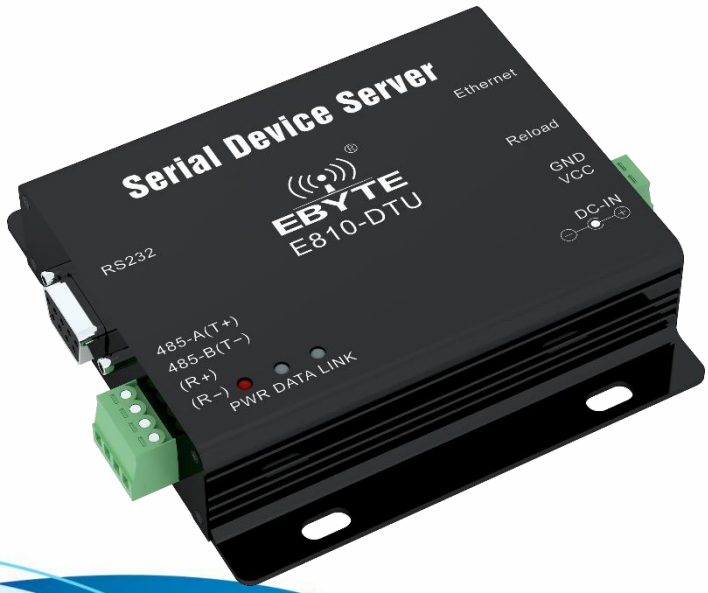
Ethernet to RS 232/RS485/RS422

E810-DTU



成都亿佰特电子科技有限公司

Chengdu Ebyte Electronic Technology Co.,Ltd.

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Chapter 1 Product Overview

1.1 Product Introduction



E810-DTU(1RS1E) is a single serial port server for RS232 & RS485 & RS422 to Ethernet, which realizes transparent data transmission between RJ45 network port and RS232 or RS485 or RS422.

Equipped with M3 series 32-bit processor, it runs fast and has high efficiency. It has four communication mechanisms: adaptive network rate (supports up to 100M full-duplex), TCP Server, TCP Client, UDP Server, and UDP Client. It is a device that realizes two-way transparent data transmission between TCP/UDP and serial port. It has a built-in operating system, which is more powerful for multi-tasking. At the same time, it is equipped with TCP/IP network protocol stack, which is more efficient and stable. It supports two SOCKETs working at the same time and WEB page configuration.

E810-DTU (1RS1E) is easy to operate, and users can directly configure the module parameters through the web page, making data transmission easy.

1.2 Product Specifications

Serial number	Product specifications and features	describe
1	Supply voltage	8V~36V, more than 36V may burn out, 12V or 24V power supply is recommended
2	Working current	74.66mA@12V(RS232), 73.47mA@12V(RS485), 73.64mA@12V(RS422)
3	How it works	Asynchronous half-duplex or asynchronous full-duplex
4	Interface	RS232: DB9 female connector RS485/RS422:1*4*3.81, wire pressing RJ45: Network port
5	Serial port standard	RS232: 1200~115200bps RS485/RS422: 1200~256000 bps RJ45: 300bps~3Mbps
6	Transmission medium	Network cable/twisted pair or shielded cable
7	Network port specifications	RJ45, 10/100Mbps
8	Network Protocol	IP, TCP/UDP, ARP, ICMP, IPV4
9	How to obtain IP	Static IP, DHCP
10	Domain name resolution	support
11	User Configuration	Web page configuration
12	Simple transparent transmission method	TCP Server, TCP Client, UDP Server, UDP Client
13	TCP Server Connection	Supports up to 6 TCP connections

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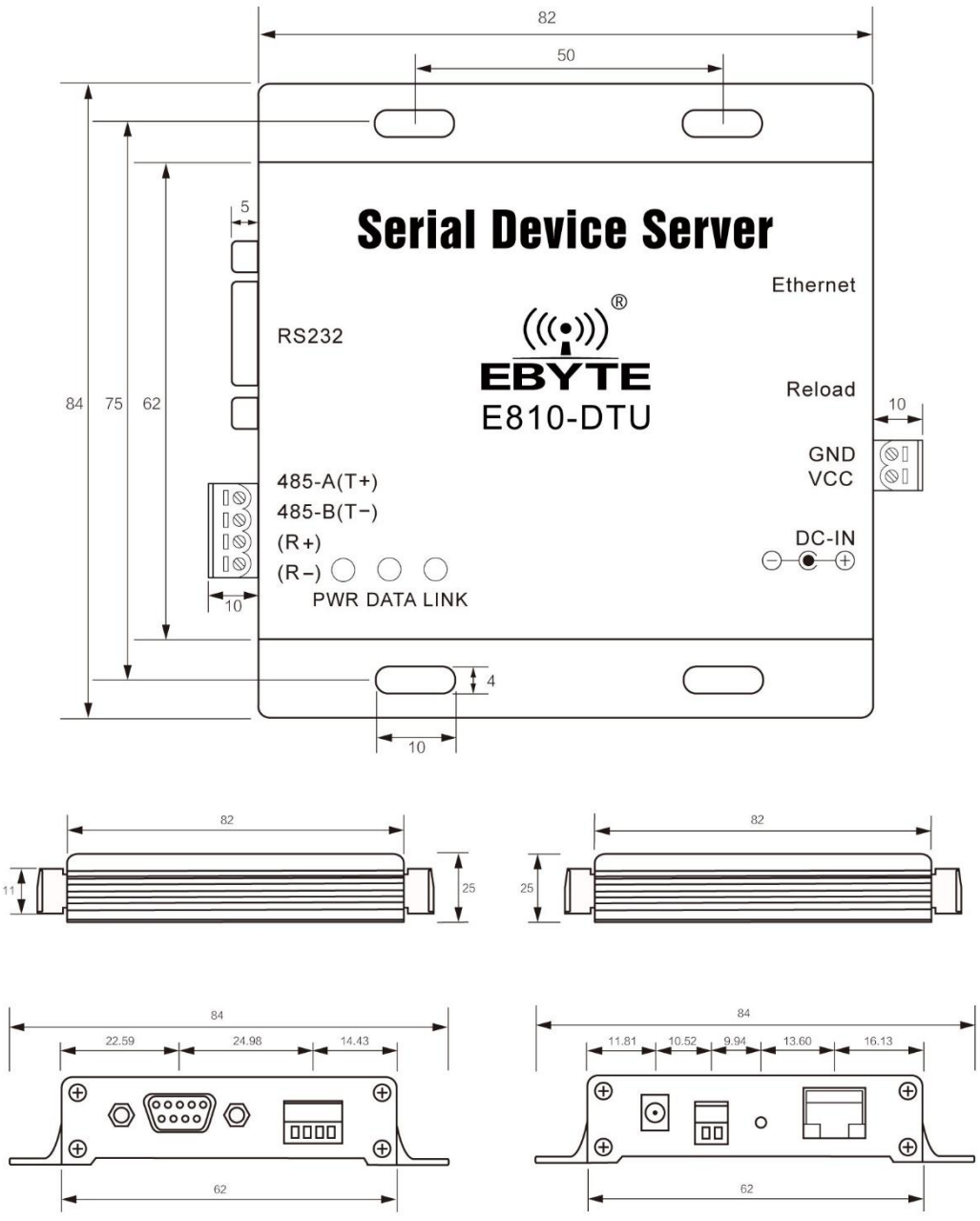
14	Packaging mechanism	0-1460 bytes of packet length
15	Operating temperature	-40 ~ +85℃, industrial grade
16	Operating humidity	10% ~ 90%, relative humidity, non-condensing
17	Storage temperature	-40 ~ +125℃, industrial grade
18	Average weight	130±5g
19	Size	80×62×25mm (same as E810-DTU(RS))

