

Modbus / EtherNet/IP Gateway

GT200-EI-2RS485

User Manual

V 3.3 RevB



SST Automation

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GT200-EI-2RS485

Modbus/EtherNet/IP Gateway

User Manual

Important Information

Disclaimer

The data and examples in this manual may not be reproduced without authorization. SSTCOMM reserves the right to upgrade the product without notifying users.

This product has many applications. Users must ensure that all operations comply with applicable laws, regulations, codes, and safety standards.

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Technical Support Contact Information

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Email: support@sstautomation.com

Safety Information

Read this section carefully before installing or operating the GT200-EI-2RS485 gateway.

WARNING — General Safety

- This product must be installed and maintained by qualified personnel familiar with industrial automation equipment.
- Read the entire user manual before installation, configuration, or operation.
- Disconnect all power sources before wiring or performing maintenance.
- Failure to follow these instructions may result in equipment damage, personal injury, or voiding of the warranty.

CAUTION — Electrical Safety

- The GT200-EI-2RS485 gateway operates on 24V DC power only. Do not connect to AC mains or any voltage exceeding the rated specification.
- Ensure correct polarity when connecting the power supply:
 - 24V+ → positive terminal
 - GND → ground terminal
 - NC → no connection (spare)
- Use a regulated 24V DC power supply with adequate current rating. An unstable or under-rated power supply may cause erratic operation or damage.
- The gateway does NOT include a power switch. Install an external disconnect device (circuit breaker or switch) within easy reach.

Do not operate the device if the power cable or connector is damaged.

CAUTION — Installation Safety

- Mount the gateway on a standard **35 mm DIN rail** in a clean, dry, and well-ventilated environment.
- Ensure adequate airflow around the device. Do not block ventilation openings.
- **Operating temperature:** -40 °C to 70 °C (-40 °F to 158 °F). Avoid installation near heat sources or in direct sunlight.
- **Operating humidity:** 5% to 95% RH (non-condensing).
- Secure all cables to prevent accidental disconnection and strain on connectors.
- Do not install the device in explosive atmospheres or corrosive environments.

CAUTION — Operation Safety



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- Do **not** connect or disconnect cables or power while the gateway is in operation (hot-plugging may cause data loss or damage).
- Ensure the device is properly grounded to prevent electrical noise and surge damage.
- In areas prone to lightning or power surges, install external surge protection devices.
- During firmware updates or configuration downloads, do **not** power off the device. Interrupting power during these operations may cause permanent damage.

CAUTION — Electrostatic Discharge (ESD)

- The GT200-EI-RS485 contains static-sensitive electronic components.
- Before handling the device, discharge any accumulated static electricity by touching a grounded metal surface.
- Handle the device by its enclosure edges only. Avoid touching exposed connectors or circuit boards.
- Store and transport the device in anti-static packaging when not installed.

NOTICE — Prohibited Actions

Action	Risk
Disassembling the device	Warranty void; risk of electric shock
Operating with damaged cables	Short circuit; fire hazard
Exceeding rated voltage (24VDC)	Permanent component damage
Immersing in liquid or operating in wet conditions	Short circuit; corrosion
Using in safety-critical applications without redundancy	System failure may cause injury



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1 Product Overview

1.1 Product Function

GT200-EI-2RS485 is a gateway which can exchange data between Modbus and EtherNet/IP protocols. The gateway acts as an adapter on the EtherNet/IP side and as a master on the Modbus side. If needed, the user can also change from EtherNet/IP to Modbus TCP functionality. Then, the user can perform Modbus-to-Modbus TCP conversion. For more details, please refer to Appendix A.

1.2 Feature

- ◆ Redundant Power Supply
- ◆ Two independent RS-485 interfaces with 1KV photoelectric isolation
- ◆ Ethernet 10/100 Mbps auto-negotiating
- ◆ IP address conflict detection
- ◆ Modbus network debugging
- ◆ Easy to use configuration software SST-GT-CFG

1.3 Technical specification

- [1] The EtherNet/IP network operates independently of the two Modbus subnets;
- [2] Ethernet 10/100 Mbps auto-negotiating;
- [3] Supports IP address conflict detection;
- [4] Supports the ODVA Standard EtherNet/IP communication protocol;
- [5] Two half-duplex RS-485 serial ports, supporting baud rates: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200; parity modes: none, odd, even, mark, space; 1 or 2 stop bits.
- [6] GT200-EI-2RS485 acts as master on the Modbus network side and supports 01H, 02H, 03H, 04H, 05H, 06H,

0FH, 10H function codes, supports up to 48 Modbus commands per RS-485 interface. Function Codes 03H, 04H, 06H and 10H support "Byte Swap" function, and it can help resolve data format issues between the two networks;

[7] Two independent RS-485 interfaces with 1KV optical isolation;

[8] The maximum number of input and output bytes of EtherNet/IP:

Maximum number of input bytes: 492Bytes

Maximum number of output bytes: 492Bytes

[9] Power supply: 24 VDC (9V ~ 30V), 90 mA (24VDC);

[10] Working temperature: -20° C to 60° C (-4° F to 140° F), relative humidity: 5% to 95% (non-condensing);

[11] External dimensions (W x H x D): 34mm x 116mm x 107mm.

[12] Installation: 35mm DIN rail;

[13] Protection class: IP20;

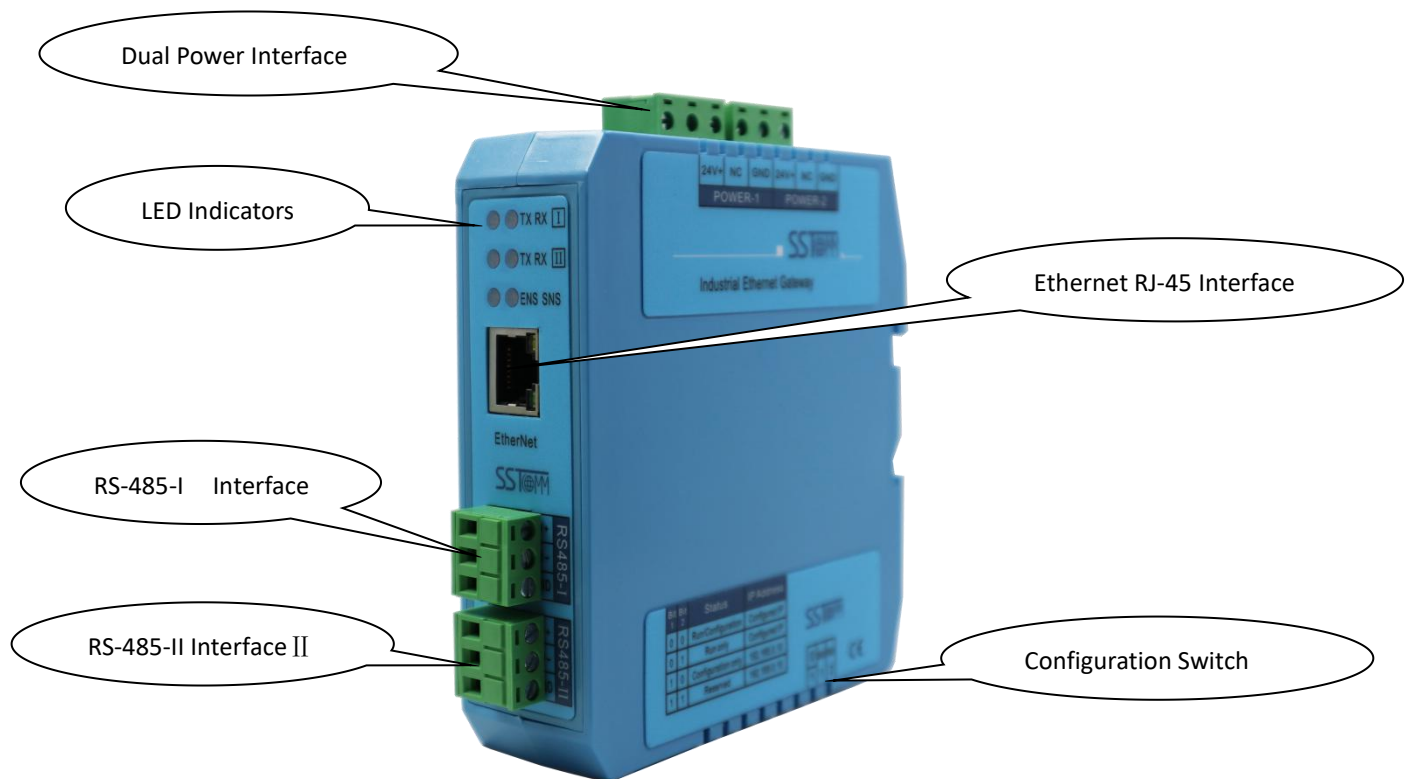
[14] Test standards: Complies with EMC test standards.

1.4 Revision History

Revision	Date	Chapter	Description
V3.3,RevB	8/4/2026	ALL	Optimize document descriptions and add new chapters
V3.3	8/23/2022	PART	Updated the product picture and dimensions
V2.3, Rev A	3/26/2021	ALL	Supports changing to Modbus TCP function
V2.3	7/14/2017	ALL	New release

2 Hardware Description

2.1 Appearance



Notes: This picture is for reference only. The product appearance is subject to the actual product.

2.2 LED Indicators

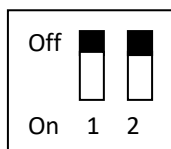
Indicator	State	Description
TX	Flashing	Sending Modbus data
	OFF	No data being transferred
RX	Flashing	Receiving Modbus data
	OFF	No data being transferred
ENS	Green	EtherNet/IP connection is established
	Flashing Green	EtherNet/IP connection is not established
	Red	IP address conflict
	Flashing Red	EtherNet/IP connection timed out; DHCP, BOOTP , IP address conflict detection
SNS	Green	Modbus Communication is normal
	Red	At least one Modbus channel response timed out, exception or error
	Flashing, red and green alternately	At least parts of devices in a Modbus channel timed out, exception or error

* Special States

Indicator	State	Description
ENS & SNS Orange	Light up together	The gateway is starting up
	Flashing alternately	Configuration mode

2.3 Configuration Switch

The configuration switch is located on the bottom of the gateway. Bit 1 controls the operating mode, and Bit 2 controls the function.



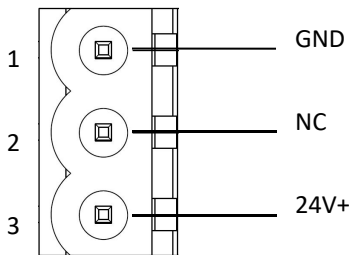
Mode (Bit 1)	Function (Bit 2)	Description
Off	Off	Operation mode, Allows configuration upload/download.
Off	On	Operation mode, configuration upload/download is not allowed.
On	Off	Configuration mode, IP address is fixed at 192.168.0.10. In this mode, configuration upload/download is allowed, but the gateway does not transfer data between the EtherNet/IP and Modbus networks.

Notes: After changing the DIP switch, you must restart GT200-EI-2RS485 (power off and power on) to make the settings take effect.

2.4 Interface

2.4.1 Power Interface

GT200-EI-2RS485 has two power interfaces with power redundancy. If one power input fails, the other continues to supply power, ensuring uninterrupted operation.



Pin	Function
1	GND,
2	NC, no connection
3	24V+ , DC

2.4.2 Ethernet Interface

The Ethernet interface utilizes an RJ-45 connector and is 10/100 Mbps auto-negotiating.



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



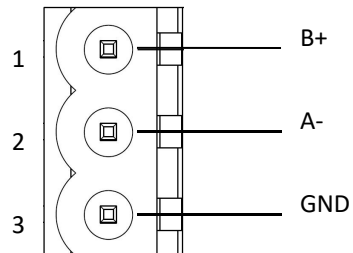
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2.4.3 RS-485 Interface

The serial interface uses a 3-pin pluggable terminal; users can wire it according to the wiring instructions on the panel.



Pin	Function
1	B(+), RS-485
2	A(-), RS-485
3	GND



3 Hardware Installation

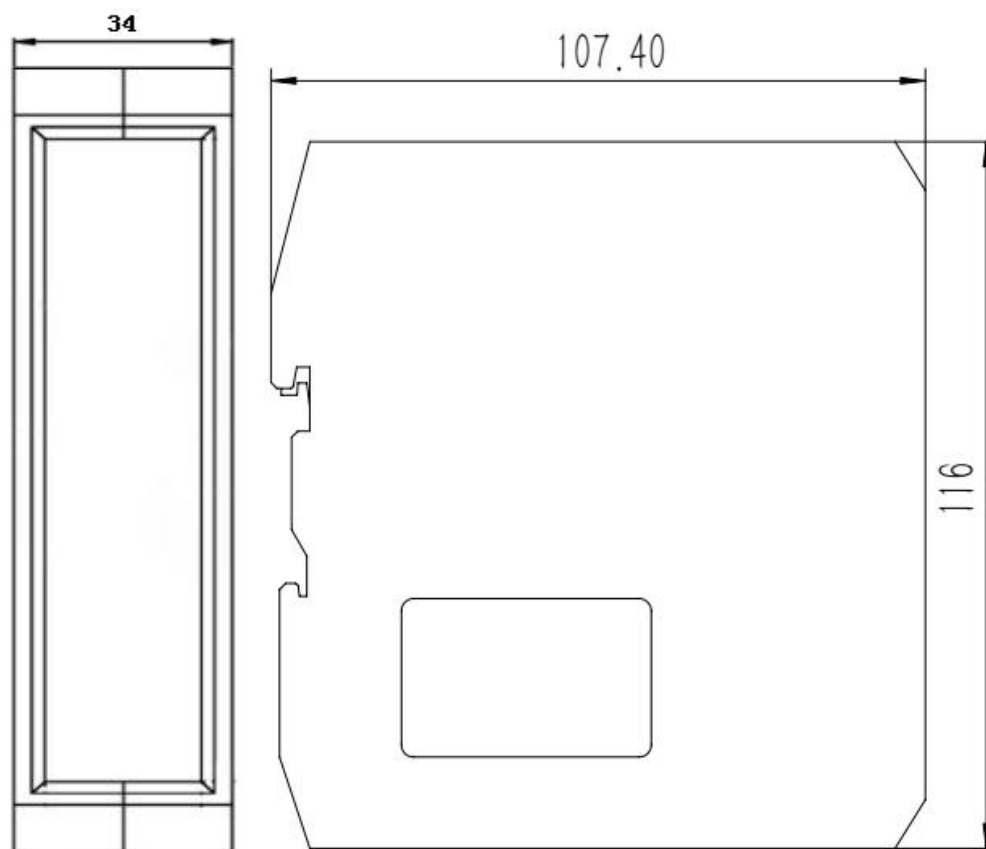
- **Do Not Modify:** Do not disassemble or modify the gateway. Unauthorized modifications void the warranty and may create safety hazards.
- **Wiring Practices:** Use appropriately rated cables for power and communication. Ensure all terminal screws are tightened to the specified torque.
- **Environmental Conditions:** Install the gateway in an enclosure with adequate ventilation. Do not expose the device to moisture, excessive dust, or temperatures outside the rated range (-20°C to 60°C).
- **Proper Grounding:** Ensure the DIN rail and enclosure are properly grounded according to local electrical codes.
- **ESD Protection:** The gateway contains electrostatic-sensitive components. Always wear an anti-static wrist strap and work on a grounded ESD mat when handling the device.
- **Verify Power Polarity:** Confirm correct power polarity before applying power. Pin 1 is GND, Pin 3 is 24V+. Reverse polarity may damage the device.
- **Power Off Before Wiring:** Always disconnect the power supply before connecting or disconnecting any cables. Ensure the power is turned off at the source.

