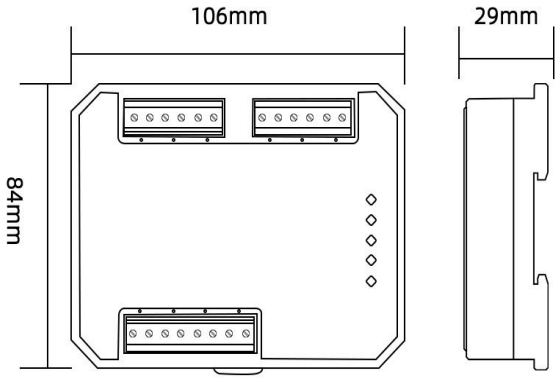
SPC2□□□-MD Serial to Ethernet Communication Module

User Manual

扫码了解详情

I. Precautions

· Do not operate this product beyond its design limits under any circumstances.
· The power supply for this product is 24V DC. Strictly prohibit the use of 220V AC power.
· This product should be installed in a safe location. The shell's maximum withstand temperature is +85°C.
· When used in environments with strong magnetic interference, Shielded cable is recommended for signal lines.
· Strictly prohibit unauthorized disassembly, modification, or repair of this product.
· Pay attention to the wiring method of this product to ensure correct Wiring and avoid damaging the product.
· Read this manual carefully before installation and use. If you have any questions, please contact our technical support personnel or refer to relevant technical guidance videos.
· Our company is not responsible for damage to components other than this product during use.
· Please download the latest electronic version of the documentation. The content of this manual is for reference only. We continuously improve the user experience, and technical parameters are subject to change without notice.



II. Product Dimensions

· Product dimensions: **106mm (L) X 84mm (W) X 29mm (H)**
· Industrial-grade flame-retardant plastic shell, standard DIN35 rail mounting.

III. Operating Environment

· Do not expose this product to excessively high or low temperatures.
· The surrounding environment must be free from strong vibration, impact, and electromagnetic interference such as large current and sparks.
· The operating environment must not contain harmful substances that cause severe corrosion to metal or plastic components. Do not use or store the product in harsh environments, otherwise it will affect the electrical performance of the product.
· Operating Temperature: -40°C ~ +80°C Relative Humidity: 10% ~ 90%RH (non-condensing)

IV. After-Sales Service

We are committed to providing you with comprehensive after-sales service and warranty policy. The product warranty period is three years. During the warranty period, if the product fails due to non-human factors, we will provide free repair or replacement service. Damage caused by violation of operating regulations and requirements will require payment of parts cost and repair fee. After the warranty period expires, we continue to provide technical support and assistance. During this period, replacement parts are provided at cost price.

V. Application Fields


Automation Equipment


Self Service Banking System


Remote Monitoring


PLC control

I. Product Introduction

The SPC2□□□-MD series modules are multifunctional, composite serial port servers that convert 2/4/8-channel serial port data to Ethernet data. They feature various MODBUS gateway modes, as well as TCP Client, TCP Server, UDP Client, UDP Server, MQTT, and HTTP IoT gateway modes, meeting the networking needs of various serial devices and PLCs. They support serial port baud rates up to 115200bps and are easily configured via host software.

This series of modules not only provides conventional serial port server functionality, converting standard RS485 serial port signals into TCP/IP signals, enabling bidirectional transparent data transmission between RS485 serial ports and TCP/IP network interfaces, but also offers MODBUS gateway functionality, converting between MODBUS TCP and MODBUS RTU protocols. This allows serial devices to connect to Ethernet for data communication, significantly reducing serial device wiring and expanding communication modes and distances.

This product requires independent power supply and adopts DIN35mm standard rail installation. It is easy to install on site and flexible to use, and can cope with various on-site applications.

· Features

· Employs a 32-bit industrial-grade, high-performance microprocessor with precision-engineered design;

· Isolated input, output, and power supply with unique anti-interference measures for stable and reliable performance;

· Supports 10/100M full-duplex/half-duplex auto-sensing Ethernet interface, compatible with 802.3 protocols;

· Supports bidirectional transparent transmission of serial port data and network data;

· Configuration using a host computer network configuration tool;

· Supports 8 simultaneous server connections, supports 16 dynamic client allocations, and supports 9 clients per server;

· The serial port uses RS485 communication, supports up to 8 RS485 communication interfaces, and features a serial port buffer clearing function;

· The serial port supports baud rates from 1200 to 115200 bps, multiple parity modes, 5 to 8 data bits, and 1 or 2 stop bits;

· Supports a serial port buffer clearing function;

· Supports DNS domain name resolution, DHCP for dynamic IP, subnet mask, default gateway, and DNS Server address;

· Supports TCP, UDP, MQTT, and HTTP client modes, as well as TCP and UDP server modes;

· Supports MODBUS gateway, enabling active reporting from RTU devices;

· Supports conversion between MODBUS TCP and MODBUS RTU protocols, and also supports multi-host mode with one-question-one-answer;

· Supports active reporting of MODBUS data to TCP transparent transmission servers, MQTT servers, etc.;

· Supports HTTP client mode, using the HTTP/1.1 protocol;

· Configurable indicator lights to indicate connection disconnection, connection establishment, and data transmission status.