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Chapter 2 Introduction to Product Design

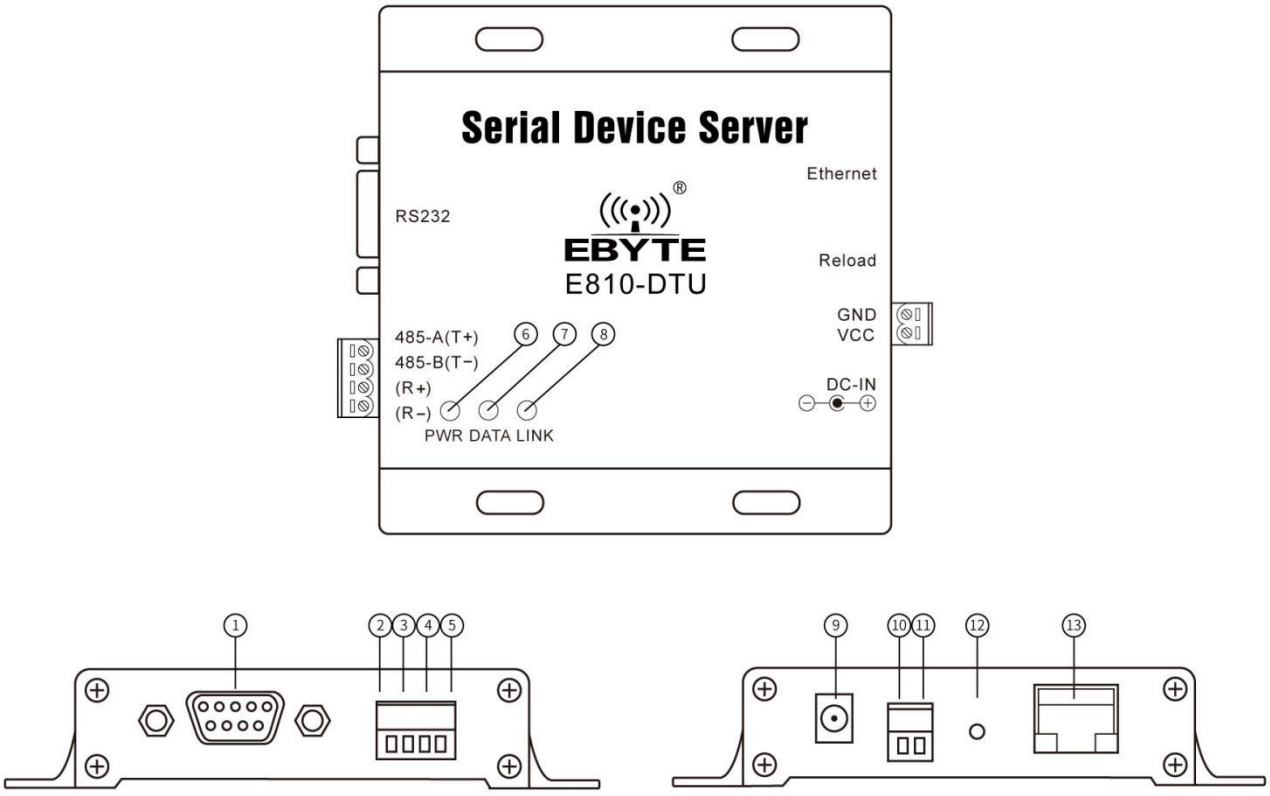
2.1 Dimensional drawing



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2.2 Definition of enclosure



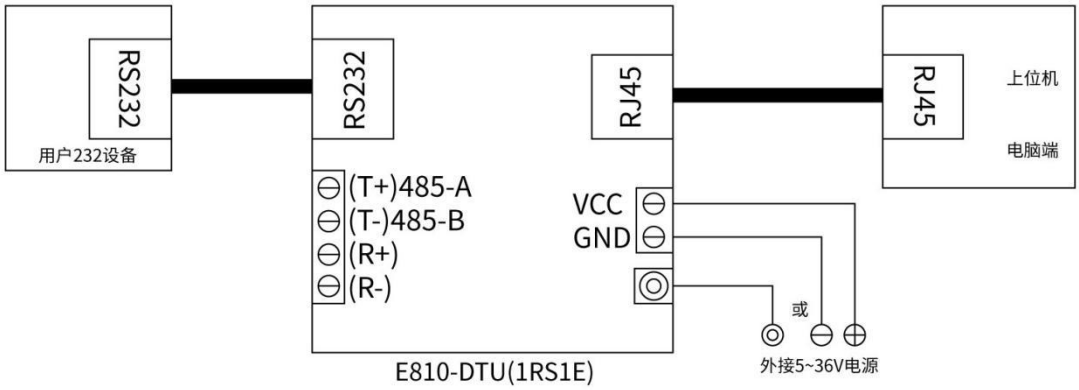
Pin number	Pin Name	Pin Purpose
1	RS232	RS232 data interface (DB9 female connector)
2	485-A(T+)	RS485 data interface A end/RS422 data transmission (A+) interface (3.81mm terminal block)
3	485-B(T-)	RS485 data interface B end/RS422 data transmission (B-) interface (3.81mm terminal block)
4	(R+)	RS422 data receiving (A+) (3.81mm terminal block)
5	(R-)	RS422 data receiving (B-) interface (3.81mm terminal block)
6	PWR	Power indicator
7	DATA	Data sending and receiving indicator light
8	LINK	Network connection indicator
9	DC-IN	Power socket, default power supply 8~36V, recommended 12V/24V, cannot be powered by the power socket at the same time
10	VCC	Power terminal block, default 8~36V, recommended 12V/24V , cannot be powered by the power socket at the same time (3.81mm terminal block)
11	GND	Power terminal ground (3.81mm terminal)
12	Reload	Restore factory settings button, long press for 5~10 seconds to be effective
13	Ethernet	RJ45 network interface

