Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual



【RS485 ⇌ WiFi】

NA611 / NA611A

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1 Introduction



NA611/NA611A is a high-performance, highly reliable dual-band WiFi serial server (RS485 ⇌ WiFi). Realize RS485 data through WiFi to realize device networking data interaction, and support IEEE802.11 a/b/g/n standards.

Features

- Support IEEE802.11 a/b/g/n standard;
- Support dual frequency（2.4G/5G）;
- Support AP, STA, WIFI Direct working mode;
- Support WEP/WPA/WPA2 multiple WIFI security authentication methods;
- Support TCP/UDP/HTTP/MQTT multiple network communication protocols;
- Support TSL/SSL secure transmission mode;
- Support 4-way Socket connection;
- Support 4-way STA device connection (AP access point);
- Support DNS, DNS-SD, DHCP network service package;
- Support AT command, WeB web page parameter configuration;
- Support NTP network time acquisition (under the premise of internet access);
- Support automatic reconnection after disconnection;
- Support high-speed continuous transmission;
- Support Alibaba Cloud, Baidu Cloud, OneNet and other platforms that support the MQTT protocol;
- Support custom registration package, custom heartbeat package function;
- Support remote command configuration;
- Support transparent multi-channel protocol transmission and broadcast transmission;
- Support Modbus protocol conversion (RTU and TCP);
- Flexible power supply (DC/AC optional);

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2 QuickStart

If there is a problem during use, click on the official website link：:https://www.cdebyte.com/Modem



2.1 Preparation for use

Before using the dual-band WiFi serial server (hereinafter referred to as the "device"), you need to prepare a computer, converter, power supply, screwdriver and other related auxiliary materials. details as follows:：

Table 2-1-1 Preparation list

No.	Device	Quantity
1	Equipment	1
2	USB to serial converter	1
3	Computer	1
4	Power Adapter（12V/1A）	1
5	WiFi antenna	1
6	Screwdriver (Slot SL 2)	1

2.2 Equipment wiring

2.2.1 Power supply wiring

Power supply, using DC 8～28V power supply, also can use DC 12V or 24V power supply.

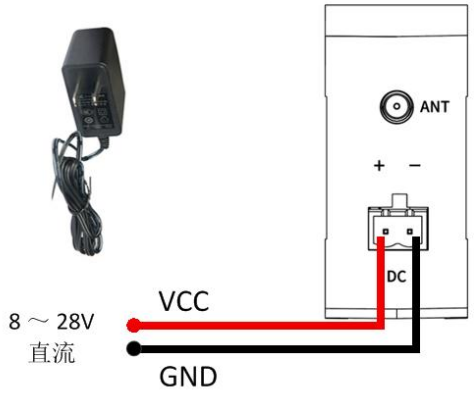


Figure 2-2-1 Power connection diagram

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2.2.2 Communications wiring RS485

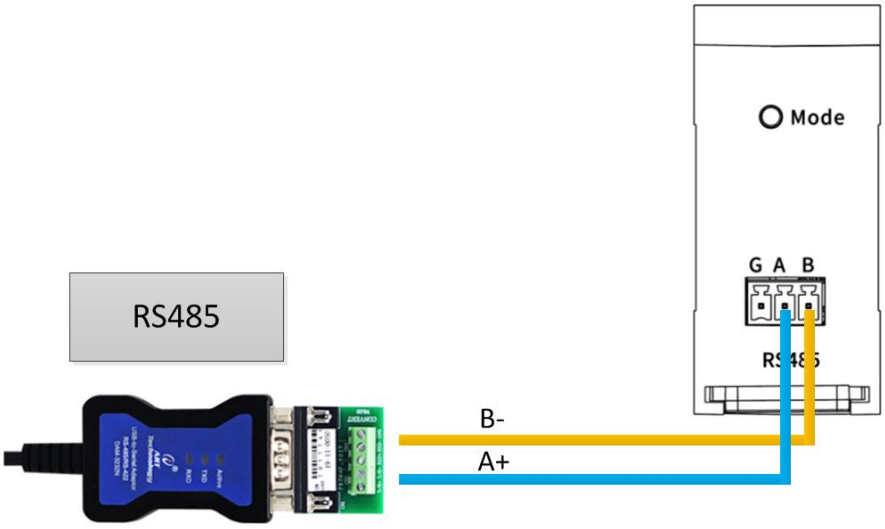


Figure 2-2-2 Communication RS485 wiring diagram

2.2.3 Overall schematic diagram



Figure 2-2-3 Schematic diagram of the whole machine

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2.3 Software configuration

2.3.1 Device connection



Figure 2-3-1 XCOM query connection parameters

Steps：

(1) Open the serial port, find the corresponding device port number, the baud rate defaults to 115200-8N1, click "open serial port".

(2) Send the "+++" command, and the serial port returns to "enter AT mode", indicating that the AT command has been entered.

(3) Send the "AT+SSID?" command, and the serial port will return "AT+SSID=0,E103-W06-V1.1,2,12345678" to get the WIFI name and address required by the computer to connect to the device later.

(4) Send the "AT+MODE?" command, the serial port returns "AT+MODE=1,1,1", if the serial port return parameters are inconsistent with this, you need to send the "AT+MODE=1,1,1" command to modify the device Working mode.

(5) Send the "AT+SVRPORTP?" command to query the IP address and port number of the next computer to

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connect to the device server.

(6) Restart the device.



Figure 2-3-3 Connecting the device

Use the WIFI name and password queried by XCOM to connect to the device. After the connection is successful, the LINKA on the device will light up.

2.3.2 Device testing

Next, we use the network debugging assistant "NetAssist" to test the connection.

Steps：

(1) Select the network card where the WIFI is located and modify the configuration parameters of IPV4. The network segment where the computer is located must be consistent with the device, as shown in Figure 2-3-4.

(2) Open the network debugging assistant "NetAssist", select the TCP Client mode, the remote host address is "10.145.45.1", the port number is "4001", click connect, as shown in Figure 2-3-5.

(3) The LINKB light of the device will light up after the connection is successful.



Figure 2-3-4 Computer parameter configuration

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Figure 2-3-5 NetAssist parameter configuration

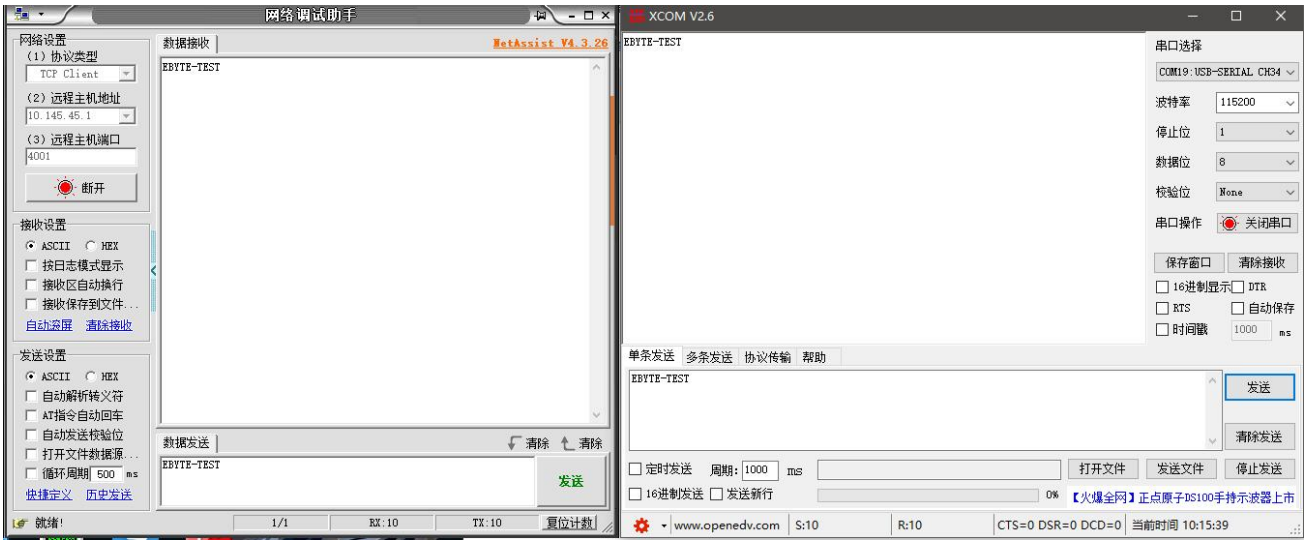


Figure 2-3-6 Actual test results

Send "EBYTE-TEST" to observe the result of data communication.

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3 Product overview

3.1 Product specifications

Table 3-1-1 Product Specifications

Product number	WiFi version	Operating Voltage	Working frequency	Communication port	Operating temperature
NA611	802.11 a/b/g/n	Direct current 8～28V	2.412GHz ～ 2.472GHz 5.180GHz ～ 5.825GHz	RS485	-40℃ ～ +85℃
NA611A		Alternating current 85～265V		RS485	

3.2 Technical specification

Table 3-2-1 Technical parameters

Project	Parameter
Operating Voltage	Direct current 8～28V / Alternating current 85～265V
Communication Interface	RS485
Working frequency	2.412GHz ～ 2.472GHz 5.180GHz ～ 5.825GHz
Maximum transmit power	16dBm ～ 18.5dBm @testing 2.412GHz 16dBm ～ 18.5dBm @testing 5.18GHz
Emission current	85mA @12V Instantaneous power consumption (2.412GHz), DSSS 1Mbps 60mA @12V Instantaneous power consumption (5.18GHz), OFDM 6Mbps
Receive current	28mA @12V Received average power consumption (2.412GHz) 32mA @12V Received average power consumption (5.18GHz)
Sleep current	6uA @12V Low power deep sleep（LPDS）
WiFi version	802.11 a/b/g/n
Operating temperature	-40℃ ～ +85℃
Product Size	92 * 66 * 30 mm（Length*width*height）
product weight	95 g ± 5g