II. Product Specifications

· Technical Parameters

Basic Parameters	
Power Supply	DC12～36V(DC24V recommended)
Operating Current	Standby≤50mA, Peak ≤80mA @DC24V
Power Isolation	3000VDC
Configuration	Sine Power Equipment Network Configuration Tool
Ethernet Interface	
Ethernet Interface	1
Interface Standard	RJ45
Network Port Speed	10/100M
Socket Connection	Supports up to 16 client connections
Protocol Type	TCP Client, TCP Server, UDP Client, UDP Server, MQTT Client, HTTP Client
Network Protocols	IP, TCP/UDP, IPv4, ICMP, APR, DHCP, DNS, MQTT, HTTP
IP Address	192.168.3.200 (User-Definable)
Domain Name Resolution	Supported
Subnet Mask	255.255.255.0 (User-Definable)
DNS Domain Name Resolution	114.114.114.114 (User-Definable)
Local Port Default channels	1-8 correspond to ports 8001-8008
Gateway	192.168.3.1 (user-defined)
Packing mechanism	8 x 512 bytes
Network port isolation	1500VDC
Serial communication parameters	
Communication level	RS485 asynchronous half-duplex differential
Number of channels:	2/4/8
Communication buffer	256 bytes
Baud rate	1200 ～ 115200bps
Data bits	5-8 bits
Parity	None, odd, even
Stop bits	1, 2
Environmental Conditions	
Operating Temperature	-40℃～+80℃
Storage Temperature	-40℃～+85℃
Relative Humidity	10%～90%RH(non-condensing)
Atmospheric Pressure	80kPa～106kPa

