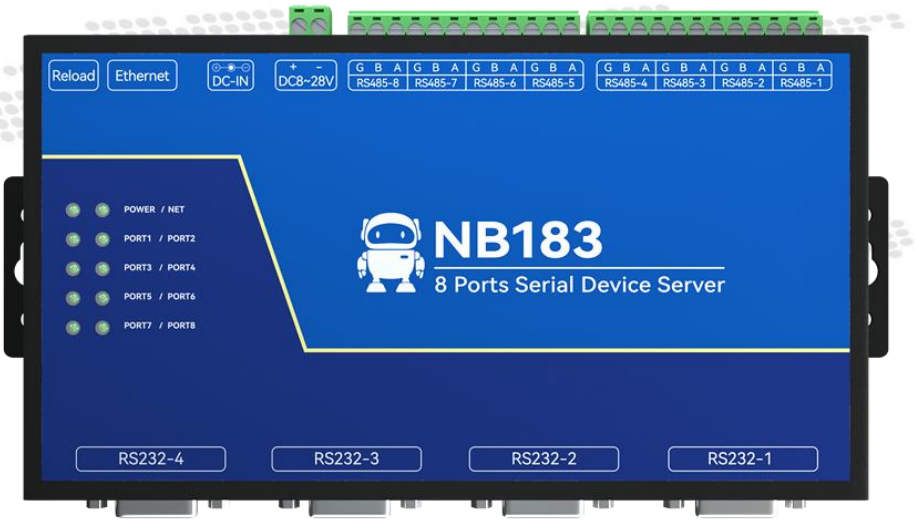
Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual

NB124x-V2/NB144x-V2/NB183x-V2

Multi-Serial Server User's Manual



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Instructions for use

This manual applies to NB124x-V2/NB144x-V2/NB183x-V2 second-generation serial servers. The software functions of the whole series are exactly the same, only the number of serial ports, isolation or not, and the size of the shell are different. The software usage is identical, this manual uses NB183-V2 as an introduction, please note that the detailed differences are shown in the following parameter comparison table.

Parameter Comparison Table

Product type	RS485	Ports Specification	RS232	Ports Specification	RS422	Ports Specification	Isolated	POE	Size（mm）
NB124	2	3.81mm terminals	2	DB9 Female	2	3.81mm terminals	√	×	173×95×26.5
NB124S	2	3.81mm terminals	2	DB9 Female	2	3.81mm terminals	×	×	173×95×26.5
NB124E	2	3.81mm terminals	2	DB9 Female	2	3.81mm terminals	√	√	173×95×26.5
NB124ES	2	3.81mm terminals	2	DB9 Female	2	3.81mm terminals	×	√	173×95×26.5
NB144	4	3.81mm terminals	4	DB9 Female	4	3.81mm terminals	√	×	198×109×26.5
NB144S	4	3.81mm terminals	4	DB9 Female	4	3.81mm terminals	×	×	198×109×26.5
NB144E	4	3.81mm terminals	4	DB9 Female	4	3.81mm terminals	√	√	198×109×26.5
NB144ES	4	3.81mm terminals	4	DB9 Female	4	3.81mm terminals	×	√	198×109×26.5
NB183	8	3.81mm terminals	4	DB9 Female	0	-	√	×	198×109×26.5
NB183S	8	3.81mm terminals	4	DB9 Female	0	-	×	×	198×109×26.5
NB183E	8	3.81mm terminals	4	DB9 Female	0	-	√	√	198×109×26.5
NB183ES	8	3.81mm terminals	4	DB9 Female	0	-	×	√	198×109×26.5

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1. Overview

EBYTE's self-developed multi-serial server series products, integrated with TCP/IP protocol stack, can realize two-way transparent transmission of data from serial port to Ethernet port, Modbus protocol conversion, serial devices on the cloud and other functions. The industrialized design ensures the stability of the device in the harsh working environment, and the rich indicator effects are used to feedback the different working status of the device.

Support the upper computer, AT command configuration, just a simple configuration, you can easily realize the serial device networking, cloud and other functions.

Widely used in server room monitoring, environmental monitoring, intelligent transportation, road gate control, intelligent courier cabinet and other industries

1.1 Features

- Industrialized design is stable and reliable with high level of port protection;
- Abundant LED status indicators, quickly locate the working status of the device;
- Support terminal or DC header power supply, 8~28V DC wide voltage input, support reverse connection protection;
- Support terminal type interface (RS485) and standard DB9 interface (RS232);
- Isolated version supports 8-channel serial port independent hardware isolation;
- Support 10/100M Ethernet interface;
- Support configuration tool, AT command 2 kinds of configuration methods (subsequent can support web page configuration);
- Baud rate support 2400～115200bps, support odd, even, no parity mode;
- Support configurable domain name resolution service, i.e. DNS;
- Support timeout restart function, time can be customized, default 30 minutes;
- Support short connection function, customizable short connection maintenance time;
- Support serial port cache cleaning function;
- Support hardware restore factory settings;
- Supports online upgrade, which is convenient for users to customize the functions;
- Support multiple registration packet and heartbeat packet modes;
- Support DHCP to get IP, mask, gateway, DNS server and so on dynamically;
- Support TCP Server, TCP Clinet, UDP Server, UDP Clinet, MQTT Clinet, HTTP Clinet multiple working modes;
- Supports multiple simultaneous open servers, each of which supports a maximum of 5 client connections;
- Supports a variety of Modbus gateways, which can realize the active reporting of RTU devices;
- Support Modbus TCP and Modbus RTU protocol inter-transfer, can be configured as a storage-type mode to

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automatically collect device data, you can also use a question-and-answer multi-host mode;

- Support MQTT gateway function, fast access to AliCloud and standard MQTT3.1.1 servers (OneNET, Baidu Cloud, Huawei Cloud, etc.);
- Support Modbus data active reporting TCP transparent transmission servers, MQTT servers and so on;
- Support HTTP client mode, using HTTP/1.1 protocol, can be configured as GET, POST two kinds of request;
- Can use TCP/IP direct communication or through the “virtual serial port” connection communication.

2. Quick use

2.1 Hardware Preparation

1. one laptop with RJ45 network port;
2. One network cable;
3. One serial port server;
4. DC12V 1A power adapter (POE version can use POE switch power supply);
5. USB to RS485 serial line (this only shows RS485 to Ethernet communication, RS232 and RS422 only interface is not the same);
6. a number of wires.

Specific preparation of hardware equipment as shown in the figure below:

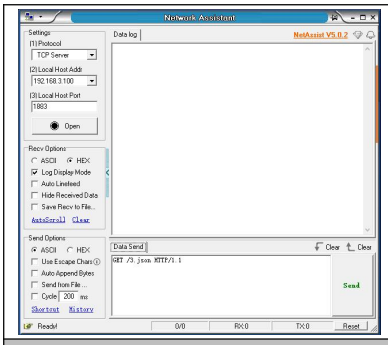
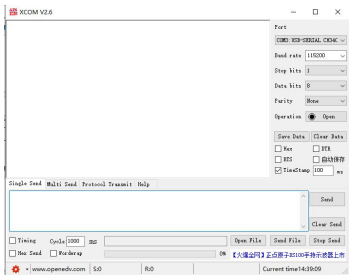
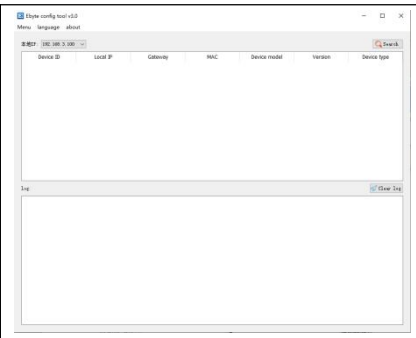
		
Computer	cable	NB183
		
DC 12V1A	USB to RS45	several wires

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2.2 Software preparation

Serial debugging assistant (XCOM), network debugging assistant (TCP/IP debugging assistant), YBT network configuration tool (configuration of the host computer), the official website address: www.ebyte.com, product details to provide download interface.

		
Network Assistant	XCOM	Network Configuration Tool

Note: The version of the host computer shown in the manual may be different from the version provided by the official website, and the host computer provided by the official website shall prevail.

2.3 Device Default Parameter Test Procedure

Different channels adopt the same IP address and different local ports, for example, the factory configured channel 1 corresponds to port 8001 and channel 8 corresponds to port 8008, for details, please refer to the chapter of “Correspondence between Channel and Serial Port”.

2.3.1.Connecting hardware



1、Connect the serial server's network port and the computer's network port with a network cable;

2. Use the USB to RS485 serial cable to connect the USB port of the computer and the RS485 port of the serial server;

3, with the power adapter (DC 8-28V) for the device to power on, power on and observe whether the indicator is normal, refer to “Indicator Description”;

4, confirm that there is no problem with the status of the next step in the configuration;

2.3.2.Device Parameter Configuration

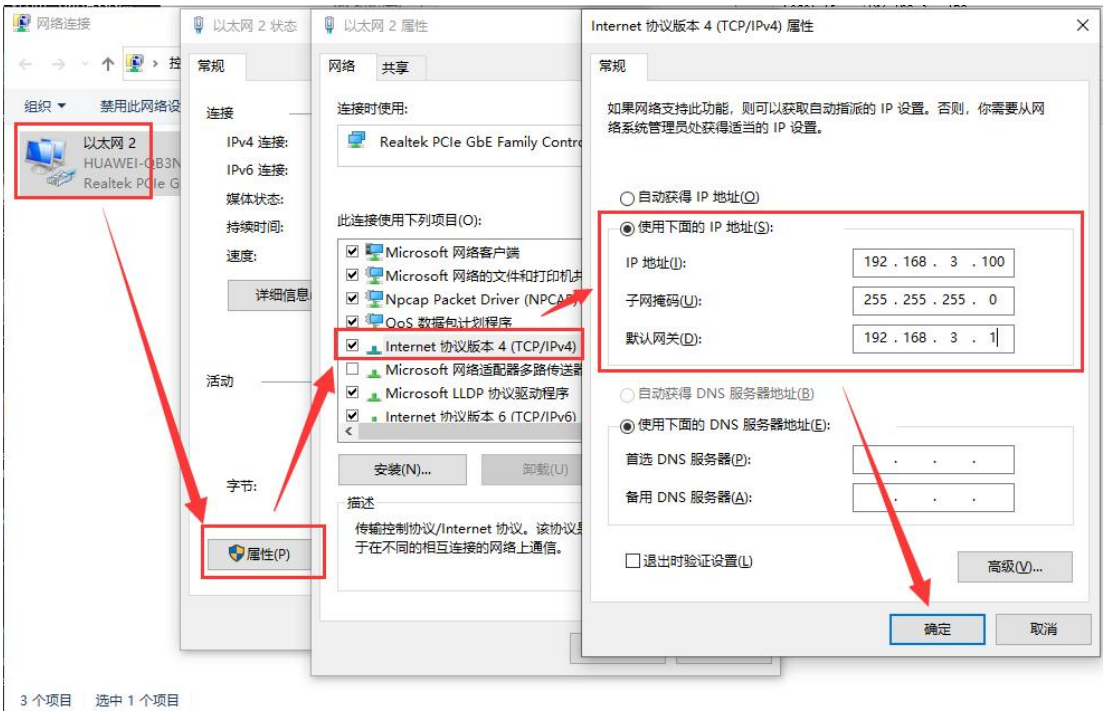
In order to enable users to quickly have a simple understanding of the serial server, we use the default parameters of the serial server to test the transparent transmission of data.The default parameters of the NB183 serial server device are shown in the following table.

Item	Default parameters
IP Address	192.168.3.7
Subnet Mask	255.255.255.0
Gateway	192.168.3.1

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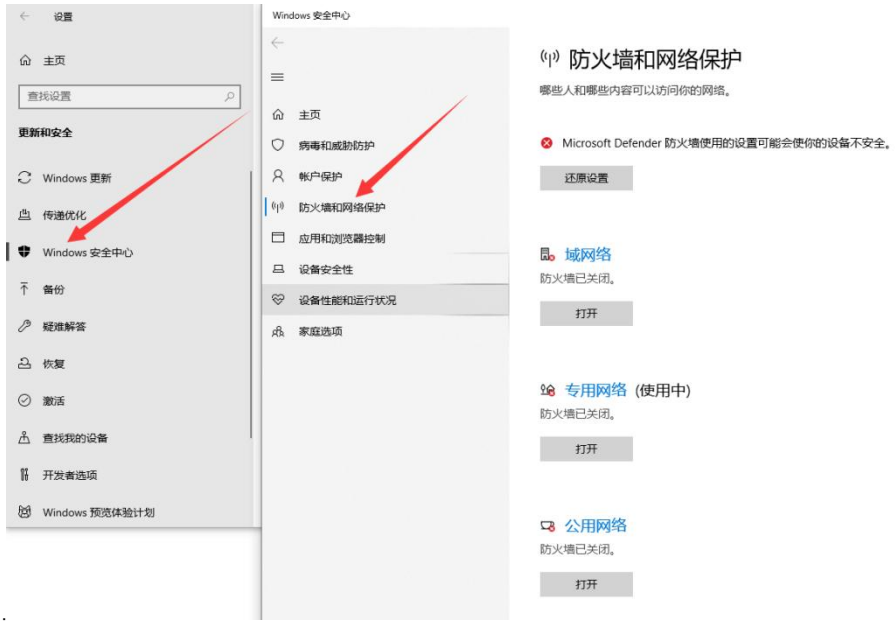
Operating mode of channel 1	TCP_SERVER
Local port of channel 1	8001
Serial Baud Rate	115200
Serial port parameters	NONE/8/1/NONE

Ensure that the IP of the computer and the IP of the serial port server are in the same network segment and do not conflict with each other. The checking method is shown in the following figure.