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3.3 Port specification

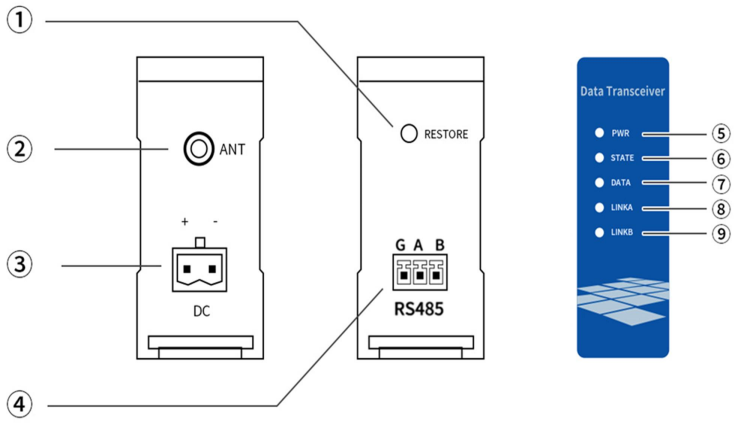


Figure 3-3-1 Interface diagram

Table 3-3-1 Port function table

No.	Name	Function	Description
1	Restore	Restart settings button	Long press the 8S device to restart
2	ANT	RF interface	SMA-K，External thread inner hole, characteristic impedance 50Ω
3	DC	Power connector	DC power input port, pressure line port
4	RS485	RS485 communication port	Standard RS485 interface
5	PWR	Power Indicator	Lights up when the power is on
6	STATE	Fault indicator	Steady on: equipment failure
7	DATA	Data transceiver indicator	Always off: No data is sent or received Green light: WIFI received data Red light: The serial port receives data
8	LINKA	WIFI connection indicator	Steady on: WIFI connection is successful Always off: Not connected to WIFI
9	LINKB	Data link indicator	Steady on: The device is successfully connected to the data processing server Off: The device is not successfully connected to the data processing server

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3.4 Dimension figure

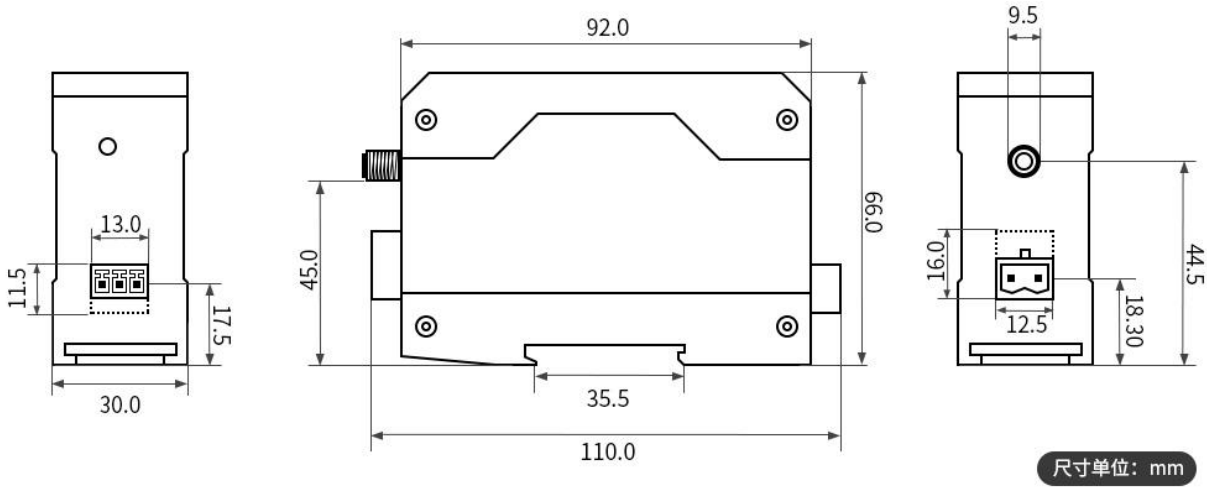


Figure 3-4-1 Dimensional drawing

3.5 Installation methods

The equipment adopts the guide rail installation method.

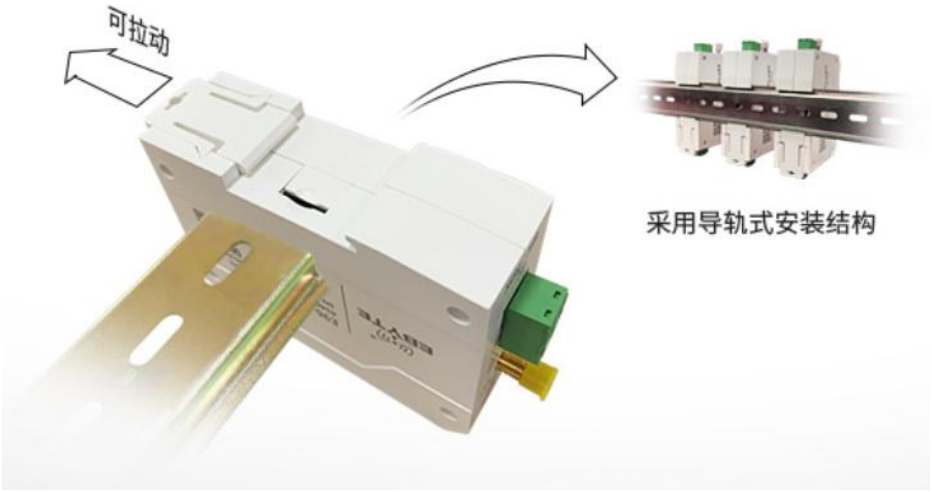


Figure 3-5-1 Rail installation

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4 Product function

4.1 Job role

4.1.1 AP model (Access Point)

Access Point is abbreviated as AP mode, similar to a router, allowing wireless devices to connect and establishing TCP/IP-based server, client, and UDP communications. In this mode, 4 stations are supported, and a maximum of 4 Tcp socket transmissions are supported. The command AT+MODE=1,x,x sets the first digit to: 1, to configure the device to work in the AP role.

4.1.2 STA model (Station)

Station mode is abbreviated as STA. In this role, the device does not provide connections and can only connect to Access Point or routers. This device supports TCP server, TCP client, and UDP in the Station role, and supports up to 4 sockets. Also supports MQTT, WebSocket, HTTP clinet. The command AT+MODE=2,x,x sets the first digit to: 2, to configure the device to work in the STA role.

4.1.3 P2P model (WiFi Direct)

WiFi Direct mode is a way to establish a point-to-point connection directly without routing. It is also called P2P, which is similar to Bluetooth but the transmission rate is significantly higher than Bluetooth. Command AT+MODE=3,x,x set the first digit to: 3 to configure the device to work in WiFi Direct mode.

There are two roles in P2P mode: Client; GroupOwner.

4.2 Transmission mode

The transmission mode refers to the number of sockets supported by the device under the TCP/IP protocol. When only one socket is supported, we define it as single-mode transmission, and when multiple channels are supported, we define it as protocol transmission.

It should be noted that the transmission mode parameter does not take effect for WiFi-Direct.

4.2.1Transparent transmission

Transparent transmission means that when only one socket is supported, the data from the serial port or the network is sent directly without any format.

Command AT+MODE=x.1,x set the second bit to 1 to configure the device to work in transparent transmission mode.

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4.2.2 Protocol 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.

(1) Designated sending

Designated sending means that the data packet input to the serial port contains a unique socks ID label, and the device transmits the data to the corresponding socket connection according to this ID number.

Fixed head	Socket ID	Data
3 Byte	1 Byte	N Byte

Fixed head： 0xAA 0xFE 0x55

Socket ID	Description
0x00	Socket 0 link
0x01	Socket 1 link
0x02	Socket2 link
0x03	Socket 3 link

Data： Application Payload

(2) Broadcast transmission

When the Socket ID is 0xff, it means broadcast. If a 4-way connection is established, the data will be sent to the 4-way socket at the same time, otherwise the data will be sent to the established connection.

(3) receiving protocol

Fixed head	Socket ID	Length	Data
3 Byte	1Byte	2Byte	N Byte

Fixed head：

0xAA 0xFE 0x55

Socket ID：

0x00,which means Socket 0 link is found

0x01,which means Socket 1 link is found

0x02,which means Socket 2 link is found

0x03,which means Socket 3 link is found

Length：

The actual length of the application data, range: 0~1000

Data：

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Application Payload

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

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

4.3 Service mode

The service mode refers to the network protocol supported by the device and the role of the device under the network protocol, which is often referred to as server (server) and client (client). Here, UDP, MQTT, HTTP client, WebSocket, etc. are all included To this mode. It should be noted that the service mode has no effect on the role of WiFi-Direct (P2P). The service model includes the following.

4.3.1 TCP Server

Let the device work as a TCP server. Use command: AT+MODE=x,x,1 Set the third bit to configure the device to work in TCP server mode.

4.3.2 TCP Client

Let the device work as a TCP client. Use command: AT+MODE=x,x,2 Set the third bit to configure the device to work in TCP client mode.

4.3.3 UDP

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

4.3.4 MQTT

In the MQTT mode, the device supports Alibaba Cloud, Baidu Cloud, OneNet and other IoT platforms. Enter the service parameters created on the platform into the device to communicate.

(1) Alibaba Cloud

Based on the network communication of Alibaba Cloud platform, you need to log in to Alibaba Cloud to obtain relevant parameters, which mainly include product secret key, device name, client ID and other information. For details, please refer to Chapter 7 Alibaba Cloud Configuration Tutorial.

(2) Baidu Cloud

For network communication based on Baidu Cloud Platform, you need to log in to Baidu Cloud to obtain relevant parameters, which mainly include information such as device name, user name, and password. For details, please refer to

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Chapter 7 Baidu Cloud Configuration Tutorial.

(3) OneNet

For network communication based on the OneNet cloud platform, you need to log in to OneNet to obtain relevant parameters, including device ID, product ID, authentication information, etc. For details, please refer to Chapter 7 OneNet Configuration Tutorial.

4.3.5 HTTP Client

When using this function, you only need to configure the corresponding server resource symbol URL, and start a trigger request to get the resource responded by the server without worrying about the complicated HTTP protocol layer. For details, see Chapter 7 HTTP Client Configuration Tutorial.

4.3.6 WebSocket

The traditional HTTP transmission protocol is based on access and response. In this way, the server is always passive and cannot be used for applications that frequently interact between web clients and web servers. The application of WebSocket function allows E103-W06 devices to pass through the serial port. Real-time interaction with the web page saves the GET and POST request process initiated by the HTTP client during multiple interactions, improves the response speed, and the device can actively push data to the web page. See Chapter 7 WebSocket Configuration Tutorial for details.

