Industrial Ethernet Serial Gateway
（Modbus RTU/ASCII / Modbus TCP）

Modbus Serial/TCP Series

User Manual

V 1.6

SST Automation

Email: support@sstautomation.com
www.SSTAutomation.com

Important Information

Warning

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Technical Support Contact Information

www.sstautomation.com

www.sstcomm.com

E-mail: support@sstautomation.com

Catalog

1 Product Overview

1.1 Product Function

GT200-MT-RS is a Modbus Serial/TCP series gateway that can provide a seamless connection between Ethernet (Modbus TCP protocol) devices and serial (Modbus RTU/ASCII) devices. The Modbus Serial/TCP series gateway supports dual Ethernet ports with a built-in network switch. The serial side supports single or dual serial ports depending on the product model used. Users need to confirm the serial interface type according to actual needs when ordering.

Modbus Serial/TCP series gateway products model list:

Product Model	Ethernet Protocol	Serial Protocol	Serial Port	Modbus TCP Connections (Slave/Master Mode)
GT200-MT-RS485	Modbus TCP	Modbus RTU/ASCII	Single RS485 port	V1.X: 8 clients/4 servers, V2.X: 12 clients/4 servers
GT200-MT-2RS485	Modbus TCP	Modbus RTU/ASCII	Dual RS485 port	V1.X: 6 clients/4 servers, V2.X: 8 clients/4 servers
GT200-MT-2RS	Modbus TCP	Modbus RTU/ASCII	RS485 and RS232 port	V1.X: 6 clients/4 servers, V2.X: 8 clients/4 servers

1.2 Product Features

- Easy to use: Users only need to refer to the product manual and application instances to realize a gateway data communication in a short time that meets configuration requirements.
- Supports both master/slave operating modes:

  Modbus RTU/ASCII slave Mode: Modbus TCP Clients communicate with Modbus RTU/ASCII slaves through the gateway.

  Modbus RTU/ASCII master Mode: Modbus RTU/ASCII master communicates with Modbus TCP Servers through the gateway.
- Dual Ethernet interface and built-in network switch with cascade support reduces the need for cables and switches.
- Supports slave ID mapping function.
- Automatic routing of Modbus TCP packet requests to the serial port.
- Supports network security settings that help protect against tampering:
  - Limit the IP address range of clients' communication machine.
  - Set a login password to prevent unauthorized access.
- Multi debugging functions: The configuration software SST-MT-CFG can provide a visual display of data exchange that greatly facilitates user communication tests.

1.3 Technical Specifications

[1] GT200-MT-RS485:

- One RS485 interface with 1KV electromagnetic isolation.

[2] GT200-MT-2RS485:

- Two RS485 interfaces with 1KV electromagnetic isolation.

[3] GT200-MT-2RS:

- One RS485 interface and one RS232 interface with 1KV electromagnetic isolation.

[4] Ethernet 10/100M self-adaptive.

[5] Slave mode for V1.X model of GT200-MT-RS/GT200-MT-2RS series: GT200-MT-RS supports 8 simultaneous Modbus TCP Client connections. GT200-MT-2RS supports 6 simultaneous Modbus TCP Client connections. Both models can support 32 simultaneous command requests.

[6] Master mode for V1.X model of GT200-MT-RS/GT200-MT-2RS series: Both models support connecting to 4 unique IPs or Modbus TCP Servers with unique ports.

[7] Slave mode for V2.X model of GT200-MT-RS/GT200-MT-2RS series: GT200-MT-RS supports 12 simultaneous Modbus TCP Client connections. GT200-MT-2RS supports 8 simultaneous Modbus TCP Client connections. Both models can support 32 simultaneous command requests.

[8] Master mode for V2.X model of GT200-MT-RS/GT200-MT-2RS series: Both models support connecting to 4 unique IPs or Modbus TCP Servers with unique ports.

[9] Serial interface specifications:

- All RS485 or both RS485 and RS232 depending on the model.
- Half-duplex.
- Baud rates supported: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 and 230400bps.
- Parity types supported: none, odd and even.
- 1 or 2 stop bits.

[10] Power supply: 24VDC (9V ~ 30V), 110mA (24VDC).

[11] Working temperature: -40℉~185℉(-40℃~85℃), relative humidity: 5% ~ 95% (non-condensing).

[12] Dimensions (W*H*D): 0.98 in*3.94 in*3.54 in (25mm*100mm*90mm).

[13] Installation: 35mm rail.

[14] Protection class: IP20.

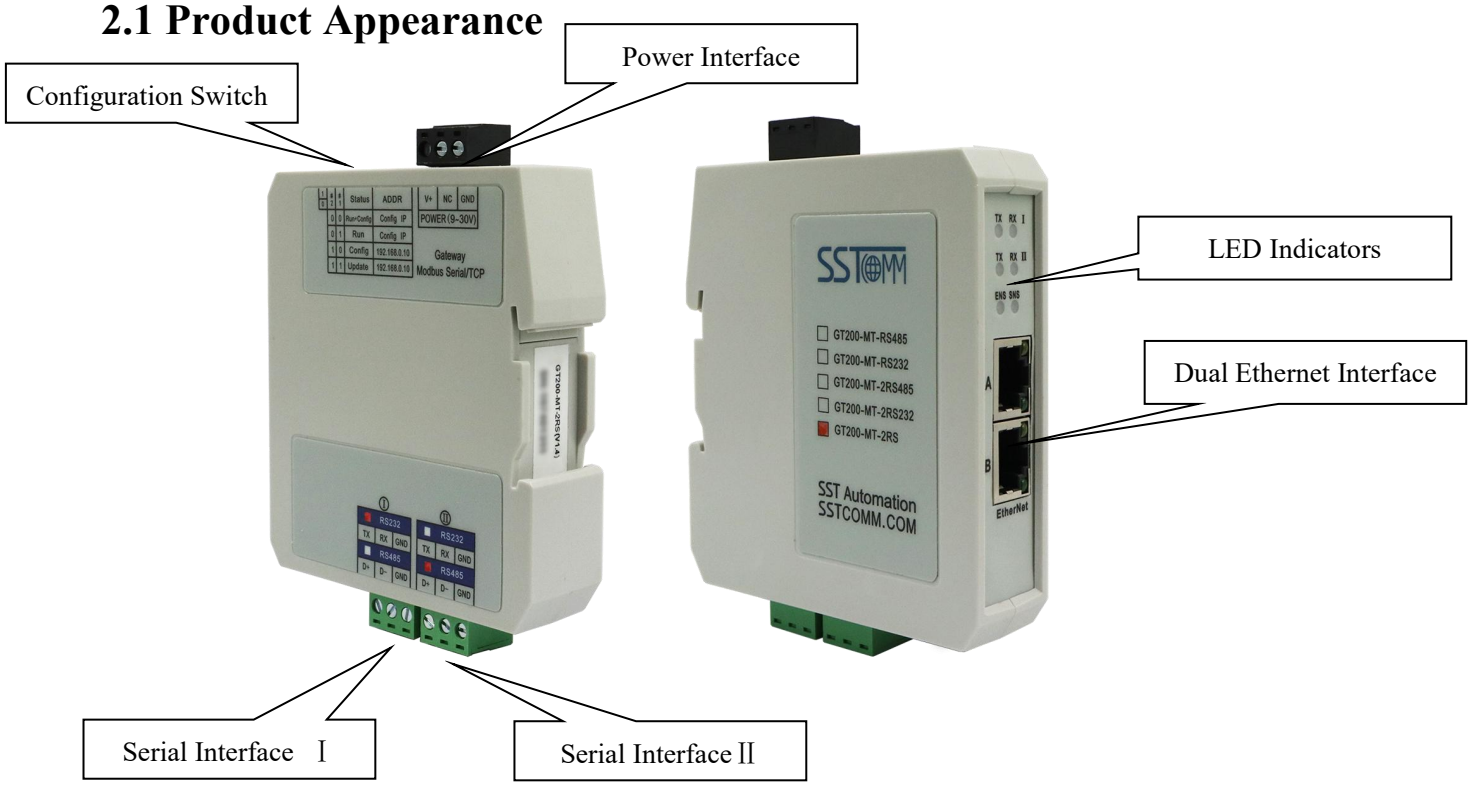
[15] Test standard: EMC test standards.

