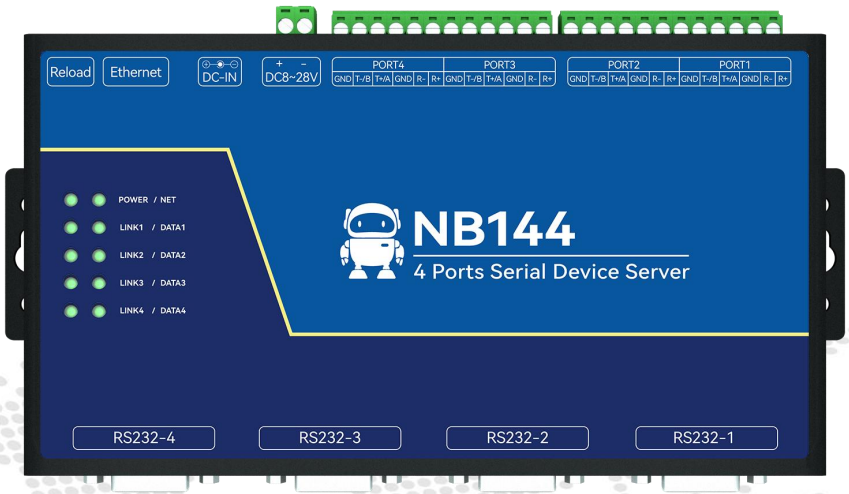
Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual



NB144
Four Serial Ports
Serial Server
User manual

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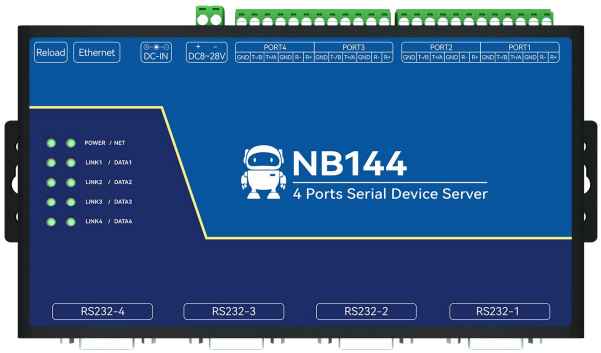
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1 Introduction



NB144 is a 4-way serial port server. It integrates the TCP/IP protocol stack inside, which can realize the two-way transparent transmission of data from the 4-way serial port to the Ethernet port. The device has the function of ModBus gateway, supports Modbus TCP to RTU, and supports automatic polling. The product adopts industrial-grade standard design to ensure the stability of the equipment in harsh working environments, and the rich indicator lights are used to feedback the different working states of the equipment.

Scope of application: This manual is applicable to four models NB144, NB144E, NB144S, NB144ES.

1.1Features

- Stable and reliable industrial design, high-level port protection;
- Abundant LED status indicators to quickly locate the working status of the device;
- Support Phoenix terminal or DC head power supply, DC 8-28V wide voltage input, support reverse polarity protection;
- Support terminal interface (RS485 /RS422) and standard DB9 interface (RS232);
- The baud rate supports 2400 ~ 115200 bps, and supports multiple verification methods;
- Support sending of various registration packets and heartbeat packets, such as connection sending M AC , connection sending customization, etc.;
- Support stable and reliable host computer and AT command configuration, independent configuration of four channels does not affect each other;
- Support DNS domain name resolution, domain name resolution server can be configured ;
- Support DHCP to dynamically obtain IP, subnet mask , default gateway, DNS server address;
- Support multiple working modes TCP client, TCP server, UDP client, UDP server, MQTT client, HTTP client ;
- 4 -way server mode can be turned on at the same time , supporting 12 clients to dynamically allocate and access, and a single server supports 13 clients to access,
- DP server mode that supports memory mode , records the UDP address of the last communication, and uses it as the destination address of the next communication;
- Support a variety of Modbus gateways, which can realize the active reporting of RTU devices, support the mutual conversion of Modbus TCP and Modbus RTU protocols, and can be configured as a storage mode to automatically collect device data, or a multi-host mode of one question and one answer;
- Support MQTT gateway function, fast access to Aliyun and standard MQTT3.1.1 servers (OneNET, Baidu Cloud, Huawei Cloud, etc.);
- Support Modb us data to actively report to TCP transparent transmission server, MQTT server and other servers;
- Support HTTP client mode, use HTTP /1.1 protocol, can be configured as two request methods : G ET and P OST
- can use TCP/IP direct communication or connect communication through " virtual serial port " ;
- Abundant independent LED status indicators, supporting links, network cables, data sending and receiving, etc .;
- Support the host computer to perform firmware upgrade or firmware switch through UDP or serial port ;
- NB144/NB144E supports 4-channel serial port independent hardware isolation.
- NB144E/NB144ES support POE power reception;

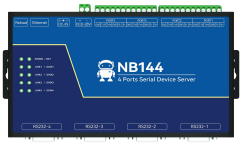
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2 Quick Start

2.1 Hardware List

1.laptop with RJ45 network port.
2.NB144 serial port server.
3.One DC12V 1A power adapter .
4.a network cable.
5.One USB to RS485 serial cable.
6.The specific preparation of hardware equipment is shown in the following:

		
PC	Ethernet cable	NB144
		
DC 12V1A	USB to RS45	wires

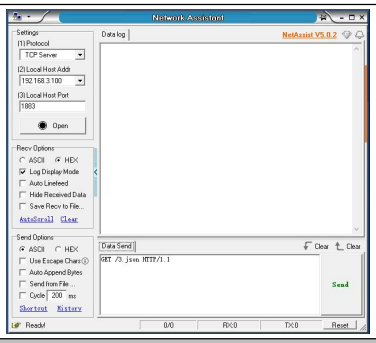
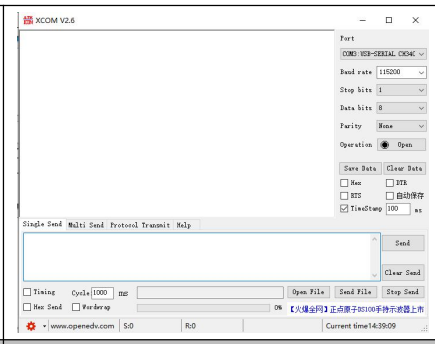
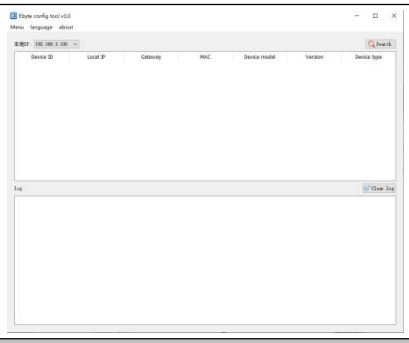
[Note] This chapter only uses one RS485 interface for demonstration, and the other interfaces can use the corresponding USB converter.

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2.2 Software

NB144 configuration tool download
Serial Debug Assistant- XCOM download
Network debugging assistant TCP/IP, download

		
TCP/IP tool	Serial Debug Assistant-XCOM	NB144 configuration tool

【Note】User can use other test tools to do test, and the operation steps are similar.

2.3 Device default parameter test steps

Different channels use the same IP but different local ports. For example, the factory-configured channel 1 corresponds to port 8001 and channel 4 corresponds to port 8004. For details, see the chapter " Channel and Serial Port Correspondence ".

2.3.1 Connecting Hardware



1. Connect the serial port server network port and the computer network port with a network cable ;
2. Use a USB to RS485 serial cable to connect the USB port of the computer to any RS 4 85 port of the serial server ;
3. Use the power adapter (DC 8 -28V) to connect the power supply to the device, and observe whether the indicator light is normal after power on , and refer to " indicator light description ";
4. After confirming that there is no problem with the status, proceed to the next step of configuration;

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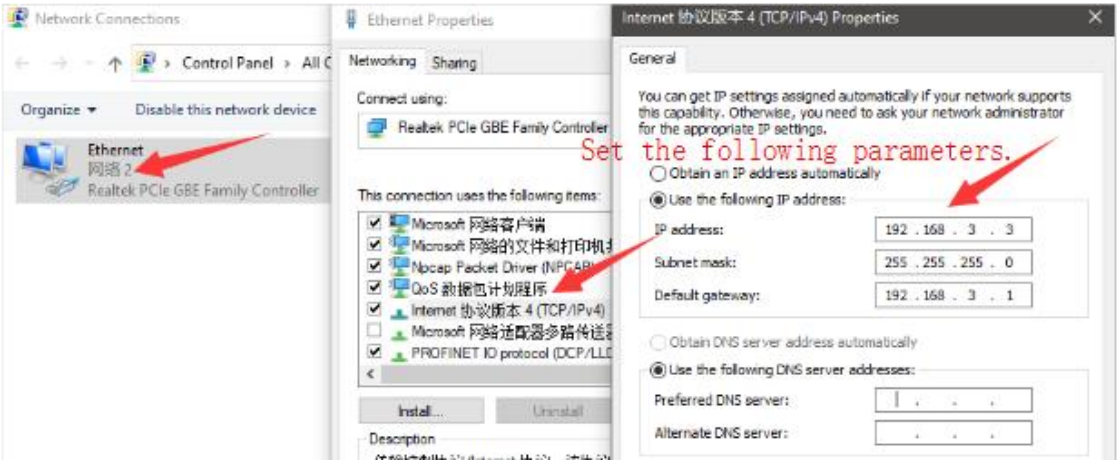
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2.3.2 Device parameter configuration

In order to enable users to quickly have a simple understanding of the serial server, we use the default parameters of the serial server to conduct data transparent transmission tests. The default parameters of N B1 44 serial port server equipment are shown in the table below.

project	default parameters
IP address	192.168.3.7
subnet mask	255.255.255.0
gateway	192.168.3.1
Channel 1 working mode	TCP_SERVER
Local port for channel 1	8 001
Serial baud rate	1 15200
Serial parameters	NONE/8/1/NONE

Make sure that the computer IP and serial server IP are in the same network segment and cannot conflict. The inspection method is shown in the figure below.



