

Modbus / EtherNet/IP Gateway

GT100-EI-RS

User Manual

V 3.2

Rev A



SST Automation

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Important Information

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Safety Information

This section summarizes essential safety requirements for installation, wiring, configuration, operation, and maintenance of the GT100-EI-RS gateway. Always follow local regulations, site safety procedures, and the product label.

DANGER — Hazardous Voltages and Unsafe Conditions

Disconnect external power before wiring, installing, removing, or servicing the gateway.

Do not install or operate the gateway in an explosive atmosphere, in a wet location, or in any location outside the specified environmental range.

If the gateway is installed in a cabinet connected to higher-voltage equipment, keep signal wiring separated from hazardous voltage wiring per the site electrical code.

WARNING — Qualified Personnel and Intended Use

Only qualified personnel familiar with industrial communication equipment and RS-485/Ethernet wiring should install, configure, and maintain the gateway.

Read the complete manual before installation and commissioning.

The gateway is intended for industrial communication and building automation data exchange. It is not intended for emergency stop, safety interlock, life-support, or other safety-critical control functions unless an independently certified safety system is used.

CAUTION — Electrical Safety

Use a regulated 24 V DC power supply. Keep the supply voltage within 9 V to 30 V DC.

Verify polarity before power-on. Connect 24V+ to the 24V+ terminal and GND to the GND terminal.

Do not short the power terminals or RS-485 terminals.

Use surge protection and proper grounding in lightning-prone or electrically noisy environments.

CAUTION — Installation and Environmental Safety

Mount the gateway on a 35 mm DIN rail in a dry, ventilated, IP-rated cabinet suitable for the installation site.

Operating temperature: -40°C to 70°C. Relative humidity: 5% to 95%, non-condensing.

Provide sufficient clearance for ventilation, wiring, and cable bending radius.

Do not apply heavy pressure, impact, or mechanical stress to the enclosure or connectors.



CAUTION — Operation, Firmware, and Configuration

Back up the configuration before restoring defaults or updating firmware.

Do not power off the gateway or disconnect Ethernet during firmware update.

After downloading a configuration, restart the gateway when required so that the new configuration takes effect.

Verify mapping, scaling, byte order, and address offset settings before connecting the gateway to a live automation system.

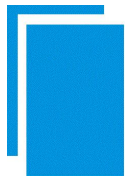


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1 Product Overview

1.1 Product Introduction

The GT100-EI-RS is an industrial gateway designed to seamlessly connect Serial devices (Modbus RTU/ASCII or generic serial) to EtherNet/IP control systems. It supports up to 32 Serial devices and includes both RS-485 and RS-232 ports to provide flexible device integration.

1.2 Key Features

- One RS-485 and one RS-232 interface, each with independent 1kV photoelectric isolation.
- Dual Ethernet ports with built-in switching capability, supporting daisy-chain connections.
- Easy Network Setup with support for DHCP and static IP addressing. If DHCP is unavailable, the gateway automatically defaults to 192.168.0.11
- Built-in I/O monitoring that allows real-time viewing of the gateway's input and output buffer data.
- Supports Non-DLR operation for direct integration into a DLR ring network.
- Easy-to-use configuration software: The GT100-EI-RS can be configured using the SST-MI-CFG software.

1.3 Technical Specifications

Modbus Serial Interface Features	
Serial Interface	One (1) RS-485 interface, half-duplex One (1) RS-232 interface, half-duplex
Interface Connectors	RS-485: One (1) 3-Pin Terminal Block RS-232: One (1) 3-Pin Terminal Block
Galvanic Isolation	Independent 1kV photoelectric isolation for each port
Baud Rates	1200 bps, 2400 bps, 4800 bps, 9600 bps, 19.2 kbps, 38.4 kbps, 57.6 kbps, 115.2 kbps
Parity Options	None, Odd, Even, Mark, Space
Stop Bits	1 or 2

Serial Operation Modes	Modbus RTU Master Modbus ASCII Master Serial Passthrough
Modbus Function Codes Supported	01 (01 _H): Read Coils 0x 02 (02 _H): Read Discrete Inputs 1x 03 (03 _H): Read Holding Registers 4x 04 (04 _H): Read Input Registers 3x 05 (05 _H): Write Single Coil 0x 06 (06 _H): Write Single Register 4x 15 (0F _H): Write Multiple Coils 0x 16 (10 _H): Write Multiple Registers 4x 23 (17 _H): Read/Write Multiple Registers 4x
Maximum Number of Modbus Slave Devices	Up to 32 Slave devices
Serial Passthrough Mode Frame Types	Time Interval between Characters Frame Length Delimiter Character
Maximum Number of Modbus Commands (As Master)	Up to 100 Modbus commands per serial port (200 total)

Table 1-1: Modbus Serial Interface Specifications

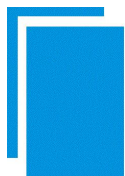
EtherNet/IP Interface Features	
Ethernet Interface	Two (2) RJ45 10/100M Ethernet ports with built-in switch and cascade support.
IP Address Assignment Modes	Static IP Addressing (Manual Configuration) DHCP (Auto IP)
Ethernet Communication Protocol	ODVA Standard EtherNet/IP
EtherNet/IP Operation Mode	EtherNet/IP Adapter (Slave)
EtherNet/IP Communication Modes Supported	Implicit Messaging (I/O Messaging) Explicit Messaging (MSG Instruction Blocks)
Maximum Input Size	Modbus Mode: Up to 492 Bytes Passthrough Mode: Up to 254 Bytes (including checksum byte)

Maximum Output Size	Modbus Mode: Up to 492 Bytes Passthrough Mode: Up to 254 Bytes (including checksum byte)
Byte Swap Modes	No Swap Two Byte Swap (0x1234 => 0x3412) Four Byte Swap (Word Swap) (0x12345678 => 0x56781234) Four Byte Swap (MSB to LSB) (0x12345678 => 0x78563412)

Table 1-2: EtherNet/IP Interface Specifications

Electrical/Environmental	
Power Supply Input Voltage	24VDC (Range 9V to 30V)
Current	110mA at 24VDC
Operating Temperature	-40°F to 158°F (-40°C to 70°C)
Relative Humidity	5% to 95% RH (non-condensing)
Certification	CE Compliant to EMC Test Standards
Hardware	
Dimensions (W × H × D)	1.0in × 4.0in × 3.6in (25mm × 100mm × 90mm)
Mounting	35mm DIN Rail
Enclosure Protection Rating	IP20
Power Interface Connector	One (1) 3-Pin Terminal Block

Table 1-3: Electrical and Environmental Specifications



1.4 Revision History

Revision	Date	Chapter	Description
V3.2, Rev A	06/03/2026	ALL	Optimize document descriptions and add new chapters.
V3.2	11/24/2025	ALL	Revision and added Chapter 8 Basic Troubleshooting and Chapter 9 Glossary of Technical Terms
V3.1	7/9/2025	ALL	New release
V2.1	11/25/2022	ALL	Increase the supported Modbus slave devices from 8 to 32. Change the default Assign IP Mode as DHCP. Revised some mistakes. Added connection diagrams to chapter 2.4.3 and chapter 4
V1.4, Rev D	1/12/2022	ALL	Update the format
V1.4, Rev C	6/17/2021	Chapter 2.3, 3.1	Revision and picture updated. Change the default IP address to 192.168.0.XXX
V1.4, Rev B	3/18/2018	ALL	Change the default IP address to 192.168.1.XXX
V1.4, Rev A	1/17/2017	ALL	Change the default Assign IP Mode to DHCP
V1.4	12/26/2016	ALL	Revision for GT100-EI-RS V1.4
V1.2	7/14/2015	ALL	New release

Table 1-4: Revision History



2 Hardware Overview

2.1 Product Appearance

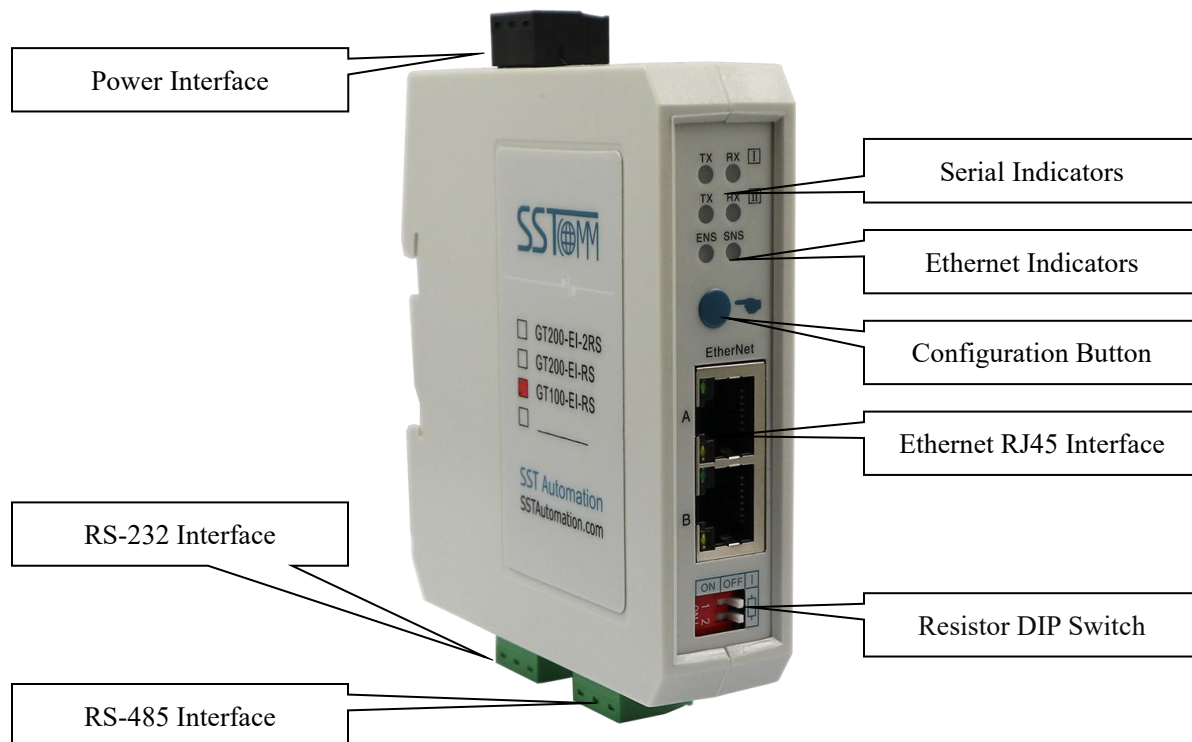


Figure 2-1: GT100-EI-RS Gateway - Interface View

Note: This image is for reference only. The actual product may differ in appearance.



2.2 LED Status Indicators

Indicators	Status	Description
ENS	OFF	IP address established.
	Flashing Red	Requesting IP address via DHCP.
	Solid Green	EtherNet/IP connection established successfully.
	Flashing Green	EtherNet/IP connection not established.
SNS	Solid Green	Serial port is ready to transmit and receive data after initialization.
Combined ENS and SNS	ENS: Solid Orange SNS: OFF	Firmware Update Mode.
	SNS Flashes Red Once	Lock Configuration.
	SNS Flashes Red Twice	Unlock Configuration.
TX	Flashing Green	Serial port is transmitting data.
RX	Flashing Green	Serial port is receiving data.

Table 2-1: LED Status Indicators



2.3 Resistor DIP Switch

A 2-position DIP switch configures whether the RS-485 serial port enables the terminal resistor.

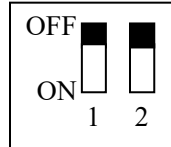


Figure 2-2: RS-485 DIP Switch Positions

Bit 1	Bit 2	Pull-Up Resistor	Pull-Down Resistor	Terminal Resistor
OFF	OFF	10 k Ω *	10 k Ω *	None*
ON	ON	1.3 k Ω	1.3 k Ω	120 Ω

Table 2-2: RS-485 Terminal Resistor DIP Switch Configuration

*Indicates Default

NOTE: Enable the Terminal Resistor if any of the following conditions apply:

- ◆ You are using a **high baud rate**.
- ◆ You are using **long communication cables**.
- ◆ You are connecting a **large number of devices** to the bus.
 - If you are connecting more than 1 serial slave device (Multi-point mode), an external terminal resistor needs to be installed after the last device.



2.4 Configuration Button

1. Locking and Unlocking Configuration

During device operation, press the button twice. The SNS red light will turn on for 500 ms and then turn off, indicating the configuration has been locked.

Press the button twice again. The SNS red light will turn on for 300 ms, turn off for 400 ms, and then turn on again for 300 ms before turning off, indicating the configuration has been unlocked.

Lock Configuration: When locked, the configuration software can detect the device but cannot upload or download configuration settings.

Unlock Configuration: When unlocked, the configuration software can detect the device and upload or download configuration settings normally.

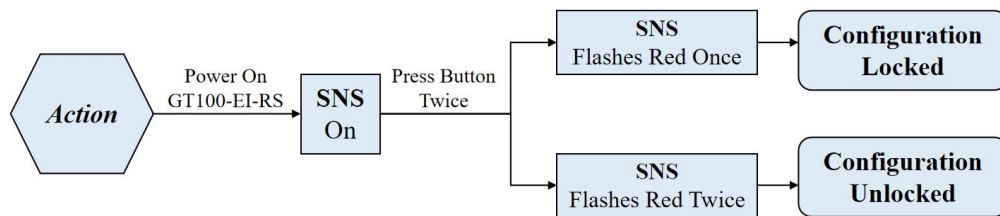


Figure 2-3: Configuration Button - Lock/Unlock Operation

NOTE: Lock the configuration to avoid unintentional changes to the configuration settings.

2. Restoring DHCP Mode

Within 10 seconds after the device completes startup (indicated by the SNS green light being steadily on), press and hold the button for 5 seconds. The SNS green light will start flashing at a frequency of 2 Hz.

Press the button once within the next 5 seconds: the SNS indicator will turn off, and the device will restore its default configuration and restart automatically. After restoring, the IP configuration will default to DHCP mode.

If the button is not pressed within 5 seconds, the SNS green light will remain steadily on, and the device will resume normal operation.

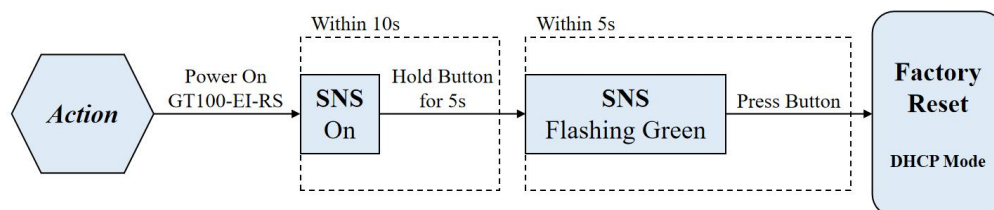


Figure 2-4: Configuration Button - Restore DHCP Mode

3. Boot Process (Firmware) Update



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- Press and hold the button while powering on the device. When the ENS orange light is steadily on and the SNS light is off, the device is ready for the firmware update.
- Open a web browser and enter the IP address `192.168.0.10`. Log in using the provided username and password.
- Click **Connect** to establish a connection. A prompt will confirm successful connection.
- Select the BIN file, then click **Download**. Wait for a prompt indicating the download is complete.
- Click **Restart** below the download success message. Once restarted, the gateway indicators will return to their operational state, confirming a successful update.

2.5 Interfaces

2.5.1 Power Interface

GT100-EI-RS has one power interface that supports 9~30VDC. It is recommended to use 24VDC power.

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

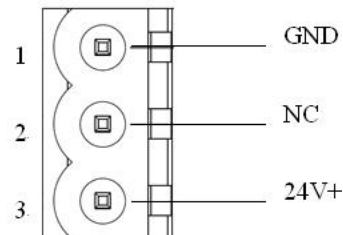


Table 2-3: Power Interface Pinout

2.5.2 Ethernet Interface

The Ethernet interface uses an RJ-45 connector that follows the IEEE802.3u standard. Its pinout (standard Ethernet signal) is defined below:

Pin	Signal Descriptions
S1	TXD+, Transmit Data+
S2	TXD-, Transmit 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-

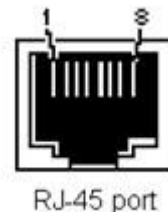




Table 2-4: Ethernet RJ45 Connector Signal Descriptions

2.5.3 RS-485 Interface

The RS-485 serial interface uses a 3-pin terminal. Its pinout is defined below:

Pin	Function
1	D-, RS-485 Transmit Negative
2	D+, RS-485 Transmit Positive
3	GND

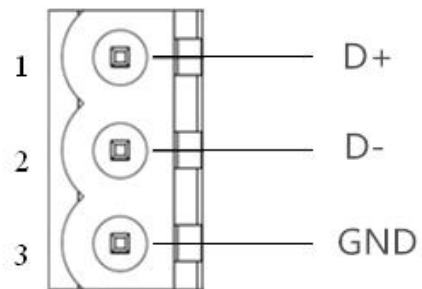


Table 2-5: RS-485 Interface Pinout

When using a multi-point connection, to prevent the reflection and obstruction of signal, it is recommended to use two terminal resistor (120Ω 1/2W) in parallel with the 2 data wires at both ends of the bus.

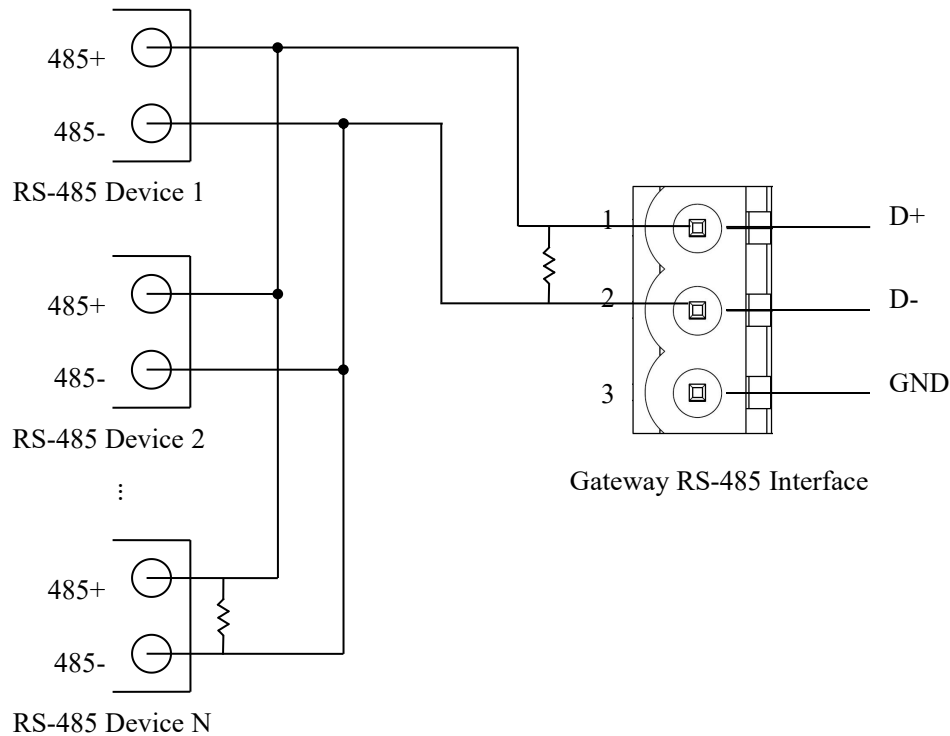


Figure 2-5: RS-485 Interface Terminal Block

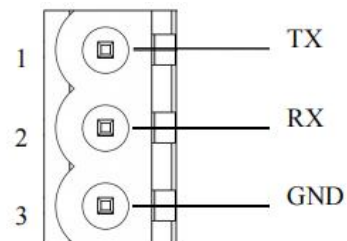
Note: There is a terminal resistor inside RS485 interface of GT100-EI-RS on version V3.X or later. If you are using V3.X or later, you can enable the internal terminal resistor of the gateway and use one external terminal resistor at the last serial device in parallel with the two data wires as shown in the diagram above.