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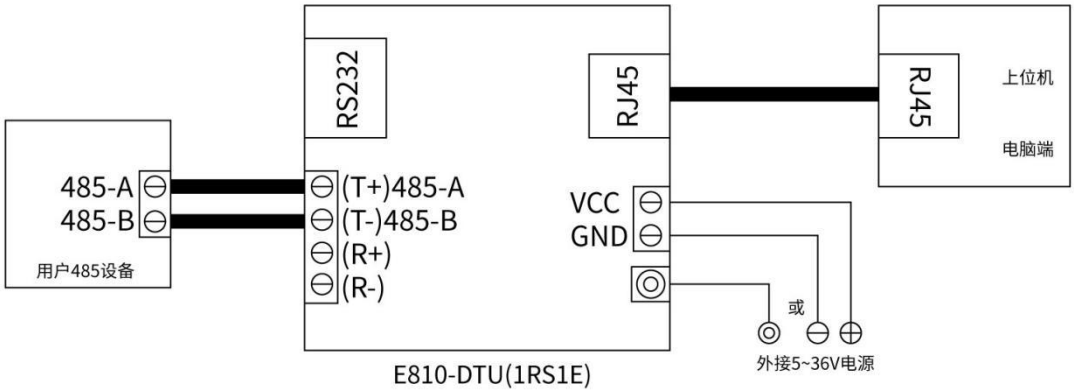
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2.3 Communication connection diagram

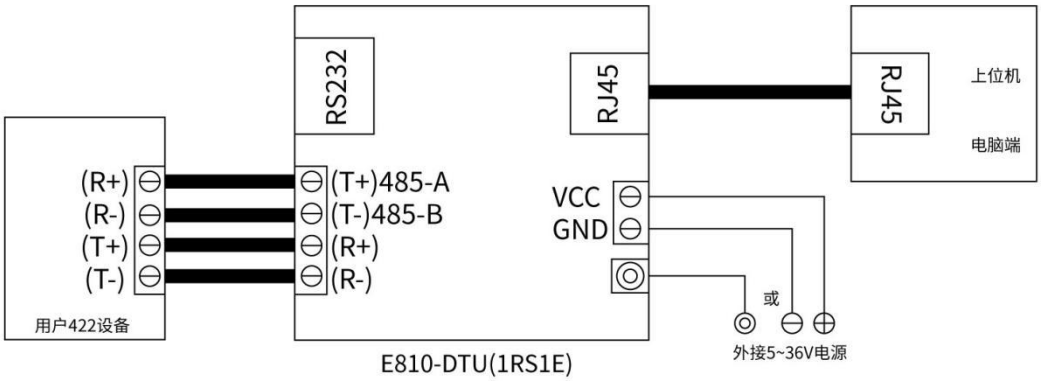
2.3.1 RS232 communication connection method



2.3.2 RS485 communication connection method



2.3.3 RS422 communication connection method



Note: When wiring as full-duplex (RS422) or half-duplex (RS485), in order to prevent signal reflection and interference, a matching resistor (parameter is 120 ohm 1/4W) must be connected at the end of the line!

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Chapter 3 Product Function Introduction

3.1 Basic network functions

3.1.1 Introduction to IP addresses

IP address refers to the Internet Protocol address, which indicates the identity of the module in the local area network. The IP address is unique in the local area network, so it cannot be repeated with other device addresses in the same local area network. The E820-TTL-02 module supports two IP acquisition methods: static IP and DHCP.

- Static IP

Static IP requires manual setting by the user. During the setting process, please remember to write the IP, subnet mask and gateway at the same time. Static IP is suitable for LANs without DHCP Server or networks with fixed IP addresses for LAN communication.

- DHCP

The main function of DHCP is to dynamically obtain IP address, gateway address, and NDS server address information from the gateway host (with DHCP server). Through DHCP, users can save the tedious steps of manually setting IP addresses, and avoid the problem of LAN IP address conflicts caused by manual IP address settings.

Note : Usually computers do not have DHCP Server function. When E820-TTL-02 is set to DHCP and directly connected to the computer, it will be in a state of waiting for the IP address to be assigned, resulting in failure of normal transparent transmission.

3.1.2 Subnet Mask Introduction

A subnet mask is a type of code used to indicate which network the host indicated by the IP address is in. A subnet mask cannot exist alone, it needs to be used in conjunction with an IP address to divide an IP address into two parts: the network address and the host address.

The subnet mask is a 32-bit address. For class A addresses, the default subnet mask is 255.0.0.0, for class B addresses it is 255.255.0.0, and for class C addresses it is 255.255.255.0. For example, for our commonly used class C addresses, the capacity of IPs in the subnet is $2^8 = 256$, but since all 0s and all 1s in an IP address are special IP addresses, the number of available IPs in a class C subnet mask is 254.

3.1.3 Gateway Introduction

A gateway is also called an internetwork connector. It enables the interconnection between two networks. If the device is connected to a router, the gateway is the router IP address. The device can access another network (or LAN) connected to the gateway through the gateway.

3.1.4 DNS Introduction

DNS stands for Domain Name System. It is a database that maps domain names to IP addresses on the World Wide Web (www).

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After the device uses the correct DNS server, it can exchange data with the external network (World Wide Web) server through the network domain name.

3.2 Serial port function

3.2.1 Introduction to serial port parameters

The basic parameters of the serial port include: baud rate, data bit, stop bit, check bit, and flow control switch.

- Baud rate: Serial port communication rate, the setting range is: 300bps~3Mbps, the baud rate supports custom baud rate.
- Data bits: The length of the data bits, the range is: 7, 8, 9.
- Stop position: The setting range is: 1~2
- Check bit: Check bit for data communication, supports three check modes: None, Odd, Even
- Flow control switch: The serial port supports flow control switch. When flow control is turned on, the sending and receiving of transmission data are controlled by RTS/CTS .

Note : By setting the serial port parameters and keeping them consistent with the serial port parameters of the serial port connected device, normal communication can be ensured.

3.2.2 Serial port framing mechanism

Since the data on the network end is transmitted in data frames, the data on the serial port needs to be framed and sent to the network end, which can transmit data more efficiently and quickly.