⚠ WARNING: Failure to follow these safety precautions may result in personal injury, equipment damage, or system malfunction.

3.0 Safety Precautions

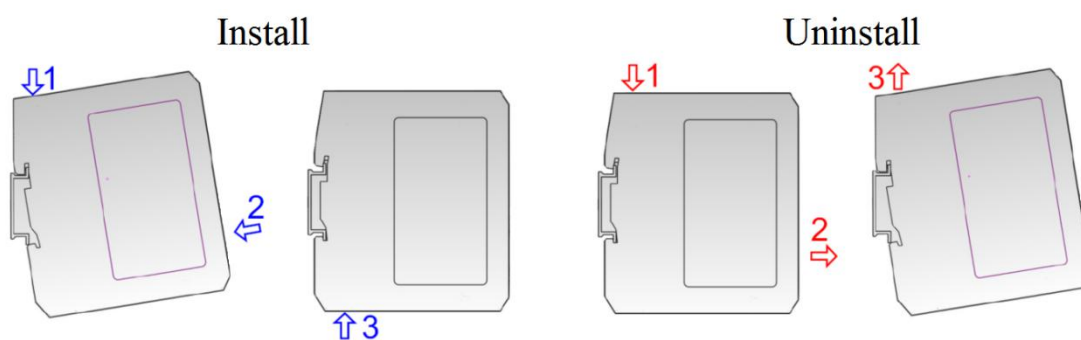
3.1 Mechanical Dimensions

1.33 x 4.56 x 4.21 in (34 mm * 116mm * 107 mm)



3.2 Installation Method

Mount the gateway on a standard 35 mm DIN rail.



4 How to Start

4.1 Connect to the Power

DC 24V power supply with dual power interfaces for redundancy. Users can use one or two power supplies.

If you are using two power supplies, when one power path fails, the other continues to supply power, ensuring normal operation.

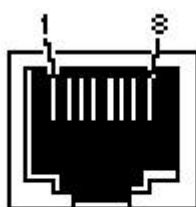
4.2 Connect Serial Devices

To prevent signal reflection and interference in RS-485 multipoint communication, add one termination resistor at each of the two farthest ends of the line. The recommended termination resistor value is 120Ω, 1/2W.

Notes: There is no internal termination resistor in the RS-485 interface of GT200-EI-2RS485.

4.3 Ethernet Connection

Connect the GT200-EI-2RS485 to your computer with the Ethernet cable, via the RJ-45 port.



RJ-45 port

4.4 Configuration Switch

The configuration switch is located on the bottom of the gateway. For normal operation, set the Mode bit (Bit 1) to OFF and the Function bit (Bit 2) to OFF, then restart the gateway. For detailed DIP switch settings, refer to Section 2.3.

Mode (Bit 1)	Function (Bit 2)	Description
Off	Off	Operation mode, Allows configuration upload/download.

Off	On	Operation mode, configuration upload/download is not allowed.
On	Off	Configuration mode, IP address is fixed at 192.168.0.10. In this mode, configuration upload/download is allowed, but the gateway does not transfer data between the EtherNet/IP and Modbus networks.

4.5 Installing Software

Double-click the SST-GT-CFG software installation package and install the configuration software SST-GT-CFG and follow the prompts to complete the installation. Then open the configuration software and finish the configuration of GT200-EI-2RS485.

Notes: The default network settings of the GT200-EI-2RS485 are: IP address 192.168.0.X, subnet mask is 255.255.255.0, gateway address is 192.168.0.1.

If the IP assignment mode is set to DHCP and no DHCP server is available, you can't search the GT200-EI-2RS485. You can set mode bit (bit 1) to On, and restart GT200-EI-2RS485 (power off and power on), the GT200-EI-2RS485 will use the fixed IP address 192.168.0.10, subnet mask is 255.255.255.0, gateway address is 192.168.0.1.

Default serial port settings: 19200 bps, 8 data bits, No parity, 1 stop bit.

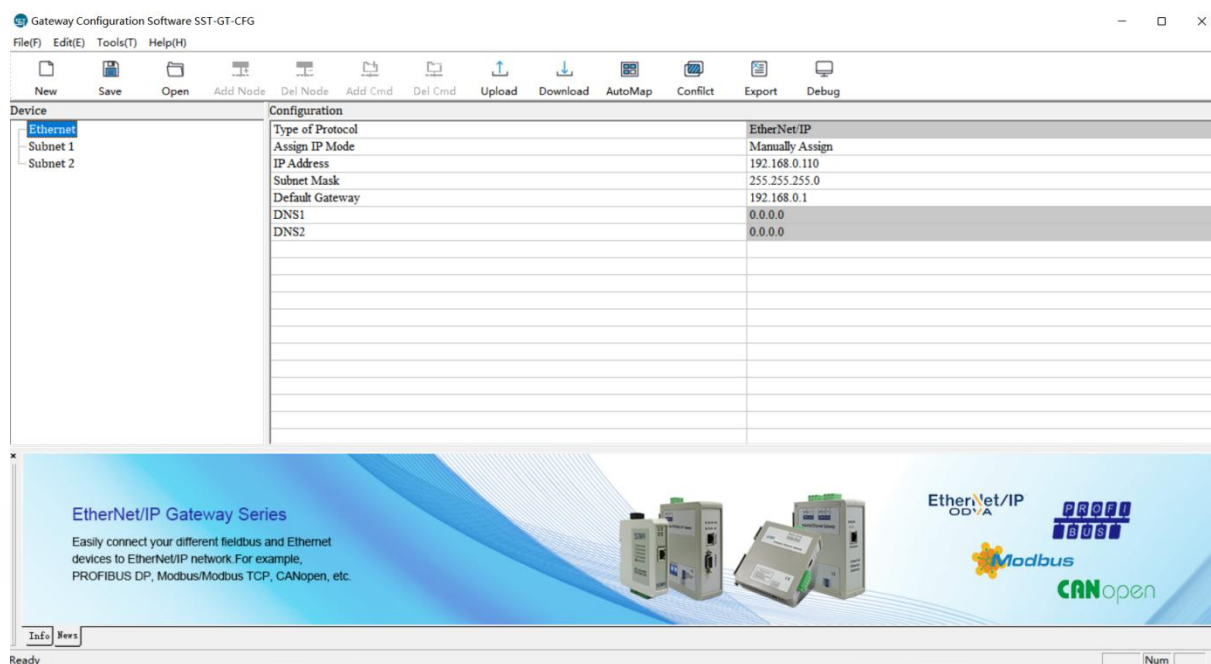
5 Configuration Software

5.1 Notes before Configuration

SST-GT-CFG is a Windows-based configuration tool for the GT200-EI-2RS485 gateway. It can set related parameters and commands of Modbus and other fieldbuses.

This document describes how to configure and operate the GT200-EI-2RS485 Modbus / EtherNet/IP gateway.

Double-click the icon to enter the main interface of the software:



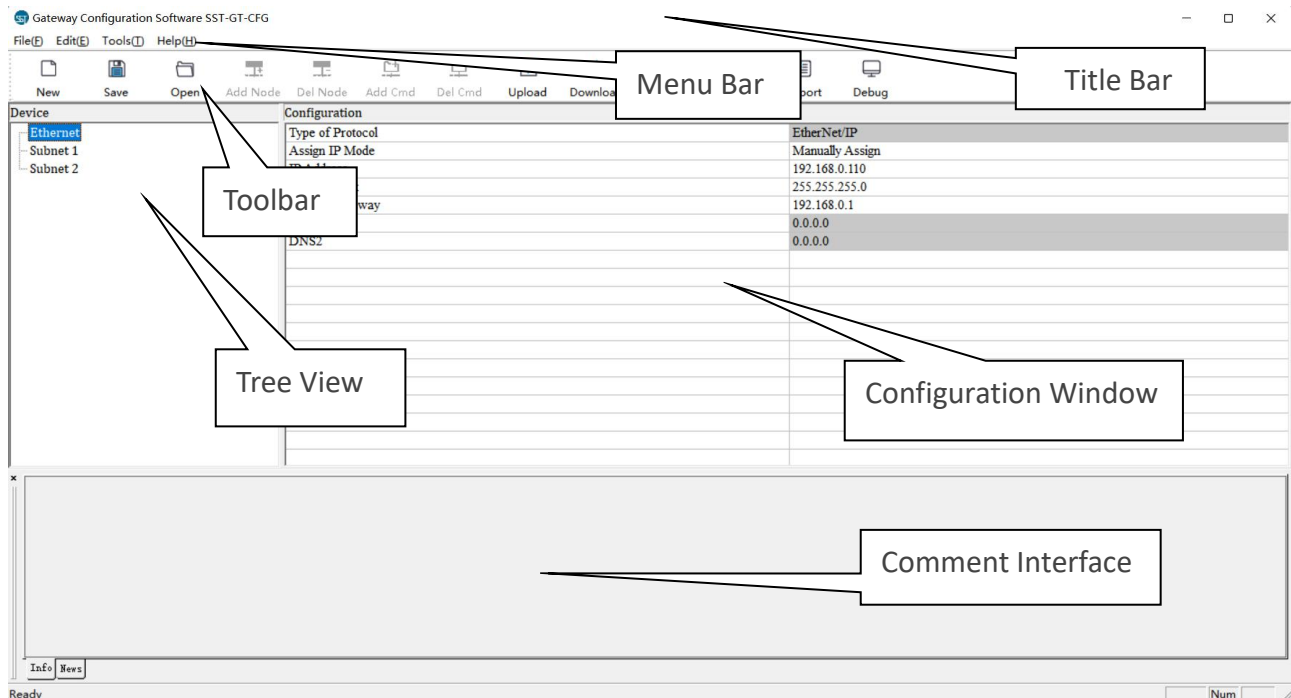
5.2 User Interface

SST-GT-CFG interface includes: title bar, menu bar, toolbar, status bar, equipment section, configuration section and notes section.

Notes: All grayed-out areas in the software cannot be changed.

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-  **New:** Create a new configuration project.
-  **Save:** Save the configuration project.
-  **Open:** Open the configuration project.
-  **Add Node:** Add a Modbus slave node.
-  **Delete Node:** Delete a Modbus slave node.
-  **Add Command:** Add a Modbus command.
-  **Delete Command:** Delete a Modbus command.
-  **Upload:** Read the configuration information from the module and display it in the software.

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Download

Download: Download the configuration file to the gateway.



AutoMap

AutoMap: Automatically calculates non-conflicting memory mapping addresses for each command.



Conflict

Conflict Detection: Checks for conflicts between configured commands in the gateway memory data buffer.



Export

Export EXCEL: Export current configuration to the local hard disk, saved as .xls file.

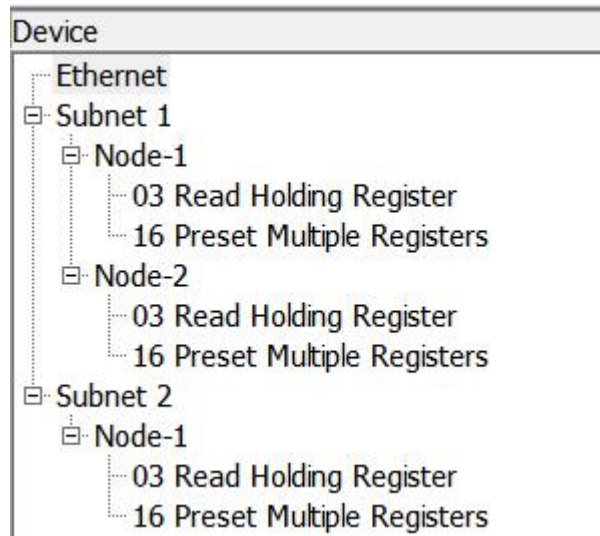


Debug

Debug: Monitor or modify the gateway memory buffer data.

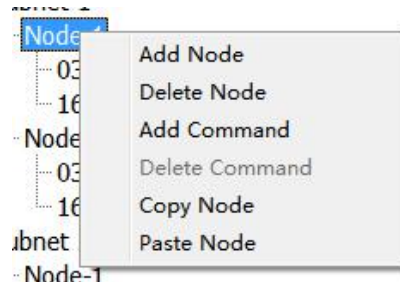
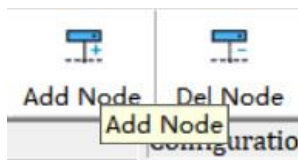
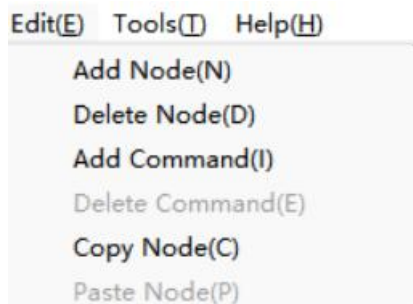
5.3 Operation of Devices view

5.3.1 Devices View Interface



5.3.2 Operation Mode

The Devices view supports three types of operation: Edit Menu, Edit Toolbar, and Right-click Edit Menu.

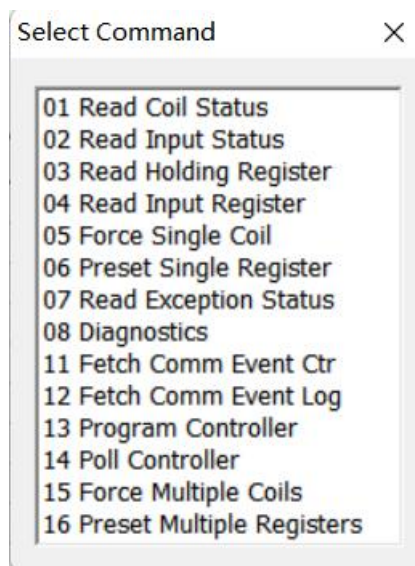


5.3.3 Operation Types

1. Add nodes: Right-click on the subnet or an existing node, then select Add Node. A new node named "new node" appears under the subnet.
2. Delete nodes: Right-click on the node, then select Delete Node. The node and all its commands will be deleted.
3. Add commands: Right-click on the node, and then select Add Command to add a command for the node. The dialog box will be shown as follows:

Currently, it supports the commands: 01H, 02H, 03H, 04H, 05H, 06H, 0FH, 10H.