1.4 Revision History

Revision	Date	Chapter	Description
V1.4	6/11/2021	ALL	New release
V1.4, Rev A	03/13/2022	PART	Update the format and software screenshot
V1.6	08/24/2022	Chapter 1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 2.4.1, 2.4.2, 2.4.3, 4, 4.1, 4.2.2, 4.3.1, 4.3.2, 4.3.3, 4.3.4, 4.3.5, 4.3.6, 4.3.7, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10, 4.11, 5, 5.1, 5.2, 5.3	Revised some mistakes. Enhancement on DHCP function. Exchanged RS485 and RS232 position for GT200-MT-2RSV1.6 and V2.2. Corrected figures in chapters 5.1, 5.2, and 5.3.

2 Hardware Description

2.1 Product Appearance



Notes:

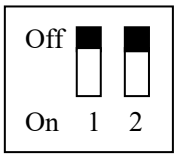
1. The picture above shows the appearance of GT200-MT-2RS.
2. GT200-MT-2RS model has two serial ports. For V1.6 and V2.2, serial I is RS485 and serial II is RS232.
3. GT200-MT-RS485 model has one serial port. Serial I is RS485.

2.2 LED Indicators

Product Model	Indicators	Status	Descriptions
GT200-MT-RS485	RX	Flashing Green	Serial port is receiving data
	TX	Flashing Green	Serial port is transmitting data
GT200-MT-2RS GT200-MT-2RS485	Ⅰ	RX Flashing Green	Serial port Ⅰ is receiving data
		TX Flashing Green	Serial port Ⅰ is transmitting data
	Ⅱ	RX Flashing Green	Serial port Ⅱ is receiving data
		TX Flashing Green	Serial port Ⅱ is transmitting data
Modbus Serial/TCP series	ENS	Green	Slave mode: At least one Modbus TCP connection has been established; Master mode: Modbus TCP connection has been established
		Flashing Green	Slave mode: Modbus TCP no connection; Master mode: Modbus TCP connection has not been established
		Flashing Red	Modbus TCP connection is disconnected and no longer exists; Obtain IP config via DHCP
		Flashing Red (3 seconds)	Modbus TCP connection is disconnected
	SNS	Solid Green	Serial port ready to transmit and receive data
		Flashing Red	Automatic routing conflict
		Solid Red	Equipment failure or firmware update failed
	ENS (Orange) and SNS (Orange)（Orange: Red and Green light on at the same time）	Simultaneously on	Start status
		Flashing alternately	Configuration Mode
		Flashing alternately (3 seconds)	Using locate function
		ENS on, SNS off	Firmware update mode

2.3 Configuration Switch

The configuration DIP switches are located at the bottom of the gateway. Bit 1 is the mode bit and Bit 2 is the function bit.



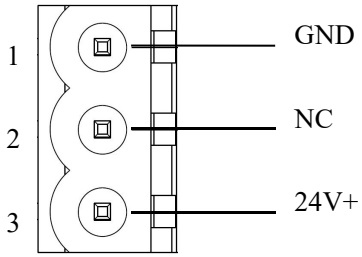
Mode (Bit 1)	Function (Bit 2)	Mode	Description
Off	Off	Run mode	Allows configuration and communication.
Off	On	Configuration mode	IP address is fixed at 192.168.0.10. Allows configuration. Prohibits communication.
On	Off	Run mode	Allows communication. Prohibits configuration and debugging (configuration data protection switch).
On	On	Firmware update mode	IP address is fixed at 192.168.0.10. This mode can only update firmware.

Note: After changing the configuration, please restart the gateway (power off and power on) to make the settings take effect.

2.4 Interface

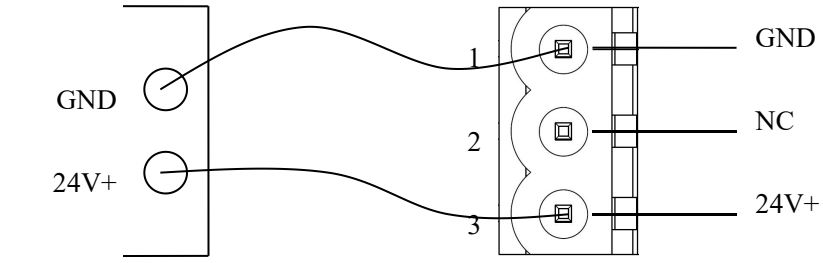
2.4.1 Power Interface

Modbus Serial/TCP series gateway uses a 24V DC power supply. The power interface uses a 3-pin 7.62mm pluggable terminal block. The pinout is defined as follows:



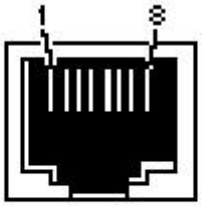
Pin	Function
1	GND
2	NC, not connected
3	24V+ , DC 24V

Power supply wiring is shown as below:



DC power: +24V　　Power interface

2.4.2 Ethernet Interface



RJ-45 port

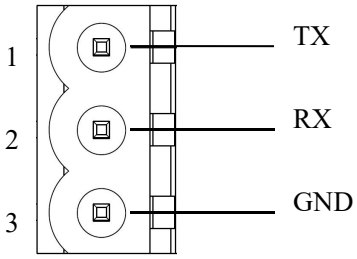
The Ethernet interface uses an RJ-45 connector. Its pinout (standard Ethernet signal) is defined as below:

Pin	Signal Description
S1	TXD+, Tranceive Data+
S2	TXD-, Tranceive Data-
S3	RXD+, Receive Data+
S4	Bi-directional Data+
S5	Bi-directional Data-
S6	RXD-, Receive Data-
S7	Bi-directional Data+
S8	Bi-directional Data-

2.4.3 Serial Interface

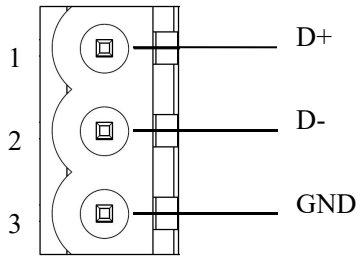
Modbus Serial/TCP series gateway uses a 3-pin 5.08mm pluggable terminal block. Ports support RS485 or RS232.

The pinout for the RS232 interface is defined as below:



Pin	Function
1	TX, connect with RX of user device
2	RX, connect with TX of user device
3	GND

The pinout for the RS485 interface is defined as below:



Pin	Function
1	D+, RS485
2	D-, RS485
3	GND

The RS485 interface of the Modbus Serial/TCP series gateway is standard. The RS485 characteristics of the product are shown as follows:

1. The basic characteristics of RS485 transmission technology

① Network topology: Linear bus, there are active bus terminal resistors at both sides.

② Transmission rate: 1200 bps~115.2Kbps.

③ Media: Shielded twisted-pair cable and also can cancel the shielding, depending on environmental conditions (EMC).

④ Site numbers: 32 stations per subsection (without repeater), and can up to 127 stations (with RS485 repeater).

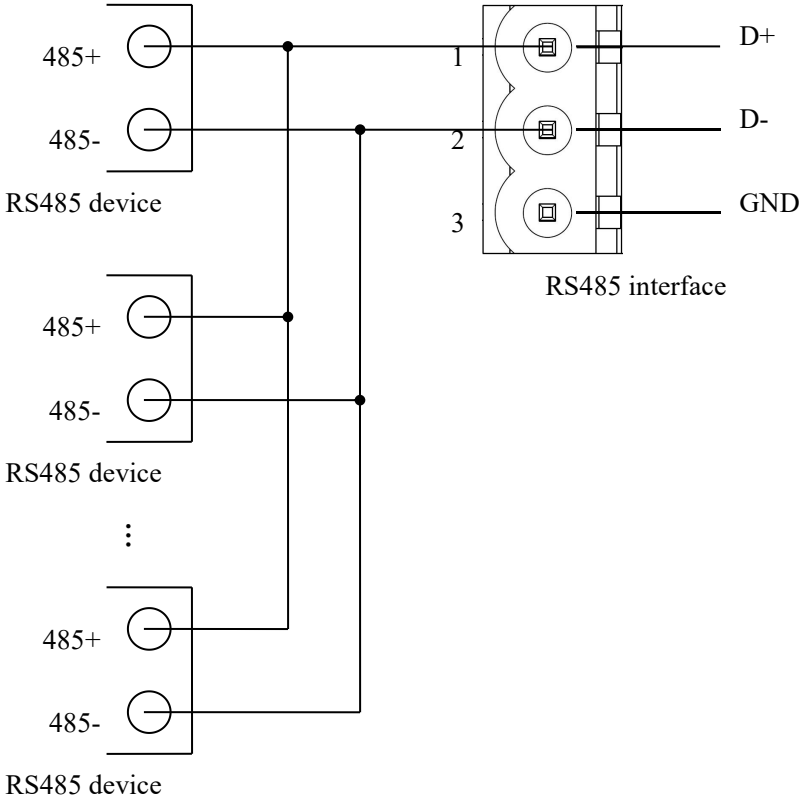
⑤ Plug connection: 3-pin pluggable terminal block.