Serial port packaging time: The default is 10ms, which can be set in the range of 0~255.

Serial port packet length: The default is 1460 bytes, which can be set in the range of 0~1460.

Note: When both parameters are not 0, the packing rule is to pack data if any one of them is met;

When one of the parameters is 0, the packing rule is another non-zero value;

When two of the parameters are 0, the packaging rule uses the default parameter values.

3.3 SOCKET Function

The E810-TTL module can establish two sockets, namely Socket A1 and Socket B1. Socket A1 supports all types of TCP Client, TCP Server, UDP Client, and UDP Server. Socket B1 only supports three types of TCP Client, UDP Client, and UDP Server.

Two sockets run simultaneously. They can be connected to different networks at the same time for data transmission.

3.3.1 TCP Client Function

(1) TCP Client provides client connection for TCP network service. It actively initiates connection request to the server and establishes connection, which is used to realize the interaction between serial port data and server data. According to the relevant provisions of TCP protocol, TCP Client has the distinction between connection and disconnection, so as to ensure the reliable exchange of data. It is usually used for data interaction between devices and servers, and is the most commonly used network communication method.

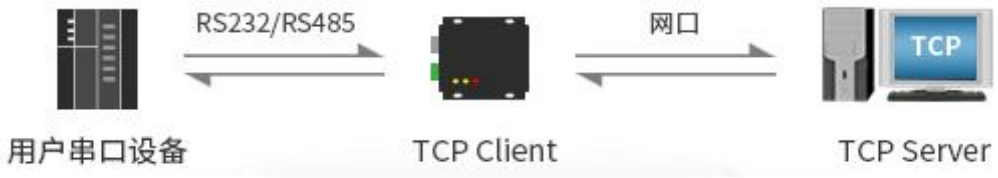
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(2) When E810-TTL attempts to connect to the server in TCP Client mode and the local port is 0, it initiates a connection with a random port each time.

(3) This mode supports short connection function.

(4) In the same LAN, if E810-TTL is set to a static IP, please keep the IP of E810-TTL and the gateway in the same network segment and set the gateway IP correctly, otherwise normal communication will not be possible.



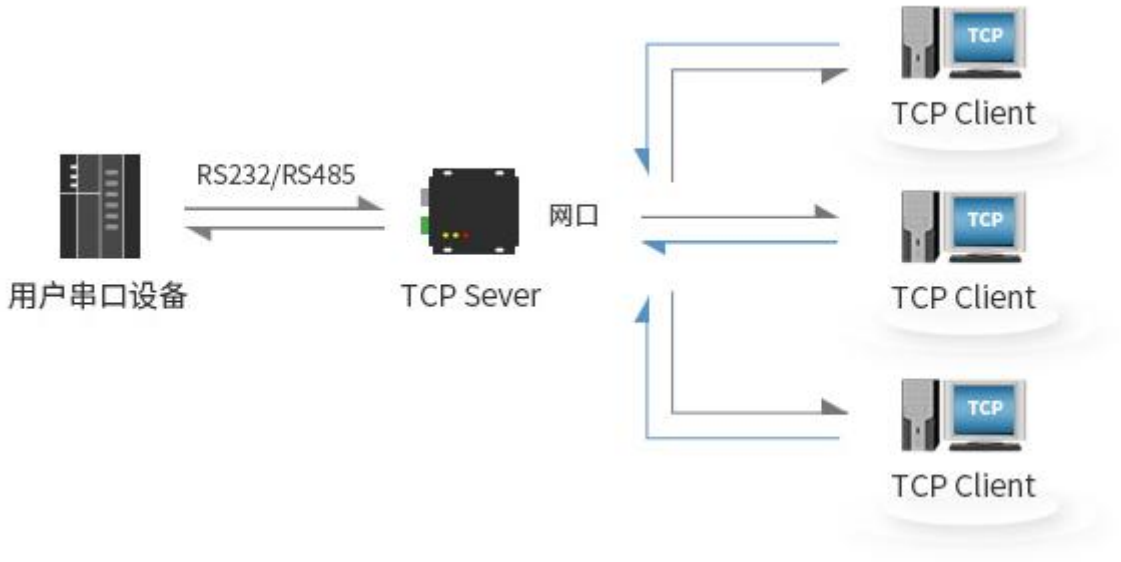
3.3.2 TCP Server Function

(1) TCP Server. In TCP Server mode, E810-TTL listens to the local port, accepts and establishes a connection for data communication when a connection request is sent, and when the E810-TTL serial port receives data, it will simultaneously send the data to all client devices that have established a connection with E810-TTL.

(2) Usually used for communication with TCP clients in a local area network. Suitable for scenarios where there is no server in the local area network and multiple computers or mobile phones request data from the server. Like TCP Client, it has the distinction between connection and disconnection to ensure reliable data exchange.

(3) When E810-TTL acts as a TCP Server, it can accept up to 6 client connections (the number of connections can be customized). The local port number is a fixed value and cannot be set to 0.

(4) The TCP Server can set the maximum number of connections. When the maximum number of connections is reached, you can choose to kick out old connections or prohibit the establishment of new connections according to the command configuration.



3.3.3 UDP Client Function

(1) UDP Client is a connectionless transmission protocol that provides simple, unreliable information transmission services for transactions. There is no connection establishment or disconnection. Data can be sent to the other party by specifying an IP and port. It is usually used in data transmission scenarios where there is no requirement for packet loss rate, the data packets are small and the

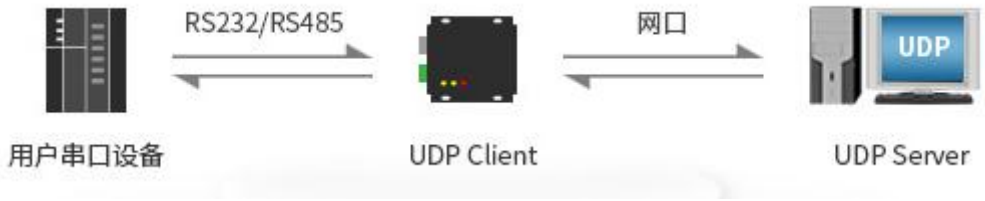
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sending frequency is fast, and the data needs to be transmitted to a specified IP.

(2) In UDP Client mode, E810-TTL will only communicate with the target port of the target IP. If the data does not come from this channel, it will not be received by E810-TTL.

(3) In UDP Client mode, if the destination address is set to 255.255.255.255, the UDP full-segment broadcast effect can be achieved, and broadcast data can also be received. The E810-TTL module supports broadcast within the network segment, such as the broadcast mode of xxx.xxx.xxx.255.

