



# Serial To Ethernet SMD Module NS2





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## **Chapter 1 Product Introduction**

NS 2 is a serial to Ethernet server module that realizes serial data and Ethernet data conversion. It provides a variety of Modbus gateway modes and TCP/DUP/MQTT/HTTP IoT gateway modes, which can meet the networking functions of various serial devices/PLCs . The module adopts LCC package, which is convenient for user equipment to be integrated on the PCB board.

The NS 8 -TB test kit comes with a USB-to-TTL circuit that does not require the user to connect an external converter, and leads to reset and factory reset pins for external buttons for easy operation, and also connects the operating status indicator pins to external LEDs for users to observe the status .

## Features

- Support 10M Ethernet interface;
- Support two configuration methods: configuration tool and AT command;
- Server mode supports multiple Socket connections ;
- The baud rate supports 2400~115200bps, and supports multiple verification methods;
- Support configurable domain name resolution service, namely DNS;
- Support timeout restart function, the time can be customized;
- Support short connection function, short connection interval time customization;
- Support serial port cache cleaning function ;
- Support hardware reset to factory settings;
- Support online upgrade, convenient user function customization;
- Support sending multiple registration packets and heartbeat packets, such as connecting to send MAC, connecting to send custom data , etc.;
- 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;
- Support 2 channels to open the server at the same time, support dynamic allocation of 16 clients, and a single server supports 15 client access ;
- Support a variety of Modbus gateways, which can realize the active reporting of RTU devices, support the interconversion of Modbus TCP and Modbus RTU protocols, and can be configured as a storage mode to automatically collect device data, or use a question and answer multi-host mode;
- Support MQTT gateway function, fast access to Alibaba Cloud and standard MQTT3.1.1 servers

(OneNET, Baidu Cloud, Huawei Cloud, etc.);

• Support Modbus data to actively report to TCP transparent transmission server, MQTT server, etc.;

• Support HTTP client mode, using HTTP/1.1 protocol, can be configured as GET, POST two request methods ;

• Support TCP/IP direct communication or connect communication through "virtual serial port" .

## **Chapter 2 Quick Start**

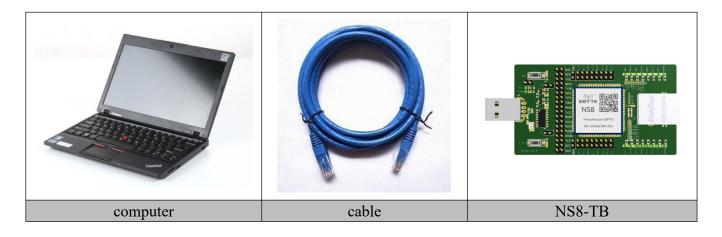
If there is a problem during use, click the official website link:

https://www.ebyte.com/product-class.aspx

The quick start is suitable for quickly verifying the functions of the device. This chapter uses the NS8-TB test board as an introduction, hereinafter referred to as the device.

## 2.1 Hardware preparation

One laptop with RJ45 network port ; One NS8-TB ; A network cable ; The specific preparation of hardware equipment is shown in the following figure:



## 2.2 Software preparation

Serial port debugging assistant (X COM ), network debugging assistant (T CP/IP debugging assistant), Ebyte network configuration tool (configuration host computer), official website address: <a href="https://www.ebyte.com">www.ebyte.com</a>, product details provide a download interface.

(((•))) EBYTE Chengdu Ebyte Electronic Technology Co., Ltd.

Introduction       Introduction <td< th=""><th>Network Assistant</th><th>X COM</th><th>Ebyte network configuration tool</th></td<>	Network Assistant	X COM	Ebyte network configuration tool
Meru larguage about	TUP free	Die Beschlie Good v hed nie 11000 Das kie 2 Das kie	Refer III (III III III III III III III III I

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

## 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 8 001 and channel 8 corresponds to port 8 00 8 in turn . For details, see the chapter " 4.1 Correspondence between channel and serial port".

#### 2.3.1 Hardware connection



1. Connect the network port of the device and the network port of the computer with a network cable ;

2. Device USB interface \_ connect to computer ;

3. After confirming that there is no problem with the status, proceed to the next step of configuration; Note: The test board is used to test the first serial port by default. If other serial ports need to be verified, jumper caps need to be switched.

## 2.3.2 Device parameter configuration

In order to enable users to quickly have a simple understanding of the device, we use the default parameters for data transparent transmission test. The default parameters of the NS8 module are shown in the table below.

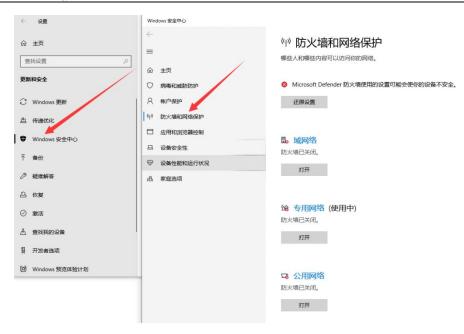
project	default parameters
IP address	192.168.3.7
subnet mask	255.255.255.0
gateway	192.168.3.1
Channel 1 working mode	TCP_SERVER
Local port of channel 1	8 001
Serial baud rate	1 15200
Serial parameters	NONE/8/1/NONE

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.

😰 网络连接	📱 以太网 2 状态	🔋 以太网 2 属性	Internet 协议版本 4 (TCP/IPv4) 属性	×
● 网络连接 ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●	120	<ul> <li>○ 以太网 2 届生</li> <li>○ 网络 共享</li> <li>注接时使用:</li> <li>● Realtek PCIe GbE Family Contract</li> <li>此连接使用下列项目(O):</li> <li>● Microsoft 网络客户講</li> <li>● Microsoft 网络客户講</li> <li>● Npcap Packet Driver (NPCAP)</li> <li>○ ● OoS 数据包计划程序</li> <li>● Internet 协议版本 4 (TCP/IPv4)</li> <li>● Microsoft LLDP 协议驱动程序</li> <li>● Internet 协议版本 6 (TCP/IPv6)</li> <li>&lt; ● Internet 协议版本 6 (TCP/IPv6)</li> <li>&lt; ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●</li></ul>	常规 如果网络支持此功能,则可以获取自动指派的 IP 设置。否则,你需要 络系统管理员处获得适当的 IP 设置。 ● 使用下面的 IP 地址(Q) IP 地址(I): 192.168.3.100 子网掩码(U): 255.255.0 默认网关(D): 192.168.3.1 ● 自动获得 DNS 服务器地址(B) ● 使用下面的 DNS 服务器地址(E): 首选 DNS 服务器(A):	从网
3 个项目 选中 1 个项目		L		

## 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 Turn on "Serial Port 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:

XCOM V2.6		
	Port	
	COM3 : USB-S	ERIAL CH34G $\sim$
	Baud rate	115200 🗸
	Stop bits	1 ~
	Data bits	8 ~
	ity	None ~
	Operation	Open
	Save Data	Clear Data
	П Нех	DTR
	TS RTS	🗌 自动保存
	🖂 TimeStar	np 100 ms
Single Send Multi Send Protocol Transmit Help		
	^	Send
		Clear Send
	~	
Timing Cycle 1000 MS	Open File Send File	Stop Send
🗌 Hex Send 🔲 Wordwrap	0% 【火爆全网】正点原子DS100	手持示波器上市
🔆 🕶 www.openedv.com S:0 R:0	Current time15	:19:02

#### 2.3.5 Turn on 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:

		Network As	sistant		-□×
Settings [1] Protocol TCP Client [2] Remote Host Addr [192.168.3.7 [3] Remote Host Port [8001 Connect Recv Options • ASCII C HEX [V Log Display Mode Auto Linefeed Hide Received Data Save Recv to File	Data log			<u>NetAssi</u>	st V5.0.2 🖗 🗘
AutoScroll Clear Send Options • ASCII C HEX	Data Send			4	Clear 🕇 Clear
Use Escape Chars (i) Auto Append Bytes Send from File Cycle 200 ms <u>Shortcut History</u>					Send
🝠 Display in log mode with t	imestamp	0/0	RX:0	TX:0	Reset