2. The main points on RS485 transmission equipment installation

① All the equipment are connected with RS485 bus.

② Subsection can be connected up to 32 sites.

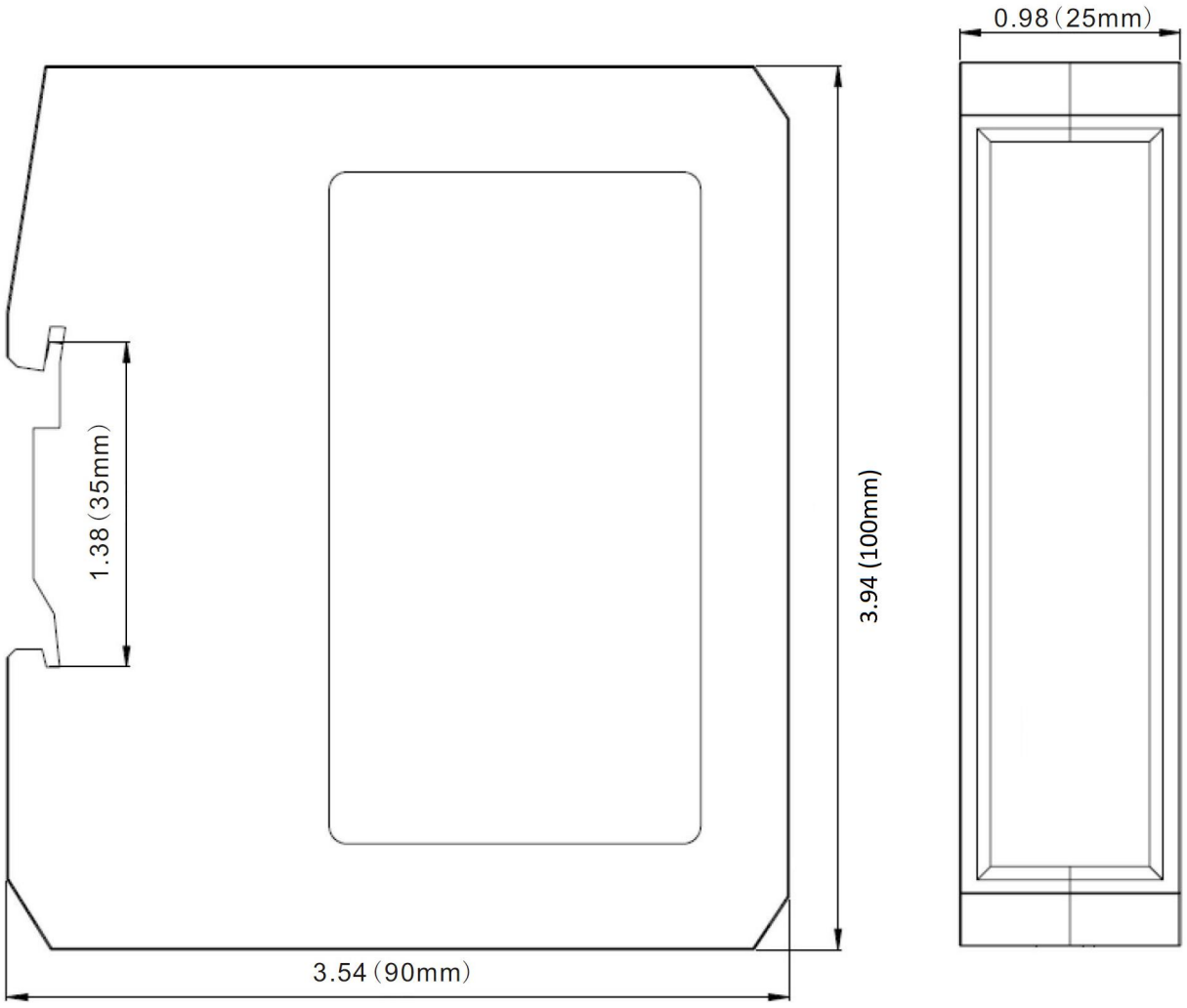
③ The farthest end of each bus has a termination resistor—120Ω 1/2W to ensure reliable operation of the network.



3 Hardware Installation

3.1 Mechanical Dimensions

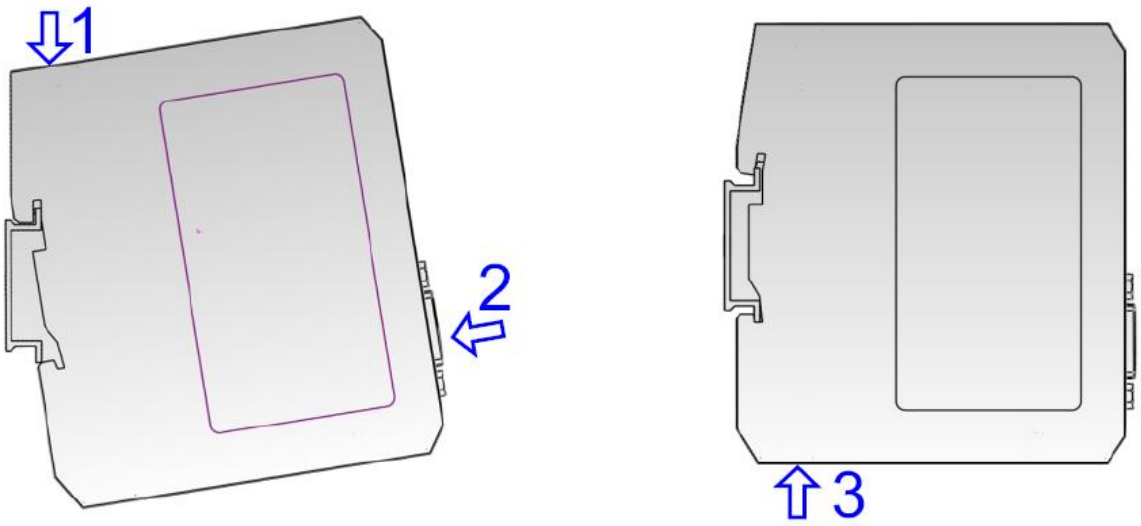
Size: 0.98 in (width)*3.94 in (height)*3.54 in (depth)



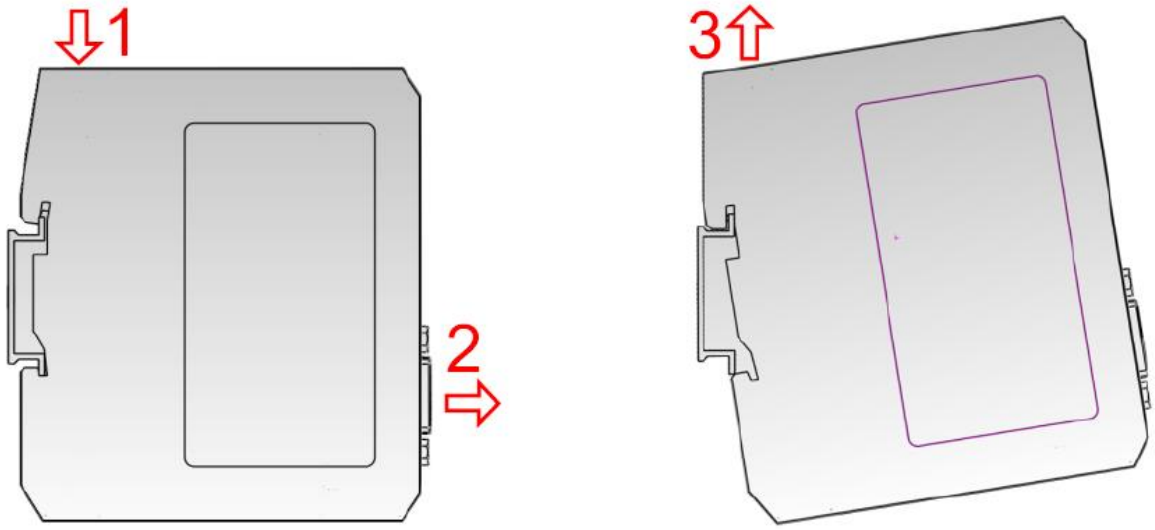
3.2 Installation Method

Use 1.38 in (35 mm) DIN Rail.

