platform, you need to log in to Baidu Cloud to obtain relevant parameters, mainly including device name, user name, password, etc. For details, see Chapter 7 Baidu Cloud Configuration Tutorial.

5.3.4.3Onenet

based on the One Net cloud platform, you need to log in to One Net to obtain relevant parameters, mainly including device ID , product ID , authentication information, etc. For details, see Chapter 7 One Net Configuration Tutorial.

5.3.5HTTP C lient

When using this function, you only need to configure the corresponding server resource URL and start a trigger request to obtain the server response resources without worrying about the complex HTTP protocol layer . For details, see Chapter 7 HTTP Client configuration tutorial.

5.3.6Web Socket

Traditional HTTP transport protocols are access-based and responsive. This approach places the server in a passive state and is unsuitable for applications where web clients frequently interact with web servers. The WebSocket function allows the E103-W06 module to interact with web pages in real time via the serial port, eliminating the need for multiple HTTP client-initiated GET and POST requests. This improves response speed and allows the module to proactively push data to web pages. For more information, see Chapter 7, "Web Socket Configuration Tutorial."

5.4 Parameter configuration

There are three ways to configure parameters: AT command configuration based on the serial port , remote AT configuration based on UDP , and web page configuration based on the browser. For detailed operations, see Chapter 6 AT Command Description and Chapter 7 User Tutorial.

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5.4.1Serial port AT configuration

To configure parameters using serial port AT commands, first send "+++" to enter AT mode. Then, follow the AT commands described in Chapter 6. After configuration, some commands take effect immediately, while others take effect after a reboot. The instructions in the AT commands section will apply. To exit AT mode , send the command: AT +EXAT . Sending the " +++ " command at any time will enter AT mode . However, AT +EXAT can only be used in AT mode ; otherwise, it is used for data transmission.
For specific AT commands, please refer to the E103-W06 AT Command Manual.

5.4.2 UDP remote configuration

UDP remote configuration is performed using network debugging tools on the same network to configure parameters. This is also called over-the-air configuration. There are two ways to access remote configuration: when the module is in AP mode and the PC is connected to the module; when the module is in STA mode and the PC and module are connected to the same router. The module monitors a fixed UDP port , 8009. When the module and the terminal are on the same network, parameter configuration can be performed by setting the corresponding IP and port. Remote configuration must be performed in AP or STA mode and after a network connection has been established. P2P mode does not support this feature.

5.4.3 Browser-based web configuration

Web page configuration requires that the PC and module are in the same LAN. There are two ways to access the web page configuration: when the module is in AP mode , the PC is connected to the module; when the module is in STA mode, the PC and module are connected to a router. The PC accesses the module's IP address through a browser and accesses the static web page to configure parameters.
7 270-0-13 , you can switch to the English configuration interface in the upper right corner.

5.5 Status Indicator

The status indication shows the working status of the module through serial port printing or pin output level status. Serial port indication: when entering AT command , it prints “ enter AT mode ”; when exiting AT command , it prints “ break AT mode ”; when AT command error occurs, it prints “ ERR=x ”; when AT command is correct, it returns to the set value.
Pin indicators include Wi- Fi connection status, socket connection status, and module abnormality. When a Wi-Fi connection is established, the W_LINK pin outputs a high level; if the connection is disconnected, W_LINK outputs a low level. When a socket connection is established, S_LINK outputs a high level; if the connection is disconnected, S_LINK outputs a low level.
When the module is operating normally, the INDICATE pin remains low. If the module fails, the INDICATE pin outputs a high level, and the module needs to be restarted.

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5.6 Low power consumption

The module's low power consumption allows the module to enter sleep mode through command operation. After entering sleep mode, it can be awakened through the pin. The awakening method is to give the WAKEUP pin (i.e., GPIO_13) a rising edge greater than 200 ms, or to receive data through the serial port.

5.7 3M high- speed continuous transmission

Regarding high-speed continuous transmission, please note the following issues:

1、 The serial port chip must be a model that can support a baud rate of 3M . Our company's test board uses the CP2102 series

2、 The serial port assistant software must be able to support 3M baud rate. The software used in our test is X COM2.6

3、 Try not to connect the module to the PC through a USB converter, but connect it directly to the USB3.0 port of the PC , otherwise packet loss may occur easily.

5.8Heartbeat packet, registration packet

Heartbeat packet registration package is a function only available in TCP client mode. This module supports customized heartbeat packet data and registration packet data content.

5.9 Modbus protocol

This module supports the Modbus protocol , enabling flexible conversion between RTU and TCP . Simply input data from the serial port, and the module will automatically recognize and convert it into Modbus -compliant data, uploading it to the network. Alternatively, it can convert received network data into Modbus- compliant data and output it through the serial port.

Note:

1、 bus supported by this module is only for data conversion and does not support actual functional operations. If you need to use this function, please cooperate with the actual PLC device .

2、 If the Modbus function is enabled , the protocol transmission becomes invalid, that is, the protocol transmission is no longer data with a fixed format, but will be converted into data that complies with the Modbus protocol standard.

3、 Only TCP server , TCP client , U DP , M QTT , Web Socket and P2P mode support Modbus protocol. HTTP client does not support it because HTTP The client is a short-connection communication method, and the server cannot actively initiate data exchange.

5.10 Static IP

In STA mode, you can set a static IP address , facilitating fixed IP communication . Note that the static IP address must be in the same network segment as the target router or AP. Otherwise, the IP address cannot be allocated and the module will not function properly. For example, if the target AP address is 10.123.45.1 , the static IP address must be set to 10.123.45.x.

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Otherwise, the IP address cannot be allocated properly and the module will not function. Static IP parameters can only be set or queried in STA mode; corresponding AT commands are not supported in other modes .

5.11Pin restore factory parameters

GPIO14 pin within 3 seconds after power-on. If it is low, the parameters will be restored to the factory default parameters. No restart is required during use. After the parameters are successfully restored, the GPIO14 pin will be set to a low level.

5.12 Scan nearby AP information

When the module works in STA mode , you can use the AT command to scan nearby AP information . If it exists, the AP information will be printed out through the serial port. The format is as follows:

Fixed head	S SID	M AC(BSSID)	channel	r ssi
+ scan:	Maximum 32 bytes	1 7 bytes	Maximum 3 bytes	Maximum 3 bytes
+scan :	TEST_ZW	14:AD:CA:AA:91:D6	4	- 69

1、 Scanning for nearby APs is only effective in STA mode , when the connection method is manual, and no Wi-Fi connection is established. Otherwise, ERR=-5 will be returned, indicating that this operation is not supported in this state .

2、 ends with a carriage return (\ r\n). MAC addresses (BSSIDs) are separated by a semicolon ' : '

3、 To scan 5G band APs, you need to enable 5G. Otherwise, the module can only scan 2.4G band AP information. The difference between 5G and 2.4G lies in the channel. The 2.4G channel is [1,13]. Channels above 13 are 5G channels.

4、 30 AP information can be scanned at a time .

5.13 Default parameters

Parameter Category	Parameter name	Parameter value	Related instructions
Serial Port	Baud rate	1 15200	AT +UART
	Digital	8	
	Stop bits	1	
	Parity	none	
	Serial port timeout	4 0 (ms)	
	Serial port frame length	1 000	
RF parameters	Operating frequency	2.4G	A T+RADIO
	Channel	1	
	Transmit power level	0	
	Country Code	CN	
A P role S SID parameter	S SID	E103-W06-V1.0	AT +SSID
	Whether to hide S SID	0 (No)	
	Encryption type	2 (WPA2)	

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	password		1 2345678	
Working Mode	Job Role		1	A T+MODE
	Transmission Mode		1	
	Service Model		1	
Network IP address	IP address		1 0.145.45.1	A T+NETIP
	Subnet mask		2 55.255.255.0	
	Gateway Address		1 0.145.45.1	
	Server address		1 0.145.45.1	
P2P connection parameters	P2P scanning gap		2 0	AT+P2PDEVINFO
	P2P Role		0 (client)	
	P2P local name		E103-W06WiFiDirectClient	
	P2P target name		E103-W06WiFiDirectGo	
P2P socket	P2P port		4 001	AT+P2PSOCKET
	P2P address		1 0.145.45.1	
STA connection parameters	Target S SID		E103-W06	AT+STACON
	Encryption type		2	
	password		ebytew06	
	Connection Type		1	A T+CONTYPE
Local socket parameters	Local Port		4 001	AT+SVRPORTIP
	Local IP		1 0.145.45.1	
Remote socket parameters	S ocket1	port	4 001	A T+SOCKET
		IP	1 0.145.45.2	
	S ocket 2	port	4 002	
		IP	1 0.145.45.2	
	S ocket 3	port	4 003	
		IP	1 0.145.45.2	
	S ocket 4	port	4 004	
		IP	1 0.145.45.2	
Heartbeat parameters	4-way socke t same	Heartbeat Type	0 (off)	AT+HEARTBT
		Heartbeat timeout	5 (unit: seconds)	
		Heartbeat data type	1 (string)	
		Heartbeat data	CDEBYTE-E103-W06-STRHT	
Registration package parameters	4-way socket same	Registration package type	0 (off)	AT+REGISTER
		Registering package data types	1 (string)	
		Registration package data	CDEBYTE-REGISTER-PACK-STR	
NTP time	NTP time zone offset		4 80 (unit: minutes) Beijing time	A T+NTPTIME

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Mod bus	Modbus Enable	0 (Disable Modbus)	AT+MODBUS
Static IP	IP address	1 0.145.45.2	A T + IPSTATIC
	Subnet mask	2 55.255.255.0	
	Gateway Address	1 0.145.45.1	
	Server address	1 0.145.45.1	

6.Tutorial

This module has many functions and requires configuration of relevant parameters before use so that it can work normally. In the following tutorials, operations marked with * are required. When using other modes, please set them according to your needs. For detailed instructions on AT commands , please refer to Chapter 6.