Select the command: Double-click the command



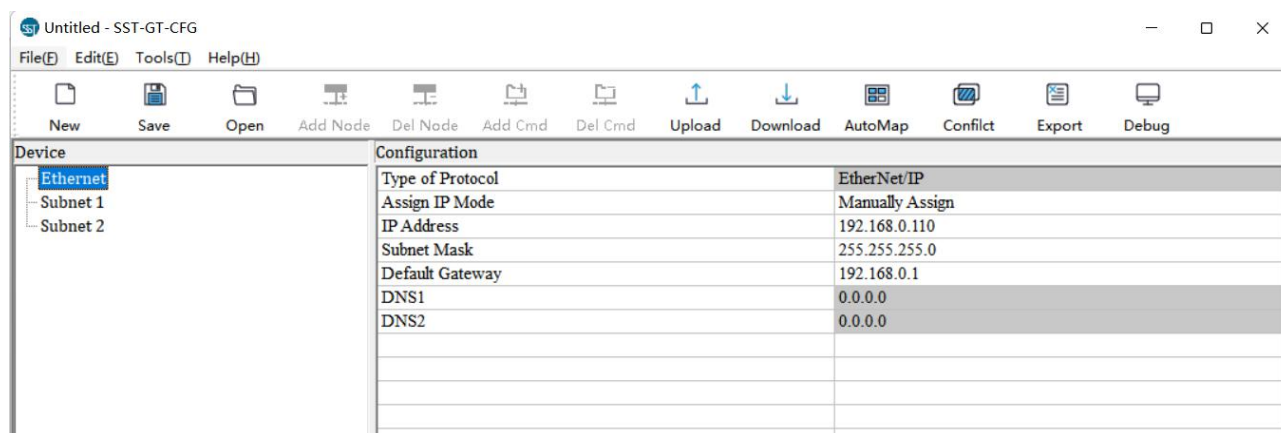
4. Delete commands: Right-click on the command and then select Delete Command.

5.4 Operation of Configuration View

5.4.1 Ethernet Configuration

In the Devices view, click Ethernet to open the configuration view:

Configurable items include: Assign IP Mode, IP Address, Subnet Mask, Gateway Address, DNS1, DNS2.



Assign IP Mode: Manual Assign, BOOTP, DHCP can be selected.

IP Address: Set the device IP address.

Subnet Mask: Set the subnet mask of the device.

Gateway Address: Set gateway address.

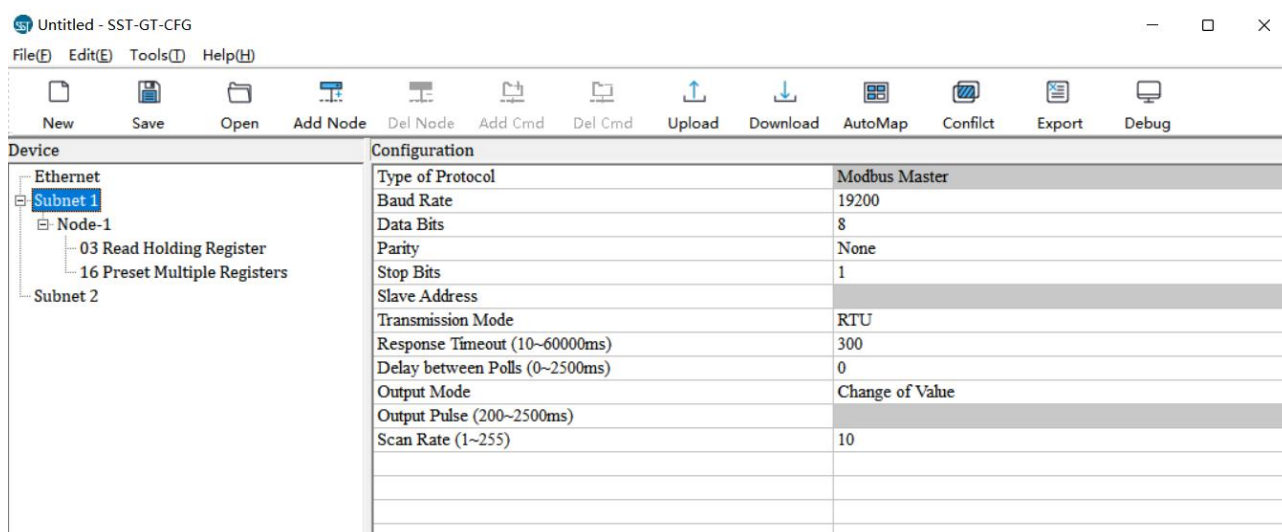
DNS1: Set the device DNS1 address.

DNS2: Set the device DNS2 address.

5.4.2 Subnet Configuration

Protocol: Modbus Master

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Baud Rate: Available options: 300, 600, 1200, 2400, 9600, 19200, 38400, 57600, 115200 bps.

Data bits: 8 bits

Parity: Available options: None, Odd, Even, Mark, Space.

Stop Bits: Available options: 1, 2.

Transmission Mode: Available options: RTU, ASCII.

Response timeout: When the Modbus master sends a command, the maximum wait time for a slave response. Range: 300 to 60000 ms.

Delay between polls: After a Modbus command has been sent and a correct response has been received, the delay before the next command is sent. The range is: 0 ~ 2500 ms.

Cycle: Same as the Modbus read command; outputs data according to the scanning ratio.

Forbidden: Prohibits output of the Modbus write command.

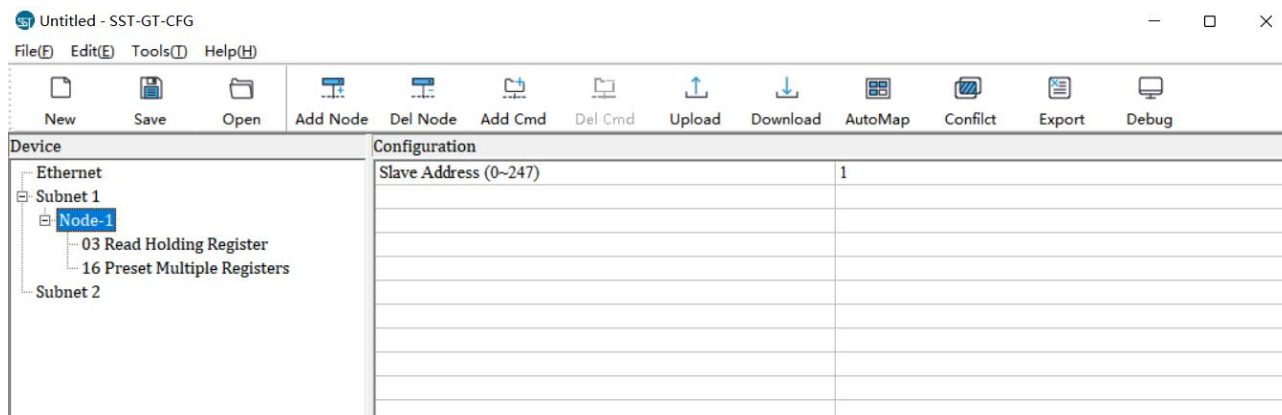
Change of Value: When the output data has changed, it outputs the write command and stops outputting after receiving a correct response.

Scan Rate: Ratio of slow-scan to quick-scan commands. If the quick-scan command is sent 10 times, the slow-scan command is sent once.

5.4.3 Node Configuration

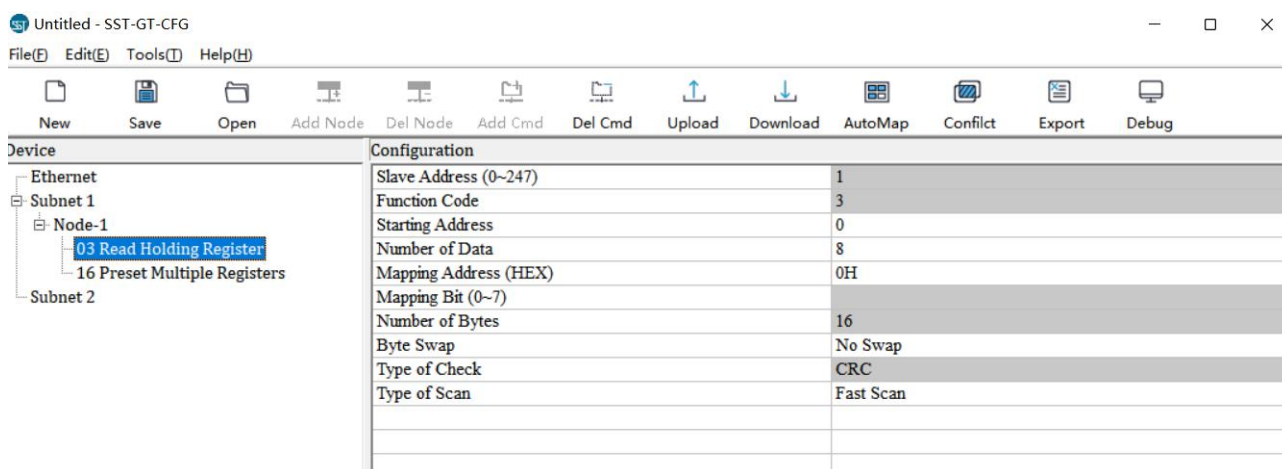
In the Devices view, left-click a node to display its configuration::

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5.4.4 Command Configuration

In the Devices view, left-click a command to display its configuration::



Starting Address: The starting address in the Modbus slave device. Range: 0 鈥?5535.

Number of Data: The length of data. Each data unit occupies two bytes.

Mapping Address: The starting address of data in memory buffer of the module.

Read command: 0x0000~ 0x01FF

Write command: 0x4000 ~ 0x41FF

When a write command uses local data exchange, it can also use addresses 0x0000 ~ 0x01FF.

Mapping Bit: For the bit operation commands, the position range of start-bit byte is 0 ~ 7.

Bytes Swap: There are three types: No Swap, Two Bytes Swap, and Four Bytes Swap. The byte display order of Modbus is MSB-first (big-endian); the byte display order of EtherNet/IP is LSB-first (little-endian). Adjust the byte swap setting to obtain the correct value.

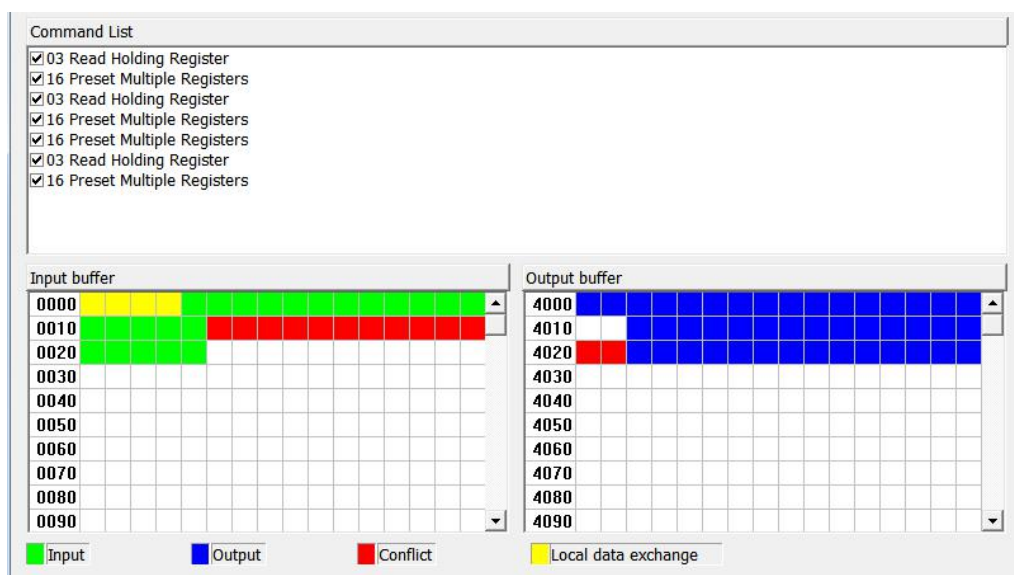
Type of Scan: There are two scan modes: quick-scan and slow-scan. It accommodates user requirements for distinct

quick-scan or slow-scan command execution. Slow-scan is equal to quick-scan being multiplied by scan ratio.

(Configure it in the subnet configuration interface)

5.5 Conflict Detection

This feature detects whether there are conflicts in "the starting address of memory mapping", allowing timely adjustment. The interface is shown as follows:



5.5.1 Operation of Command List

The command list displays all configured commands. Each checkbox corresponds to a command and highlights its memory-mapping location. Select a checkbox to highlight the corresponding memory location in the grid. Clicking the command again will deselect it and hide its mapping location. Use this feature to detect mapping conflicts.



5.5.2 Operation of Memory Mapping Area

The memory mapping area is divided into two parts: the input area and the output area.

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Input-mapping address: 0x0000 ~ 0x3FFF (total input area; read commands are mapped to 0x0000 ~ 0x01FF by default)

Output-mapping address: 0x4000 ~ 0x7FFF.

Each box represents a byte address.

Green: Read commands are shown in the input-mapping area; no conflict;

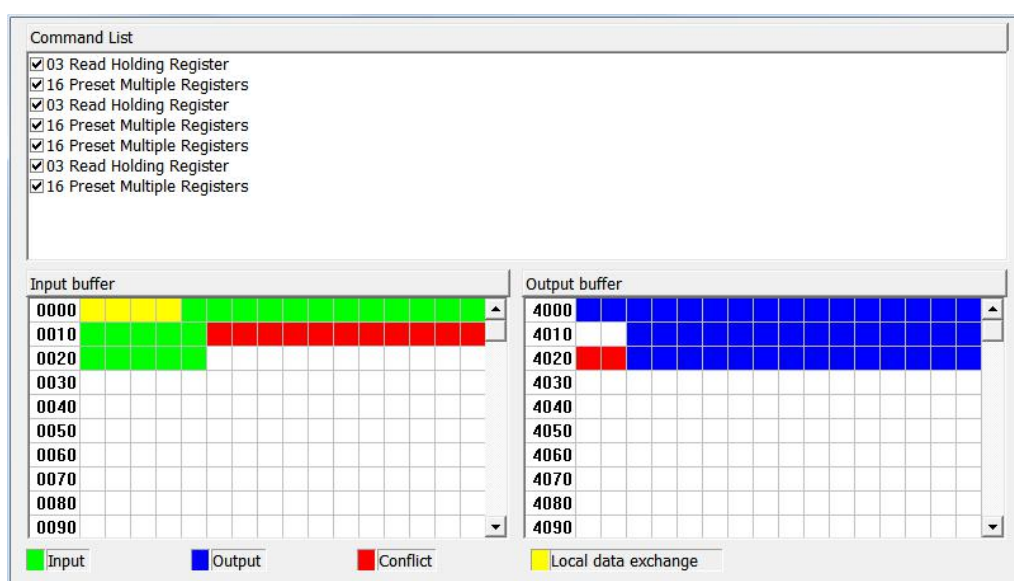
Yellow: Write commands are shown when the mapping address is in the input area; no conflict;

Blue: When the address mapping area is located in the output area; no conflict.