2.3.3.Disabling computer firewalls

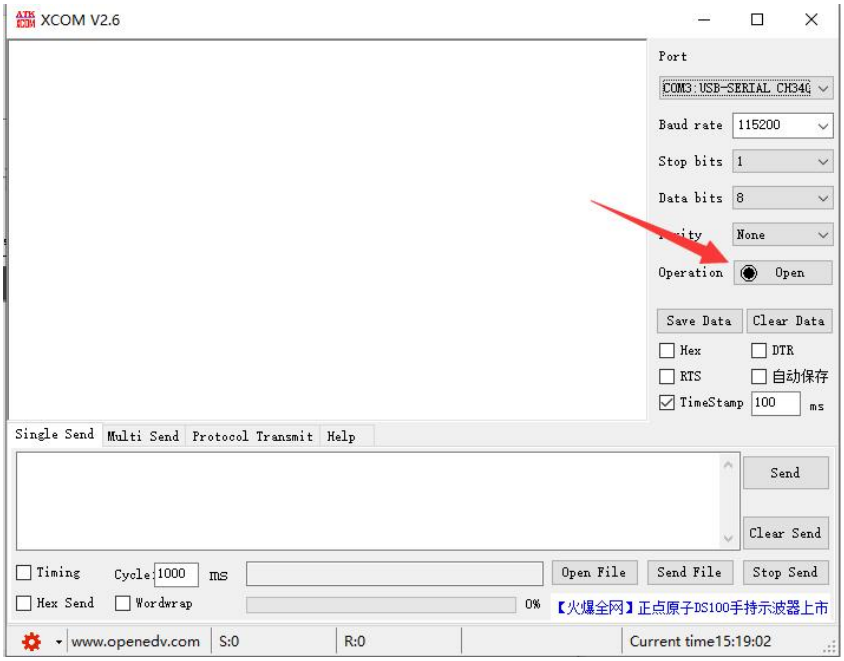
If communication is unsuccessful, the user can try turning the computer off the firewall and try again



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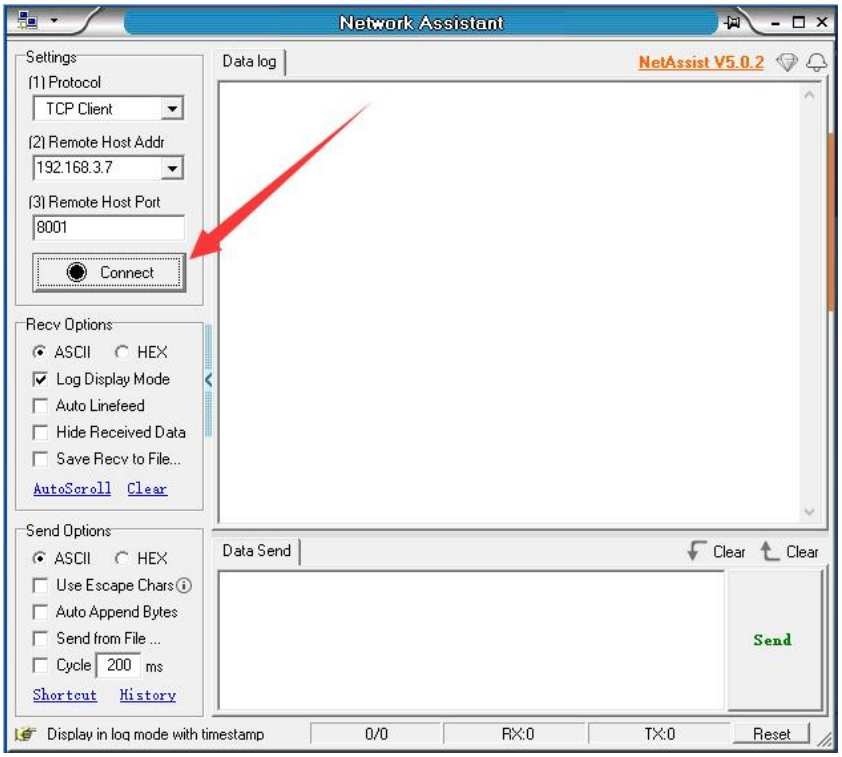
2.3.4. Open the “Serial Debugging Assistant”.

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



2.3.5. Opening the Network Assistant

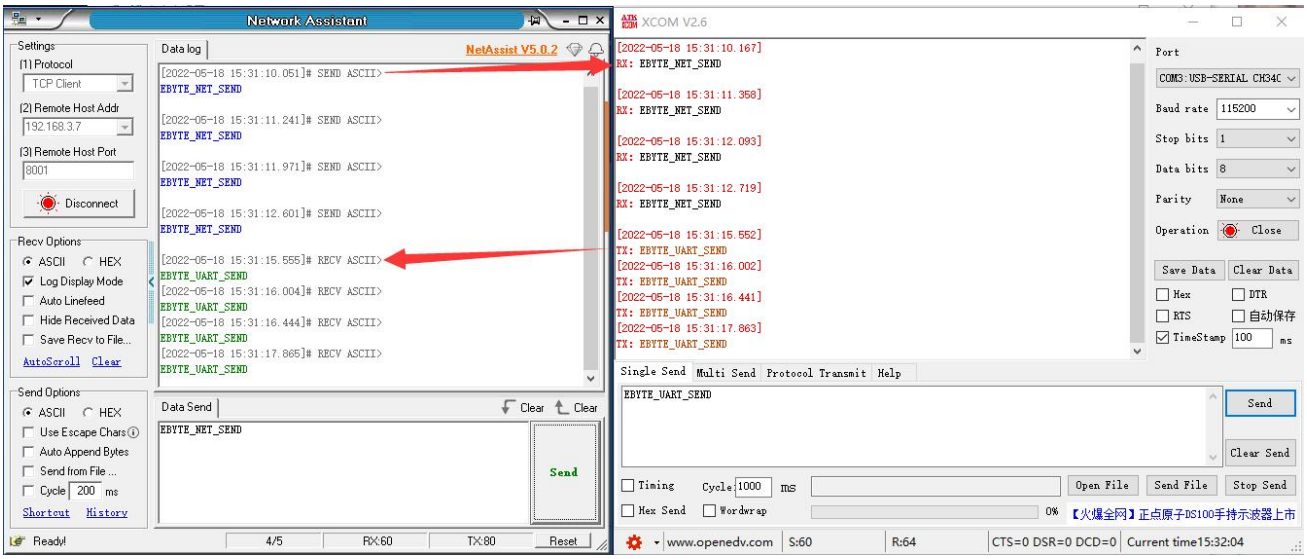
Select “TCP Client” mode, configure the remote IP as “192.168.3.7”, and configure the remote port as “8001” as shown in the following figure:



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2.3.6. Sending and receiving data test

Click “Network Debugging Assistant” and “Serial Debugging Assistant” on the [Send] button, you can realize the transparent transmission of network and serial data, as shown in the figure below.



3. Product Overview

3.1 Specification parameters

Project	Connector	Description
Power Supply	Crimp Terminal DC Female	DC 8 ~ 28 V, not input power at the same time; Crimp terminals: 5.08mm*2 phoenix terminals are used; DC female connector: straight insertion type round hole, outer diameter 5.5mm, inner diameter 2.0mm;
Network Port	RJ45	10/100M
Operating Mode	TCP Server、TCP Client、UDP Server、UDP Client、HTTP Client、MQTT Client (default TCP Server)	
Socket Connection	TCP server supports up to 5 client connections on a single serial port	
Network Protocol	IP、TCP/UDP、IPv4、ICMP、APR、DHCP、DNS、HTTP、MQTT	
IP Acquisition Method	DHCP, static IP (default static IP)	
Domain name resolution	Support	
Configuration	Configuration tools, AT commands	

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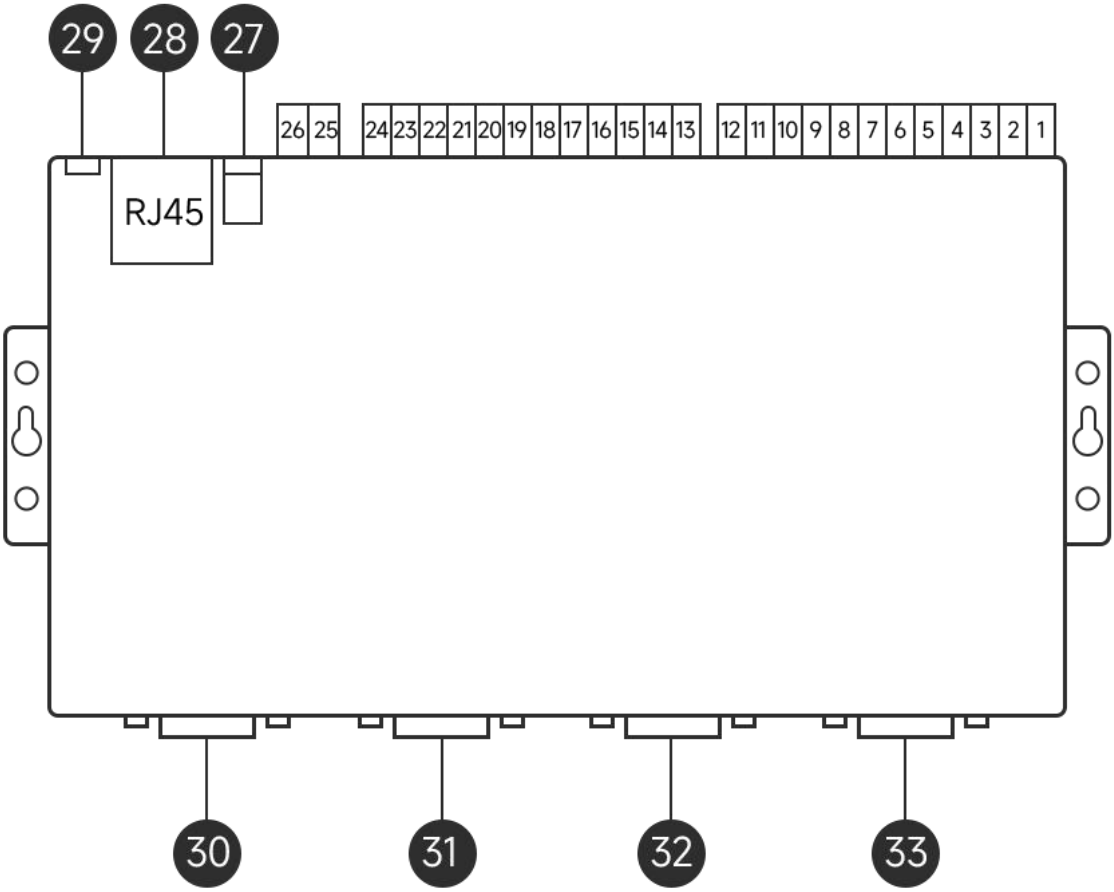
IP address	Customizable (default, 192.168.3.7)
Local Port	Customizable (default, channel 1 to channel 8: 8001-8008)
Subnet Mask	Customizable (default, 255.255.255.0)
Gateway	Customizable (default, 192.168.3.1)
Serial port caching	8×3k Byte
Serial Packing Mechanism	1024 Byte
Serial Baud Rate	2400 ~ 115200 bps（default 115200）
Data Bit	8
Stop Bit	1 (default), 2
Check Bit	None (default), Odd, Even
Installation	Positioning hole mounting
Operating temperature and humidity	-40 ~ +85℃、5% ~ 95%RH（condensationless）
Storage temperature and humidity	-40 ~ +105℃、5% ~ 95%RH（condensationless）

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3.2 Interface Description

3.2.1. Eight serial ports



No	Name	function	Instruction
1	RS485-1-A	Channel 1-RS485 Interface A	3.81mm Phoenix Terminal
2	RS485-1-B	Channel 1-RS485 interface B	3.81mm Phoenix Terminal
3	RS485-1-G	Channel 1-RS485 Interface G	3.81mm Phoenix Terminal
4	RS485-2-A	Channel 2-RS485 Interface A	3.81mm Phoenix Terminal
5	RS485-2-B	Channel 2-RS485 Interface B	3.81mm Phoenix Terminal
6	RS485-2-G	Channel 2-RS485 Interface G	3.81mm Phoenix Terminal

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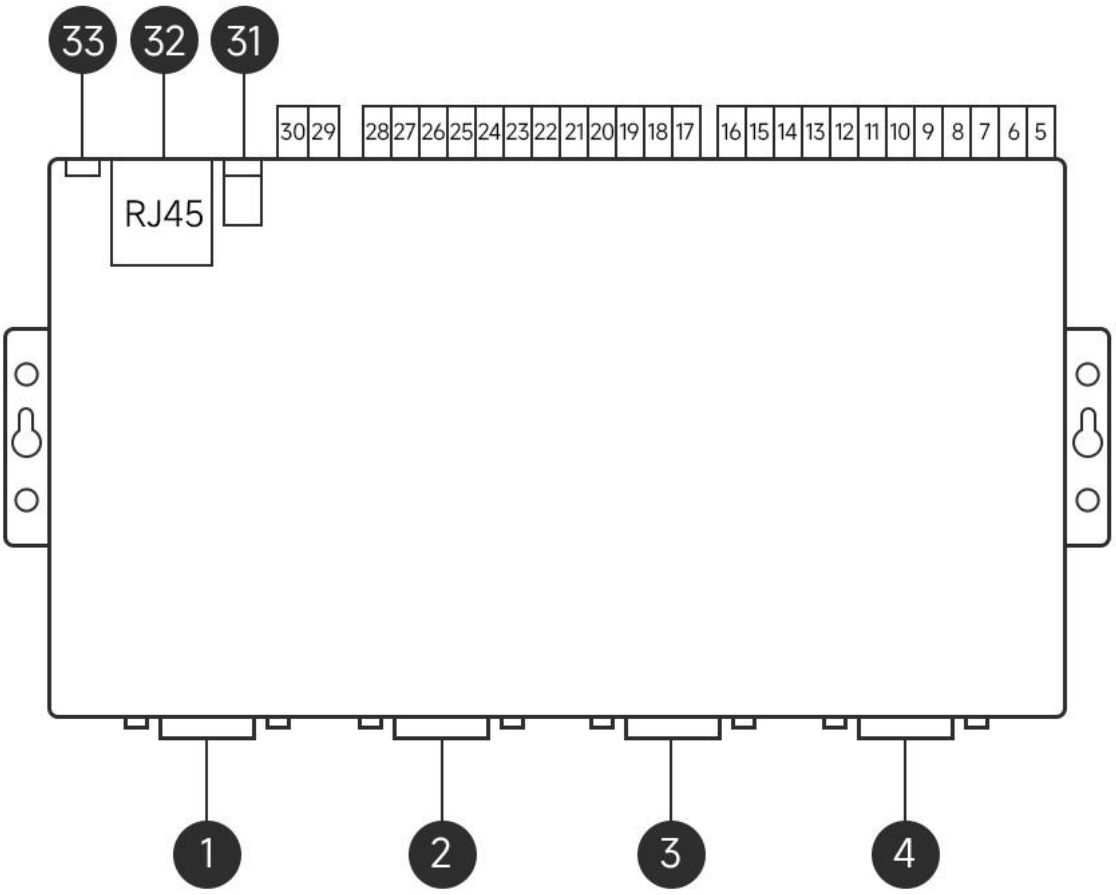
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7	RS485-3-A	Channel 3-RS485 Interface A	3.81mm Phoenix Terminal
8	RS485-3-B	Channel 3-RS485 Interface B	3.81mm Phoenix Terminal
9	RS485-3-G	Channel 3-RS485 Interface G	3.81mm Phoenix Terminal
10	RS485-4-A	Channel 4-RS485 Interface A	3.81mm Phoenix Terminal
11	RS485-4-B	Channel 4-RS485 Interface B	3.81mm Phoenix Terminal
12	RS485-4-G	Channel 4-RS485 Interface G	3.81mm Phoenix Terminal
13	RS485-5-A	Channel 5-RS485 Interface A	3.81mm Phoenix Terminal
14	RS485-5-B	Channel 5-RS485 Interface B	3.81mm Phoenix Terminal
15	RS485-5-G	Channel 5-RS485 Interface G	3.81mm Phoenix Terminal
16	RS485-6-A	Channel 6-RS485 Interface A	3.81mm Phoenix Terminal
17	RS485-6-B	Channel 6-RS485 Interface B	3.81mm Phoenix Terminal
18	RS485-6-G	Channel 6-RS485 Interface G	3.81mm Phoenix Terminal
19	RS485-7-A	Channel 7-RS485 Interface A	3.81mm Phoenix Terminal
20	RS485-7-B	Channel 7-RS485 Interface B	3.81mm Phoenix Terminal
21	RS485-7-G	Channel 7-RS485 Interface G	3.81mm Phoenix Terminal
22	RS485-8-A	Channel 8-RS485 Interface A	3.81mm Phoenix Terminal
23	RS485-8-B	Channel 8-RS485 Interface B	3.81mm Phoenix Terminal
24	RS485-8-G	Channel 8-RS485 Interface G	3.81mm Phoenix Terminal
25	-	Negative for DC 8-28 V	DC 8-28 V, 2*5.08mm phoenix terminal input; Cannot be powered at the same time as the socket;
26	+	Positive terminal of DC 8-28 V	DC 8-28 V, 2*5.08mm phoenix terminal input; Cannot be powered at the same time as the socket;
27	DC-IN	DC power input	DC 8-28 V;