6.1 Basic TCP / UDP data transmission

Why is it called basic TCP/UDP data transmission? Because this data transmission is based on the transport layer of the TCP /IP protocol, the most basic data transmission layer. Data at this layer does not require complex network packetization like protocols such as MQTT and HTTP . Please study this for detailed explanation.

Both AP and STA roles support data transmission, provided that the module and target are on the same LAN. There are some differences between AP and STA modes, such as support for multiple connection protocols. In AP mode, there's no need to set the remote IP address in advance. This tutorial is based on serial port AT commands . Steps marked with **an * indicate required operations; those without an * are optional and can be omitted. After opening the serial** port debugging assistant, perform the following operations.

Data transmission is divided into: data transmission with PC and data transmission with module.

6.1.1Communication with PC

6.1.1.1 Communicate with the TCP server of the PC in the AP role

This is just an example. The other two communications in TCP mode can also refer to this example (TCP server , UDP) . Different modes can be set through the AT + MODE command.

1. * Set module role: AP , transmission mode: transparent transmission, service mode: TCP server ;
   A T+MODE = 1 , 1 , 1
2. Configure S SID related parameters (S SID is commonly known as WiFi name):
   AT+SSID=0,E103-W06-TEST,2,12345678 .
3. Set the operating frequency:

AT+RADIO=1,36,0,0,CN

4. Set IP address :

AT+NETIP=192.168.1.111,255.255.255.0,192.168.1.31,192.168.1.31

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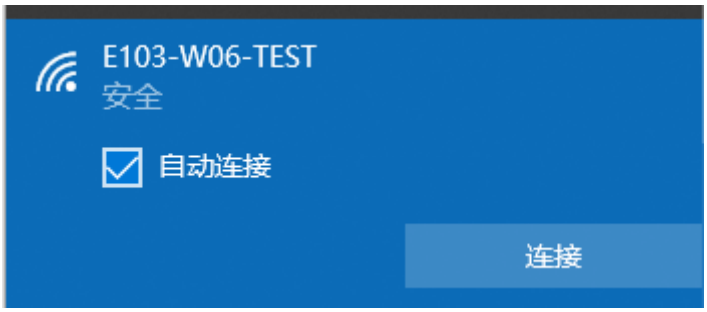
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5. Set the port number:

AT+SVRPORTIP=4001



6. * After configuring the parameters, restart the module and find the WiFi with the SSID (Wi - Fi hotspot name) set in the second step on the PC side called E103 - W06-TEST , enter the secret connection



7. * After successful connection, query local IP and local port:

AT+ SVRPORTIP?

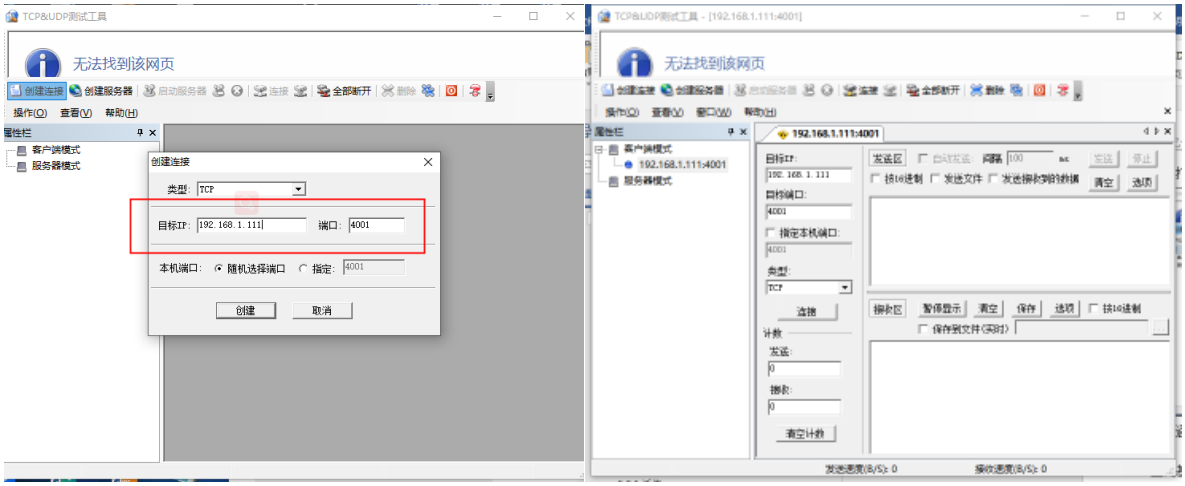
The response is as follows: AT+SVRPORTIP=4001,192.168.1.111

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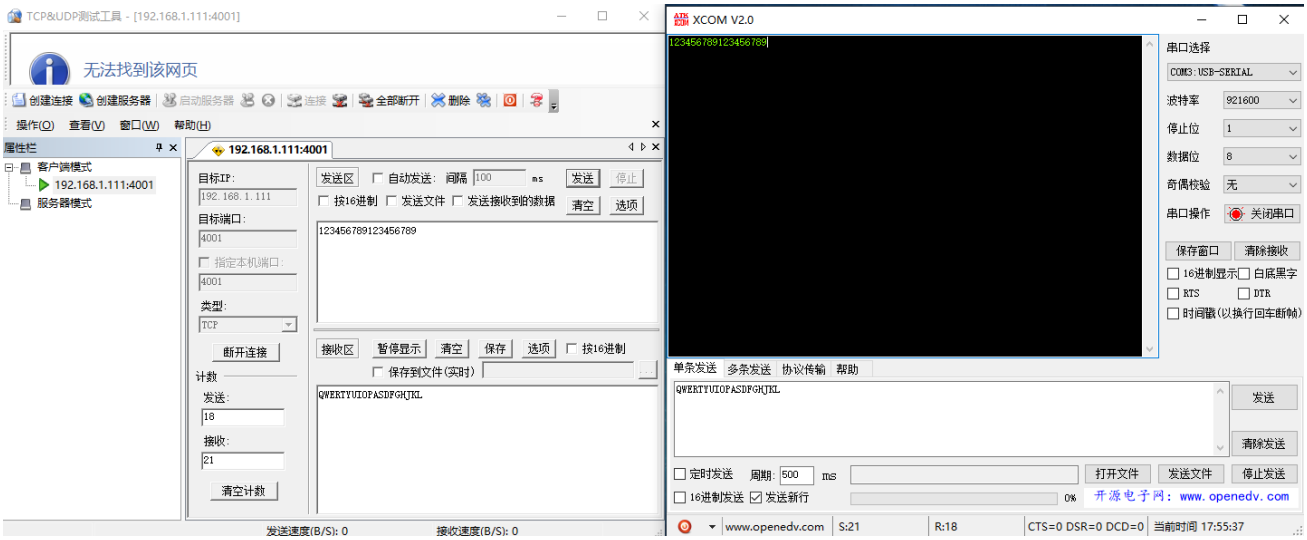
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8. * Open the TCP debugging assistant. Since the module is a server, create a client here and enter the corresponding IP and port information in step 7 , as shown in the figure:



9. * Communication, before communication, please note that if the module is in AT mode , you need to exit AT command , AT +EXAT



At this point, data transmission based on the AP mode is completed .

Other transmission modes and service modes are set based on this.

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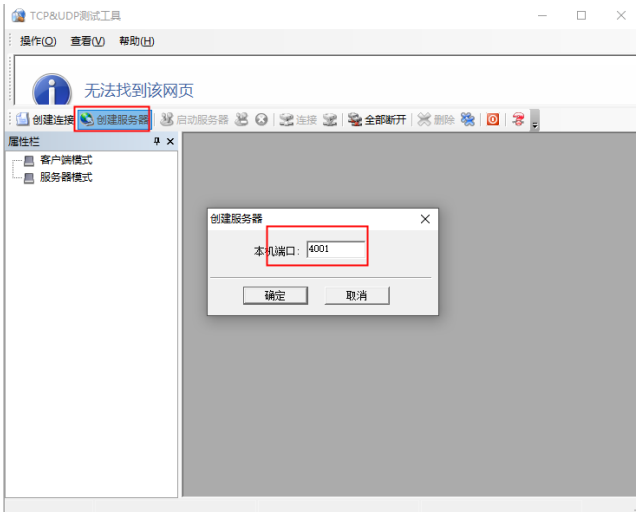
6.1.1.2 The STA role communicates with the TCP client of the PC

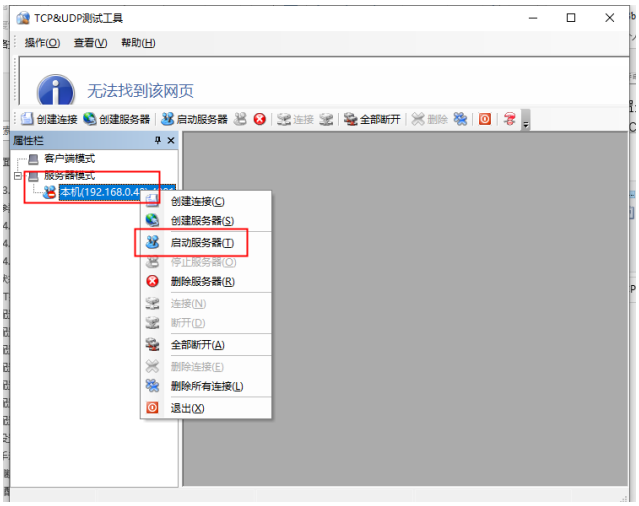
PC in the STA role, the module must be on the same local area network as the PC . This tutorial uses a mobile phone hotspot, but a router can also be used. The same process applies to the STA 's other two TCP server modes , UDP , by setting different modes using the AT + MODE command.