2.5.4 RS-232 Interface

The RS-232 serial interface uses a 3-pin terminal. Its pinout is defined below:as below:

Pin	Function
1	TX, Connect user device RS-232's RX
2	RX, Connect user device RS-232's TX
3	GND, Connect user device RS-232's GND

Table 2-6: RS-232 Interface Pinout





3 Installation

3.1 Mechanical Dimension

Size (width × height × depth):

1.0 in × 4.0 in × 3.6 in (25 mm × 100 mm × 90 mm)

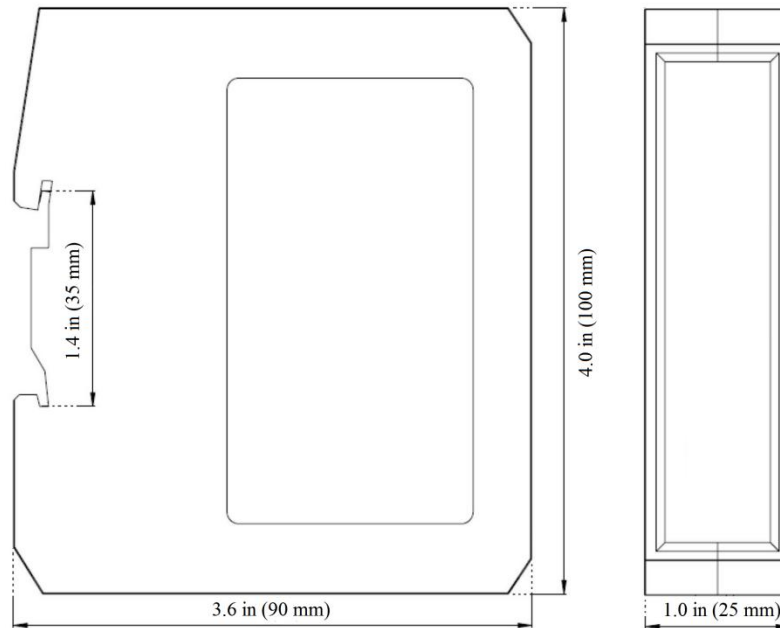


Figure 3-1: RS-232 Interface Terminal Block

3.2 Installation Method

Using 1.4 in (35mm) DIN RAIL

Installation Steps:

1. Hook the top of the gateway onto the DIN rail.
2. Press the bottom of the gateway firmly toward the rail until it snaps into place.
3. Gently tug to verify secure mounting.

Removal Steps:

1. Using a flat-head screwdriver, pull the DIN rail latch downward.
2. Tilt the bottom of the gateway outward and lift off the rail.



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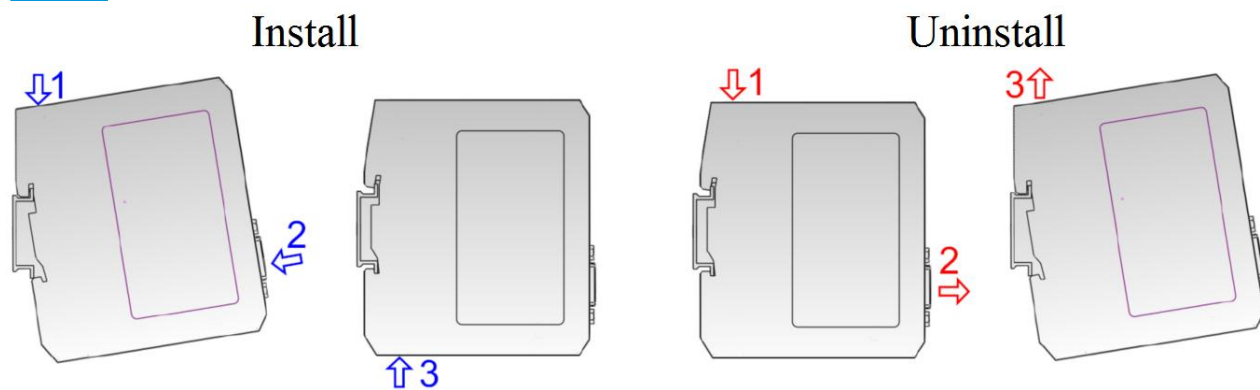


Figure 3-2: Mechanical Dimensions



4 Quick Start Guide

Before You Begin

Download the configuration software and EDS file:

- ◆ Download SST-MI-CFG software from www.sstautomation.com/Download1/ and install it.
- ◆ Download the EDS file for GT100-EI-RS from www.sstautomation.com/Download1/.

Basic steps when configuring GT100-EI-RS :

1. Wiring: See also Chapter 2.5 Interfaces.

- Connect the network port of the gateway to the PC with a network cable for downloading the configuration.
- Connect the serial port of the gateway to the serial device for communication with the serial device.
- Connect the gateway power supply and power on.

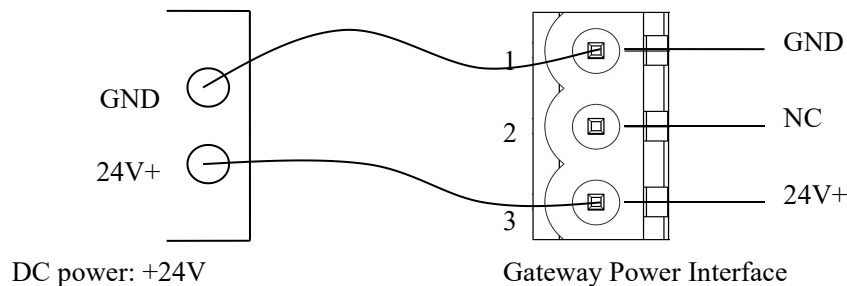


Figure 4-1: DIN Rail Installation Method

2. Build your configuration using SST-MI-CFG and download it to the gateway. For more details, see [Chapter 5](#).

If the gateway cannot be searched, try the following:

- The network factory setting for GT100-EI-RS is DHCP. If DHCP fails, the gateway IP will revert back to 192.168.0.11. Check whether the computer and gateway are on the same network segment.
- Test the network connection first. Refer to the note “[How to Use the Ping Command](#)” located on our Support page on the sstautomation.com website.
- If the download fails: Check whether the download configuration is correct, ensure the device is set to the unlocked configuration state, or contact us for technical support assistance.

After downloading the configuration, the device can be restarted either automatically or manually. The downloaded configuration will take effect only after the restart, allowing normal communication.

Note: The factory default network setting for the GT100-EI-RS is DHCP. In DHCP mode, if the IP address is not assigned within 30 seconds, the gateway will automatically assign the fixed IP address 192.168.0.11.

5 Software Instructions

5.1 Software Interface Description

The SST-MI-CFG configuration software runs on the Windows platform and configures the GT100-EI-RS through the networkGT100-EI-RS through the network interface. It configures the parameters and commands configure the parameters and commands for Modbus and Ethernet.

Double click the software icon on the desktop after installation to enter the configuration interface:



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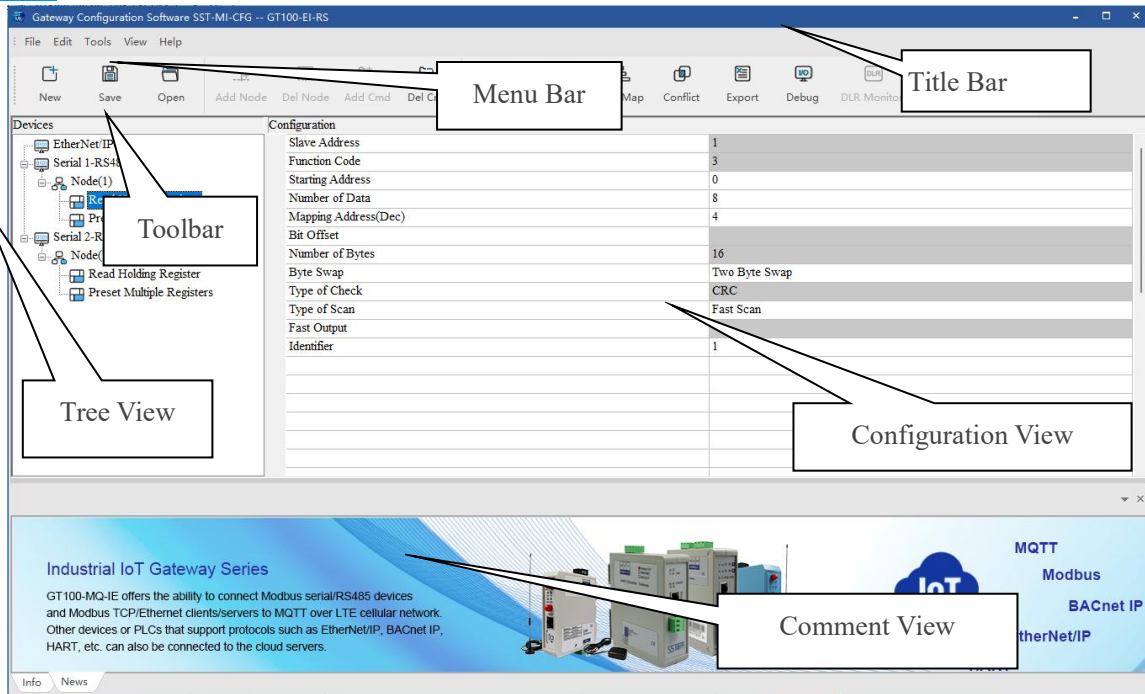


Figure 5-1: SST-MI-CFG Main Window with Annotations

Toolbar interface shown as follows:



Figure 5-2: SST-MI-CFG Toolbar Icons

-  **New:** Create a new configuration project.
-  **Save:** Save current configuration.
-  **Open:** Open a configuration project.
-  **Add Node:** Add a Modbus slave node.
-  **Delete Node:** Delete a Modbus slave node.



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Add Command: Add a Modbus command.



Delete Command: Delete a Modbus command.



Upload: Read the configuration information from the module and shown in the software.



Download: Download the configuration file to the gateway.



Calculate Mapping Address: Used to automatically calculate the mapped memory address without conflict by each command.



Mapping Address Conflict Detection: To check whether there are some conflicts with configured commands in the gateway memory data buffer.



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



I/O data Monitor: Enables online monitoring of the input/output buffer data of the gateway.



Import configuration files: import configuration files from previous versions (V2.1) to reconfigure the gateway parameters

Table 5-1: SST-MI-CFG Toolbar Functions

5.2 Device View

5.2.1 Ethernet Configuration View

In the device view interface, click Ethernet. configuration view interface is shown below:

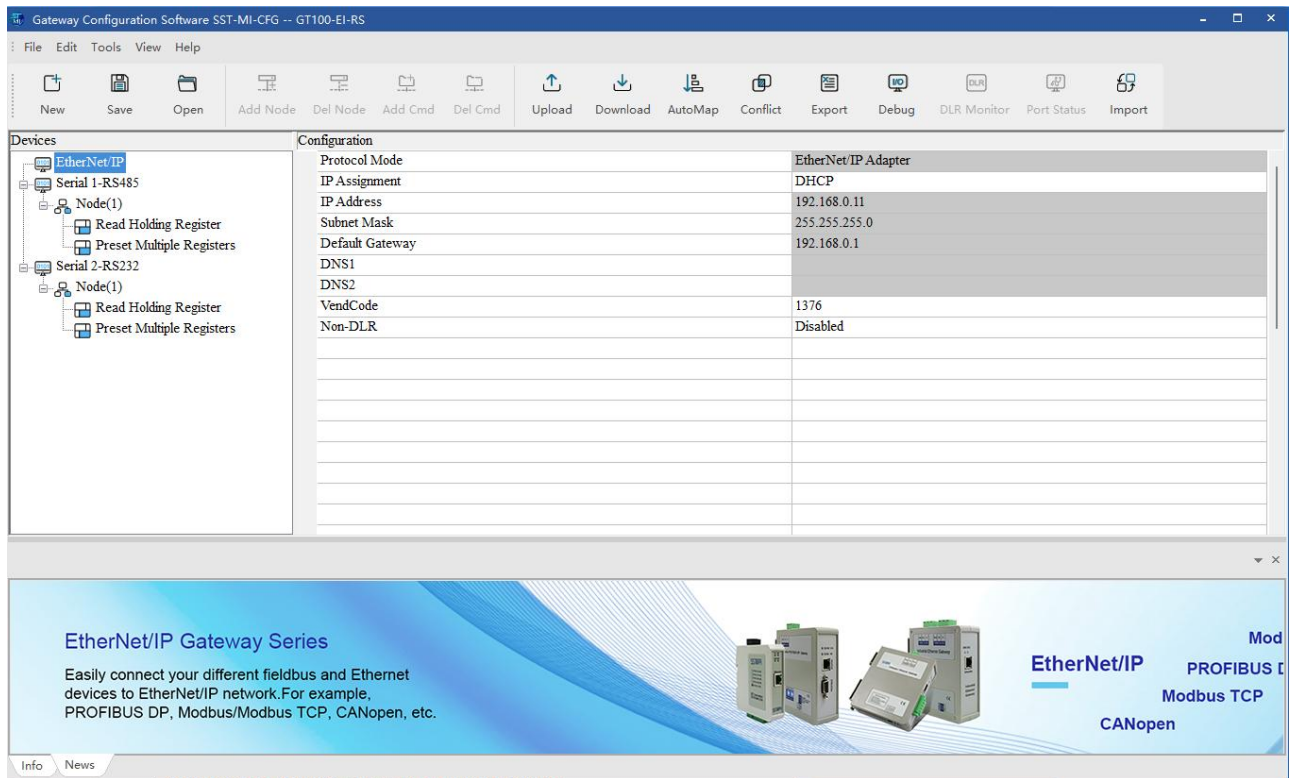


Figure 5-3: SST-MI-CFG Toolbar

IP Assignment: Static and DHCP.

Static: Manually assign a static IP address.

DHCP: Automatically receive an IP address from a DHCP server on the network.

IP Address: Sets the IP address of the device.

Subnet Mask: Sets the subnet mask of the gateway's EtherNet/IP interface.

Default Gateway: Sets the gateway address of the device.

Timeout Action: This function determines whether to clear EtherNet/IP input data when the number of Modbus command response errors equals the number of Modbus command retries set in software.

Clear: Clear the EtherNet/IP input data.

Hold: Hold the last received EtherNet/IP input data.

Modbus command Retransmission Times: Sets the number of times to resend a Modbus command when there is a Modbus response error.

VendCode: VendCode can be modified as required. Range: 1-65535. Default Value: 1. After modification, the corresponding EDS file must also be updated.

Non-DLR Function: Supports "Disable" and "Enable," with "Disable" as the default.

If used in a DLR ring network, enable this function.

If used on a non-redundant branch of a DLR system, disable this function.

5.2.2 Subnet Configuration View-Modbus Master

1. Modbus Master configuration view

The “Modbus Master” protocol mode configuration interface is shown below:

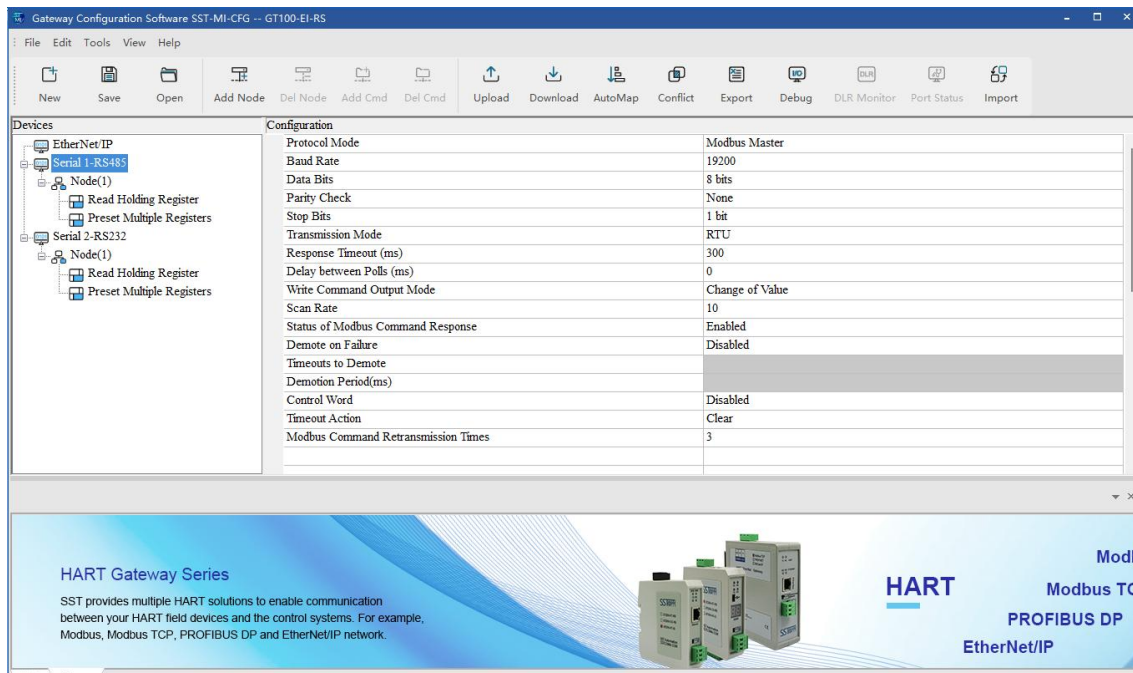


Figure 5-4: Modbus Master Configuration Interface

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

Data Bits: 7, 8.

Parity Check: None, Odd, Even.

Stop Bits: 1, 2.

Transmission Mode: RTU or ASCII.



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Response Timeout: The amount of time the gateway waits for the Modbus slave's response after the Modbus Master sends a request. Range: 5~60000ms.

Delay between Polls: The amount of time the gateway delays before sending the next request after a response has been received. Range: 0~ 2500ms.

Write Command Output Mode: There are three types of output commands: Cycle, Forbidden and Change of Value.

Cycle: Sends Modbus write commands periodically at the scan rate according to the scan rate.

Forbidden: Disables output of the Modbus write command.

Change of Value: Sends Modbus write commands when the output data changes.