# 2.3.6 Data sending and receiving 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.

	Network Assistant	¥ ×	SCOM V2.6	- 🗆 X
Settings (1) Protocol	Data log	NetAssist V5.0.2 🧇 📿	[2022-05-18 15:31:10.167] RX: EBVTE NET SEND	Port
TCP Client	[2022-05-18 15:31:10.051]# SEND ASCII> EBVIE_NET_SEND	- I I I I I I I I I I I I I I I I I I I	[2022-05-18 15:31:11.358]	COM3:USB-SERIAL CH34C $\sim$
(2) Remote Host Addr 192.168.3.7	[2022-05-18 15:31:11.241]# SEND ASCII>		RX: EBYTE_NET_SEND	Baud rate 115200 🗸
(3) Remote Host Port	EBYTE_NET_SEND		[2022-05-18 15:31:12.093] RX: EBVTE NET SEND	Stop bits 1 🗸
8001	[2022-05-18 15:31:11.971]# SEND ASCII> EBYTE NET SEND			Data bits 8 🗸 🗸
- Disconnect	[2022-05-18 15:31:12.601]# SEND ASCII>		[2022-05-18 15:31:12.719] RX: EBYTE_NET_SEND	Parity None ~
Recy Options	EBYTE_NET_SEND		[2022-05-18 15:31:15.652]	Operation 💓 Close
● ASCII ← HEX	[2022-05-18 15:31:15.555]# RECV ASCII>		TX: EBTTE_UART_SEND [2022-05-18 15:31:16.002]	Save Data Clear Data
Log Display Mode	[2022-05-18 15:31:16.004]# RECV ASCII>		TX: EBYTE_UART_SEND [2022-05-18 15:31:16.441]	Hex DTR
Hide Received Data	EBYTE_VART_SEND [2022-05-18 15:31:16.444]# RECV ASCII>		TX: EBYTE_VART_SEND [2022-05-18 15:31:17.863]	□ RTS □ 自动保存
Save Recv to File AutoScroll Clear	EBYTE_VART_SEND [2022-05-18 15:31:17.865]# RECV ASCII>		TX: EBYTE_VART_SEND ~	TimeStamp 100 ms
Send Options	EBVTE_UART_SEND	~	Single Send Multi Send Protocol Transmit Help EBVTE UART SEND	
	Data Send	두 Clear 🛧 Clear	LDT IE_OKAL_DERU	Send
Use Escape Chars (i)	EBVTE_NET_SEND			Clear Send
Send from File		Send	Timing Cwele(1000 me Open File	Send File Stop Send
Cycle 200 ms Shortcut History				Send File Stop Send
le Ready!	4/5 RX:60	TX:80	Image: State of the s	

# **Chapter 3 Product overview**

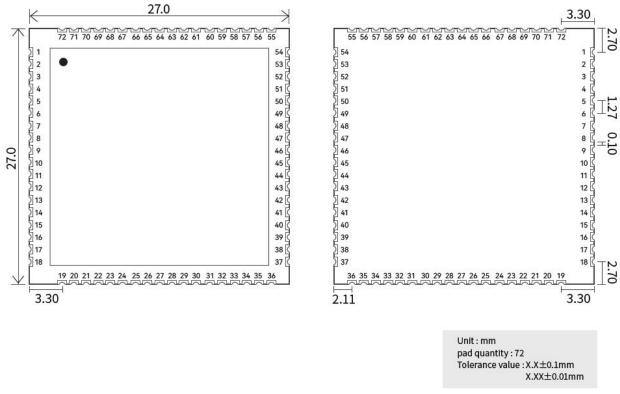
# 3.1 Product specifications

Product number	product type	Socket Connectio ns	Operating mode	Working voltage (V)	Product Size (mm)
EBT3001	Single serial port chip	6 way		DC 2.1~3.6	5 x 5
EBT3002	Eight serial port chip	1 6 way		DC 2.4~3.6	10 x 10
NS1	Single serial port patch	6 way		DC 3.0~5.5	17×19
NS2	Dual serial port patch	1 6 way		DC 3.0~5.5	27 × 27
NS4	Four serial port SMD	1 6 way		DC 3.0~5.5	27 × 27
NS8	Eight serial port patch	1 6 way	TCP Server	DC 3.0~5.5	27 × 27
NS1 -TB	Test base	6 way	TCP Client	DC 3.0~5.5	$71 \times 27$
NS8-TB	Test base	1 6 way	UDP Server _	DC 3.0~5.5	$103 \times 49$
NT1	single serial pin	6 way	UDP Client	DC 3.0~5.5	35 x 22 x 20
NT1-B	single serial pin	6 way	M QTT Client	DC 3.0~5.5	35 x 22 x 20
NA111	Single serial	6 way	H TTP Client	DC 8~28	$110 \times 66 \times 30$
NA111-A	port rail	0 way		AC 85~265	110 × 00 × 30
N B114	Single serial port positioning hole	6 way		DC 8~28	$1\ 02\  imes\ 84\  imes\ 25$
NB124	Dual serial port positioning hole	6 way		DC 8~28	$\begin{array}{c} 173 \times 95 \times \\ 26.5 \end{array}$
NB144	Four serial port positioning holes	1 6 way		DC 8~28	$\begin{array}{c} 198 \times 109 \times \\ 26.5 \end{array}$
NB183	Eight serial port positioning holes	1 6 way		DC 8~28	$\begin{array}{c} 198 \times 109 \times \\ 26.5 \end{array}$

# 3.2 Technical Parameters

Item	Explanation
Operating Voltage	$3.0 \sim 5.5 V (DC)$
	Peak: 200mA @ 5V
We ulting a symmetry	Standby: 30mA@5V
Working current	Peak: 250mA @ 3.3V
	Standby: 50mA@3.3V
Serial port level	TTL level ( 3.3V )
Operating mode	TCP Server (default), TCP Client, UDP Server, UDP Client, HTTP Client, M QTT Client
Socket connection	
Socket connection	TCP server supports up to 16 client connections
Network protocol	IP, TCP/UDP, IPv4, I CMP , APR , D HCP , D NS , HTTP , M QTT
IP address	Customizable (default, 192.168.3.7)
DNS	support
DNS domain name resolution server	Customizable (default 1 14.114.114.114)
Configuration method	Configuration tools, AT commands
Local port	Can be customized (default, channel 1~channel 2 : 8 001-800 2)
Subnet mask	255.255.255.0 (default, customizable)
Gateway	192.168.3.1 (default, customizable)
Serial cache	512 Bytes
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
Product Size	$27 \times 27 \times 2.8 \text{ mm} (L \times W \times H)$
Product weight	3.5g_
Working temperature and humidity	$-40 \sim +85^{\circ}$ C, 5% $\sim 95\%$ RH (no condensation)
Storage temperature and humidity	-40 $\sim$ +105°C, 5% $\sim$ 95%RH (no condensation)

#### Pin Description 3.3



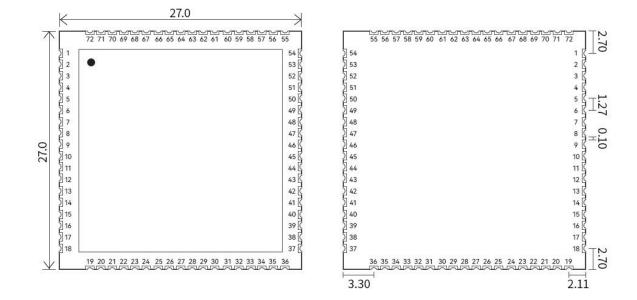
Seria 1 No.	pin	Functional description
1	GND	Common ground terminal, power supply negative terminal
		input;
2	NC	Default suspending;
3	NC	Default suspending;
4	NC	Default suspending;
5	NC	Default suspending;
6	NC	Default suspending;
7	GND	Common ground terminal, power supply negative terminal
		input;
8	GND	Common ground terminal, power supply negative terminal
		input;
9	GND	Common ground terminal, power supply negative terminal
		input;
10	GND	Common ground terminal, power supply negative terminal
		input;
11	NC	Default suspending;

12	NC	Default suspending;
13	NC	Default suspending;
14	NC	Default suspending;
15	TXD2	The serial port sends data, only supports 3.3V T TL, if it is
15	TADZ	connected to 5 V, level conversion is required;
16	RXD2	The serial port receives data, only supports 3.3V T TL, if it is
10	ICID2	connected to 5 V, level conversion is required;
17	NC	Default suspending;
18	NC	Default suspending;
19	GND	Common ground terminal, power supply negative terminal
17	GILD	input;
20	GND	Common ground terminal, power supply negative terminal
		input;
twent	VCC	Positive power input, supports 3-5.5V input, can be used with
y one		pin 22 at the same time;
twent	VCC	Positive power input, support 3-5.5V input; can be used with
y two		pin 21 at the same time;
twent	NC	Default suspending;
y		
three		
twent	NC	Default suspending;
y four		
25	NC	Default suspending;
26	NC	Default suspending;
27	NC	Default suspending;
28	NC	Default suspending;
29	NC	Default suspending;
30	NC	Default suspending;
31	NC	Default suspending;
32	NC	Default suspending;
33	485EN-2	Serial port 2 R S48 5 enable pin, normally low, pull high when
		sending data
34	NC	Default suspending;
35	NC	Default suspending;
36	485EN-1	Serial port 1 R S48 5 enable pin, normally low, pull high when
		sending data
37	NC	Default suspending;
38	NC	Default suspending;
39	NC	Default suspending;
40	NC	Default suspending;
41	SPDLED	Network port data indicator
42	LINKLED	Network port connection indicator
43	RX+	Ethernet receives RX+ signal;