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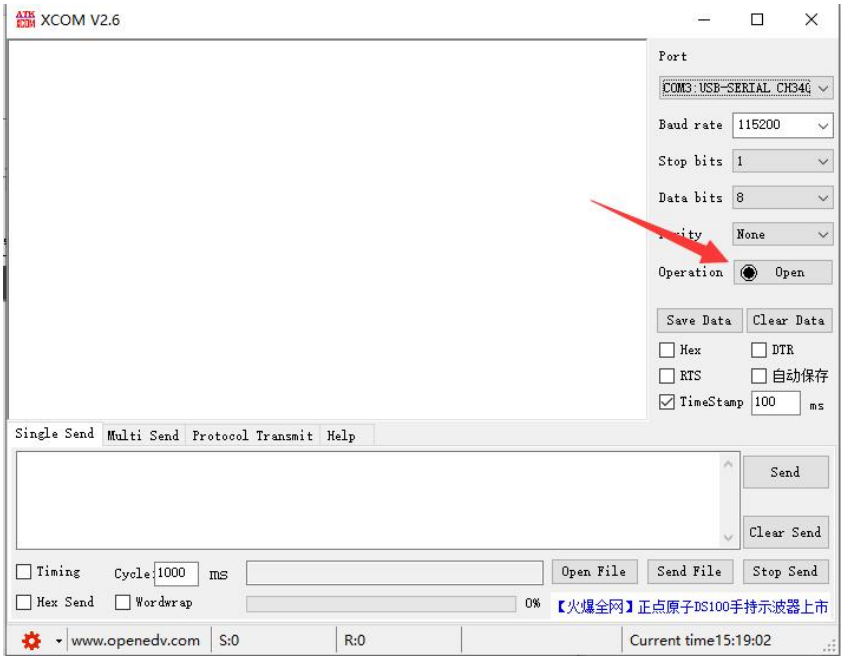
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2.3.3 Turn off the computer firewall

If the communication is unsuccessful, the user can try to turn off the firewall on the computer and try again.

2.3.4 Open the "Serial Debug Assistant"

Select the correct serial port number, configure the correct serial port parameters (115200-8N1), and open the serial port, as shown in the figure below:

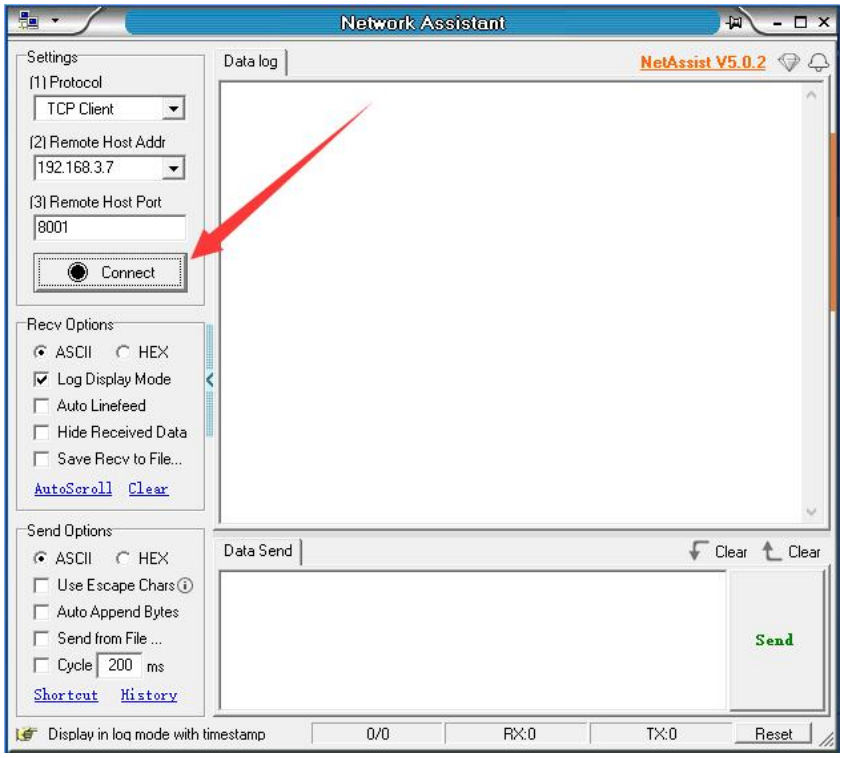


2.3.5 Open network assistant

Select the "TCP client " mode, configure the remote IP as "1 92.168.3.7 ", and configure the remote port as "8 001 ", as shown in the figure below:

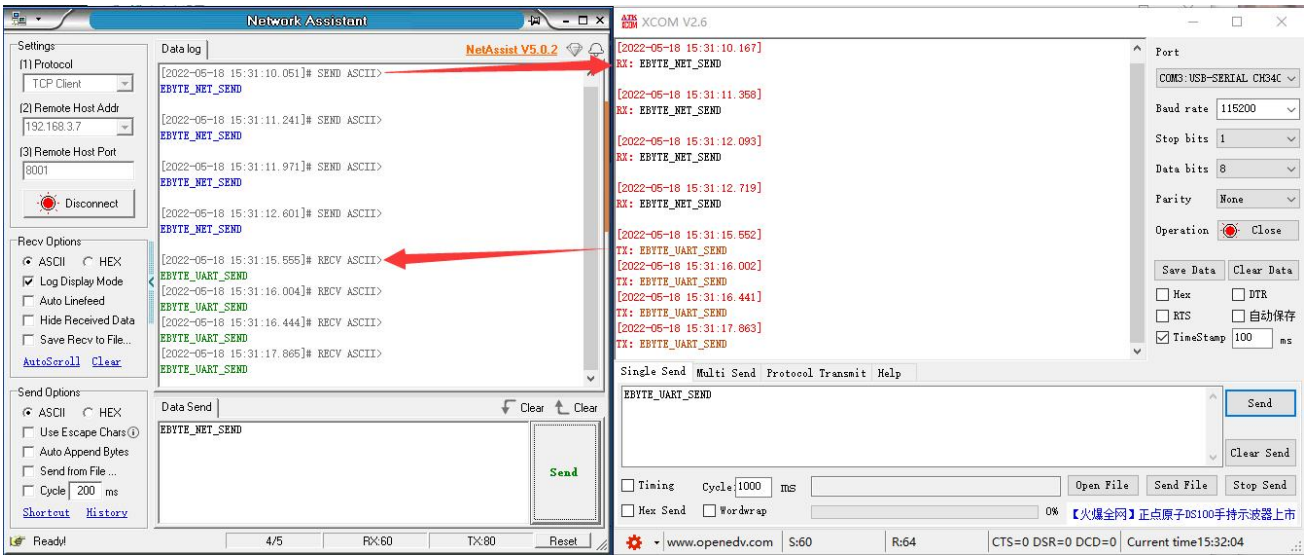
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2.3.6 Send and receive data test

Click the [Send] button on the " Network Debug Assistant " and " Serial Port Debug Assistant " respectively to realize the transparent transmission of network and serial port data, as shown in the figure below.