Scan Rate: The ratio of slow scan cycles to fast scan cycles. Each Modbus command can be set to either fast or slow scanning. If this value is set to 10, fast scan commands will be sent 10 times for every 1 slow scan command.

Range: 1~255. Default Value: 10.

Status of Modbus Command Response: Supports "Disabled" and "Enabled". When set to Enable: Each command uses a bit to indicate the execution status of the command. If the execution is successful, the corresponding bit is set to 1, otherwise it is set to 0. Default Value: Enabled.

Demote on Failure: Supports "Disabled" and "Enabled".

When Demote on Failure is "Enabled", after N times of command response failures (errors), if the command is a fast scan, it will be demoted to a slow scan. This parameter is valid for Modbus reading command and cycle writing command.

Timeouts to Demote: Number of attempts to write before entering demotion. Range: 1-255. Default Value: 3

Demotion Period(ms): The Demotion Period determines how long a demoted command remains in a demoted state. If the demotion time is up, the commands in the demoted state will automatically revert to the original non-demoted state. Range: 100-3600000ms. Default Value: 10000ms.

Control Word: When this setting is enabled, a block of data will be reserved at the beginning of the EtherNet/IP output data buffer to function as the Control Word. Each bit in the Control Word parameter corresponds to an individual Modbus command. The Control Word functions like a switch, allowing each Modbus command in the Control Word to be toggled ON or OFF. When a bit in the Control Word is set to 1, the corresponding command is enabled. When a bit is set to 0, the corresponding command is disabled.

When the Write Command Output Mode is set to Disabled, the Control Word will do nothing. Write commands will be disabled. Read commands will not be affected by the Control Word and will communicate normally.

The Control Word setting supports the following options: Disabled, All Commands and Only Write Commands.

Disabled: Disables the Control Word parameter.

All Commands: Every Modbus read command and write command will correspond to 1 bit in the Control Word parameter.

Default Value: Disabled.

Clear: Set the EtherNet/IP input data to zero.

Default Value: Clear.

2. Node Configuration

[illegible]

26

- Parameter Description:
 - (1) In "Modbus Master" protocol mode, the node is the Modbus slave station address. "Modbus Master" protocol mode is selected, the node is the Modbus slave station address. The slave address range is from 0 ~ 247.
 - (2) Up to 32 nodes can be configured on the RS-485 serial port..
- Instructions: For device view, the software supports three kinds of operation modes: edit menu, edit toolbar, and right-click edit menu.

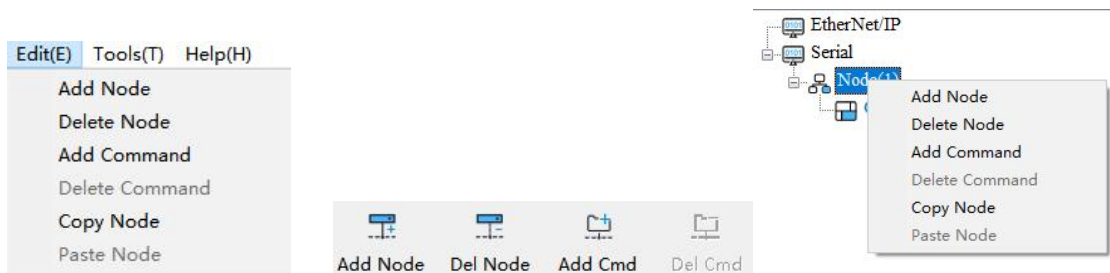


Figure 5-6: SST-MI-CFG Toolbar

- (1) Add node: Right click on Subnet or existing nodes, and then perform the operation of adding a new node. Then there will be a new node named "Node-x" under subnet.
- (2) Delete node: Click on the node to be deleted, and then select "Delete Node". The node and all commands will be deleted.
- (3) Copy node: Click on the existing node, and then select "Copy Node". The node and all existing commands under the node will be copied.
- (4) Paste node: Click and choose any existing node, and then select "Paste Node". A new node and all existing commands will be pasted under the subnet tree. The parameters of new node will have the default settings and will need to be reconfigured.

3. Command Configuration

- Parameter Description: Commands No. supported: 01, 02, 03, 04, 05, 06, 15, 16, 23
- Instructions: The Command Configuration view supports three types of operation: Edit Menu, Edit Toolbar and Right click edit Menu.
 - (1) Add commands: Left click on the node, and then perform the operation of adding command to add a command for the node.
 - (2) Delete commands: Left-click on the command and perform the operation of deleting command.

Under the "Modbus Master" mode, left click on a command and then the configuration interface is shown as below:



Note: This item of SST-MI-CFG indicates protocol address. When users input PLC address, it will pop up the dialog box below. After clicking OK, the PLC address users input will be converted into the protocol address.

SST-MI-CFG

 The address you entered could be the PLC address, and will be converted to a protocol address!

Command	PLC Style Address Examples (Base 1)	Corresponding Protocol Style Addresses (Base 0)
Coil Status	00001~00010	00000~00009
Input Status	10001~10010	00000~00009
Holding Register	40001~40010	00000~00009
Input Register	30001~30010	00000~00009

For example, when Modbus command is configured as 03H (read holding register), when users input 40001 in this item (Modbus register starting address), it will pop up the dialog box after confirming. When clicking OK, PLC address 40001 will be converted into 0.

28



Mapping Address (DEC): Data starting address in module memory buffer.

Address range that data is mapped in the module memory.

Read command: 0-491.

Write command: 0-491.

Bit Offset (0~7): Modbus function codes 01, 02, 05, 15 can set the position of the bit address in bytes through this parameter. Range: 0-7.

Number of Bytes: The data bytes of number of data.

Byte Swap: There are two types: Enabled and Disabled.

Disabled: No byte order change is made.

Enabled: The high and low bytes of the 2 bytes are exchanged. For example: 0x1234, convert to 0x3412.

Type of Scan: Scanning method of Modbus command: Fast Scan and Slow Scan optional. Issued at Scan Rate when the command is set to slow scan. Default Value: Fast Scan.

For example: If Scan Rate is set to 10 then every fast scan command will be sent 10 times and those slow commands will be sent once.

Identifier: It is only used to identify each command after the Status of Modbus Command Response is turned on.

5.2.3 Subnet Configuration View-User Config

To switch the Protocol Mode from “Modbus Master” to “User Config”, you should manually power off and power on the gateway to make the configuration take effect after downloading the configuration.

The “User Config” configuration interface of “Protocols Mode” is shown below:

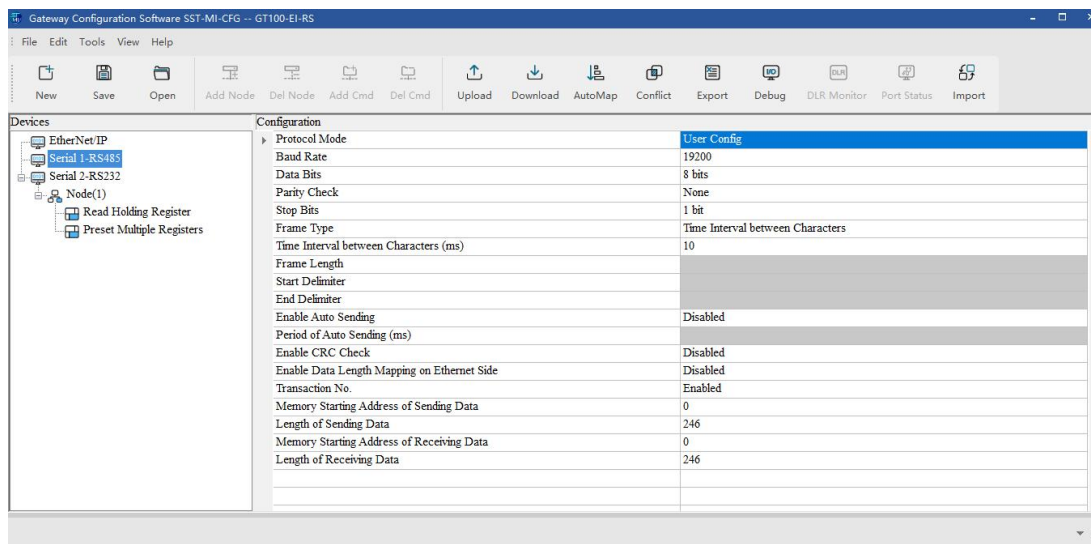


Figure 5-9: SST-MI-CFG Configuration Interface

Frame Type: In "User Config" mode, there are three methods to decide whether a frame is terminated or not: Time Interval between Characters, Frame length and Delimiter.

Time Interval Between Characters: To determine the end of one frame serial data by judging the time interval between characters.

Time Interval between Characters: The maximum time interval between characters that determines the end of a frame. Range: 10-60000ms. Default Value: 10ms.

Frame Length: The length of a frame's data that determines the end of a frame. Range: 1-254. Default Value: 111.

Start Delimiter: The starting character of the received data frame. This setting is only valid when the control method is set to "Delimiter".

END Delimiter: The ending character of the received data frame. This setting is only valid when the control method is set to "Delimiter".

Enable Auto Sending: Supports "Disabled" and "Enabled".

Enabled: The gateway will send data periodically at the "Period of Auto Sending" parameter.

Disabled: Send serial data only when there is a change in the data to be sent.

Period of Auto Sending: User input, the default value is 1000, the range is 10~60000ms. Valid when enable Auto



Sending.

Enable CRC Check: Valid when frame type is Time Interval between Characters and frame length. Enable and Disable

Enable Data Length Mapping on Ethernet Side: The first byte in Ethernet input data indicates the length of serial receiving data frame.

Transaction No.: Add a byte at the frame header to represent the transaction sequence number, which identifies the data frame, with a cycle of 0-255.

To input data on the EtherNet/IP end, send one frame of data with a transaction sequence number plus 1.

When outputting data on the EtherNet/IP end, the transaction sequence number is incremented by 1 to output one frame of data.

Memory Starting Address of Sending Data: Map address offset in output buffer;Data Direction EtherNet/IP -> Serial; Range: 0-490.

Length of Sending Data: The number of bytes mapped to the output buffer;Range: 2-256.**Memory Starting Address of Receiving Data:** Map address offset in input buffer; Data Direction Serial->EtherNet/IP;Range: 0-490.

Length of Receiving Data: The number of bytes mapped to the input buffer;Range: 2-256.

For additional parameter details, refer to "Protocol Type: Modbus Master."

5.2.4 Info View

The Comment View displays explanations for the corresponding configuration items. For example, when configuring the "Memory Mapping Start Address," the Comment View displays the following:

Starting Address: Displayed in decimal.
The starting address of the Modbus slave device to start reading/writing commands. Range: 0-65535.
Note:
There are two address formats of Modbus command: protocol address (base 0) and PLC address (base 1).The protocol address (base 0) format needs to be filled in here.
For example:
Function: 03, PLC address: 40006, enter 5 (protocol address format) in here.

Figure 5-10: Comment View (Context-Sensitive Help)



5.3 Tools

The "Tools" tab on the menu bar contains the following functions:

- Upload Config
- Download Config
- Auto Mapping
- Conflict Detect
- Export EXCEL
- Debug
- Import
- Mapping Address

5.3.1 Ethernet Configuration

Before configuring GT100-EI-RS parameters, users must first locate the GT100-EI-RS device. This configuration software provides two methods for searching the GT100-EI-RS device to be configured.

- (1) The default option is to check “use the search function”. Users can searchers can search all GT100-EI-RS gateways on the network.

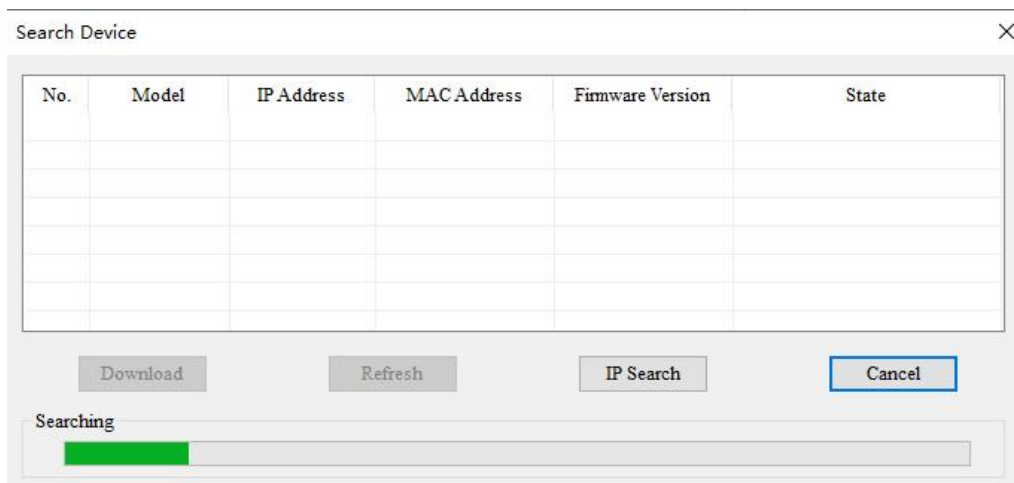


Figure 5-11: Tools Menu Functions

(2) Method 2: Search Device by Specified IP Address

Click the "IP Search" button on the device search interface to open a dialog box for entering the IP address to be searched.

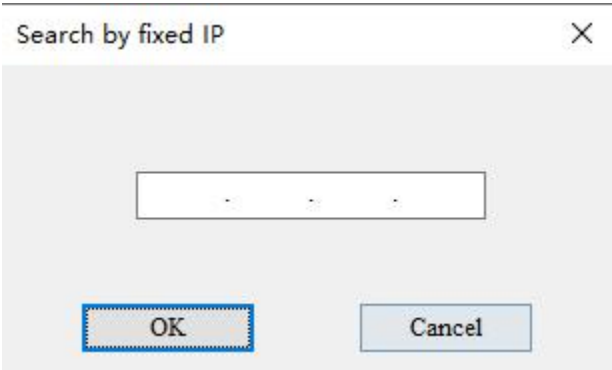


Figure 5-12: IP Search Dialog

After entering the correct IP address, the software will search for a GT100GT100-EI-RS device with that IP address on the network.

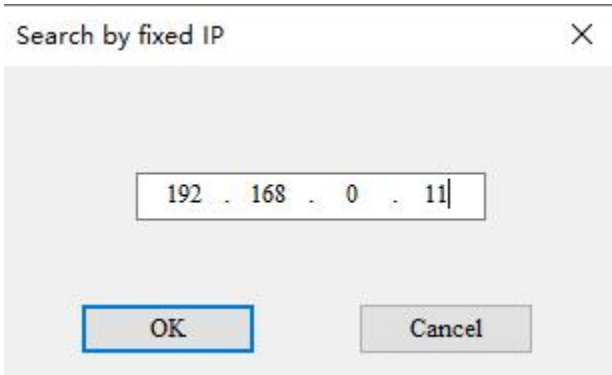


Figure 5-13: IP Search Dialog

Once the device is found, click "OK" to display the device information in the main interface list.

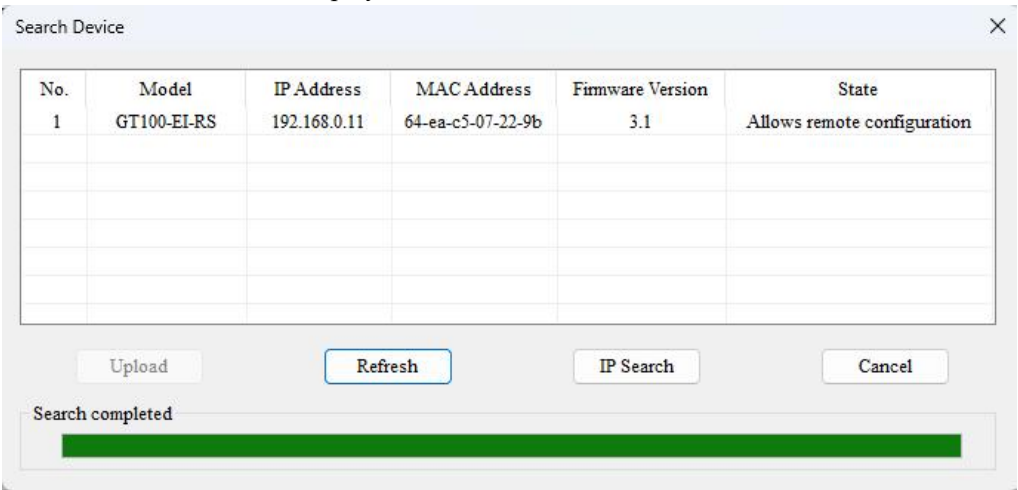


Figure 5-14: IP Search Dialog

Note: If the user selects "IP Search " ensure the entered IP address is correct; otherwise, the device will not be found.



5.3.2 Upload

Select "Upload", it will read configurations from the gateway, and the interface is shown as below:

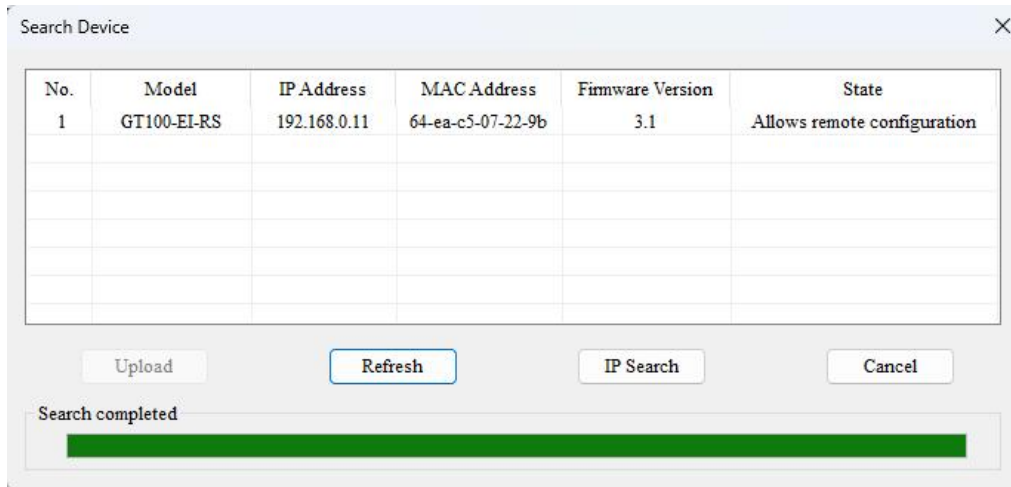


Figure 5-15: IP Search Dialog

Select the device, click Upload. The window displays the uploaded content, and after a short period, the configuration upload is completed.