44	RX-	Ethernet receives RX- signal ;
45	TX+	Ethernet sends TX+ signal ;
46	TX-	Ethernet sends TX- signal ;
47	RESTORE	Reset pin, pull it down for more than 5 seconds to take effect
48	TXD1	The serial port sends data, only supports 3.3V T TL, if it is
		connected to 5 V, level conversion is required;
49	RXD1	The serial port receives data, only supports 3.3V T TL, if it is
		connected to 5 V, level conversion is required;
50	NC	Default suspending;
51	NC	Default suspending;
52	NC	Default suspending;
53	3.3V	Can output voltage 3.3V ;
54	GND	Common ground terminal, power supply negative terminal
54	UND	input;
55	NC	Default suspending;
56	NC	Default suspending;
57	NC	Default suspending;
58	NC	Default suspending;
59	NRST	
		Module reset, pull down for more than 1ms to take effect
60	NET	Network connection indicator light, output 2S square wave if the connection is successful
		If the connection is unsuccessful, output a 1S rectangular
61	NC	wave, pull it high at 0.9S, and pull it low at 0.1S
		Default suspending;
62	NC	Default suspending;
63	NC	Default suspending;
64	NC	Default suspending;
65	LINK1	Serial port 1 data link indicator, U DP mode output low level ;
		In other modes, if the connection is successful, the output will
		be low level, and if there is no connection, the output will be
		high level ;
66	DATA1	Serial port 1 data indicator pin, output 50ms square wave
		when there is data interaction;
67	LINK2	Serial port 2 data link indicator, U DP mode output low level ;
		In other modes, if the connection is successful, the output will
		be low level, and if there is no connection, the output will be
		high level ;
68	DATA2	Serial port 2 data indicator pin, output 50ms square wave
	NC	when there is data interaction;
69	NC	Default suspending;
70	NC	Default suspending;
71	NC	Default suspending;
72	NC	Default suspending;



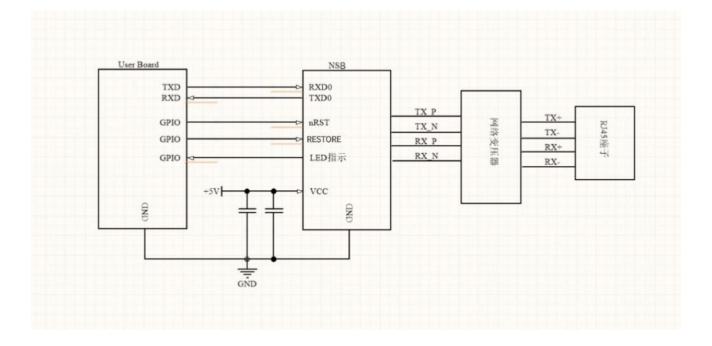
## 3.4 Dimensions



Unit : mm pad quantity : 72 Tolerance value : X.X±0.1mm X.XX±0.01mm

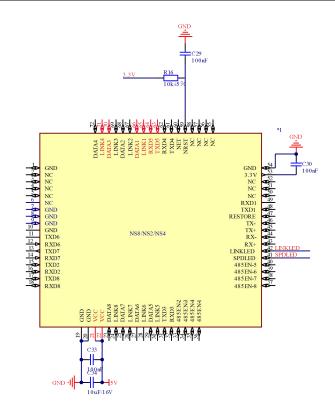
## 3.5 Hardware Reference Design

## 3.5.1 Typical application hardware connection



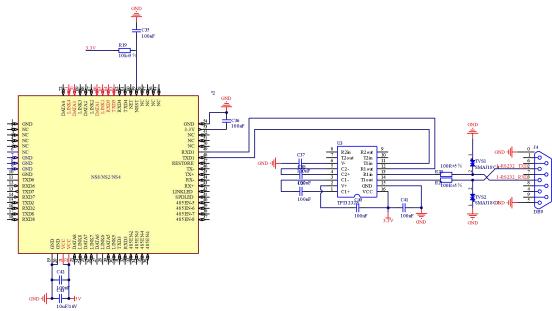
## 3.5.2 power interface

NS 2 uses DC typically 5 V. The voltage range of V CC is  $3.0 \sim 5.5$  V, the normal working current is 200 mA @5V, and the peak current is about 300 mA @5V. It should be noted that if the power supply is less than 3.3V, the 3.3V output of pin 53 will vary according to the input. V CC can be connected to 10UF/ 16V /10% and 100nF/50V/10% bypass chip capacitors to stabilize the module , and the NRST reset pin needs to be pulled up . As shown below.

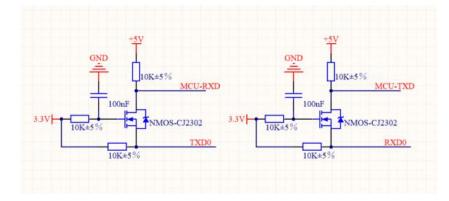


#### 3.5.3 UART interface

UART is a serial data interface and only supports TTL-3.3V communication level. It can connect RS-232 chip to RS-232 level and connect with external equipment. The UART interface of this module includes TXD/RXD signal lines. Taking the RS-232 level as an example, the reference circuit is as follows:



If it is to communicate directly with MCU (3.3V level), just add the TXD of the module to the RXD of the MCU, and connect the RXD of the module to the TXD of the MCU. If the MCU is at 5V

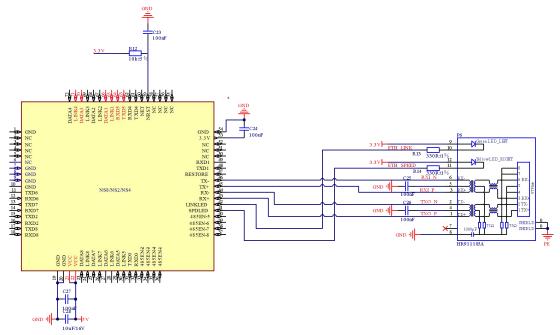


level, a conversion circuit needs to be added in the middle, as shown in the figure below:

## 3.5.4 Application of External Network Transformer for 10 M Ethernet Interface

The NS 2 module can be connected to an external 10 M Ethernet physical interface, and supports the design method of interconnecting RJ45 connectors and network transformers.

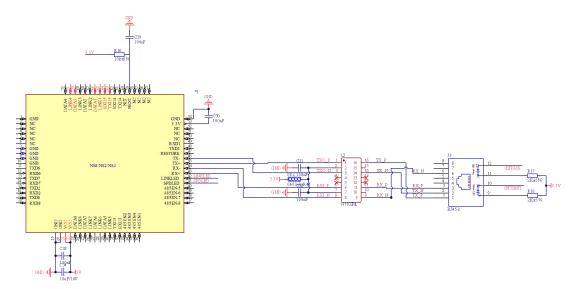
The network transformer and RJ45 connector are combined into a standard 10M Ethernet physical interface, and then connected to the NS1 module. RX+ and RX- are differential lines, 100 ohm differential impedance matching, TX+ and TX- are differential lines, 100 ohm differential impedance matching. The hardware design reference circuit diagram is as follows:



#### 3.5.5 Application of 10M Ethernet interface built-in network transformer

RJ45 built-in 2KV electromagnetic isolation network transformer. The corresponding network data receiving pin of the NS1 module is directly AC-coupled with the data receiving pin of the

Ethernet physical interface, and is used as a data transmission channel in the system. RX+ and RXtake differential lines, 100 ohm differential impedance matching, TX+ and TX- take differential lines, 100 ohm differential impedance matching. The hardware design reference circuit diagram is as follows.