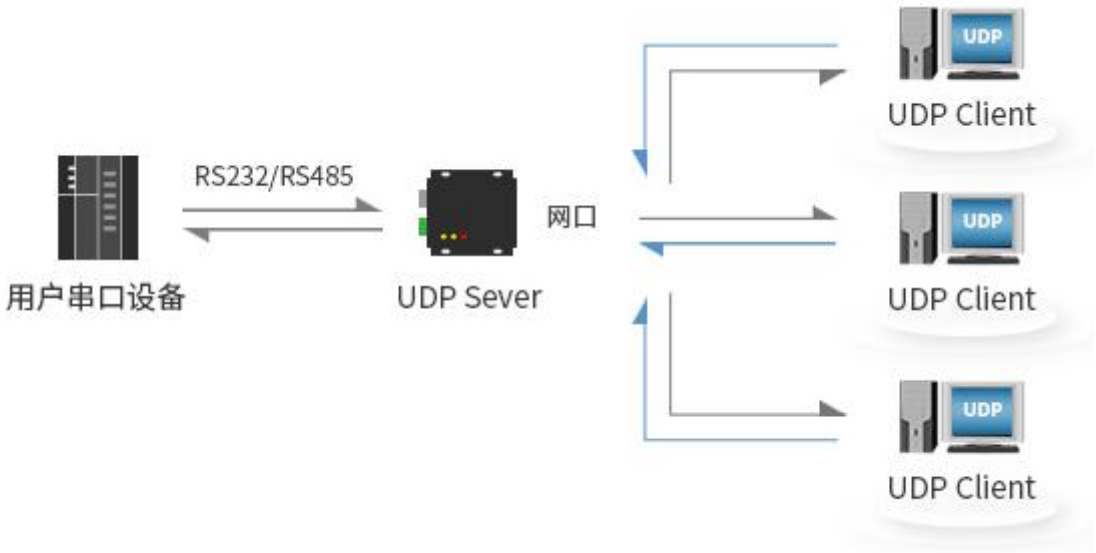


3.3.4 UDP Server Function

(1) UDP Server means that the source IP address is not verified on the basis of ordinary UDP. After receiving each UDP data packet, the target IP is changed to the data source IP and port number. When sending data, it is sent to the IP and port number of the most recent communication.

(2) This mode is usually used in data transmission scenarios where multiple network devices need to communicate with the module and do not want to use TCP due to the high speed and frequency.

Note : UDP Server cannot actively send data. It can only send data to the IP and port with which data was recently exchanged after receiving the data.



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3.4 Features

3.4.1 Web page configuration

The module can be accessed through a browser to perform web page configuration. When accessing the web page, the access end and the module need to be in the same LAN. After entering the user name and password, enter the web configuration page.



3.4.2 Heartbeat Packet Function

In the network transparent transmission mode, users can choose to let E810-TTL send heartbeat packets. Heartbeat packets can be sent to the network server or to the serial device, but not at the same time.

The main purpose of sending to the network end is to maintain the connection with the server. It is only effective in TCP Client and UDP Client modes.

In applications where the server sends fixed query commands to the device, in order to reduce communication traffic, the user can choose to send a heartbeat packet (query command) to the serial port device instead of sending the query command from the server.

The E810-TTL module supports custom heartbeat packets with a maximum length of 40 bytes.

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3.4.3 Registration package function

In the network transparent transmission mode, the user can choose to let the module send a registration package to the server. The registration package is to allow the server to identify the data source device, or as a password to obtain server function authorization. The registration package can be sent when the module establishes a connection with the server, or it can be spliced into the registration package data at the front end of each data packet as a data packet. The data of the registration package can be a MAC address or a custom registration data, where the custom registration package setting content is up to 40 bytes.

Establishing a connection and sending a registration packet is mainly used to connect to a server that requires registration.

Data carrying registration package: The data sent is connected to the registration package at the front end of the data, which is mainly used for protocol transmission.

The registration packet mechanism is only applicable to TCP Client and UDP Client, and is invalid under TCP Server and UDP Server.



Figure 5-1 Sending MAC when connecting



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Figure 5-2 Sending custom data when connecting



Figure 5-3 Sending MAC in each packet



Figure 5-4 Sending custom data in each packet

3.4.4 Transparent Cloud Function

The transparent cloud function mainly solves the open platform for data interaction between devices, devices and software configuration tools, and devices and servers. Users can enable the transparent cloud function through instructions, and register devices and interact with data according to the relevant usage methods of the Ebyte Cloud Platform. For details, please refer to the "Ebyte Cloud Platform Transparent Transmission Guide".



3.4.5 Short connection function

The use of TCP short connections is mainly to save server resources and is generally used in multi-point to point scenarios. Using short connections can ensure that all existing connections are useful connections, without the need for additional control measures to screen.

The TCP short connection function is used in TCP Client mode. After the short connection function is turned on, if the serial port

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or network port does not receive data within the set time, the connection will be automatically disconnected. The short connection function is turned off by default, and the disconnection time can be set after the function is turned on. The setting range is 2~255S.

3.4.6 KeepAlive Function

Keep-Alive is a mechanism for detecting dead connections in TCP connections. When the user does not send any data, the TCP link will periodically send "Keep-Alive" information to maintain idle links and avoid dead connections consuming unnecessary system resources. This setting is effective under TCP, and users can customize the Keep-Alive switch and other parameters.

Keepalive parameter description:

time: the number of seconds after which the TCP link starts a detection message without any data packet transmission;

intv: the time interval between the previous detection message and the next detection message;

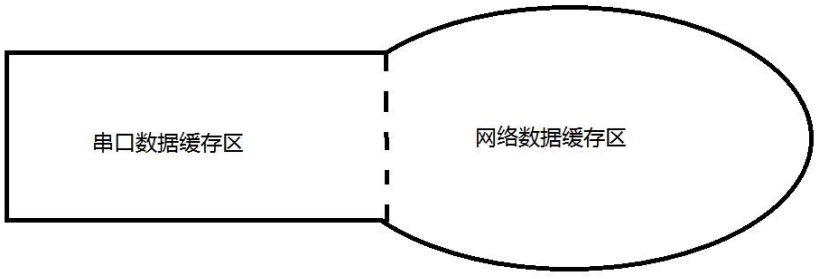
probes: The maximum number of probe failures. When the sniffing fails to reach this number, the TCP connection will be disconnected.