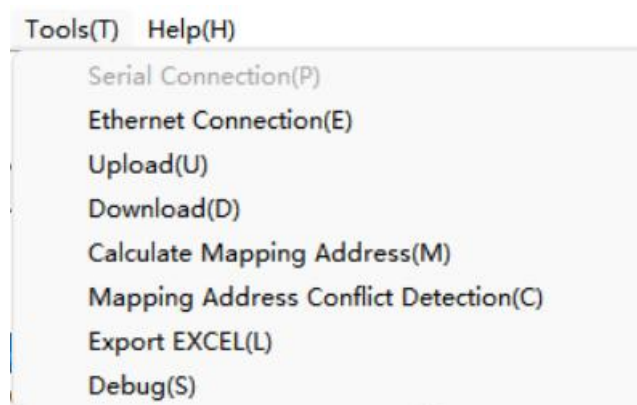
Red: Output area or input area, multiple commands mapped to the same byte address: address conflict.

For bit operation commands, the above color conventions also apply.

Click the input-output regional grid, whether the grid is occupied or not is shown as follows:



5.6 Hardware Communication



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5.6.1 Ethernet Configuration

Users have the option to use the search function. When enabled, the software searches for all GT200-EI-2RS485 devices on the Ethernet network during upload or download. When disabled, users must manually specify the target device, and only that device will be listed during upload or download.

Notes: Click "OK" to confirm the setting. Click "Search" to initiate a device search.

The image shows two 'Ethernet Connection' dialog boxes. The left dialog has the checkbox 'Use the search function' checked. Below it, the text 'The IP address to connect to:' is followed by an empty text box with three dots. The right dialog has the checkbox 'Use the search function' unchecked. Below it, the text 'The IP address to connect to:' is followed by a text box containing '192 . 168 . 0 . 10'. Both dialogs have 'OK' and 'Cancel' buttons at the bottom.

5.6.2 Upload

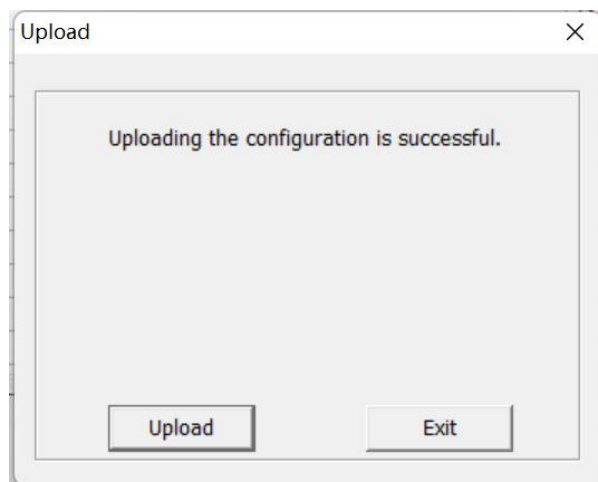
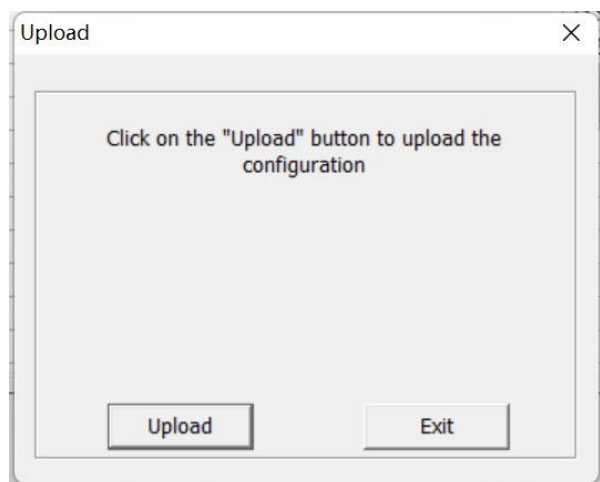
When uploading a configuration, the Search Device dialog will appear:

The image shows a 'Scan' dialog box. It contains a table with the following data:

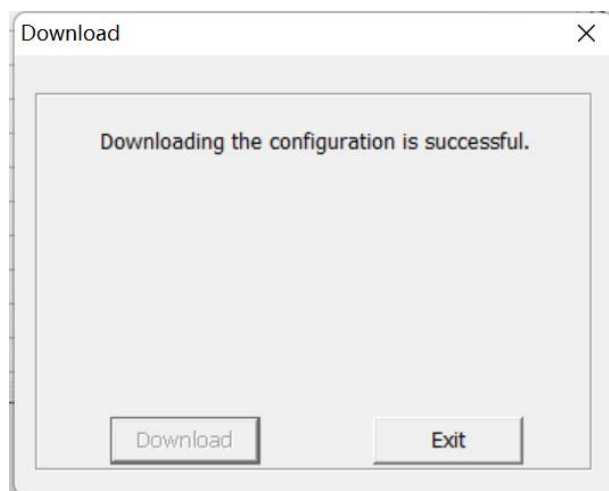
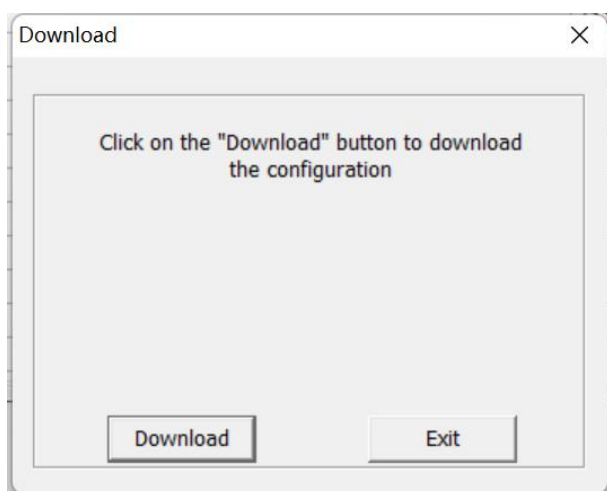
No.	Model	IP Address	MAC Address	Firmware Version
1	GT200-EI-2RS485	192.168.0.10		2.5

Below the table are three buttons: 'Log In', 'Refresh', and 'Cancel'. At the bottom, there is a 'Scanning complete' label and a progress bar.

Select the device you want to configure and click "Log In". Gateway configuration information will be uploaded to the software from the device. The pop-up window is as follows:



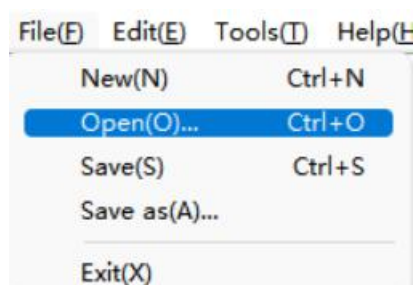
5.6.3 Download



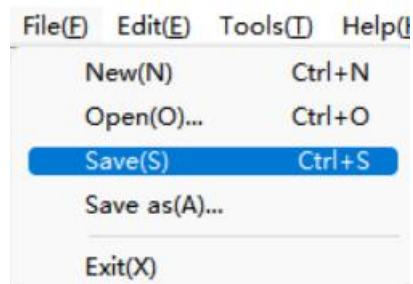
Note: Before downloading, ensure that all configuration parameters have been set correctly.

5.7 Load and Save Configuration

5.7.1 Load Configuration Project



5.7.2 Save Configuration Project



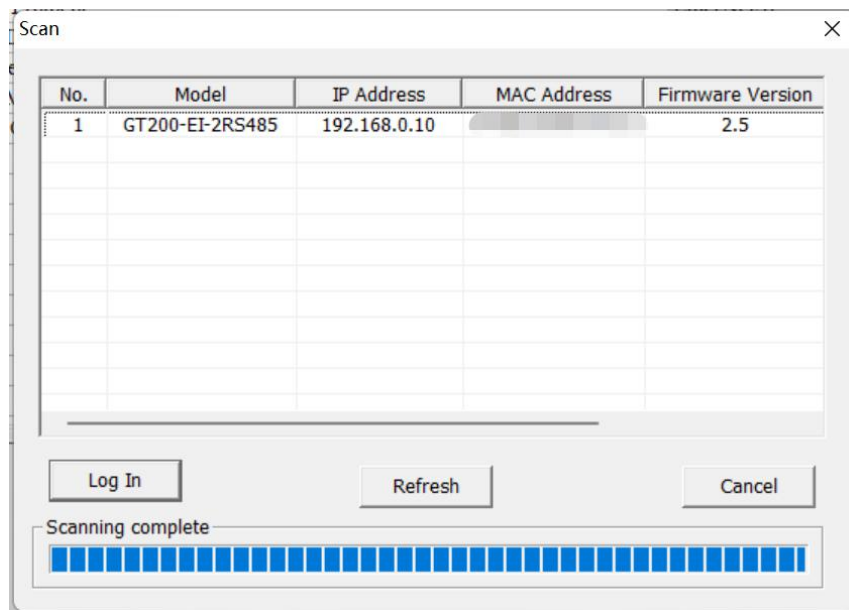
5.8 Export Excel

Exporting to Excel helps users review the complete configuration.

Click the Export Excel icon, choose a save location, and save the configuration as an Excel file.

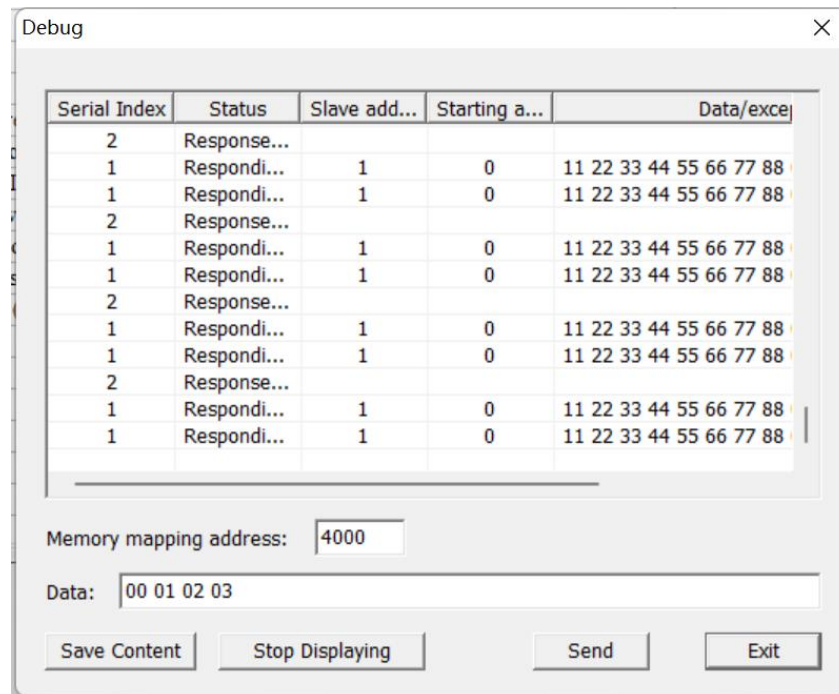
5.9 Debug

This function is used to monitor the gateway memory buffer data. The scan window will pop up:



Select the device and click "Log In", then enter the debug dialog. Display interface as follows:

GT200-EI-2RS485 Modbus/EtherNet/IP Gateway User Manual



Memory-mapped address: Starting memory address for writing data to the gateway

Data: Data being written to the gateway memory

Users can debug Modbus communication by sending test data.

6 EtherNet/IP Connection Parameters

Parameters	Instance Number	Data Size (Bytes)
Input	102	Range: 5-496 Default: 496
Output	101	Range: 1-492 Default: 492
Configuration	113	10 (Fixed)

The data size of input instance 102 can be configured within the range of 5 to 496 bytes using the SST-EPN-CFG configuration software, where the first 4 bytes are reserved for the real-time frame header.

The data size of output instance 101 can be configured within the range of 1 to 492 bytes using the SST-EPN-CFG configuration software.

The following example uses Studio 5000 Logix as an example:

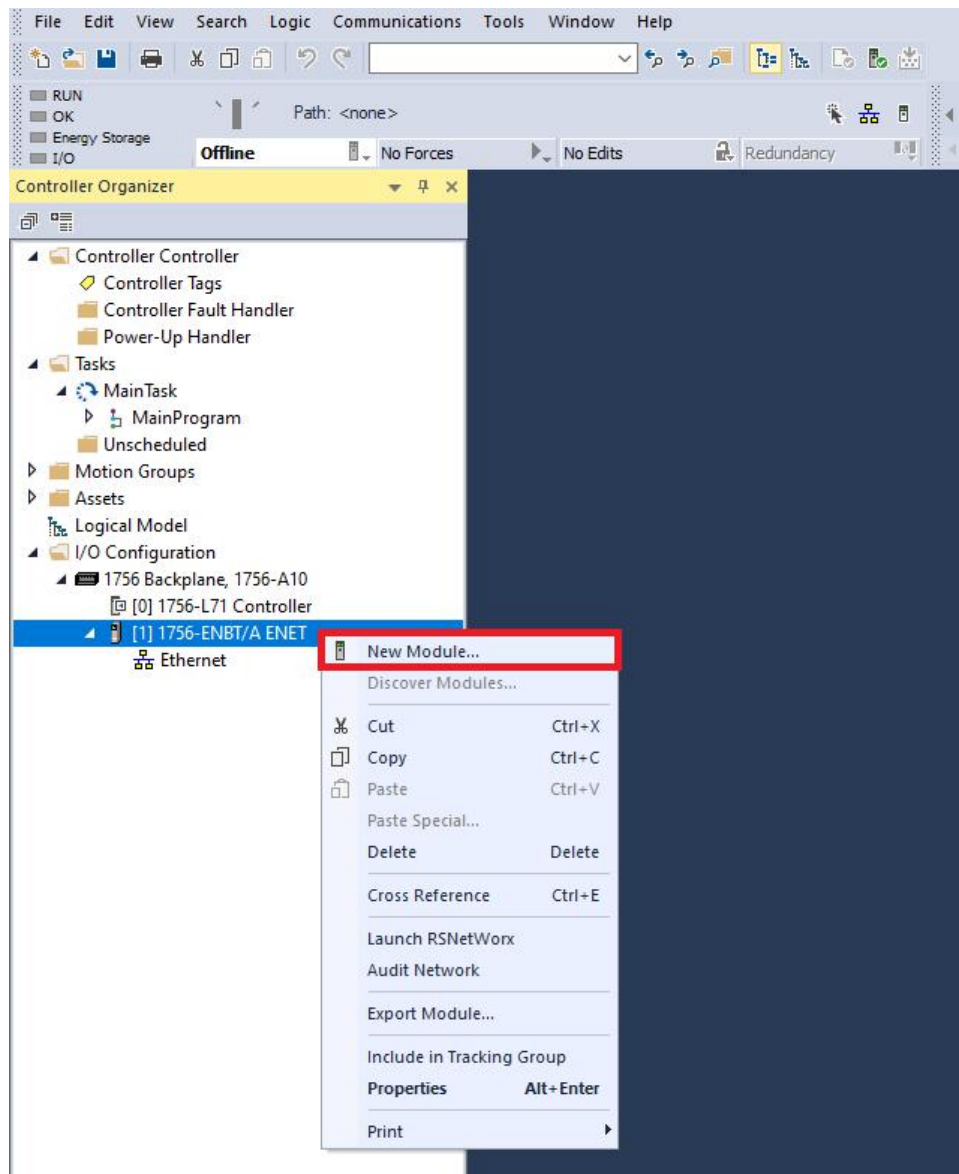
Note: The following example shows how to enter the configuration parameters in Studio 5000 Logix:

The data size configured in Studio 5000 Logix must match the data size configured in the SST-EPN-CFG configuration software. For example, if the input data size configured in the SST software is 496 bytes, and if Studio 5000 Logix is using DINT (32-bit), then the input data size must be set to 124 ($496 \times 8/32 = 124$).