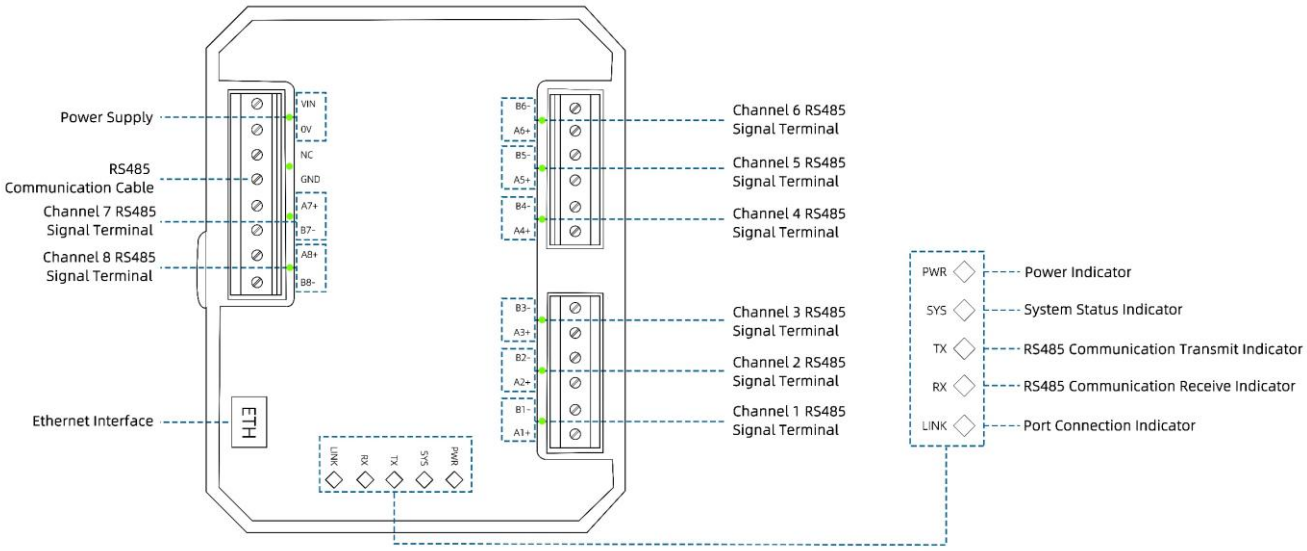
· Terminal Description

Terminal Mark	Function Description
VIN	Power supply positive terminal, DC12-36V input
OV	Power supply negative terminal
NC	No connection
GND	RS-485 communication signal ground or shield connection
A7+	RS-485 communication signal positive terminal, Channel 7
B7-	RS-485 communication signal negative terminal, Channel 7
A8+	RS-485 communication signal positive terminal, Channel 8
B8-	RS-485 communication signal negative terminal, Channel 8
A1+	RS-485 communication signal positive terminal, Channel 1
B1-	RS-485 communication signal negative terminal, Channel 1
A2+	RS-485 communication signal positive terminal, Channel 2
B2-	RS-485 communication signal negative terminal, Channel 2
A3+	RS-485 communication signal positive terminal, Channel 3
B3-	RS-485 communication signal negative terminal, Channel 3
A4+	RS-485 communication signal positive terminal, Channel 4
B4-	RS-485 communication signal negative terminal, Channel 4
A5+	RS-485 communication signal positive terminal, Channel 5
B5-	RS-485 communication signal negative terminal, Channel 5
A6+	RS-485 communication signal positive terminal, Channel 6
B6-	RS-485 communication signal negative terminal, Channel 6
ETH	Ethernet port

· Indicator Description

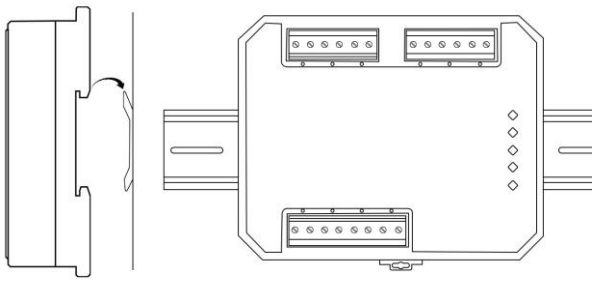
Indicator Mark	Function Description
PWR	Power indicator
SYS	System status indicator, flashes when normal
TXD	RS485 communication indicator, flashes when sending data
RXD	RS485 communication indicator, flashes when receiving data
LINK	Network port connection is successful, the indicator is solid

· Wiring and indication

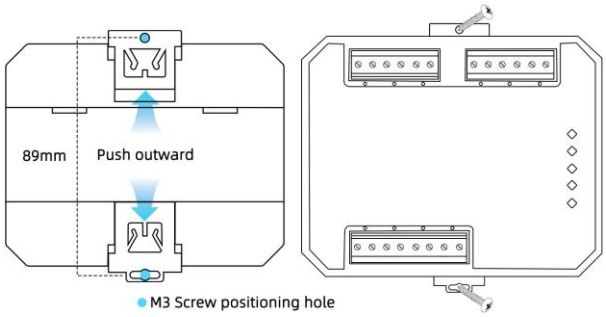


· Installation Instructions

This module is designed for mounting on a 35mm DIN rail. The rail must comply with the mounting dimensions for TH35-7.5 rails specified in the national standard GB/T19334-2003. The module can be easily installed and removed from the rail, ensuring a stable and secure installation. This module also supports screw mounting for installation without a DIN rail.



– Installation method of guide rail –



– Screw installation method –

· Product Naming Rules

Take the SPC2080-MD11L as an example: 8-channel RS485 serial-to-Ethernet communication module, Ethernet speed 10/100Mbps, M-shaped form factor, module powered by DC12-36V.

SPC	2	08	0	M	D	1	1	L
Product Type	Contact Type	Conversion Channels	Serial Number	Product Form Factor	Comm Speed	Isolation Level	Output Type	Power Supply
Comm signal conversion module	1 USB 2 ETH 3 Bluetooth 4 WIFI 5 CAN 6 Profinet 7 LoRa 8 Serial Comm 9 Othe Comm	1-32	0-9	N Form Factor K Form Factor M Form Factor W Form Factor F Form Factor R Form Factor Y Form Factor Q Form Factor S Form Factor	A Speed 200Kbps B High Speed 1Mbps C Ethernet 10Mbps D Ethernet 100Mbps E Other Speeds	0 No Isolation 1 1500V 2 3000V 3 Other	0 RS232 1 RS485 2 Ethernet 3 Bluetooth 4 WiFi 5 CAN 6 Profinet 7 LoRa 9 Mixed output	L DC12-36V H AC220V C +12V D +24V U USB Power

III. Communication Function Introduction

· RS485 Parameter and Channel Correspondence

Baud Rate: 1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, 76800, 115200 bps