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			In-line round hole, 5.5 mm OD, 2.0 mm ID; Cannot be powered at the same time as the terminals;
28	Ethernet	Ethernet interface	Standard RJ45 Ethernet interface, 10/100M adaptive
29	Reload	Factory reset button	Press and hold for 5s and then NET will light up for 5s and the device will be restored to the factory.
30	RS232-4	Channel 4-RS232 interface	Standard DB9 Female, 2-TXD, 3-RXD, 5-GND
31	RS232-3	Channel 3-RS232 interface	Standard DB9 Female, 2-TXD, 3-RXD, 5-GND
32	RS232-2	Channel 2-RS232 interface	Standard DB9 Female, 2-TXD, 3-RXD, 5-GND
33	RS232-1	Channel 1-RS232 interface	Standard DB9 Female, 2-TXD, 3-RXD, 5-GND

3.2.2. Four Serial Ports



No	Name	Function	Instruction
1	RS232-4	Serial 4-RS232 Interface	Standard DB9 female connector, 2-TXD, 3-RXD, 5-GND
2	RS232-3	Serial 3-RS232 Interface	Standard DB9 female connector, 2-TXD, 3-RXD,

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			5-GND
3	RS232-2	Serial 2-RS232 Interface	Standard DB9 female connector, 2-TXD, 3-RXD, 5-GND
4	RS232-1	Serial 1-RS232 Interface	Standard DB9 female connector, 2-TXD, 3-RXD, 5-GND
5	RS422-1-R+	Serial 1-RS422 Interface-R+	3.81mm Phoenix Terminal
6	RS422-1-R-	Serial1-RS422 Interface-R-	3.81mm Phoenix Terminal
7	GND	Serial1 Ground Terminal	3.81mm Phoenix Terminal
8	RS422-1-T+/A	Serial 1-RS422 Interface-T+ Serial 1-RS485 Interface A	3.81mm Phoenix Terminal
9	RS422-1-T-/B	Serial1-RS422 Interface-T- Serial 1-RS485 Interface B	3.81mm Phoenix Terminal
10	GND	Serial port 1 ground terminal	3.81mm Phoenix Terminal
11	RS422-2-R+	Serial2-RS422 Interface-R+	3.81mm Phoenix Terminal
12	RS422-2-R-	Serial2-RS422 Interface-R-	3.81mm Phoenix Terminal
13	GND	Serial 2 Ground	3.81mm Phoenix Terminal
14	RS422-2-T+/A	Serial 2-RS422 Interface-T+ Serial 2-RS485 Interface A	3.81mm Phoenix Terminal
15	RS422-2-T-/B	Serial2-RS422 Interface-T- Serial 2-RS485 Interface B	3.81mm Phoenix Terminal
16	GND	Serial 2 ground terminal	3.81mm Phoenix Terminal
17	RS422-3-R+	Serial 3-RS422 Interface-R+	3.81mm Phoenix Terminal
18	RS422-3-R-	Serial 3-RS422 Interface-R-	3.81mm Phoenix Terminal
19	GND	Serial2 Ground	3.81mm Phoenix Terminal
20	RS422-3-T+/A	Serial 3-RS422 Interface-T+ Serial 3-RS485 Interface A	3.81mm Phoenix Terminal
21	RS422-3-T-/B	Serial 3-RS422 Interface-T- Serial 3-RS485 Interface B	3.81mm Phoenix Terminal
22	GND	Serial 3 ground terminal	3.81mm Phoenix Terminal
23	RS422-4-R+	Serial 4-RS422 Interface-R+	3.81mm Phoenix Terminal
24	RS422-4-R-	Serial 4-RS422	3.81mm Phoenix Terminal

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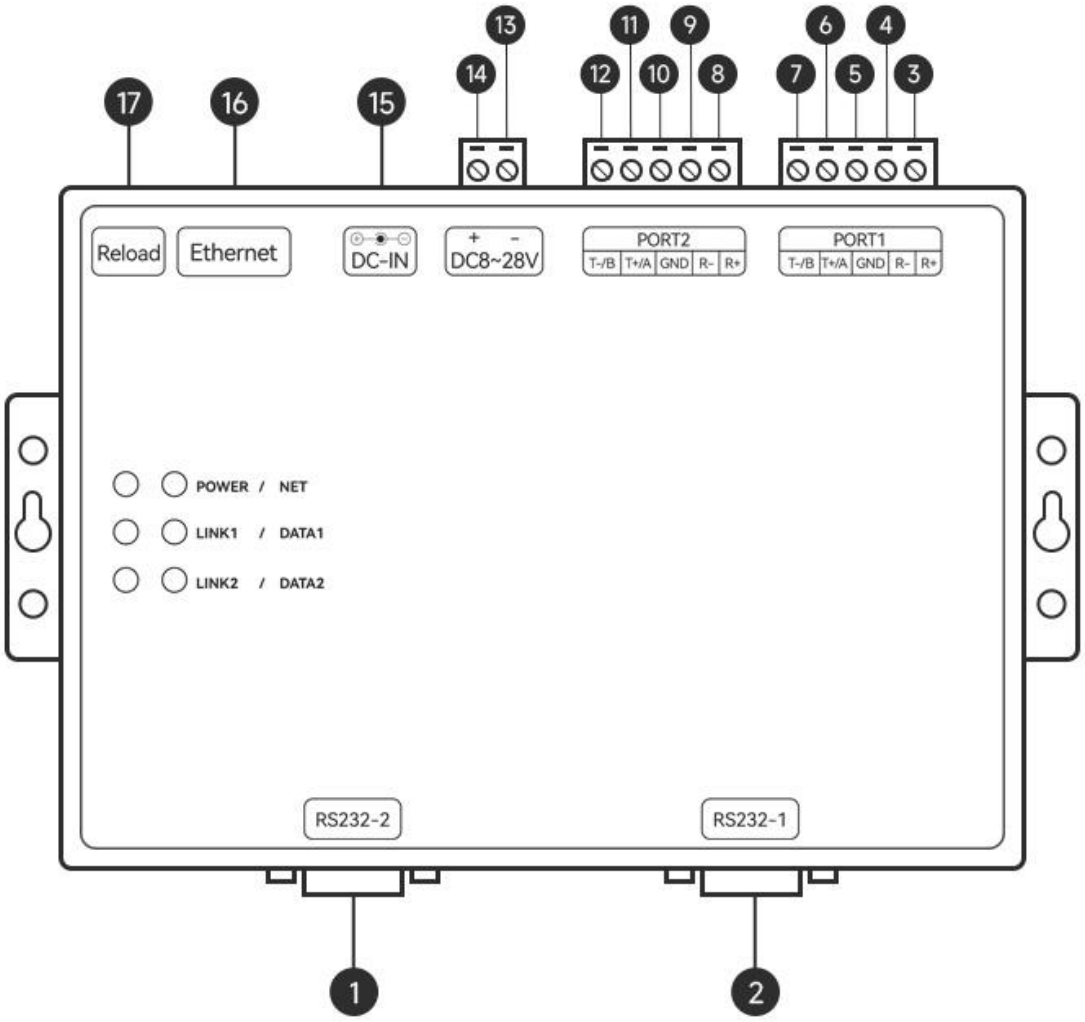
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		Interface-R-	
25	GND	Serial 4 Ground	3.81mm Phoenix Terminal
26	RS422-4-T+/A	Serial 4-RS422 Interface-T+ Serial 4-RS485 Interface A	3.81mm Phoenix Terminal
27	RS422-4-T-/B	Serial 4-RS422 Interface-T- Serial 4-RS485 Interface B	3.81mm Phoenix Terminal
28	GND	Serial port 2 ground terminal	3.81mm Phoenix Terminal
29	-	Negative terminal of DC 8-28 V	DC 8-28 V, 5.08 mm Phoenix terminals;
30	+	Positive terminal of DC 8-28 V	DC 8-28 V, 5.08 mm Phoenix terminals;
31	DC-IN	DC power input	DC 8-28 V; Outside diameter 5.5 mm, inside diameter 2.0 mm straight round hole;
32	Ethernet	Ethernet Interface	Standard RJ45 Ethernet interface
33	Reload	Factory Reset Button	Long press 5s and then NET will light up for 5s, the device will be restored to factory.

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3.2.3. Two serial ports



No	Name	Function	Instruction
1	RS232-2	Serial 2-RS232 Interface	Standard DB9 Female, 2-TXD, 3-RXD, 5-GND
2	RS232-1	Serial 1-RS232 Interface	Standard DB9 Female, 2-TXD, 3-RXD, 5-GND
3	RS422-1-R+	Serial 1-RS422 Interface-R+	3.81mm Phoenix Terminal
4	RS422-1-R-	Serial1-RS422 Interface-R-	3.81mm Phoenix Terminal
5	GND	Serial1-Ground	3.81mm Phoenix Terminal
6	RS422-1-T+/A	Serial 1-RS422 Interface-T+ Serial 1-RS485 Interface A	3.81mm Phoenix Terminal
7	RS422-1-T-/B	Serial1-RS422 Interface-T- Serial 1-RS485 Interface B	3.81mm Phoenix Terminal
8	RS422-2-R+	Serial 2-RS422	3.81mm Phoenix Terminal

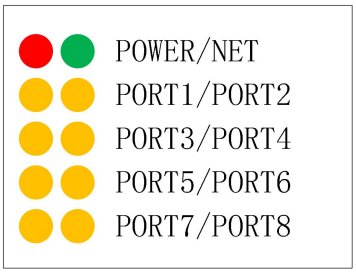
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		Interface-R+	
9	RS422-2-R-	Serial2-RS422 Interface-R-	3.81mm Phoenix Terminal
10	GND	Serial2 Ground Terminal	3.81mm Phoenix Terminal
11	RS422-2-T+/A	Serial 2-RS422 Interface-T+ Serial 2-RS485 Interface A	3.81mm Phoenix Terminal
12	RS422-2-T-/B	Serial2-RS422 Interface-T- Serial 2-RS485 Interface B	3.81mm Phoenix Terminal
13	-	Negative for DC 8-28 V	DC 8-28 V, 5.08mm Phoenix terminals;
14	+	Positive terminal of DC 8-28 V	DC 8-28 V, 5.08mm Phoenix terminals;
15	DC-IN	DC power input	DC 8-28 V; Outside diameter 5.5 mm, inside diameter 2.0 mm straight round hole;
16	Ethernet	Ethernet interface	Standard RJ45 Ethernet interface
17	Reload	Factory reset button	Long press 5s and then NET will light up for 5s, the device will be restored to factory.

3.3 Indicator light descriptions

3.3.1. Eight serial ports



tab	function	instruction
POWER	Power Indicator	Lights up after DC 8-28V power input
NET	Network Indicator	No network cable connected: off; Network cable connected: illuminated;
PORT1	Channel 1 status indicator	Link is not connected: the indicator is off; Link connection successful: indicator light is always on; UDP mode: the indicator light is always on; Data send/receive indication: blinking when sending/receiving data on network or serial port;

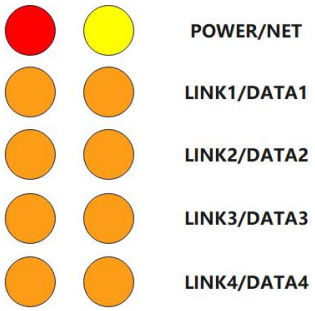
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PORT2	Channel 2 Status Indicator	Link is not connected: the indicator is off; Link connection successful: indicator light is always on; UDP mode: the indicator light is always on; Data send/receive indication: blinking when sending/receiving data on network or serial port;
PORT3	Channel 3 Status Indicator	Link is not connected: the indicator is off; Link connection successful: indicator light is always on; UDP mode: the indicator light is always on; Data send/receive indication: blinking when sending/receiving data on network or serial port;
PORT4	Channel 4 Status Indicator	Link is not connected: the indicator is off; Link connection successful: indicator light is always on; UDP mode: the indicator light is always on; Data send/receive indication: blinking when sending/receiving data on network or serial port;
PORT5	Channel 5 Status Indicator	Link is not connected: the indicator is off; Link connection successful: indicator light is always on; UDP mode: the indicator light is always on; Data send/receive indication: blinking when sending/receiving data through network or serial port.;
PORT6	Channel 6 Status Indicator	Link is not connected: the indicator is off; Link connection successful: indicator light is always on; UDP mode: the indicator light is always on; Data send/receive indication: blinking when sending/receiving data on network or serial port;
PORT7	Channel 7 Status Indicator	Link is not connected: the indicator is off; Link connection successful: indicator light is always on; UDP mode: the indicator light is always on; Data send/receive indication: blinking when sending/receiving data on network or serial port;
PORT8	Channel 8 Status Indicator	Link is not connected: the indicator is off; Link connection successful: indicator light is always on; UDP mode: the indicator light is always on; Data send/receive indication: blinking when sending/receiving data on network or serial port;

3.3.2. Four serial ports

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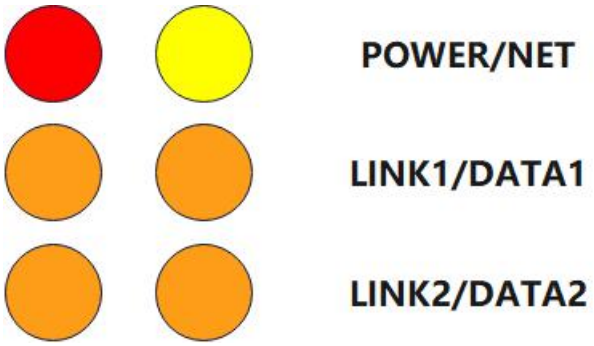


tab	function	instruction
POWER	Power Indicator	Lights up after DC 8-28V power input
NET	Network Indicator	No network cable connected: off; Network cable connected: illuminated;
LINK1	Channel 1 Status Indicator	Link is not connected: the indicator is off; Link connection successful: indicator light is always on; UDP mode: the indicator light is always on;
DATA1	Channel 1 Data Indicator	Blinking when sending or receiving data over the network or through the serial port
LINK2	Channel 2 Status Indicator	Link is not connected: the indicator is off; Link connection successful: indicator light is always on; UDP mode: the indicator light is always on;
DATA2	Channel 2 Status Indicator	Blinks when sending and receiving data over the network or serial port;
LINK3	Channel 3 Status Indicator	Link is not connected: the indicator is off; Link connection successful: indicator light is always on; UDP mode: the indicator light is always on;
DATA3	Channel 3 Status Indicator	Blinks when sending and receiving data over the network or serial port;
LINK4	Channel 4 Status Indicator	Link is not connected: the indicator is off; Link connection successful: indicator light is always on; UDP mode: the indicator light is always on;
DATA4	Channel 4 Status Indicator	Blinks when sending and receiving data over the network or serial port;

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3.3.3. Two serial ports



tab	function	instruction
POWER	Power Indicator	Lights up after DC 8-28V power input
NET	Network Indicator	No network cable connected: off; Network cable connected: illuminated;
LINK1	Channel 1 Status Indicator	Link is not connected: the indicator is off; Link connection successful: indicator light is always on; UDP mode: the indicator light is always on;
DATA1	Channel 1 Data Indicator	Blinks when sending and receiving data over the network or serial port;
LINK2	Channel 2 Status Indicator	Link is not connected: the indicator is off; Link connection successful: indicator light is always on; UDP mode: the indicator light is always on;
DATA2	Channel 2 Data Indicator	Blinks when sending and receiving data over the network or serial port;

Note: Some of the special working mode indicator status:

1、Restore the factory, long press the key for 5 seconds all the indicator lights are on, after letting go LINK and DATA is off that restores the factory successfully;