4.4 Parameter configuration

There are 3 ways of parameter configuration: AT command configuration based on serial port, remote AT configuration based on UDP, and web page configuration based on browser. For detailed operation, please refer to Chapter 6 AT Command Description and Chapter 7 Tutorial.

4.4.1 Serial port AT configuration

When you need to use the serial port AT command to configure the parameters, first send "+++" to enter the AT mode, and then operate according to the AT command in Chapter 6. After the configuration is completed, some commands will take effect immediately, and some commands will take effect after restarting, according to the description of the AT command chapter Prevail. To exit the AT mode, send the command: AT+EXAT. Sending "+++" command at any time will enter AT mode. But AT+EXAT can only be used in AT mode, otherwise it is used as data transmission.

4.4.2 UDP remote configuration

UDP remote configuration is the parameter configuration performed using network debugging tools under the same network, which can also be called air configuration. There are two ways to enter the remote configuration: when the device is in AP mode, the PC is connected to the device; when the device is in STA mode, the PC and the device are connected to the same router. The device will always listen to a fixed UDP port 8009. When the device and the terminal

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are on the same network, you can configure the parameters by setting the corresponding IP and port. The remote configuration must be in AP mode or STA mode, and the network connection has been established before it can be performed. P2P mode does not support this function.

4.4.3 Web page configuration

The web configuration must ensure that the PC and the device are in the same local area network. There are two ways to enter the web configuration: the device is connected to the device in AP mode; the device is in STA mode, and the PC and device are connected to a router together. The PC accesses the IP address of the device through a browser, and accesses the static web page for parameter configuration.

4.5 Status indication

The status indication is to display the working status of the device through serial port printing or pin output level status.

Serial port instructions: print "enter AT mode" when entering AT command, print "break AT mode" when exiting AT command, print "ERR=x" for AT command error, and return the set value if the AT command is correct.

The pin indication includes WiFi connection status indication, socket connection status indication and device abnormality indication. When the WiFi connection is established, the W_LINK pin outputs a high level, and if the connection is disconnected, the W_LINK outputs a low level. When the socket connection is established, S_LINK outputs a high level, and if the connection is disconnected, S_LINK outputs a low level.

The INDICATE pin remains low under normal working conditions. If the INDICATE pin of the device outputs a high level abnormally, the device needs to be restarted at this time.

4.6 Low power consumption

The low power consumption of the device enables the device to enter the dormant state through command operation. After entering dormancy, it can be awakened by a pin. The wake-up method is to recommend WAKEUP (ie GPIO_13) with a rising edge greater than 200ms.

4.7 High speed continuous transmission(3M)

Regarding high-speed continuous transmission, the following issues need to be paid attention to:

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

(2) The serial port assistant software must be able to support the 3M baud rate, the company’s test software is XCOM2.6

(3) Try not to connect the device to the PC through a USB converter, and connect it directly to the USB3.0 port of the PC, otherwise packet loss will easily occur.

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4.8 HeartBeat, Registration packet

The heartbeat packet registration package is a function only available in the TCP client mode. This device supports custom heartbeat packet data and registration packet data content.

4.9 Modbus protocol

This device supports Modbus protocol and can realize free conversion between RTU and TCP. When in use, you only need to transfer data from the serial port, and the device will automatically recognize and convert it into Modbus-compliant data, and upload it to the network. Or convert the received network-side data into data conforming to the Modbus specification and output it from the serial port.

requires attention:

1. The Modbus supported by this device is only for data conversion and does not support actual function operations. If you need to use this part of the function, please cooperate with the actual PLC device.

2. If the Modbus function is turned on, the protocol transmission is invalid, that is, the protocol transmission is no longer data with a fixed format, and it will be converted to data that conforms to the modbus protocol standard.

3. Only TCP server, TCP client, UDP, MQTT, WebSocket and P2P modes support Modbus protocol. HTTP client does not support it. The reason is because HTTP client is a short-connection communication method, and the server cannot actively initiate data exchange.

4.10 Stastic IP

In STA mode, it can support the setting of static IP, which is convenient for realizing fixed IP communication. It should be noted that the static IP address must be in the same network segment as the target router or target AP, otherwise it will not be able to assign IP and not work normally. For example, the target AP address is 10.123.45.1, then the static IP address must be set to 10.123.45.x. Otherwise, the IP address cannot be assigned normally and the device cannot work.

4.11 Default parameters

Parameter category	parameter name	Parameter value	Related instructions
Serial port	Baud rate	115200	AT+UART
	digit	8	
	Stop bit	1	
	Parity check	none	
	Serial port timeout	40（ms）	
	Serial port frame length	1000	
	working frequency	2.4G	

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RF parameters	channel		1	AT+RADIO
	Transmit power level		0	
	CountryCode		CN	
AP role SSID parameters	SSID		E103-W06-V1.1	AT+SSID
	Whether to hide the SSID		0（no）	
	Encryption type		2（WPA2）	
	password		12345678	
Operating mode	Job role		1	AT+MODE
	Transmission mode		1	
	Service model		1	
Network IP address	IP address		10.145.45.1	AT+NETIP
	Subnet mask		255.255.255.0	
	Gateway address		10.145.45.1	
	server address		10.145.45.1	
P2P connection parameters	P2P Scan gap		20	AT+P2PDEVINFO
	P2P role		0（client）	
	P2P Local name		E103-W06WiFiDirectClient	
	P2P Target name		E103-W06WiFiDirectGo	
P2P socket	P2P port		4001	AT+P2PSOCKET
	P2P address		10.145.45.1	
STAConnection parameters	target SSID		E103-W06	AT+STACON
	Encryption type		2	
	password		ebytew06	
	Connection Type		1	AT+CONTYPE
local Socket parameter	Local port		4001	AT+SVRPORTIP
	Local IP		10.145.45.1	
Remotely Socket parameter	Socket1	port	4001	AT+SOCKET
		IP	10.145.45.2	
	Socket2	port	4002	
		IP	10.145.45.2	
	Socket3	port	4003	
		IP	10.145.45.2	
	Socket4	port	4004	
		IP	10.145.45.2	
Heartbeat parameters	4 sockets are the same	Heartbeat type	0（shut down）	AT+HEARTBT
		Heartbeat timeout	5（Unit: second）	
		Heartbeat data type	1（String）	
		Heartbeat	CDEBYTE-E103-W06-STRHT	

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		data		
Registration package parameter	4 sockets are the same	Register package type	0（shut down）	AT+REGISTER
		Register package data type	1（String）	
		Register package data	CDEBYTE-REGISTER-PACK-STR	
NTP time	NTP Time zone offset		480 (Unit: minutes) Beijing time	AT+NTPTIME
Modbus	Modbus Enable		0（shut down Modbus）	AT+MODBUS
Static IP	IP address		10.145.45.1	AT+IPSTATIC
	Subnet mask		255.255.255.0	
	Gateway address		10.145.45.1	
	server address		10.145.45.1	

5 Instructions

5.1 Data transmission TCP/UDP

5.1.1 PC communication

Refer to this example (TCP server, UDP) for the other two communications in TCP mode, and set different modes through AT+MODE command.

(1) Set device role: AP, transmission mode: transparent transmission, service mode: TCP server; AT+MODE=1,1,1

(2) Configure SSID related parameters (SSID commonly known as WiFi name): AT+SSID=0, E103-W06-TEST, 2, 12345678.

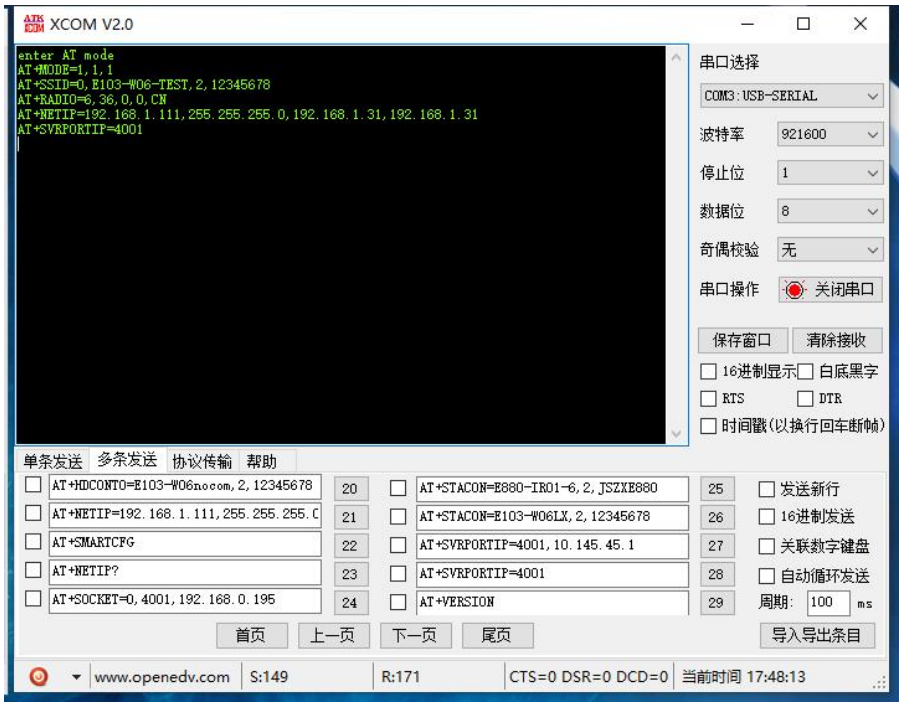
(3) Set working frequency: AT+RADIO=1,36,0,0,CN

(4) Set IP address: AT+NETIP=192.168.1.111,255.255.255.0,192.168.1.31,192.168.1.31

(5) Set the port number: AT+SVRPORTIP=4001

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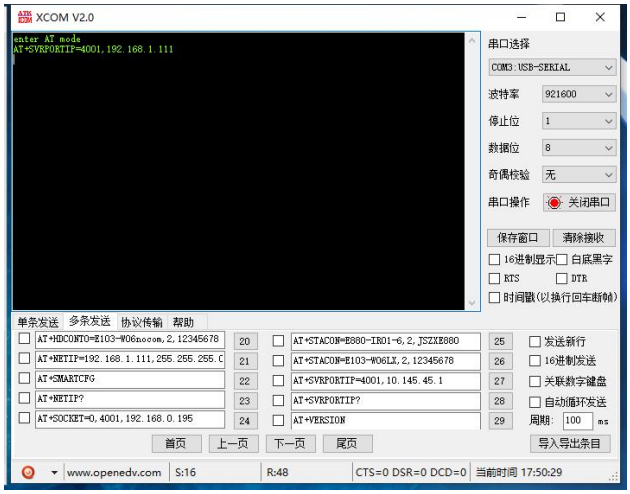
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(6) After configuring the parameters, restart the device, find the SSID (WiFi hotspot name) set in the second step on the PC side, and enter the Secret connection.