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3 Parameters

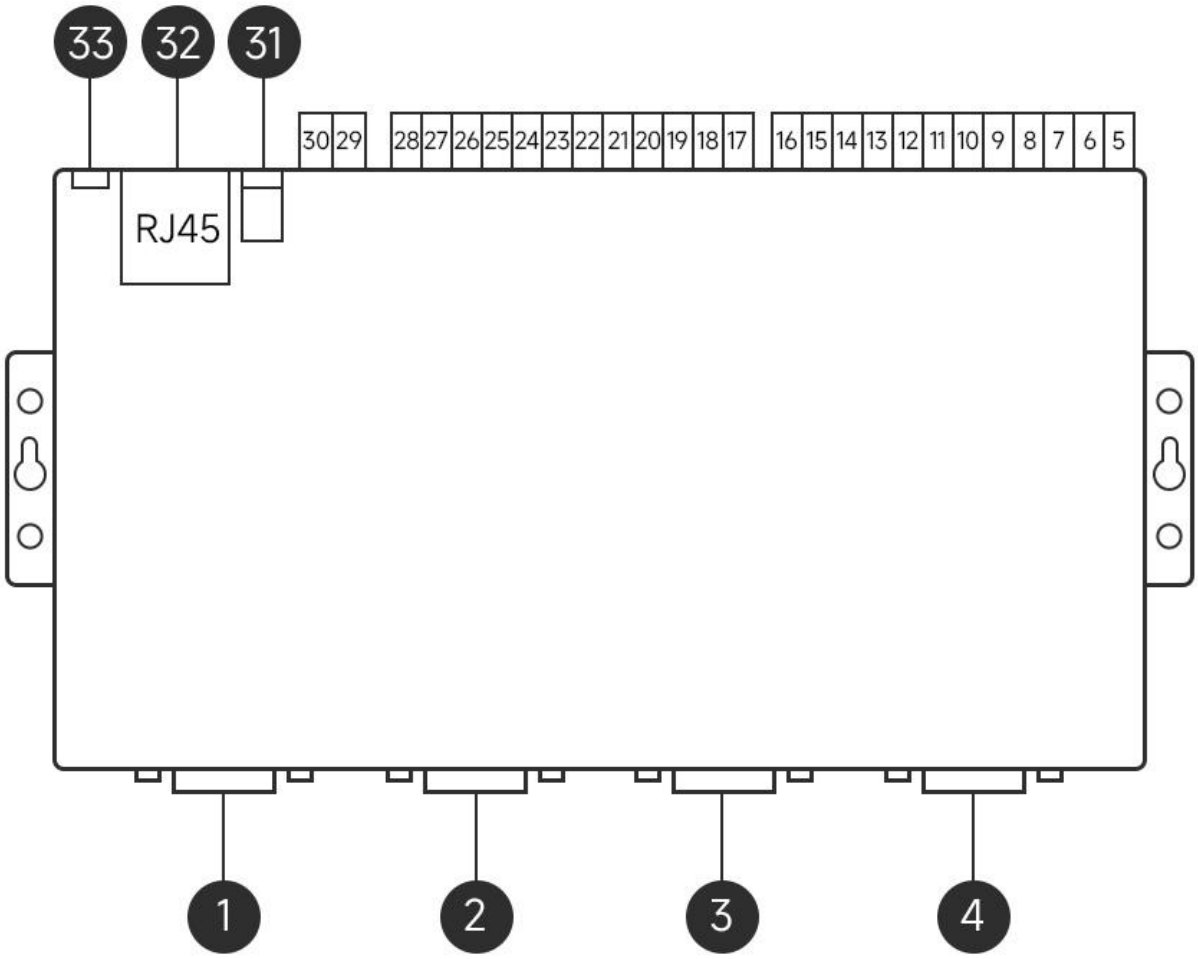
3.1 Technical parameters

project	interface	illustrate
power supply	Crimp terminal	DC 8～28 Power supply, used when not available; Crimp terminal: 5.08 mm Phoenix terminal; D C female head: straight plug-in round hole, outer diameter 5.5mm , inner diameter 2.0 mm ;
	D C female	
Network port	RJ45	10M
serial port	Channel 1 to Channel 4	Interface 1 (RS485 , 3.81mm Phoenix terminal, support isolation); Interface 2 (RS232 , standard RS232 line sequence D B9 female); Interface 3 (RS 422 , 3.81mm Phoenix terminal, support isolation);
Operating mode	TCP Server (default), TCP Client, UDP Server, UDP Client, HTTP Client , MQTT Client	
Network protocol	TCP/IP, UDP, MQTT , HTTP , IPv4, I CMP , APR , D HCP , D NS	
IP acquisition method	DHCP, static IP (default)	
DNS	Support, address can be configured	
configuration method	Parameter configuration host computer , AT command	
IP address	192.168.3.7 (customizable)	
local port	Channel 1~ 4 : 8 001-800 4 (can be customized)	
subnet mask	255.255.255.0 (customizable)	
gateway	192.168.3.1 (customizable)	
Serial cache	512 Bytes	
Serial packaging mechanism	512 Bytes	
Serial baud rate	2400 ~ 115200 bps (default 115200)	
data bit	8	
stop bit	1 (default), 2	
Check Digit	None (default), Odd, Even	
installation method	positioning hole	
Product Size	198 x 108x26.5mm (LxWxH) _ _	
product weight	5 30 g ± 5 g	
Working temperature and humidity	-40 ～ +85℃, 5% ～ 95%RH (no condensation)	
storage temperature and humidity	-40 ～ +105℃, 5% ～ 95%RH (no condensation)	

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3.2 Interface Description



serial number	name	Function	illustrate
1	RS232-4	Serial port 4 -RS232 interface	Standard DB9 female, 2 -TXD , 3 -RXD , 5-GND
2	RS232-3	Serial port 3 -RS232 interface	Standard DB9 female, 2 -TXD , 3 -RXD , 5-GND
3	RS232-2	Serial port 2 -RS232 interface	Standard DB9 female, 2 -TXD , 3 -RXD , 5-GND
4	RS232-1	Serial port 1 -RS232 interface	Standard DB9 female, 2 -TXD , 3 -RXD , 5-GND
5	RS422-1-R+	Serial port 1-RS422 interface-R+	3.81mm Phoenix terminal
6	RS422-1-R-	Serial port 1-RS422 interface-R-	3.81mm Phoenix terminal
7	GND	Serial port 1 ground	3.81mm Phoenix terminal

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		terminal	
8	RS422-1-T+/A	Serial port 1-RS422 interface-T+ Serial port 1-RS485 interface A	3.81mm Phoenix terminal
9	RS422-1-T-/B	Serial port 1-RS422 interface-T- Serial port 1-RS485 interface B	3.81mm Phoenix terminal
10	GND	Serial port 1 ground terminal	3.81mm Phoenix terminal
11	RS422-2-R+	Serial port 2-RS422 interface-R+	3.81mm Phoenix terminal
12	RS422-2-R-	Serial port 2-RS422 interface-R-	3.81mm Phoenix terminal
13	GND	Serial port 2 ground terminal	3.81mm Phoenix terminal
14	RS422-2-T+/A	Serial port 2-RS422 interface-T+ Serial port 2-RS485 interface A	3.81mm Phoenix terminal
15	RS422-2-T-/B	Serial port 2-RS422 interface-T- Serial port 2-RS485 interface B	3.81mm Phoenix terminal
16	GND	Serial port 2 ground terminal	3.81mm Phoenix terminal
17	RS422-3-R+	Serial port 3-RS422 interface-R+	3.81mm Phoenix terminal
18	RS422-3-R-	Serial port 3-RS422 interface-R-	3.81mm Phoenix terminal
19	GND	Serial port 2 ground terminal	3.81mm Phoenix terminal
20	RS422-3-T+/A	Serial port 3-RS422 interface-T+ Serial port 3-RS485 interface A	3.81mm Phoenix terminal
twenty one	RS422-3-T-/B	Serial port 3-RS422 interface-T- Serial port 3-RS485 interface B	3.81mm Phoenix terminal
twenty two	GND	Serial port 3 ground terminal	3.81mm Phoenix terminal
twenty	RS422-4-R+	Serial port 4-RS422	3.81mm Phoenix terminal

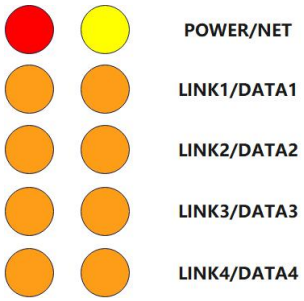
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three		interface-R+	
twenty four	RS422-4-R-	Serial port 4-RS422 interface-R-	3.81mm Phoenix terminal
25	GND	Serial port 4 ground terminal	3.81mm Phoenix terminal
26	RS422-4-T+/A	Serial port 4-RS422 interface-T+ Serial port 4-RS485 interface A	3.81mm Phoenix terminal
27	RS422-4-T-/B	Serial port 4-RS422 interface-T- Serial port 4-RS485 interface B	3.81mm Phoenix terminal
28	GND	Serial port 2 ground terminal	3.81mm Phoenix terminal
29	-	Negative pole of DC 8-28 V	DC 8 -28 V , 5.08 mm Phoenix terminal;
30	+	Positive pole of DC 8-28 V	DC 8 -28 V , 5.08 mm Phoenix terminal;
31	DC -IN	DC power input	DC 8-28V ; Outer diameter 5.5mm , inner diameter 2.0 mm in-line round hole;
32	Ethernet _	Ethernet interface	Standard R J45 Ethernet interface
33	re load	factory reset button	After long pressing for 5s, N ET is always on for 5s, and the device is restored to factory

Warning: Only one of the two power supply ports can be used in one time.