1. Turn on the hotspot on your phone, connect your PC to it, and find the IP address assigned to your PC by the hotspot . This step is very important. If the IP address is incorrect, communication will be impossible. (You can also connect to a router)



2. *Open the T CP debugging assistant, create a T CP Server, enter the port number set in the second step, and start the server:





3. *Set the communication port and IP address (this step is very important, if the IP address is incorrect, communication will not be possible), refer to the instructions: Configure, read the SOCKET port, IP address:

AT+SOCKET=0,4001,192.168.43.64

4. * **Set** module role: STA , transmission mode: transparent transmission, service mode : client

AT+MODE=2,1,2

5. *Set the connection target parameters. The parameters here are the hotspot name, password and encryption method set in the first step:

AT+STACON=ebytew06,2,12345678

6. *Set the connection method (connection is divided into manual, automatic, smartconfig), here choose automatic connection:

AT+CONTYPE=1

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7. Restart the module and wait for the module to connect to the hotspot and TCP Server before transmitting data.



At this point, the communication between the STA role and the PC has been established.

Note: Some mobile phones may not have data forwarding function due to their own technical reasons, so please pay attention.

6.1.1.3 UDP protocol transmission in AP role

This example will demonstrate protocol transmission in AP mode .

1. *Set role: AP , transmission mode: protocol transmission, service type: U DP

AT+MODE=1,2,3

2. *Set the local port number

A T+ SVRPORTIP=4001

3. *Set the UDP communication list. This step is to distinguish the source of UDP data. You can set up 4 groups.

A T+SOCKET=0 , 4001,10.145.45.2

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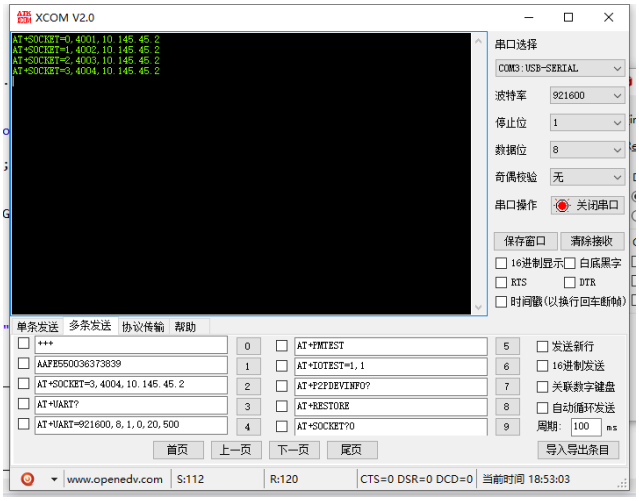
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A T+SOCKET=1,4002,10.145.45.2

A T+SOCKET=2,4003,10.145.45.2

A T+SOCKET=3,4004,10.145.45.2

This is just for demonstration, the actual value can be set as needed.

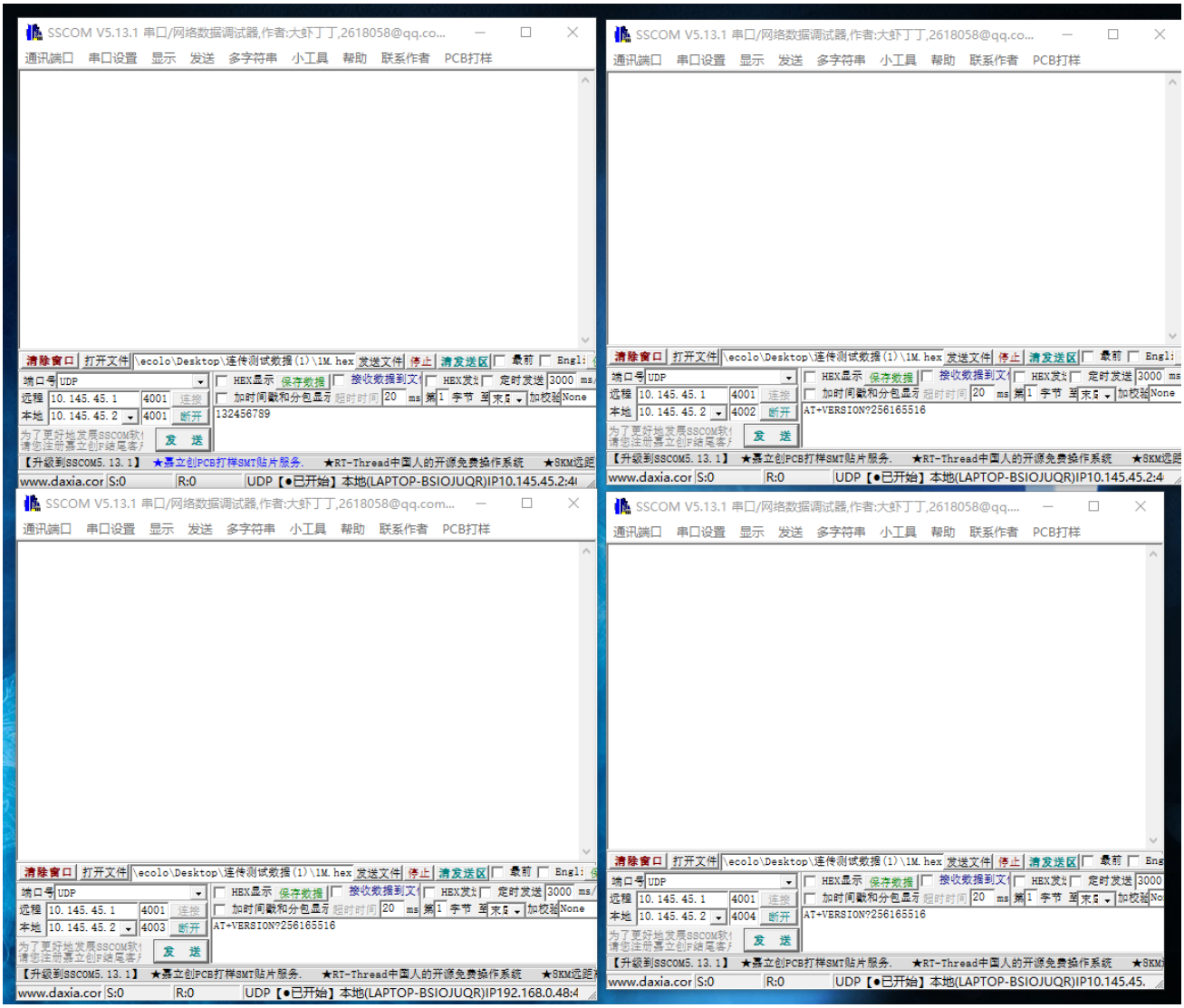


4. *Restart the module and connect to the module using a PC

5. *Open U DP Assistant to establish U DP communication

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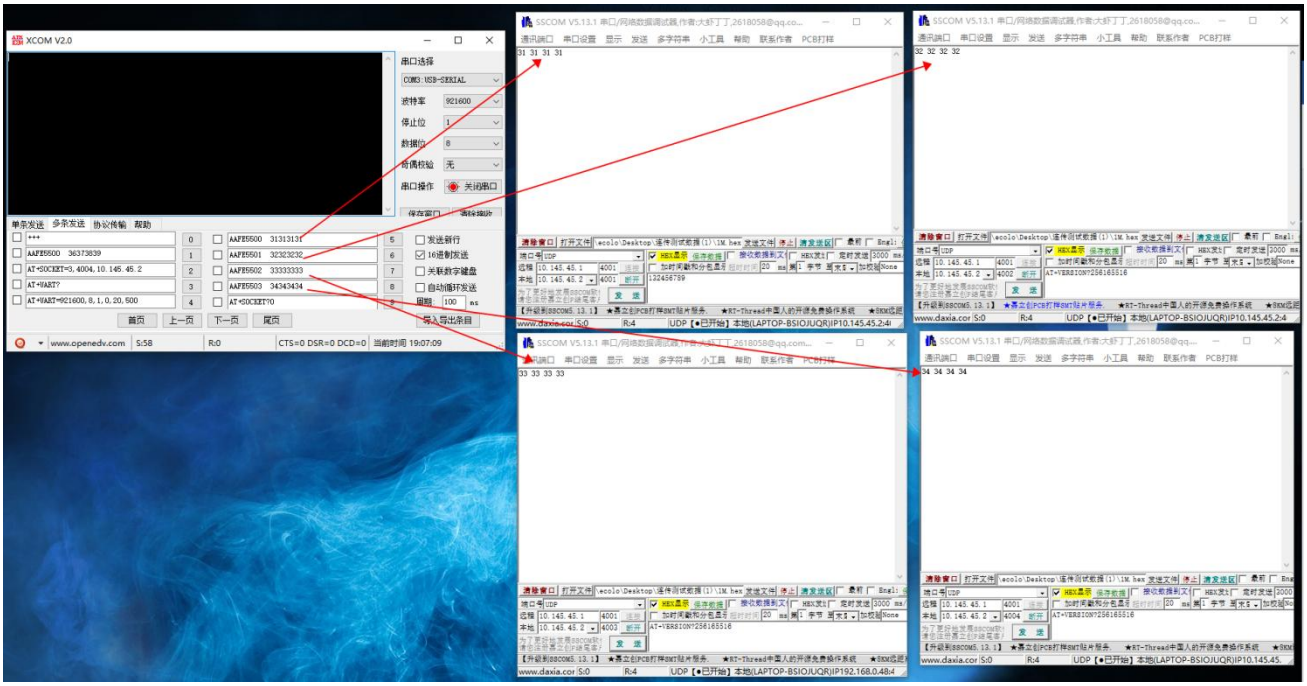


5. *Communication: Because it is a protocol transmission, when the module sends data, it is necessary to input the data in accordance with the protocol transmission format. For details, see Protocol Transmission . The PC side does not need to add format, but the module will print out the data in accordance with the protocol format after receiving the data from the PC side.