Installing the gateway



Uninstalling the gateway



4 Configuration Software

The SST-MT-CFG configuration software is used to finish the configuration of the Modbus Serial/TCP series gateway. (GT200-MT-2RS shown as an example below)

Note:

The factory Ethernet setting of Modbus Serial/TCP series gateway for V1.4 is 192.168.0.10, subnet mask is 255.255.255.0, and gateway address is 192.168.0.1. For V1.5 and above, the factory setting is DHCP. If the gateway cannot get the IP address in DHCP mode, the IP address will be returned to fixed 192.168.0.10.

(When users click the “Advanced” tab in the “Restore Factory Settings ", the default IP address configuration is DHCP.)

4.1 Notes before Configuration

SST-MT-CFG is a product based on Windows platform, and used to configure parameters of Modbus Serial/TCP series gateway.

Before running the software, make sure the user’s computer and Modbus Serial/TCP series are in the same network.

Double-click the icon to access the main interface:

4.2 Search Equipment

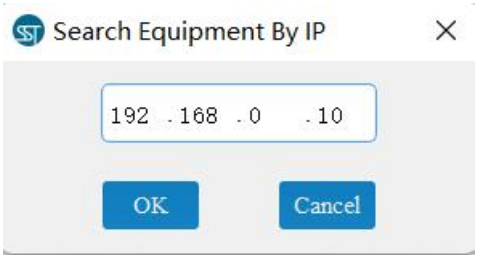
Before configuring parameters of Modbus Serial/TCP, users need to search the gateway using the software. The software provides two ways to search the gateway.

4.2.1 Search Equipment in Ethernet

Click “Search Equipment” button of the main interface, the software will search all the available Modbus Serial/TCP series gateway equipment and list them in the main interface.

4.2.2 IP Search

Click “IP Search” button of the main interface will pop up a dialog box which requests you to input the IP address.



After entering the correct IP address, the software will search for a Modbus Serial/TCP series gateway with this IP address in the network, and list the information of the equipment in the main interface.

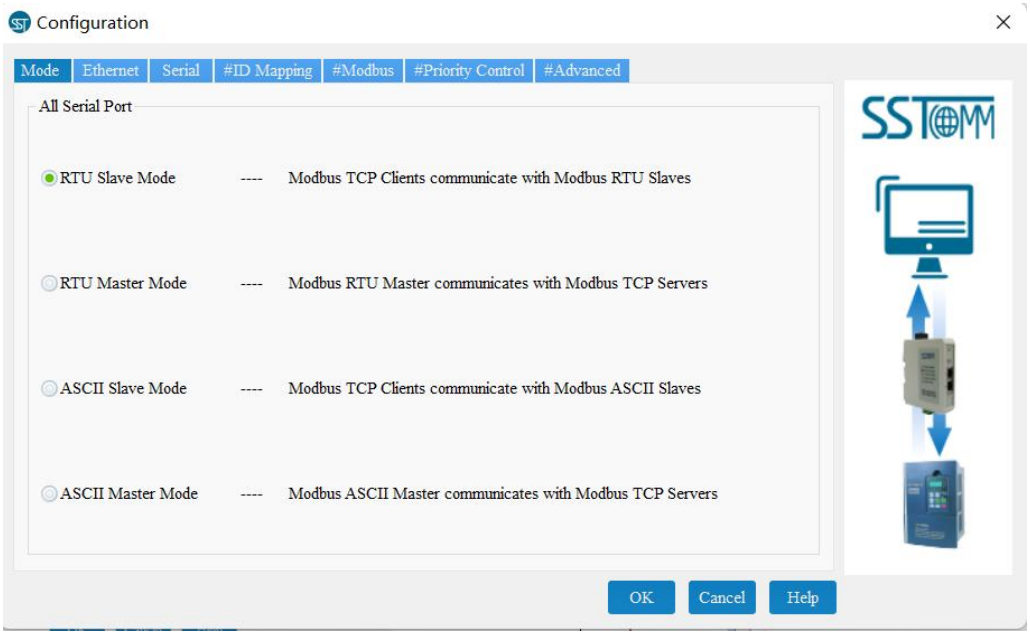
Note: If users select the “IP Search”, users need to enter the correct IP address or it will not find the equipment.

4.3 Configuration

Select the equipment to be configured in the list, and the “Locate”, “Configuration”, “Remote Reset”, “New”, “Open” and “Save” buttons will become available:

Click “Configuration” button, a password authentication dialog box will pop up if the equipment has been set with a password:

Pass the password authentication or then enter configuration interface with no password:



4.3.1 Mode Selection

The Modbus Serial/TCP series gateway now supports four operating modes:

RTU Slave Mode: Modbus TCP Clients communicate with Modbus RTU Slaves through the gateway.

RTU Master Mode: Modbus RTU Master communicates with Modbus TCP Servers through the gateway.

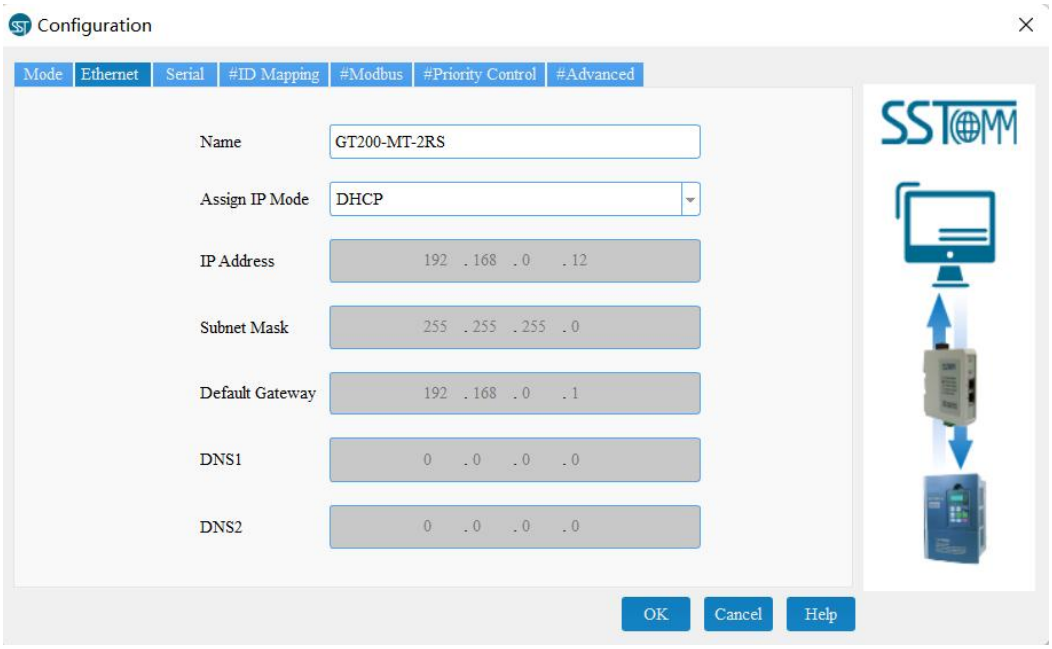
ASCII Slave Mode: Modbus TCP Clients communicate with Modbus ASCII Slaves through the gateway.

ASCII Master Mode: Modbus ASCII Master communicates with Modbus TCP Servers through the gateway.

Operating mode of Modbus Serial/TCP series gateway is defined by the role of master or slave of serial equipment, for example, when you want to achieve the communication between Modbus TCP Client devices and Modbus RTU/ASCII slave devices, users need to select "RTU/ASCII slave Mode" of Modbus Serial/TCP series gateway.

4.3.2 Ethernet Parameters

Ethernet parameters include: “Name”, “Assign IP Mode”, “IP Address”, “Subnet Mask”, “Default Gateway”, “DNS1” and “DNS2”.