## 3.5.6 Reference package

In order to facilitate the customer's hardware layout, Ebyte has made a corresponding PCB package library. Please download the specific documents from the official website

https://www.ebyte.com/product-class-all.html

## **Chapter 4 Basic functions**

## 4.1 Correspondence between channel and serial ports

Baud rate: 2 400, 4 800, 9 600, 1 4400, 1 9200, 3 8400, 5 7600, 7 6800, 1 15200bps; Data bits: only 8 bits are supported;

Parity bit: support no parity (N ONE ), odd parity (O DD ), even parity (E VEN ); Hardware flow control: not supported;

aisle	default working mode	default port
channel 1	T CPS	8001
channel 2	T CPS	8002

#### 4.1 Local network parameters

#### 4.1.1 Local IP

S TATIC (static IP) : users can define configuration IP, subnet mask, default gateway, domain name resolution server (D NS server);

D HCP (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;

#### 4.1.2 D NS (domain name resolution)

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.

#### 4.1.3 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.

#### 4.1.4 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 5 minutes, and the user can customize the cycle of restarting with timeout or no data.

## 4.2 Hardware factory reset

RESTORE pin of the device is kept low for 5s, and the factory reset of the device is completed.

## 4.3 Device working mode

#### 4.3.1 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 2 channels can establish a complete communication link. In addition, the device also has 14 dynamic access communication links. For example, if the device turns on the 2-channel server mode, each The server can access 8 client devices, or if the device opens 1 server, the server can connect to 15 client devices. If the number of client devices exceeds the access number, the device will refuse to connect.

#### 4.3.2 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 .

2 channels can independently open 2 -way TCP client .

#### 4.3.3 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.

#### 4.3.4 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 .

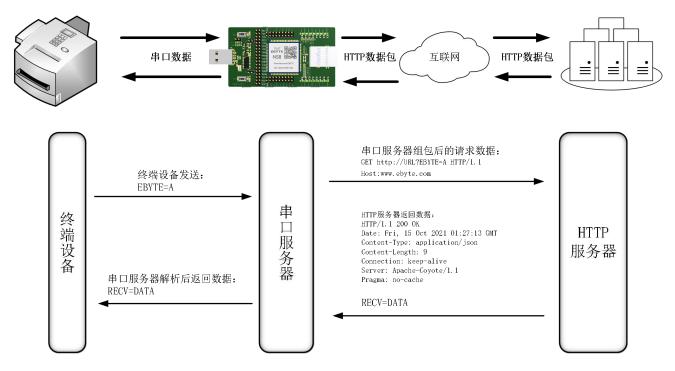
In this mode, the destination address is set to 255.255.255.255, and the sending data will be broadcast on the entire network segment, but the sending and receiving devices need to ensure that the ports are consistent, and the device can also receive broadcast data .

[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.

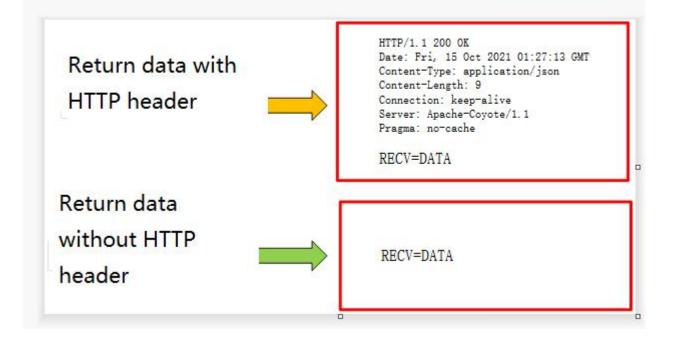
## 4.3.5 HTTP client

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 two 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.



It supports configuring whether to return the HTTP protocol header, and the returned data is shown in the figure below:



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 with HTTP function supports 2 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), the specific configuration is shown in the figure below:

网络设置	PORT1	PORT2	PORT3	PORT4	PORT5	PORT6	PORT7	PORT8	网络设置	PORT1	PORT2	PORT3	PORT4	PORT5	PORT6	PORT7	PORTS
网络参数设置									基本参数 网络工作模式 HI	1779 変白崖			~			本地满口	0
设备名称	A001								目标IP/域名 ww							目标端口	
SNA	S001								波特军 115 □ 启动短连接		1据位 8 1 </td <td><ul> <li>              校验( 接时间      </li> </ul></td> <td>NONE V</td> <td>/ 停止位</td> <td>1 ~</td> <td>流控 连接清空缓存</td> <td>NONE ~</td>	<ul> <li>              校验( 接时间      </li> </ul>	NONE V	/ 停止位	1 ~	流控 连接清空缓存	NONE ~
IP地址类型	动态I	LP.						~	<b>陸</b> 夏制参数						RL	C	1 粘贴參数
本地IP地址	192.1	168.3.7							HTTP参数				/				^
子网撞码	255.2	255. 255. 0							HTTP请求方式 HTTP URL路行		~						
网关	192.1	168.3.1							□ 不返回包 Http 包头					/	HEA	DER	
DNS	114.1	114. 114. 114							Host:www.	baidu. com							
断网重连时间	5秒							\$									
超时重启时间	300秒	3				19 19 19	用超时重启		<b>二</b> 复制参	影数						☑ 粘腸	参数

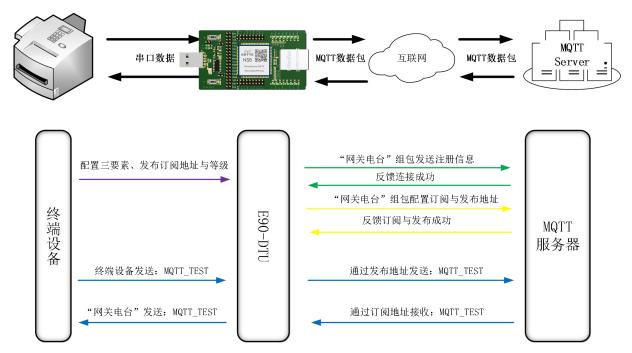
The request data is "/", use the serial port assistant to get the web page:

ATS XCOM V2.6		_		×
HTTP/1.1 200 OK Accent-Ranzes: bytes	^	Port		
Rocept-hanges, bytes Cache-Control: no-cache		COM3: USB-S	SERIAL CH	134C 🗸
Connection: keep-alive				
Content-Length: 9508		Baud rate	115200	~
Content-Type: text/html				
Date: Fri, 17 Jun 2022 03:48:01 GMT		Stop bits	1	$\sim$
P3p: CP=" OTI DSP COR IVA OUR IND COM "		n	0	
P3p: CP=" OTI DSP COR IVA OUR IND COM "		Data bits	8	$\sim$
Pragma: no-cache		Parity	None	~
Server: BWS/1.1		Tarity	none	Ŷ
Set-Cookie: BAIDUID=AFDEDA8B33352FE045C560B03CEC0850:FG=1; expires=Thu, 31-Dec-37		Operation	🦲 c1	ose
23:55:55 GMT; max-age=2147483647; path=/; domain=.baidu.com Set-Cookie: BIDUPSID=AFDEDA8B33352FE045C560B03CEC0850; expires=Thu, 31-Dec-37				
Set-Cookie: BiDUFSID=AFDEDA6D53552fE046C500D03CEC050; expires=inu, 31-Dec-37 23:55:55 GMT; max-age=2147483647; path=/; domain=.baidu.com				
23.55.55 GMT; max-age=2147403047; path=7; domain=.baldu.com Set=Cookie: PSTM=1655437681; expires=Thu, 31-Dec=37 23:55:55 GMT; max-age=2147483647;		Save Data	Clear	Data
path=/; domain=. baidu. com		Hex	DTI	R
Set-Cookie: BAIDUID=AFDEDA8B33352FE95CABE44166990399:FG=1; max=age=31536000;		□ RTS		动保存
expires=Sat, 17-Jun-23 03:48:91 GMT; domain=.baidu.com; path=/; version=1; comment=bd				5月1年1子
Traceid: 16554376810466744427776909494167371134	~	🗌 TimeSta	mp 100	ms
Single Send Protocol Transmit Help				
chight of the send frotooor framsmit help				
		^	Ser	nd
			Clear	Send
		*		
Timing Cycle 1000 MS Open File	:	Send File	Stop	Send
□ Hex Send □ Wordwrap 0% 【火爆全网	ιĒ	点原子DS100	手持示波	器上市
* www.openedv.com S:1 R:10495 CTS=0 DSR=0 DCD=0	Cur	rent time11	:48:08	

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.