3.4.7 Timeout restart function

The timeout restart (no data restart) function is mainly used to ensure the long-term stable operation of E810-TTL. When the network port does not receive data for a long time, or the network does not receive data for a long time, E810-TTL will restart after exceeding the set time, so as to avoid abnormal conditions affecting communication. The time for the timeout restart can be set through the web page. The normal working time of this function is set to 60~65535S, and the default value is 3600S. 0 is closed. When the setting is out of range, it returns to the default value.

3.4.8 Clear cache function

When the TCP connection is not established, the data received by the serial port will be placed in the buffer area. The E810-TTL serial port receiving buffer is 2Kbyte. When the TCP connection is established, the network buffer data can be set to be cleared according to customer needs.



The device has two buffers, namely the serial port data buffer and the network data buffer. When the SOCKET clear buffer function is turned on, only the buffer data of the relevant SOCKET link will be cleared, and the serial port buffer data will not be cleared.

3.4.8 Modbus TCP to RTU function

The device supports conversion between Modbus RTU and Modbus TCP. After the function is enabled, the device receives data and detects whether the data meets the Modbus RTU (Modbus TCP) protocol requirements. After the verification is successful, the

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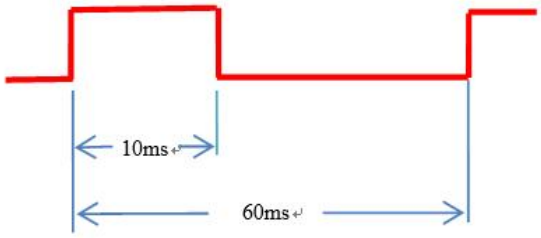
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Modbus RTU data will be converted to Modbus TCP, and the Modbus TCP data will be converted to Modbus RTU data.

3.4.9 Link/data sending and receiving indication function

Link indicates the network connection status of the module. In TCP mode, when the network is not connected, Link is off, and when the connection is established, Link is always on. In UDP mode, the Link indicator is always on.

The other is the data transmission indicator, which displays the data transmission status of the serial port of the module. When there is no data transmission on the serial port, the data transmission indicator light is off. When there is data transmission on the serial port, it flashes with a cycle of 60ms and the indicator light is on for 10ms.



3.4.10 Restoring factory settings

There are two ways to restore the module to factory settings: software factory settings and hardware factory settings. In the hardware factory settings mode, pull down the factory settings Restore pin for 5s to 15s, and then pull it high to restore the factory settings parameters.

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Chapter 4 Quick Use

4.1 Introduction to the software configuration tool

1. Search interface:

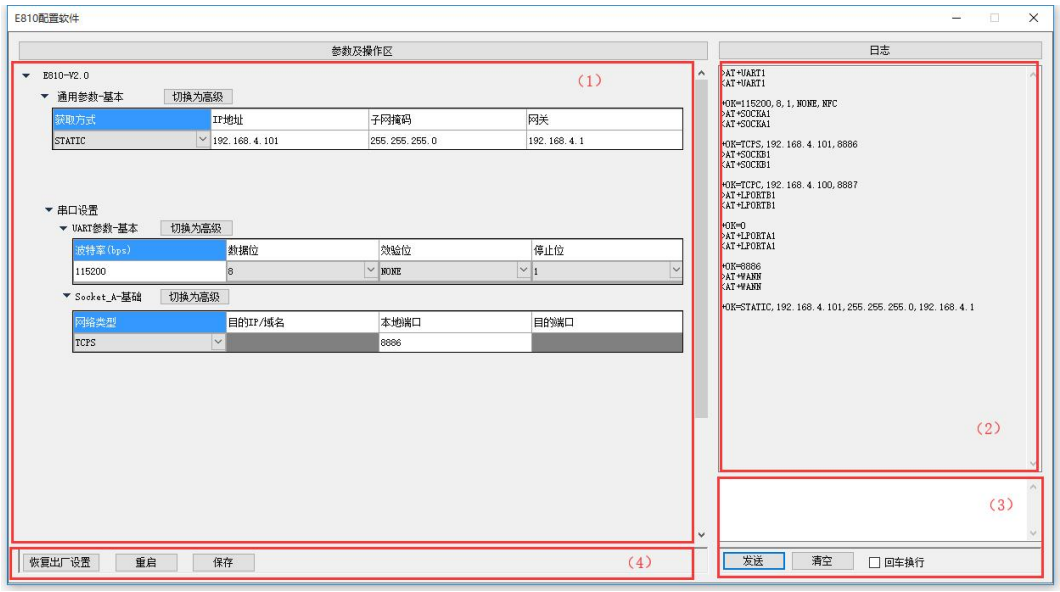


(1) Function menu area;

(2) Search the device class table area.

Note : The E810-TTL module supports cross-segment configuration. When configuring, do not set the PC end to the same IP address segment as the module. However, when performing UDP/TCP communication in the LAN, the IP address segment must be the same, otherwise communication will fail.

2. Double-click the device to be configured to enter the parameter configuration interface



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(1) Parameter configuration area;

(2) Log display area;

(3) Customized data/command sending area;

(4) Special function operation area.

Note: After configuring on the software configuration tool, you need to click Save and restart the module to take effect.

4.2 Default Parameters

IP acquisition type	STATIC
IP address	192.168.4.101
Subnet Mask	255.255.255.0
Gateway	192.168.4.1
DNS	61.139.2.69
Backup NDS	192.168.4.1
Serial port parameters	115200,8,NONE,1,NFC
Serial port packaging time	10 (milliseconds)
Serial port packet length	1460 (bytes)
Socket A1 Basic Parameters	TCPS,192.168.4.101,8886
Socket A1 Heartbeat Packet Mode	NET
Socket A1 heartbeat packet content	0 (seconds), turn off the heartbeat packet function
Socket A1 Registration Packet Mode	heartbeat msg
Socket A1 Registration Pack Time	closure
Socket A1 Registration Pack Contents	regist msg
Socket A1 short connection time	0 (seconds), turn off the short connection function
Socket A1 keepalive parameters	time/inteval/probes = 10 (seconds)/5 (seconds)/30 (times)
Socket A1 clear cache function	OFF
Socket B1 Basic Parameters	TCPC,192.168.4.100,8887
Socket B1 Heartbeat Packet Mode	NET
Socket B1 heartbeat packet time	0 (seconds), turn off the heartbeat packet function
Socket B1 heartbeat packet content	heartbeat msg
Socket B1 Registration Packet Mode	closure
Socket B1 Registration Pack Contents	regist msg
Socket B1 short connection time	0 (seconds), turn off the short connection function