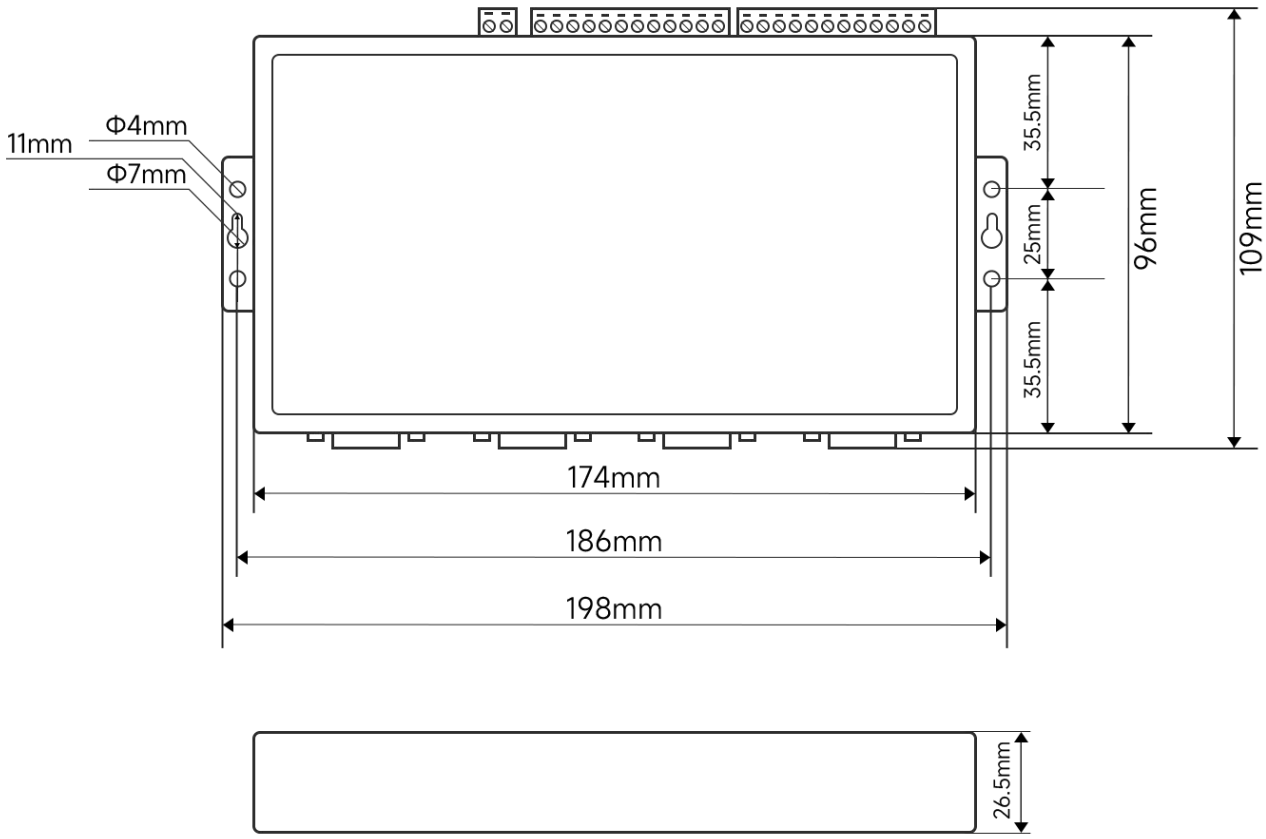
2、Press and hold the key to power on, wait for the firmware burning, except for the power supply, the rest of the indicator lights to 100ms as a cycle of blinking; transmission of the upgrade file to 200ms as a cycle of blinking, the upgrade is completed for the normal light effect;

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3.4 Dimensional drawings

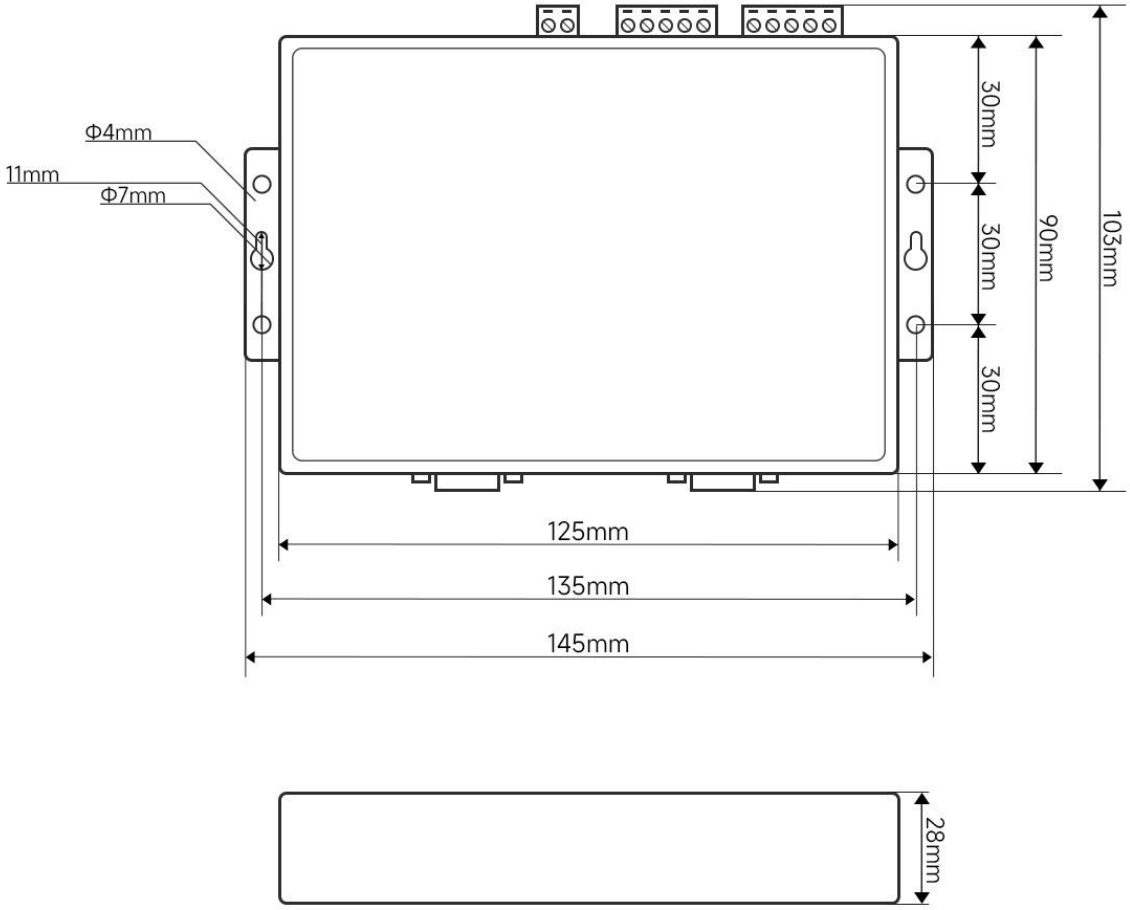
3.4.1. Eight Four serial ports



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3.4.2. Two serial ports



4. Basic functions

4.1 Channel and Serial Port Correspondence

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

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Channel	Default Operating Mode	default port
Channel 1	TCPS	8001
Channel 2	TCPS	8002
Channel 3	TCPS	8003
Channel 4	TCPS	8004
Channel 5	TCPS	8005
Channel 6	TCPS	8006
Channel 7	TCPS	8007
Channel 8	TCPS	8008

4.2 Local network parameters

4.2.1. Local IP

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

4.2.2. DNS (domain name resolution)

When the user enters a domain name, it will automatically query the DNS server, and the DNS server will retrieve the database and get the corresponding IP address. In the static IP mode the user can customize the server for domain name resolution for resolving the private domain name server data, and in the dynamic IP mode the device will automatically follow the domain name resolution servers configured by the routing device, and the user only needs to change the DNS servers of the routing device. Users only need to modify the DNS server of the routing device without configuring the device.

4.2.3. Disconnection and reconnection cycle

The device initiates a reconnection request periodically when it detects a disconnection from the server, so the “disconnection reconnection time” will not affect the connection establishment time under normal circumstances, and the user can customize the request period, the default is 5s.

4.2.4. Timeout restart (no downlink data restart)

The device monitors the data sending and receiving situation, if the device does not receive the data sent from Ethernet for a long time, the device automatically performs a reboot to ensure the stability of long-time work.
The default period of this function is 30 minutes, and users can customize whether to turn on or off the timeout reboot,

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and also can customize the period of timeout reboot.

4.3 Hardware Restoration

Reload pin of the device, keep pressing it for 5s until all the indicators light up, after letting go of it, all the indicators outside the power supply and network turn off, and the device restoration of the factory is completed.

4.4 Equipment operating modes

4.4.1. TCP Server

TCP Server means TCP server. In TCP Server mode, the device listens to the local port, accepts connection requests from clients and establishes connections for data communication. When the Modbus gateway function is turned off, the device sends the data received from the serial port to all the client devices that have established connections with the device.
When the device is in server mode, each serial port supports 5 client devices, and the device will reject the connection if the number of client devices exceeds the number of accesses.

4.4.2. TCP Client

TCP Client is the TCP client. When the device is working, it will initiate a connection request to the server and establish a connection, which is used to realize the interaction between serial port data and server data.
The use of the client needs to be configured to accurately configure the IP address/domain name of the target and the target port.
Eight channels can independently open eight TCP clients.

4.4.3. UDP Server

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

Note: In UDP mode, the data sent from the network to the device should be less than 1024 Bit per packet, otherwise it will cause data loss.

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4.4.4.UDP Client

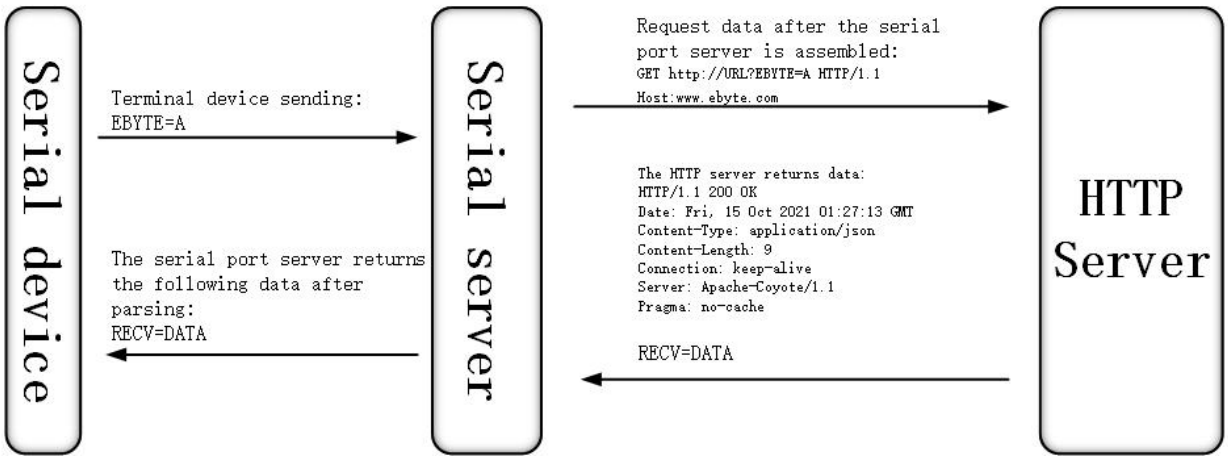
UDP Client is a connectionless transport protocol that provides a simple and unreliable transaction-oriented messaging service. There is no connection establishment or disconnection, and data can be sent to the other party by configuring the destination IP and destination port. It is usually used in data transmission scenarios where the packet loss rate is not required, the packet size is small and the sending frequency is fast, and the data is to be transmitted to a specified IP.
In UDP Client mode, the device will only communicate with the configured (destination IP and destination port) remote UDP device.
In this mode, the destination address is set to 255.255.255.255, and the sent data will be broadcasted in the whole network segment, but the transmitting and receiving devices need to make sure that the ports are the same, and at the same time, the device can also receive the broadcast data.

Note: In UDP mode, the data sent from the network to the device should be less than 1024 Bit per packet, otherwise it will cause data loss.

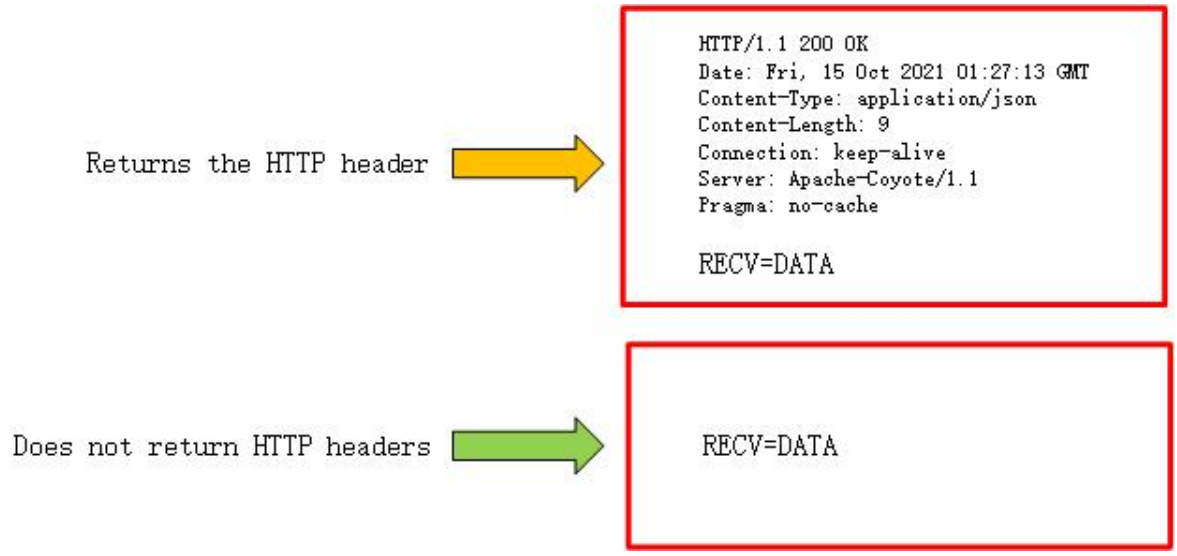
4.4.5. HTTP Client

This mode can realize the function of HTTP automatic packet grouping, providing two ways of GET and POST, the customer can configure the URL, Header and other parameters by themselves, and the device sends packet groups to realize the fast communication between the serial data and the HTTP server, and the URL and Header support the longest 128 bytes of data, and the eight channels can independently turn on the HTTP client mode, without affecting each other. The eight channels can independently enable HTTP client mode without affecting each other.
The HTTP request data should be less than the packet length (1024 bytes), otherwise the device will divide the request data into multiple packets, resulting in abnormal requests.