Data Bits: 5, 6, 7, 8

Parity: None, Odd, Even

Hardware Flow Control: Not Supported

Channel Default	Protocol Mode	Default Port
Channel 1	TCP Server	8001
Channel 2	TCP Server	8002
Channel 3	TCP Server	8003
Channel 4	TCP Server	8004
Channel 5	TCP Server	8005
Channel 6	TCP Server	8006
Channel 7	TCP Server	8007
Channel 8	TCP Server	8008

Gateway Default Parameters

Item	Default Parameters
IP Address	192.168.3.200
Subnet Mask	255.255.255.0
Gateway	192.168.3.1
Channel 1 Protocol Type	TCP Server
Channel 1 Local Port	8001

· Device Network Parameters

1. Device IP

- STATIC (Static IP)，Users can define and configure the IP address, subnet mask, default gateway, and DNS server.
- DHCP (Dynamic IP Acquisition)， After logging into the server, the device automatically obtains the server-assigned IP address, subnet mask, gateway address, and DNS server address parameters, and configures them for use.

2. DNS (Domain Name Resolution)

When a user enters a domain name, the device automatically queries the DNS server, which retrieves the corresponding IP address from the database. In static IP mode, users can customize the DNS server used to resolve private DNS server data. In dynamic IP mode, the device automatically uses the DNS server configured on the router. Users only need to modify the router's DNS server; no configuration is required.

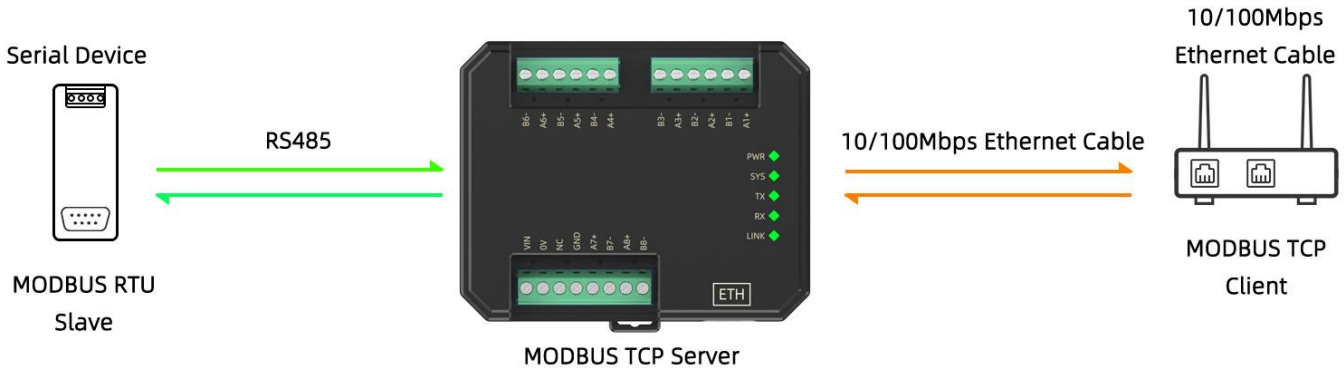
3. Network Reconnection Period

When the device detects a disconnection from the server, it periodically initiates a reconnection request. Therefore, the "Reconnection Period" does not affect the normal connection establishment time. Users can customize the request period; the default is 5 seconds.

· Module Configuration and Operating Mode Description

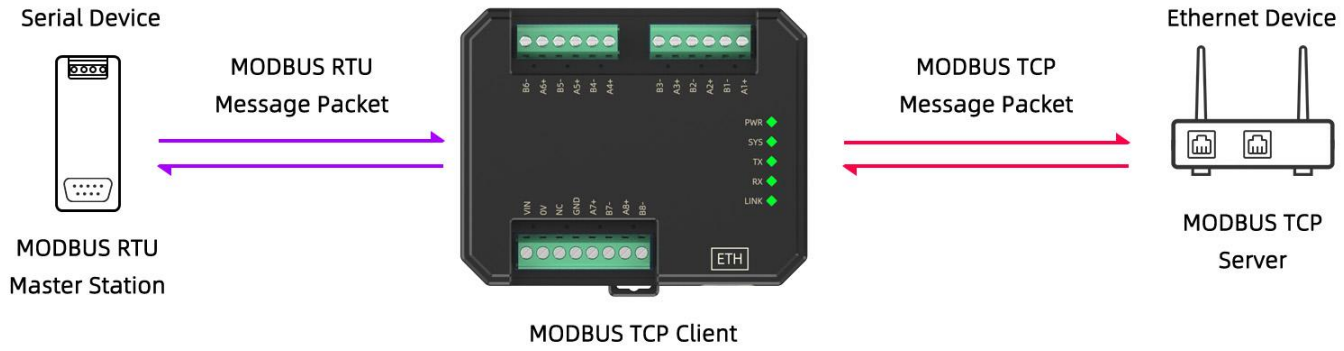
1. TCP Client

- TCP Client is a TCP client. When operating, the module will actively initiate a connection request to the server and establish a connection, enabling the exchange of serial port data with the server.
- Using the client requires accurate configuration of the target IP address/domain name and target port.
- Eight channels can independently open eight TCP clients. (Specific number depends on the number of serial ports.)