3.3Indicator light description



Label	Function	illustrate
POWER	Power Indicator	Connect to the power supply, light up;
N ET	Running lights	Not connected to the network cable: 1 00 ms on, 9 00 ms off, flashing periodically; Connecting the network cable: 1s is a cycle of flashing;

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LINK 1	Channel 1 Status Indicator	No link connection: the indicator light is off; The link connection is successful: the indicator light is always on; UDP mode: the indicator light is always on;
DATA1	Channel 1 data indicator	Data sending and receiving: flashes when the network or serial port sends and receives data;
LINK2	Channel 2 status indicator	No link connection: the indicator light is off; The link connection is successful: the indicator light is always on; UDP mode: the indicator light is always on;
DATA2	Channel 2 status indicator	Data sending and receiving: flashes when the network or serial port sends and receives data;
LINK3	Channel 3 Status Indicator	No link connection: the indicator light is off; The link connection is successful: the indicator light is always on; UDP mode: the indicator light is always on;
DATA3	Channel 3 Status Indicator	Data sending and receiving: flashes when the network or serial port sends and receives data;
LINK4	Channel 4 status indicator	No link connection: the indicator light is off; The link connection is successful: the indicator light is always on; UDP mode: the indicator light is always on;
DATA4	Channel 4 status indicator	Data sending and receiving: flashes when the network or serial port sends and receives data;

[Note] The status of some special working mode indicator lights:

1.Restore the factory, NET is always on for 5s, and the rest of the indicators remain in the state until NET goes out and then goes out;

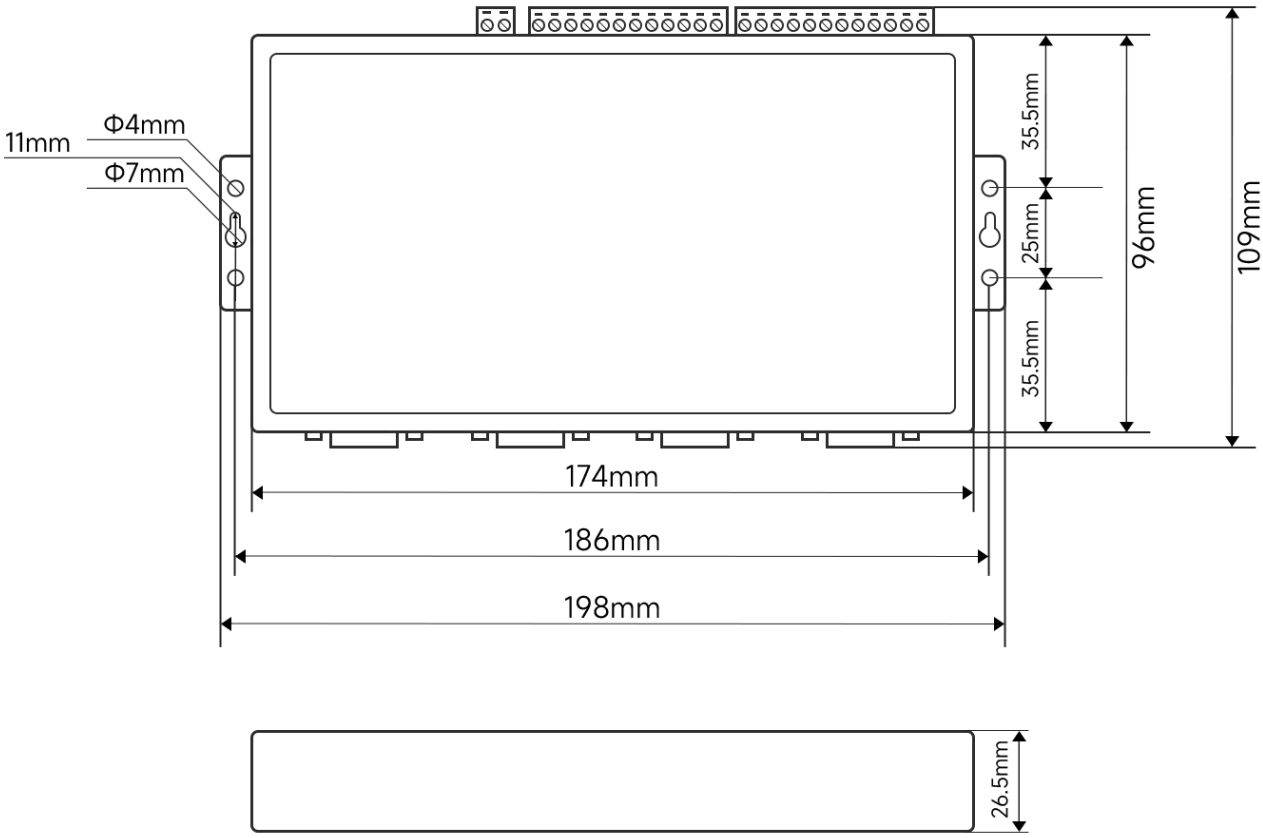
2.Wait for the firmware burning, and the other indicators except the power indicator will flash at a period of 50 ms until the upgrade file starts to be transferred, or the firmware burning wait is exited;

3.During the firmware burning operation, all the indicators except the power indicator will flash at a cycle of 500 ms until the upgrade is completed;

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3.4 Dimensions



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4 Functions

4.1 Correspondence between channel and serial port

Baud rate: 2400 , 4800 , 9600 , 14400 , 19200 , 38400 , 57600 , 76800 , 115200bps ;
Data bits: only 8 bits are supported;
Parity bit: support no parity (NONE), odd parity (ODD), even parity (EVEN);
Hardware flow control: not supported;

Channel	Serial Port	indicator light	serial protocol	Factory port, mode
channel 1	COM 1	P ORT1	RS485 , RS232 , RS422	8001 , TCPS
channel 2	COM 2	P ORT2	RS485 , RS232 , RS422	8002 , TCPS
channel 3	COM 3	P ORT3	RS485 , RS232 , RS422	8003 , TCPS
channel 4	COM 4	P ORT4	RS485 , RS232 , RS422	8004 , TCPS

4.2 Local network parameters

4.2.1 Local IP

STATIC (static IP) : users can define configuration IP , subnet mask, default gateway, domain name resolution server (D NS server);
DHCP (dynamic IP acquisition): The device logs in to the server to automatically obtain the IP address, subnet mask, gateway address, and DNS server address parameters assigned by the server and configure them for use;

4.2.2 DNS (domain name resolution)

When the user enters the domain name, the DNS server will be automatically queried, and the DNS server will retrieve the database to obtain the corresponding IP address. In the static IP mode , the user can customize the domain name resolution server to resolve private domain name server data . In this mode, the device automatically follows the domain name resolution server configured by the routing device, and the user only needs to modify the DNS server of the routing device without configuring the device.

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4.2.3 Network disconnection reconnection cycle

When the device detects that it is disconnected from the server, it periodically initiates a reconnection request, so the "disconnection reconnection time" will not affect the connection establishment time under normal circumstances. Users can customize the configuration request cycle, and the default is 5s.

4.2.4 Timeout restart (no data restart)

The device monitors data sending and receiving. If the device does not send and receive data for a long time, the device will automatically restart to ensure the stability of long-term work.

The default cycle of this function is 30 minutes, and the user can customize the cycle of restarting with timeout or no data.

4.3 Hardware factory reset

Reload pin of the device for 5s until the N ET indicator light stops flashing, keep the NET indicator on for 5s, and the device is restored to factory.

4.4 Device working mode

4.4.1 TCP Server

TCP Server is the TCP server. In TCP Server mode, the device listens to the local port, accepts the connection request from the client and establishes a connection for data communication. When the Modbus gateway function is turned off, the device sends the data received by the serial port to all client devices connected to the device.

The number of clients that can be accessed by the server is dynamically adjusted. First, ensure that each channel of the 4 channels can establish a complete communication link. In addition, the device also has 12 communication links for dynamic access. For example, if the device turns on the 4 -channel server mode, each The server can access 4 client devices, or if the device opens 1 server, the server can connect to 13 client devices. If the number of client devices exceeds the access number, the device will refuse to connect.

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4.4.2 TCP Client

TCP Client is the TCP client. When the device is working, it will actively initiate a connection request to the server and establish a connection to realize the interaction between serial port data and server data.
To use the client, you need to configure the IP address/domain name and target port of the target accurately .
4 channels can independently open 4 TCP clients.

4.4.3 UDP Server

UDP Server means that the device does not verify the source IP address of the data when using the UDP protocol to communicate. After receiving a UDP data packet, it saves the source IP address and source port of the data packet, and sets it as the target IP and port . , so the data sent by the device only sends data packets to the source IP address and port where the device received data last time . This mode is usually used in scenarios where multiple network devices communicate with this device, and the frequency is high, and the TCP Server cannot meet the conditions.
Using UDP Server requires the remote UDP device to send data first, otherwise the data cannot be sent normally.

[Note] In UDP mode, the data sent by the network to the device should be less than 5 12B it per packet, otherwise it will cause data loss .

4.4.4 UDP Client

UDP Client is a connectionless transmission protocol that provides transaction-oriented simple and unreliable information transmission services. There is no connection establishment and disconnection, and data can be sent to the other party only by configuring the destination IP and destination port. It is usually used in the data transmission scenario where there is no requirement for the packet loss rate, the data packet is small and the sending frequency is fast, and the data is to be transmitted to the specified IP.
In UDP Client mode, the device will only communicate with the configured (target IP and target port) remote UDP device .
In this mode, the destination address is set to 255.255.255.255, and the sending data will be

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broadcast on the entire network segment, but the sending and receiving devices need to ensure that the ports are consistent, and the device can also receive broadcast data .

[Note] In UDP mode, the data sent by the network to the device should be less than 5 12B it per packet, otherwise it will cause data loss.

4.4.5 HTTP client _

This mode can realize HTTP automatic package function, and provides two methods of GET and POST. Customers can configure URL, Header and other parameters by themselves, and the device will send the package to realize fast communication between serial port data and HTTP server. URL and Header It supports up to 128 bytes of data, and the 4 channels can independently open the HTTP client mode without affecting each other.

The HTTP request data should be smaller than the packet length (5 to 12 bytes), otherwise the device will divide the request data into multiple packets for request, resulting in abnormal request.

Configuration instructions, turn on the host computer, search for the device and enter the device configuration interface, configure the "network parameters" first, it is recommended to use the DHCP function, to avoid the device IP abnormality caused by wrong configuration (network segment error, IP conflict, etc.), it needs to be used in the configuration The channel of the HTTP function supports 4 channels to configure the HTTP client mode at the same time. Here is an example of requesting the "Baidu" webpage through GET (URL : empty , H EADER : Host : www.baidu.com , target domain name : www .baidu.com , target port: 8 0 , it is recommended to use a random port for the local port).

POST description , the header data configured as POST request method does not need to configure the header data with a separate data length (for example: Content-length: 2729), the device will automatically calculate the data length and group the packet to send, other header data needs to be manually configured, at most Support 1 28 bytes data configuration.

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4.4.6 MQTT client

Supports fast access to standard MQTT3.1.1 protocol servers (OneNET, Baidu Cloud, Huawei Cloud, user-built server types, etc.) and Alibaba Cloud servers, supports quality of service configuration (Qos 0, Qos 1), and supports ultra-long text Configuration, convenient and better access to network service operators (server address, three elements, subscription and publishing address support up to 128 characters configuration, Alibaba Cloud product key 64 characters).

For all configurations, refer to the following table to fill in the parameters:

parameter	Standard MQTT3.3.1	Baidu cloud	One NET
Equipment name (Client ID)	Client ID	DeviceKey	device ID
username (Device name)	User Name	IoTCoreId/DeviceKey	Product ID
password (Device secret)	Password _	DeviceSecret	Device Name/ User Password
PrductKey _	Alibaba Cloud parameters, can be left blank		
post topic	MQTT release topic address (dynamically generated by One NET)		
subscribe topic	MQTT subscription topic address (dynamically generated by One NET)		

【Note】

- Dynamically generating topic addresses can use the same parameters to achieve the effect of data return, for example: OneNET publishes and subscribes to the same topic address: 1 23456 to achieve data return;
- Due to the adjustment of the MQTT platform (Baidu Cloud, Huawei Cloud, OneNET), the connection cannot be made after filling in the parameters, and the platform rules shall prevail.

4.5 Channel port

random port:

TCP client, UDP client, HTTP client, MQTT client can configure the local port as 0 (use random local port), server mode cannot use random port, otherwise the client cannot establish the connection correctly (device is not correctly configured) port listening).

Using a random port connection can quickly re-establish the connection when the device is accidentally disconnected from the server, preventing the server from rejecting the connection due to four waved incomplete. It is recommended to use a random port in client mode.

When the device configures the TCP client, HTTP client, and MQTT client mode at AT , it will automatically configure a random port, which can be canceled by customization.

Static port:

Device fixed port (factory default: 8 001-800 4), TCP server mode device listens to the configuration port, accepts the connection request from the client and establishes a connection for data communication, and TCP client

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mode device fixed port initiates a connection request.

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5 Advanced Features

5.1 Heartbeat package and registration package

5.1.1 heartbeat packet

In client mode, users can choose to send heartbeat packets and customize the heartbeat packet time. The heartbeat packet can choose network heartbeat packet and serial port heartbeat packet. It supports hexadecimal and ASCII code sending. This heartbeat packet is not MQTT heartbeat. It needs to be closed when using MQTT client mode. MQTT heartbeat can only be set in the "MQTT parameter configuration" column. Configure "Heartbeat Period" in the next step. The content of the MQTT heartbeat packet is restricted by the protocol and cannot be configured. It is recommended not to configure it for less than 60s. For example, the Alibaba Cloud manual recommends using 120s.

Heartbeat packet sending mode:

1. The default is to turn off the heartbeat packet mode.
2. Serial mode -> The device sends heartbeat content to the serial bus according to the set heartbeat time interval.
3. Network port mode -> The device sends heartbeat content to the network port bus according to the set heartbeat time interval.

Customize the content of the heartbeat packet (support up to 40 bytes (ASCII) data, 20 bytes (HEX) data)

Customize the heartbeat packet sending time interval. When it is set to 0, the heartbeat packet function is turned off. When the value is greater than 0, the heartbeat packet function is turned on. When it is turned on, the range can be set: (1-65536) seconds, and the default value is 0.

5.1.2 registration package

In the client mode, the user can choose to send the registration package and customize the registration package time.

The registration package supports the following modes:

1. The MAC address (OLMAC) is sent when the network establishes a connection with the device.

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2. The data of the custom registration package (OLCSTM) is sent when the network establishes a connection with the device.
3. After the connection between the network and the device is established, the MAC address (EMBMAC) is added in front of each packet of data sent by the device to the network.
4. After the connection between the network and the device is established, each packet of data sent by the device to the network will be prepended with custom registration packet data (EMBCSTM).

Customize the content of the registration package (support up to 40 bytes (ASCII) data, 20 bytes (HEX) data)

[Note] When configuring the registration package, it is recommended not to use special characters (such as "," "\", "/", etc.), if you want to use it, it is recommended to use hexadecimal configuration.

5.2 short connection

In client mode, short network connections are supported (this function is disabled by default). TCP short connections are mainly used to save server resource overhead, and are generally used in multi-point (multi-client) to one-point (server) scenarios.

The TCP short connection function is applied in the TCP Client mode. After the short connection function is turned on, it only requests to connect with the server when sending information. After the connection is successful, the serial port does not receive data or the network port has no data to send and receive within the set time. The device will automatically disconnect.

When the short link hold time is set to 0, the short link function is disabled. When the setting range is (2-255) seconds, the short connection function is enabled, and the default hold time is 0 seconds (short connection is turned off).

5.3 Serial buffer cleaning

When the TCP connection is not established, the data received by the serial port will be placed in the buffer area. The serial port receiving buffer is 512 bytes. After the network connection is successful, you can choose to clear the serial port buffer or send the buffer through the network through configuration.

Enable: The device does not save the data received by the serial port before the connection is established.

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Disabled: After the connection is established, the network will receive the data buffered by the serial port .

5.4 Modbus gateway

5.4.1 Simple Protocol Conversion

Convert Modbus RTU data to Modbus TCP data, or convert Modbus TCP data to Modbus RTU data, and realize the mutual conversion between Ethernet Modbus data and serial port Modbus data.

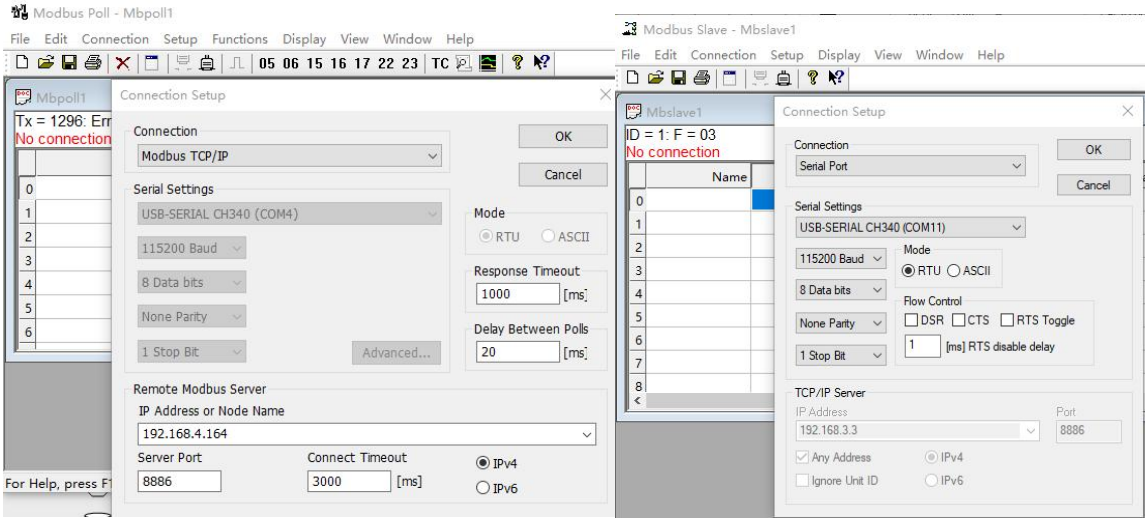
Simple protocol conversion can work in any mode (TCP client, TCP server, UDP client, UDP server, MQTT client). This gateway mode does not support multi-host operation. If you need multiple hosts, please use "storage gateway" and "multi-host mode".

Simple protocol conversion configuration:



Modbus Poll and Modbus Slave software debugging:

Software connection settings:

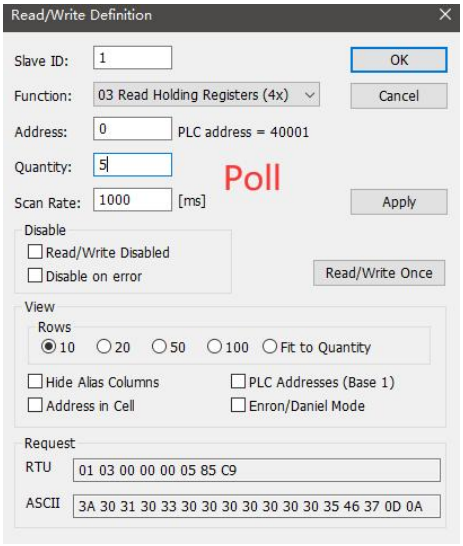


Software register reading and emulation configuration:

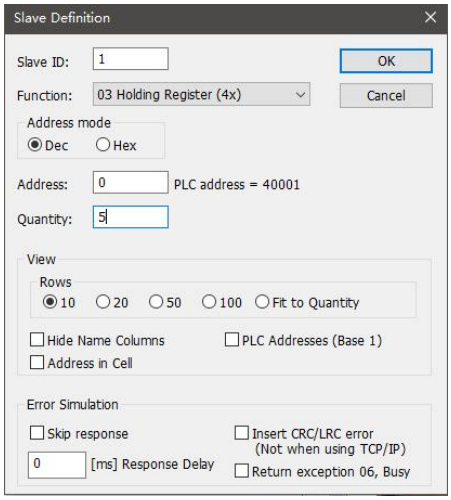
Poll menu selection Set up →Read/Write Definition