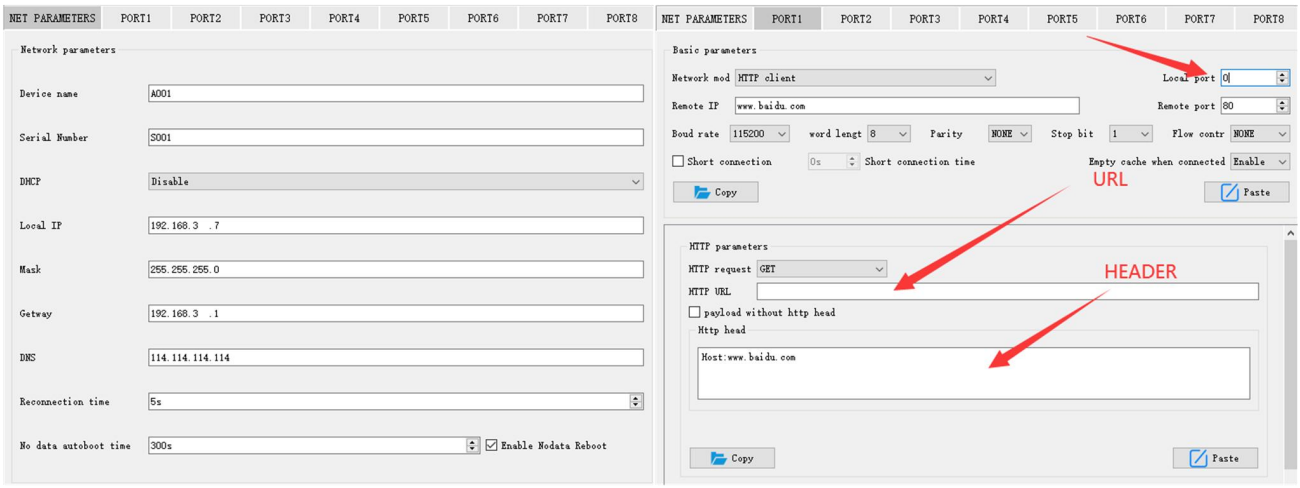




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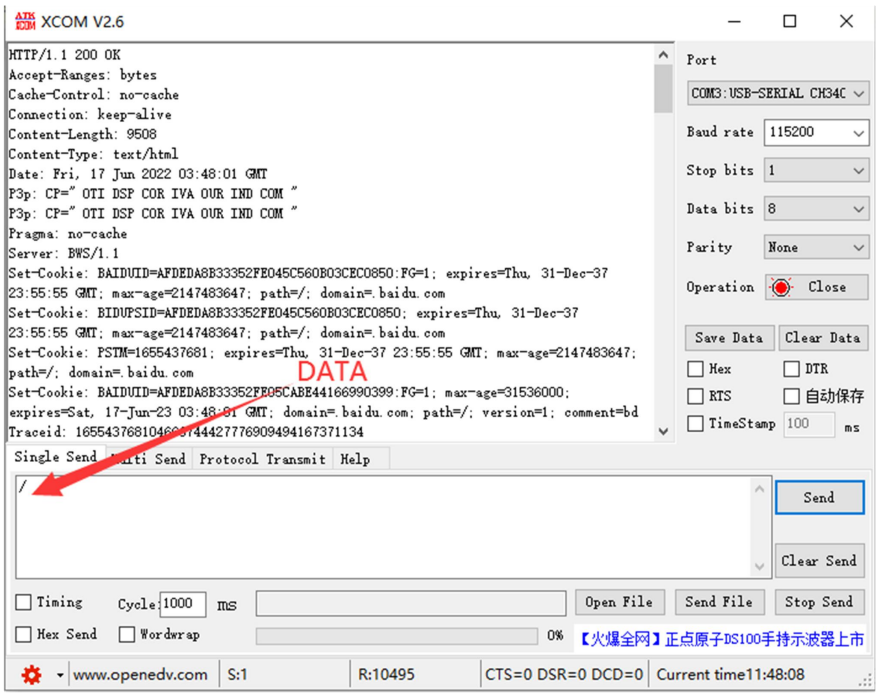


Configuration instructions, open the host computer, search for the device to enter the device configuration interface, first configure the "network parameters", it is recommended to use the DHCP function, to avoid misconfiguration of the device IP anomalies (network segment errors, IP conflicts, etc.), in the configuration of the need to use the HTTP function of the channel to support the eight-channel simultaneous configuration of the HTTP client Mode, here through the GET request "Baidu" web page as an example (URL: empty, HEADER: Host: www.baidu.com, target domain name: www.baidu.com, target port: 80, the local port is recommended to use a random port), the specific configuration is shown in the following figure The specific configuration is shown in the following figure:



The request data is "/", use the serial port assistant to get the web page:

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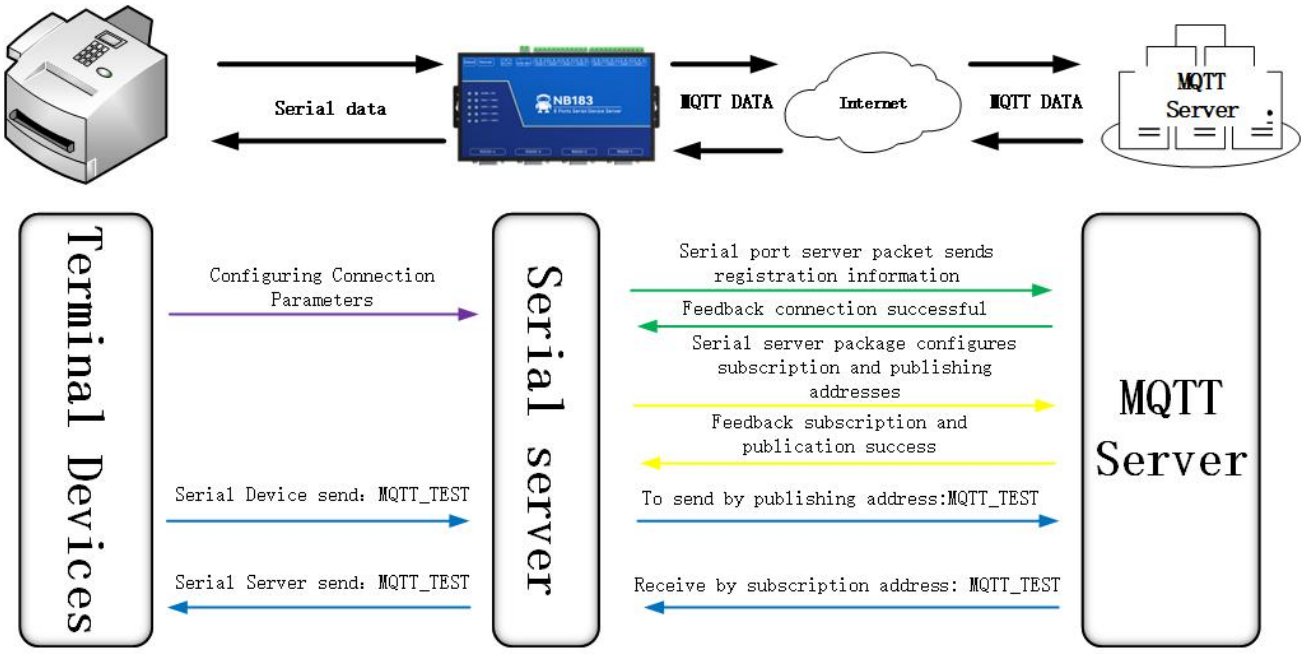
POST description, configured as a POST request method packet header data does not need to be individually configured data length of the packet header (for example: Content-length: 2729) by the device automatically calculates the length of the data and sends the group packet, the other packet header data need to be manually configured to support up to 128 bytes of data configuration.

4.4.6. MQTT Client

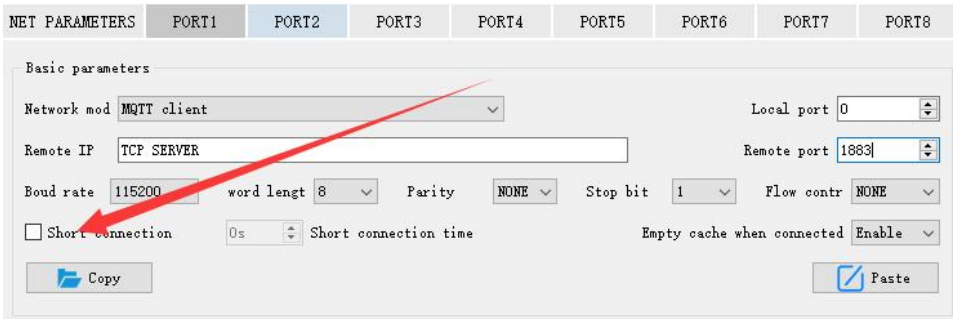
Supports quick access to standard MQTT3.1.1 protocol servers (OneNET, Baidu Cloud, Huawei Cloud, user self-built and other server types) and Aliyun servers, supports quality of service level configuration (Qos 0, Qos 1), and supports ultra-long text configuration for better access to the network service operator (server address, triplex, subscribe and publish address support up to 128 characters) configuration, and 64 characters for AliCloud product keys).

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Short links should be turned off using the MQTT feature, otherwise the device will connect to the server repeatedly. It is recommended to use random ports, as shown in the following figure:



(1) , select the standard MQTT3.1.1, Baidu Cloud, OneNET, Huawei Cloud configuration can refer to the following table to fill in the parameters:

parameters	Standard MQTT3.3.1	Baidu cloud	OneNET
device name (Client ID)	Client ID	DeviceKey	Device ID
user ID (Device name)	User Name	IoTCoreId/DeviceKey	Product ID
Password (Device secret)	Password	DeviceSecret	device name/User Password
PrductKey	AliCloud parameters, optional		
Post a topic	MQTT publish topic address (dynamically generated by OneNET)		
Subscribe to threads	MQTT subscription topic address (dynamically generated by OneNET)		

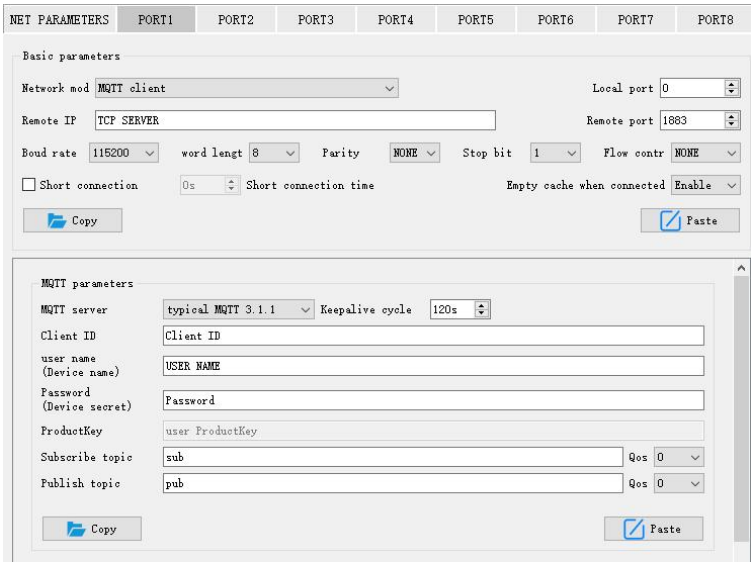
[Note]

dynamically generated theme address can use the same parameters to achieve the effect of data back, for example: OneNET release subscription to the same theme address: 123456, you can achieve data back;

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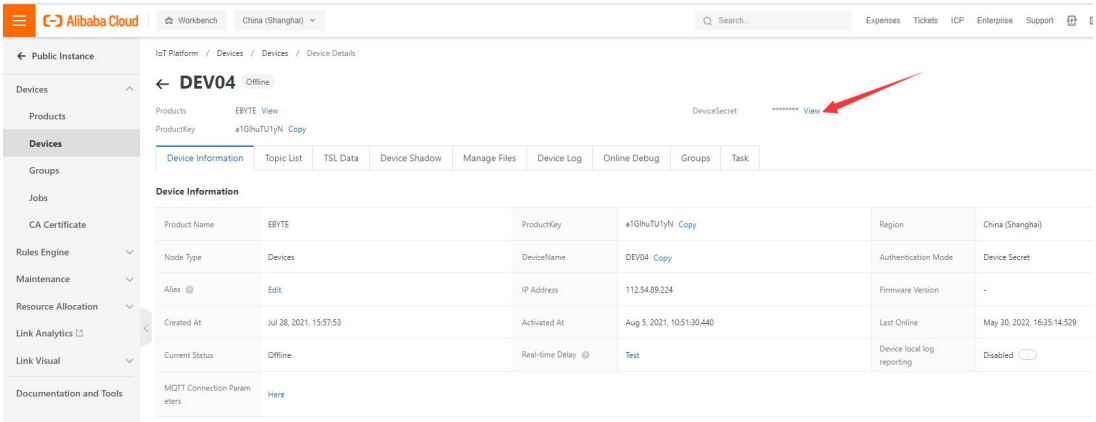
Due to the MQTT platform (Baidu Cloud, Huawei Cloud, OneNET) there are adjustments resulting in the parameters filled in can not be connected, to the platform rules prevail;

To fill in the standard MQTT3.1.1 parameters as an example, the following chart:

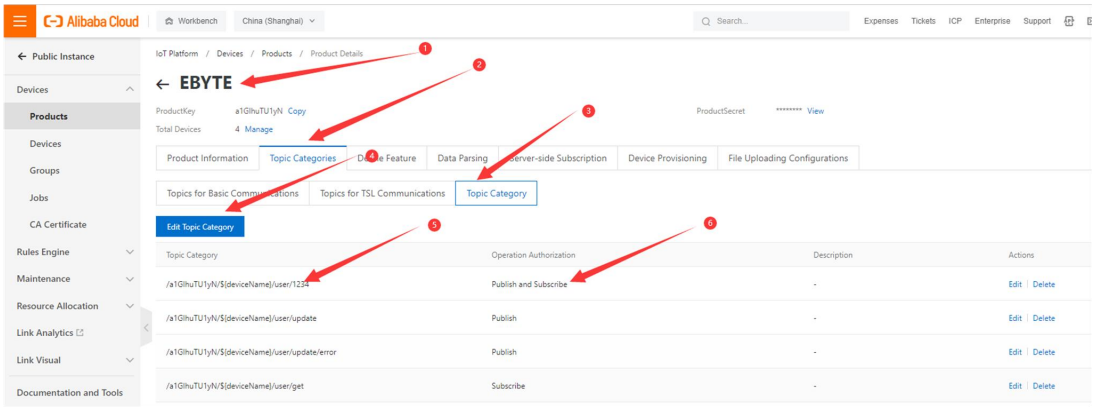


(2) Aliyun

Support the use of Aliyun “three elements” to connect directly to the server, to get connected to the Aliyun need “three elements”, as shown in the figure (only for demonstration cases, users need to use self-built parameters to connect):



Configure Topic for communication testing:



Configure the topic description:

Select the corresponding product, in the list of Topic Classes under the “Customized Topic” (for detailed instructions,

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please refer to the AliCloud documentation), click “Define Topic Class”, configure the name as 1234 and give publish and subscribe permissions (for). (for realizing data transmission).