2. TCP Server

- A TCP server is a TCP server. In TCP server mode, the device listens on the local port, accepts client connection requests, and establishes connections for data communication. When the Modbus gateway function is disabled, the device sends data received on the serial port to all client devices connected to the device. The network parameters that require configuration for the module include: operating mode, module IP, subnet mask, default gateway, and module port.
- In server mode, each link can connect to up to five clients. If the number of connected clients exceeds this limit, the device will reject the connection.



3. UDP Client

- UDP Client is a connectionless transmission protocol that provides simple, transaction-oriented, unreliable information transmission services. There's no connection establishment or disconnection involved; data can be sent to a specific destination simply by configuring the destination IP and port. It's typically used in data transmission scenarios where packet loss rates are minimal, data packets are small, transmission frequency is high, and data must be sent to a specific IP address.
- The module will first transmit data destined for the local port to the module's serial port. Data destined for the module's serial port will also be transmitted via UDP to the specified destination IP and port. In this mode, the module requires configuration of the following network parameters: operating mode, module IP, subnet mask, default gateway, module port, destination IP, and destination port.
- In UDP Client mode, the device will only communicate with the configured remote UDP device (destination IP and port).
- In this mode, the destination address is set to 255.255.255.255. Sent data will be broadcast to the entire network segment, but the sending and receiving devices must use the same port. The devices can also receive broadcast data.

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

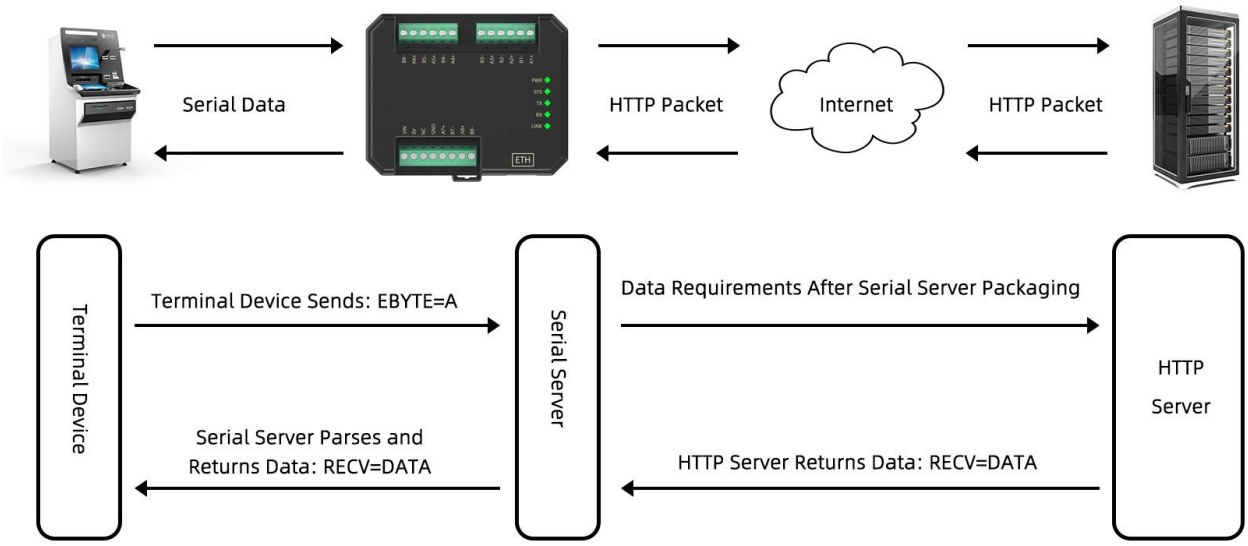
4. UDP Server

- UDP Server means that the device does not verify the source IP address of data when communicating using the UDP protocol. After receiving each UDP packet, it saves the packet's source IP address and source port and sets them as the destination IP and port. Therefore, data sent by the device is only sent to the source IP address and port of the last device receiving the data.
- The module receives all data sent to the local IP and port and forwards it to the serial port. Data sent to the module's serial port is also forwarded via UDP to the UDP IP and port of the communicating device. In this mode, the network parameters that require configuration include: operating mode, module IP, subnet mask, default gateway, and module port.
- This mode is typically used in scenarios where multiple network devices communicate with the device frequently, making TCP Server insufficient.
- Using UDP Server requires the remote UDP device to send data first; otherwise, data transmission will fail.