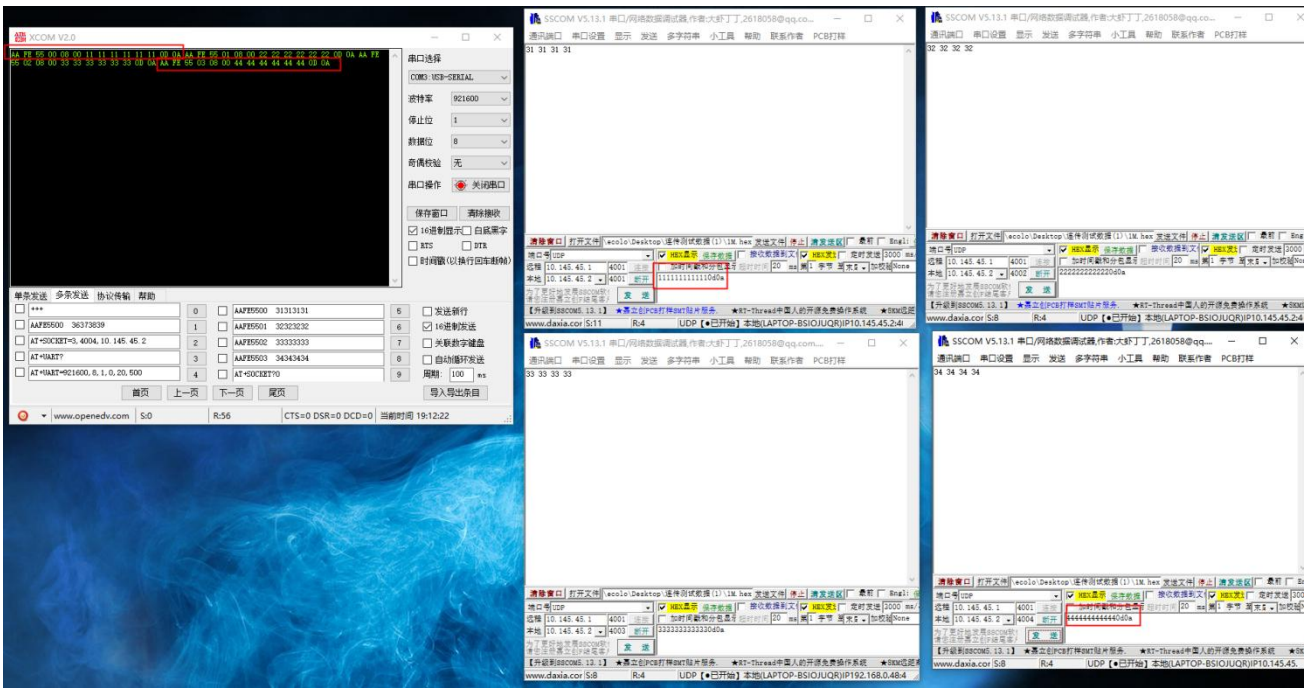
Module sends:

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Module receives:

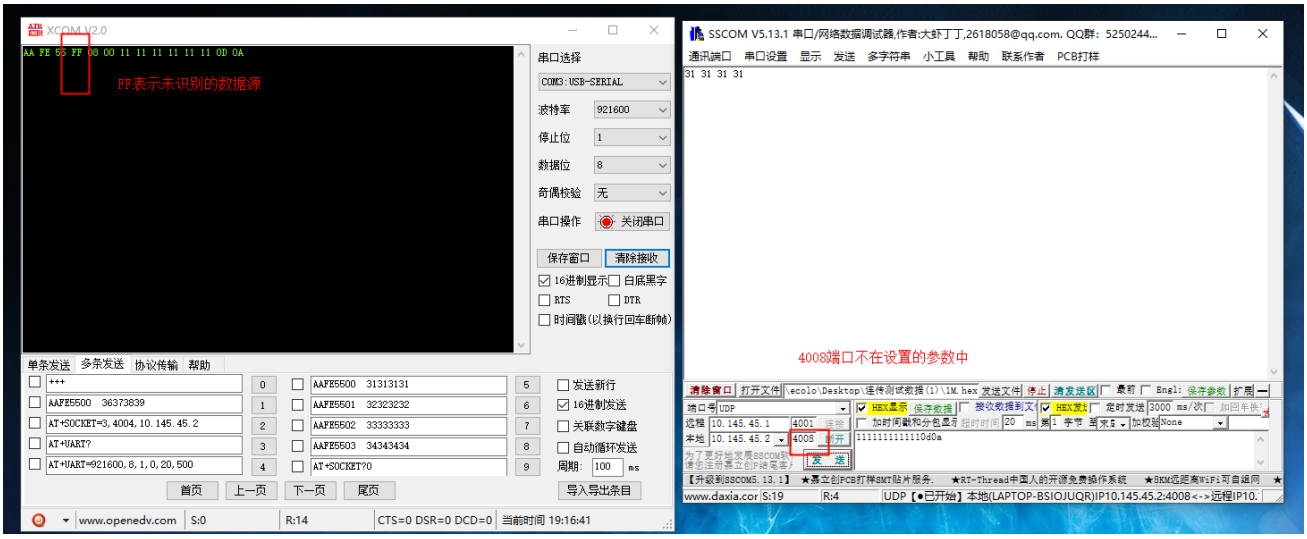


At this point, the communication between the module and the PC is completed. Both AP and STA roles support TCP server, TCP Client , and U DP . The specific combination can be used in conjunction with these three tutorials.

It should be noted that if the source address and port of the received data are not in the parameters set in step 3, the serial number spit out by the serial port will be 0xff, indicating an unrecognized data source.

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6.1.2Communication between modules

There are three modes of communication between modules of this product: communication based on AP-STA; communication based on STA - STA . In both communication modes, one module acts as the TCP server and the other as the TCP client . The only difference is that the STA -STA mode requires the two modules to be connected to an external router.

P2P communication based on Wi -Fi Direct .

6.1.2.1 TCP communication of AP -STA between modules

1、 *Set the operating mode, setting module A to the AP role and module B to the STA role . It's important to note that in TCP mode , the service modes of the modules cannot be set to the same. This means that if one module is a TCP server and the other is a TCP client , communication will not be established. Regarding channel and frequency settings, since the modules are dual-band (2.4 GHz and 5.8 GHz), ensure that the frequencies of both modules are consistent.

AP configuration:

Mode: AT+MODE=1,1,1

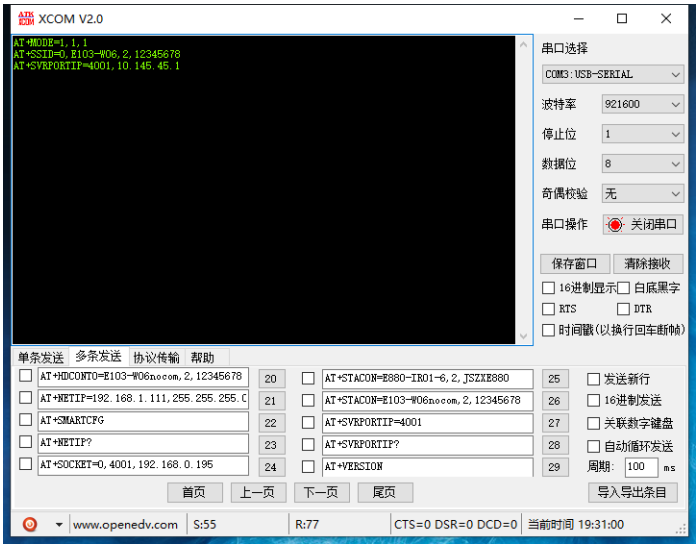
SSID : AT+SSID=0,E103-W06,2,12345678

Get the local IP : AT +SVRPORTIP? (This operation must be performed here, and then the parameters are passed to STA , otherwise communication will not be possible)

See the figure for the return value.

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S TA configuration:

Mode: AT+MODE=2,1,2

Target: AT+STACON=E103-W06,2,12345678

Set the remote IP and port. Here, the local IP obtained from the AP configuration is passed in as the remote IP of the STA :

A T+SOCKET=0,4001,101.145.45.1

After the configuration is complete, restart the module and wait for the connection to be completed before sending data.

It is important to note that before starting the STA, you must enter the IP address of the AP to which you are connecting . Otherwise, a normal network connection cannot be established.

If the AP opens the protocol transmission mode at this time, it can support the connection of 4 STAs ， and the configuration method of the remaining STAs is the same.

For STA-STA communication, the two modules need to be connected to the same router. Here, the SSID of the target AP is E103-W06 for demonstration.

STA1 configuration process

Mode: AT+MODE=2,1,1

Target: AT+STACON=E103-W06,2,12345678

Configure local port: AT+SVRPORTIP=4001

Get IP address: AT+SVRPORTIP ? Response: AT+SVRPORTIP=4001,192.168.0.189

STA2 configuration process:

Mode: AT+MODE=2,1,2

Target: AT+STACON=E103-W06,2,12345678

Set the remote IP and port. Here, pass in the IP and port obtained by STA1 ：

A T+SOCKET=0,4001, 192.168.0.189

Restart the module and wait for the connection to be completed before communication can begin.

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6.1.2.2 UDP communication between modules

UDP is a type of communication that does not establish a connection. The core is the IP address and port. In this communication mode, one party acts as an AP and the other as a STA.

1、 Configure the AP module :

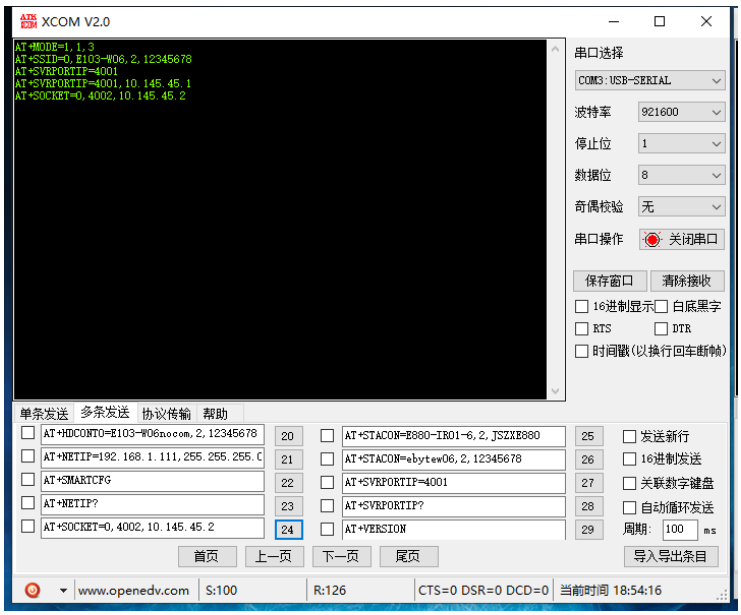
Setting mode: A T+MODE=1,1,3

Set SSID : AT+SSID=0,E103-W06,2,12345678

Set the local port: AT+SVRPORTIP=4001

Get the local port local IP : AT +SVRPORTIP?. The response is: AT+SVRPORTIP=4001,10.145.45.1

Set remote port Set remote IP : AT +SOCKET=0,4002,10.145.45.2



2、 Configure the STA module:

Setting mode: A T+MODE=2,1,3

Set target S SID : AT+STACON=E103-W06,2,12345678

Set the connection mode: AT+CONTYPE=1

Set the local port: AT+SVRPORTIP=4002 (Note that the local port here is the remote port in the previous step)

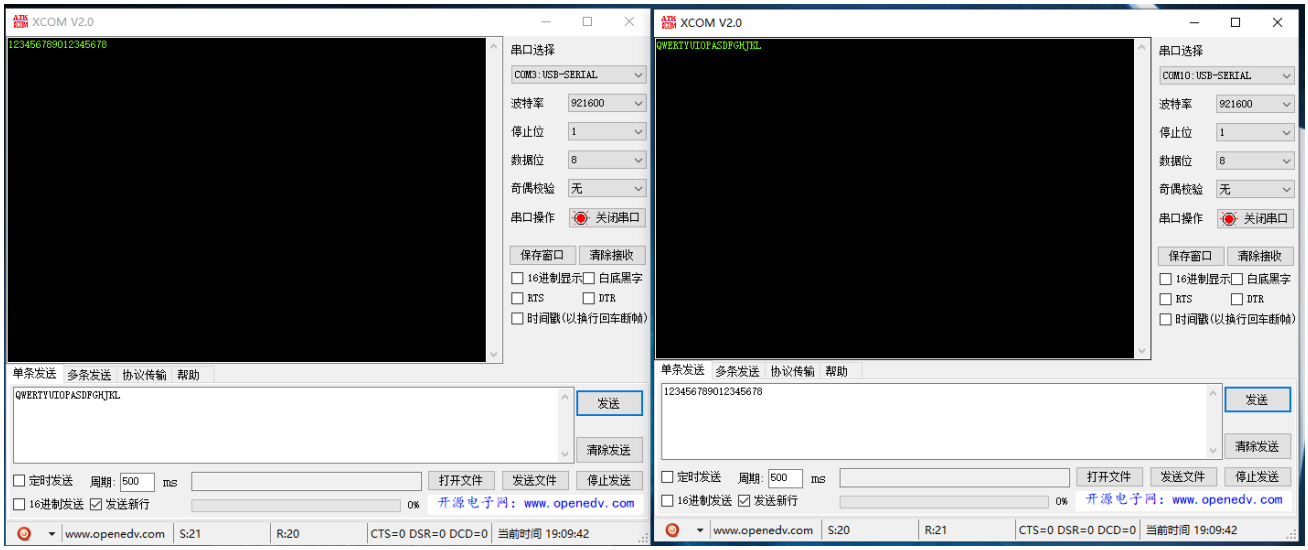
Set the remote port remote IP : AT +SOCKET=0,4001,10.145.45.1 (the remote port IP here is the local port IP in the previous step)

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3. *Restart the module, wait for connection and communication.



6.1.2.3 Wi -Fi Direct P2P communication

Wi- Fi-Direct is a point-to-point connection. The configuration process is as follows.

1. *First configure to P2P mode, two modules send AT command at the same time : AT +MODE=3,1,1

2. Then select one of the modules to configure as Group Owner and send a command to set the connection parameters (for instructions, see Configuring and Reading WiFi-Direct (P2P) Connection Parameters):

AT+P2PDEVINFO=20,1,E103-W06WiFiDirectGo,E103-W06WiFiDirectClient

1、 Query the socket local port and IP address (or) :

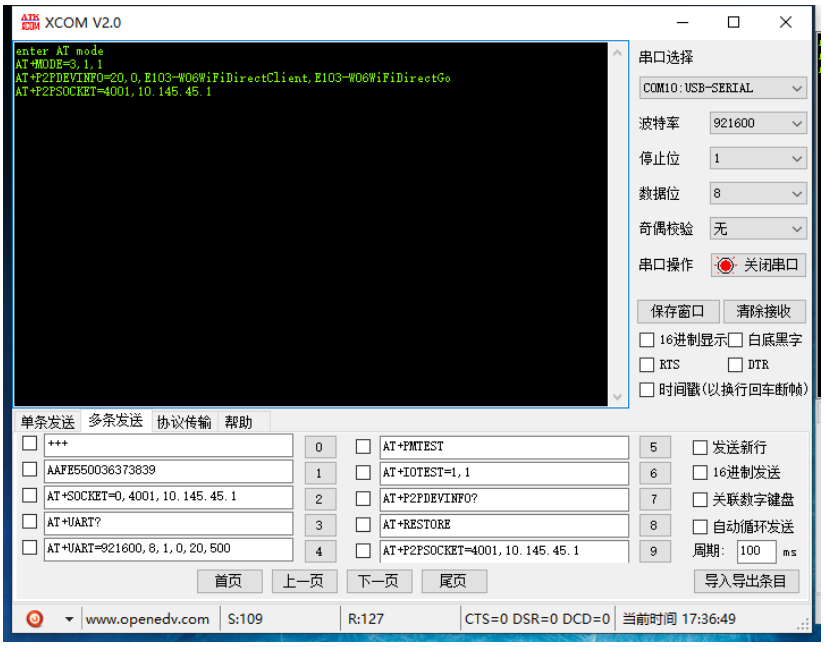
AT+P2PSOCKET ?

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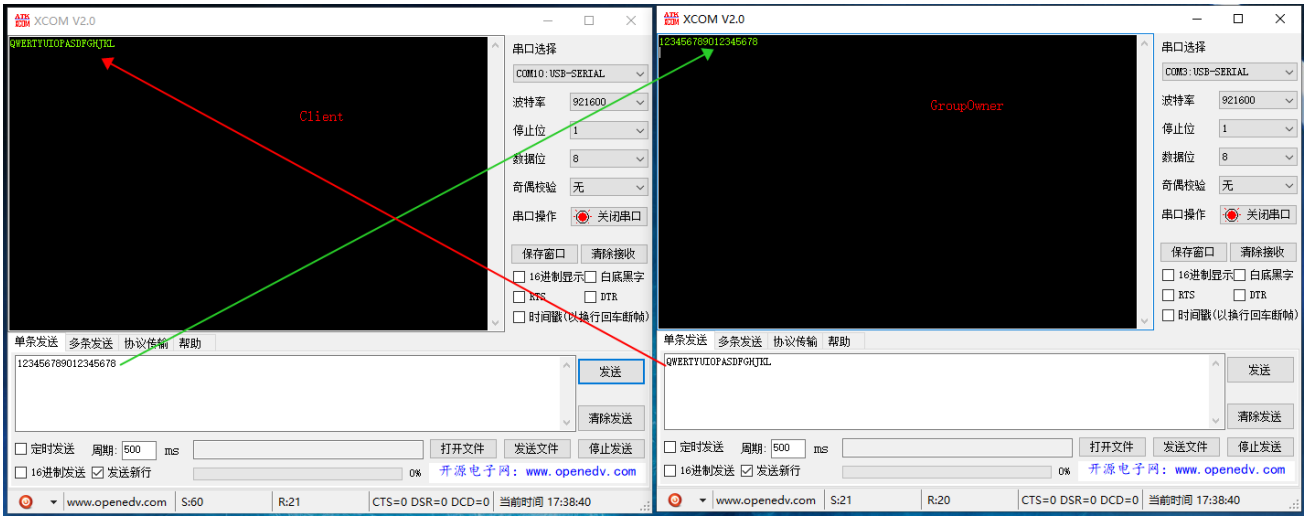
4. Finally, configure another module as Client and send instructions to set connection parameters:
AT+P2PDEVINFO=30,0,E103-W06WiFiDirectClient,E103-W06WiFiDirectGo
5. Configure the remote port and address. Set the IP address and port of the Group Owner found in the previous step to the Client (the IP address and port here must be obtained after querying the Group Owner, otherwise communication cannot be established)
AT+SVRPORTIP=4001,10.145.45.1



6. *Restart and wait for the connection to be established before communication

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6.2 Network Communication

Network communication is based on the STA role and communication with various cloud platforms, including Alibaba Cloud, Baidu Cloud, OneNet based on MQTT; HTTP server y and WebSocket.