6.1 Implicit I/O Messaging Connection Method (Recommended)

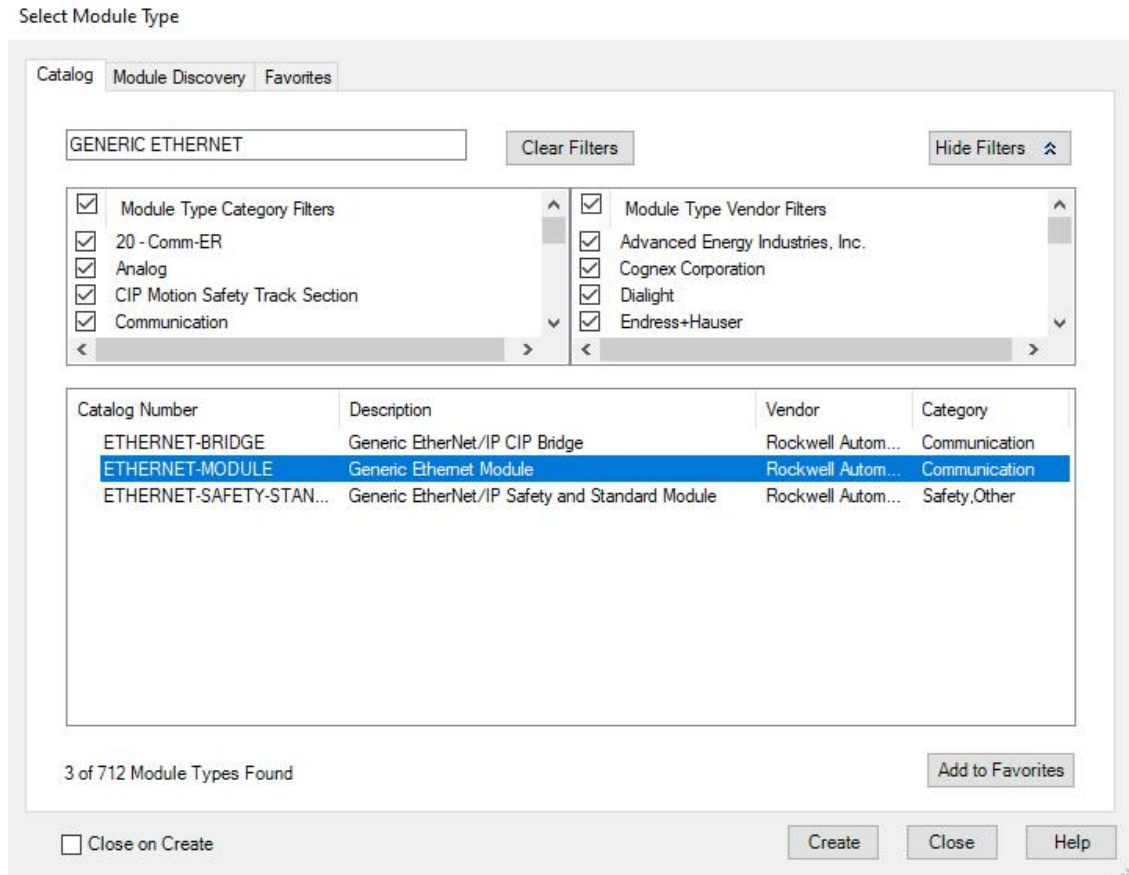
The following Studio 5000 Logix example will show how to connect using Implicit I/O Messaging.

First, right-click on the EtherNet/IP scanner module and click "New Module", as shown below:



GT200-EI-2RS485 Modbus/EtherNet/IP Gateway User Manual

In the pop-up dialog box, search for "GENERIC ETHERNET", choose "ETHERNET-MODULE", and click "Create" as shown below:



GT200-EI-2RS485 Modbus/EtherNet/IP Gateway User Manual

Configure relevant information of GT200-EI-2RS485 in the pop-up window, as shown below:

In the above picture, the module information needs to be configured includes:

Configure data types such as DINT, INT, SINT, REAL and etc. After confirmation, this cannot be changed. To change data types, a new module must be created.

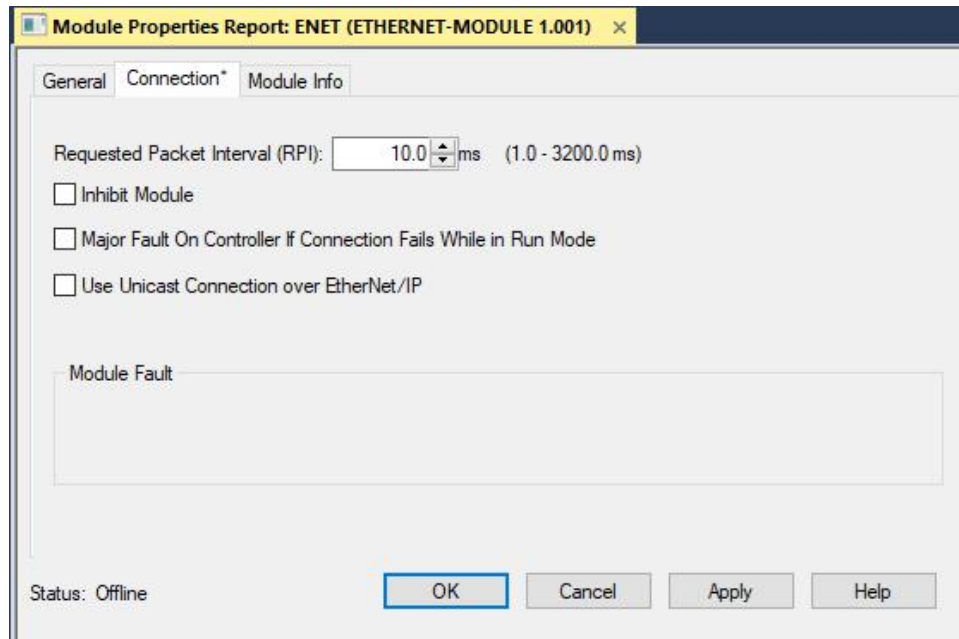
Note: "Size" (configured bytes) in the image above should be the consistent with relevant input and output bytes of the instance in the above chapter.

GT200-EI-2RS485

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Click "OK", set scanner polling time interval in the pop-up dialog box, the default is 10ms, as shown below:



After setting this interval, click "OK" to save.

GT200-EI-2RS485 Modbus/EtherNet/IP Gateway User Manual

To view the output data, first double click the "Controller Tags" tree. Then expand the "SSTGateway:O" tag as shown below:

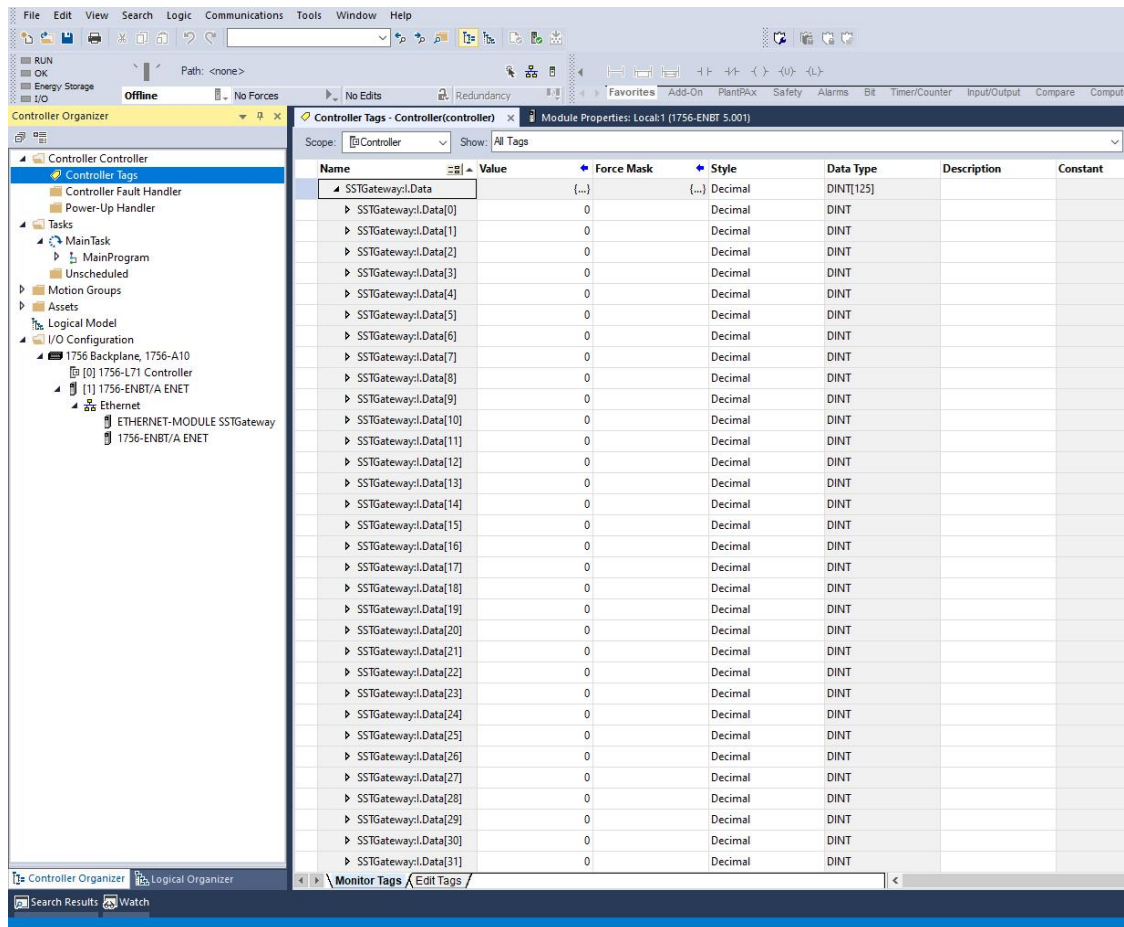
The screenshot shows the SST Automation software interface. On the left, the 'Controller Organizer' tree is expanded to 'Controller Tags'. The 'SSTGateway:O' tag is selected. The main window displays a table of output data addresses.

Name	Value	Force Mask	Style	Data Type	Description	Constant
SSTGateway:C	{...}	{...}	{...}	AB:ETHERNET_MODU...		☐
SSTGateway:I	{...}	{...}	{...}	AB:ETHERNET_MODU...		☐
SSTGateway:O	{...}	{...}	{...}	AB:ETHERNET_MODU...		☐
SSTGateway:O.Data	{...}	{...}	Decimal	DINT[124]		
SSTGateway:O.Data[0]	0		Decimal	DINT		
SSTGateway:O.Data[1]	0		Decimal	DINT		
SSTGateway:O.Data[2]	0		Decimal	DINT		
SSTGateway:O.Data[3]	0		Decimal	DINT		
SSTGateway:O.Data[4]	0		Decimal	DINT		
SSTGateway:O.Data[5]	0		Decimal	DINT		
SSTGateway:O.Data[6]	0		Decimal	DINT		
SSTGateway:O.Data[7]	0		Decimal	DINT		
SSTGateway:O.Data[8]	0		Decimal	DINT		
SSTGateway:O.Data[9]	0		Decimal	DINT		
SSTGateway:O.Data[10]	0		Decimal	DINT		
SSTGateway:O.Data[11]	0		Decimal	DINT		
SSTGateway:O.Data[12]	0		Decimal	DINT		
SSTGateway:O.Data[13]	0		Decimal	DINT		
SSTGateway:O.Data[14]	0		Decimal	DINT		
SSTGateway:O.Data[15]	0		Decimal	DINT		
SSTGateway:O.Data[16]	0		Decimal	DINT		
SSTGateway:O.Data[17]	0		Decimal	DINT		
SSTGateway:O.Data[18]	0		Decimal	DINT		
SSTGateway:O.Data[19]	0		Decimal	DINT		
SSTGateway:O.Data[20]	0		Decimal	DINT		
SSTGateway:O.Data[21]	0		Decimal	DINT		
SSTGateway:O.Data[22]	0		Decimal	DINT		
SSTGateway:O.Data[23]	0		Decimal	DINT		
SSTGateway:O.Data[24]	0		Decimal	DINT		
SSTGateway:O.Data[25]	0		Decimal	DINT		
SSTGateway:O.Data[26]	0		Decimal	DINT		
SSTGateway:O.Data[27]	0		Decimal	DINT		
SSTGateway:O.Data[28]	0		Decimal	DINT		

The SSTGateway:O data tag represents the corresponding output data addresses of the SST Gateway.

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To view the input data, expand the "SSTGateway:I" tag as shown below:



The SSTGateway:I data tag represents the corresponding input data addresses of the SST Gateway.

Please note that the first 4 input bytes are used to display the status bytes of the SST Gateway. See [Chapter 6](#) for more details.