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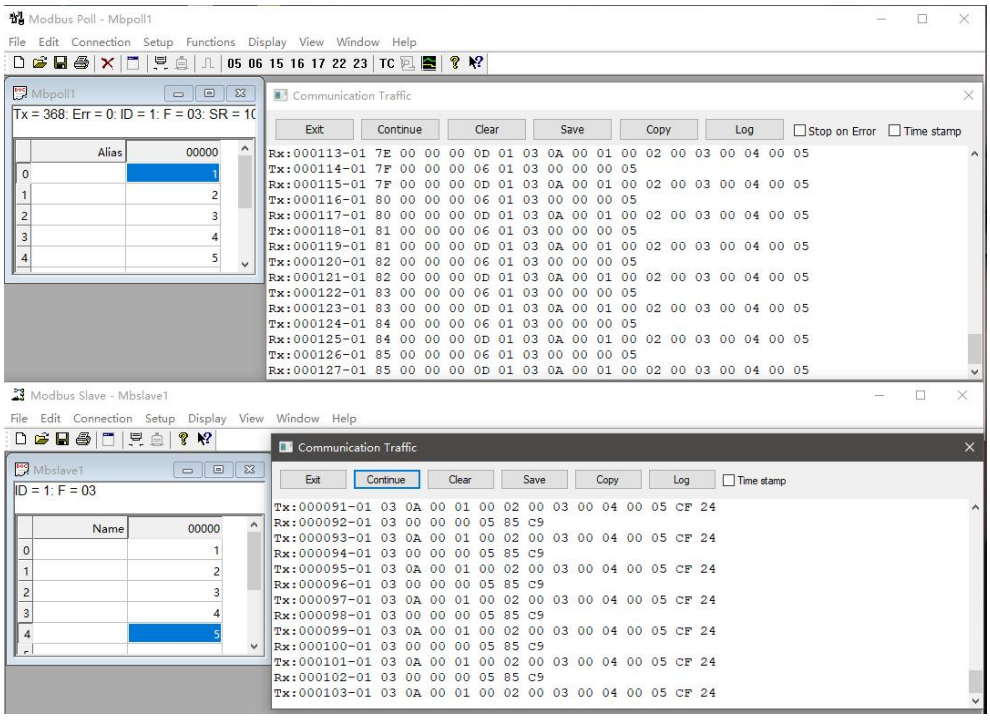
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S slave menu select Set up Slave →Definition



Newsletter Demo:



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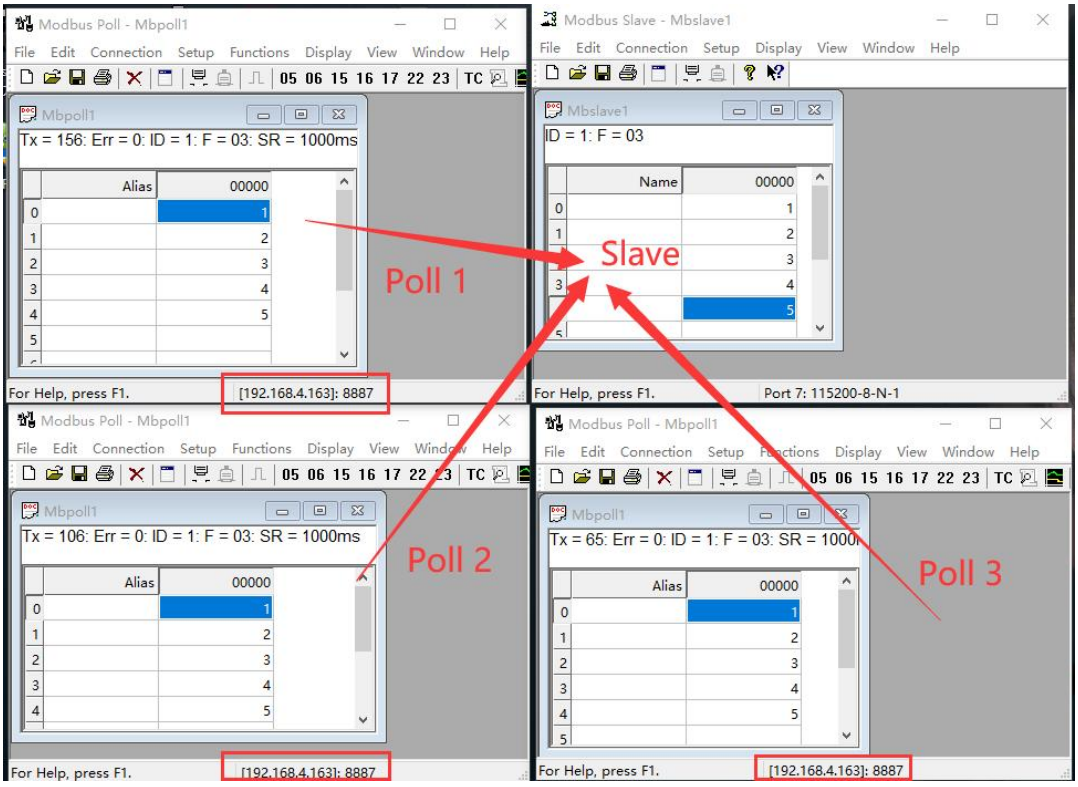
5.4.2 multi-host mode

Relatively simple protocol conversion can only have one Modbus master station, while the multi-host mode can simultaneously access multiple Modbus TCP hosts. When multiple Modbus hosts access at the same time, the Modbus gateway will perform bus occupancy scheduling (RS -485 The bus can only process one request at a time, and the multi-host mode will sort and process according to the TCP request, and other links will wait), thus solving the bus conflict problem (currently, it supports up to 9 Modbus channels in single server mode TCP host connection, multi-channel host access at the same time should pay attention to the matching of the request interval and timeout time, otherwise the transmission rate of the serial port is much lower than the transmission rate of the Ethernet, resulting in packet loss. If you need a fast response, it is recommended to use a "storage gateway"), it only supports working in TCP server mode, and the slave can only be on the serial port, otherwise it cannot work normally.

As the number of hosts increases, the Modbus timeout should be increased accordingly. If multiple hosts need continuous high-speed requests, it is recommended to use "storage gateway", and it is recommended to configure "simple protocol conversion" when there are no multiple hosts.



Refer to "Simple Protocol Conversion" for software configuration and register configuration, and open multiple Modbus Poll software at the same time (3 channels as an example, and a single server model can support up to 9 channels).



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5.4.3 storage gateway

The storage gateway not only arbitrates the bus data, but also stores repeated read instructions. When different hosts request the same data, the gateway does not need to ask the RTU device register status multiple times, but directly returns the data cached in the storage area, which is extremely It greatly improves the multi-host request processing capability of the gateway, and also shortens the time consumed by the entire request process. Users can customize the polling interval of the storage area instructions and the instruction storage time according to their needs.



As an optimization of multi-host request performance, the storage gateway can only work in the TCP server mode, which improves the response speed of the network side.

Features:

（1） gateway has a 2K cache for storing instructions and returning results (reading 10 holding registers as an example, it can store about 67 instructions and returning results);

（2） RTU response timeout automatically clears the cache to ensure the real-time and authenticity of the data;

（3） The polling interval can be customized, 0 -65535 ms (default: 200ms) ;

（4） The gateway will poll the RTU device according to the storage time of the command used for configuration. If the MODBUS host does not query the command again during the storage time, the gateway will automatically delete the storage command to release the cache;

（5） The first instruction and control instruction (05 , 06 , 0F , 10 function code) will directly access the RTU device;

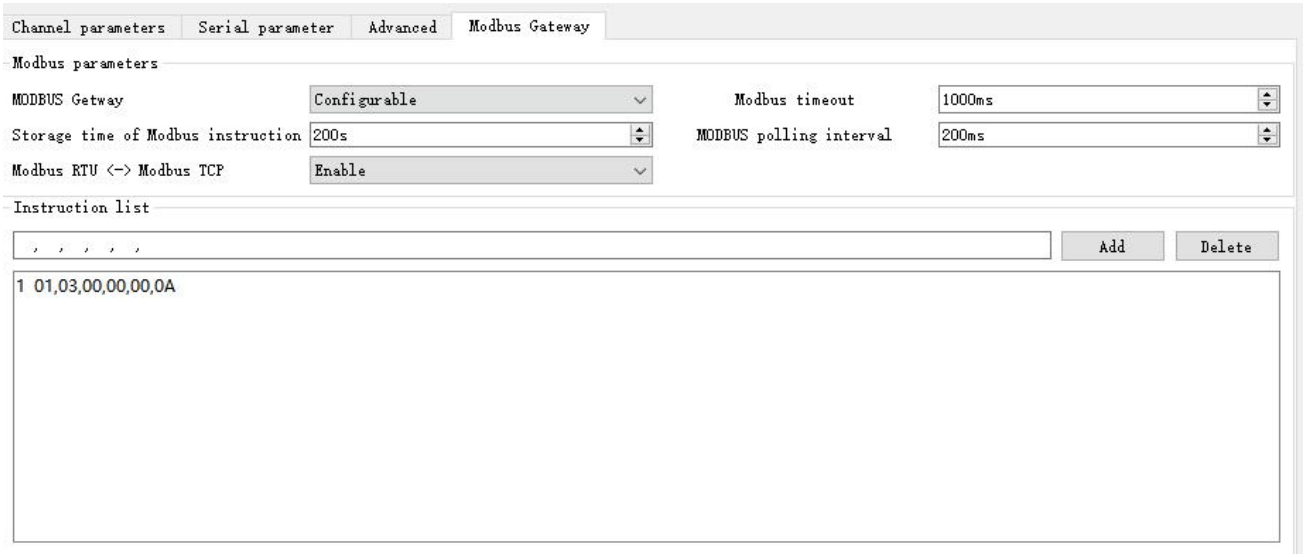
（6） Only support 0 1 , 0 2 , 0 3 , 0 4M od bus function code query result storage;