Configure the device connection parameters as shown in the following figure (the left figure is for the host computer, the right figure is for the web configuration):

{

“ProductKey": ‘a1GlhuTU1yN’,

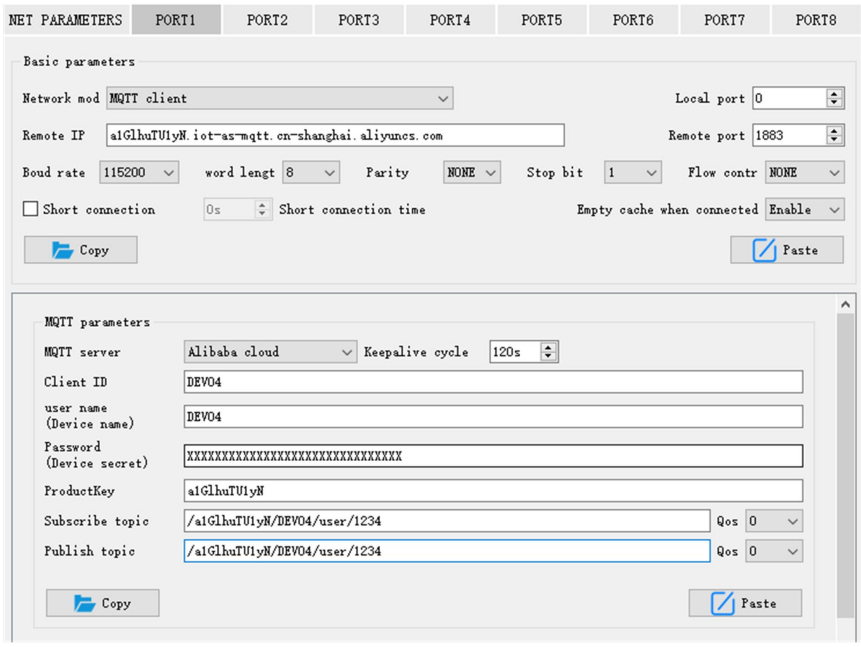
“DeviceName": ‘DEV04’,

“DeviceSecret": ”xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx”

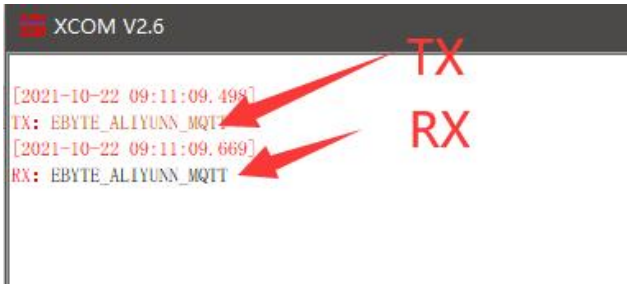
}

Aliyun server address: ProductKey.iot-as-mqtt.cn-shanghai.aliyuncs.com:1883

Subscribe and publish Topic:/a1GlhuTU1yN/DEV04/user/1234



AliCloud MQTT platform communication test:



4.5 Channel ports

Random port:

TCP clients, UDP clients, HTTP clients, and MQTT clients can configure the local port to 0 (using a random local port), and random ports must not be used in server mode, or the client will not be able to establish a connection correctly (the device is not listening on the port correctly).

Using a random port connection can quickly re-establish the connection when the device accidentally disconnects from

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the server, preventing the server from rejecting the connection due to four incomplete waves, and it is recommended to use a random port in client mode.

The device automatically configures random ports when AT configures TCP client, HTTP client, and MQTT client modes, which can be customized and canceled.

Static port:

Device fixed port (factory default used: 8001-8008), TCP server mode device listens to the configured port, accepts the connection request from the client and establishes the connection for data communication, TCP client mode device fixed port initiates the connection request.

5. Advanced Features

5.1 Heartbeat Package and Registration Package

5.1.1 Heartbeat kit

In client mode, users can choose to send heartbeat packets and customize the heartbeat packet time. Heartbeat packet can choose network heartbeat packet, serial heartbeat packet two modes, support hexadecimal and ASCII code to send, this heartbeat packet is not MQTT heartbeat, using MQTT client mode needs to be closed, MQTT heartbeat can only be configured in the "MQTT Parameter Configuration" column "Heartbeat MQTT heartbeat can only be configured in the "MQTT Parameter Configuration" column as "Heartbeat Period", MQTT heartbeat packet content is constrained by the protocol is not open to configuration, it is recommended not to configure less than 60s, for example, Aliyun manual suggests 120s.

Heartbeat packet sending mode:

1. Default is off heartbeat packet mode.
2. Serial port mode -> the device sends heartbeat contents to the serial port bus according to the set heartbeat interval.
3. Network port mode->Device sends heartbeat content to the network port bus according to the set heartbeat interval.

Customize heartbeat packet content (maximum support 128 bytes (ASCII) data, 64 bytes (HEX) data)

Customize the heartbeat packet sending time interval, set to 0 to turn off the heartbeat packet function, set the value greater than zero to turn on the heartbeat packet function, open can be set in the range: (1-65536) seconds, the default value is 0.

5.1.2 Registration packages

In client mode, users can choose to send registration packets and customize the setting of registration packet time.

The registration packet supports the following modes:

1. sending MAC address (OLMAC) when the network establishes connection with the device.
2. Send data of customized registration packet when the network establishes connection with the device (OLCSTM).
3. Each packet of data sent by the device to the network after the network establishes a connection with the device is preceded by the MAC address (EMBMAC).
4. After the connection between the network and the device is established, each packet of data sent by the device to the

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network is preceded by the data of the customized registration packet (EMBCSTM).
Customized registration packet content (maximum support for 128 bytes (ASCII) data, 64 bytes (HEX) data)
Note: It is recommended not to use special characters (e.g. “,” “\” “/”, etc.) when configuring the registration packet, and if you want to use it, it is recommended to use hexadecimal configuration.

5.2 Short connections

In Client mode, it supports network short connection (the function is disabled by default), TCP short connection is mainly used to save server resource overhead, and is generally applied to the scenario of multi-point (multi-client) to one-point (server).
The TCP short connection function is used in TCP Client mode. When the short connection function is turned on, the device will only request to connect with the server when sending information, and after the connection is successful, the device will automatically disconnect if the serial port does not receive any data or the network port does not send/receive any data within the set period of time.
The short link hold time is set to 0 to close the short connection function. When the setting range is (2-255) seconds, the short connection function is turned on, and the default holding time is 0 seconds (short link is turned off).

5.3 Serial port cache cleanup

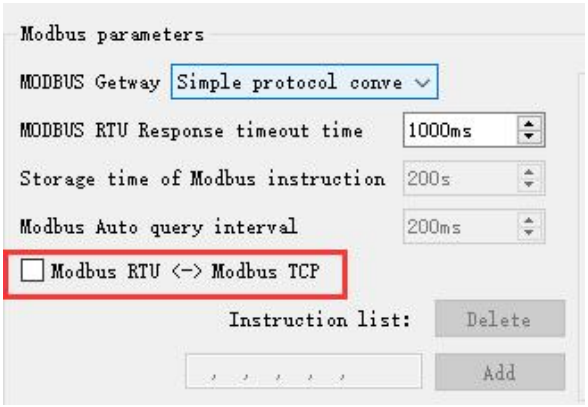
When the TCP connection is not established, the data received by the serial port will be put in the buffer area, the serial port receive buffer is 3k bytes, after the network connection is successful, you can choose to clear the serial port buffer or send the buffer over the network through the configuration.
Enable: The device does not save the data received by the serial port before the connection is established.
Disable: The network will receive the cached data from the serial port after the connection is established.

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5.4 Modbus Gateway

5.4.1 Protocol conversion

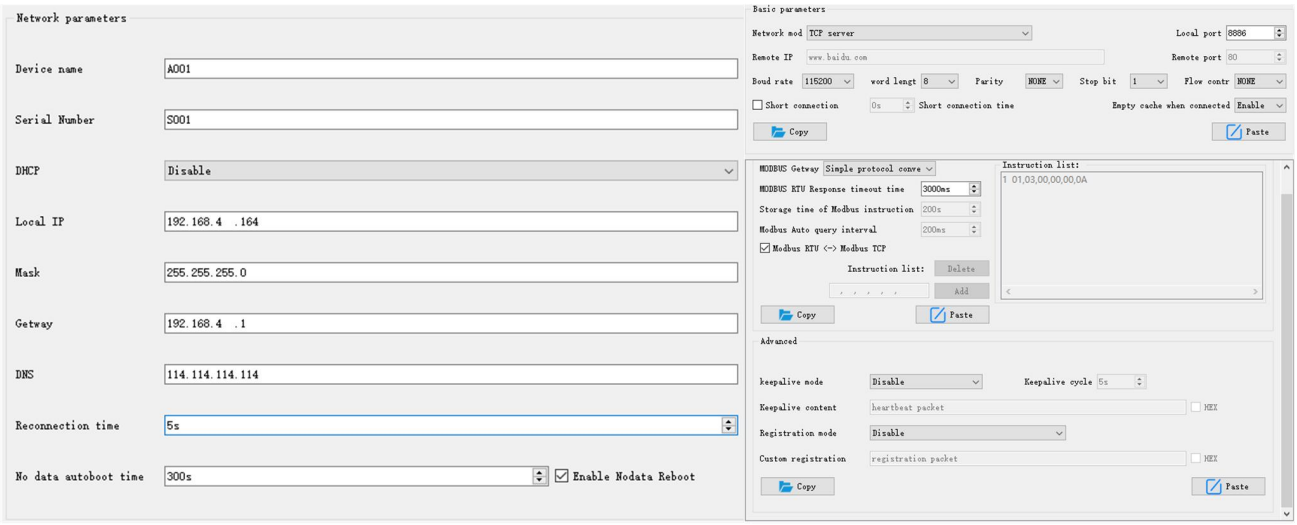


Enable: Modbus data is verified and non-Modbus data (RTU/TCP) is discarded and not transmitted, and the Modbus RTU protocol is interchanged with the Modbus TCP protocol.
Disable: No protocol conversion but verify Modbus data, non-Modbus data (RTU/TCP) is discarded and not transmitted.

5.4.2. Simple Protocol Conversion

Convert Modbus RTU data to Modbus TCP data, or Modbus TCP data to Modbus RTU data, to realize the inter-conversion of Ethernet Modbus data and serial 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, please use “Storage Gateway” and “Multi-Host Mode” if you need multi-host. “Multi-host operation is not supported in this gateway mode.

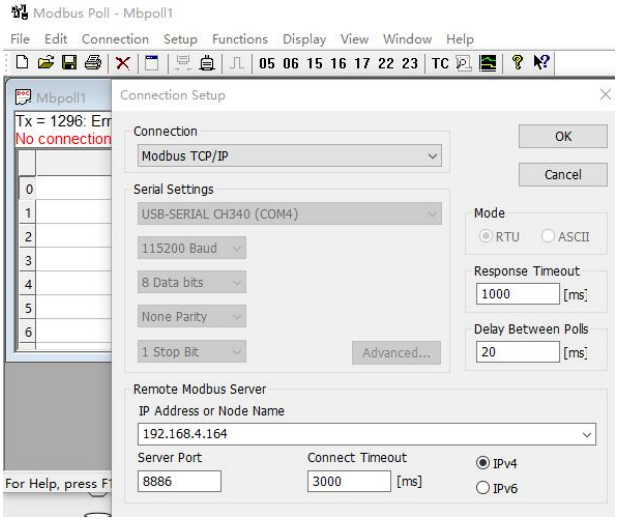
Simple Protocol Conversion Configuration:



Modbus Poll and Modbus Slave software debugging:

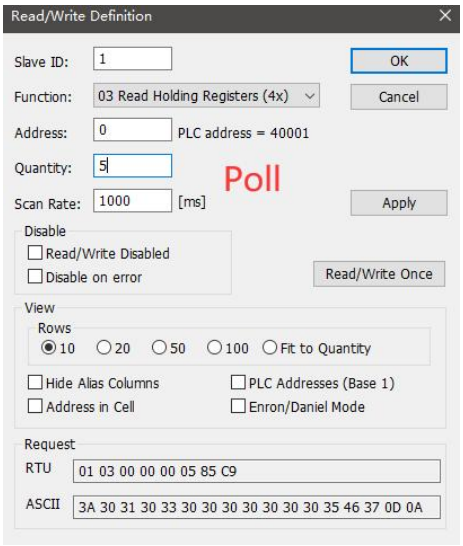
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Software connection setup:

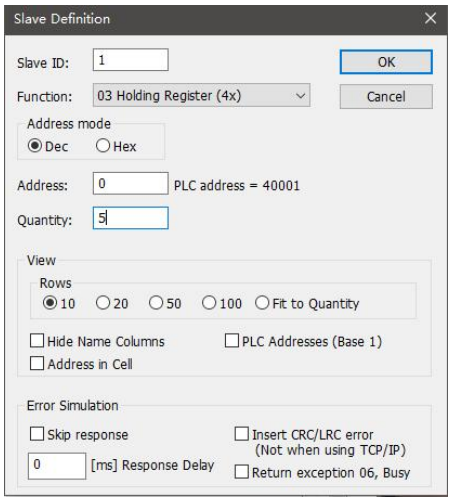


Software Register Read and Emulation Configuration:

Poll menu selection SetupRead/Write Definition

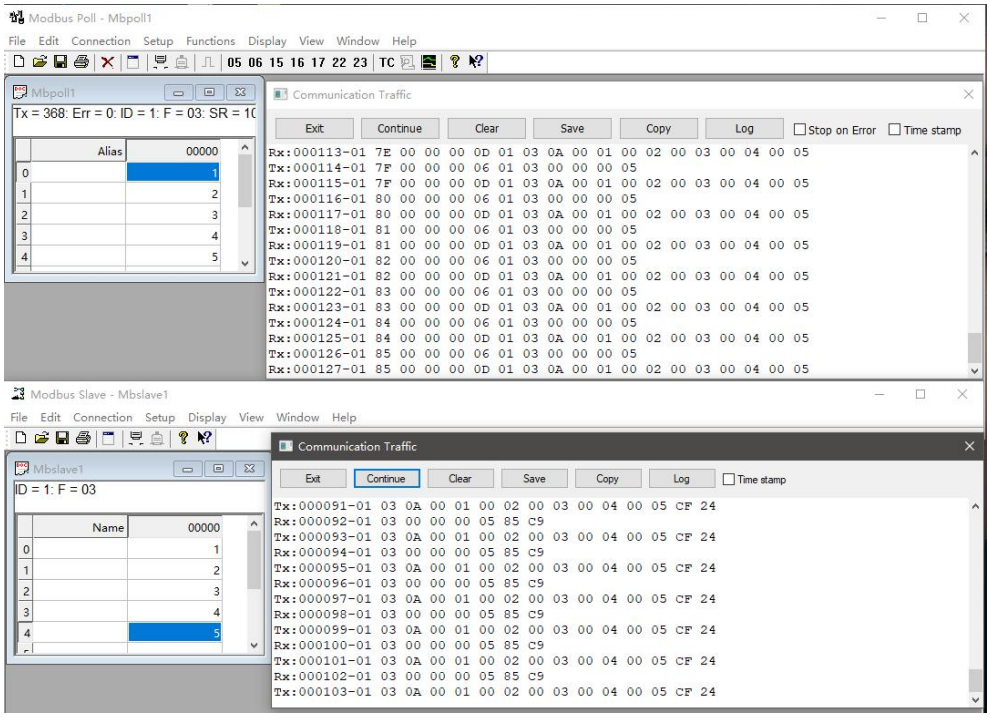


Slave menu selection SetupSlave Definition



Newsletter Demo:

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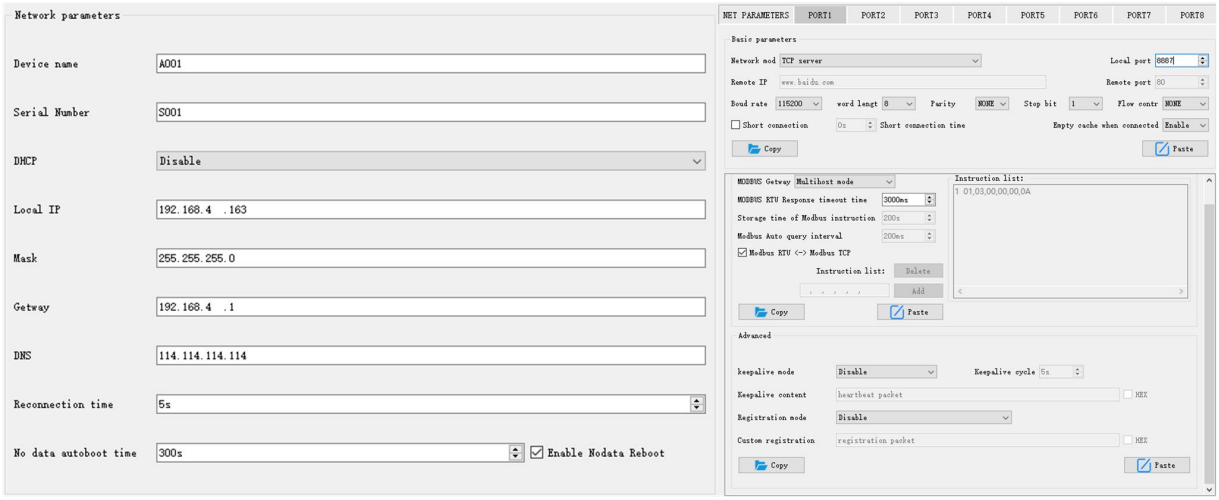
5.4.3. Multi-Host Mode

Relatively simple protocol conversion can only exist a Modbus master, while the multi-host mode can access multiple Modbus TCP hosts at the same time, when multiple Modbus hosts access at the same time, the Modbus gateway will carry out bus occupancy scheduling (RS-485 bus can only handle one request at a time, while the multi-host mode will be based on the sequence of the TCP request to sort and process, and other links to wait, so as to solve the bus conflict problem (currently under the single-server mode each channel supports up to five Modbus TCP host connections, you should pay attention to the matching of the request interval and timeout time). Other links will wait), so as to solve the problem of bus conflict (currently in single-server mode supports up to 5 Modbus TCP host connections per channel, multiple hosts accessed at the same time should pay attention to the matching of the request interval and timeout, otherwise it should be due to the serial transmission rate is much smaller than the Ethernet transmission rate resulting in packet loss, if you need a fast response, it is recommended to use the “Storage Gateway”). If you need fast response, it is recommended to use “Storage Gateway”), which only supports working in TCP server mode, and the slave can only be in the serial port, otherwise it can't work properly.