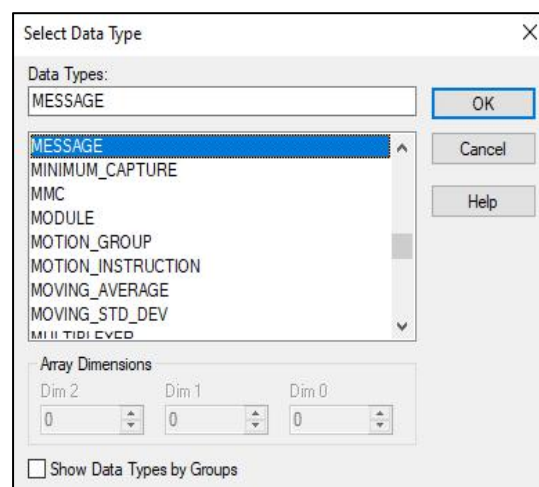
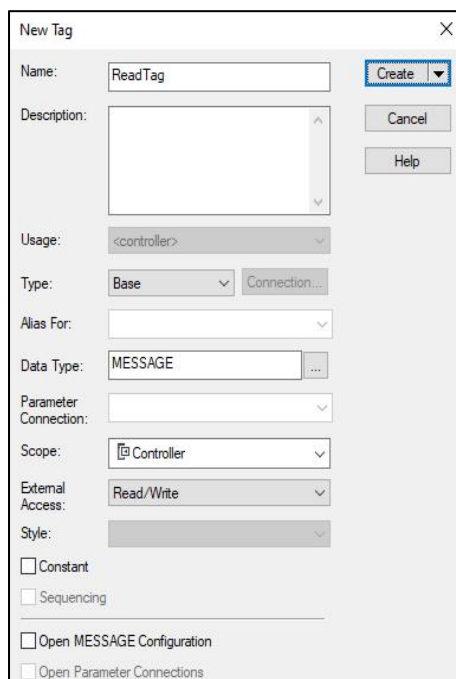
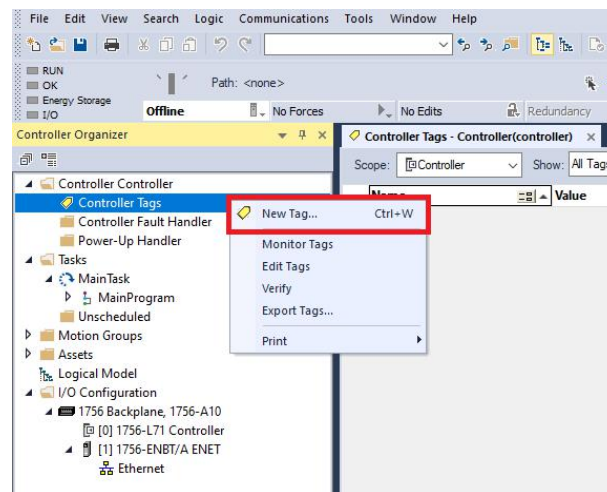
6.2 Explicit MSG Connection Method

The following Studio 5000 Logix example will describe how to read/write EtherNet/IP data using explicit MSG messaging.

6.2.1 Read MSG Instruction Block

To start, create a new project in "Offline" mode. Then under "Controller Tags", add two new tags named "ReadTag" and "ReadData" as shown below:

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Set the data type of "ReadData" as "SINT", then set the Array Dimension "Dim 0" to match the Input Data Size. Refer to the connection parameters from the beginning of Chapter 6:

GT200-EI-2RS485 Modbus/EtherNet/IP Gateway

User Manual

New Tag

Name: Create

Description:

Usage:

Type: Connection...

Alias For:

Data Type: ...

Parameter Connection:

Scope:

External Access:

Style:

☐ Constant

☐ Sequencing

☐ Open Configuration

☐ Open Parameter Connections

Cancel Help

Select Data Type

Data Types:

OK

Cancel

Help

Array Dimensions

Dim 2: Dim 1: Dim 0:

☐ Show Data Types by Groups

File Edit View Search Logic Communications Tools Window Help

Path: <none>

Controller Organizer

- Controller Controller
 - Controller Tags
 - Controller Fault Handler
 - Power-Up Handler
 - Tasks
 - MainTask
 - MainProgram
 - Unscheduled
 - Motion Groups
 - Assets
 - Logical Model
 - I/O Configuration
 - 1756 Backplane, 1756-A10
 - [0] 1756-L71 Controller
 - [1] 1756-ENBT/A ENET
 - Ethernet

Controller Tags - Controller(controller)

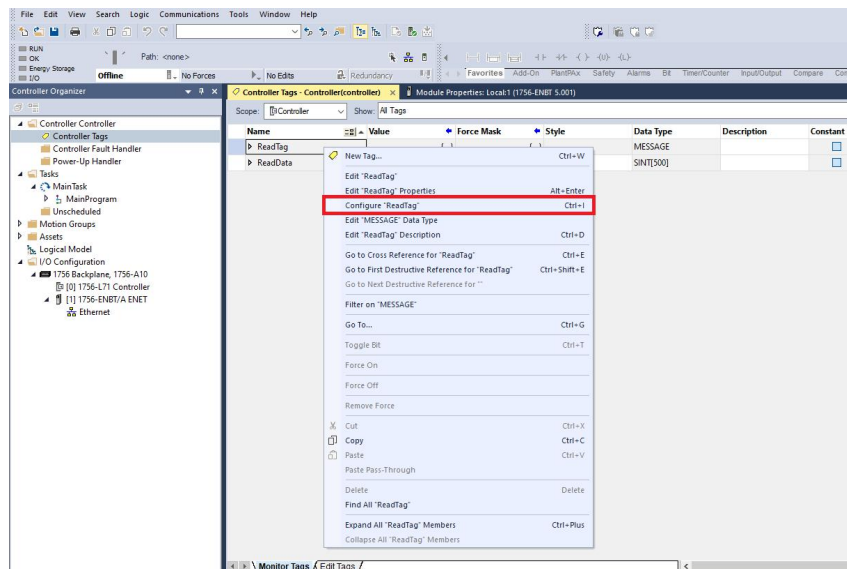
Scope: Show: Enter Name

Name	Value	Force Mask	Style	Data Type	Description	Constant
TimerScan	{...}	{...}	{...}	TIMER		☐
ReadTag	{...}	{...}	{...}	MESSAGE		☐
ReadData	{...}	{...}	Decimal	SINT[496]		☐

Monitor Tags / Edit Tags

GT200-EI-2RS485 Modbus/EtherNet/IP Gateway User Manual

Right-click on "ReadTag", select "Configure 'ReadTag'" as shown below:



Message Configuration - ReadTag

Configuration* Communication Tag

Message Type: CIP Generic

Service Type: Get Attribute Single

Service Code: e (Hex) Class: 4 (Hex) Instance: 102 Attribute: 3 (Hex)

Source Element: Source Length: 0 (Bytes)

Destination Element: ReadData

New Tag...

☐ Enable
 ☐ Enable Waiting
 ☐ Start
 ☐ Done
 Done Length: 0

☐ Error Code:
 Extended Error Code:
 ☐ Timed Out

Error Path: Error Text:

OK Cancel Apply Help

GT200-EI-2RS485

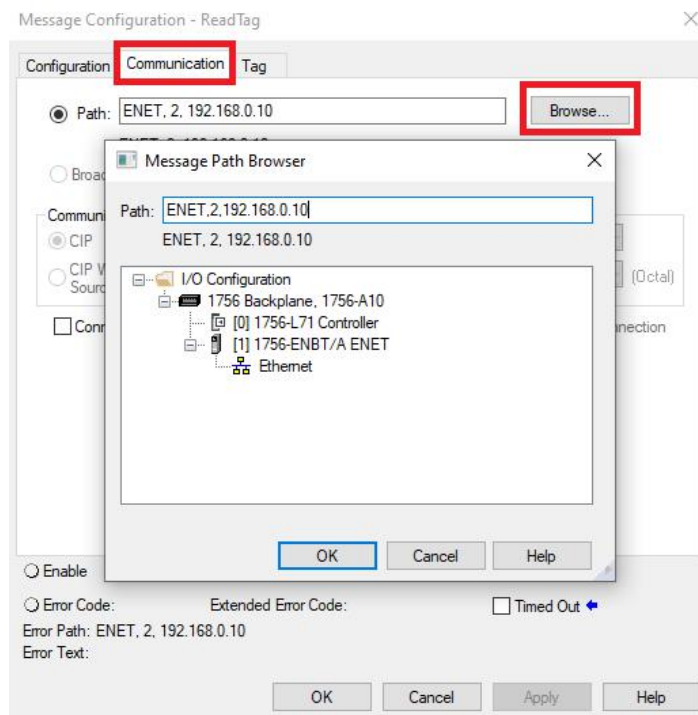
Modbus/EtherNet/IP Gateway

User Manual

Select the "Communication" tab and click the "Browse" button. Then input the network path to connect to the GT200-EI-2RS485.

Enter the network path in the following format:

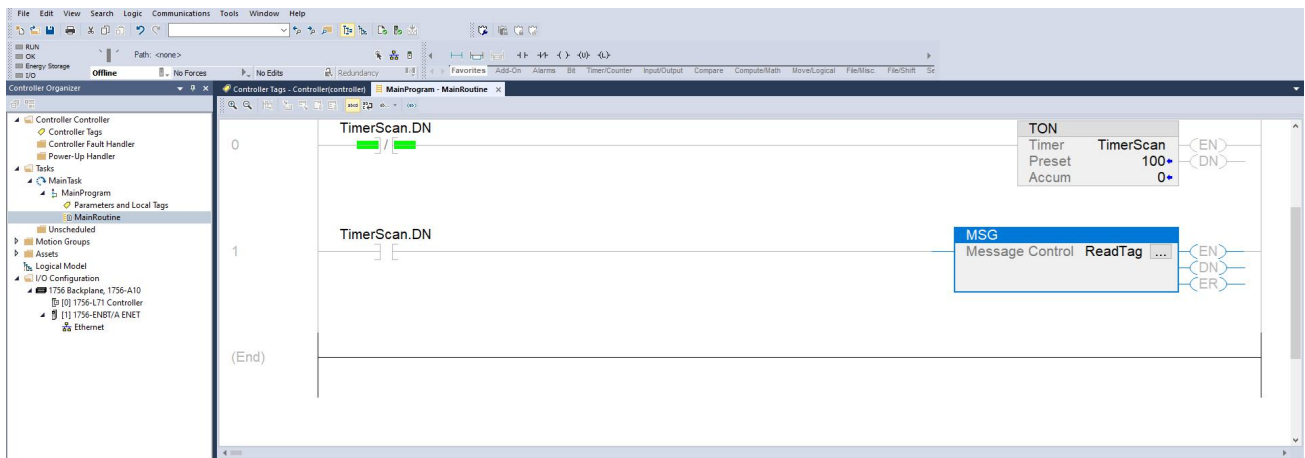
[EtherNet/IP Interface Name], 2 (Ethernet Communication), [GT200-EI-2RS485 IP Address]



GT200-EI-2RS485 Modbus/EtherNet/IP Gateway User Manual

Add a "MSG" command and select "ReadTag" as "Message Control" in the "MainRoutine" of "MainProgram" as shown in the image below. This is a simple command which can send a read request. The user still needs to add some logic commands to trigger this command in common program. For further details, refer to Studio 5000 Logix reference material.

Download the program to the PLC and set PLC into "Online" state.

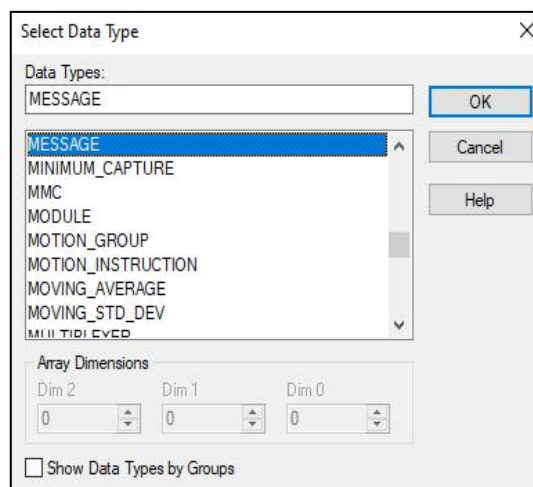
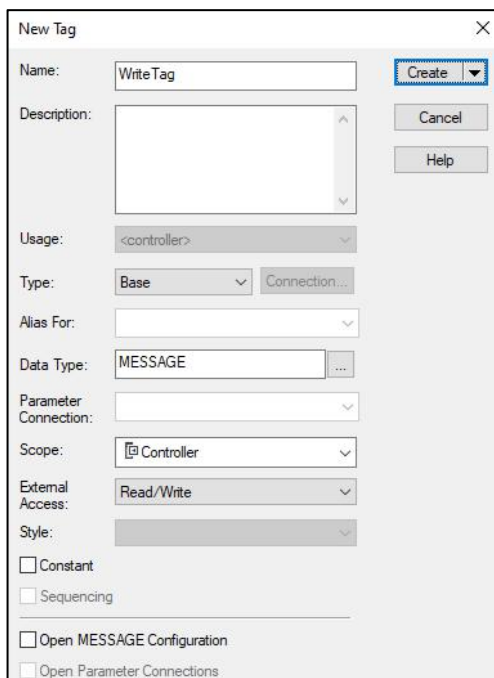
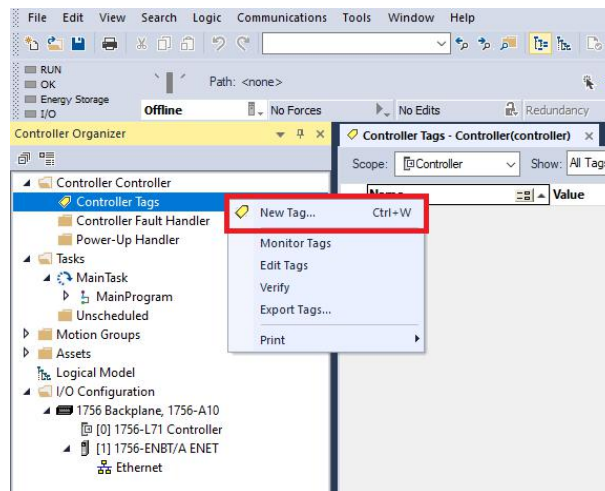


Click "Control Tags" and select "Monitor Tags". Expand "ReadData" to see that PLC can read Modbus TCP data through the GT200-EI-2RS485 gateway.

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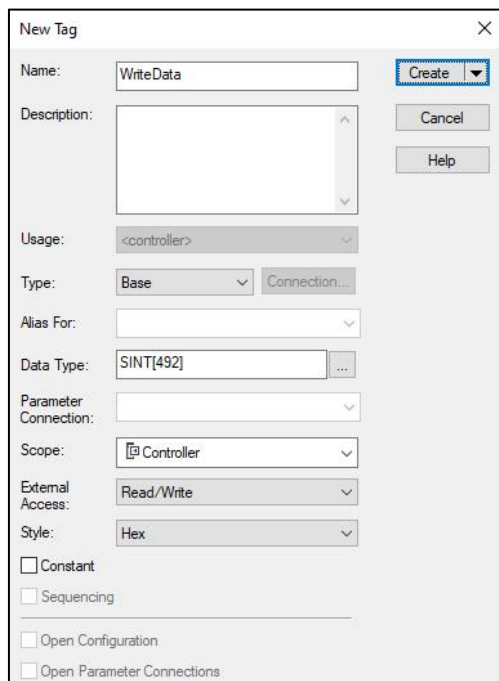
6.2.2 Write MSG Instruction

Switch to "Offline" mode and add two new tags "WriteTag" and "WriteData", under the "Controller Tags". Define the type of "WriteTag" as "MESSAGE" and "WriteData" as "SINT[500]" as shown below:



Set the data type of "WriteData" as "SINT", then set the Array Dimension "Dim 0" to match the Output Data Size. Refer to the connection parameters from the beginning of Chapter 6:

GT200-EI-2RS485 Modbus/EtherNet/IP Gateway User Manual



New Tag

Name: WriteData Create

Description:

Usage: <controller>

Type: Base Connection...