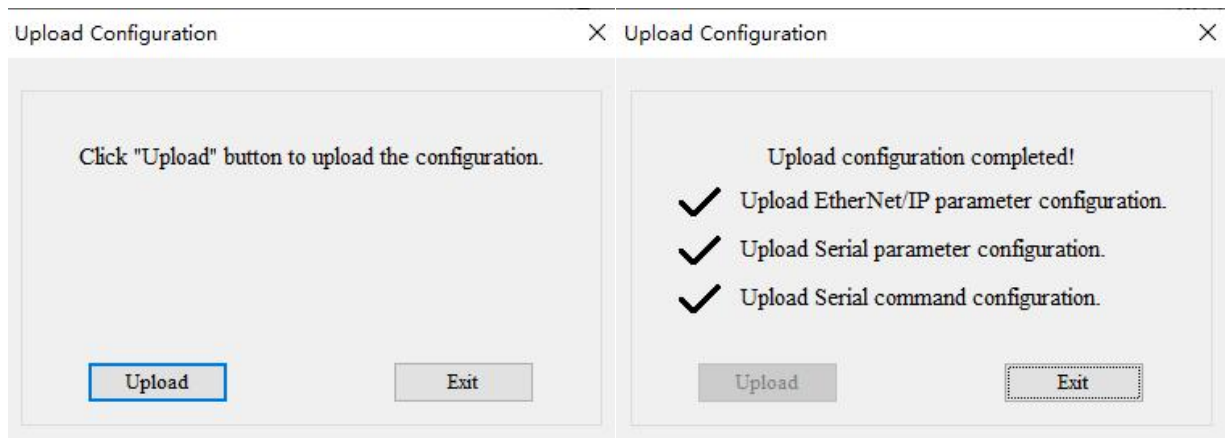


Figure 5-16: Upload Configuration Progress Window

If the gateway cannot be searched:

- Check whether the computer and gateway are in the same network segment. When using the gateway for the first time, the gateway is in the 192.168.0.X network segment.
- test the network connection first. refer to the note [“How to Use the Ping Command”](#) located on our Support page on the sstautomation.com website.



5.3.3 Download

Select "Download", it will download configurations to the gateway, and the interface is shown as below:

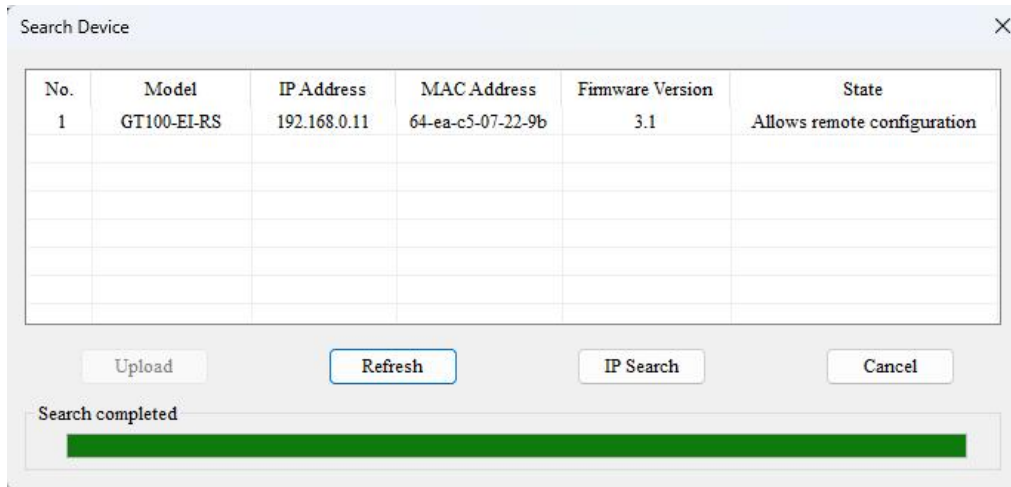


Figure 5-17: Gateway Search Troubleshooting

Note:

1. Before downloading, ensure all configurations are complete and correct.
 2. The downloaded configuration requires a gateway restart to take effect.
 3. The gateway's default IP configuration mode is DHCP. Once an IP address is automatically obtained via DHCP, the configuration software can detect the gateway device.
 4. If there is no DHCP server or switch in the network, and the IP address is not obtained within approximately 30 seconds after powering on or restarting, the gateway will automatically revert to the fixed IP address '192.168.0.11'.
- Click "Download," and the window will display the download progress. After a short period, the configuration download will be completed.

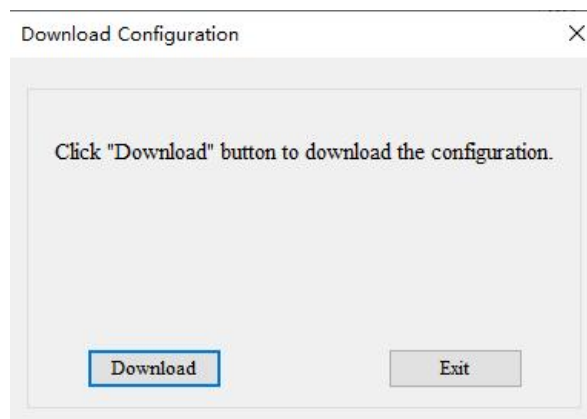


Figure 5-18: Download Configuration Progress Window



After downloading, it will pop up the dialog box as below:

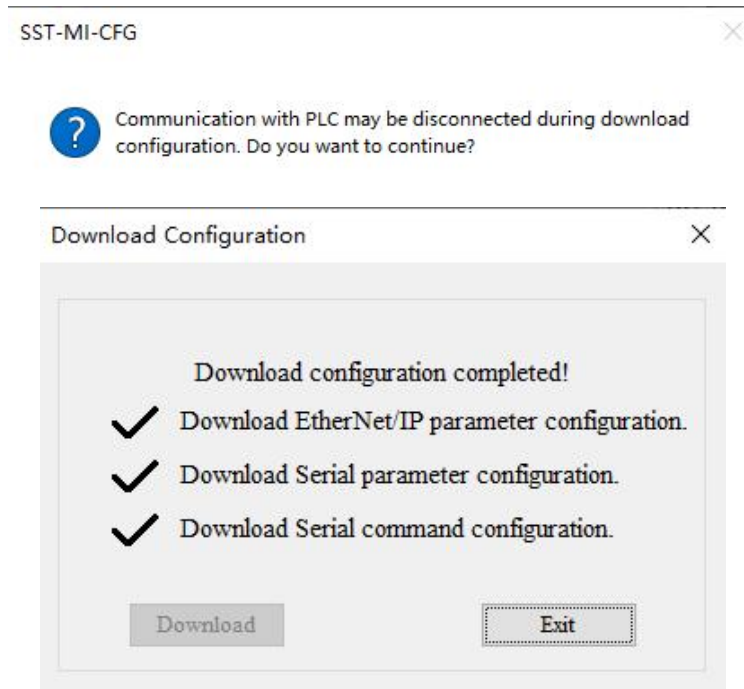


Figure 5-19: Configuration Dialog

Click OK will restart the gateway remotely.

5.3.4 Calculate Auto Mapping

The automatic mapping function automatically calculates the mapping addresses and fills in the values. Once this function is activated, it will overwrite previously set data with the newly calculated values. After automatic mapping, there are no address conflicts in the mapping buffer. This function is related to the parameter "Number of Data," which must not be left empty.

In the "Tools" bar, select "Auto Mapping" or click the "Auto Mapping" icon to display the following prompt:

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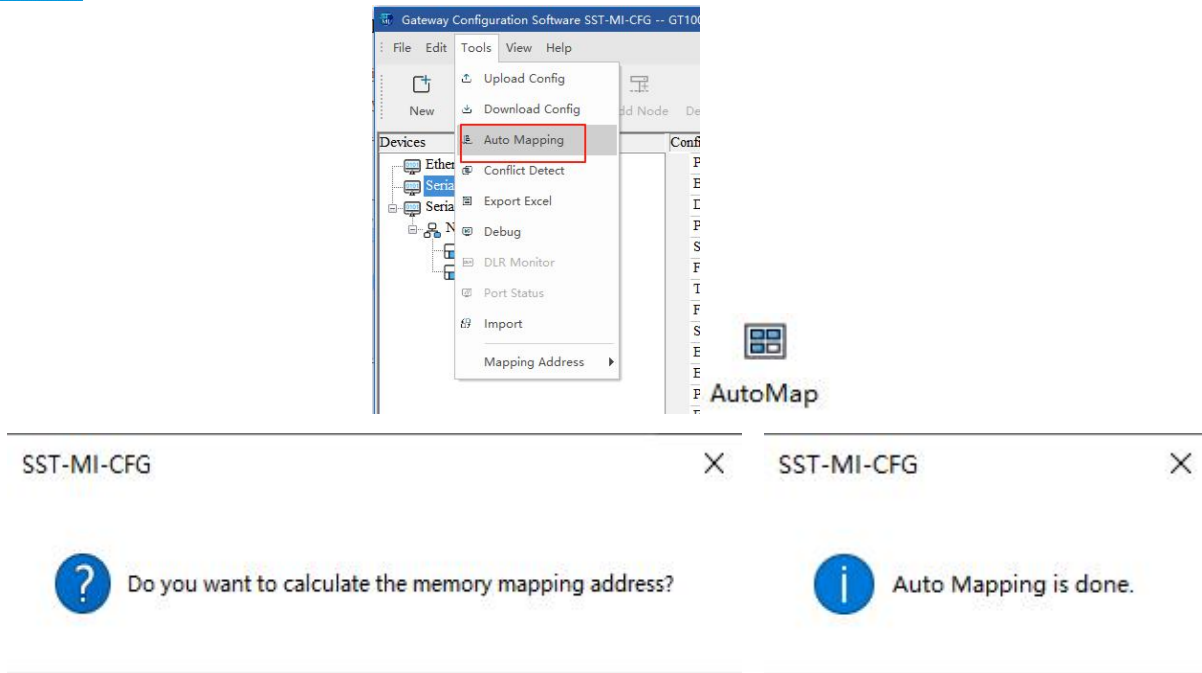


Figure 5-20: Auto Mapping Confirmation Prompt

5.3.5 Conflict Detect

Used to detect whether there are address conflicts in the "Memory Mapping Data." If conflicts are present, the configuration cannot be downloaded to the gateway, and the configuration must be modified promptly. This function is intended for the Modbus Master. In the "Tools" bar, select "Conflict Detect" or click the "Conflict Detect" icon to open the "Conflict Detect" window:

Decimal (DEC) Display

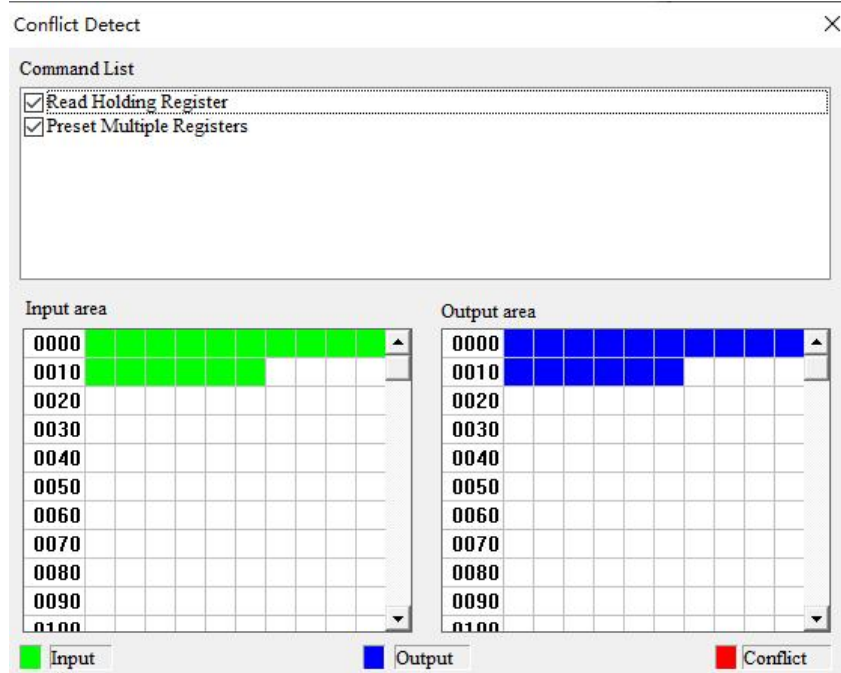


Figure 5-21: Conflict Detection - Memory Mapping (Decimal View)

Hexadecimal (HEX) Display:

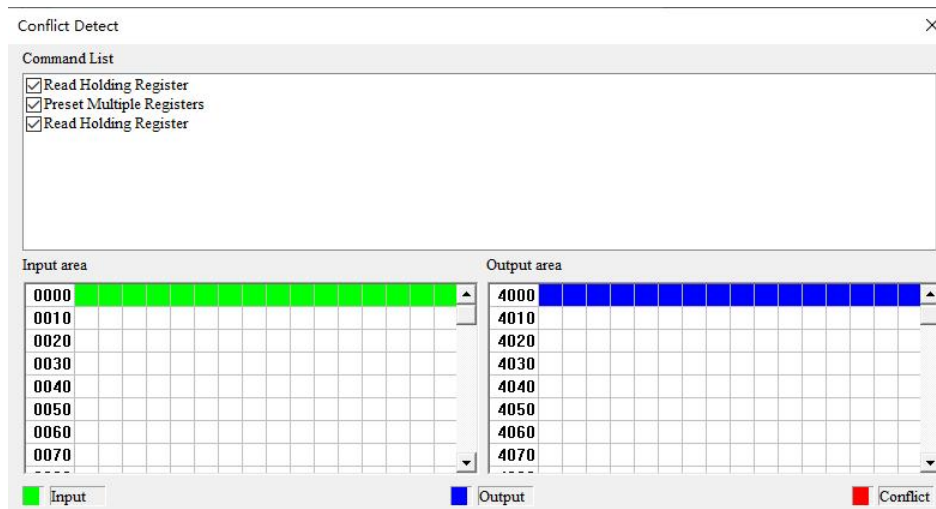


Figure 5-22: Conflict Detection - Memory Mapping (Hexadecimal View)

(1) Command List Operation

It shows configured command in the command list interface. Check box before each command is used to check the position of this command in memory mapping area. Click one command and check the box, it will show the position where relevant commands occupy in the memory mapping area. Click the command again and uncheck the box, the command will not be shown in the mapping area. This function will be used for confliction detect among commands in memory mapping area.



Figure 5-23: Conflict Detection - Command List

(2) Memory Mapping Area Operation

Memory mapping area divides into input area and output area.

Input mapping address range: 0x0000 ~ 0x01EB(HEX), 0 ~ 491(DEC)

Output mapping address range: 0x4000 ~ 0x41EB(HEX), 0 ~ 491(DEC)

Each grid represents one byte address.

Green: Read command is shown in input mapping area, it will be in green without conflict.

Blue: When address mapping area is located in output area, it will be in blue without conflict.

Red: In input area or output area, different command occupied on the same byte, this byte area will be in red.

For bit operation command, the above grid displaying meaning works the same.

Click input/output area grids, each bit of relevant byte in the grid will show whether each bit is occupied. As is shown below:

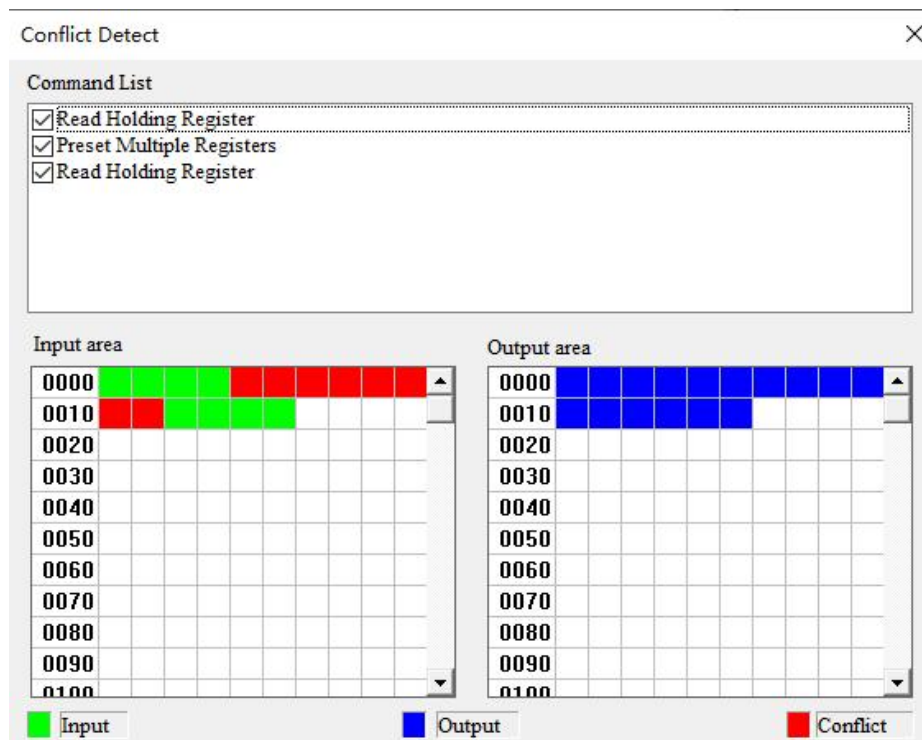


Figure 5-24: Memory Mapping Area - Bit-Level Detail

5.3.6 Export Excel

Users can use the function to check the gateway configurations.

Select "Export Excel", you can save the configuration with .xls as its extension.

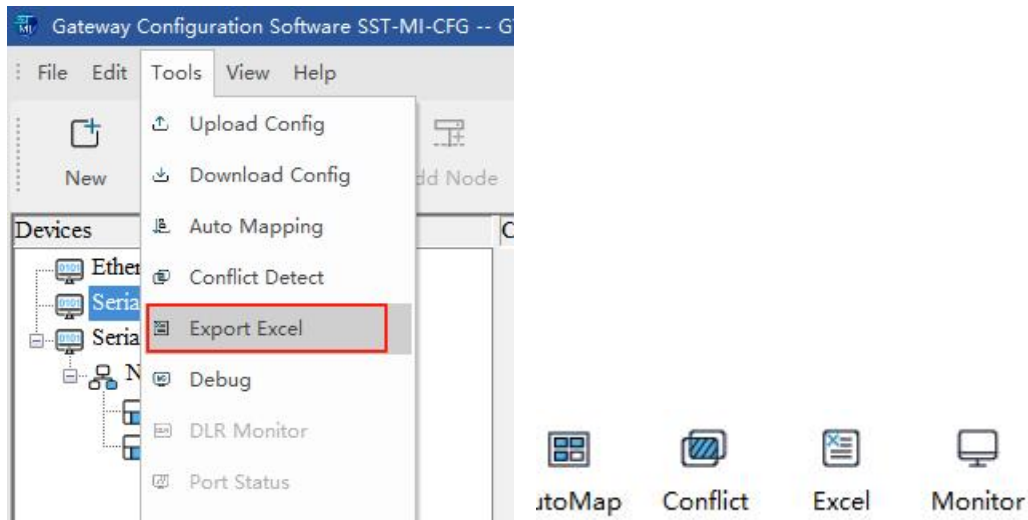


Figure 5-25: Export Configuration to Excel File

After clicking save, it will open the excel file automatically.

5.3.7 Debug

This function is used to monitor the data in the gateway's input/output buffer online.

Click "Debug" to access the device search interface. Select the device and click "Debug."