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

5. HTTP Client

- This mode enables automatic HTTP packet assembly and provides a POST method. Customers can configure URL parameters, which the device then assembles and sends, enabling fast communication between serial port data and the HTTP server. URLs support up to 96 bytes of data, and each of the eight channels can independently enable HTTP client mode without interfering with each other.
- HTTP request data must be less than the packet length (1024 bytes). Otherwise, the device will split the request data into multiple packets, resulting in request errors.



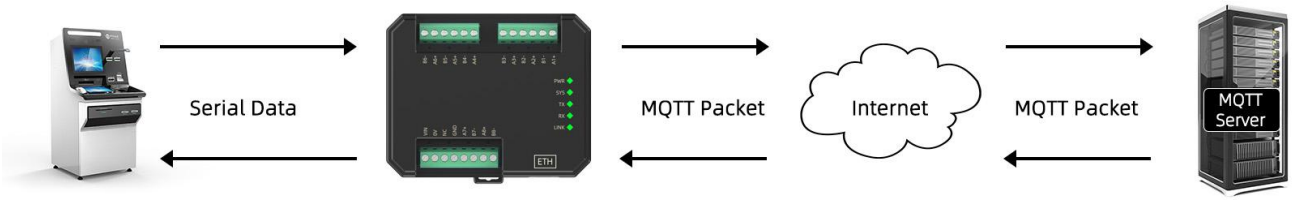
Use the HTTP function configuration reference, as shown in the following figure:

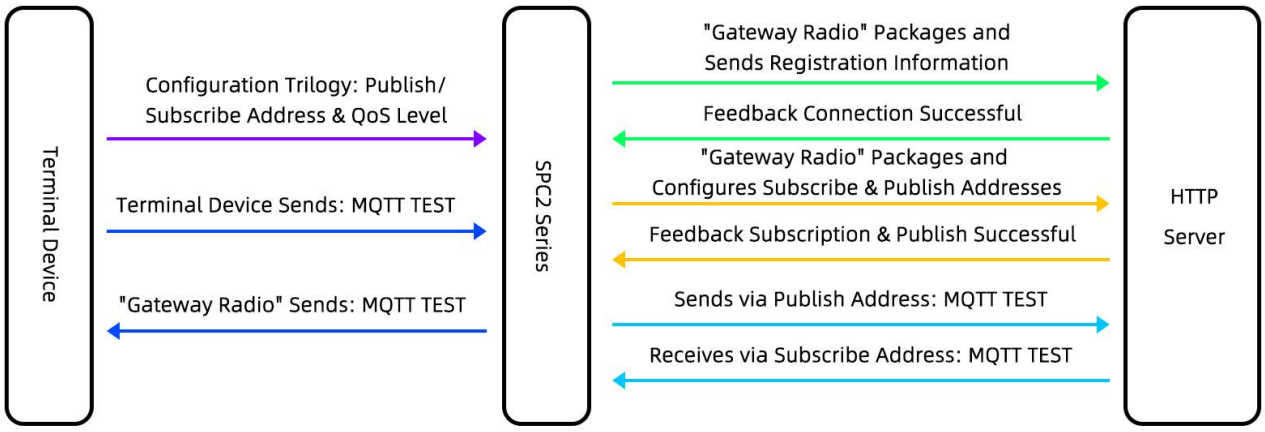
POST Description：

For packets configured as POST requests, the device automatically calculates the length of any header that does not require a specific data length configuration and sends it as a packet. Other header data must be manually configured. A maximum of 128 bytes of data is supported.

6. MQTT Client

Supports quick access to standard MQTT 3.1.1 protocol servers (Baidu Cloud, Huawei Cloud, user-hosted servers, and others) and Alibaba Cloud servers. It supports QoS level configuration (QoS 0 and QoS 1) and supports long text configuration for easier access to network service providers (server address, three elements, and subscription and publication addresses support up to 128 characters).





Use the MQTT function configuration reference, as shown in the following figure:

- **Channel Port**

Random Port:

TCP, UDP, HTTP, and MQTT clients can configure the local port to 0 (using a random local port). Do not use a random port in server mode, as this will prevent the client from properly establishing a connection (the device is not properly listening on the port). Using a random port allows for quick re-establishment if the device unexpectedly disconnects from the server, preventing the server from rejecting the connection due to incomplete four handshake attempts. Using a random port in client mode is recommended.