Alias For:

Data Type: SINT[492] ...

Parameter Connection:

Scope: Controller

External Access: Read/Write

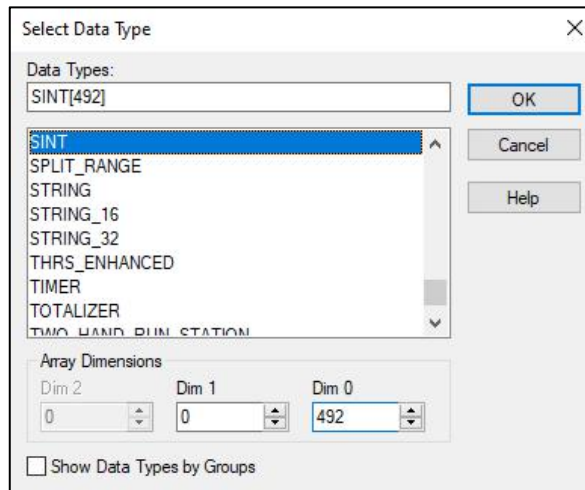
Style: Hex

☐ Constant

☐ Sequencing

☐ Open Configuration

☐ Open Parameter Connections



Select Data Type

Data Types:

SINT[492] OK

SINT

SPLIT_RANGE

STRING

STRING_16

STRING_32

THRS_ENHANCED

TIMER

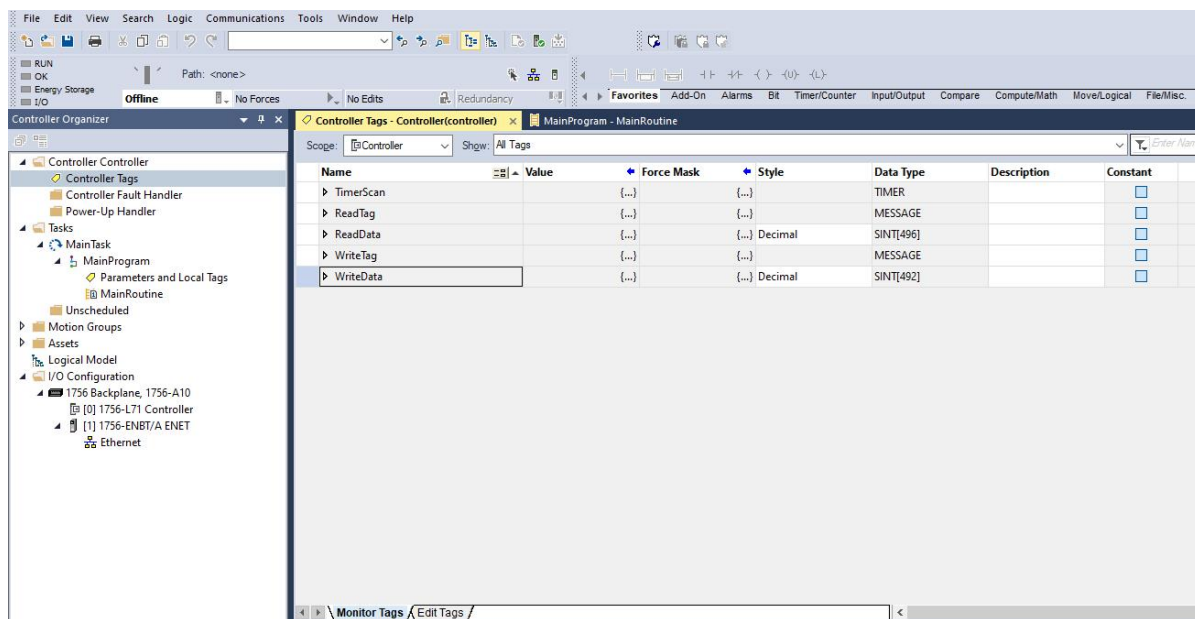
TOTALIZER

TWO_BAND_DIM_STATION

Array Dimensions

Dim 2: 0 Dim 1: 0 Dim 0: 492

☐ Show Data Types by Groups



The screenshot shows the SSTA Automation software interface. The Controller Organizer on the left displays a tree structure with the following items:

- Controller Controller
 - Controller Tags
 - Controller Fault Handler
 - Power-Up Handler
- Tasks
 - MainTask
 - MainProgram
 - Parameters and Local Tags
 - MainRoutine
 - Unscheduled
- Motion Groups
- Assets
- Logical Model
- I/O Configuration
 - 1756 Backplane, 1756-A10
 - [0] 1756-L71 Controller
 - [1] 1756-ENBT/A ENET
 - Ethernet

The MainRoutine table in the center displays the following data:

Name	Value	Force Mask	Style	Data Type	Description	Constant
TimerScan		{...}	{...}	TIMER		☐
ReadTag		{...}	{...}	MESSAGE		☐
ReadData		{...}	{...} Decimal	SINT[496]		☐
WriteTag		{...}	{...}	MESSAGE		☐
WriteData		{...}	{...} Decimal	SINT[492]		☐

Enter into the "Monitor Tags" interface and input some data in the "WriteData" tag. This data will be sent to GT200-EI-2RS485 through the PLC. As shown in the image below, 0x10, 0x20, 0x30, 0x40, 0x50, 0x60, 0x70, 0x80 and 0x90 are the data that will be output.

GT200-EI-2RS485

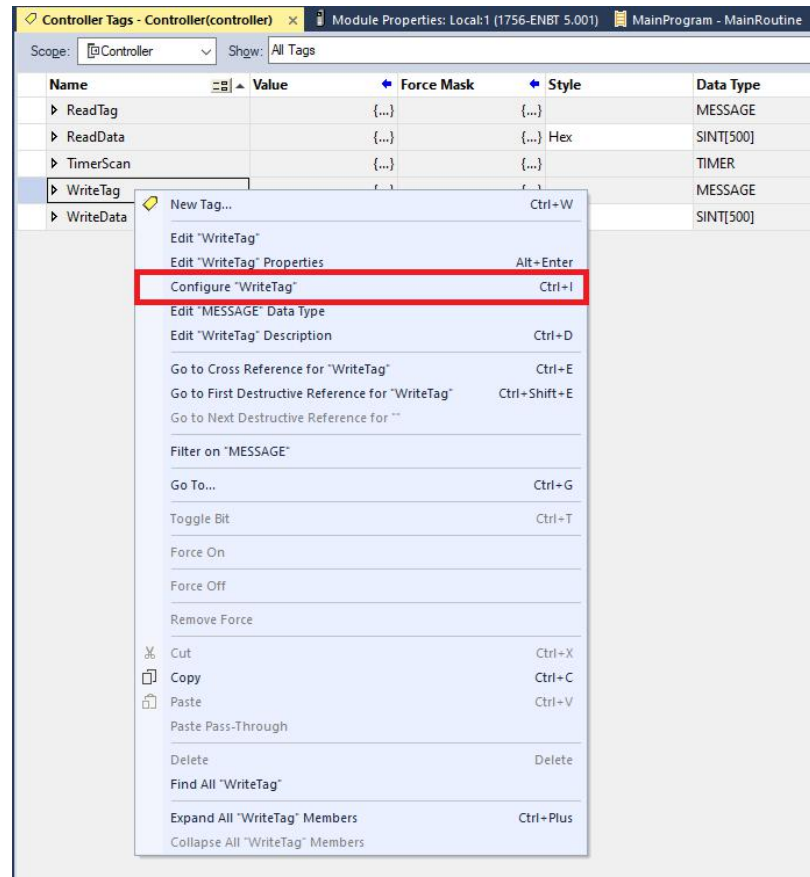
Modbus/EtherNet/IP Gateway

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Controller Tags - Controller(controller) x MainProgram - MainRoutine						
Scope: Controller		Show: All Tags				
Name	Value	Force	Mask	Style	Data Type	Description
▶ TimerScan	{...}			{...}	TIMER	
▶ ReadTag	{...}			{...}	MESSAGE	
▶ ReadData	{...}			{...} Hex	SINT[496]	
▶ WriteTag	{...}			{...}	MESSAGE	
▲ WriteData	{...}			{...} Hex	SINT[492]	
▶ WriteData[0]	16#10			Hex	SINT	
▶ WriteData[1]	16#20			Hex	SINT	
▶ WriteData[2]	16#30			Hex	SINT	
▶ WriteData[3]	16#40			Hex	SINT	
▶ WriteData[4]	16#50			Hex	SINT	
▶ WriteData[5]	16#60			Hex	SINT	
▶ WriteData[6]	16#70			Hex	SINT	
▶ WriteData[7]	16#80			Hex	SINT	
▶ WriteData[8]	16#90			Hex	SINT	
▶ WriteData[9]	16#00			Hex	SINT	
▶ WriteData[10]	16#00			Hex	SINT	

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Right-click "WriteTag" and select "Configure "WriteTag" as shown below:



Select "Set Attribute Single", and the relevant Service Code will become "10 (Hex)"

Select "WriteData" tag, indicating that the data in the "WriteData" tag will become the data PLC outputs.

Use byte as unit, and this value should be less than or equal to the currently selecting bytes which instance represents (Configured bytes number in SST-EPN-CFG).

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Message Configuration - WriteTag

Configuration* Communication Tag

Message Type: CIP Generic

Service Type: Set Attribute Single

Source Element: WriteData

Source Length: 492 (Bytes)

Service Code: 10 (Hex) Class: 4 (Hex)

Instance: 101 Attribute: 3 (Hex)

Destination Element:

New Tag...

☐ Enable ☐ Enable Waiting ☐ Start ☐ Done Done Length: 0

☐ Error Code: Extended Error Code: ☐ Timed Out

Error Path:

Error Text:

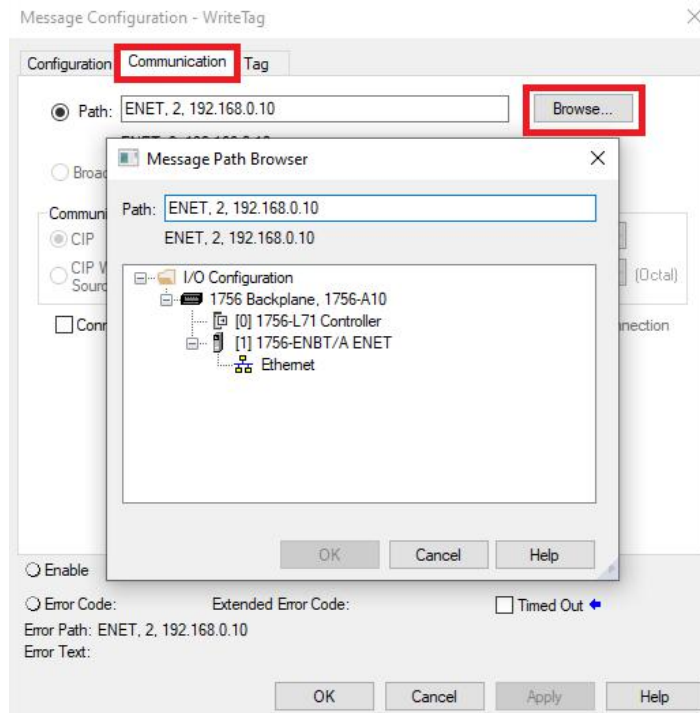
OK Cancel Apply Help

GT200-EI-2RS485 Modbus/EtherNet/IP Gateway User Manual

Select the "Communication" tab and click the "Browse" button. Then input the network path to connect to the GT200-EI-2RS485.

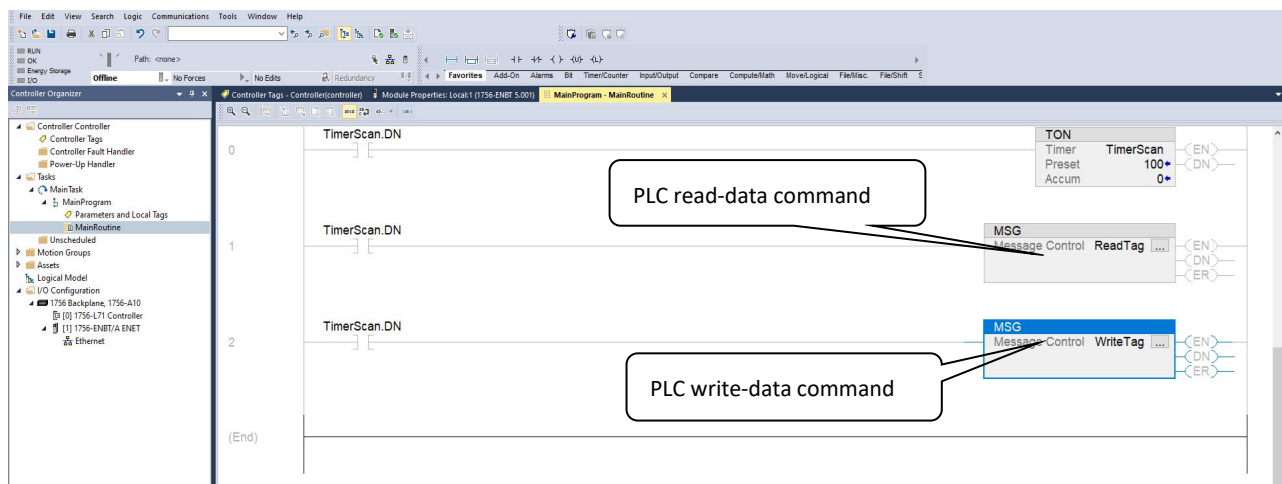
Enter the network path in the following format:

[EtherNet/IP Interface Name], 2 (Ethernet Communication), [GT200-EI-2RS485 IP Address]



Add a "MSG" command in the "MainRoutine" of "MainProgram" and select "WriteTag" as "Message Control" as shown below.

Download the PLC program to the PLC and set PLC to "Online" state,. The data in "WriteData" will be output to Modbus devices through GT200-EI-2RS485.



7 How to Read/Write I/O Data (MSG Method)

The gateway, acting as an EtherNet/IP scanner, supports data read/write using the MSG method (Class 3). The MSG request and response are mapped to the output and input data of the EtherNet/IP scanner (originator), respectively.

1. MSG Request Description (Output Data from the EtherNet/IP Scanner)

No	Data	Bytes	Descriptions
1	Sequence No	1	Range: 0 to 255; any change indicates new data.
2	Reserved	1	0
3	Valid Length	2	Range: 6 to 1424
4	Service	1	Only supports 0x0E and 0x10.
5	Class	2	Valid range: 0 to 0x00FF, reserved range: 0x0100 to 0xFFFF.
6	Instance	2	Valid range: 0 to 0x00FF, reserved range: 0x0100 to 0xFFFF.
7	Attribute	1	Range: 0 to 0xFF
8	Write Data	N	Occupies multiple bytes. If it is a read operation, this part of the data is not present.

2. MSG Response Description (Input Data to the EtherNet/IP Scanner)

No	Data	Bytes	Descriptions
1	Sequence No	1	Range: 0 to 255. Any change indicates new data. Typically, the value increments by 1, and when it reaches 255, it rolls over to 0.
2	State	1	Meaning: 0 – Invalid 1 – Success 2 – Failure 3 – Request valid length is out of allowed range 4 – Requested service not supported 5 – Received response data length exceeds the allowed valid response length. Note: For status 2 (Failure), if the mapped response area length is greater than 4 bytes, one byte of read data is used to display the EtherNet/IP status code. Otherwise, this byte is not included.
3	Valid Length	2	Range: 0 to 492

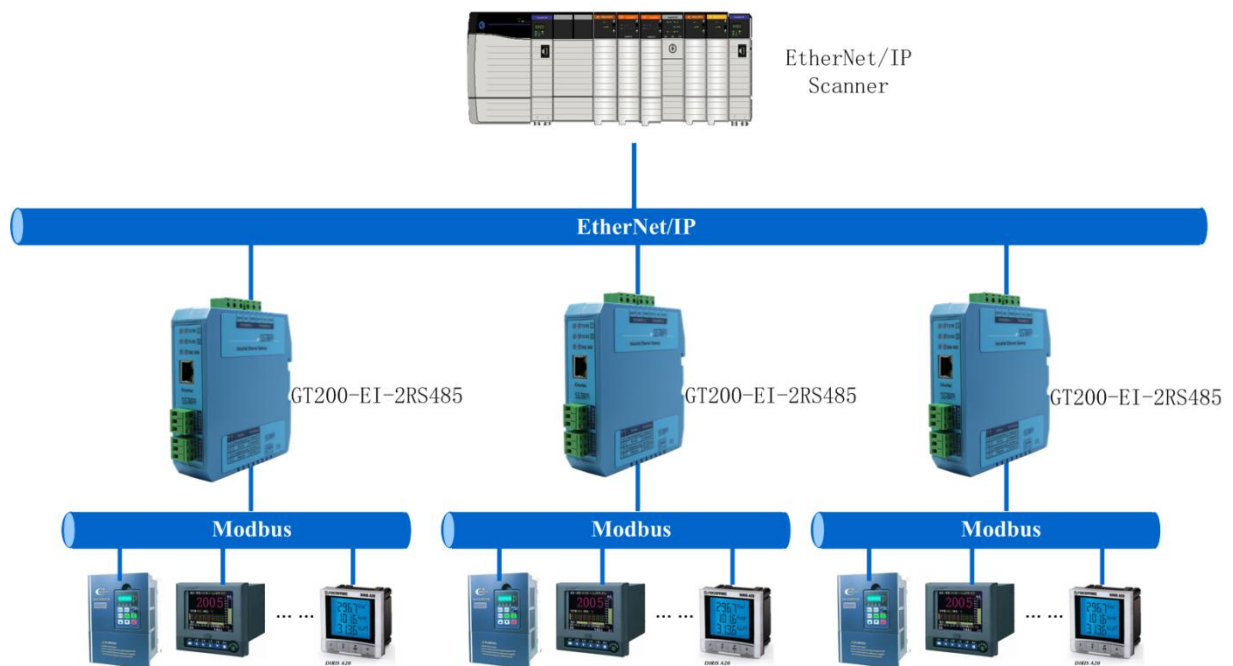


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4	Read Data	N	Occupies multiple bytes. If it is a write operation, this part of the data is not present.
---	-----------	---	--

8 Typical Application

GT200-EI-2RS485 can connect Modbus devices to the EtherNet/IP network, enabling communication between a PLC (or PC) with an EtherNet/IP interface and Modbus devices:



9 Troubleshooting

This section provides solutions for common issues encountered during installation and operation of the GT200-EI-2RS485 gateway.

9.1 Network & Discovery Issues

Symptom: SST-GT-CFG cannot search for or detect the GT200-EI-2RS485.

No.	Possible Cause	Solution
1	Ethernet cable disconnected or faulty	Verify that the Ethernet cable is securely connected to both the gateway and your PC. The link LED on the RJ-45 port should be illuminated.
2	PC IP address not on the same subnet	Ensure the PC IP address is on the same subnet as the gateway (default: 192.168.0.XXX, not 192.168.0.10). Use subnet mask 255.255.255.0.
3	DIP switch in configuration mode	Check the DIP switch position. If set to configuration mode (Bit 1 ON, Bit 2 OFF), the gateway IP is forced to 192.168.0.10.
4	Firewall blocking discovery packets	Temporarily disable Windows Firewall or any third-party security software that may block discovery packets.
5	Network connectivity issue	Use the PING command to verify network connectivity: ping 192.168.0.10 (or the configured IP address).

9.2 Modbus Communication Issues

Symptom: The SNS LED is red (solid or flashing), indicating Modbus communication errors.

No.	Possible Cause	Solution
1	RS-485 wiring incorrect	Verify the RS-485 wiring: Pin 1 = B(+), Pin 2 = A(-), Pin 3 = GND. Ensure correct polarity.
2	Modbus slave device not responding	Check that the Modbus slave device is powered on and configured with the correct slave ID matching the command configuration.
3	Serial port parameters mismatch	Verify that the baud rate, parity, data bits, and stop bits in SST-GT-CFG match the slave device settings.
4	Signal reflection on RS-485 bus	For multi-drop RS-485 networks, add a 120 Ω , 1/2 W termination resistor at both ends of the bus to prevent signal reflection.
5	Insufficient diagnostic information	Use the Debug function in SST-GT-CFG (Section 5.9) to monitor real-time Modbus command execution and response data.

9.3 EtherNet/IP Connection Issues

LED Status Reference

LED State	Meaning
ENS Off	No power or no Ethernet link established.
ENS Flashing Green	Gateway is operational but no EtherNet/IP scanner connection has been established.
ENS Solid Green	An active EtherNet/IP I/O connection is established and data exchange is in progress.
ENS Flashing Red	Connection timeout or the device is requesting an IP address via DHCP/BOOTP.
ENS Solid Red	Duplicate IP address detected on the network.

Symptom: The ENS LED is not solid green. Refer to the LED status table below for diagnosis.

No.	Possible Cause	Solution
1	Scanner (PLC) configured with wrong IP address	Verify that the EtherNet/IP scanner (PLC) is configured with the correct IP address of the GT200-EI-2RS485 gateway.
2	Connection parameters mismatch	Ensure that the connection parameters (Instance ID 101–123, data sizes) in the scanner configuration match the gateway configuration.
3	Duplicate IP address on the network	Check for duplicate IP addresses on the network. Each device must have a unique IP.
4	DHCP/BOOTP server unreachable	If using DHCP/BOOTP, ensure the server is reachable and has a valid lease for the gateway.

9.4 Firmware Upgrade Issues

Symptom: The FTP upgrade process described in Appendix A does not complete within 5 minutes.

Note: This troubleshooting section applies only after the gateway has been converted from EtherNet/IP to Modbus TCP functionality. For the upgrade procedure, refer to Appendix A.

No.	Possible Cause	Solution
1	Windows Firewall blocking FTP connection	Close the Command Prompt window and temporarily disable Windows Firewall, then retry the upgrade.
2	DIP switch not in bootloader mode	Verify that the DIP switch is set to Bit 1 ON and Bit 2 OFF, then power-cycle the gateway before starting the FTP process.
3	PC IP address conflicts with gateway IP	Ensure the PC IP address is set to 192.168.0.XXX (not

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		192.168.0.10) with subnet mask 255.255.255.0.
4	Network connectivity issue	Confirm PING to 192.168.0.10 is successful before running the batch file.
5	Power or Ethernet disconnected during upgrade	Do not disconnect power or Ethernet during the upgrade process. If the process fails repeatedly, contact SST Automation technical support.

9.5 General Debugging Tips

#	Debugging Tip	Reference
1	Use the Debug function in SST-GT-CFG to monitor gateway memory buffer data in real time.	Section 5.9
2	Export the configuration to Excel to verify all command mappings and memory addresses.	Section 5.8
3	Use the Conflict Detection feature to check for overlapping or conflicting memory address assignments.	Section 5.5
4	When troubleshooting, upload the current configuration from the device to verify the actual settings on the gateway.	Section 5.6.2
5	Check the hardware DIP switch position before and after configuration changes; always restart the gateway after changing DIP switches.	—
6	Verify that the Ethernet cable is properly seated and the link LED on the RJ-45 port is illuminated.	—

10 Default Factory Settings

Category	Parameter	Default Value
Power Supply	Input Voltage	24 VDC (9–30 VDC)
Power Supply	Current Consumption	90 mA at 24 VDC
Power Supply	Power Redundancy	Dual independent inputs
EtherNet/IP	Max Input Data	496 bytes (492 bytes payload + 4 bytes header)
EtherNet/IP	Max Output Data	492 bytes
EtherNet/IP	Connection Instances	101–123 (23 instances)
EtherNet/IP	IP Address (default)	192.168.0.10
EtherNet/IP	Subnet Mask	255.255.255.0
EtherNet/IP	Default Gateway	192.168.0.1
EtherNet/IP	IP Assignment Mode	Static
DIP Switch	Bit 1 (Mode)	OFF (Operation Mode)
DIP Switch	Bit 2 (Function)	OFF (Standard routing)
Serial Port	Baud Rate	19200 bps
Serial Port	Data Bits	8
Serial Port	Parity	None
Serial Port	Stop Bits	1
Serial Port	Transmission Mode	RTU

Term	Definition
CIP (Common Industrial Protocol)	The application-layer protocol used by EtherNet/IP for industrial automation communication.
EtherNet/IP	An industrial Ethernet network protocol based on CIP, widely used in Rockwell Automation and other industrial control systems.
Modbus RTU	A binary serial communication protocol using Remote Terminal Unit (RTU) encoding. Each byte is transmitted as two hexadecimal characters.
Modbus ASCII	A serial communication protocol using ASCII character encoding. Less efficient than RTU but easier to debug.
Modbus TCP	Modbus protocol encapsulated in TCP/IP packets for communication over Ethernet networks.
Scanner (Originator)	The EtherNet/IP device that initiates I/O connections. Typically a PLC that reads/writes data from/to the adapter.
Adapter (Target)	The EtherNet/IP device that responds to I/O connection requests. The GT200-EI-2RS485 acts as an adapter on the EtherNet/IP network.
MSB (Most Significant Byte)	The byte with the highest place value in a multi-byte number. Modbus uses MSB-first (big-endian) byte order.

LSB (Least Significant Byte)	The byte with the lowest place value. EtherNet/IP uses LSB-first (little-endian) byte order.
DIN Rail	A standardized 35mm metal rail used for mounting industrial control equipment in enclosures.
RS-485	A differential serial communication standard supporting multi-point networks, commonly used with Modbus RTU for industrial applications.
BOOTP / DHCP	Protocols for automatic IP address assignment. BOOTP (Bootstrap Protocol) is a predecessor to DHCP (Dynamic Host Configuration Protocol). Both are supported by the GT200-EI-2RS485.
EMC(Electromagnetic Compatibility)	The ability of electrical equipment to function correctly in its electromagnetic environment without introducing intolerable interference.

11 Frequently Asked Questions (FAQ)

Q1: Why can't SST-GT-CFG discover the gateway?

A: There are two possible scenarios:

- 1) New gateway: By default, the gateway uses a static IP of 192.168.0.10. Ensure your PC is on the 192.168.0.x subnet.
- 2) Previously configured but IP unknown: Set the DIP switch to Configuration mode (Bit 1 ON, Bit 2 OFF), then restart the gateway. The IP will default to 192.168.0.10.

Q2: The SNS LED is solid red. What does this mean?

A: This indicates a Modbus communication error. Check the following:

- Verify RS-485 wiring: Pin 1 = B(+), Pin 2 = A(-), Pin 3 = GND.
- Confirm the Modbus slave device is powered on and its slave ID matches the configuration.
- **Ensure baud rate, parity, data bits, and stop bits match the slave device settings.**

Q3: The ENS LED is not solid green. What should I check?

A: Refer to the LED status table in Section 9.3 for diagnosis. Common causes include:

- The EtherNet/IP scanner (PLC) is configured with an incorrect IP address for the gateway.
- Connection parameters (instance ID, data size) in the scanner do not match the gateway configuration.
- A duplicate IP address exists on the network.

Q4: Data values received by the PLC are incorrect or garbled.

A: This is most likely a Byte Swap configuration issue. Modbus uses MSB-first (big-endian) byte order, while EtherNet/IP uses LSB-first (little-endian). Try each Byte Swap mode (No Swap, Two Bytes Swap, Four Bytes Swap) in SST-GT-CFG until the data matches the expected format.

Q5: I changed the DIP switch but the settings did not take effect.

A: After changing any DIP switch position, you must restart the gateway (power cycle) for the new settings to take effect.

Q6: The gateway works with one RS-485 port but not the other.

A: Each RS-485 interface is configured independently. Verify that both interfaces have commands configured in SST-GT-CFG. Use the Debug function (Section 5.9) to check each interface's memory buffer data.

12 Glossary

A: Key technical features include:

Function Code	Modbus Data Type	Address Range	Mapping Address (HEX)	Max Data Count	Reference
01	Read Coils	00001–0xxxx	0x0000–0x0255	400	Chapter 5.4.4
02	Read Discrete Inputs	10001–1xxxx	0x0000–0x0255	400	Chapter 5.4.4
03	Read Holding Registers	40001–4xxxx	0x0000–0x0255	127	Chapter 5.4.4
04	Read Input Registers	30001–3xxxx	0x0000–0x0255	127	Chapter 5.4.4
05	Write Single Coil	00001–0xxxx	0x0000–0x0255	1	Chapter 5.4.4
06	Write Single Register	40001–4xxxx	0x0000–0x0255	1	Chapter 5.4.4
15	Write Multiple Coils	00001–0xxxx	0x0000–0x0255	400	Chapter 5.4.4
16	Write Multiple Registers	40001–4xxxx	0x0000–0x0255	127	Chapter 5.4.4
23	Read/Write Multiple Registers	40001–4xxxx	0x0000–0x0255	127	Chapter 5.4.4