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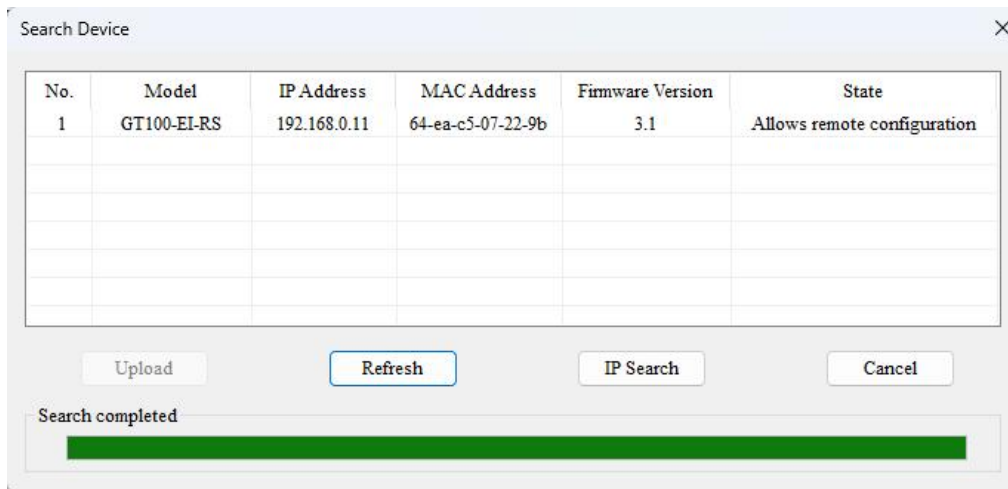


Figure 5-26: I/O Data Monitor View

Enter the monitoring interface:



6 Interface Design Description

6.1 Modbus Master

Data exchange of Modbus and EtherNet/IP of GT100-EI-RS is set up through "mapping". There are two data buffer areas, one is EtherNet/IP network input buffer and the other is EtherNet/IP network output buffer. Network input and output buffers serve the EtherNet/IP scanner. Modbus read command will write the read data to the network input buffer for EtherNet/IP accessing. Modbus write register command gets data from network output buffer and export to the Modbus slave equipment through write command.

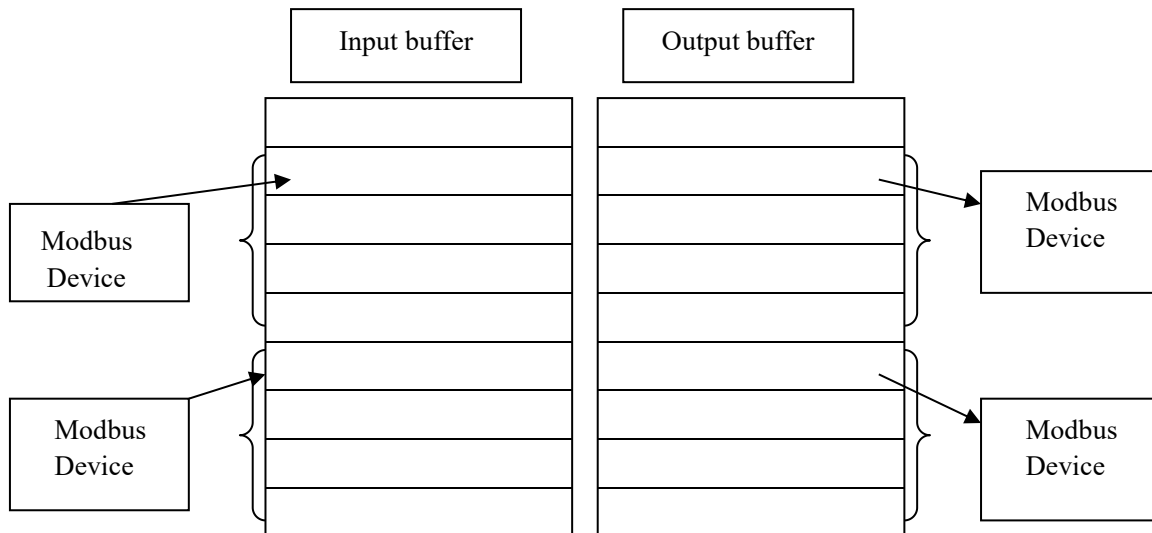


Figure 6-1: Modbus-to-EtherNet/IP Data Buffer Mapping Architecture

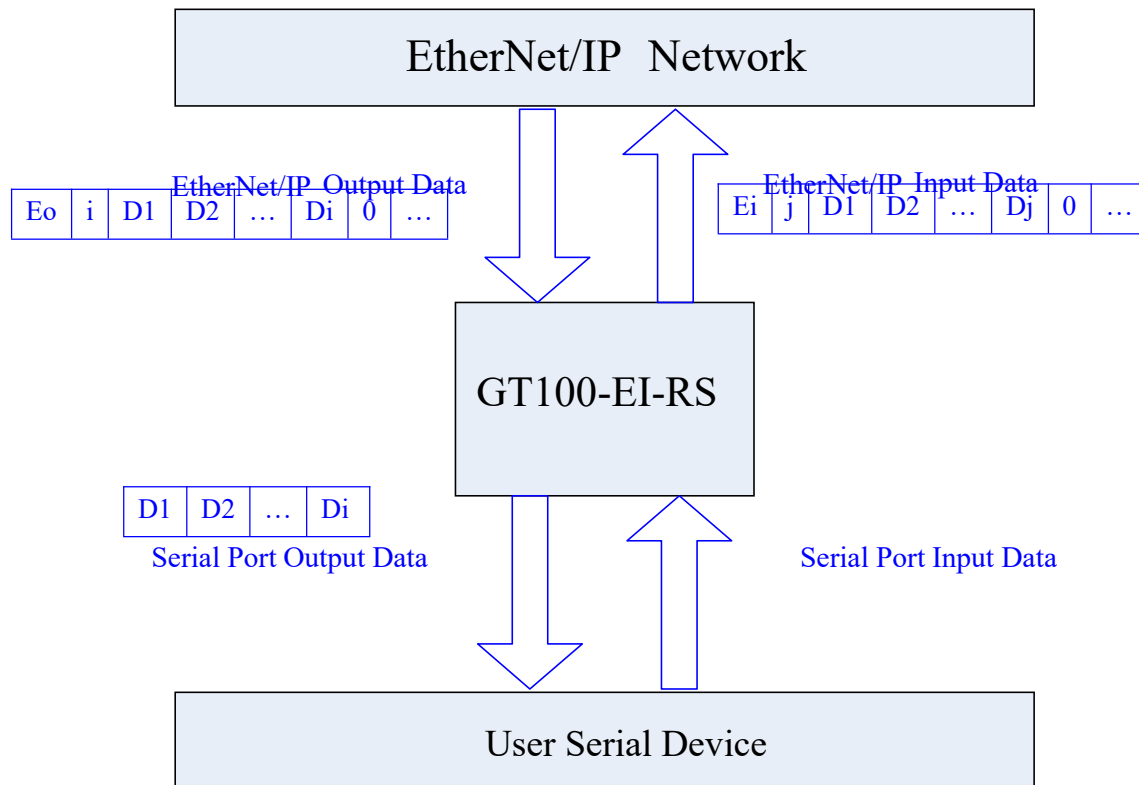
Users can configure at most 100 commands, each one Modbus command can read one group of continuous Modbus registers.



6.2 User Config

1 Data Exchange

This product provides data exchange between EtherNet/IP industrial Ethernet protocol and serial interface. The communication between EtherNet/IP and serial data is bidirectional. The output data of EtherNet/IP can be sent to serial fieldbus through the serial interface and the data received from serial interface is put into input data of EtherNet/IP. Data exchange is shown as follows:



" E_o " is transaction number of EtherNet/IP output data. " i " is serial data number included in output data being transmitted. " D_1 " to " D_i " are data being transmitted by serial. " E_i " is transaction number of EtherNet/IP input data. " j " is serial data number included in input data receiving from serial. " D_1 " to " D_j " are data receiving from serial.



2 Universal Protocol

EtherNet/IP output data format:

[Transaction number]	[Output data length n]	[Output data 1]... [Output data n]	[0x00] ... [0x00]
	-- n --		-- m --

Note:

The number of EtherNet/IP output byte should be greater than or equal to $n + 2$.

M 0x00 are filling data (also for any number). $n + m + 2$ should be equal to the number of EtherNet/IP output-byte.

Transaction number: When transmitting output data, the transaction number must add 1 to show a new frame data.

Example:

If users select the number of EtherNet input byte and output-byte is 8-byte input and 8-byte output, length of serial output-data is 3, data are 01 02 03. Current transaction number is 0.

The format of output-data is:

[01][03][01][02][03][00][00][00]

EtherNet input data format:

[Transaction number]	[Input data length n]	[Input data 1]... [Input data n]	[0x00] ... [0x00]
	-- n --		-- m --

Note:

The number of EtherNet/IP input byte should be greater than or equal to $n + 2$.

M 0x00 are filling data (also for any number). $n + m + 2$ should be equal to the number of EtherNet/IP input-byte.

Transaction number: The transaction number adds 1 showing a new frame input data.

Example:

If users select the number of EtherNet/IP input-byte and output byte is 8-byte input and 8-byte output, length of serial input-data is 3, data are 04 05 06. Current transaction number is 0.

The format of input data is:

[01][03][04][05][06][00][00][00]



7 EtherNet/IP Connection Parameters

Connection parameters the gateway provides are shown below:

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

Table 7-1: EtherNet/IP Connection Parameters

The data size of input instance 102 can be configured within the range of 5 to 496 bytes using the SST-MI-CFG configuration software, where the first 4 bytes are reserved for the real-time frame header. (The first 4 bytes are reserved for the real-time frame header (status bytes), so the actual user data range is 1–492 bytes.)

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

Take configuration parameters of RSLogix5000 as an example:

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

New Module

Type: ETHERNET-MODULE Generic Ethernet Module
Vendor: Rockwell Automation/Allen-Bradley
Parent: ENET
Name: SSTGateway
Description:
Comm Format: Data - DINT
Address / Host Name
☒ IP Address: 192 . 168 . 0 . 10
☐ Host Name:
Connection Parameters
Input: 102 Assembly Instance: 102 Size: 124 (32-bit)
Output: 101 Assembly Instance: 101 Size: 123 (32-bit)
Configuration: 113 Assembly Instance: 113 Size: 10 (8-bit)
Status Input:
Status Output:
☒ Open Module Properties
OK Cancel Help

The data size configured in Studio 5000 Logix must match the data size configured in the SST-MI-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 ($496 \times 8/32 = 124$).

Figure 7-1: EtherNet/IP Connection Parameters (RSLogix 5000 Example)

7.1 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:

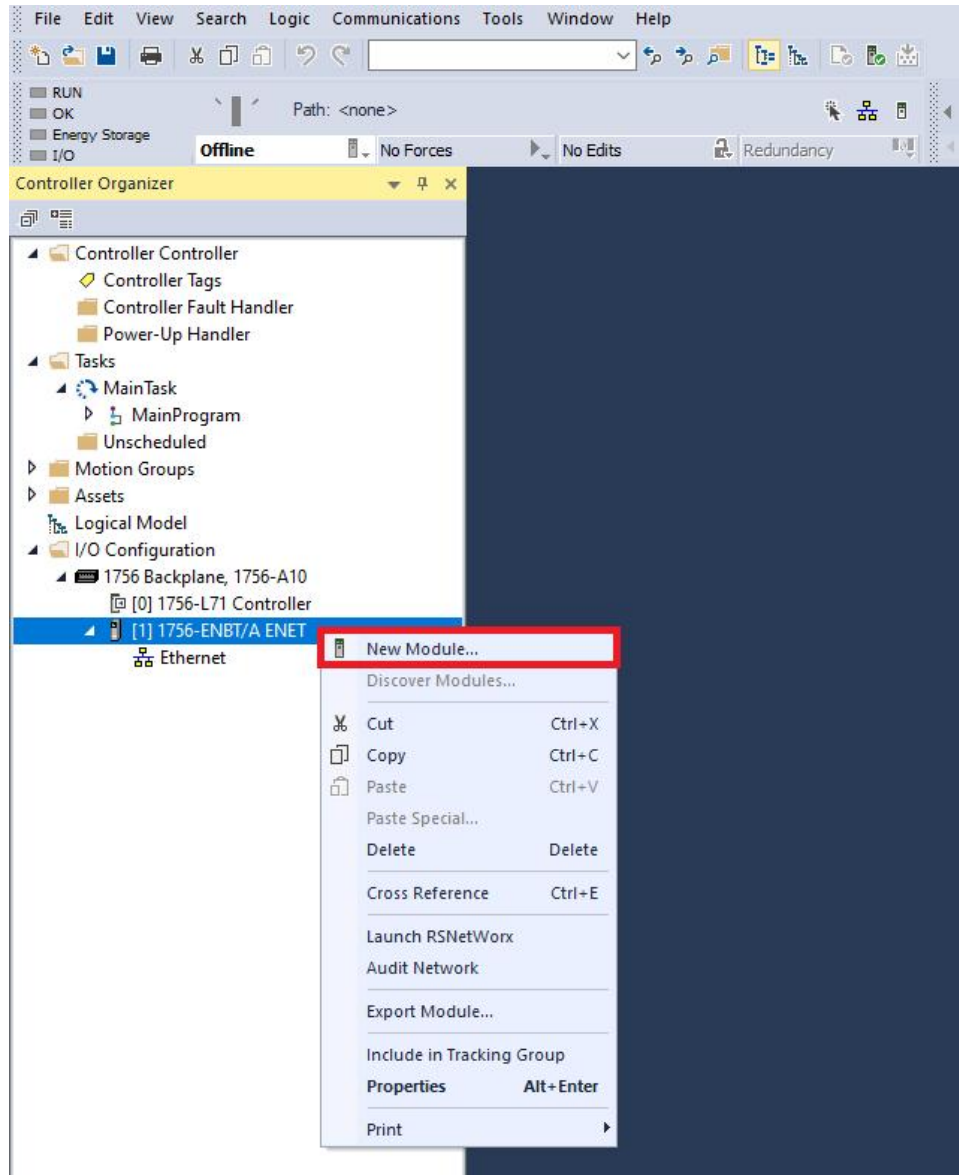


Figure 7-2: Studio 5000 - Add New Module (Implicit I/O)



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

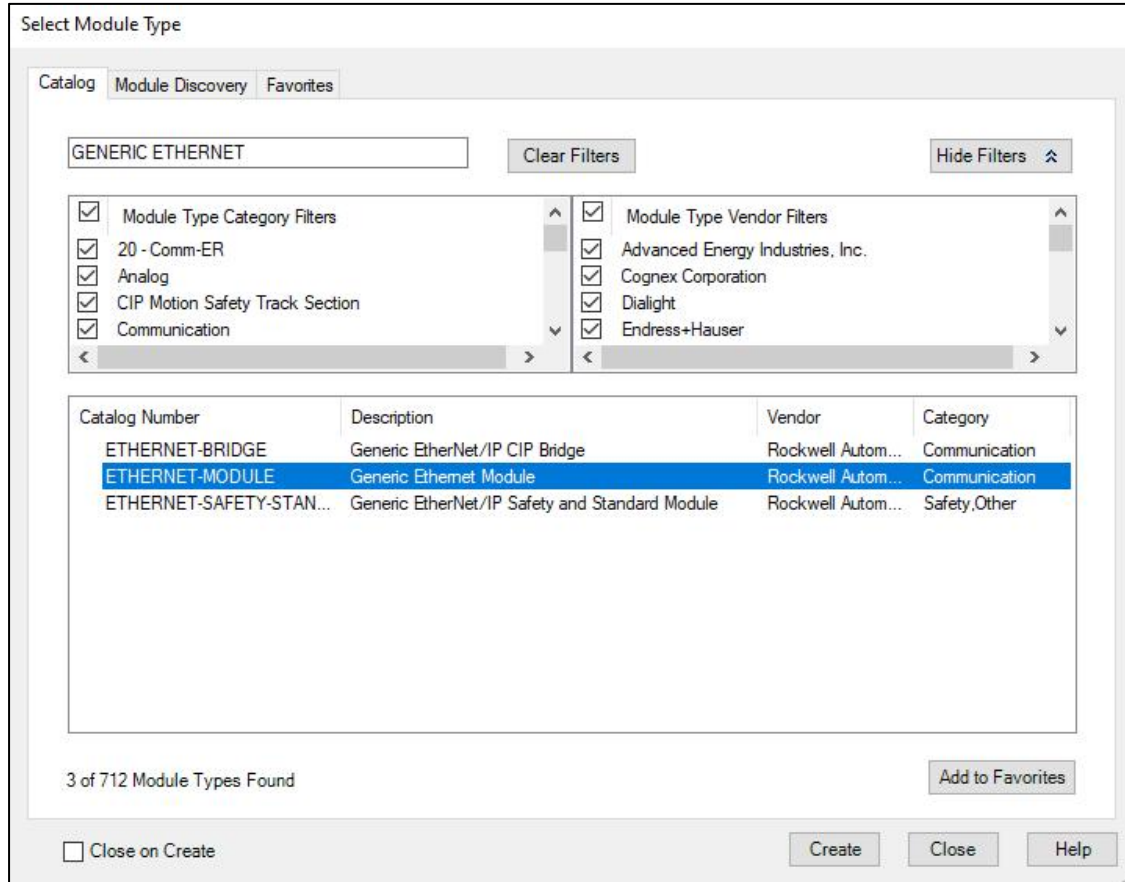


Figure 7-3: Configuration Dialog

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Configure relevant information of GT100-EI-RS in the pop-up window, as shown below:

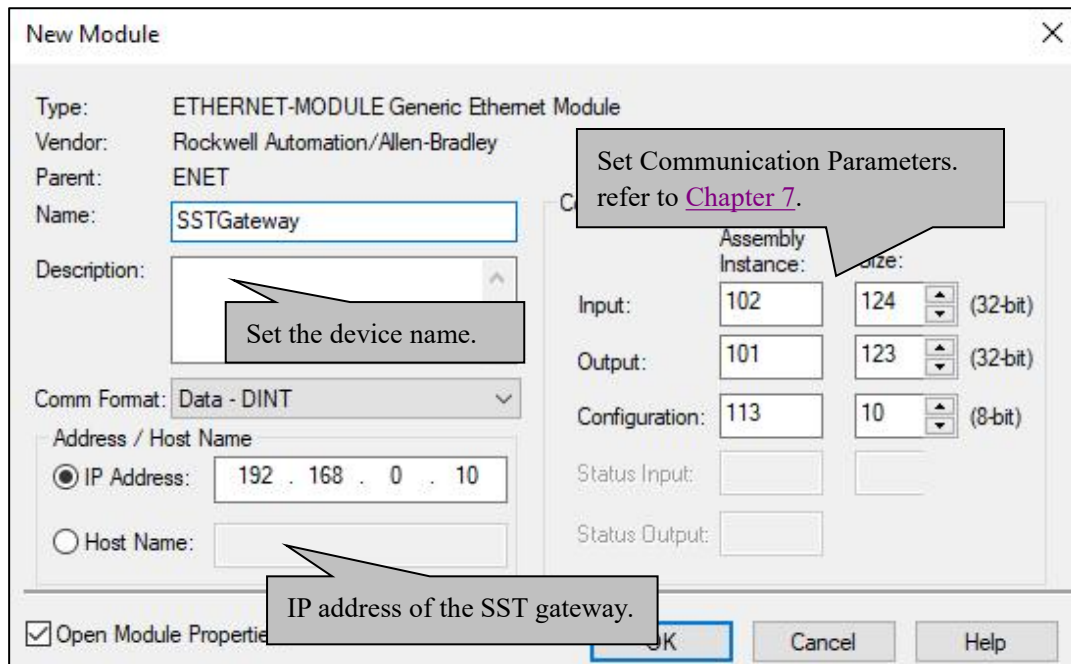


Figure 7-4: Configuration Dialog

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

- Name:** The name of the added EtherNet/IP device module.
- Comm Format:** 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.
- IP Address:** Set the IP address of the added EtherNet/IP device module (The IP address of GT100-EI-RS, which is configured by the software SST-MI-CFG).
- Connection Parameters:** Set the Connection Parameters for communication. For more details, refer to the beginning of [Chapter 7](#).

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.



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Figure 7-5: Studio 5000 - Generic Ethernet Module Configuration Details

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

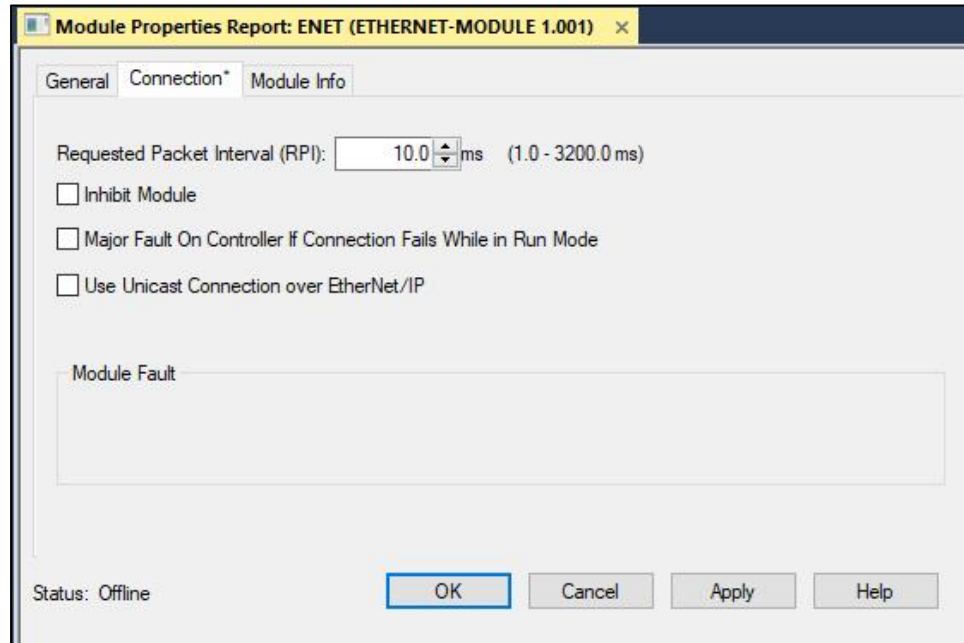


Figure 7-6: Configuration Dialog

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

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

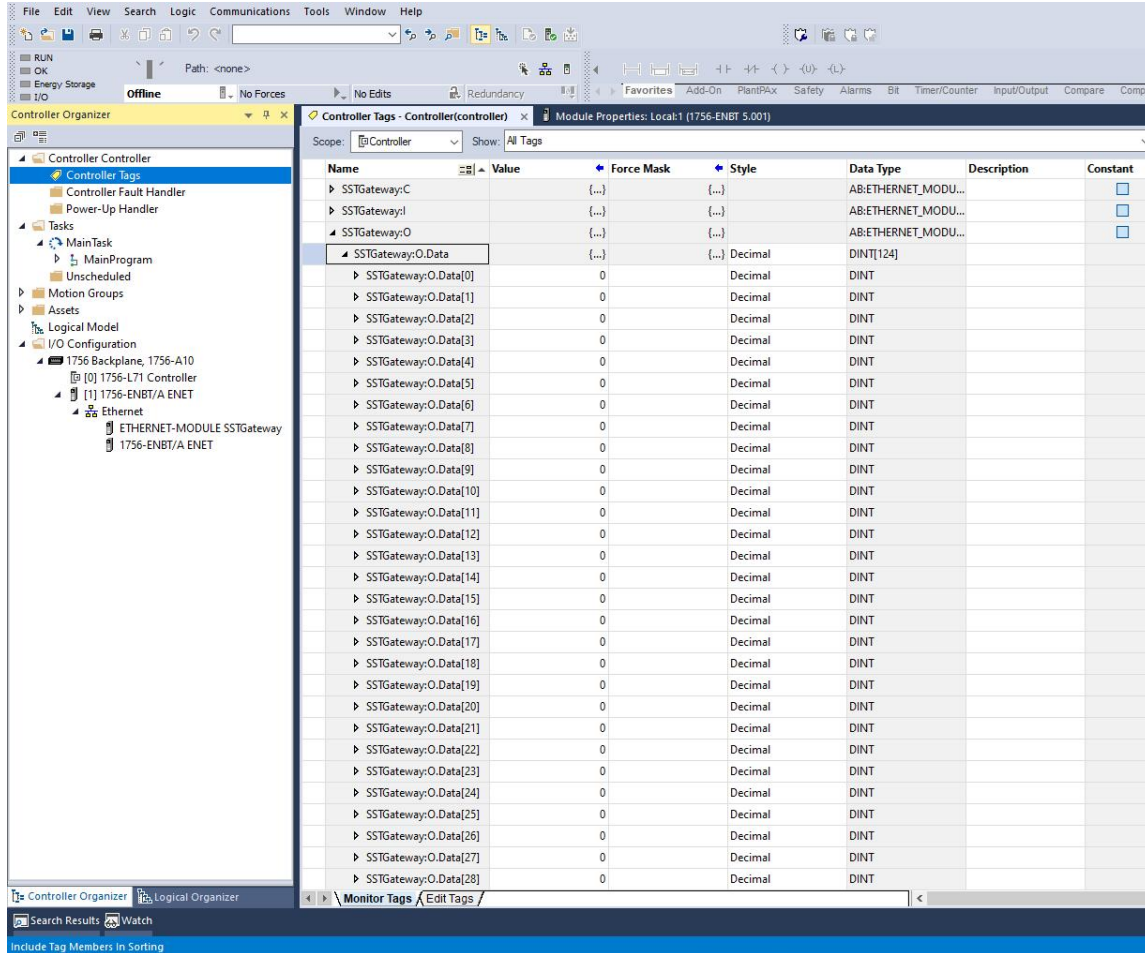


Figure 7-7: Configuration Dialog

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:

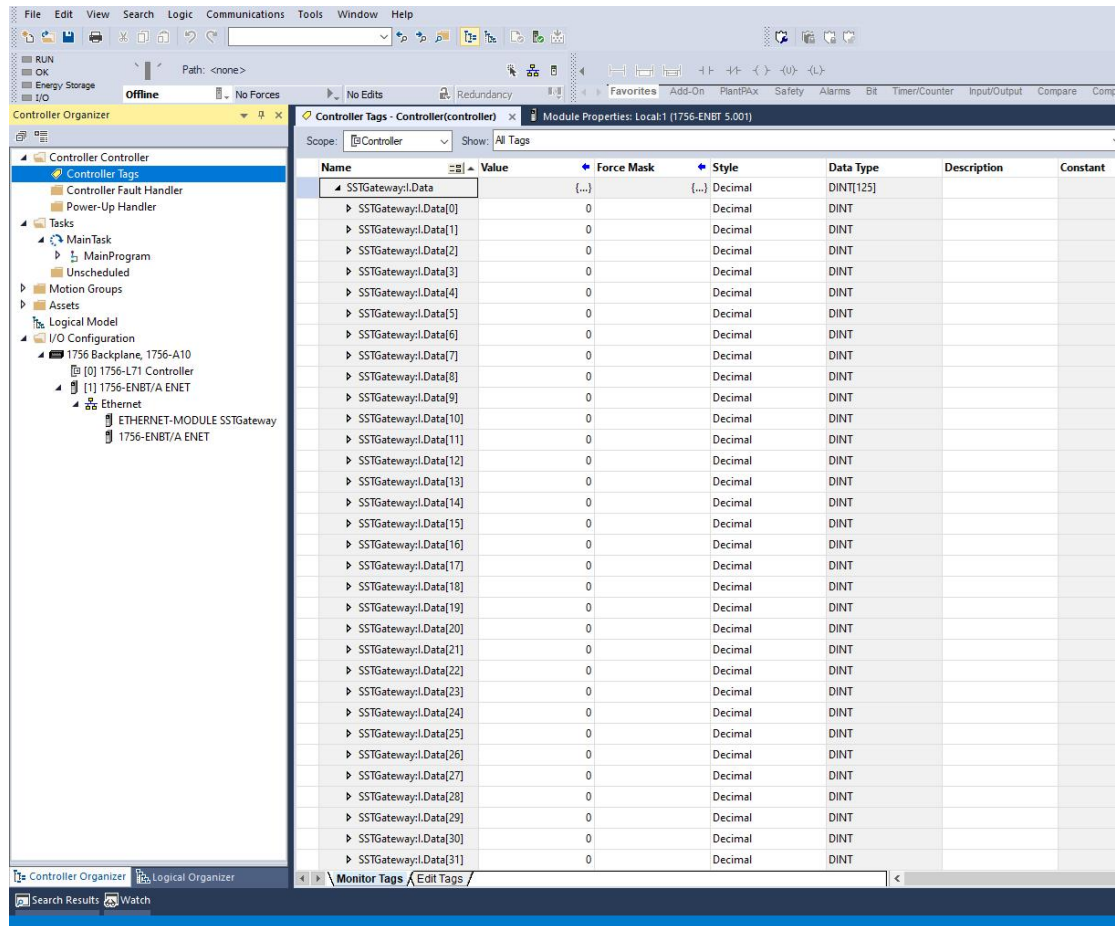


Figure 7-8: Data Output Flow Diagram

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

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

7.2 Explicit MSG Connection Method

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

7.2.1 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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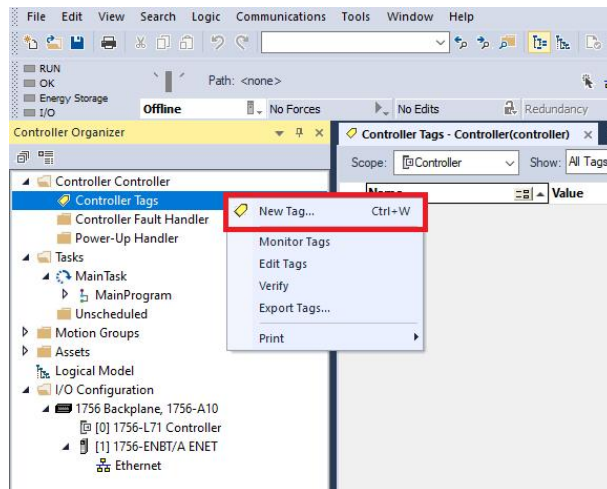


Figure 7-9: Studio 5000 - Read MSG Tag Definition

Set the data type of "ReadTag" as "MESSAGE":

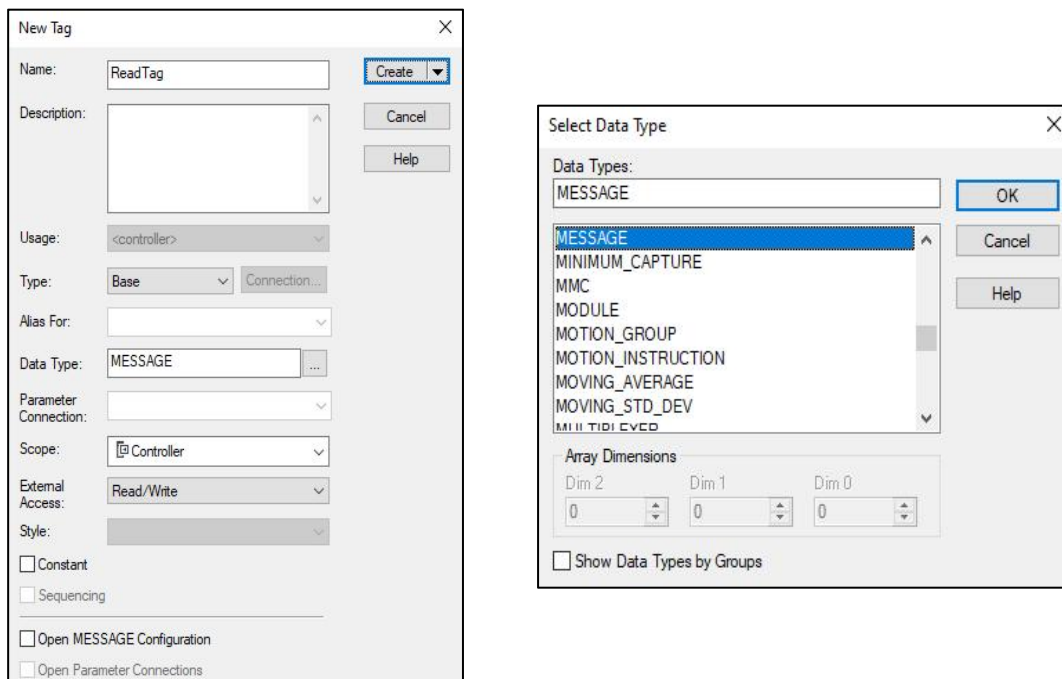


Figure 7-10: Studio 5000 - Tag Configuration

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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 7](#):

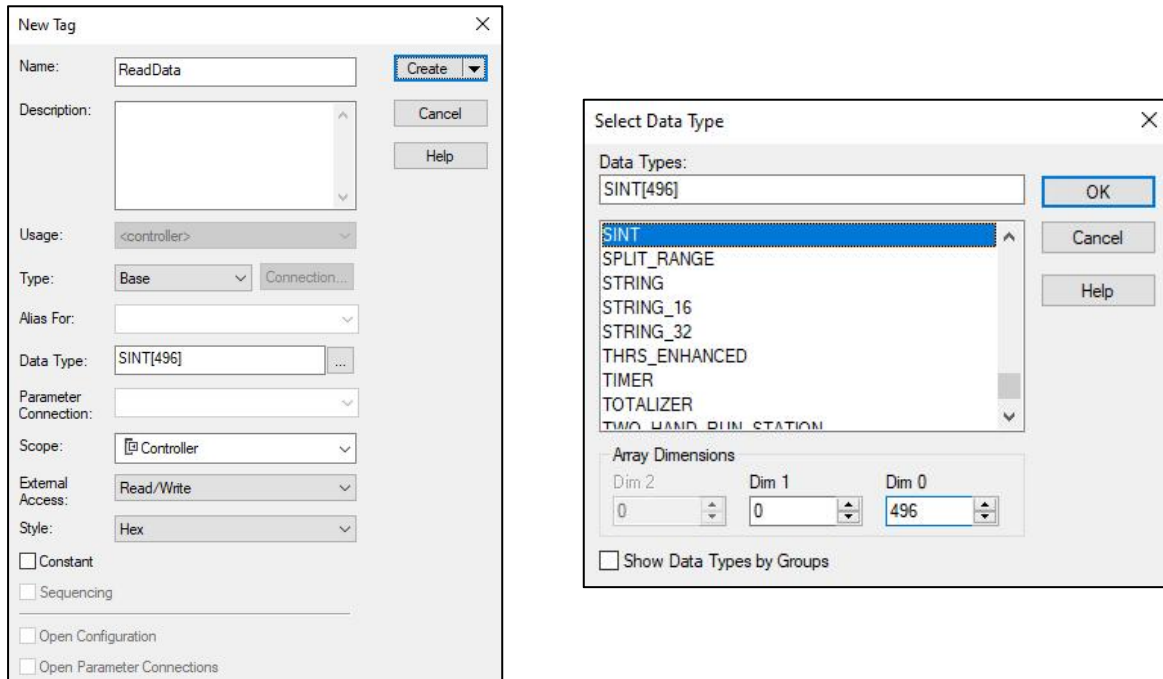


Figure 7-11: Studio 5000 - Tag Configuration

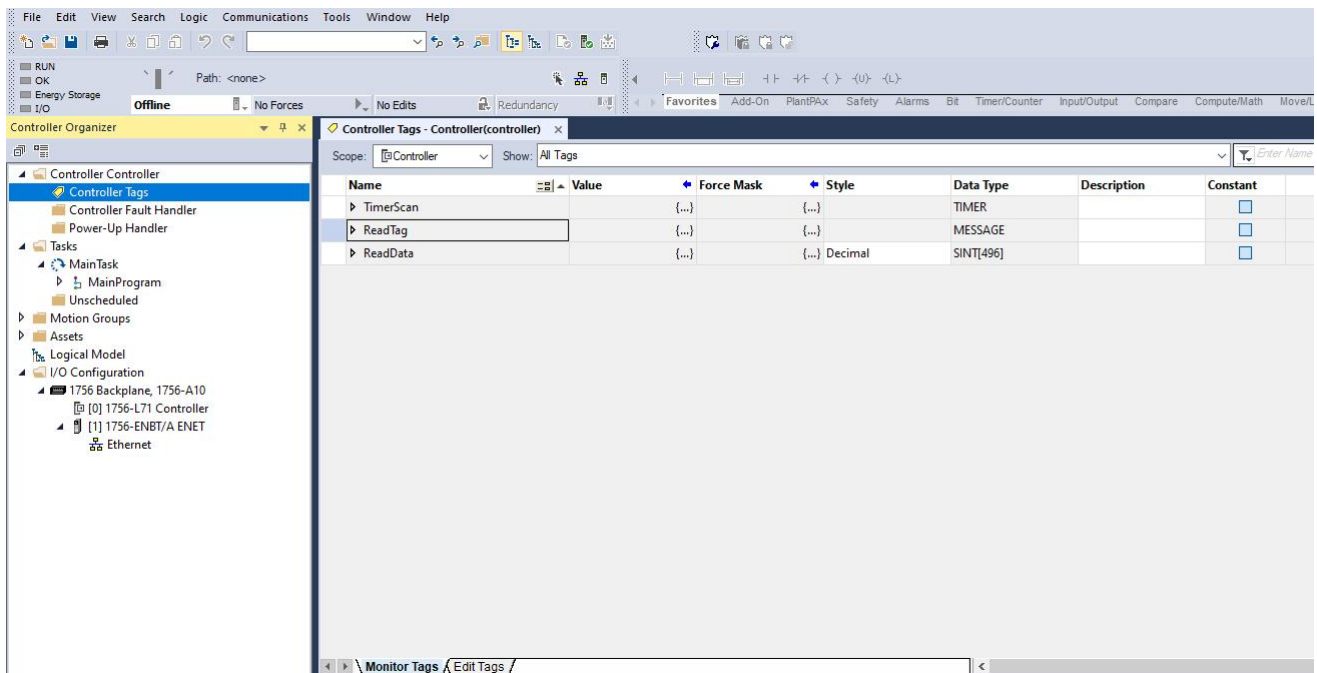


Figure 7-12: Data Input Flow Diagram

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

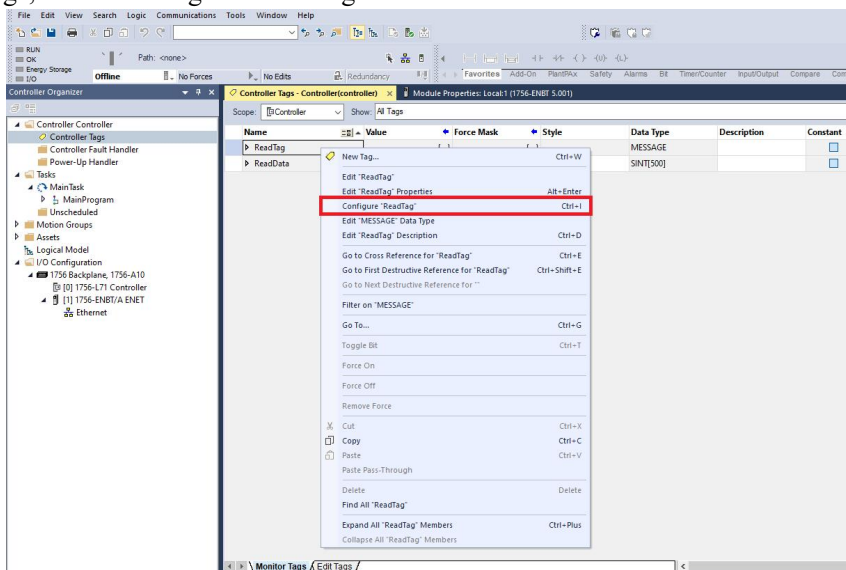


Figure 7-13: Studio 5000 - Tag Configuration

In pop-up window, configure the following settings:

- Message Type:** CIP Generic.
- Service Type:** Select "Get Attribute Single". The relevant service code will become "e (Hex)".
- Class:** 4 (Hex)
- Instance:** 102
- Attribute:** 3 (Hex)
- Destination:** Select the "ReadData" tag. The obtained data will be saved in this tag.

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Message Configuration - ReadTag

Configuration* Communication Tag

Message Type: CIP Generic

Service Type: Get Attribute Single

Source Element:

Source Length: 0 (Bytes)

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

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

Figure 7-14: Studio 5000 - Read MSG Destination Configuration

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Select the "Communication" tab and click the "Browse" button. Then input the network path to connect to the GT100-EI-RS.

Enter the network path in the following format:

[EtherNet/IP Interface Name], 2 (Ethernet Communication), [GT100-EI-RS IP Address]

Then click "OK" to confirm:

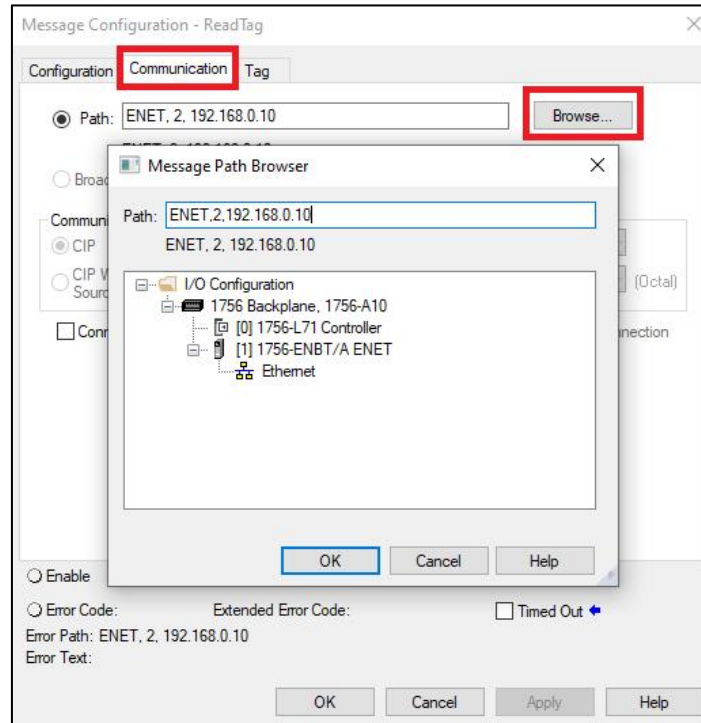


Figure 7-15: Studio 5000 - MSG Communication Path Configuration

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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.

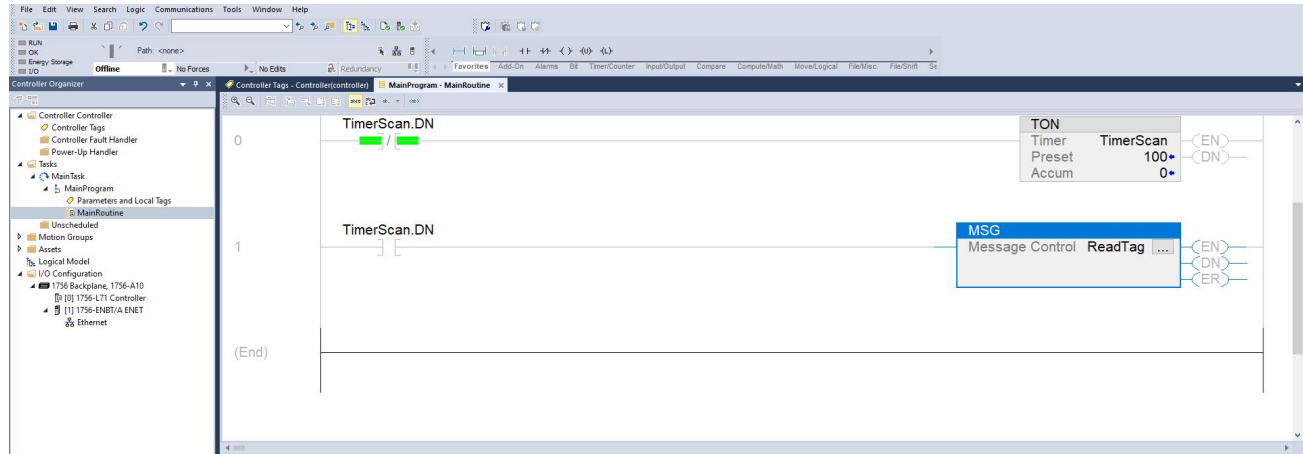


Figure 7-16: Studio 5000 - Tag Configuration

Click "Control Tags" and select "Monitor Tags". Expand "ReadData" to see that PLC can read Modbus TCP data through the GT100-EI-RS gateway.

7.2.2 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:

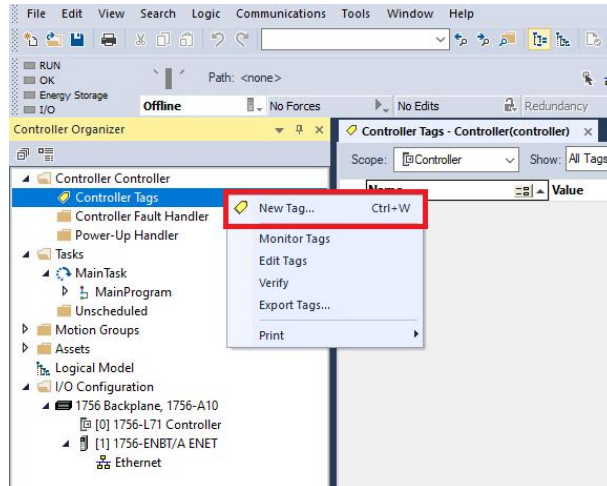


Figure 7-17: I/O Data Monitor View

Set the data type of "WriteTag" as "MESSAGE":

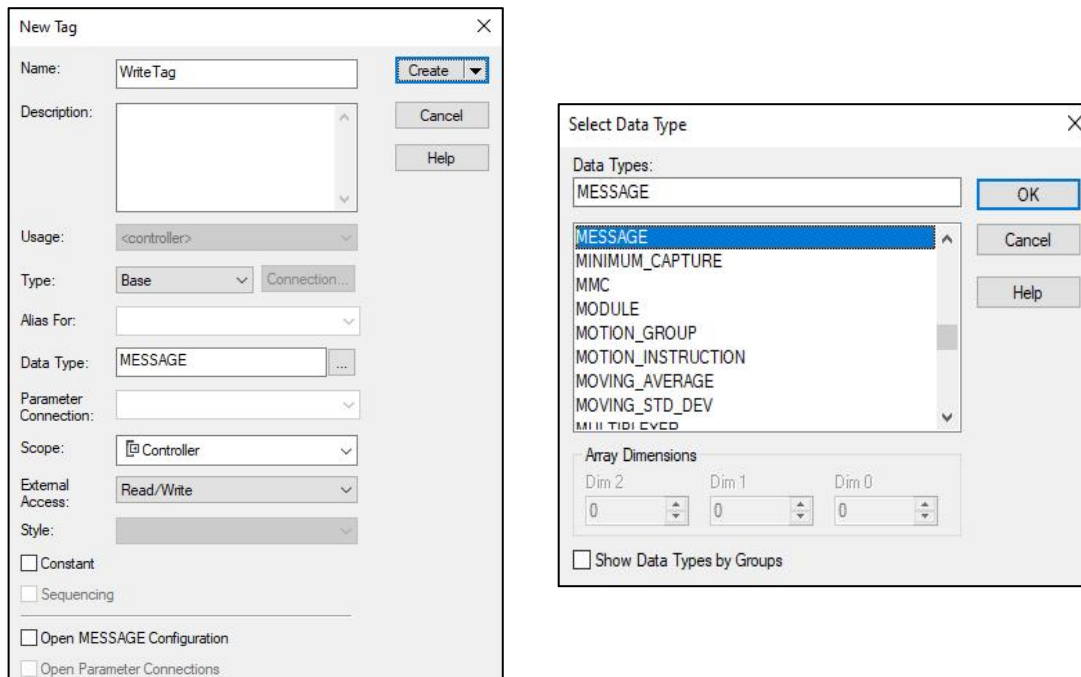


Figure 7-18: Studio 5000 - Write Tag Configuration

Set the data type of "WriteData" as "SINT", then set the Array Dimension "Dim 0" to match the Output Data Size. Refer

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to the connection parameters from the beginning of [Chapter 7](#):

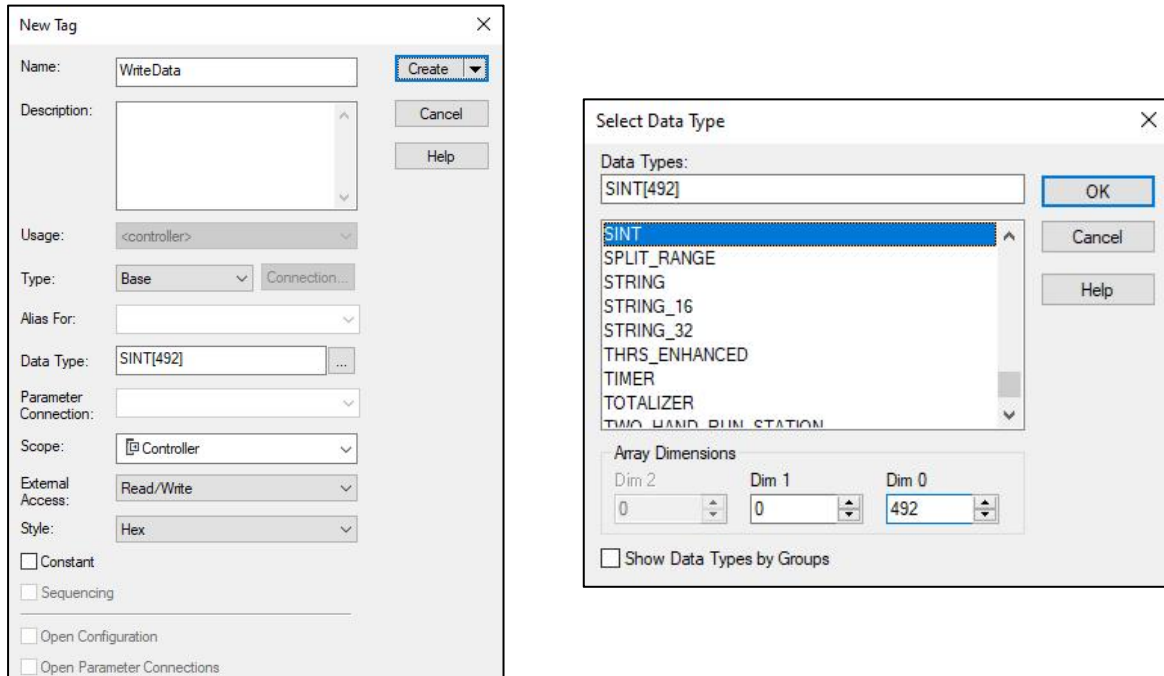


Figure 7-19: Studio 5000 - Write Tag Configuration

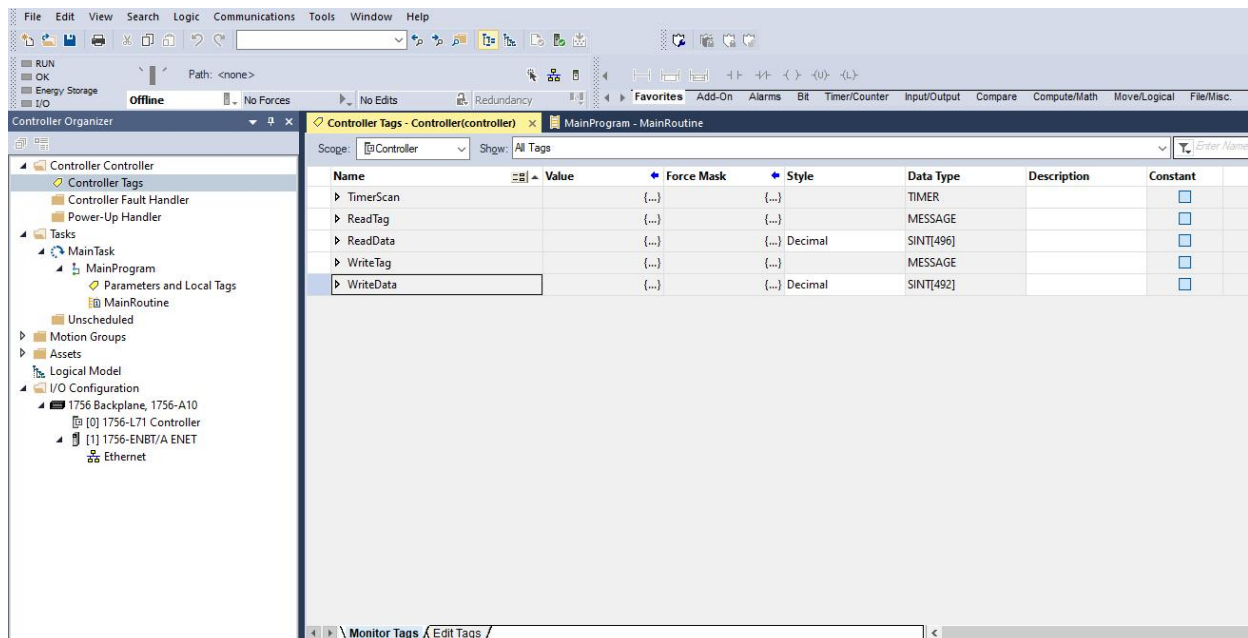


Figure 7-20: Data Output Flow Diagram

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Enter into the "Monitor Tags" interface and input some data in the "WriteData" tag. This data will be outputted to GT100-EI-RS through PLC. As shown in the image below, 0x10, 0x20, 0x30, 0x40, 0x50, 0x60, 0x70, 0x80 and 0x90 are the data that will be outputted.

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	

Figure 7-21: I/O Data Monitor View



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

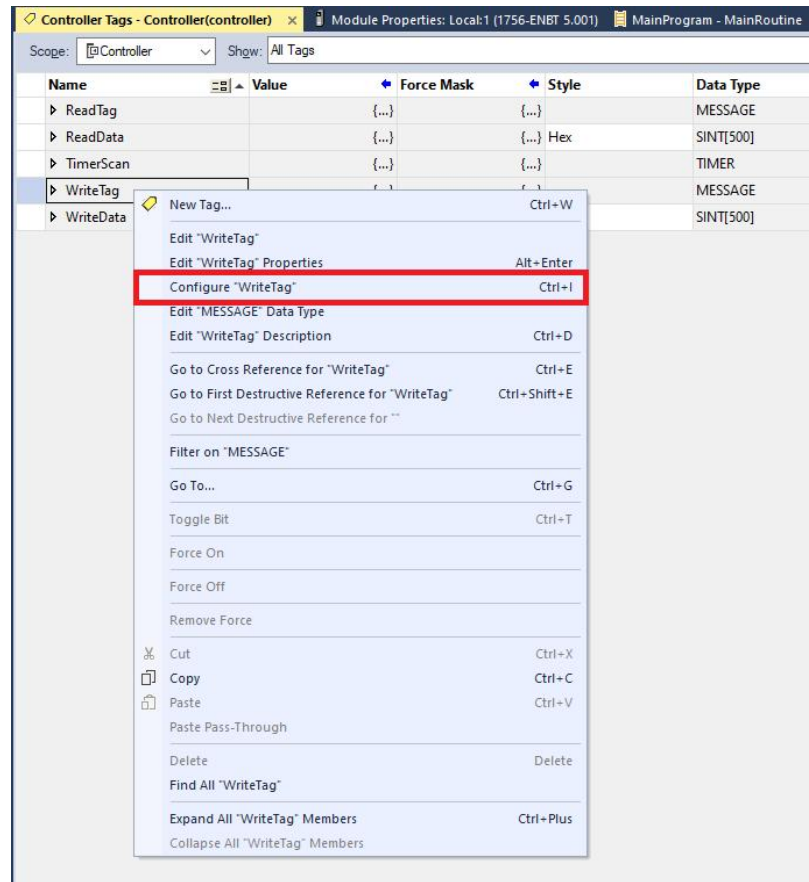


Figure 7-22: I/O Data Monitor View

In the new pop-up window, configure the following settings:

Message Type:	CIP Generic
Service Type:	Select "Set Attribute Single", and the relevant Service Code will become "10 (Hex)"
Class:	4 (Hex)
Instance:	101
Attribute:	3 (Hex)
Source Element:	Select "WriteData" tag, indicating that the data in the "WriteData" tag will become the data PLC outputs.
Source Length:	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-MI-CFG).