Name: Enter a name to identify the device in order to distinguish from other equipment. The name cannot have spaces and can be a length of up to 20 characters.

Assign IP Mode: Set the IP Address configuration mode of the equipment.

IP Address: Set IP Address of the equipment.

Subnet Mask: Set subnet mask of the equipment.

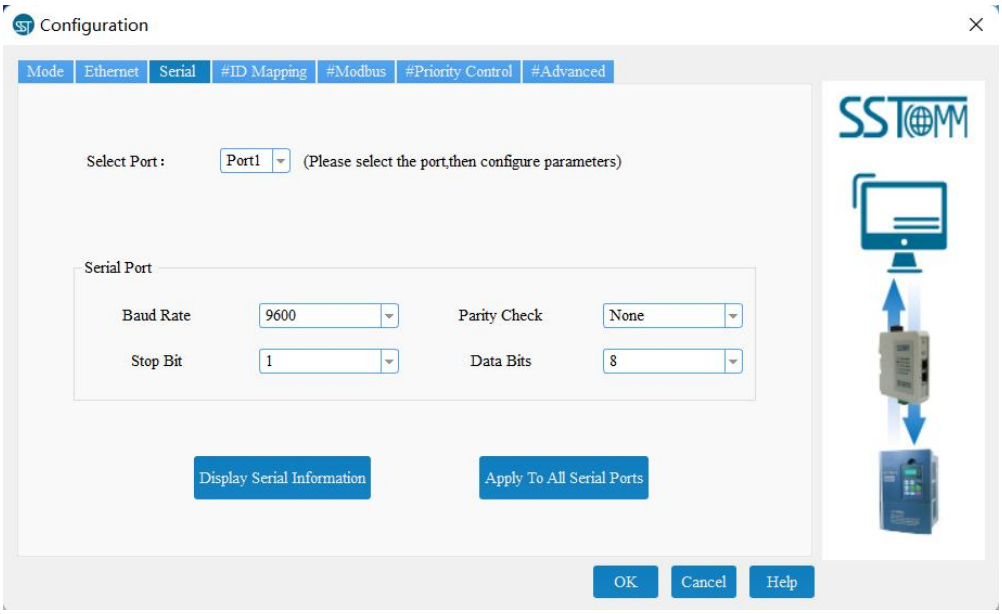
Default Gateway: Set gateway address of the equipment.

DNS1: 0.0.0.0 (currently only supports 0.0.0.0)

DNS2: 0.0.0.0 (currently only supports 0.0.0.0)

4.3.3 Serial Parameters

Serial parameters include: “Baud Rate”, “Check Bit”, “Stop Bits” and “Data Bits”.



Baud Rate: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400bps.

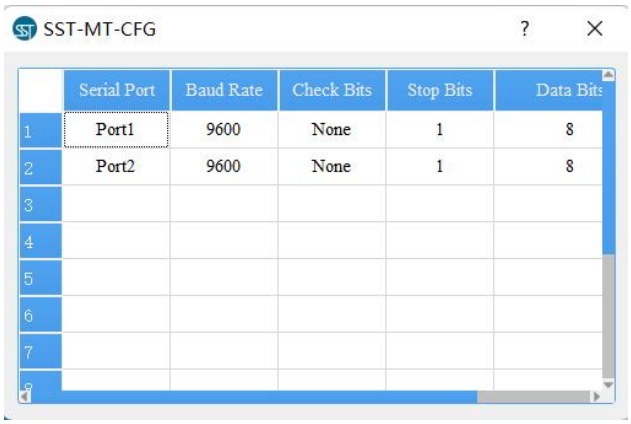
Check Bit: None, Odd, Even.

Stop Bit: 1, 2.

Data Bits: 8 (currently only support 8 data bits).

Note: GT200-MT-2RS gateway: If both serial ports will be configured with the same parameters, then only one serial port needs to be configured in the software. Click "Apply to All Serial Ports” to apply the configuration to both serial ports at the same time.

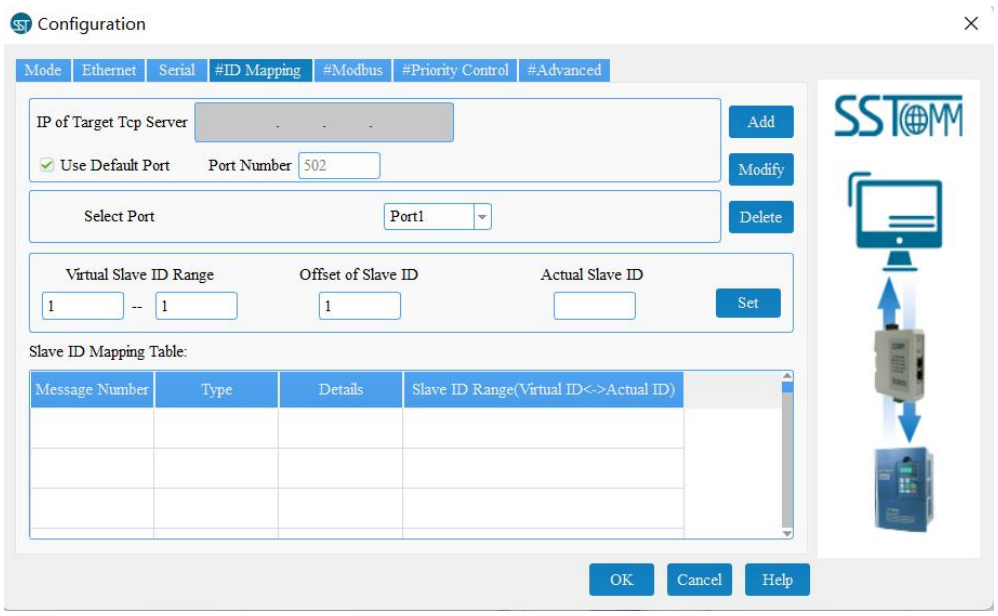
Click “Display Serial Information” to show the current serial port configuration:



4.3.4 ID Mapping (Advanced Function)

When users select RTU Slave or ASCII Slave mode, and only configure the basic configuration, the ID Mapping tab cannot be configured.

When you select RTU master or ASCII master mode, please indicate which server the request packets are sent to.



Virtual Slave ID Range: Enter an ID range, the left is minimum, the right is maximum (no more than 247).

Offset of Slave ID: D-value of virtual ID and actual ID (can be negative).

Actual Slave ID: By clicking “Set” button to calculate.

- When selecting “RTU/ASCII slave Mode”, users need to specify the serial port to be mapped.
- When selecting “RTU/ASCII master Mode”, users need to set “IP of Target TCP server”, that is the IP address of the server to be connected.
- After setting “Virtual slave ID Range” and “Offset of Slave ID”, click “Set” button, “Actual Slave ID” value is automatically calculated.
- When users click “Add” button, users can add a message in “Slave ID Mapping Table”.
- When users want to modify the added information, users fist select the information you want to modify, and then set “Virtual Slave ID Range” and “Offset of Slave ID”, click “Modify” button.
- When users want to delete the added information, users need to select the information you want to delete, and click “Delete” button.

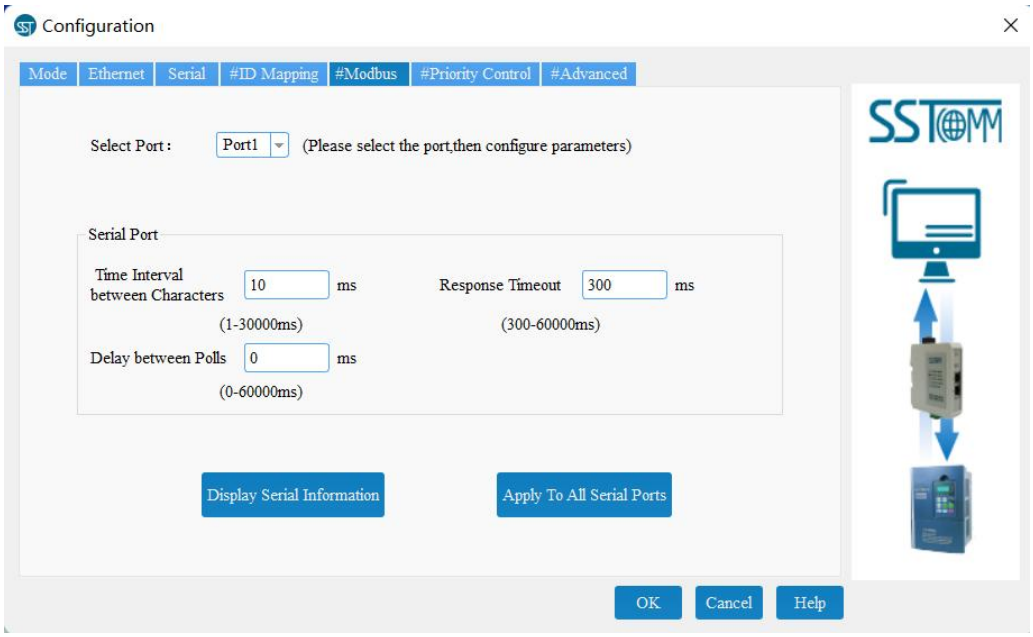
Tips:

1. “Add” and “Modify” button both have “Set” function. Users do not need to click “Set” after clicking “Add” or “Modify”.
2. Supports up to 4 group ID mapping.