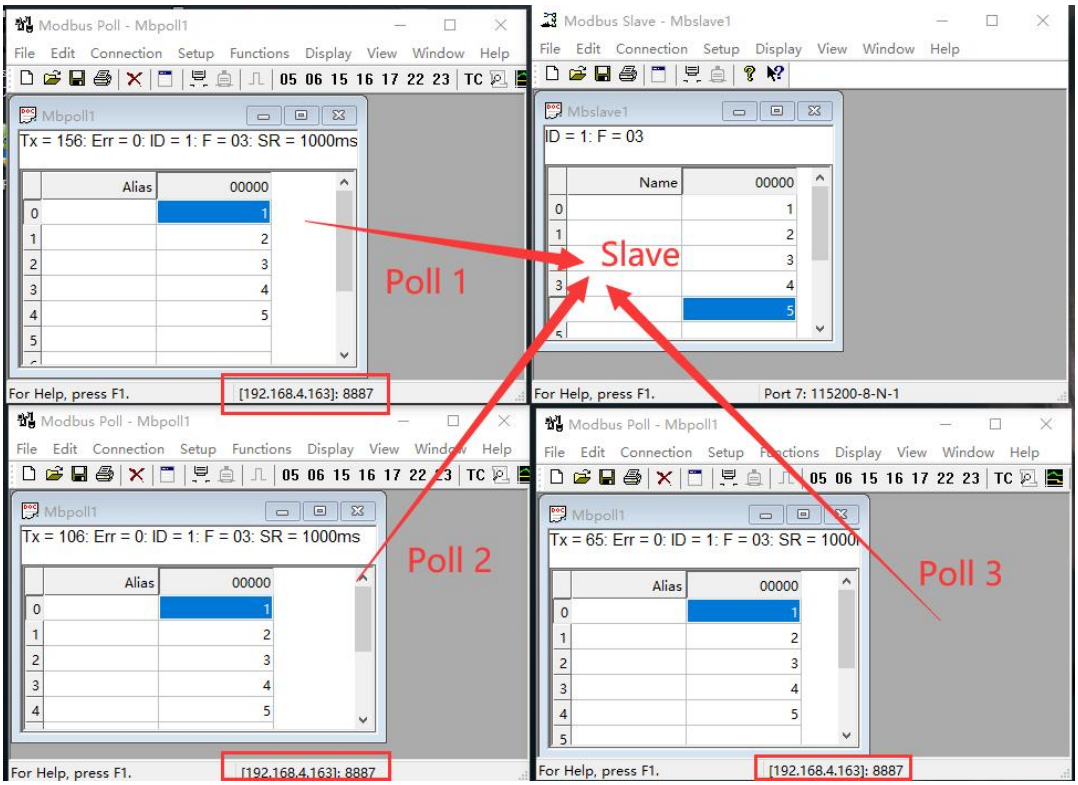
As the number of hosts increases, the Modbus timeout should be increased accordingly, if you need multiple hosts to continuously request at high speed, it is recommended to use “Storage Gateway”, and it is recommended to configure it as “Simple Protocol Conversion” when there are no multiple hosts.

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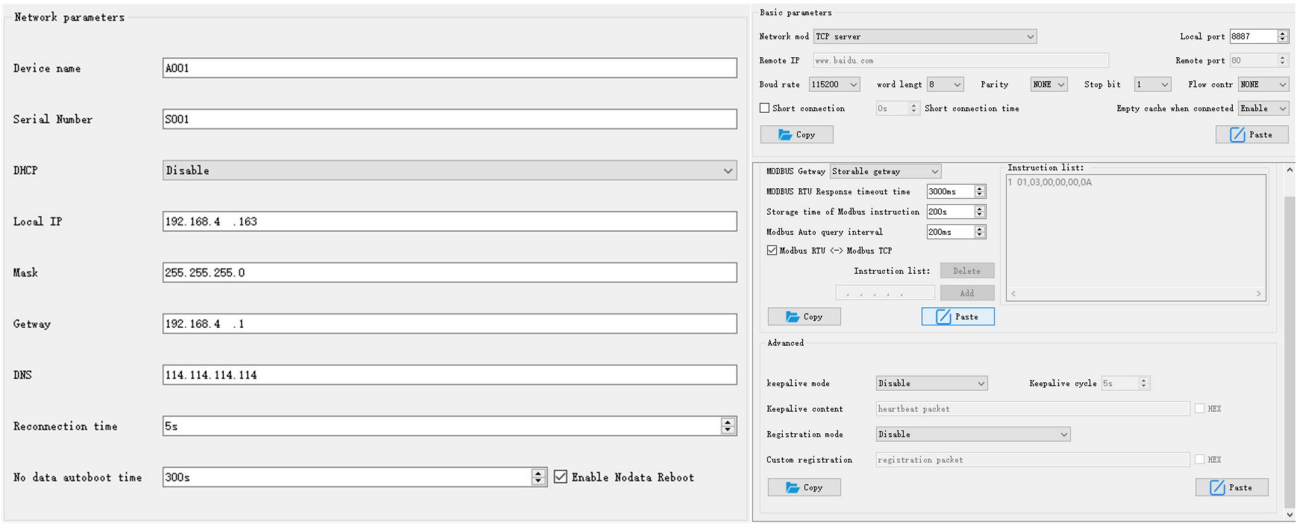
Refer to “Simple Protocol Conversion” for software configuration and register configuration to enable multiple Modbus Poll software at the same time.



5.4.4. Storage Gateway

The storage type gateway not only arbitrates the bus data but also stores the repeated read commands. When different hosts request the same data, the gateway does not need to inquire the register status of the RTU device several times, but directly returns the cached data in the storage area, which greatly enhances the processing capability of the gateway for multi-host requests, and at the same time shortens the time consumed by the whole request process. Users can customize the command polling interval and command storage time in the storage area according to their needs.

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The Storage Gateway, as an optimization of the performance of multi-host requests, also works only in TCP server mode, which improves the response speed on the network side.

Features:

(1) The gateway has a 2K cache for storing instructions and returning results (reading 10 holding registers, for example, can store roughly 67 instructions and return results);

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

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

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

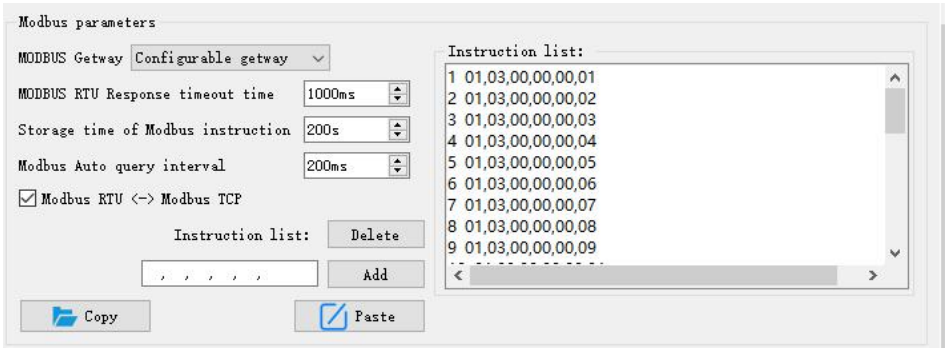
(5) The first instruction and control instructions (05, 06, 0F, 10 function codes) will directly access the RTU device;

(6) Only 01, 02, 03, 04 Modbus function code query result storage is supported;

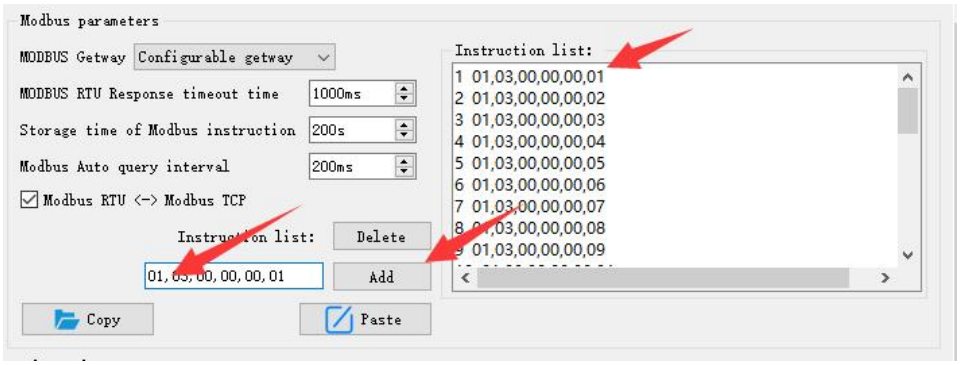
5.4.5.Configurable Gateways

According to the pre-configured MODBUS commands, the gateway will automatically poll the RTU device registers (only supports the configuration of MODBUS read commands), the commands in the non-storage table will directly operate the RTU device, and the commands that are frequently read can be stored in the gateway in advance, which can shorten the response time (querying the configured commands), and the data won't be sent to the server directly, it needs to be requested by the Modbus host before it will be returned. The data will not be sent to the server directly, but will be returned only when requested by the Modbus host, similar to the use of “Simple Protocol Conversion”, if you need to upload the data to the server automatically, please select “Auto Upload”. Due to the above features, only Modbus slaves can be connected to the serial port side of the configurable gateway.

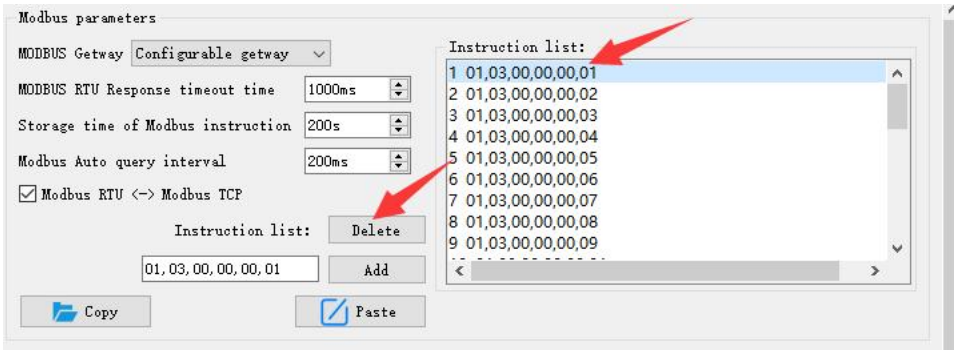
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Instruction storage instructions (added, instruction errors and formatting errors cannot be added):



Instruction storage instructions (deleted):



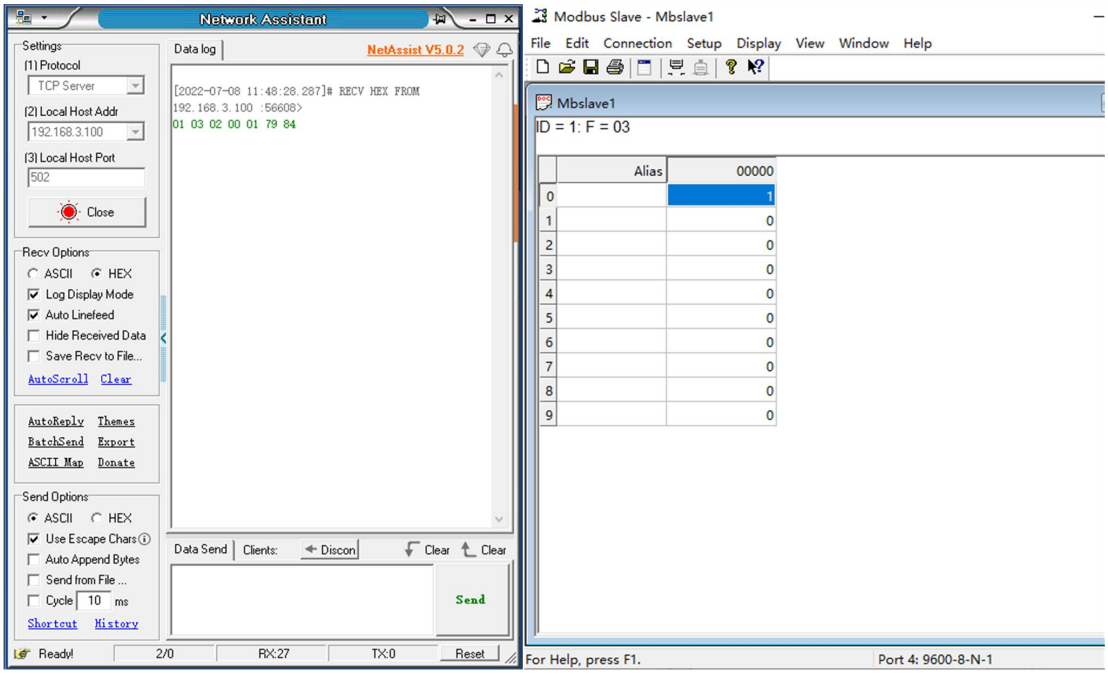
5.4.6.Automatic uploads

In client mode (TCP client, UDP client, MQTT client, HTTP client) the gateway automatically polls the stored commands in the command table and uploads them to the server. You can select the feedback format (Modbus RTU format or Modbus TCP format) and the command polling interval (0-65535ms) according to your needs.