5.4.4 Configurable Gateway

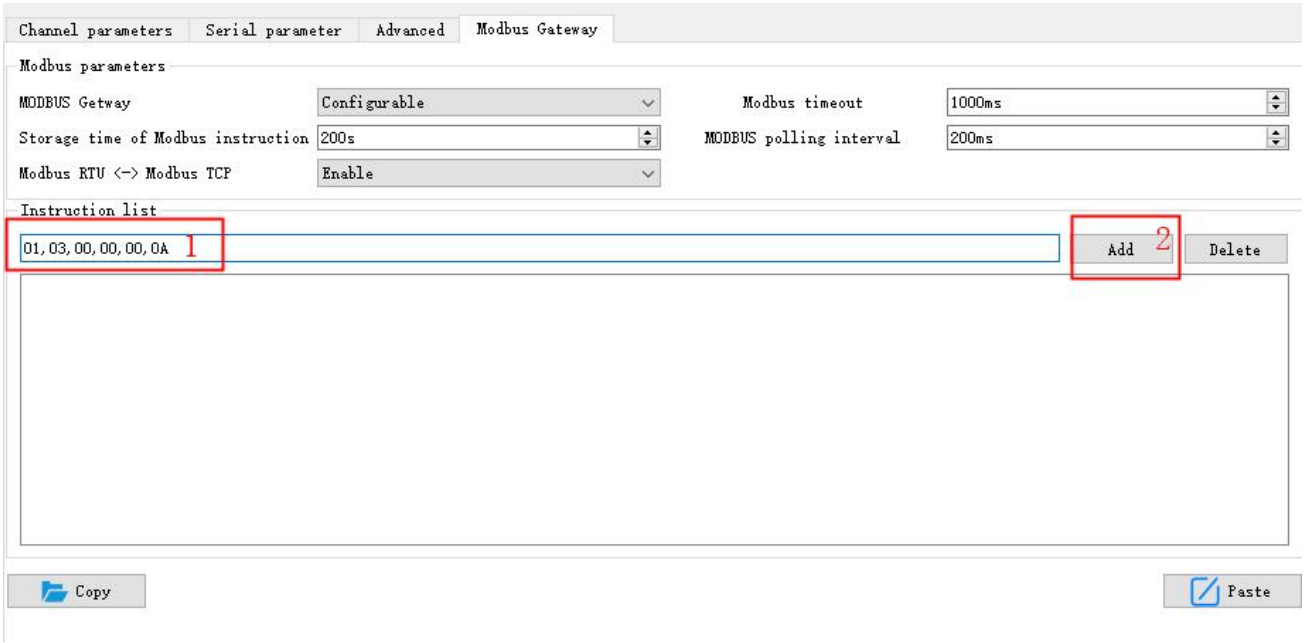
The gateway automatically polls the RTU device registers according to the pre-configured MODBUS commands (only supports the configuration of MODBUS read commands), and the commands in the non-storage table will directly operate the RTU device, and the frequently read commands can be stored in the gateway in advance, which can shorten the Response time (command to query configuration), the data will not be sent directly to the server and will only be returned after the request of the Modbus host, which is similar to the use method of "simple protocol conversion". If you need to automatically upload the data to the server, please select "automatic upload". Due to the above characteristics, the serial port side of the configurable gateway can only be connected to the Modbus slave station.

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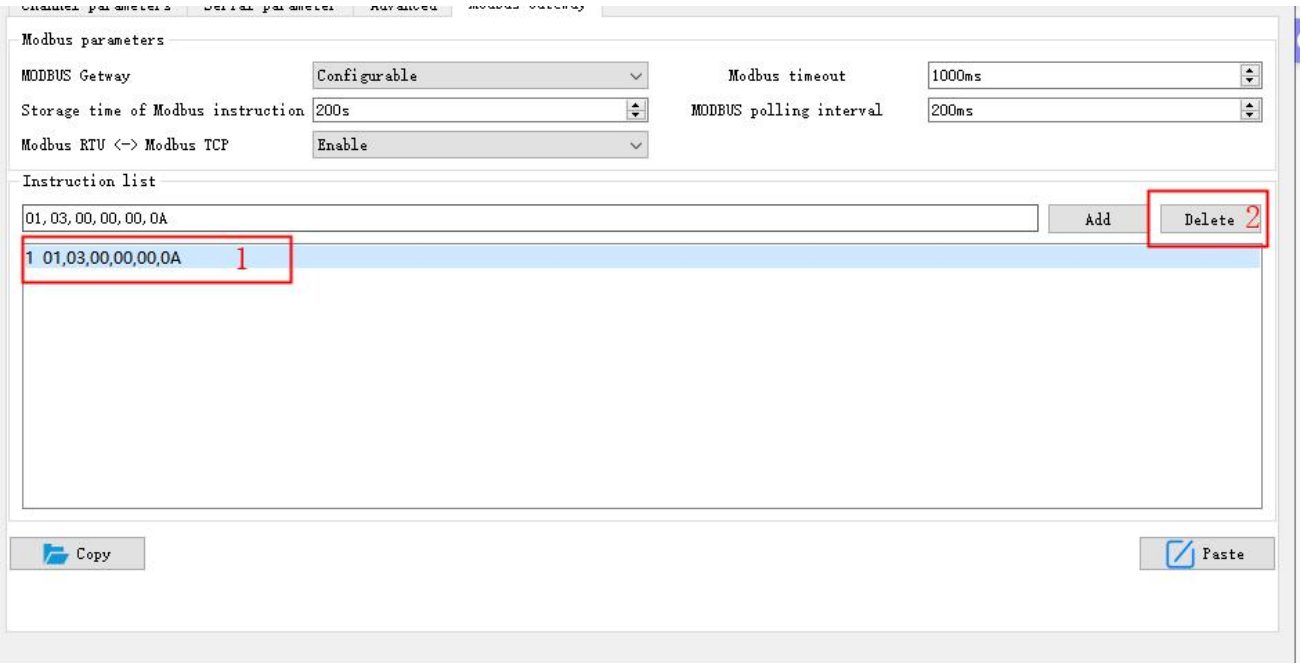
Instructions storage instructions (increase, instruction errors and format errors cannot be added):



Instruction storage instructions (delete):

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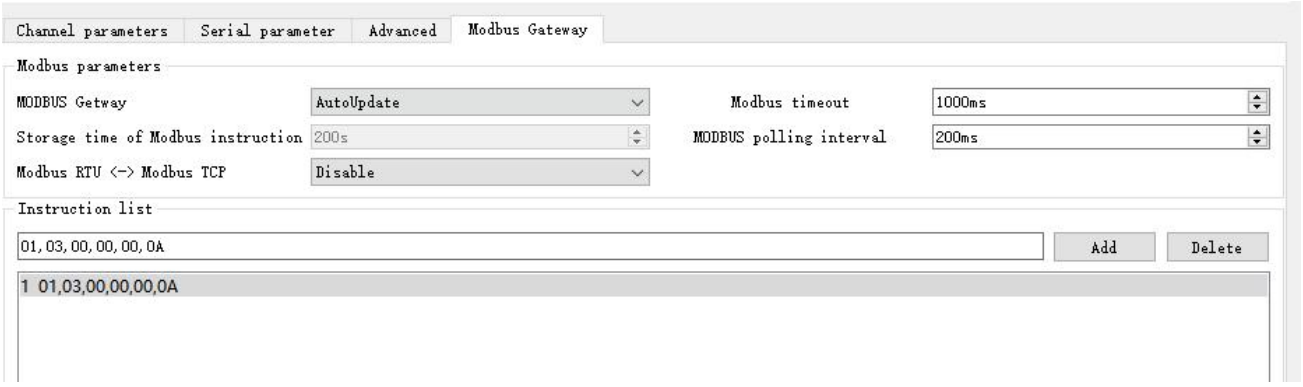
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5.4.5 automatic upload

In the client mode (TCP client, UDP client, MQTT client, HTTP client) the gateway will automatically poll the instructions stored in the instruction table and upload them to the server. You can choose the feedback format (Modbus RTU format or Modbus TCP format) according to your needs.) and command polling interval (0-65535ms).

Instruction pre-storage refers to "Configurable Gateway - Instructions for Instruction Storage", and automatically uploads the host computer/webpage configuration.



5.5 Firmware upgrade

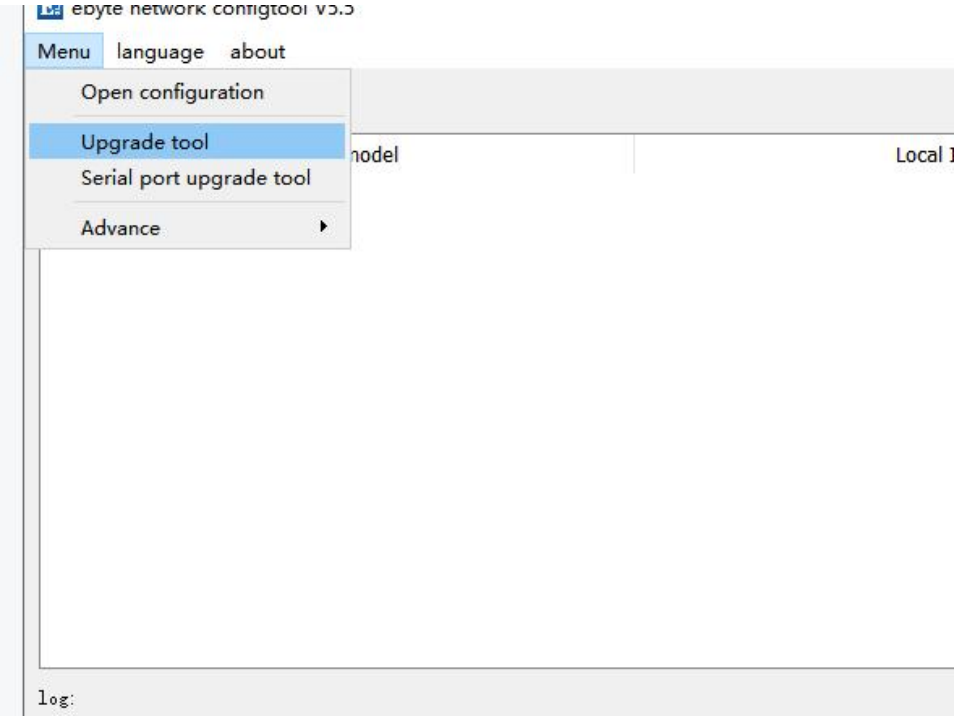
Users can upgrade the firmware of the device through the "Ebyte Network Configuration Tool" .

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5.5.1 UDP upgrade

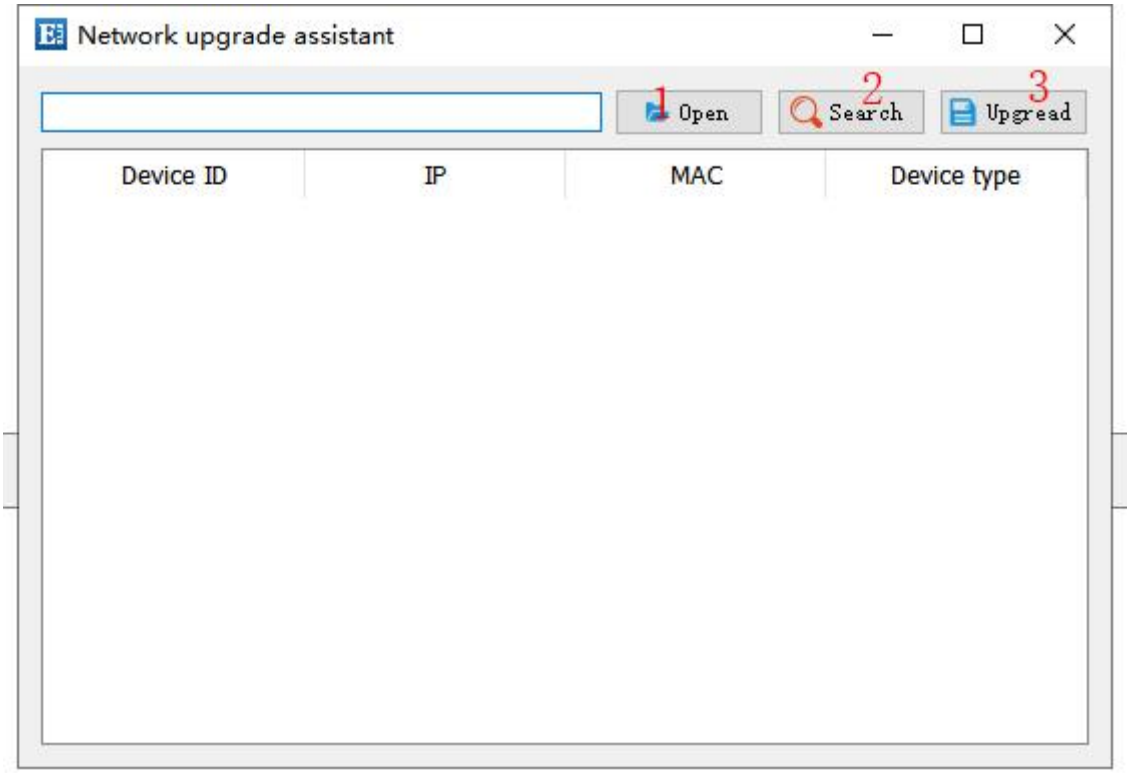
Step 1: Open the "Ebyte Network Configuration Tool", and select "Device Upgrade Assistant" under the "Menu" option;



Step 2: Select the firmware to be used, which needs to be obtained from the "Related Downloads" of the corresponding product details on the official website (www.ebyte.com) . The demo firmware is not provided on the official website.

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Step 3: Click "Search Device", the device list will display the currently found device, click "Stop Search" again.

After selecting the device to be upgraded, click Start to upgrade, and wait for the host computer to display that the upgrade is complete.

5.5.2 Serial upgrade

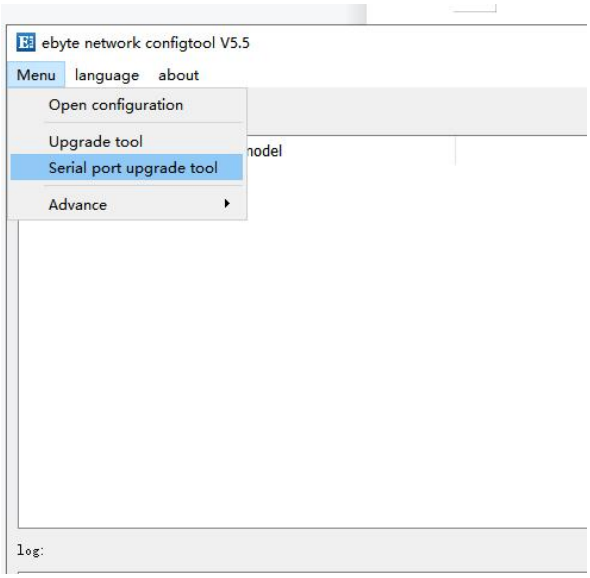
Only channel 1 (that is, serial port 1, which can use the RS232 interface / RS485 interface /RS422 interface) supports the upgrade using the serial port. When the network upgrade fails or the network environment is complicated, it is recommended to use the serial port to upgrade;

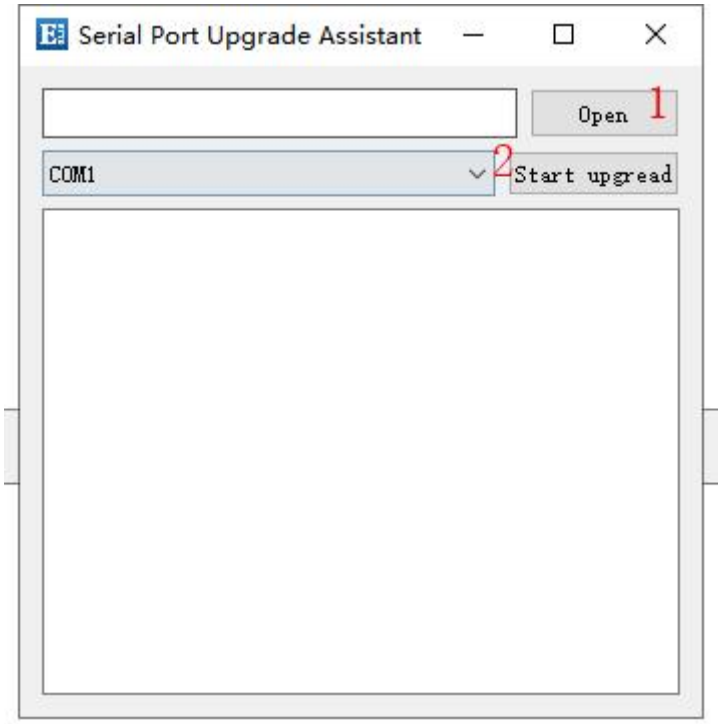
Step 1: Make sure the device is powered off and connect to serial port 1 correctly;

Step 2: Open "Ebyte Network Configuration Tool", select "Serial Port Upgrade Assistant" under the "Menu" option, select the corresponding serial port and click "Open Serial Port";

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Step 3: Select the firmware to be used, which needs to be obtained from the "Related Downloads" of the corresponding product details on the official website (www.ebyte.com) . The demo firmware is not provided on the official website;

Step 4: Click "Start Upgrading", press and hold Re load on N B1 44 , then turn on the power of the device, wait for the firmware upgrade to complete, and click "Cancel" to end the serial port upgrade.

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6 Revision history

Version	revision date	Revision Notes	Maintenance man
1.0	2022-11-14	initial version	LYL
1.1	2024-8-13	Modify the image	LYL

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