6.2.1MQTT

MQTT supports four transmission modes: Alibaba Cloud, Baidu Cloud, OneNet, and standard MQTT/MQTTS. For detailed operations, see the AT Command Manual. For MQTTTS, you must first use commands to configure the device time parameters .

The configuration process is as follows: register and obtain relevant parameters according to the platform you use, and finally add them in the web window. You can also use AT commands for configuration.

Special note: For users who have built their own MQTT server, you can use this module to access it. You can choose Baidu Cloud or OneNet and fill in the corresponding parameters.

When using Baidu Cloud with a self-built MQTT server, the device name is the client ID, and the username and password correspond to each other. When using OneNet, the device ID is the client ID, the product ID is the username, and the authentication information is the password.

6.2.1.1Alibaba Cloud

1、 Log in to the web page, in the Mode Settings menu , select Station as the work role, select MQTT as the service mode, and save the settings.
2、 In the Parameter Settings menu, select Alibaba Cloud.
3、 Product key: Create a product and device in the Alibaba Cloud IoT platform console to obtain a product key. For example: A1Ve0iJW6z1
4、 Device Name: The device name entered when adding the device. Note: Only numbers and English characters can be

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entered, and the input length cannot exceed 10 bytes.

5、 Client ID: User-defined input. Note: Only numbers and English characters can be entered, and the input length cannot exceed 12 bytes.

6、 Device key: Create a product and device in the Alibaba Cloud IoT platform console to obtain a device key. For example: AHlmNjuaMCGJ1bFOjC4EZMZmHSUhzSEQ

7、 Address: The domain name for accessing Alibaba IoT. For example: A1Ve0iJW6z1.iot-as-mqtt.cn-shanghai.aliyuncs.com

8、 Port: Alibaba IoT port. For example: 1883

9、 Subscription topic: For example: /A1Ve0iJW6z1/MQTT_TEST/user/get

10、 Publish topic: For example: /A1Ve0iJW6z1/MQTT_TEST/user/update

11、 Subscription and publishing message levels: Qos:0 , Qos:1 , Qos: 2





6.2.1.2Baidu Cloud

1、 Log in to the web page, in the Mode Settings menu , select Station as the work role, select MQTT as the service mode, and save the settings.

2、 In the parameter settings menu, select Baidu Cloud.

3、 Device Name: The name you enter when creating a new device shadow. Note: Only numbers and English characters can be entered, and the input length cannot exceed 15 bytes.

4、 Username: the name in the object shadow connection configuration. For example: Un2d6cs/E810MQTT

5、 Key: The key in the object shadow connection configuration. For example: s9mMzByp4Mpryphq

6、 Address: The domain name for accessing Baidu IoT. For example: Un2d6cs.mqtt.iot.gz.baidubce.com

7、 Port: Baidu IoT port. For example: 1883

8、 Subscription topic: For example: $baidu/iot/general/get

9、 Release topic: For example: $baidu/iot/general/update

10、 Subscription and publishing message levels: Qos:0 , Qos:1 , Qos: 2

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6.2.1.3 One Net

1、 Log in to the web page, in the Mode Settings menu , select Station as the work role, select MQTT as the service mode, and save the settings.

2、 Log in to the web page again and select ONENET in the parameter settings menu . Note: Select Multi-protocol Access when creating a product for OneNet.

3、 Device ID: e.g. 511986588

4、 Product ID: e.g. 286258

5、 Authentication information: Custom input when creating a device. For example: ebyte

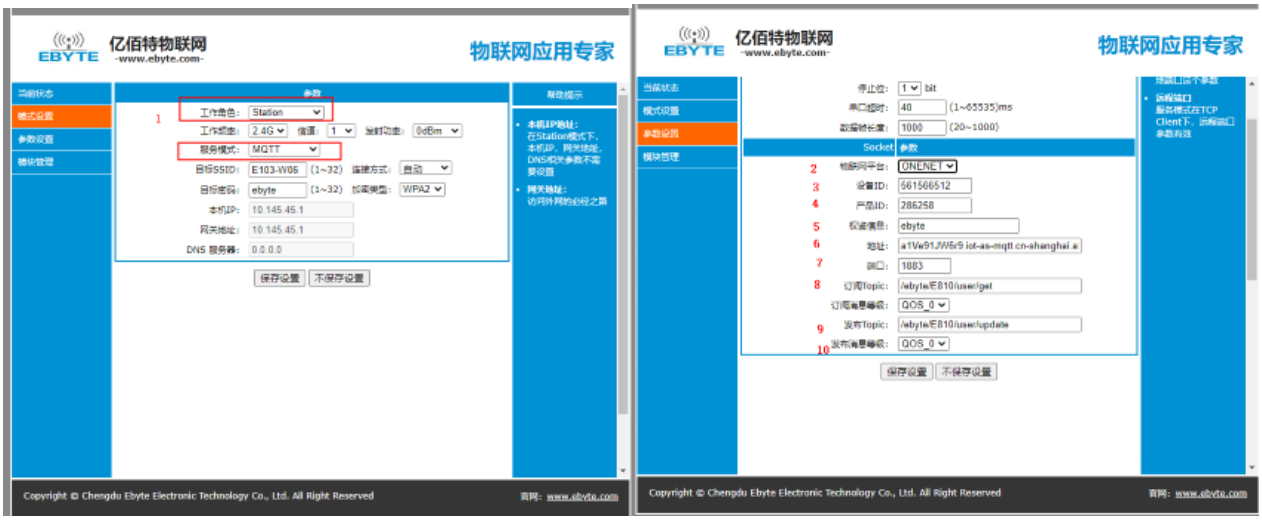
6、 Address: The domain name for accessing ONENET IoT. For example: mqtt.heclouds.com

7、 Port: ONENET IoT port. For example: 6002

8、 Subscription topic: For example: iot/general/get

9、 Publish topic: For example: iot/general/update

10、 Subscription and publishing message levels: Qos:0 , Qos:1 , Qos: 2



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6.2.2 HTTP Client

1. Log in to the web page, in the mode setting menu , select Station as the work role, select HTTP Client as the service mode, and save the settings.
2. Log in to the web page again and enter the HTTP server address in the parameter setting menu .
3. Fill in the HTTP server port number.
4. The request method can be post or get.
5. Select "All output" for output mode, and all the content replied by the server will be output through the serial port. Select "Valid output" and the serial port will only output valid data.
6. Enter the header URL path.
7. User-defined input protocol header, multiple headers need to be added directly \r\n, and the last one is not added.



If the user passes parameters via GET, the following details how to use GET.

GET /request/login.do?name=test&userpwd=123456 HTTP/1.1

Host: 192.168.4.10:8080

Where /request/login.do? is the content set in the header path URL (note the addition of ? after the URL), name=test&userpwd=123456 is the data received by the module serial port, and 192.168.4.10:8080 is the HTTP server address and port.

Custom protocol header: The default is Connection: keep-alive, which can be modified by the user. If multiple commands are required, add \r\n between the commands, and do not add the last one.

If the user passes parameters via POST, the following details how to use POST.

POST /request/login.do HTTP/1.1

Host: 192.168.4.10:8080

(This is a blank line and cannot be deleted. The content in the last published brackets should be deleted, and the blank line should be retained.)

username= test &userpwd=123456

Where /request/login.do is the content set in the header path URL, name=test&userpwd=123456 is the data received by the module serial port, and 192.168.4.10:8080 is the HTTP server address and port.

Custom protocol header: The default is Connection: keep-alive, which can be modified by the user. If multiple commands are required, add \r\n between the commands, and do not add the last one.

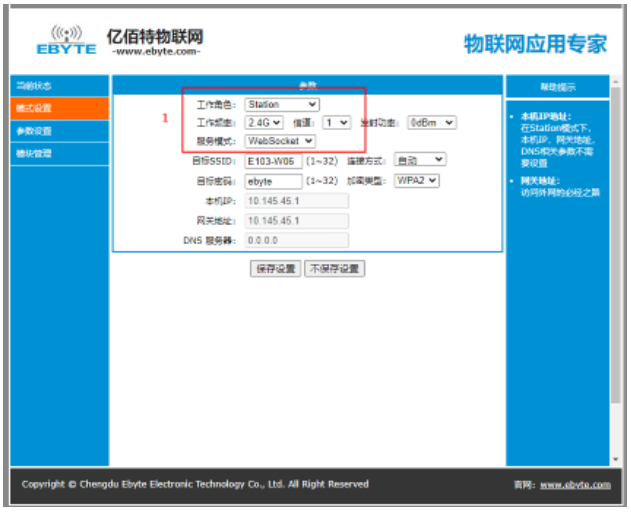
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6.2.3Web Socket

1、 Log in to the web page, in the mode setting menu , select Station as the work role, select websocket as the service mode, and save the settings

2、 In the parameter setting menu, configure the required parameters .





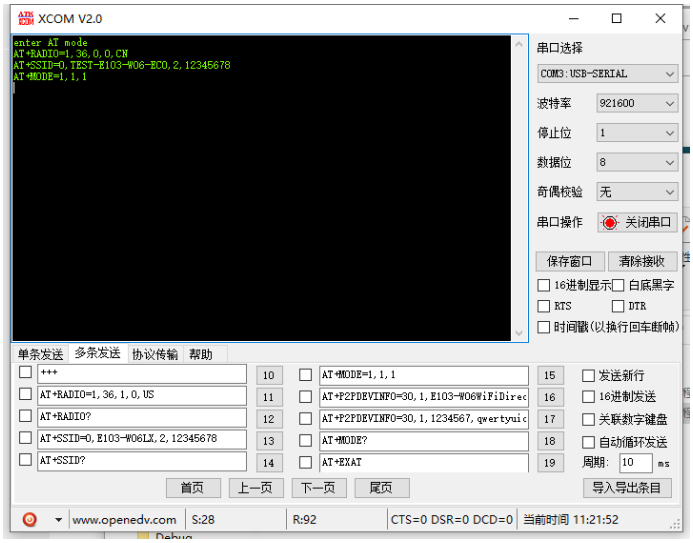
6.3 Parameter configuration

6.3.1Serial port AT command configuration

Serial port AT command configuration, directly open the serial port debugging assistant, set the corresponding baud rate, data bits, etc.

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AT instructions in Chapter 6. Note that the instructions must comply with the specifications.

6.3.2 UDP remote configuration

During remote configuration, ensure that the module and PC are on the same LAN. For configuration methods, see Communication with a PC (either place the module in AP mode and connect the PC to the module, or place the module in STA mode and connect the PC to the same router). After obtaining the IP address, simply enter the IP address and UDP port number 8009 (this port number is fixed and cannot be changed). Remote configuration is essentially an AT command operation. For specific commands, see AT commands. The following figures show remote configuration in AP mode and STA mode, respectively.



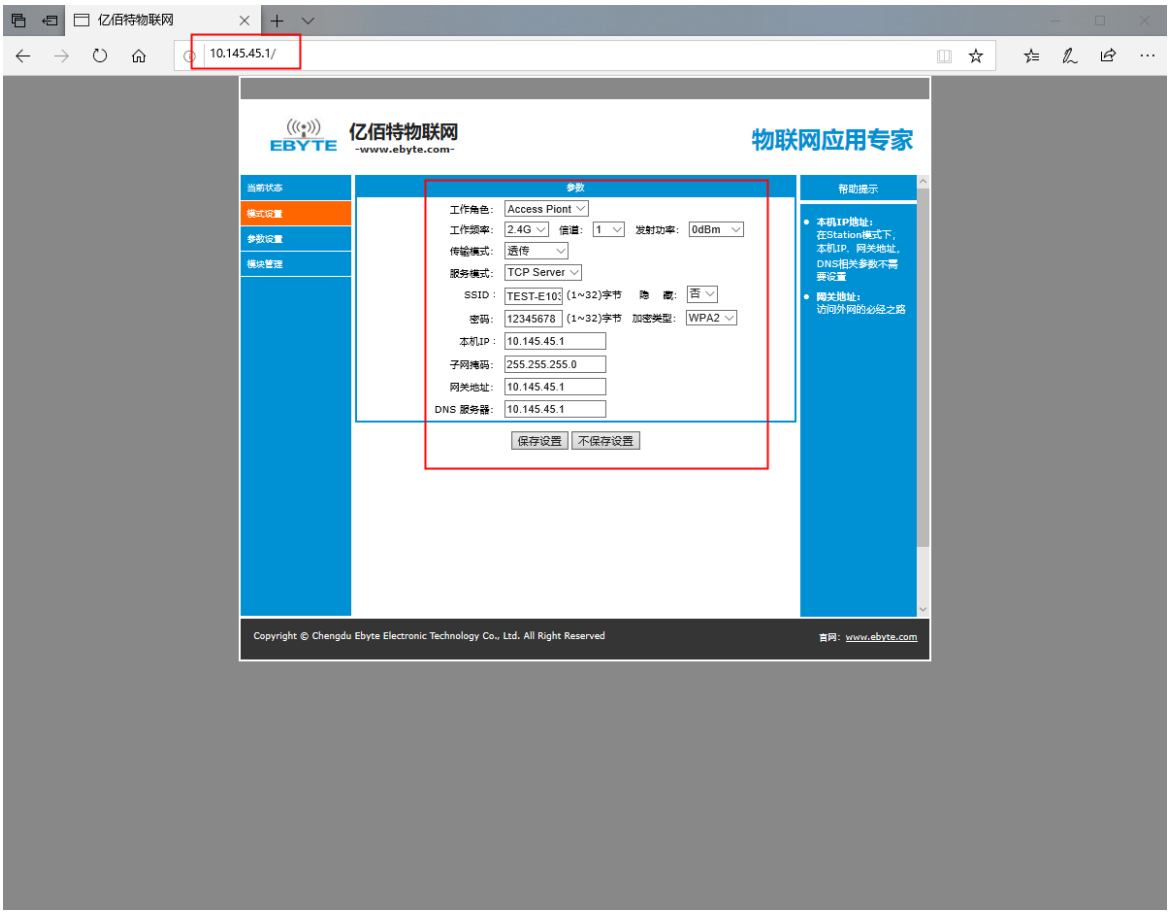
6.3.3 Web page configuration

When configuring on the web page, ensure that the module and PC are in the same LAN. Find the module's corresponding IP address and enter it in the browser. 10.145.45.1 is only used for demonstration purposes. For the specific IP address, use the command: AT+SVRPORTIP? to query it. Enter the correct IP address to enter the configuration interface. Set the

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IP address based on the module's feedback, and set other parameters based on your needs.

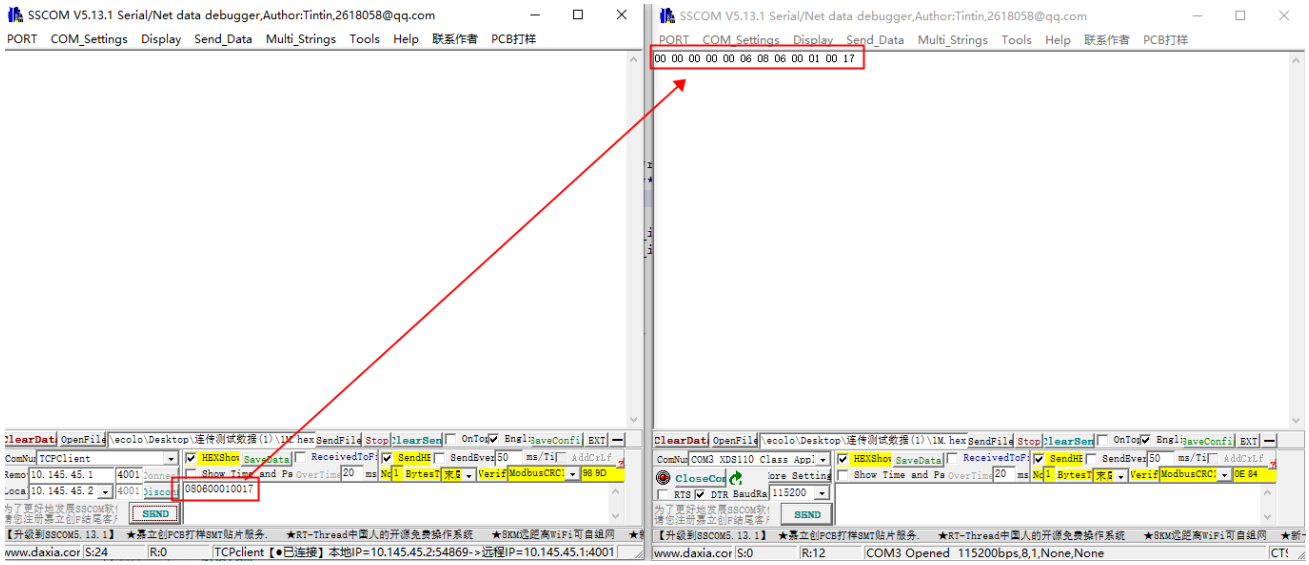


6.4 Mode bus usage

After setting the working parameters according to the above chapter, enter the AT command and start the modbus protocol: AT +MODBUS=1 . After the connection is established, communication will begin.

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The Modbus protocol of this module only supports data conversion and transmission. If necessary, please operate it in combination with the actual controls.

6.5 Static IP usage

1、 Set the module to STA client mode. A T+MODE=2,1,2

2、 Set static IP related parameters. AT+IPSTATIC=1,10.145.45.9,255.255.255.0,10.145.45.1,10.145.45.1

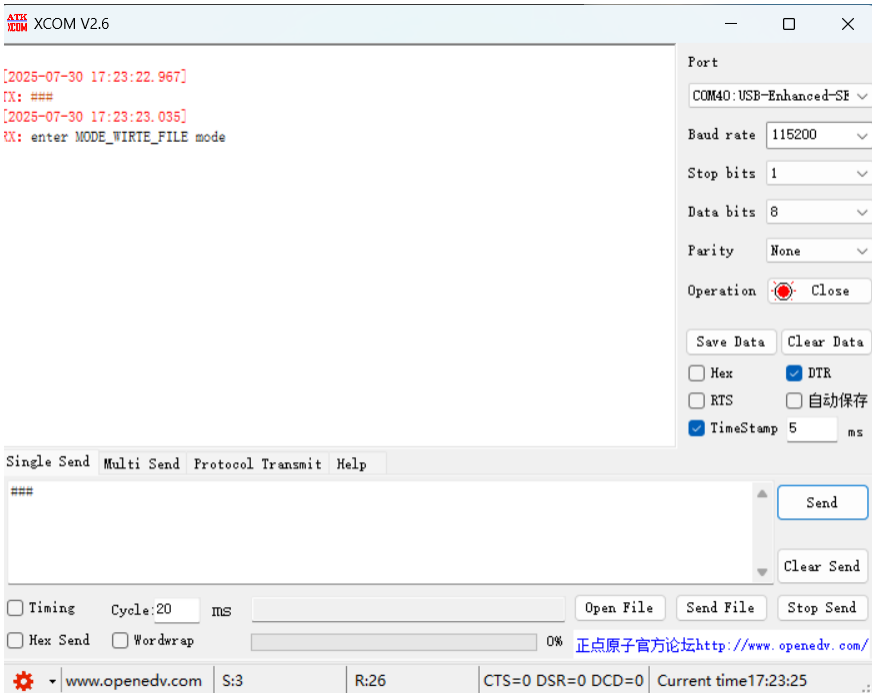
3、 Set the target AP, socket port, and address as described in Section 6.1.2.1 . Restart the module to establish a connection for communication.