The screenshot shows the 'Message Configuration - WriteTag' dialog box. The 'Configuration*' tab is selected, displaying the following settings:

- Message Type:** CIP Generic
- Service Type:** Set Attribute Single
- Service Code:** 10 (Hex)
- Class:** 4 (Hex)
- Instance:** 101
- Attribute:** 3 (Hex)
- Source Element:** WriteData
- Source Length:** 492 (Bytes)
- Destination Element:** (Empty)

At the bottom of the dialog, there are radio buttons for 'Enable', 'Enable Waiting', 'Start', and 'Done'. The 'Done Length' is set to 0. There are also checkboxes for 'Error Code', 'Extended Error Code', and 'Timed Out'. The 'OK' button is highlighted.

Figure 7-23: Studio 5000 - Write MSG Source Configuration



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Select the "Communication" tab and click the "Browse" button. Then input the network path to connect to the GT100-EI-RS.

Enter the network path in the following format:

[EtherNet/IP Interface Name], 2 (Ethernet Communication), [GT100-EI-RS IP Address]

Then click "OK" to confirm:

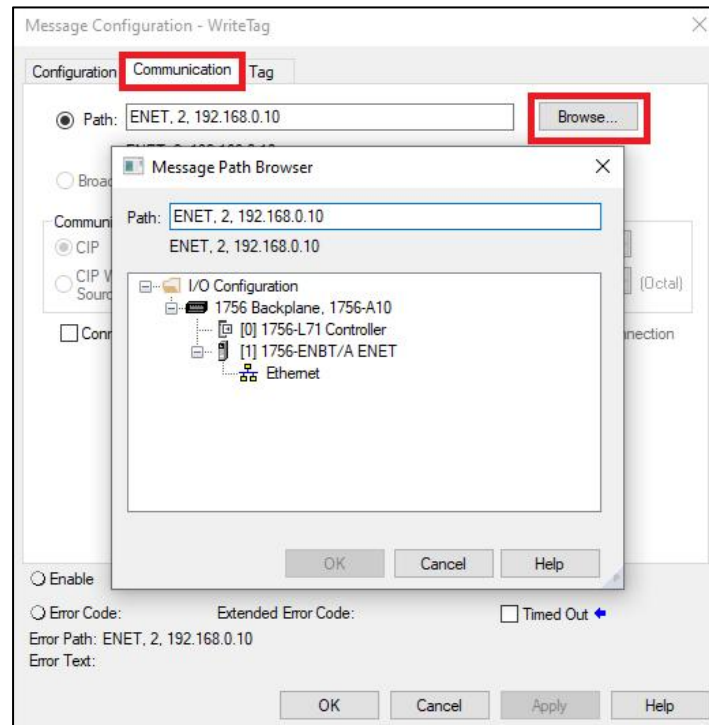


Figure 7-24: Studio 5000 - Write MSG Communication Path Configuration

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 outputted to Modbus TCP master or server through GT100-EI-RS.

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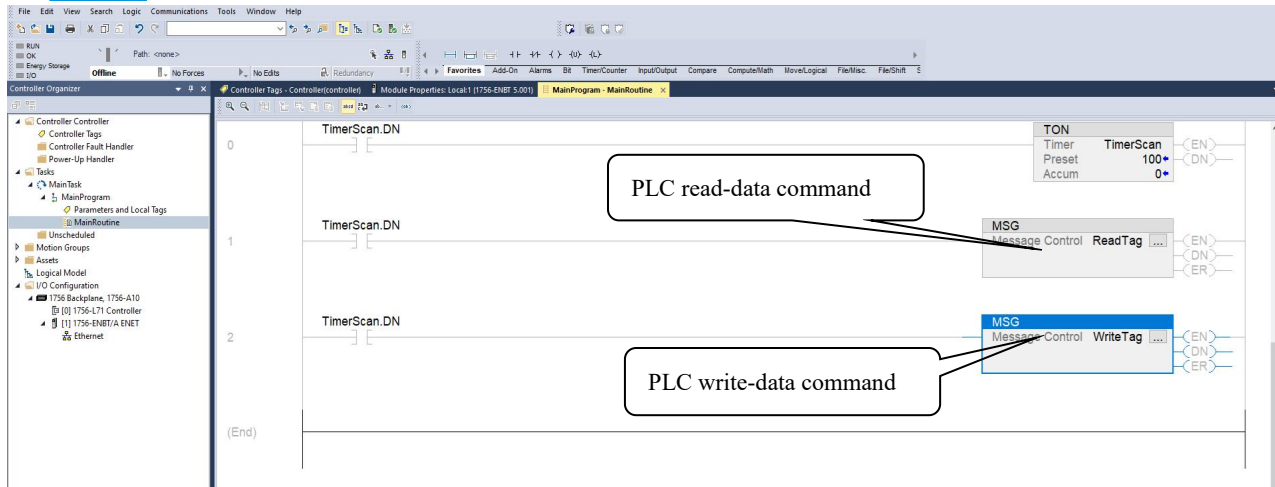
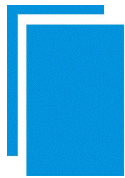


Figure 7-25: Studio 5000 - Write Tag Configuration

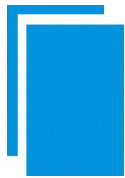


8 Troubleshooting

8.1 LED Indicator Troubleshooting

Issue	LED State	Possible Cause	Solution
Gateway does not power on	All LEDs OFF	No power supply or incorrect voltage	Check 24VDC power supply (range: 9–30 VDC). Verify polarity: 24V+ to pin 3, GND to pin 1. Test with multimeter.
DHCP requesting indefinitely	ENS flashing red continuously	No DHCP server available on network	Wait 30 seconds for automatic fallback to 192.168.0.11, or configure static IP via SST-MI-CFG software (see Chapter 5.2.1).
EtherNet/IP connection not established	ENS flashing green	PLC not connected, EDS file not imported, or wrong I/O configuration	Verify EDS file imported in Studio 5000. Check Ethernet cable connection. Confirm Connection Parameters (Instance 101/102) match configuration. Verify PLC is in Run mode.
Device stuck in firmware update mode	ENS solid orange, SNS OFF	Device entered boot mode and update not completed	Complete firmware update (see Chapter 2.4, step 3). If no update needed, power cycle the gateway to return to normal operation.
Configuration locked	SNS flashes red ×1	Configuration locked via button press	Unlock by pressing configuration button twice. SNS red will flash twice to confirm unlock. See Chapter 2.4.
Configuration unlocked indication	SNS flashes red ×2	Normal indication after unlock operation	No action required. Configuration can now be uploaded/downloaded normally.
No serial data activity	TX/RX LEDs not flashing	Modbus commands not being sent or no response from slave	Verify slave device is powered and wired correctly. Check Modbus command configuration in SST-MI-CFG. Confirm slave address and register mapping.
Gateway normal operation	ENS solid green, SNS solid green	Normal operational state	TX/RX will flash green when serial data is being transmitted/received.

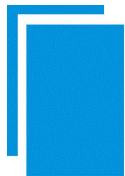
Table 8-1: LED Indicator Troubleshooting



8.2 Communication Troubleshooting

Issue	Possible Cause	Solution
Device not found in SST-MI-CFG software	PC and gateway on different subnets; firewall blocking UDP broadcast	Ensure PC and gateway are on same subnet. If using DHCP fallback, set PC to 192.168.0.x subnet. Temporarily disable Windows firewall. Use "Search by IP Address" function in software.
Failed to download or upload configuration	Configuration is locked	Unlock configuration by pressing button twice (see Chapter 2.4). SNS red light will indicate unlock status.
No response from Modbus slave devices	Wrong slave address, mismatched serial parameters, or wiring fault	Verify slave device Modbus address matches node configuration. Confirm baud rate, parity, data bits, stop bits match slave settings. Check RS-485 D+/D- wiring polarity. Ensure slave device is powered.
Intermittent or unstable Modbus communication	Missing or incorrect bus termination, long cables, electrical noise	Enable internal 120Ω terminal resistor via DIP switch (see Chapter 2.3). Install external 120Ω resistor at farthest slave device. Use shielded twisted-pair cable. Keep RS-485 wiring away from power cables.
Configuration downloaded but no data exchange	Gateway not restarted after download	Restart the gateway (power cycle or click "OK" on the restart prompt after download). Configuration takes effect only after restart.
Data values incorrect or garbled	Byte swap setting incorrect, mapping address conflict, or data type mismatch	Verify Byte Swap setting (Enabled/Disabled) per command. Check mapping addresses for conflicts using Conflict Detect tool. Confirm Comm Format (INT/DINT/REAL) matches PLC tag data type.
Modbus CRC or timeout errors	High baud rate over long distance, poor cable quality, or excessive electrical noise	Reduce baud rate (e.g., from 115.2k to 19.2k). Use high-quality shielded twisted-pair cable. Increase Response Timeout value in Modbus Master settings.
EtherNet/IP I/O connection timeout in PLC	Instance size mismatch between EDS and configuration	Verify Output Instance 101 size (1–492 bytes) and Input Instance 102 size (5–496 bytes) in SST-MI-CFG match the values configured in PLC Generic Ethernet Module. Check RPI (Requested Packet Interval) setting.
Some Modbus commands execute slowly	Fast/Slow scan configuration or Demote on Failure active	Check Scan Rate setting. If Demote on Failure is enabled, failed commands are demoted to slow scan. Review Timeouts to Demote and Demotion Period settings in Chapter 5.2.2.

Table 8-2: Communication Troubleshooting



8.3 Hardware and Installation Troubleshooting

Issue	Possible Cause	Solution
Gateway overheating	Insufficient ventilation, ambient temperature too high, or enclosure without airflow	Ensure adequate clearance around gateway. Verify operating temperature stays within -40°C to 70°C. Install in ventilated IP-rated cabinet.
RS-485 communication unstable even with correct configuration	Missing terminal resistor, ground loop, or improper shield grounding	Enable internal terminal resistor on gateway (see Chapter 2.3). Install external 120Ω 1/2W resistor at far end. Ground cable shield at ONE end only to avoid ground loops.
Ethernet link LED not lit on switch/PLC	Faulty Ethernet cable, speed mismatch, or port disabled	Test with known-good Cat5e/Cat6 cable. Verify switch port is enabled and set to Auto-Negotiation. Try different switch port.
Gateway reboots intermittently	Unstable power supply, voltage drops below 9V, or electrical noise on power line	Use regulated 24VDC power supply. Verify voltage at gateway terminals under load. Add surge protection in noisy environments. Check power wiring gauge.
Cannot restore factory defaults via button	Button press timing incorrect	After power-on (SNS green solid), hold button for 5 seconds until SNS flashes at 2 Hz. Then press once within 5 seconds. See Chapter 2.4 for detailed timing.

Table 8-3: Hardware and Installation Troubleshooting



9 FAQ

Q1: What is the default IP address of the GT100-EI-RS?

The factory default IP assignment mode is DHCP. If no DHCP server responds within 30 seconds after power-on, the gateway automatically falls back to the static IP address 192.168.0.11 with subnet mask 255.255.255.0.

Q2: How do I reset the gateway to factory default settings?

Within 10 seconds after the gateway completes startup (SNS green LED steady on), press and hold the configuration button for 5 seconds until the SNS green LED flashes at 2 Hz. Then press the button once within the next 5 seconds. The SNS LED will turn off and the gateway will restart with factory default settings. See Chapter 2.4 for detailed instructions.

Q3: How do I update the gateway firmware?

Press and hold the configuration button while powering on the device. When the ENS LED is solid orange and SNS is off, connect a PC to the gateway and open a web browser to 192.168.0.10. Log in with the provided credentials, select the BIN firmware file, and click Download. After download completes, click Restart. See Chapter 2.4, step 3 for detailed instructions.

Q4: How many Modbus slave devices can the GT100-EI-RS support?

The GT100-EI-RS supports up to 32 Modbus slave devices on the RS-485 bus, with up to 100 Modbus commands per serial port (200 total across both ports).

Q5: What Modbus function codes are supported?

The GT100-EI-RS supports the following Modbus function codes: 01 (Read Coils), 02 (Read Discrete Inputs), 03 (Read Holding Registers), 04 (Read Input Registers), 05 (Write Single Coil), 06 (Write Single Register), 15/0F (Write Multiple Coils), 16/10 (Write Multiple Registers), and 23/17 (Read/Write Multiple Registers). See Appendix A for a complete reference.



Q6: How do I configure the EDS file in Studio 5000 or RSLogix 5000?

In Studio 5000, right-click the Ethernet scanner module, select "New Module", search for "Generic Ethernet Module", and click Create. Enter the gateway IP address and configure Connection Parameters: Input Instance 102 (size 5–496 bytes), Output Instance 101 (size 1–492 bytes), Configuration Instance 113 (size 10 bytes). Set the Comm Format (INT, DINT, REAL, or SINT) as needed. See Chapter 7.1 for a step-by-step guide.

Q7: What is the maximum RS-485 cable length?

The maximum recommended RS-485 cable length depends on the baud rate. At 9600 bps, up to 1200 meters (4000 ft). At 115.2 kbps, up to 120 meters (400 ft). Always use shielded twisted-pair cable (characteristic impedance 120Ω) and enable proper termination for reliable communication.

Q8: How do I test network connectivity to the gateway?

Use the Ping command from a Windows command prompt: ping [gateway IP address]. If the gateway responds, the network connection is working. If not, verify that the PC and gateway are on the same subnet, the Ethernet cable is connected, and the firewall is not blocking ICMP packets. Refer to the "How to Use the Ping Command" guide on the SST Automation support website.

Q9: When should I enable the Byte Swap setting?

Enable Byte Swap when the byte order of Modbus register data does not match the expected byte order of the PLC. For example, some Modbus devices transmit the high byte first while the PLC expects low byte first. The GT100-EI-RS also supports Four Byte Swap (Word Swap) and Four Byte Swap (MSB to LSB) at the EtherNet/IP connection level for 32-bit data types. See Chapter 1.3 for all byte swap options.

Q10: Can I use both RS-485 and RS-232 ports simultaneously?

Yes. The GT100-EI-RS has one RS-485 port and one RS-232 port, each with independent 1kV photoelectric isolation. Both ports can be used simultaneously for Modbus RTU/ASCII Master or Serial Passthrough communication.

Q11: Why does the configuration software not detect my gateway after changing its IP address?

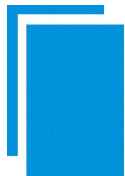
If you changed the gateway IP address and the software can no longer find it, ensure your PC is on the same subnet as the



new IP address. Alternatively, use the "Search by IP Address" function in SST-MI-CFG (Tools → Ethernet Configuration → IP Search) and enter the new IP address directly. You can also restore the gateway to DHCP/factory defaults using the configuration button (see Q2).

Q12: What should I do if the gateway does not respond after a firmware update?

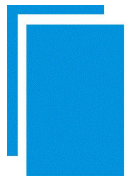
If the gateway becomes unresponsive after a firmware update, try the following: (1) Power cycle the gateway. (2) Re-enter firmware update mode by holding the configuration button while powering on, then reflash the correct firmware. (3) Ensure the firmware file matches the gateway hardware version (GT100-EI-RS). (4) If the issue persists, contact SST Automation technical support at support@sstautomation.com with your model, serial number, and firmware version.



10 Glossary of Technical Terms

Abbreviation / Term	Definition
BIN	Binary (firmware file format)
CIP	Common Industrial Protocol
CRC	Cyclic Redundancy Check
D+ / D-	Positive / Negative Data Line (RS-485)
DEC	Decimal
DHCP	Dynamic Host Configuration Protocol
DINT	Double Integer (32 bits)
DLR	Device Level Ring
EMC	Electromagnetic Compatibility
EtherNet/IP	Ethernet Industrial Protocol (ODVA standard)
GND	Ground
Hex	Hexadecimal
Hz	Hertz
I/O	Input / Output
IEEE	Institute of Electrical and Electronics Engineers
INT	Integer (16 bits)
IP	Internet Protocol; also Ingress Protection
k Ω	Kilo-Ohms
kV	Kilovolt
mm	Millimeters
ms	Milliseconds
MSG	Message (Explicit Messaging in EtherNet/IP)
NC	Not Connected
ODVA	Open DeviceNet Vendors Association
PLC	Programmable Logic Controller
REAL	Real Number — Floating Point (32 bits)
RJ-45	Registered Jack 45 (Ethernet connector)
RXD+ / RXD-	Receive Data Positive / Negative
SINT	Short Integer (8 bits)
SNS	Sensor Signal — indicates sensor status or input
TXD+ / TXD-	Transmit Data Positive / Negative
VDC	Volts Direct Current

Table 10-1: Glossary of Technical Terms



11 Appendix

Quick Reference Card

Default Network Settings

Parameter	Default Value
IP Assignment Mode	DHCP
Fallback IP Address	192.168.0.11
Subnet Mask	255.255.255.0
Firmware Update IP	192.168.0.10

Table 11-1: Default Network Settings

LED Quick Reference

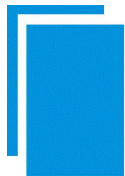
Condition	ENS	SNS	TX	RX
Normal Operation	Solid Green	Solid Green	Flashing Green (TX active)	Flashing Green (RX active)
DHCP Requesting	Flashing Red	—	—	—
No EtherNet/IP Connection	Flashing Green	—	—	—
Config Locked	—	Flashes Red ×1	—	—
Config Unlocked	—	Flashes Red ×2	—	—
Firmware Update	Solid Orange	OFF	—	—

Table 11-2: LED Quick Reference

Connection Parameters

Instance	Number	Default Size	Configurable Range
Output	101	492 bytes	1–492 bytes
Input	102	496 bytes	5–496 bytes
Configuration	113	10 bytes	Fixed

Table 11-3: EtherNet/IP Connection Instance Parameters



Supported Modbus Function Codes

Code	Function	Data Type
01 (0x01)	Read Coils	0x
02 (0x02)	Read Discrete Inputs	1x
03 (0x03)	Read Holding Registers	4x
04 (0x04)	Read Input Registers	3x
05 (0x05)	Write Single Coil	0x
06 (0x06)	Write Single Register	4x
15 (0x0F)	Write Multiple Coils	0x
16 (0x10)	Write Multiple Registers	4x
23 (0x17)	Read/Write Multiple Registers	4x

Table 11-4: Supported Modbus Function Codes

Configuration Button Operations

Action	How To	Indicator
Lock Config	Press button ×2	SNS red ON 500 ms → OFF
Unlock Config	Press button ×2 (again)	SNS red ON 300 ms → OFF 400 ms → ON 300 ms → OFF
Restore DHCP	Hold 5s after startup, then press once within 5s	SNS green flashes 2 Hz
Firmware Update	Hold button while powering on	ENS orange steady, SNS OFF

Table 11-5: Configuration Button Operations

Compliance and Warranty Notes

Use only official product labels, declarations of conformity, and regional approval documents to claim CE, FCC, RoHS, WEEE, or other compliance status. Do not add regulatory claims to customer-facing material unless the corresponding certification is verified.

The gateway is intended for industrial and building automation communication. It is not a safety-rated controller and must not be used as the sole device for personnel protection or emergency shutdown.



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The product is covered by a 3-year limited warranty from the date of purchase. Warranty terms, service scope, and return procedures are subject to the sales contract or the official SST Automation warranty policy applicable to the region.

For technical support, provide the model, serial number if available, firmware version, configuration project, wiring information, and fault description