#### 4.3.6 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 6 4 characters ).



When using the M QTT function, you should close the short link, otherwise the device will repeatedly connect to the server. It is recommended to use a random port, as shown in the figure below:

网络设置	PORT1	PORT2	PORT3	PORT4	PORT5	PORT6	PORT7	PORT
基本参数								
网络工作模式 MQ	IT 客户端	/		$\sim$			本地端口 🛛	-
目标IP/域名 to	siver						目标端口 1	883
波特率 115	200 ~ *	数据位 8	~ 校验位	none $\sim$	停止位	1 ~	流控	NONE
		秒 🗧 短连挂	多时间				连接清空缓存	启用

1. To select the standard MQTT3.1.1, Baidu Cloud, OneNET, and Huawei Cloud configurations, you can refer to the following table to fill in the parameters:

parameter	Standard M QTT3.3.1	Baidu cloud	One NET
Equipment name (Client ID )	Client ID	DeviceKey	device ID
username (Device name )	User Name	IoTCoreId/Device Key	Product ID
password (Device secret )	Password _	DeviceSecret	Device Name/ User Password
PrductKey _	Alibaba (	Cloud parameters, car	n be left blank
post topic	M QTT release	topic address ( dynar	nically generated by

	One NET )
gubgariba tania	M QTT subscription topic address (dynamically
subscribe topic	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;

• the adjustment of the M QTT platform (Baidu Cloud, Huawei Cloud, OneNET), the

connection cannot be made after filling in the parameters, and the platform rules shall prevail; Take the standard MQTT3.1.1 parameter filling as an example, as shown in the figure below:

网络设置	PORT1	PORT2	PORT3	PORT4	PORT5	PORT6	PORT7	PC	ORT8
本参数									
络工作模式 MQTT:	客户端			~			本地端口	0	\$
标IP/域名 top se	erver						目标端口	1883	\$
特室 115200	~ 数:	据位 8	~ 校验的	None v	停止位	1 ~	流控	NONE	~
] 启动短连接	吨	り 🔅 短连持	鲥间				连接清空缓存	7 启用	~
								-	
- (T the late of the								1 41016	a 11.
左 复制参数							C	1 粘贴参	勬
							C	1 粘贴参	遨
▶ 复制参数 MQTT参数							Į.	1 粘肌佔参	黝
	标准	MQTT 3.1.1	~ 心跳包	周期	20秒 💠		C	1 粘眼晶	黝
MQTT参数	标准 Clien		~ 心跳包	9周期 [1	20秒 🛟			<sup>2</sup> 粘線	き数
MQTT参数 平台选择 设备名	hannessee	t ID	~ 心跳包	1周期 [1	20秒 🗘		[		き数
MQIT参数 平台选择 设备名 Client ID 用户名	Clien	t ID NAME	~ 心跳包	1 <b>月</b> 期 [1	20秒 🗘				****
<b>取IT参数</b> 平台选择 设备名 Client ID 用户名 Device name 密码	Clien USER Passw	t ID NAME	~ 心跳包	1周期 [i	20秒 🗘				該数
MQTT参数 平台选择 设备名 Client ID 用户名 Device name 密码 Device secret	Clien USER Passw	t ID NAME ord	~ 心跳包	」周期 [1	20秒 文		【 】 Qos等级(		5数

#### 2. Ali Cloud

It supports the use of Alibaba Cloud's "three elements" to directly connect to the server to obtain the "three elements" needed to connect to Alibaba Cloud, as shown in the figure (only for demonstration cases, users need to use self-built parameters to connect):

(-) 阿里云	â I	作台 华东2(	上海) ~								Q	搜索
← 公共实例		1 填写物联网平	台满意度问卷,说	出您的心声,有机会	收获100元代金券	,(点击进入)						
设备管理	^		他群网平台 / 设备管理 / 设备 / 设备洋街									
产品		← DEV	04 高线									
设备		产品 ProductKey	EBYTE 查看 a1GlhuTU1j								DeviceSecret	****** 查看
分组		设备信息	Topic 列表	物模型数据	设备影子	文件管理	日志服务	在线调试	分组	任务		
任务												
CA 证书		设备信息										
规则引擎	~	产品名称	EBYTE					ProductKey	ä	a1GlhuTU1y	N 复制	
监控运维	~	节点类型	设备					DeviceName		DEV04 👮		

Configure Topic for communication test:

☰ (-) 阿里云	â I	1台 华先2 (上海) ~ 0	Q 搜索	费用 工单 ICP 督
← 公共实例		項写物联网平台篇章度问卷, 说出您的心耳, 有机会收获100元代金券 (点击进入)		
设备管理	^	地影羽干金 / 设备管理 / 产品评估 2 6		
产品		( LUTTE		
设备		ProductKey a1GihuTU1yN 复制 设备数 4 前注言了	ProductSecret ******* 查看	
分组		产品信息 Topic 美列表 功能定义 数据解析 服务编订阅 设备开发		
任务				
CA 证书		基础通信 Topic 物模 通信 Topic 自定义 Topic	0	
规则引擎	$\sim$	定义 Topic 类		
监控运维	$\sim$	自定义 Topic 操作权限	描述	操作
设备划归	~	/a1GlhuTU1yN/S(deviceName)/user/1234 发布和订阅	-	编辑 删除

Configuration theme description:

Select the corresponding product, click "Customize To pic " under the Topic class list (please refer to the Alibaba Cloud documentation for details ), click "Define To pic class", configure the name as 1 234 and grant publish and subscribe permissions (use for data return).

Configure the device connection parameters, as shown in the figure below (the left picture is the upper computer, and the right picture is the webpage configuration ) :