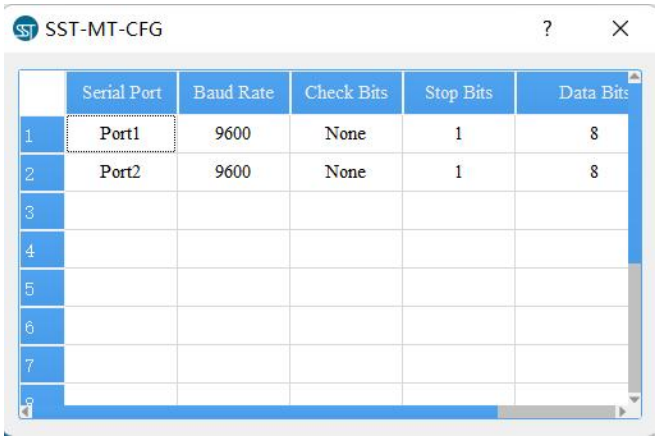
4.3.5 Modbus (Advanced Function)

When users select RTU Slave or ASCII Slave Mode, and only configure the basic parameters, the Modbus tab does not need to be configured.

Set "Time Interval between Characters", "Response Timeout" and "Delay between Polls" of Modbus RTU/ASCII in the following interface:



Note: When users use the GT200-MT-2RS gateway, they only need to configure one serial port if all serial port parameters are consistent. Click "Apply to All Serial Ports" to set all serial port parameters to the currently displayed values. Click "Display Serial Information" to show the current serial port configuration:



4.3.6 Priority Control (Advanced Function)

When users select RTU slave or ASCII slave Mode and only configure the basic configuration, Priority Control does not need to be configured. (Modbus Serial/TCP series gateway does not currently support this feature)

Ethernet speed is faster than serial port, and it will cause frames to build up in a queue. Priority Control can be configured to frame priority.

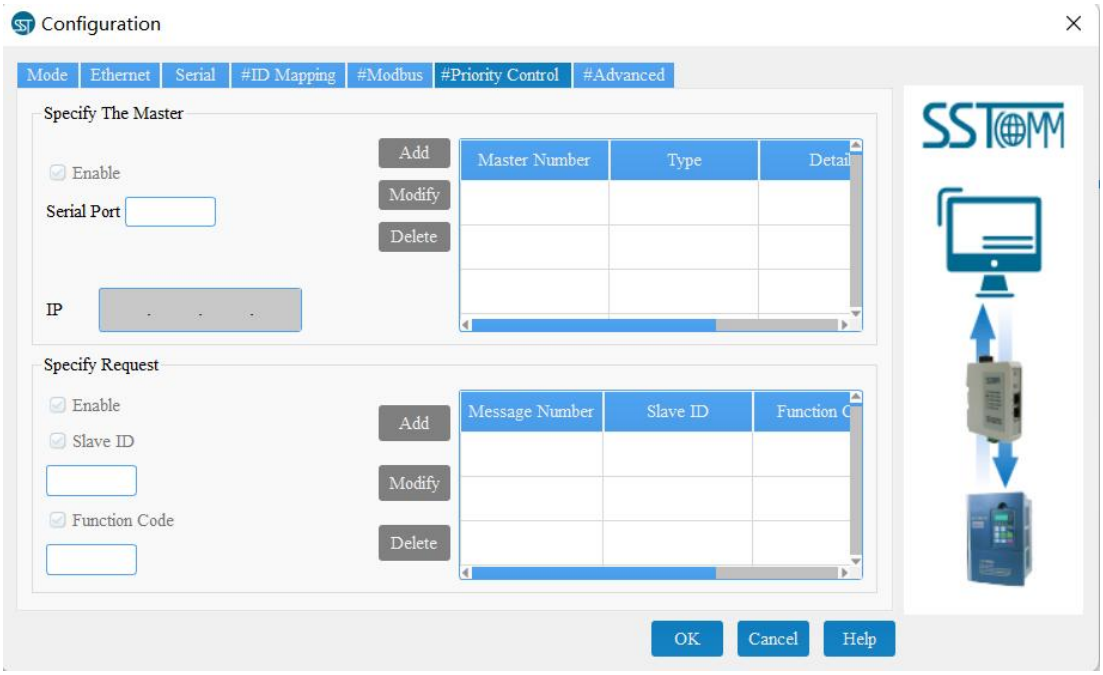
After enabling "Priority Control", users can set the following parameters:

- **Specify the master:** The requests of specified master are prior to transmit.
- **Specify the request:** The requests of specified slave ID (virtual ID) or function codes are prior to transmit.

Priority of requests:

Conditions	Priority
Comply with specified master, and comply with specified request	High
Comply with specified master, or comply with specified request	General
Not comply with priority conditions	Low

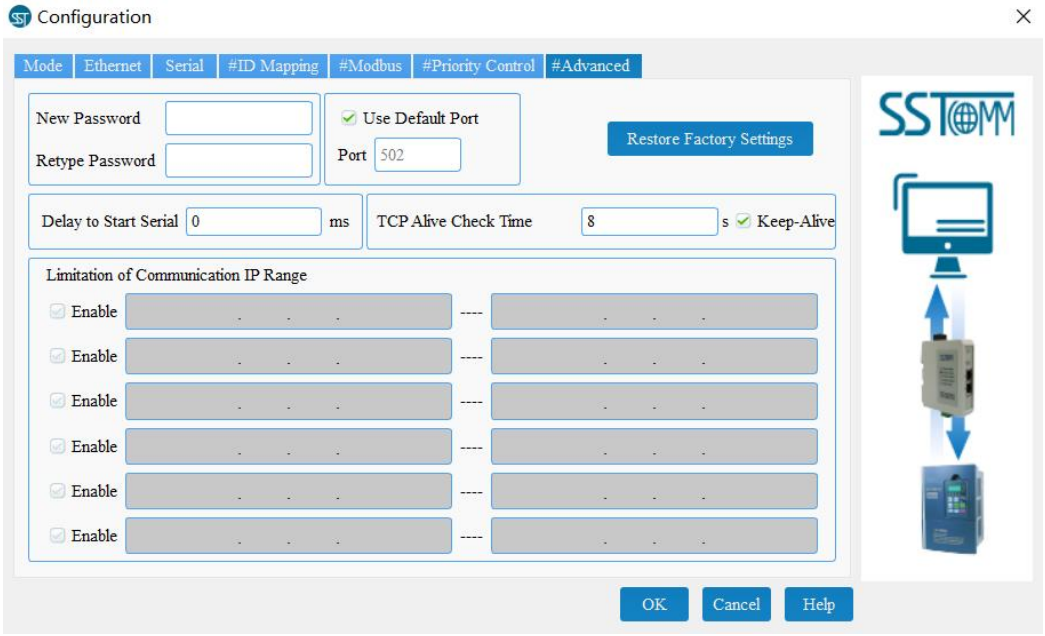
The "Add", "Modify" and "Delete" buttons work the same as with "ID mapping".



4.3.7 Advanced (Advanced Function)

When users select RTU slave or ASCII slave Mode and only configure the basic configuration, the Advanced tab cannot be configured.

Advanced parameters include: "Password", "Confirm Password", "Use default port", "Port Number", "Start-up Delay of Serial Port", "Restore Factory Settings", "TCP Connect Idle Time", and "Limitation of communication IP Range".



Password: After setting the password, users need to enter the password when logging in the equipment again. If users want to delete the password, just set your password to empty.

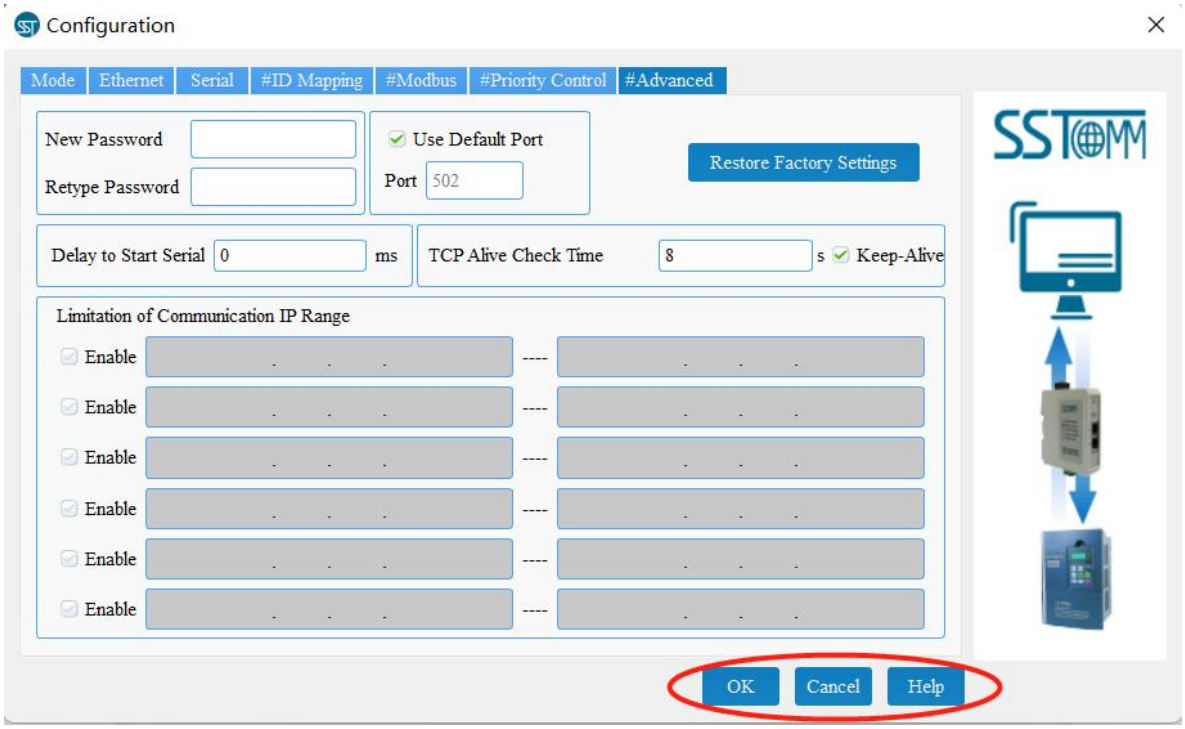
Restore Factory Settings: When users click the button, the previous configuration information will be lost.

TCP Connect Idle Time and Keep-Alive: When a TCP connection idle time reaches the set value, if "Keep-Alive" is selected, then transmit keep-alive message; If not, then disconnect the TCP connection.

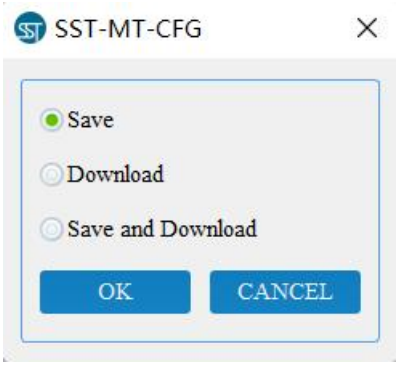
Limitation of communication IP range: Set the range of communication IP to limit the client to connect to Modbus Serial/TCP.

4.3.8 OK, Cancel and Help

After configuring parameters, users need to click “OK” button to write the configuration to the equipment. If you do not want to write to the configuration, click “Cancel” button.



(1) OK:

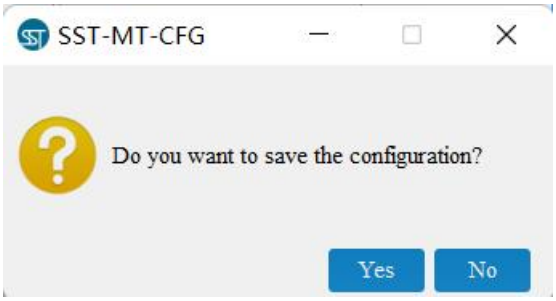


Save: Save the configuration as ". inf " format to the local disk;

Download: Download the configuration to the equipment;

Save and Download: Save to the hard disk and download to the equipment.

(2) Cancel:



Yes: Save to the hard drive and close.

No: No save and direct close.

(3) Help:

Open the software manual.

4.4 Locate

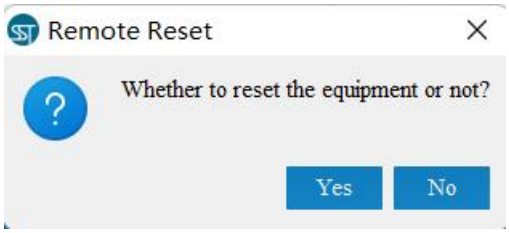
When users manage multiple Modbus Serial/TCP gateways, the “Locate” function can be used to identify equipment that will be configured.

Users can click on the “Locate” button when the equipment is connected to Ethernet to make the ENS and SNS red indicators of the equipment flash alternately for 3 seconds to help them find it.

4.5 Remote Reset

The function of “remote reset” will restart the selected equipment. Clicking remote reset will make the ENS and SNS red indicators turn on at the same time

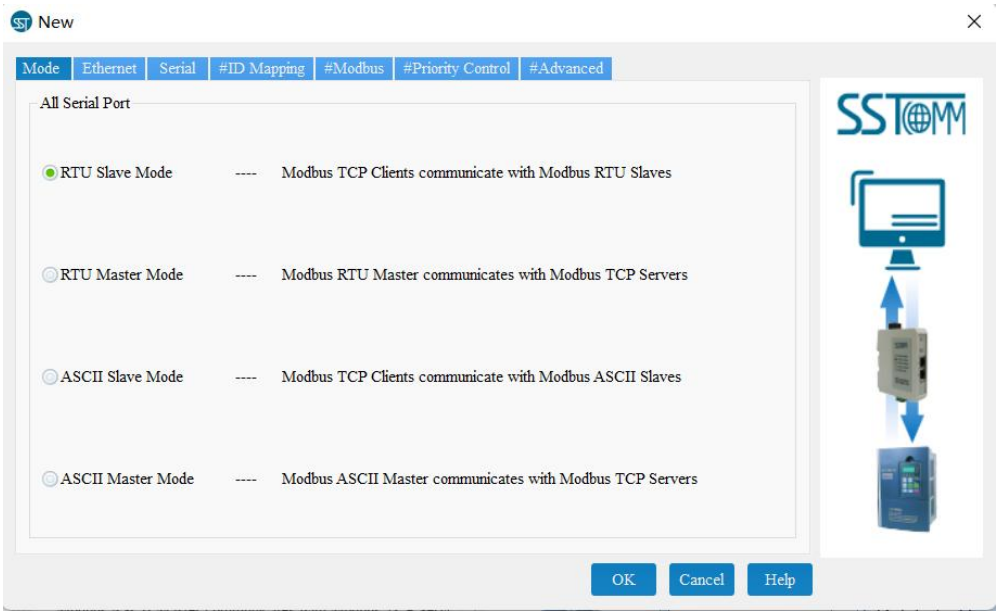
To perform a remote reset, first select the equipment in the list and click the “Remote reset” button. It will then pop up a confirmation dialog. Click “OK” to complete the operation.



4.6 New Config.file (Offline Configuration)

Click “New Config.file” and select an equipment message dialog box:

It will open up a new configuration interface where all of the data is set to the factory defaults.



4.7 Load Config.file

Load Config.file opens a previously saved configuration file to the software.

4.8 Save Config.file to PC

Save Config.file is equivalent to file export. Select a device and click “Save” to save the parameters of the device as a “.inf” format file on the hard disk

Note: The configuration file can be opened with notepad and you can modify the data inside. Make sure to verify the accuracy of the modified data if it is changed manually.