Static Port:

The device uses a fixed port (factory default: 8001-8008). In TCP server mode, the device listens on the configured port, accepts client connection requests, and establishes connections for data communication. In TCP client mode, the device initiates connection requests on the fixed port.

IV. Using the Configuration Software

Use the "SinePower NetSet V1.2.exe" network configuration software to set relevant parameters.

1. Open "SinePower NetSet V1.2.exe" and click "Search Devices." The device list will display all online devices.

2. Double-click the device you have found to retrieve its parameters.

3. In the basic network parameters area on the left side of the interface, modify the device's network parameters as needed. Click "Set Network" to save the settings.

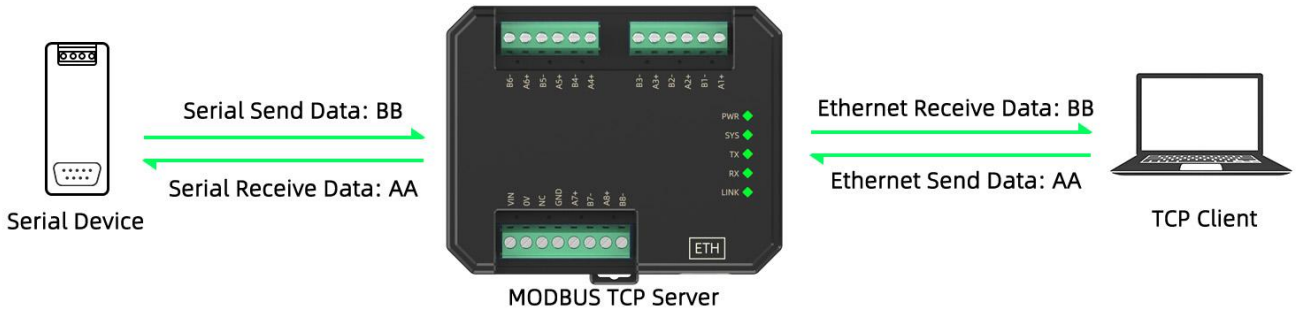
4. In the parameter settings area in the center of the interface, modify the network protocol and serial port parameters as needed. Click "Set Port" to save the settings. After completing the configuration, click "Restart Device" to reset the device. The device will restart. Wait a moment, then click "Search Devices" to find the device and read the parameters to view the device configuration results.

5. This device supports 8-channel port settings. The default interface is for channel 1. To set parameters for another channel, first read the parameters for the corresponding port number. The interface will automatically switch to the corresponding channel number, allowing you to set the parameters for the current channel number.

6. Use the transparent transmission function configuration reference and set the relevant options through the working mode position, as shown in the following figure:

Ⅴ. Introduction to the transparent transmission function

· Server transparent transmission



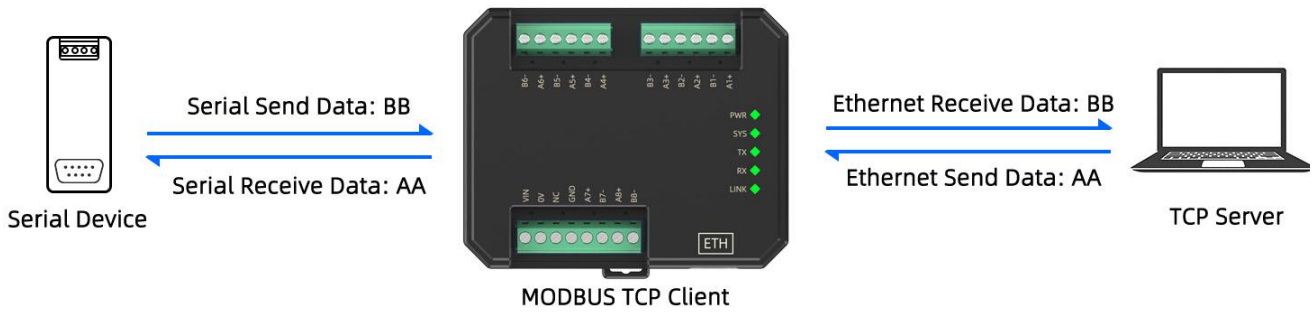
Functional Overview

Functional Overview: The module acts as a TCP server, directly converting serial port data to the Ethernet port for transmission, and vice versa.