{

```
"ProductKey": "a1GlhuTU1yN",
"DeviceName": "DEV04",
"DeviceSecret": "xxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

}

Aliyun server address: ProductKey . iot-as-mqtt.cn-shanghai.aliyuncs.com:1883 pic for subscription and publishing : /a1GlhuTU1yN/DEV04/user/1234

基本参数								
网络工作模式 MQTT	客户端			~			本地端口	0
目标IP/域名 alGlh	TV1yN.iot-	as-mqtt. on-sh	anghai. aliyun	cs.com			目标端口	1883
皮特室 115200	~ 数	居位 8	~ 校验的	NONE V	停止位	1 ~	流控	NONE
自动短连接	0秒	⇒ 短连结	多时间				连接清空缓存	启用
	-0		200 3100				LEISCHLL-SCI1	
							1.100	粘贴参数
╞━ 复制参数								
<mark>늗</mark> 复制参数								Takase
▶ 复制参数 MQTT参数								TOKOSS
-	阿里z	<del>.</del>	~ 心跳包	]周期	120秒 🗘			TOKOSOS
MQTT参数	阿里z DEV04		~ 心跳包	周期	120秒 🛟			1000209
MQTT参数 平台选择 设备名			~ 心跳包	」周期	120秒 🛟			
MQTT参数 平台选择 设备名 Client ID 用户名	DEVO4			1周期	12010			
MQTT参数 平台选择 设备名 Client ID 用户名 Device name 密码	DEVD4 DEVO4 xxxxxx			周期	120秒 🗘			
MQTT参数 平台选择 设备名 Client ID 用户名 Device name 密码 Device secret	DEVO4 DEVO4 xxxxxx alGlh		*****	1.周期	120秒 文		Qos等级 [0]	

Alibaba Cloud M QTT platform communication test:

- TX	
RX	
	- TX RX

## 4.4 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.

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 use: 8 001-800 2 ), 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 mode device fixed port initiates a connection request.

## **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.
- Serial mode -> The device sends heartbeat content to the serial bus according to the set heartbeat time interval.
- 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.

- 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.
- 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.

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

#### 5.4 Modbus gateway

#### 5.4.1 Protocol conversion

MODBUS网关	简单协议转化	~	
MODBUS RTU <u>应</u> 滑	<b>各超时时间</b>	1000毫秒	÷
MODBUS RTU指令	令存储时间	10秒	÷
MODBUS RTU转合该	间调福时间	500毫秒	*

Enable: Verify Modbus data and discard non-Modbus data (R TU/TCP) without transmission, and convert Modbus RTU protocol to Modbus TCP protocol.

Disabled: Do not perform protocol conversion but check Modbus data, discard non-Modbus data (R TU/TCP) and do not transmit.

#### 5.4.2 Simple Protocol Conversion

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, U DP client, U DP server, M QTT client). This gateway mode does not support multi-host operation. If you need multiple hosts, please use "storage gateway" and "multi-host mode".

网络参数设置		基本参数 网络工作概 TCF 服务编   本地编口 8896 3
设备名称	A001	日報21745編 102 103 日報34日 002 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
SN码	S001	
IP地址类型	静态12 ~	Rubits         開始         所設置         所設置
本地IP地址	192.168.4 .164	MODBUS RTU描令存编时间 200秒 0
子网掩码	255. 255. 255. 0	
网关	192.168.4 .1	▶ 夏射然救
DNS	114.114.114	※助会型 込み目標式 美田心規則 ~ 心肌目期時 50 : 101 :
断网重连时间	500	自定文公開包載線 Jeartheat packet 日の注射 注册包載式 美田主新包載式 ~ 自定文注册包載線 registration packet 日の注射
超时重启时间	300秒 💿 启用超时重启	
		📄 保存配置 🍃 夏制態数 🚺 転船節数 🍈 重自设备 📿 恢夏取以節数 🗸 导北配置 🔨 今天入配置

Simple protocol conversion configuration:

# Modbus Poll and Modbus Slave software debugging : Software connection settings:

= 1296: Err			Mbslave1	Connection Setup
	onnection Modbus TCP/IP ~	OK Cancel	ID = 1: F = 03 No connection	Connection Sector
	erial Settings USB-SERIAL CH340 (COM4)	Mode	0	Serial Settings
	115200 Baud V 8 Data bits V None Parity V 1 Stop Bit V Advanced	Response Timeout       1000     [ms]       Delay Between Pols       20     [ms]	2 3 4 5 6 7	USB-SERIAL CH340 (COM11) 115200 Baud 8 Data bits None Parity 1 Stop Bit 1 Stop Bit Mode ® RTU O ASCII Bow Control DSR CTS RTS Toggle 1 [ma] RTS disable delay
1	emote Modbus Server IP Address or Node Name 192.168.4.164	~	8	TCP/IP Server         Port           IP Address         Port           192.168.3.3         8886

Software register reading and emulation configuration: Poll menu selection Set up  $\rightarrow$  Read/Write Definition

Read/Write	Definition		
Slave ID:	1		ОК
Function:	03 Read Holding F	Registers (4x) 🗸	Cancel
Address:	0 PLC	address = 40001	
Quantity:	5	Poll	
Scan Rate:	1000 [ms]		Apply
	Write Disabled on error		Read/Write Once
View Rows 10	○20 ○50	◯100 ◯ Fit to	Quantity
Hide A	lias Columns	PLC Addre	esses (Base 1)
Addre	ss in Cell	Enron/Dar	iiel Mode
Request			
RTU 0	1 03 00 00 00 05 8	35 C9	
ASCII 3	A 30 31 30 33 30 3	30 30 30 30 30 3	0 35 46 37 0D 0A

Slave menu select Set up  $\rightarrow$  Slave Definition

Slave Defin	ition		×
Slave ID:	1		ОК
Function:	03 Holding Register (4	4x) ~	Cancel
Address r			
Address:	0 PLC add	ress = 40001	
Quantity:	5		
View			
Rows	O20 O50 O1	.00 O Fit to Quar	itity
Hide M		PLC Addresses (	Base 1)
Error Simu	ulation		
Skip re	esponse	Insert CRC/LRG	
0	[ms] Response Delay	Return except	

#### Newsletter Demo:

Mbpoll1		53	Commu	1.2	T (C																		3
c = 368: Err = 0: ID =			Commu	nication	Tramo																		
C - 000. EII - 0. IB	1.1 - 00. 01	10	Exit		Contin	Je		Clear		1	Save			Copy	/		ι	.og		Stop on Error	🗌 Time	e stam	np
Alias	00000	^	Rx:00011	3-01	7E 0	00	00	0D	01 0	8 0A	. 00	01	00	02	00	03	00	04	00	05			
	1		Tx:00011	4-01	7F 0	00	00	06	01 0	3 00	00	00	05										
	2		Rx:00011											02	00	03	00	04	00	05			
	2		Tx:00011																				
	3		Rx:00011											02	00	03	00	04	00	05			
	4		Tx:00011 Rx:00011											00	00	0.2	00	0.4	00	0.5			
	5		Tx:00012											02	00	03	00	04	00	05			
		•	Rx:00012											02	00	03	00	04	00	05			
			Tx:00012													-							
			Rx:00012	3-01	83 0	00	00	0D	01 0	OA	00	01	00	02	00	03	00	04	00	05			
			Tx:00012	4-01	84 0	00	00	06	01 0	3 00	00	00	05										
			Rx:00012											02	00	03	00	04	00	05			
			Tx:00012		85 0				01 0	3 00	00												
																	1212	12025		1000			
		_	Rx:00012	7-01	85 0	00	00	0D	01 0	8 0A	00	01	00	02	00	03	00	04	00	05			
Modbus Slave - Mbsla	ave1		Rx:00012	7-01	85 0	00 00	00	OD	01 0	8 0A	00	01	00	02	00	03	00	04	00	05	- □		
		Viev			85 0	00 00	00	0D	01 0	8 0A	. 00	01	00	02	00	03	00	04	00	05	- 0	(	
Edit Connection S	Setup Display	Viev	v Window	Help			00	0D	01 0	8 0A	. 00	01	00	02	00	03	00	04	00	05	- [	(	
Edit Connection S	Setup Display			Help			00	0D	01 0	3 0A	. 00	01	00	02	00	03	00	04	00	05	-	( )	
Edit Connection S	Setup Display		v Window	Help unicatio	on Traffi						. 00			02		03				05	- [		
Edit Connection S E B B I I I I Mbslave1	Setup Display		v Window	Help unicatio			00 Clea		01 0. Sa		. 00	01		02	00 Log	03		04 Time s			-	( )	