(7) After the connection is successful, query the local IP and local port: AT+SVRPORTIP. The return is as follows: AT+SVRPORTIP=4001,192.168.1.111

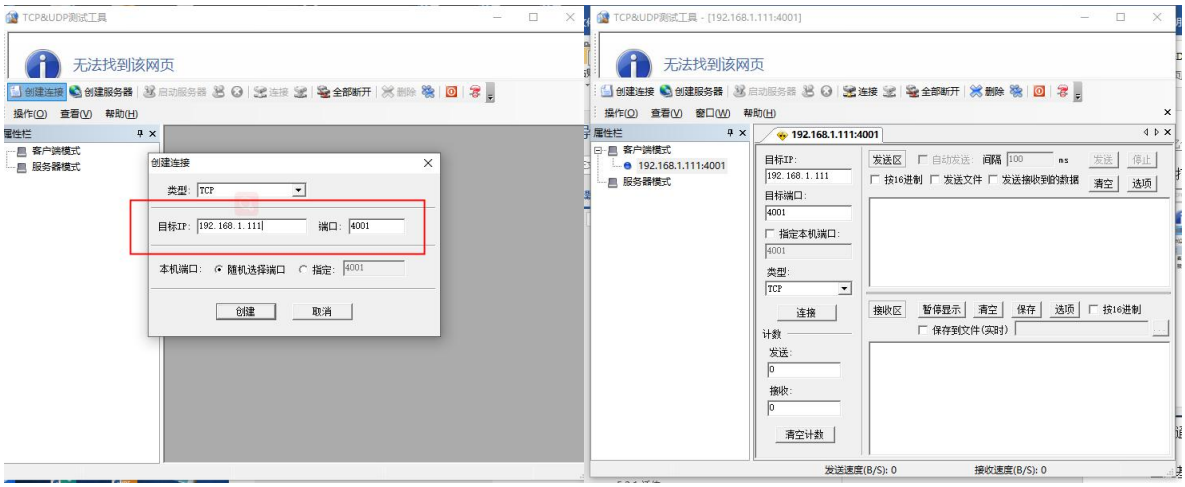


(8) Open the TCP debugging assistant, because the device is a server, so create a client here, and enter the

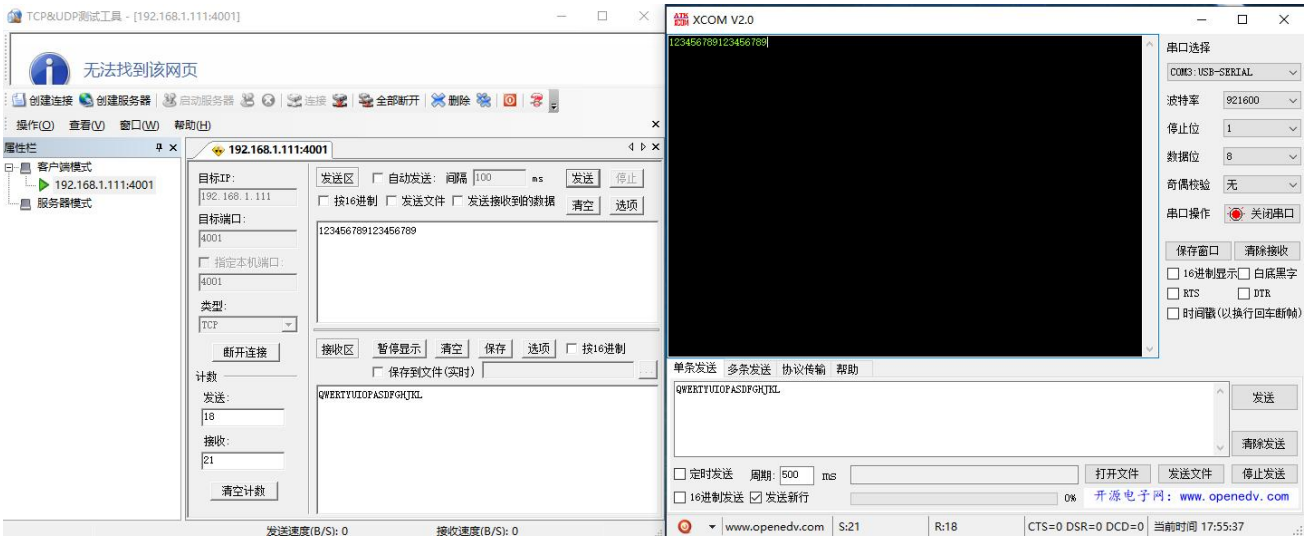
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corresponding IP and port information in step 7, as shown in the figure:



(9) Before communication, it should be noted that if the device is in AT mode, you need to exit the AT command, AT+EXAT



So far, the data transmission based on the AP mode is completed. Other transmission modes and service modes are set by themselves based on this.

5.1.2 Communication between the roles STA and TCP Server

(1) To realize communication with PC under the role of STA, the device needs to ensure that the PC and MO block are in the same local area network. Here we take the way of mobile phone hotspot as a tutorial, and router can also be used. The other two TCP servers and UDP of STA also refer to this process, and set different modes through AT+MODE command.

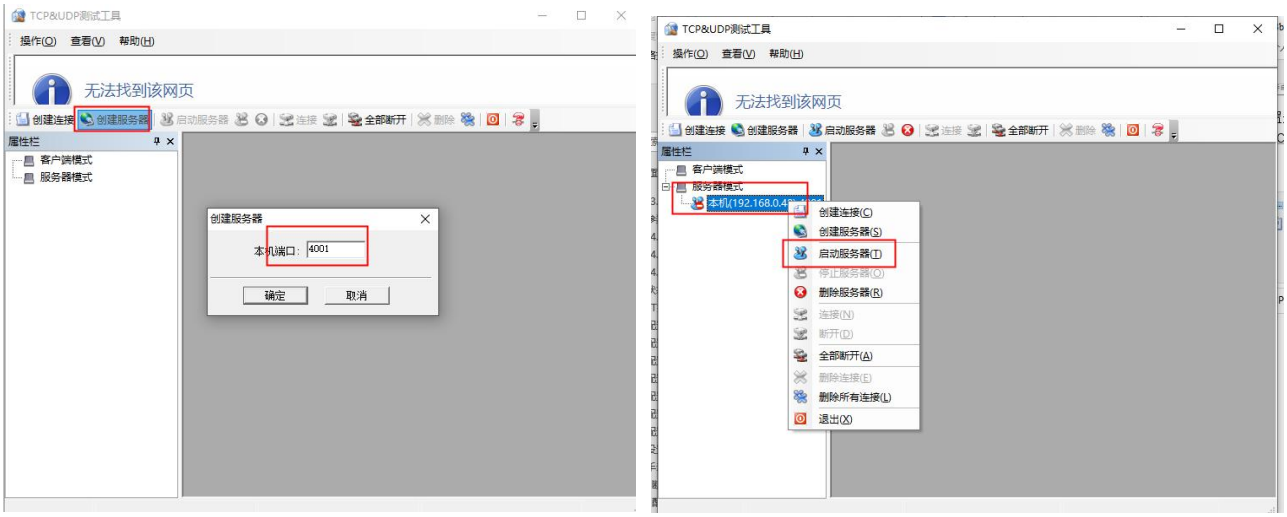
1. *Turn on the mobile phone hotspot, connect the PC to the hotspot, and find the IP address assigned by the hotspot to the PC. This step is very important. If the IP address is incorrect, communication will not be possible. (You can also connect to the router)



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(2) Open the TCP debugging assistant, create a TCP Server server, enter the port number set in the second step, and start the server:



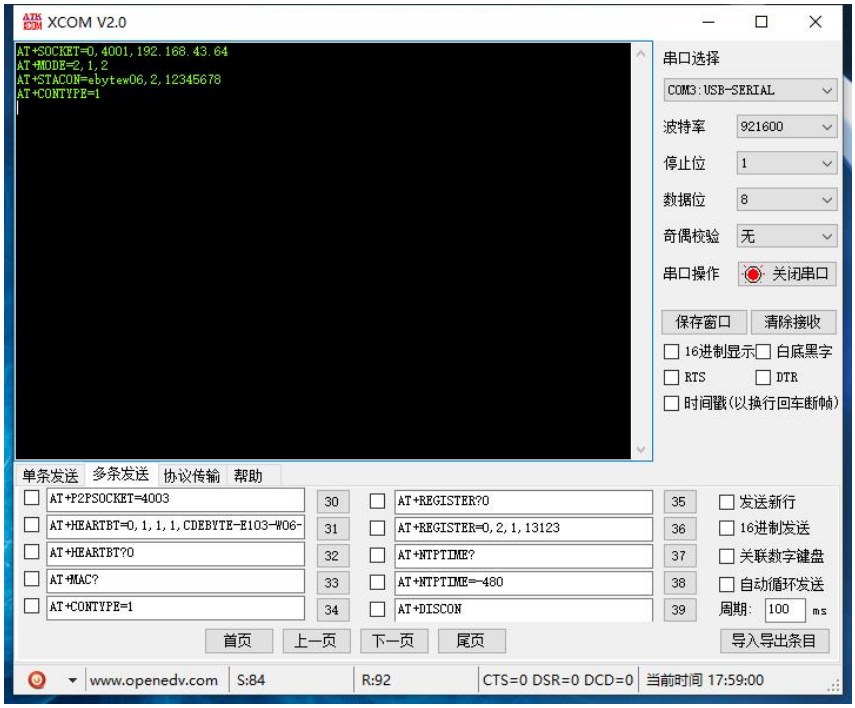
(3) Set the communication port and IP address (this step is very important, if the IP address is incorrect, communication will not be possible), refer to the instruction: configure and read the SOCKET port, IP address: AT+SOCKET=0,4001,192.168.43.64

(4) Set device 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 (connections are divided into manual, automatic, and smartconfig), here select automatic connection:

AT+CONTYPE=1



(7) Restart the device, and wait for the device to connect to the hotspot and Tcp Server for data transmission

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At this point, communication with the PC under the STA role has been established. Note: Some mobile phones may not have data forwarding function due to their own technology, so you need to pay attention.

5.1.3 Communication between the roles STA and UDP

This example will demonstrate protocol transmission in AP mode.

(1) Setting role: AP, transmission mode: protocol transmission, service type: UDP AT+MODE=1,2,3

(2) Set the local port number AT+ SVRPORTIP=4001

(3) Set the UDP communication list. This step is to distinguish the source of UDP data. 4 groups can be set.

AT+SOCKET=0.4001,10.145.45.2

AT+SOCKET=1.4002,10.145.45.2

AT+SOCKET=2.4003,10.145.45.2

AT+SOCKET=3.4004,10.145.45.2

This is just for demonstration, and the actual value is set according to your needs.

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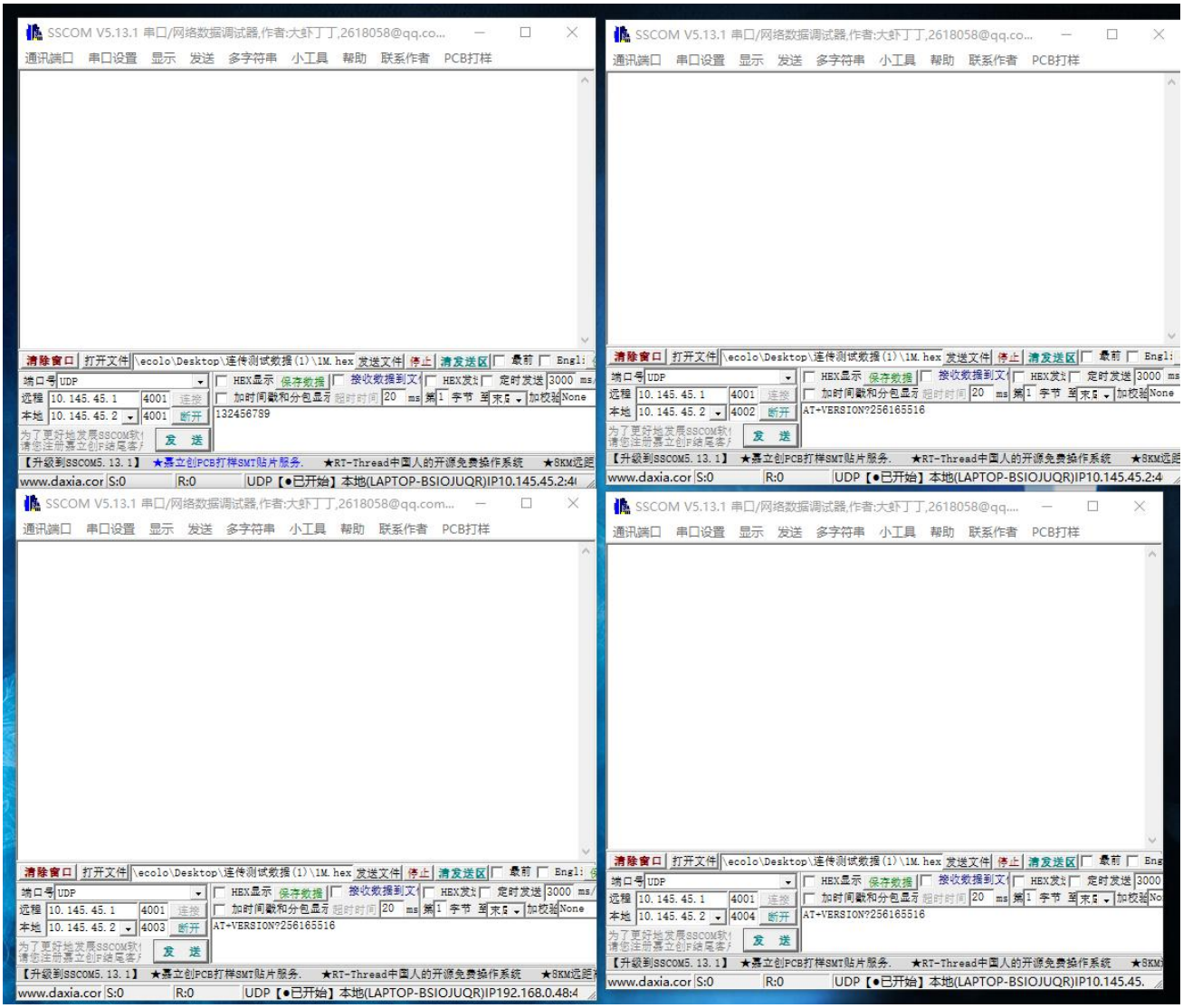


(4) Restart the device and use the PC to connect to the device.

(5) Open the UDP assistant to establish UDP communication.

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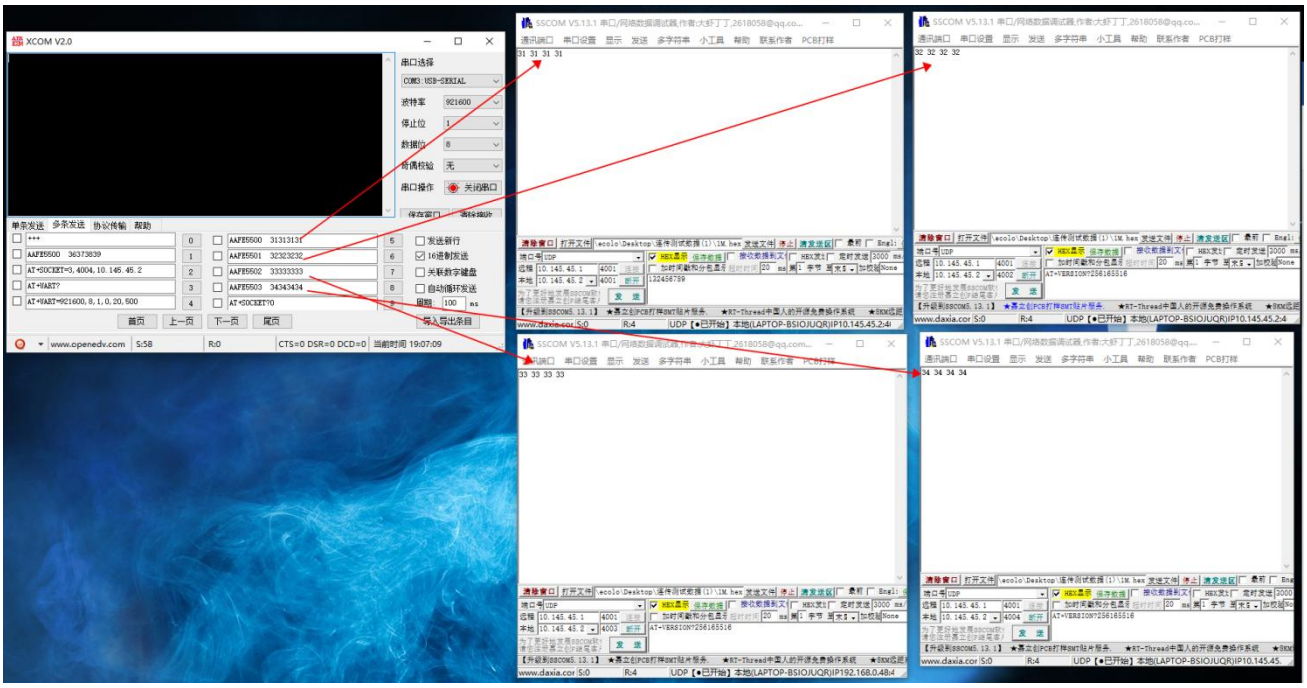


(6) Communication, because it is a protocol transmission, it is necessary to input data according to the protocol transmission format when sending data on the device side. For details, see Protocol Transmission. The PC side does not need to add a format, but the device will print out the data according to the protocol format after receiving the data from the PC side.

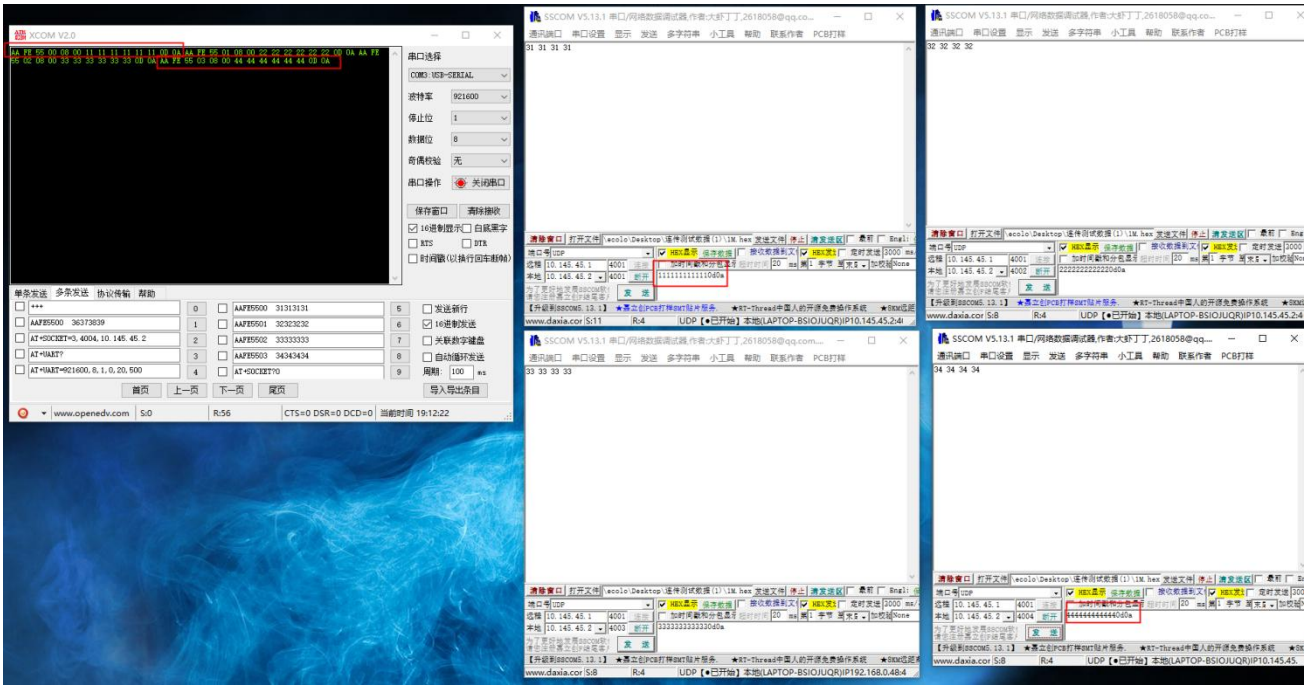
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Device sent:



Device receiving:

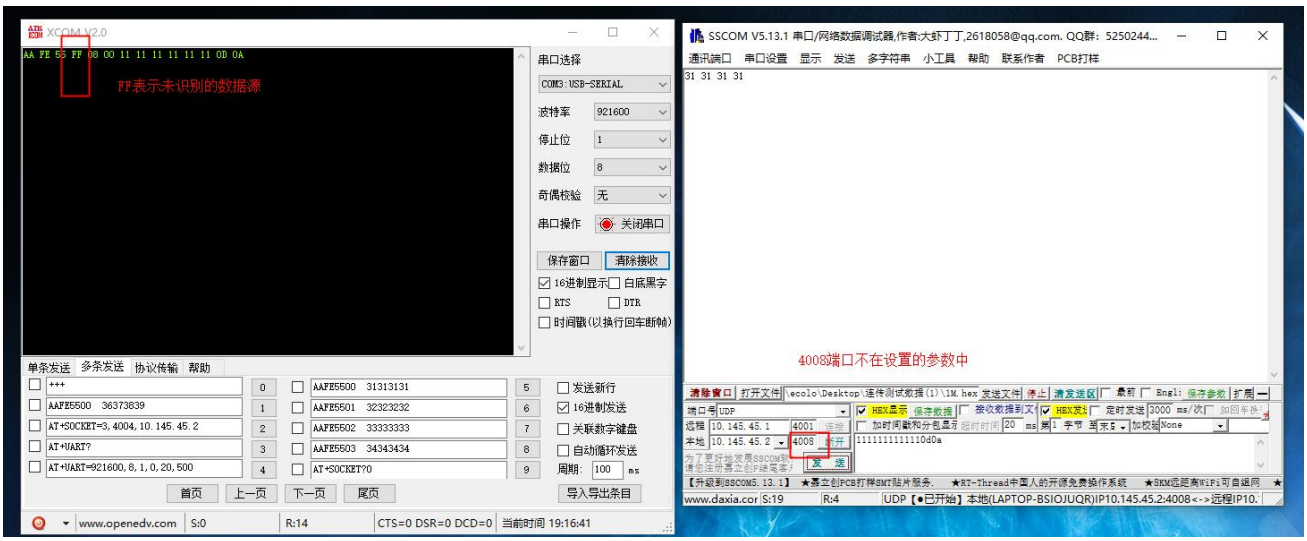


At this point, the communication between the device and the PC is complete. Both the AP and STA roles support TCP server, TCP Client, and UDP. The specific combination can be used in conjunction with these three tutorials.

It should be noted that if the source address and port of the received data are not in the parameters set in the third step, the serial port number is 0xff, which means that the data source is not recognized.

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5.1.4 TCP communication between AP-STA devices

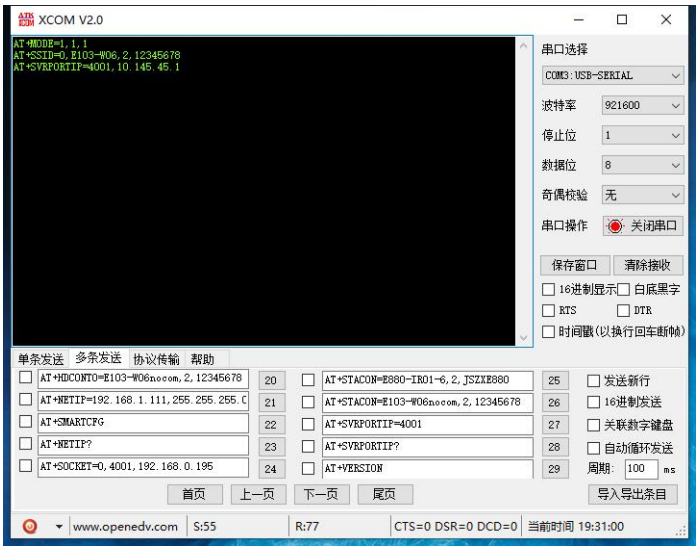
(1) Set the working mode, set device A to AP role, and device B to STA role. It is particularly important to note that in TCP mode, the service mode of the device cannot be set to the same, that is to say, one of the two devices is a TCP Server and the other must be a TCP Client, otherwise the connection and communication cannot be established normally. Regarding the channel and frequency settings, because the devices are dual-frequency 2.4G and 5.8G, it is also necessary to ensure that the frequencies of the two devices are the same.

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 pass the parameters into the STA, otherwise communication will not be possible), the return value is shown in the figure.



STA 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 in the AP configuration is passed in as the remote IP of the

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STA:

AT+SOCKET=0,4001,101.145.45.1

After the configuration is complete, restart the device, wait for the connection to be completed, and then send data.

Special attention is needed: Before starting the STA, the IP address of the AP connected to it must be passed in. Otherwise, a normal network connection cannot be established.

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

For STA-STA communication, two devices 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 the local port: AT+SVRPORTIP=4001

Get IP address: AT+SVRPORTIP? Get back: 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 the IP and port obtained by STA1 are passed in:

AT+SOCKET=0,4001, 192.168.0.189

Restart the device and wait for the connection to complete before communicating.

5.1.5 UDP communication between devices

UDP is a communication that does not establish a connection, and the core is the IP address and port. In this way, one serves as AP and the other serves as STA.

(1) Configure AP equipment:

Setting mode: AT+MODE=1,1,3

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

Set the local port: AT+SVRPORTIP=4001

Get the local IP of the local port: AT+SVRPORTIP?. Get back: AT+SVRPORTIP=4001,10.145.45.1

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

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(2) Configure STA equipment:

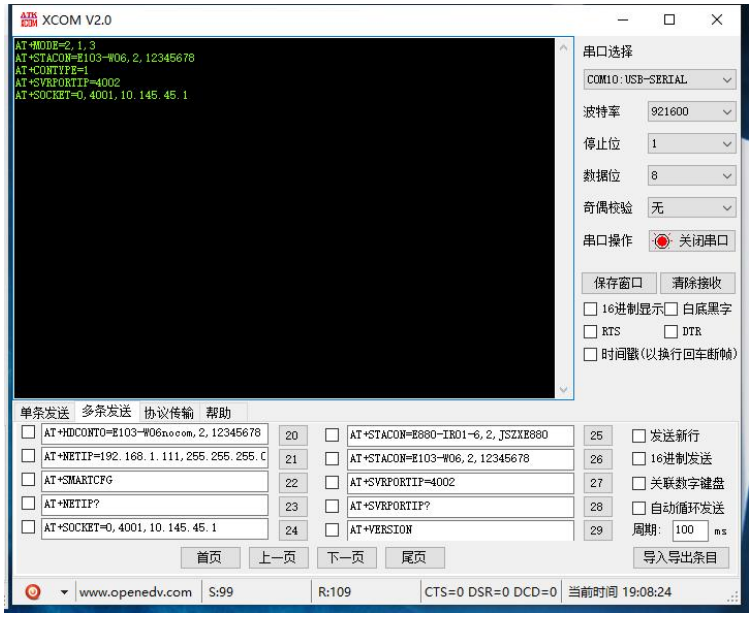
Setting mode: AT+MODE=2,1,3

Set the target SSID: AT+STACON=E103-W06,2,12345678

Set connection method: AT+CONTYPE=1

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

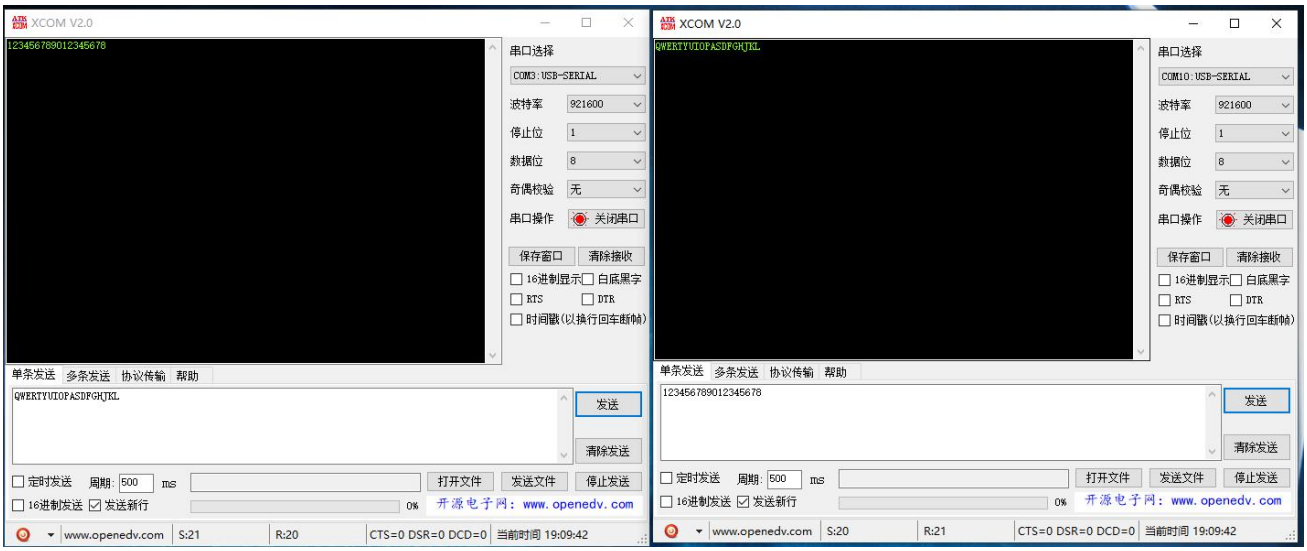
Set the remote port remote IP: AT+SOCKET=0,4001,10.145.45.1 (the remote port IP here is the local port IP in the previous step)



(3) Restart the device, wait for connection, and communicate.