6.6 Instructions for writing CA certificates

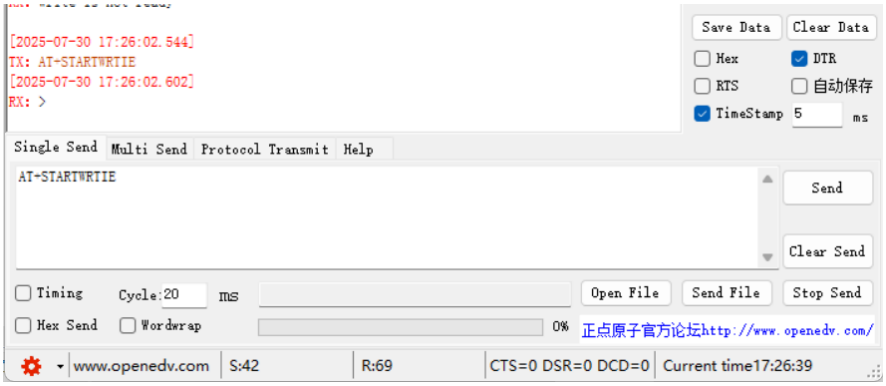
1、 Send “###” via the serial port to enter file writing mode

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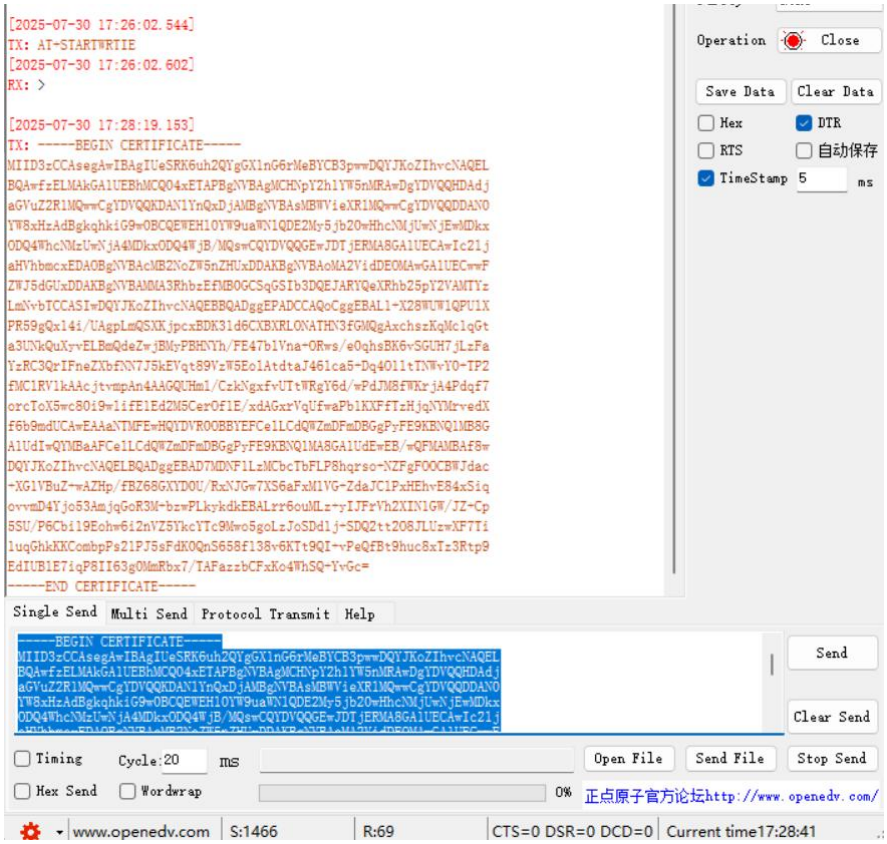
2、 " AT+STARTWRTIE " enters file writing mode and waits for the return of the ">" symbol



3、 Write the certificate content (note that the certificate is currently only used for MQTTS verification and only supports certificates in PEM format)

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4、 After writing the content, send " AT+WRTIEOVER " and wait for the prompt to exit the file writing mode.

5、 Cancel write command "AT+EXITWRITE"

6、 The ca certificate has been written. Currently, this certificate only supports use as the mqtts verification server certificate.

6.7 WPA2 Enterprise Encryption Explained

1、 Currently, only WPA2 PEAP-MSCHAPV2 encryption is supported, and only TLS 1.0 encryption suite is supported (this issue is determined by the CC3235SF chip hardware). If you need to join an enterprise network, please pay attention to the TLS 1.0 compatibility of the authentication server. For detailed parameters, see the instruction manual.

7.Welding operation instructions

7.1 Reflow Temperature

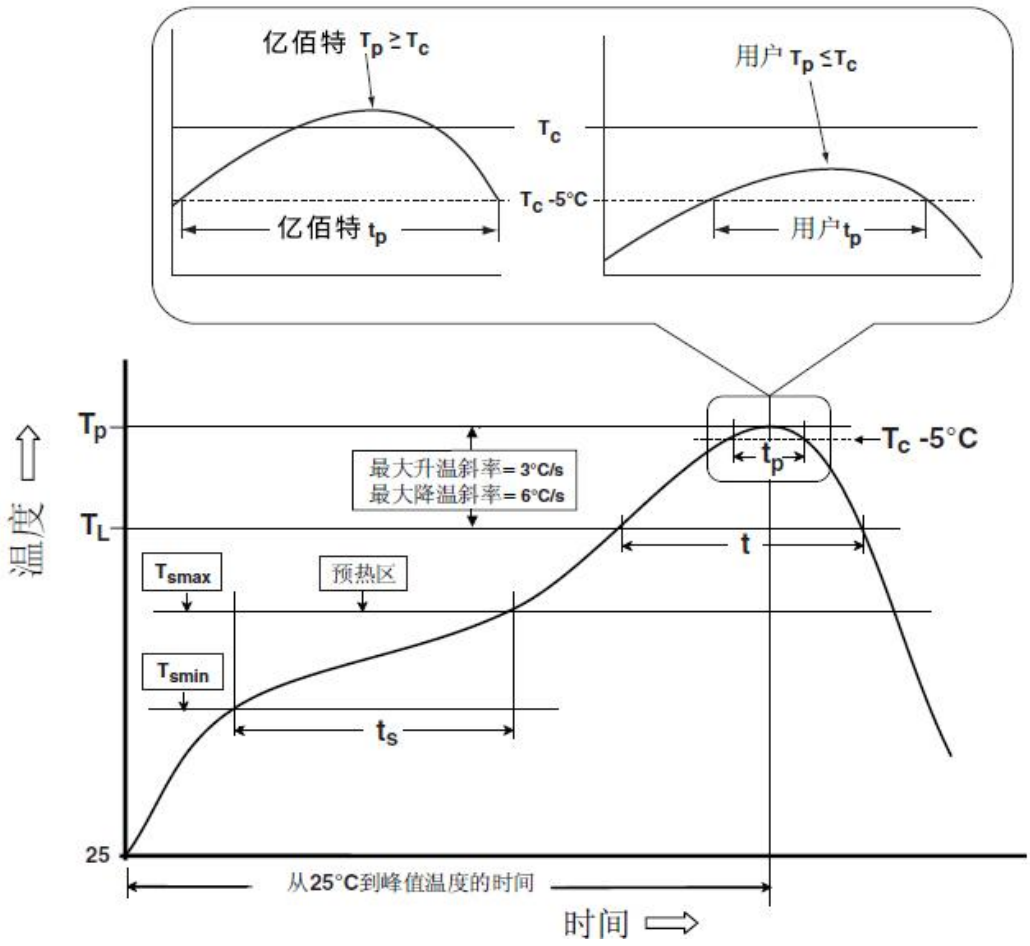
Reflow profile characteristics		Leaded process assembly	Lead-free process assembly
Preheating /keeping warm	Minimum temperature (Tsmin)	100℃	150℃
	Maximum temperature (T smax)	150℃	200℃

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	Time (T smin ~T smin)	60-120 seconds	60-120 seconds
Heating slope (TL ~ Tp)		3℃/second, maximum	3℃/second, maximum
Liquidus temperature (TL)		183℃	217℃
T L above the holding time		60-90 seconds	60-90 seconds
Package peak temperature Tp		Users must not exceed the temperature indicated on the product's "Moisture Sensitivity" label.	Users must not exceed the temperature indicated on the product's "Moisture Sensitivity" label.
The time (T p) within 5° C of the specified classification temperature (Tc) is shown in the figure below.		20 seconds	30 seconds
Cooling slope (Tp~ TL)		6℃/second, maximum	6℃/second, maximum
Time from room temperature to peak temperature		6 minutes, the longest	8 minutes, the longest
※The peak temperature (Tp) tolerance of the temperature curve is defined as the upper limit of the user			

7.2 Reflow Oven Curve



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8.Revision History

Version	Revision Date	Revision Notes	Maintainer
1.0	2 020.10.14	Initial version	l uo
1.2	2020.12.03	Content changes	Ren
1.3	2021.04.09	Product Upgrade	Ren
1.4	2 022.09.04	1. Added English web configuration interface. 2. Added the function of serial port wake-up after hibernation.	M.T.
1.5	2023.4.20	Added welding operation instructions	Hao
1.6	2024.3.7	Content changes	Hao
1.7	2025.8.5	Added CA certificate operation and enterprise encryption instructions	Hao

About Us

Sales Hotline: 4 000 - 330 - 990

Company phone number : 028-61399028

Technical Support: support@cdebyte.com

Official website： www.cdebyte.com

333-D347, Innovation Center, No. 4 Xixin Avenue, High-tech West District, Chengdu, Sichuan Province

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