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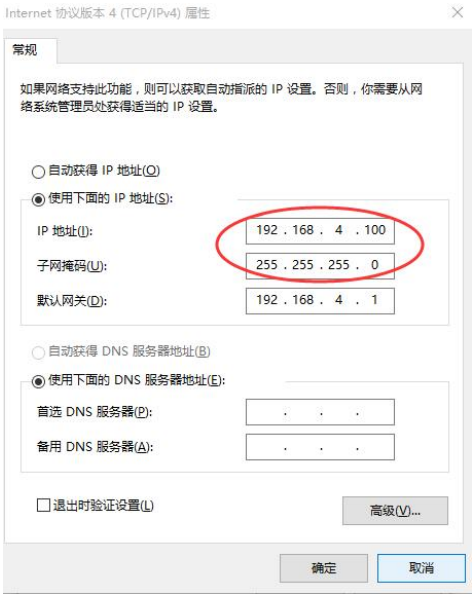
Socket B1 keepalive parameters	time/inteval/probes = 10 (seconds)/5 (seconds)/30 (times)
Socket B1 clear cache function	OFF
Cloud transparent transmission switch	OFF
Maximum number of connections allowed by the TCP server	6 (pcs)
Intranet discovery port	1901
Password discovery on the intranet	www.cdebyte.comwww.cdebyte.com
Web page port	80
Web login username/password	admin/admin
Command echo	OFF
Timeout restart time	3600 (seconds)

4.3 SOCKET Usage Instructions

Preparation before use:

1. Set the IP address of the PC to be the same as that of the E810-TTL module and the PC, and the subnet mask to be the same. For example, the IP address of the PC is 192.168.4.100, and the IP address of the module is 192.168.4.101.

PC configuration:



Module side configuration:



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1.1.1 TCP Client Usage Instructions

1. Open the PC network debugging assistant. Here we take "Wildman Network Debugging Assistant" as an example. Set the protocol type to TCP Server, and set the local IP and port to 192.168.4.100, 8886 respectively.

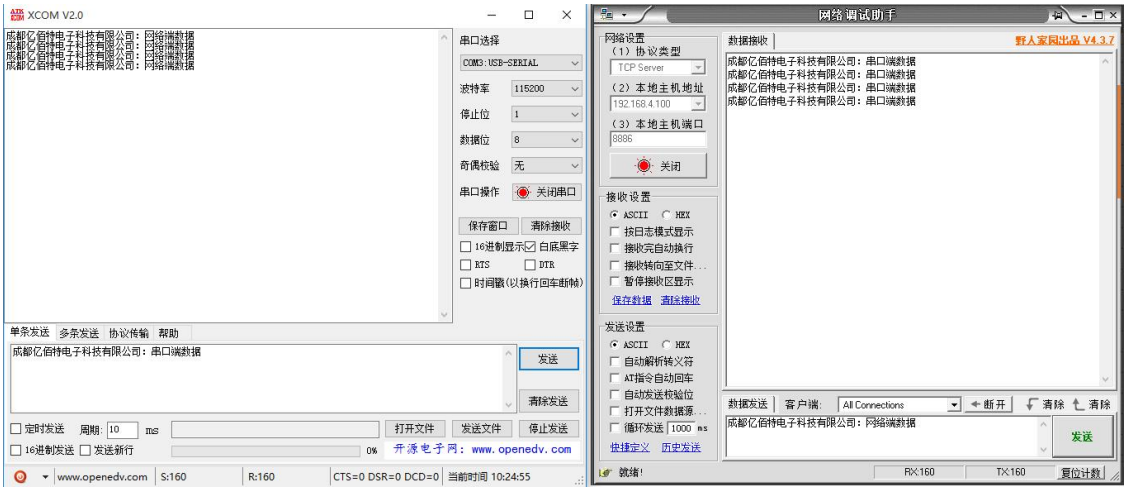


2. Set the device SOCKET A1 network type to TCPC (TCP Client), the destination IP to 192.168.4.100, the local port to 0 (random port), and the destination port to 8886. Click Save and restart the module.

Socket_A-基础 切换为高级

网络类型	目的IP/域名	本地端口	目的端口
TCPC	192. 168. 4. 100	0	8886

3. Open the serial port assistant, select the correct COM port and baud rate, wait for the device to connect to the TCP Server, and perform a communication test with the "Network Debug Assistant".



1.1.2 TCP Server Usage Instructions

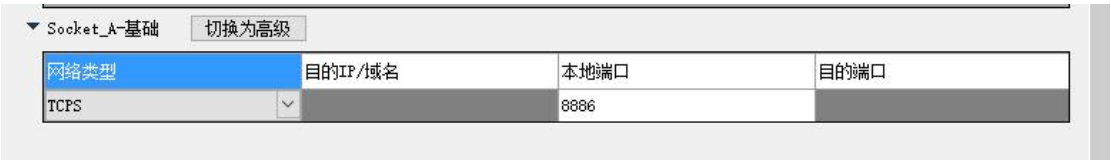
1. Set the "Network Debug Assistant" to TCP Client, the remote host IP to 192.168.4.101, and the remote host port number to 8886.

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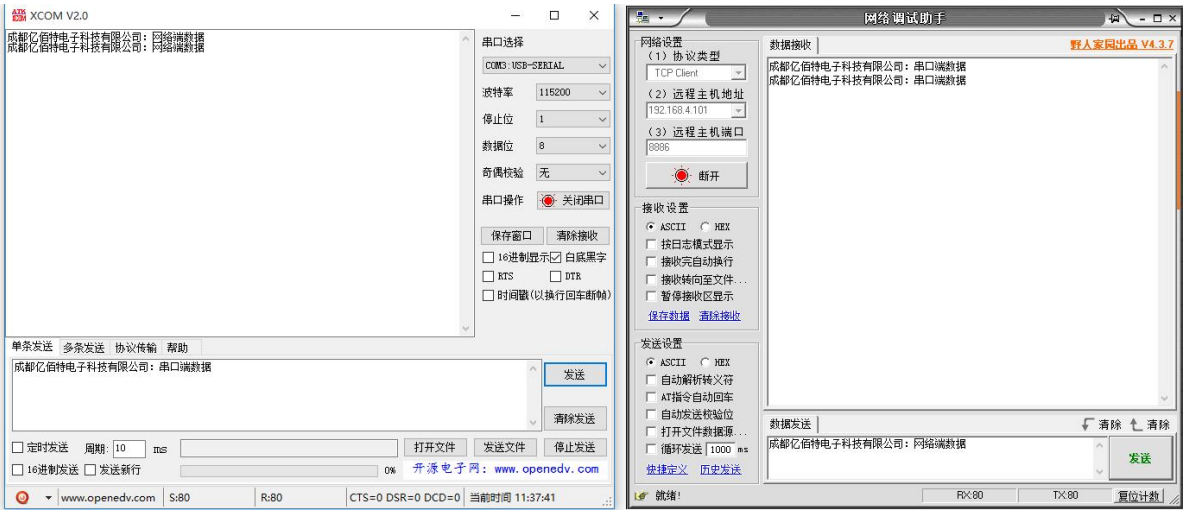
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2. Set the network type of device SOCKET A1 to TCPS (TCP Server) and local port 8886. Click Save and restart the module.