Edit Connection S E B B I I I I Mbslave1	Setup Display		v Window	Help unicatio	on Traffi Continue 03 0	c	Clea	r 00	Sa 02 (	ve 0 0	1	Сору			Log		0.						
Edit Connection S E B B I I I I Mbslave1	Setup Display		V Window	Help unicatio 0 01-01 02-01	n Traffi iontinue 03 (0 03 (0	c ]	Clea 0 01 0 00	r 00 05	Sa 02 ( 85 (	ve 0 0	3 00	Copy ) 04	00	05	Log CF	24	0.				-		
Edit Connection S E B B I I I I Mbslave1 = 1: F = 03	Setup Display		V Window Comm Ext Tx:0000 Rx:0000 Tx:0000	Help unicatic 0 0 0 0 1-01 0 2-01 0 0 2-01 0 3-01	n Traffi ontinue 03 0 03 0 03 0	a 00 0 00 0 00	Clea 0 01 0 00 0 01	r 00 05 00	Sa 02 ( 85 ( 02 (	ve 0 0 9 0 0	3 00	Copy ) 04	00	05	Log CF	24	0.				-		
Edit Connection S E B B I I I I Mbslave1 = 1: F = 03	Setup Display		<ul> <li>Window</li> <li>Comm</li> <li>Ext</li> <li>Tx:0000</li> <li>Rx:0000</li> <li>Tx:0000</li> <li>Rx:0000</li> </ul>	Help unicatio 91-01 92-01 93-01 94-01	on Traffi iontinue 03 0 03 0 03 0 03 0	A 00 0 00 A 00 0 00	Clea 0 01 0 00 0 01 0 00	r 00 05 00 05	Sa 02 ( 85 ( 02 ( 85 (	ve 0 0 9 0 0	3 00	Copy ) 04 ) 04	, 00	05	Log CF CF	24					- [		
Edit Connection S E B B I I I I Mbslave1 = 1: F = 03	Setup Display		<ul> <li>Window</li> <li>Ext</li> <li>Tx:0000</li> <li>Rx:0000</li> <li>Tx:0000</li> <li>Tx:0000</li> <li>Tx:0000</li> </ul>	Help unicatio 91-01 92-01 93-01 94-01 95-01	n Traffi ontinue 03 0 03 0 03 0 03 0 03 0	A 00 0 00 A 00 0 00 A 00	Clea 0 01 0 00 0 01 0 01 0 01	r 00 05 00 05 00	Sa 02 (0 85 (0 85 (0 02 (0	ve 0 0 9 0 0 9 0 0	3 00	Copy ) 04 ) 04	, 00	05	Log CF CF	24					- [		
Edit Connection S E B B I I I I Mbslave1 = 1: F = 03	Setup Display		<ul> <li>Window</li> <li>Comm</li> <li>Ext</li> <li>Tx:0000</li> <li>Rx:0000</li> <li>Tx:0000</li> <li>Rx:0000</li> <li>Rx:0000</li> <li>Rx:0000</li> <li>Rx:0000</li> </ul>	Help unicatio 91-01 92-01 93-01 94-01 95-01 95-01	n Traffi ontinue 03 0 03 0 03 0 03 0 03 0 03 0	A 00 0 00 A 00 0 00 A 00 0 00	Clea 0 01 0 00 0 01 0 00 0 01 0 00	00 05 00 05 00 05	Sa 02 ( 85 ( 85 ( 02 ( 85 ( 85 (	ve 0 0 9 0 0 9 0 0	3 OC 3 OC 3 OC	Copy 0 04 0 04	00	05 05 05	Log CF CF	24							
Edit Connection S E B B I I I I Mbslave1 = 1: F = 03	Setup Display		<ul> <li>Window</li> <li>Ext</li> <li>Tx:0000</li> <li>Rx:0000</li> <li>Tx:0000</li> <li>Tx:0000</li> <li>Tx:0000</li> </ul>	Help unicatio 91-01 92-01 93-01 94-01 95-01 95-01 96-01 97-01	n Traffi ontinue 03 0 03 0 03 0 03 0 03 0 03 0	A 00 0 00 A 00 0 00 A 00 0 00 A 00	Clear 0 01 0 00 0 01 0 01 0 01 0 01	00 05 00 05 00 05 00	Sa 02 ( 85 ( 85 ( 85 ( 85 ( 85 ( 85 ( 02 ()	ve 0 0 9 0 0 9 0 0	3 OC 3 OC 3 OC	Copy 0 04 0 04	00	05 05 05	Log CF CF	24							
Edit Connection 9	Setup Display		<ul> <li>Window</li> <li>Ext</li> <li>Tx:0000</li> <li>Rx:0000</li> <li>R</li></ul>	Help unicatio 91-01 92-01 93-01 94-01 95-01 96-01 97-01 98-01	on Traffi ontinue 03 0 03 0 03 0 03 0 03 0 03 0 03 0	A 00 A 00	Clear 0 01 0 00 0 01 0 00 0 01 0 00 0 01 0 00	00 05 00 05 00 05 00 05	Sa 02 (0 85 (0 85 (0 85 (0 85 (0 85 (0 85 (0 85 (0 85 (0	ve 0 0. 9 0. 9 0. 9 0. 9 0. 9 0.	3 00 3 00 3 00 3 00	Copy 0 04 0 04 0 04 0 04	, 00 00 00	05 05 05	Log CF CF CF	24 24 24 24					-		
Edit Connection 9	Setup Display		<ul> <li>Window</li> <li>Ext</li> <li>Tx:0000</li> <li>Rx:0000</li> <li>Tx:0000</li> <li>Rx:0000</li> <li>Tx:0000</li> <li>Rx:0000</li> <li>Tx:0000</li> <li>Tx:0000</li> <li>Tx:0000</li> </ul>	Help unicatio 91-01 92-01 93-01 94-01 95-01 96-01 97-01 98-01 99-01	on Traffi Continue 03 0 03 0 03 0 03 0 03 0 03 0 03 0 03	C A 00 0 00 A 00 0 00 A 00 0 00 A 00 0 00 A 00	Clea 0 01 0 00 0 01 0 00 0 01 0 00 0 01 0 00 0 01 0 00 0 01	00 05 00 05 00 05 00 05 00	Sa 02 (0 85 (0))))))))))))))))))))))))))))))))))))	ve 0 0. 9 0. 9 0. 9 0. 9 0. 9 0.	3 00 3 00 3 00 3 00	Copy 0 04 0 04 0 04 0 04	, 00 00 00	05 05 05	Log CF CF CF	24 24 24 24					-		
Modbus Slave - Mbsla Edit Connection S Be B B C P Mbslave1 = 1: F = 03	Setup Display		<ul> <li>Window</li> <li>Ext</li> <li>Tx:0000</li> <li>Rx:0000</li> <li>Tx:0000</li> <li>Rx:0000</li> <li>Tx:0000</li> <li>Rx:0000</li> <li>Tx:0000</li> <li>Tx:0000</li> <li>Tx:0000</li> <li>Tx:0000</li> <li>Tx:0000</li> <li>Tx:0000</li> <li>Tx:0000</li> </ul>	Help unicatio 91-01 92-01 93-01 93-01 95-01 96-01 97-01 98-01 99-01 00-01	on Traffi Continue 03 0 03 0 03 0 03 0 03 0 03 0 03 0 03	c A 00 0 00 A 00 0 00 A 00 0 00 A 00 0 00 A 00 0 00 0 00	Clear ) 01 ) 00 ) 01 ) 00 ) 01 ) 00 ) 01 ) 00 ) 01 ) 00 ) 01	r 00 05 00 05 00 05 00 05 00 05 00 05	Sa 02 (0 85 (0 85 (0 85 (0 85 (0 85 (0 85 (0 85 (0 85 (0 85 (0	ve 0 0. 9 0. 9 0. 9 0. 9 0. 9 0. 9 0. 9 0.	3 00 3 00 3 00 3 00 3 00	Copy ) 04 ) 04 ) 04 ) 04	, 00 00 00 00	05 05 05 05	Log CF CF CF CF	· 24 · 24 · 24 · 24 · 24					- [		
Edit Connection 9	Setup Display		<ul> <li>Window</li> <li>Ext</li> <li>Tx:0000</li> <li>Rx:0000</li> <li>Tx:0000</li> <li>Tx:00000</li> <li></li></ul>	Help unicatio 91-01 92-01 93-01 94-01 95-01 95-01 95-01 99-01 99-01 00-01 01-01	n Traffi ontinue 03 0 03 0 03 0 03 0 03 0 03 0 03 0 03	c A 00 0 00 A 00 0 00 A 00 0 00 A 00 0 00 A 00 0 00 A 00 0 00 A 00	Clea ) 01 ) 00 ) 00 ) 01 ) 01	r 00 05 00 05 00 05 00 05 00 05 00 05 00	Sa 02 ( 85 ( 02 ( 85 ( 95 ( 95 ( 95 ( 95 ( 95 ( 95 ( 95 ( 9	ve 0 0. 9 0. 9 0. 9 0. 9 0. 9 0. 9 0. 9 0.	3 00 3 00 3 00 3 00 3 00	Copy ) 04 ) 04 ) 04 ) 04	, 00 00 00 00	05 05 05 05	Log CF CF CF CF	· 24 · 24 · 24 · 24 · 24							

#### 5.4.3 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 15 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.

网络参数设置		网络设置 PORTI PORT2 PORT3 PORT4 PORT5 PORT6 PORT7 PORT8
设备名称	A001	基本総数 同誌工作表: INT 部分論
รหญ	5001	
IP地址类型	• • • • • • • • • • • • • • • • • • •	Na.Base 参数 ReaserSPA 多主教義式
本地IP地址	192. 168. 4 163	mones Intige (中語時間)
子网摘码	255, 255, 255, 0	
网关	192.168.4 .1	
DNS	114.114.114	
断网重连时间	<b>6</b> 秒	BEX24の問題制度 havtitet parket 10近初 主発句成式  英語集成成  ・
超时重启时间	300秒 ; 🖉 扁桃糖用	○ 第時世界 () 秋秋世界 () 10日7日 () 10171

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 15 channels).

📲 Modbus Poll - Mbpoll1	- 🗆 X	Modbus Slave - Mbslave1	- 🗆 🗙
File Edit Connection Setup Functions Display Vi	ew Window Help	File Edit Connection Setup Display View Window	Help
D 📽 🖬 🎒 🗙 🗖 💆 🚊 💷 05 06 15 16		D 📽 🖬 🎒 🛅 🗏 🚊 🤋 🕺	
Mbpoll1         Image: State	Poll 1	Name         00000           0         1           1         2           3         4           5         5           For Help, press F1.         Port 7: 115200-8-N-1	
챕 Modbus Poll - Mbpoll1	- 0 ×	월 Modbus Poll - Mbpoll1	– 🗆 X