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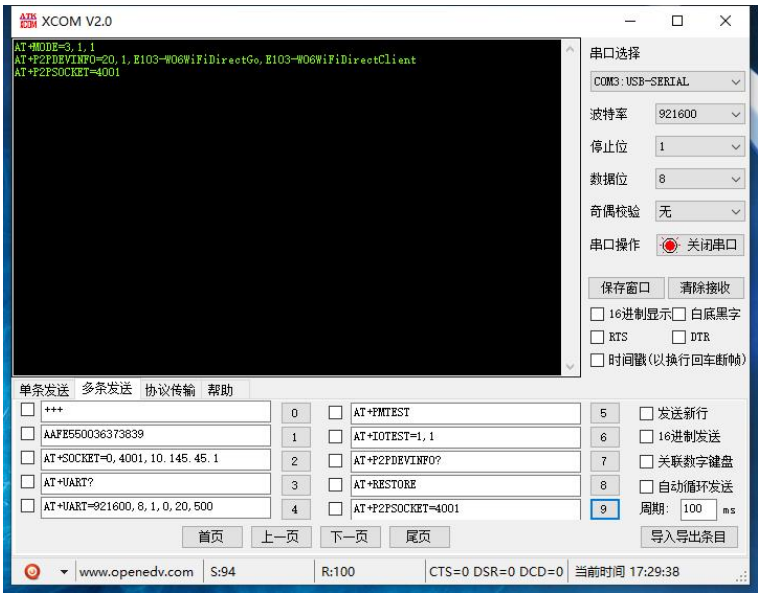
5.1.6 Set up the P2P communication of WiFi Direct

WiFi-Direct is a point-to-point connection, and the configuration process when in use is as follows.

(1) First configure to P2P mode, and both devices send AT commands at the same time: AT+MODE=3,1,1

(2) Then select one of the devices to configure as GroupOwner, and send instructions to set connection parameters (see configuration and read WiFi-Direct (P2P) connection parameters for instructions):
AT+P2PDEVINFO=20,1,E103-W06WiFiDirectGo,E103-W06WiFiDirectClient

(3) Query the local port and IP address of the socket (or): AT+P2PSOCKET?



(4) Finally, configure another device as Client, and send instructions to set connection parameters:
AT+P2PDEVINFO=30,0,E103-W06WiFiDirectClient,E103-W06WiFiDirectGo

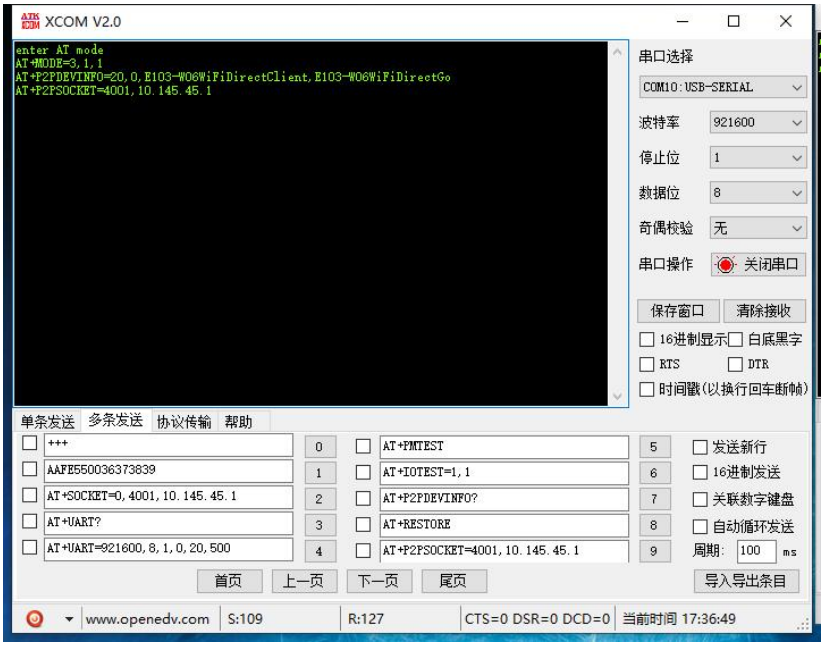
(5) Configure the remote port and address, set the IP address and port of the GroupOwner queried in the previous

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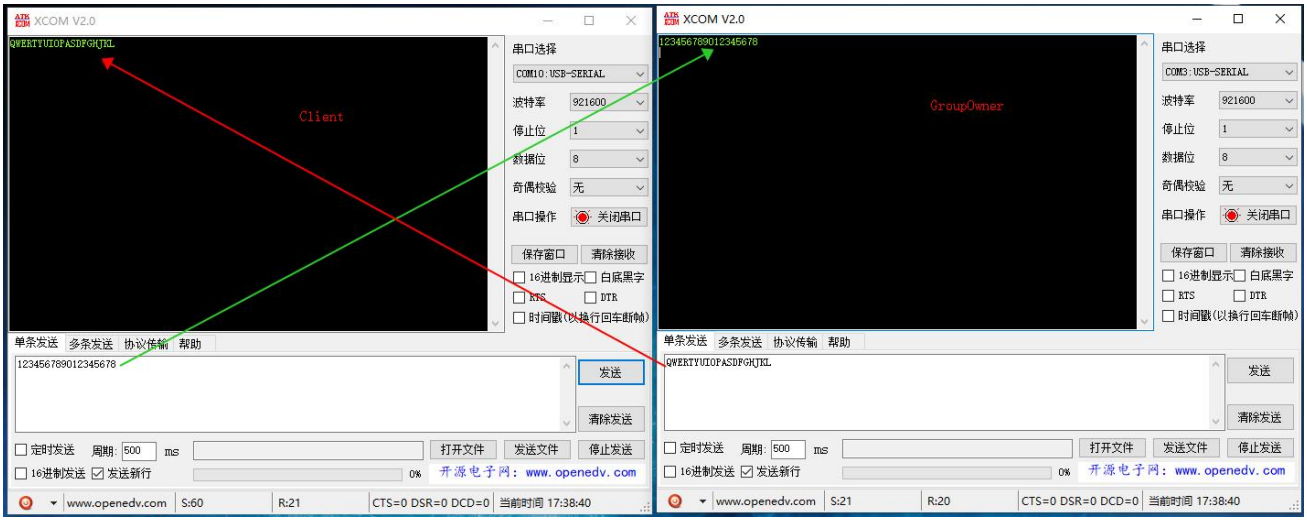
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step to the Client (the IP address and port of this part must be obtained after querying the GroupOwner, otherwise communication cannot be established)

AT+SVRPORTIP=4001,10.145.45.1



(6) Restart and wait for the connection to be established to communicate



5.2 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 servery and WebSocket.

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5.2.1 MQTT

Three types of transmission are supported under MQTT, Alibaba Cloud, Baidu Cloud, and OneNet. The configuration process is as follows, according to the platform you use, go to register to obtain the relevant parameters, and finally add them in the web window, or you can use AT commands for configuration.

Special note: For users of self-built mqtt server, use this device to access, you can choose Baidu cloud or onenet, and fill in the corresponding parameters.

When the self-built mqtt server uses Baidu Cloud, the device name is the Client ID and the user name and password correspond. When using onenet, the device ID is the Client ID, the product ID is the user name, and the authentication information is the password.

(1) Alibaba Cloud

- Log in to the web page, in the mode setting menu, select the work role as Station and the service mode as MQTT, and save the settings.
- In the parameter setting menu, select Alibaba Cloud.
- Product key: In the console of the Alibaba Cloud IoT platform, create a product and device to obtain a product key. Such as: A1Ve0iJW6z1
- Device name: The device name entered when adding a device. Note: Only numeric English can be input, and the input length cannot exceed 10 bytes.
- Client ID: User-defined input. Note: Only numeric English can be input, and the input length cannot exceed 12 bytes.
- Device key: In the console of Alibaba Cloud Internet of Things platform, create a product and device to obtain a device key. Such as: AHlmNjuaMCGJ1bFOjC4EZMZmHSUhzSEQ
- Address: The domain name of Alibaba Internet of Things.
  Such as: A1Ve0iJW6z1.iot-as-mqtt.cn-shanghai.aliyuncs.com
- Port: Alibaba Internet of Things port. Such as: 1883
- Subscribe topics: such as: /A1Ve0iJW6z1/MQTT_TEST/user/get
- Publish the subject: such as: /A1Ve0iJW6z1/MQTT_TEST/user/update
- Subscribe to publish message levels: Qos:0, Qos:1, Qos:2





(1) Baidu Cloud

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- Log in to the web page, in the mode setting menu, select the work role as Station and the service mode as MQTT, and save the settings.
- In the parameter setting menu, select Baidu Cloud.
- Equipment name: the name entered when creating a shadow of an object. Note: Only numeric English can be input, and the input length cannot exceed 15 bytes
- User name: The name in the configuration of the shadow connection. Such as: Un2d6cs/E810MQTT
- Key: The key in the configuration of the object shadow connection. Such as: s9mMzByp4Mpryphq
- Address: Access to the domain name of Baidu Internet of Things.
- Port: Baidu Internet of Things port. Such as: 1883
- Subscribe to topics: such as: $baidu/iot/general/get
- Release topic: such as: $baidu/iot/general/update
- Subscribe to publish message levels: Qos:0, Qos:1, Qos:2



(1) OneNet

- Log in to the web page, in the mode setting menu, select the work role as Station and the service mode as MQTT, and save the settings.
- Log in to the web page again, and select ONENET in the parameter setting menu. Note: Onenet creates products to choose multi-protocol access.
- Device ID: such as: 511986588
- Product ID: such as: 286258
- Authorization information: custom input when creating a device. Such as: ebyte
- Address: Access to the domain name of ONENET Internet of Things. Such as: mqtt.heclouds.com
- Port: ONENET Internet of Things port. Such as: 6002
- Subscribe to topics: such as: iot/general/get
- Release topic: such as: iot/general/update
- Subscribe to publish message levels: Qos:0, Qos:1, Qos:2

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5.2.2 HTTP Client

Log in to the web page, in the mode setting menu, select the work role as Station and the service mode as HTTP Clinet, and save the settings.

(1) Log in to the web page again, and fill in the HTTP server address in the parameter setting menu.

(2) Fill in the HTTP server port number.

(3) The request method can be post or get.

(4) All output is selected as the output mode, the content of the server's reply is all output through the serial port, and the valid output is selected, and the serial port only outputs valid data.

(5) Enter the URL path of the header.