Please don’t modify keywords or add spaces to the file.

4.9 Configurate

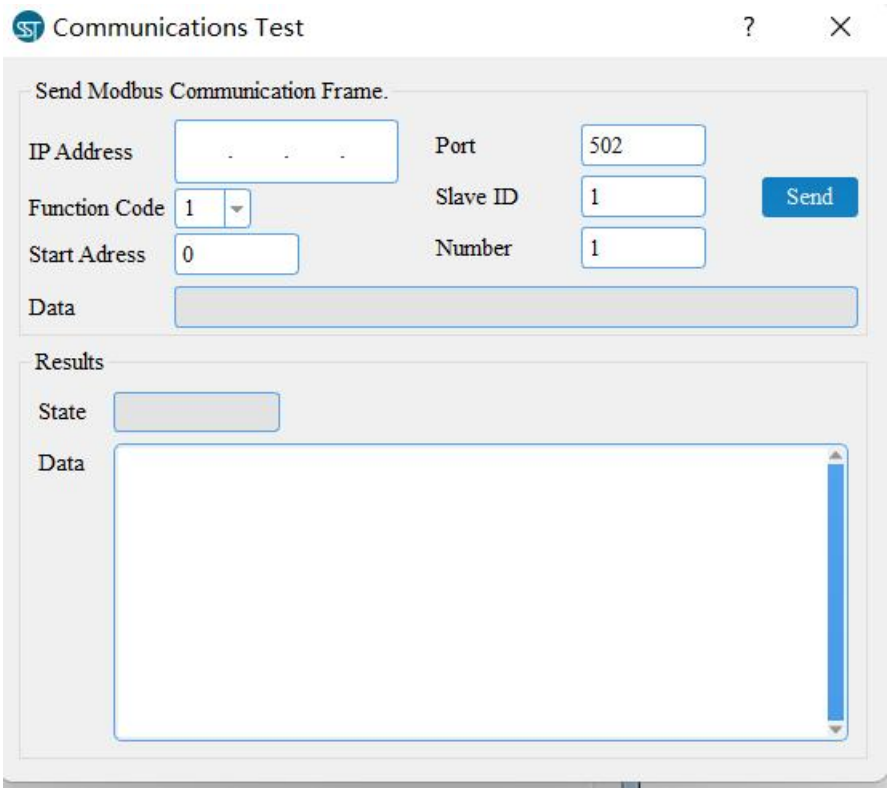
Click "Search Equipment" to find gateways connected to the network. If any GT200-MT-RS/2RS products are found, click "Configurate" to start configuration of the gateway.

4.10 Help

The “Help” function opens the software manual.

4.11 Communication Test

"Communication Test" can send a Modbus TCP request manually. This function can be convenient for users who are debugging serial equipment. Click "Communication Test" to open the dialog window:



IP Address: The IP address of the equipment needs to be connected.

Port: The port number of equipment needs to be connected. The default value is 502.

Function: Supports the following function codes: 1, 2, 3, 4, 5, 6, 15 and 16.

Slave ID: The slave address (virtual ID).

Start Address: The start address of registers or coils. Value is in decimal.

Number: The number of registers or coils. Value is in decimal.

Data (up): The data that will be sent. Value is in hex.

State: The response state can be any of the following: "No response", "Right response", or "Wrong response".

Data (down): Shows the content of the response message.

Note: The input data is in HEX. It must follow the data format shown in the following example: "12 FF 0C".

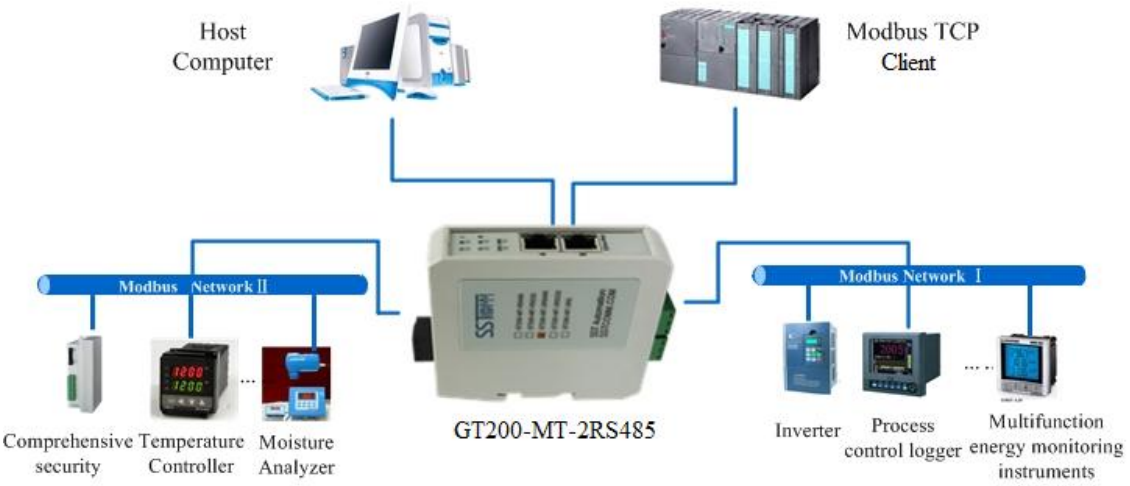
5 Typical Application

Modbus Serial/TCP series gateway can connect Modbus master/slave devices to Ethernet in order to realize the communication between Ethernet and serial devices.

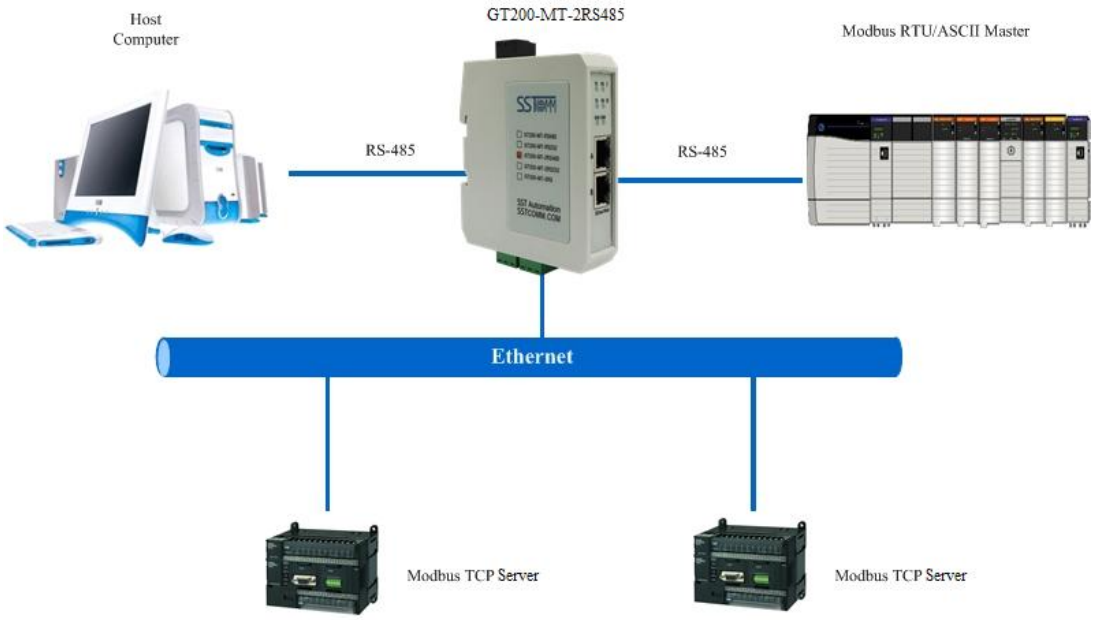
The following are some typical applications of the Modbus Serial/TCP series gateway. (GT200-MT-2RS485 is shown as an example)

5.1 Multiple Ethernet Clients Connecting with Multiple Serial Slaves

GT200-MT-2RS485 supports dual Ethernet ports with a built-in switch function and also supports more than one independent serial port. For RS485 serial ports, it can connect up to 32 Modbus slave devices to Ethernet per serial port.



5.2 Multiple Serial Masters Connecting with Multiple Ethernet Servers



5.3 Serial Master Connecting with Serial Slaves via Ethernet

Serial devices can communicate via Ethernet to extend transmission distances.