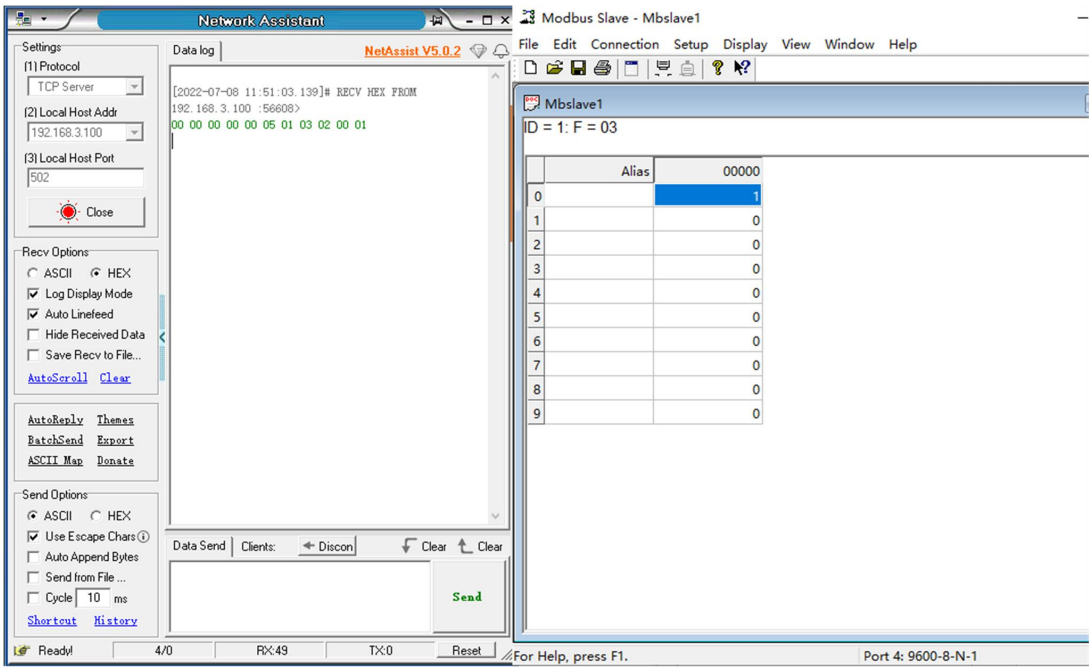
Command pre-storage is referenced to “Configurable Gateway - Command Storage Description” and automatically uploaded to the host computer/web page for configuration:

TCP client demo (Modbus RTU format):

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TCP client demo (Modbus TCP format):



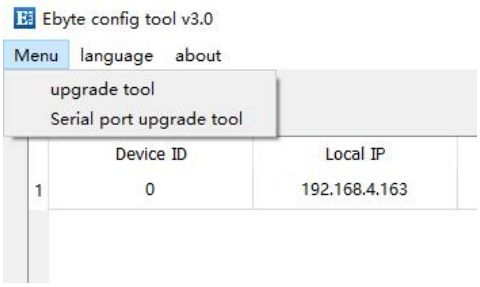
5.5 Firmware upgrades

Users can upgrade the firmware of the device through the “EBYTE Network Configuration Tool”.

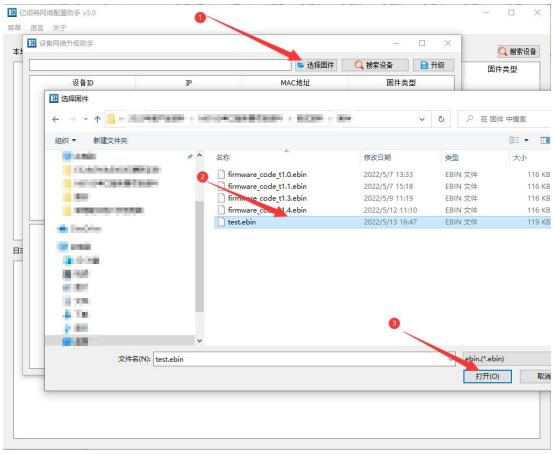
5.5.1.UDP upgrade

Step 1: Open “EBYTE Network Configuration Tool” and select “Device Upgrade Assistant” under “Menu” option;

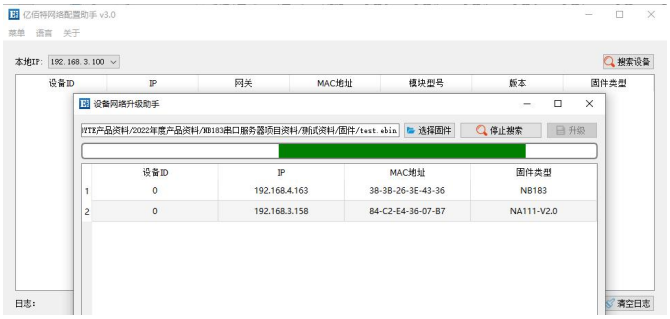
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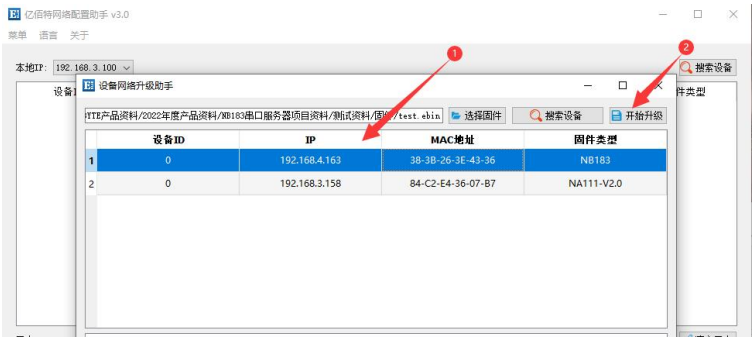
Step 2: Select the firmware you need to use, you need to get it from the "Related downloads" of the corresponding product details on the official website (www.cdebyte.com), the firmware for demo use is not available on the official website.



Step 3: Click "Search for Devices", the device list will show the currently found devices, click "Stop Searching" again.



Select the device to be upgraded and click Start Upgrade, wait for the upper computer to show that the upgrade is complete.



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5.5.2.Serial port upgrade

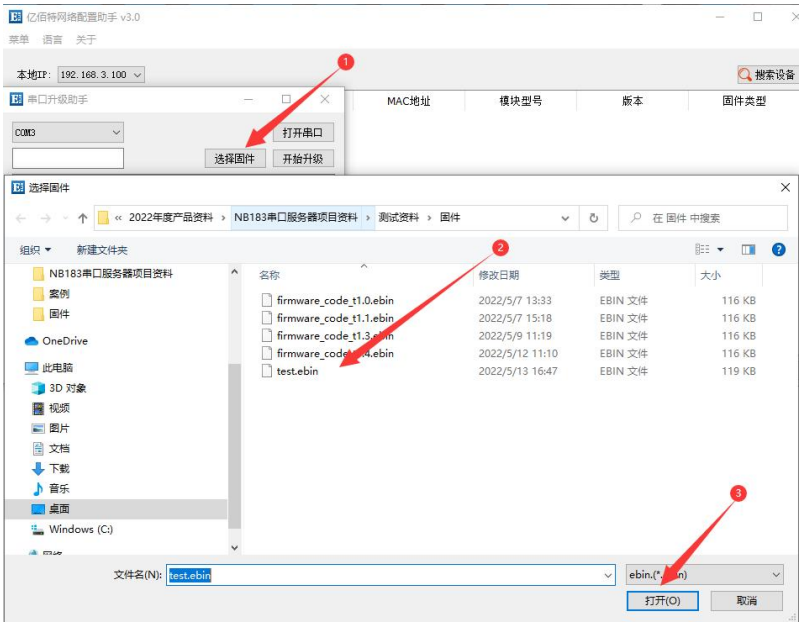
Only channel 1 (i.e., serial port 1) supports upgrading using the serial port, and it is recommended to use the serial port for upgrading when network upgrading fails, or when the network environment is complicated;

Step 1: Make sure the device is in the power-off state, and connect the serial port 1 correctly;

Step 2: Open “Yeppert Network Configuration Tool”, select “Serial Port Upgrade Assistant” under “Menu” option, select the corresponding serial port and click “Open Serial Port”. “Open Serial Port”;

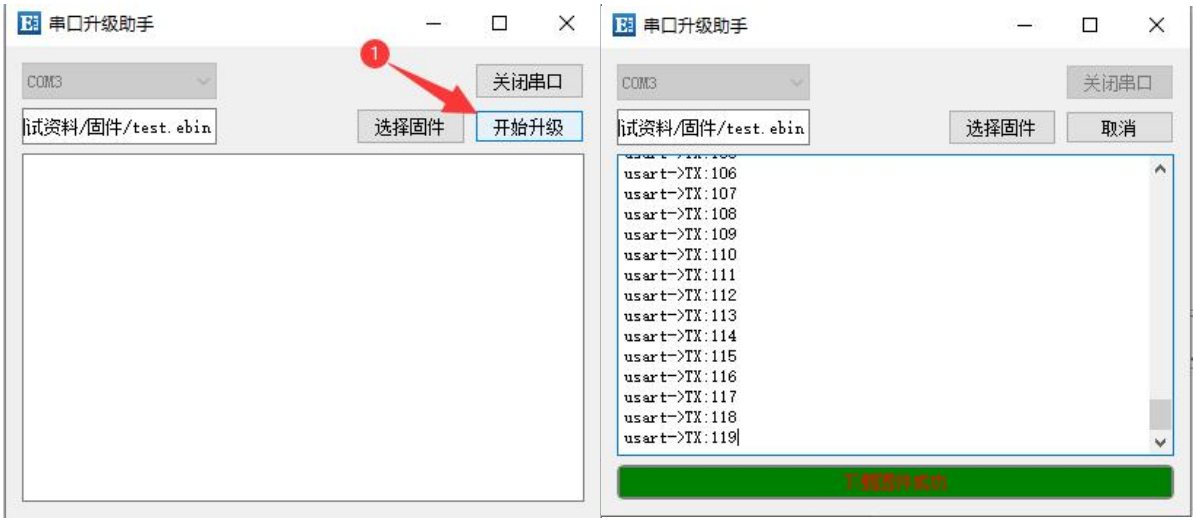


Step 3: Select the firmware you need to use, you need to get it from the official website (www.cdebyte.com) under the “Related downloads” of the corresponding product details, the demo firmware is not available on the official website;



Step 4: Click “Start Upgrade”, press and hold Reload of NB183 and then turn on the power of the device, wait for the firmware upgrade to complete, then click “Cancel” to end the serial port upgrade;

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6. Parameter Configuration

6.1 Upper computer parameterization

6.1.1.Downloading the host computer

You can copy the link below to download the latest version of the uploader from the EBYTE website, which is located in the related downloads underneath the product.

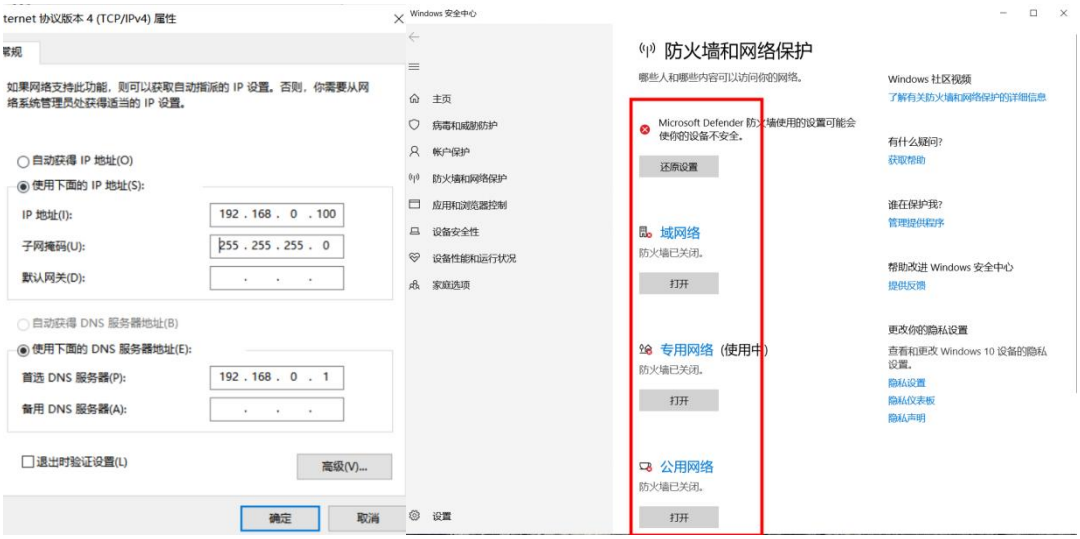
Note: The page of the uploader may be slightly changed in different versions, subject to the latest one provided by the official website.

Reference link: https://www.cdebyte.com

6.1.2.Environmental preparation

If you are directly connected through the switch, please make sure that the antivirus software is exited and the firewall of the computer is turned off. If you are directly connected to the computer, you also need to pay attention to the computer can not use dynamic IP, you can use any network segment IP address.

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6.1.3. Upper computer use

Double-click to run the host computer software, such as more than one network card need to select the IP address used to connect the device, click on the “search for devices”, you can see that the device has been found, click on the device to realize the parameters of the configuration.

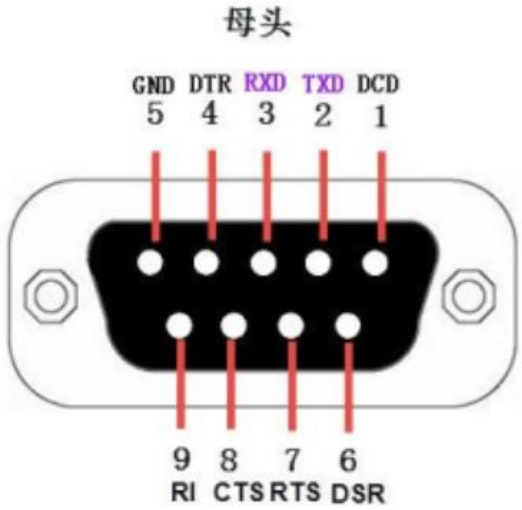
You can configure the network settings and serial port settings directly on the right side, and click “Save Configuration” and “Restart Device” to complete the configuration, and you can also restore the device to the factory, and you can choose to export and import the configuration information when multiple devices are configured at the same time.

6.2 Serial AT Command Configuration

6.2.1. Environmental preparation

Use the serial AT command for the device, first of all, to ensure that the serial line can be connected properly. 485 interface A to A, B to B, RS232 interface can be connected directly using DB9 male connector, such as the need to convert to a 3-wire system, you need to connect the adapter TXD to RXD, RXD to TXD, GND to GND.

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6.2.2. Serial port and serial port tool preparation

After connecting the serial port, you can use any serial port tool to open the serial port, if you can't find the serial port, you need to install the corresponding serial port driver, you need to search for the corresponding chip to download. The default baud rate of the device is 115200, 8N1.
If there is no corresponding serial port tool, you can download it from our official website.
Link: https://www.cdebyte.com

6.3 Network AT Command Configuration

You can refer to the EBYTE AT instruction set, this is only an example.
Related links: https://www.cdebyte.com
Send +++, send AT again within three seconds, the device back to show +OK that is, enter the AT setting, you can send the rest of the AT command.

6.3.1. Network AT Command Configuration

Network AT command is used in the same way as serial AT, you need to connect the TCP link first to ensure the link is successful before proceeding, you can refer to the EBYTE AT command set, this place is only an example.
Related links: https://www.cdebyte.com
The server side sends +++, and sends AT again within three seconds, and the device displays +OK back that it enters the AT setting and can send the rest of AT commands.

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The final explanation right belongs to Chengdu EBYTE Electronic Technology Co.Ltd

Revision history

Versions	Revision Date	Revision Notes	Maintaining people
1.0	2025-5-9	Initial Version	LYL

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