(6) User-defined input protocol header, if multiple entries need to be added directly\r\ndo not add the last one.





If the user passes parameters via GET, the following explains how to use GET in detail. as follows:

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

Host: 192.168.4.10:8080

Among them, /request/login.do? is the content set in the header path URL (note that you need to add? After the

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URL), and name=test&userpwd=123456 is the data received by the device serial port. 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 more than one is needed, add \r\n between the commands, and not add the last one.

If the user passes parameters through POST, the following describes how to use POST. as follows:

POST /request/login.do HTTP/1.1

Host: 192.168.4.10:8080

(The place is a blank line and cannot be deleted. The content of the parentheses in the final release must be deleted, and the blank line is reserved)

username=test&userpwd=123456

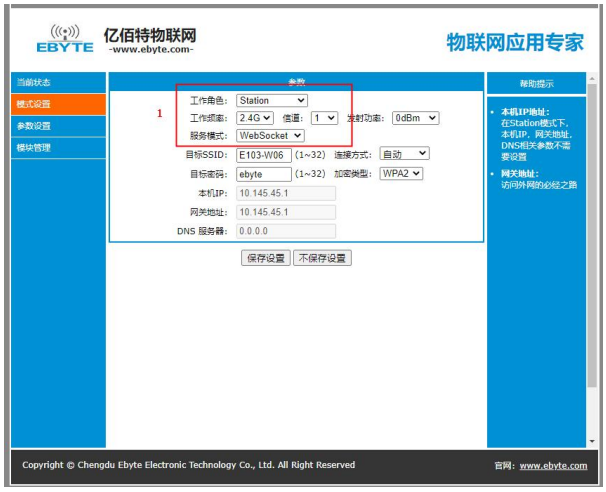
Among them, /request/login.do is the content set in the header path URL, and name=test&userpwd=123456 is the data received by the device serial port. 192.168.4.10:8080 is the HTTP server address and port.

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

5.2.3 WebSocket

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

(2) In the parameter setting menu, configure the required parameters.





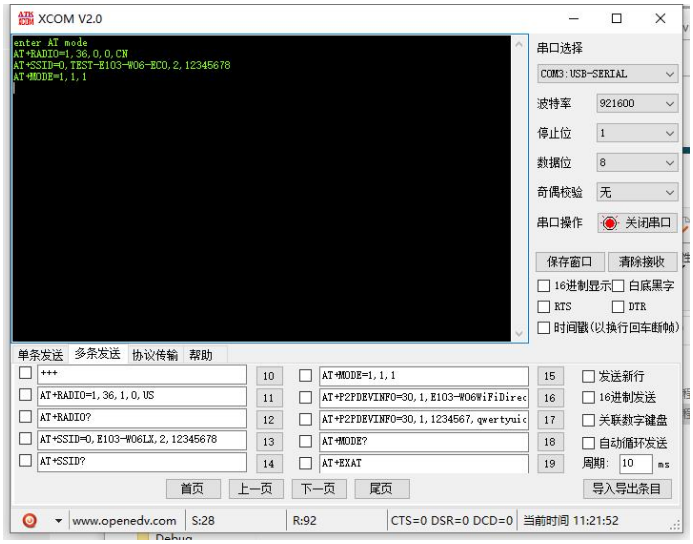
5.3 Parameter configuration

5.3.1 Serial port AT instruction configuration

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

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To configure according to the AT command in Chapter 6, note that the command must follow the specification.

5.3.2 UDP remote communications

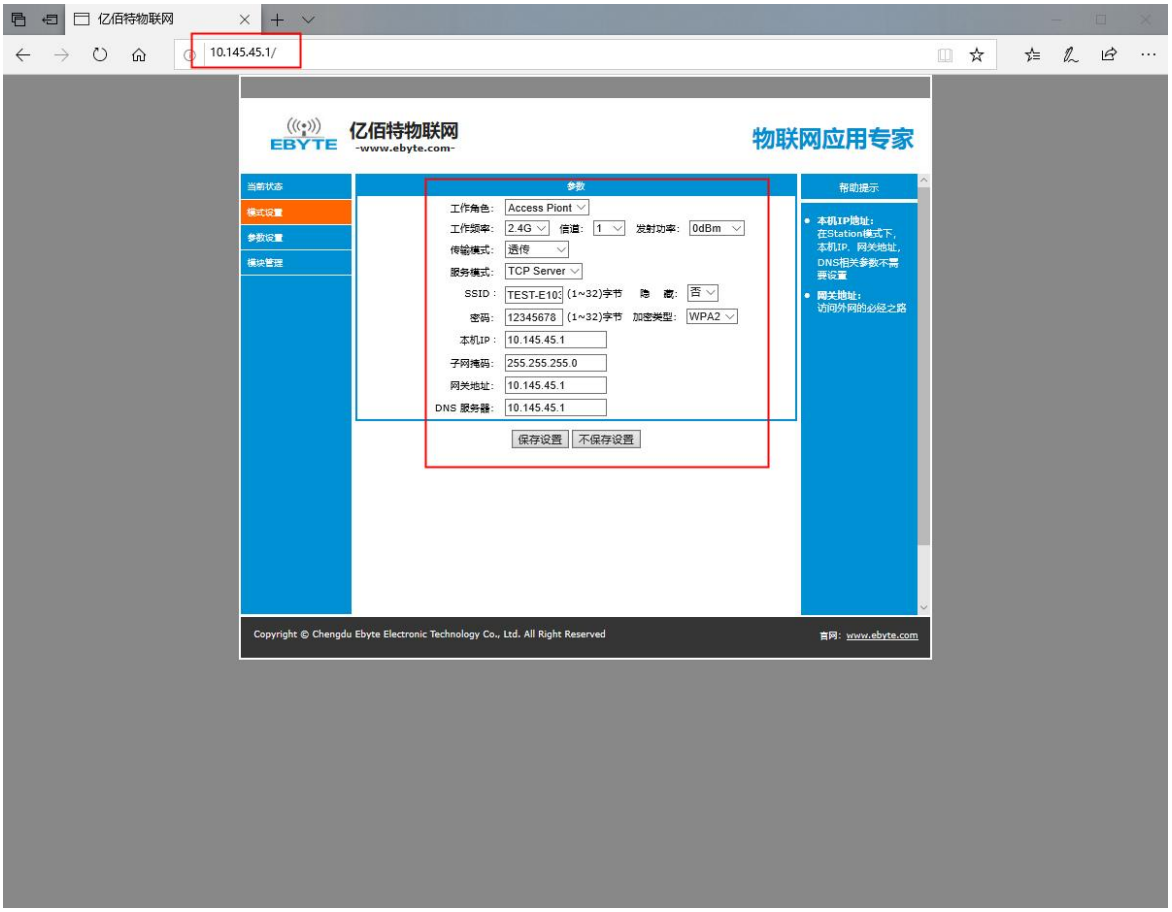
During remote configuration, it is necessary to ensure that the device and PC are in the same LAN. For the configuration method, see the communication with the PC (either make the device in AP mode and the PC connects to the device, or make the device in STA mode and the PC connect to the same router) to obtain the IP After the address, directly enter the IP address and UDP port number 8009 (this port number is a fixed value and does not support changing). The remote configuration is essentially an AT command operation. For specific commands, see AT commands. The following figure shows the remote configuration based on AP mode and STA mode.



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5.3.3 Web page configuration

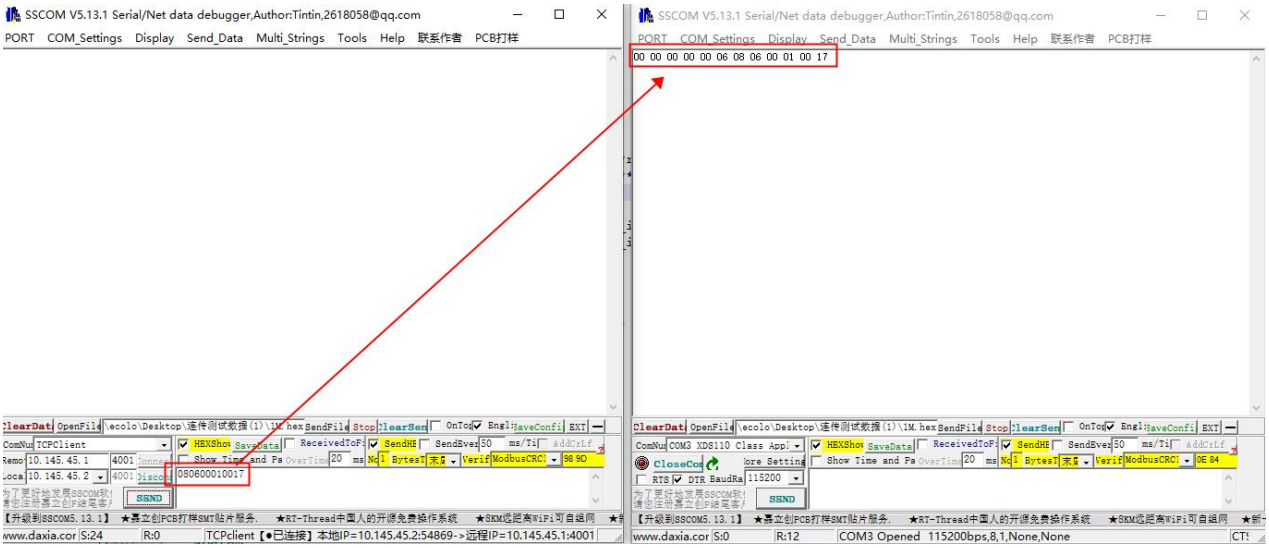
When configuring the web page, you also need to ensure that the device and the PC are in the same LAN, find the IP address corresponding to the device, and enter this IP address in the browser. Here 10.145.45.1 is just the IP address used for demonstration, the specific IP address Please use the command: AT+SVRPORTIP? to query and enter the correct IP to enter the configuration interface. The IP address is set according to the feedback result of the device, and other parameters are set according to your own needs.



5.3.4 Modbus use

After setting the working parameters according to the above chapters, enter the AT command and turn on the modbus protocol: AT+MODBUS=1. Communicate after establishing a connection

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The MODBUS function of this device only supports protocol conversion between MODBUS RTU and MODBUS TCP. If necessary, please use it in combination with actual use.

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Revision History

edition	Revision date	Revision description	Maintainer
1.0	2025-5-6	Initial version	LYL

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