File Edit Connection Setup Functions Display Vi		File Edit Connection Setup Functions Display View	v Window Help
🗋 🗃 🖨 🗙 🛅 🗒 🛕 л. 05 06 15 16	17 22 23 TC 🖳	🗋 🖻 🖨 🎒 🗙 🔚 🗒 🖳 🛄 🛄 🛝 05 06 15 16 17	7 22 23   TC 🖳 🔀
Alias         00000           0         1           1         2           3         4           4         5	Poll 2	Alias         00000           0         1           1         2           3         4           4         5           5         ✓	Poll 3
For Help, press F1. [192,168,4,163]: 8887		For Help, press F1. [192,168,4,163]: 8887	

#### 5.4.4 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.

网络参数设置		基本参数 PH能工作機3 TCF 服务編 〜 本地編工 @007 ©
设备名称	4001	目前#17552、100:103-3100         目前第二回のこ:           波特軍         115000 く 前能位         9 く 統給位         第000 く 前住位         1 く 流行         1 く 流行         1 の 流行           自然部位         第0 く 統給位         第000 く 前住位         第000 く 前住         1 く 満行         第000 く         1 未満空部           自然地位         第100 く 前近         第100 く 前         第100 く 前         第100 く 前         第100 く 前
SN码	5001	
IP地址类型	释态IP 、	Xuður 御政     Táganyy → 1682至62分末     Totalanyy → 1682至62分末     Totalanyy → 1682至62分末     Totalanyy → 1682至62分末     Totalanyy → 1682至62分末
本地IP地址	192, 168, 4 , 163	MOBRIS XTV(消荷期計画         2009日         5           MOBRIS XTV(消荷期計画         2004日         5
子网掩码	255, 255, 255, 0	Imposite         Imposite
网关	192.168.4 .1	正 項約約款         // MAX約款           運动设置         // / / / / / / / / / / / / / / / / / /
DNS	114, 114, 114	
断网重连时间	519 (3	
超时重启时间	300秒 💿 🖸 高用器时重启	

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) The 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) The 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) 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 01, 02, 03, 04M od bus function code query result storage;

### 5.4.5 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.

MODBUS网关	可配置网关	~	预配置指令列表	
MODBUS RTU <u>应</u> 行	<b>答超时时间</b>	1000臺秒 🗘	1 01,03,00,00,00,0A	
MODBUS RTU指名	令存储时间	200秒 🗘		
MODBUS RTU轮行	间间隔时间	200臺秒 🗘		
RTU<->TCP	办议转换			
	指令列	刘表: 删除		
		増加->	<	2
<b>清</b> 复制参		増加->	٢	

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

$\sim$		
3000毫秒 🛊	1 01,03,00,00,00,0A 2 01,02,00,00,00,0A	
200秒 🗧	3 01,01,00,00,00,0A	
200毫秒 😜	5 02,03,00,00,00,00	
0	2	
刘表: 删除		
), OA 増加->	<b>*</b>	>
	3000臺秒 ÷ 200秒 ÷ 200臺秒 ÷ 1 列表: 删除	3000 変秒 章     1 01,03,00,00,00,0A       200 変秒 章     2 01,02,00,00,00A       200 変秒 章     3 01,01,00,00,00,0A       200 変秒 章     5 02,03,00,00,00,0A       1     2

Instruction storage instructions (delete):

MODBUS 网关 可配置网关	ŧ ~	预配置指令列表	
MODBVS RTV应答超时时间	3000臺秒 🛟	1 01,03,00,00,00,0A 2 01,02,00,00,00,0A	
MODBUS RTU指令存储时间	200秒 🗘	3 01,01,00,00,00,0A 4 01,04,00,00,00,0A	
MODBUS RTU轮询间隔时间	200臺秒 😫	5 02,03,00,00,00,0A	
☑ RTU<->TCP协议转换		2	
	指令列表: 删除 🖊		
02, 03, 00,	00, 00, 0A 増加->		>

#### 5.4.6 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:

TCP client demo (Modbus RTU format):

	网络调试助手	- U ×	📑 Modbus Slave -	[Mbslave1]		- 🗆 🗙
网络设置 (1) 协议类型 TCP Server マ	<b>数据日志</b> [2022-01-08 13:51:3 192.168.4.163 :6131:	<u>NetAssist V5.0.2</u>	File Edit Conr □ □ □ □ □ □ □ □ □ = 1: F = 03	nection Setup Displa	y View Window	v Help <u> </u> ×
(2)本地主机地址 192.168.4.100 👤	01 03 02 00 01 79 8	4 9.669]# RECV HEX FROM	Name	00000	Name	00010
(3)本地主机端口   <sup>8886</sup>	192.168.4.163 :6131 01 03 02 00 01 79 8		0	0		0
· 美闭			2	0		0
接收设置 C ASCII ⓒ HEX			4	0		0
<ul> <li>✓ 接日志模式显示</li> <li>厂 接收区自动换行</li> </ul>	<		5 6	0		0
<ul> <li>□ 接收数据不显示</li> <li>□ 接收保存到文件</li> </ul>			8	0		0
自动滚屏 清除接收			9	0		0
发送设置 ・ ASCII C HEX						
<ul> <li>✓ 转义符指令解析 ①</li> <li>□ 自动发送附加位</li> <li>□ 打开文件数据源</li> <li>□ 循环周期 300 ms</li> <li>快捷指令 历史发送</li> </ul>		↓ 「清除 1 清除 发送	<			>
👉 就约 9/0	RX:63	TX:0 复位计数 //	For Help, press F1.	Port 7: 1	15200-8-N-1	

TCP client demo (Modbus TCP format):

	网络调试助手		× 🗄 Moo	dbus Slave - [Mbs	lave1]		- 0	×
网络设置 (1)协议类型 TCP Server ▼ (2)本地主机地址	数据日志 [2022-01-08 14:03: 192.168.4.163 :445	<u>NetAssist V5.0.2</u>	P	Edit Connectio	and the second	ay View Wind	low Help _	8 ×
192. 168. 4. 100	00 00 00 00 00 05	01 03 02 00 01 04.958]# RECV HEX FROM		Name	00000	Name	00010	
(3)本地主机端口	192.168.4.163 :445	Conference and an an an an an	0		1		0	l.
8886	00 00 00 00 00 05	01 03 02 00 01 10.002]# RECV HEX FROM	1		0		0	
· 美闭	192.168.4.163 :445		2		0		0	
	00 00 00 00 00 05	01 03 02 00 01	3		0		0	
接收设置			4		0		0	
C ASCII C HEX			5		0		0	
<ul> <li>✓ 按日志模式显示</li> <li>✓ 接收区自动换行</li> </ul>			6		0		0	
□ 接收数据不显示			7		0		0	
□ 接收保存到文件			8		0		0	
自动滚展 清除接收			9		0		0	
发送设置         ● ASCII ● HEX           「 转义符指令解析 ①           「 自动发送附加位           「 打开文件数据源           「 循环周期 300 ms           快捷指令 <u>历史发送</u>	数据发送 ) _ ◆ 断 01234567\r \n	<u>円」 「</u> 清除 <b>1</b> .清除 发送						
☞ 发送 76/0	RX:3532	TX:0 复位计数		, press F1.	Port 7: 1	15200-8-N-1		

# 5.5 Firmware upgrade

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

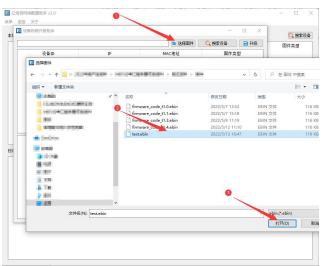
# 5.5.1 UDP upgrade

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

#### the "Menu" option;

33 亿佰特网络配置助 24 语言 关于	<b>≨ v3.0</b>	
设备升级助手 串口升级助手	00 ~	
设备ID	IP	网关

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.



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

			10.02	模块型号	版本	固件:
108	设督网络升级助手				-	
PTT	8产品资料/2022年度产品资料	/10183串口服务器项目资料	/狮试资料/固件/test.	ebin 🐚 选择固件	🔾 停止搜索	日升级
1	设备ID 0	IP 192.168.4.1	63 38	MAC地址 3B-26-3E-43-36	固件类 NB183	
2	0	192.168.3.1		C2-E4-36-07-B7	NA111-V	

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

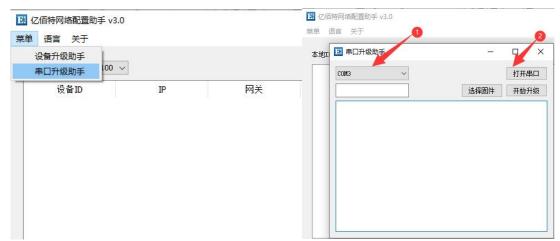
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	1	0	192.168.4.163	38-3B-26-3E-43-36	NB183	
	2	0	192.168.3.158	84-C2-E4-36-07-B7	NA111-V2.0	
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#### 5.5.2 Serial upgrade

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

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";



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;

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Step 4: Click "Start Upgrade", pull down the Re load pin of NS2 and 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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The final interpretation right belongs to Chengdu Ebyte Electronic Technology Co., Ltd.

## **Revision history**

Version	revision date	Revision Notes	Maintained by
1.0	2023-03-16	initial version	LL
1.1	2023-12-8	Corrected dimensional	LYL
		drawings	

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