3. Open the serial port assistant, select the correct COM port and baud rate, click "Network Debug Assistant" to connect, and perform a communication test after connecting to the device.



1.1.3 UDP Client User Guide

1. Set the "Network Debug Assistant" to UDP (this software configuration tool does not distinguish between UDP Client and UDP Server), the local host IP to 192.168.4.100, and the local host port number to 8887.

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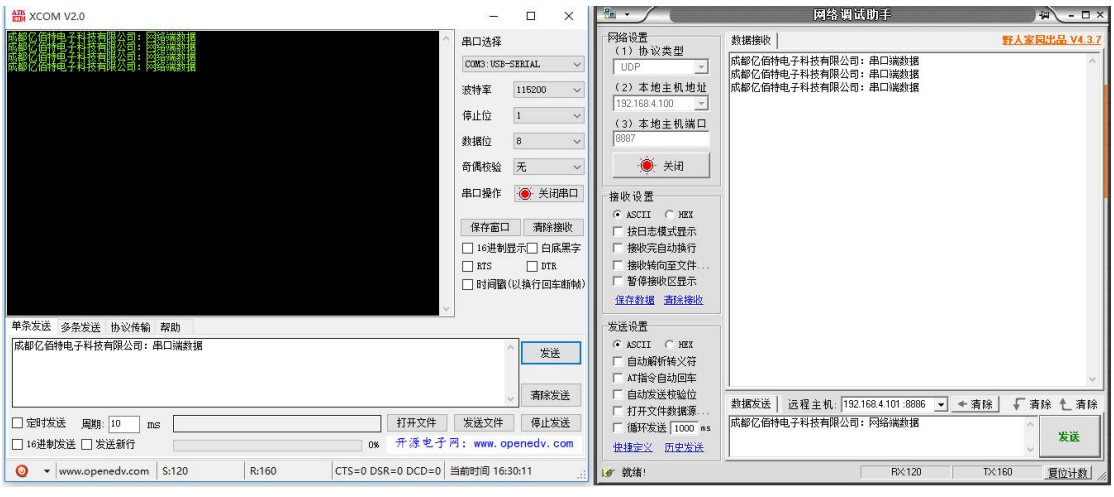
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2. Set the device SOCKET A1 network type to UDPC (UDP Client), the target IP to 192.168.4.100, and the target port to 8887. Click Save and restart the module.

网络类型	目的IP/域名	本地端口	目的端口
TCPC	192.168.4.100	8886	8887

3. Open the serial port assistant, select the correct COM port and baud rate, click "Network Debug Assistant" to open, and perform communication test.



1.1.4 UDP Server Usage Instructions

1. Set the "Network Debug Assistant" to UDP (this software configuration tool does not distinguish between UDP Client and UDP Server), the local host IP to 192.168.4.101, the local host port number to 8886, and the remote host to 192.168.4.101:8887.

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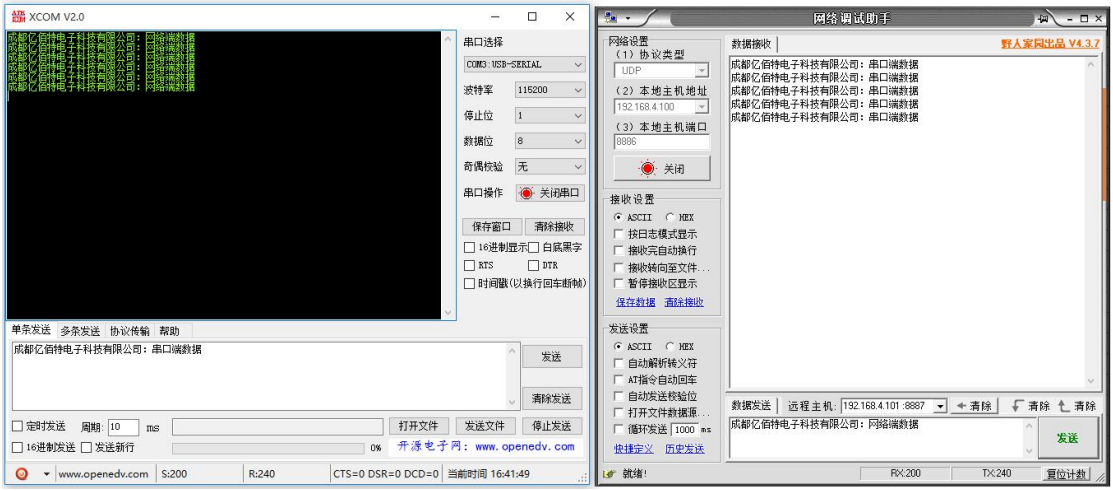
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2. Set the network type of device SOCKET A1 to UDPS (UDP Server), local IP to 192.168.4.100, and local port to 8887. Click Save and restart the module.

网络类型	目的IP/域名	本地端口	目的端口
UDPS	192.168.4.100	8887	8886

3. Open the serial port assistant, select the correct COM port and baud rate, click "Network Debug Assistant" to open, and perform communication test.



4.4 WEB Introduction

The module supports web page configuration. Users can use any browser to enter the module IP address and port (the default browser port is 80) and enter the web page after successful login. As shown in the figure:

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Select one or more pages to browse and configure parameters according to specific needs (taking serial port parameters as an example).



After filling in the parameters correctly, click Save Settings.

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The page will automatically jump to the module management page. After clicking Restart Module, the module will restart and the set parameters will take effect.



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Chapter 5 Frequently Asked Questions

5.1 The transmission distance is not ideal

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

5.2 Modules are vulnerable to damage

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

5.3 Bit Error Rate is Too High

- There is interference from the same frequency signal nearby. Stay away from the interference source or change the frequency or channel to avoid interference.
- The clock waveform on SPI is not standard . Check whether there is interference on the SPI line . The SPI bus line should not be too long.
- An unsatisfactory power supply may also cause garbled characters, so the reliability of the power supply must be ensured;
- Extension cables or feeder cables that are of poor quality or are too long can also cause a high bit error rate.

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Chapter 6 Revision History

Version	Revision Date	Revision Notes	Maintainer
1.2	2025-05-22	Modified Versions	huaa

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