Parameter Description

Parameter Type	Details
Network Port Connection Target	TCP Client
Serial Port Connection Target	RS485 Serial Device
Channel 1 Default IP Address	192.168.3.200
Channel 1 Default Port Number	8001
Number of Connected Clients	1
Serial Port Communication Parameters	9600, 8-bit data, no parity, 1 stop bit

· Client transparent transmission



Functional Overview

The module acts as a TCP client, actively connecting to a TCP server at a specified IP and port, directly converting serial port data to the Ethernet port for transmission, and vice versa.

Parameter Description

Parameter Type	Details
Network Port Connection Target	TCP Server
Network Type	LAN
Serial Port Connection Target	RS485 Serial Device
Default Remote Server IP Address and Port	192.168.3.100 (IP) and 8001 (Port) for RS485
Number of Connected Servers	1
Serial Port Communication Parameters	9600, 8-bit data, no parity, 1 stop bit

VI. Quick Start Guide

If you encounter any technical issues during use, please visit our video channel and find the corresponding product quick start guide to quickly verify device functionality.

· Hardware Requirements

- A laptop with an RJ45 network port;
- An SPC2 communication module;
- An Ethernet cable;
- A USB to 485 communication module (SPC1020-KA);

The required hardware is shown in the figure below:

computer

Ethernet cable

SPC2 Module

USB to RS485 module

· Software Preparation

Serial Port Debugging Assistant (SCOMM), Network Debugging Assistant (TCP/IP Debugging Assistant), Sine Power Network Configuration Tool (for configuring the host computer)

Serial Port Debugging Assistant

Network Debugging Assistant

SinPower Network Configuration Tool

· Device Testing Steps

Different channels use the same IP address but different local ports. For example, the factory-configured channel 1 corresponds to port 8001, and this is increased sequentially to channel 8, which corresponds to port 8008.

1. Connect the hardware device

- Connect the device's Ethernet port to the computer's Ethernet port using an Ethernet cable.
- Connect the device's RS485 terminal to the computer's USB port via a USB-to-485 communication module.
- Confirm that everything is working correctly before proceeding to the next configuration step.

2. Device Parameter Configuration

To help users quickly understand the device, we used default parameters for transparent data transmission testing. The module's default parameters are shown in the table below:

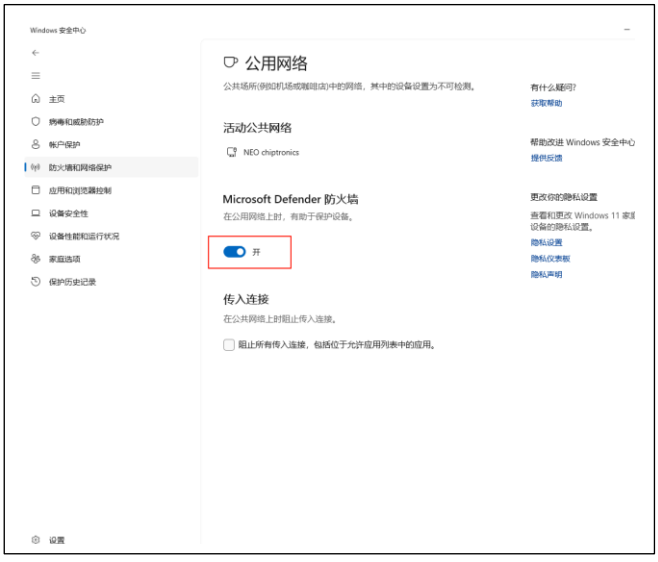
Item	Default Parameters
IP Address	192.168.3.200
Subnet Mask	255.255.255.0
Gateway	192.168.3.1
Channel 1 Protocol Type	TCP Server
Channel 1 Local Port	8001
Serial Port Communication Parameters	9600, 8-bit data, no parity, 1 stop bit

Ensure that the computer IP address and the serial device server IP address are on the same network segment and do not conflict. The verification method is shown in the figure below:

Note: Before opening the software, disable the computer's wireless network. This is because the IP automatically identified by the configuration and testing software prioritizes the wireless network IP address over the local connection IP address.

3. Disable your computer's firewall

If communication fails, try disabling your computer's firewall, router's firewall, and antivirus software before trying again.



4. Open the "Serial Port Debug Assistant"

Select the correct serial port number and configure the correct serial port parameters. Then open the serial port, as shown below:

5. Open the Network Assistant.

Select "TCP Client" mode, configure the remote IP address to "192.168.3.200" and the remote host port to "8001," and connect to the device, as shown below:

6. Sending and receiving data test

Click the "Send" button on "Network Debugging Assistant" and "Serial Debugging Assistant" respectively to realize the transparent transmission of network and serial port data, as shown in the following figure: