

Modbus / EtherNet/IP Gateway GT100-EI-RS

User Manual

V 2.1



SST Automation

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Important Information

Warning

The data and examples in this manual cannot be copied without authorization. SST Automation reserves the right to upgrade the product without notifying users.

The product has many applications. The users must make sure that all operations and results are in accordance with the safety of relevant fields, and the safety includes laws, rules, codes and standards.

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1 Product Overview

1.1 Product Function

GT100-EI-RS is a gateway that can provide a seamless connection between serial (Modbus RTU/ASCII and generic) and EtherNet/IP. It can connect up to 32 Modbus (or other serial protocol) slave devices to an EtherNet/IP network. The Modbus side supports RS-485 and RS-232 serial interfaces and only uses one interface during data communication.

1.2 Product Features

- Easy to use: Users can refer to the product manual to quickly configure a data connection that meets their needs.
- Wide applications: Any device with a RS-485/RS-232 interface can be connected to an EtherNet/IP network through the GT100-EI-RS gateway. For example, Variable-Frequency Drives (VFDs) with a Modbus interface, motor starting protectors, and transmitters can all be connected to EtherNet/IP.
- Transparent Data Transmission: Users can directly forward raw data between EtherNet/IP and Modbus/serial to establish a transparent data connection.
- One RS-485 or RS-232 interface with independent 1KV photo electric isolation.
- Ethernet 10/100M network interface.
- IP address conflict detection.
- Easy-to-use configuration software: The GT100-EI-RS can be configured by the SST-MI-CFG software easily.



1.3 Technical Specifications

[1] EtherNet/IP network is independent with Modbus network.

[2] IEEE802.3 100BASE-T Ethernet 10/100M.

[3] IP address conflict detection.

[4] Supports ODVA standard EtherNet/IP communication protocol.

[5] Serial port parameters:

- ◆ RS485 or RS232 interface, half-duplex.
- ◆ Baud rate: 1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200 bps.
- ◆ Parity check mode: None, Odd and Even.
- ◆ Stop bits: 1, 2.

[6] Modbus master:

- ◆ Function code: 01H, 02H, 03H, 04H, 05H, 06H, 0FH and 10H.
- ◆ Each master can configure up to 48 Modbus commands.
- ◆ Function codes 03H and 04H support "**Word / Byte mapping**" which makes it easy to fix format conversion issues with big endian and little endian data between the two networks. The gateway can connect 32 Modbus slave devices through the RS-485 connection.

[7] User Config: Universal serial communication. Supports character timeout, character number and delimiter control modes. Has an auto sending function.

[8] Serial port has independent 1KV photoelectric isolation.

[9] Max input and output bytes of EtherNet/IP:

- ◆ Max input bytes: 492 bytes (256 bytes under universal mode).
- ◆ Max output bytes: 492 bytes (256 bytes under universal mode).

[10] Power supply: 24VDC (11~30VDC), 70mA (24VDC).

[11] Working temperature: -40°F~140°F(-40°C~60°C), Humidity: 5% ~ 95% (non-condensing).

[12] Dimensions (W*H*D): 1.0 in*4.0 in *3.6 in (25mm*100mm*90mm).

[13] Installation: 1.4 in (35mm) RAIL.

[14] Protection level: IP20.

1.4 Revision History

Revision	Date	Chapter	Description
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



2 Hardware Description

2.1 Product Appearance



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

2.2 Indicators

Indicators	Status	Descriptions
ENS (IP indicators)	Red off	IP address established
	Red blinking	DHCP
SNS (EtherNet/IP network status indicators)	Green on	EtherNet/IP connection is established, communication is normal
	Green blinking	EtherNet/IP connection is not established
TX, RX (Serial data indicators)	TX, red blinking	Serial port is sending data
	RX, green blinking	Serial port is receiving data

2.3 Factory Reset Button

The factory reset button is located at the top of the adapter.

Action	Descriptions
Press button down for at least 3 seconds, and release the button after all indicators are off.	Reset to default settings - 192.168.0.11

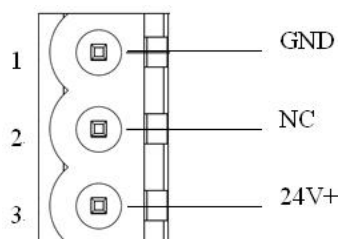
Note: The reset action will clear the configuration, please download the configuration first before using.

2.4 Interface

2.4.1 Power Interface

GT100-EI-RS has one power interface that supports 11~30VDC. It is recommended to use 24VDC power.

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

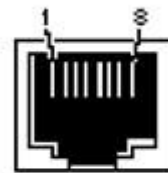




2.4.2 Ethernet Interface

The Ethernet interface uses an RJ-45 connector follows the IEEE802.3u 100BASE-T standard. Its pinout (standard Ethernet signal) is defined as 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-

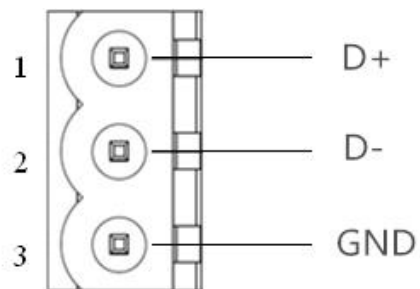


RJ-45 port

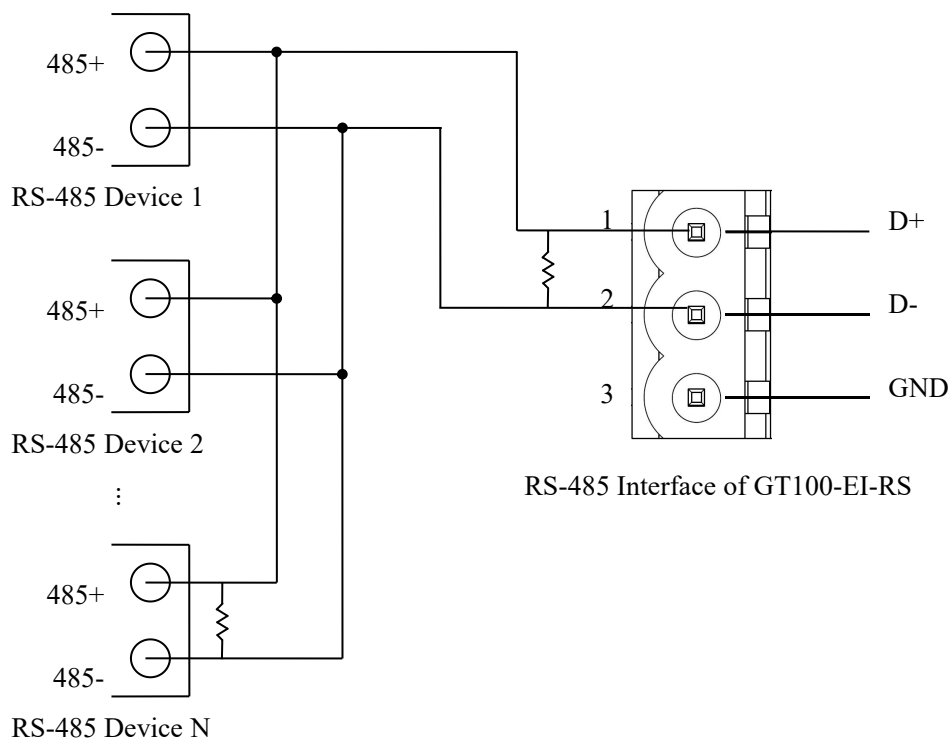
2.4.3 RS-485 Interface

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

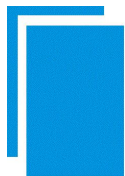
Pin	Function
1	D-, RS-485 Transmit Negative
2	D+, RS-485 Transmit Positive
3	GND



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



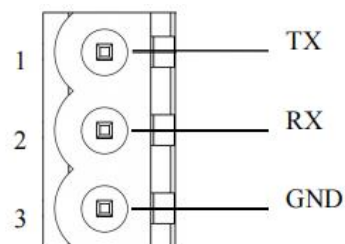
Note: There is no terminal resistor inside RS485 interface of GT100-EI-RS.



2.4.4 RS-232 Interface

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



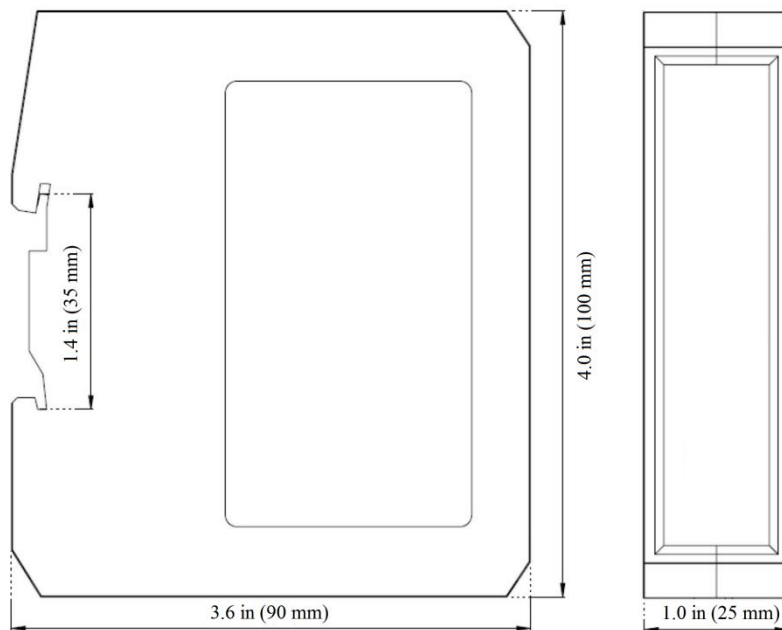


3 Installation

3.1 Machine Dimension

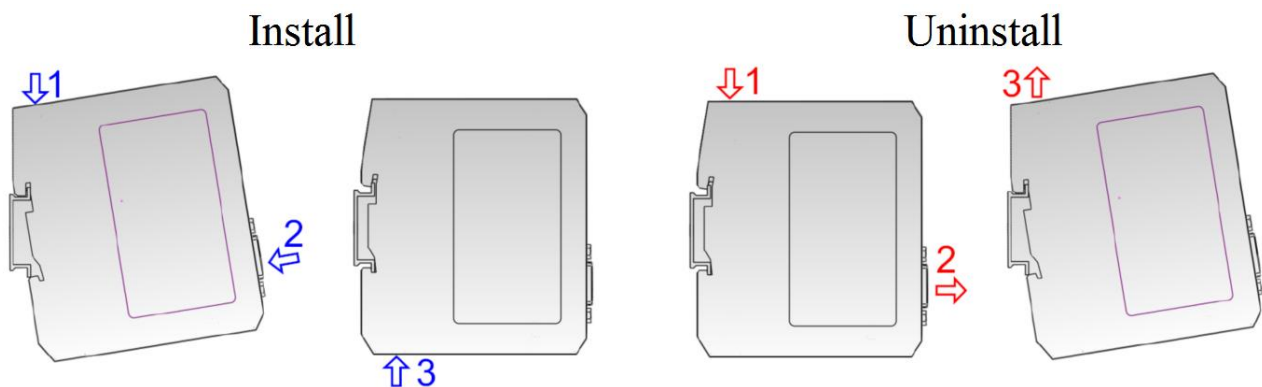
Size (width * height * depth):

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



3.2 Installation Method

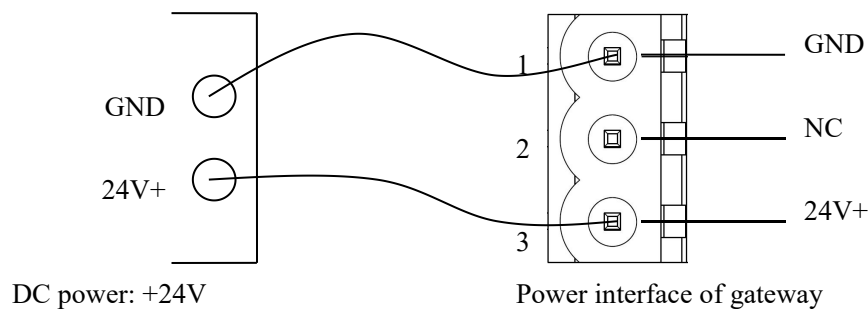
Using 1.4 in (35mm) DIN RAIL



4 Quick Start Guide

Basic steps when configuring GT100-EI-RS :

1. Wiring: See also [Chaper 2.4 Interface.](#)
 - (1) Connect the network port of the gateway to the PC with a network cable for downloading the configuration.
 - (2) Connect the serial port of the gateway to the serial device for communication with the serial device.
 - (3) Connect the gateway power supply and power on.



2. Download SST-MI-CFG software from www.sstautomation.com/Download1/ and install it.
3. Download the EDS file for GT100-EI-RS from www.sstautomation.com/Download1/.
4. 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, please 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. Please check whether the computer and gateway are on the same network segment.
- Please test the network connection first. Please refer to the note “[How to Use the Ping Command](#)” located on our Support page on the sstautomation.com website.
- If you use the factory reset button, press and hold it for 3 seconds and release the button after all indicators are off. The gateway will restore the default configuration and the IP address will be fixed to 192.168.0.11.

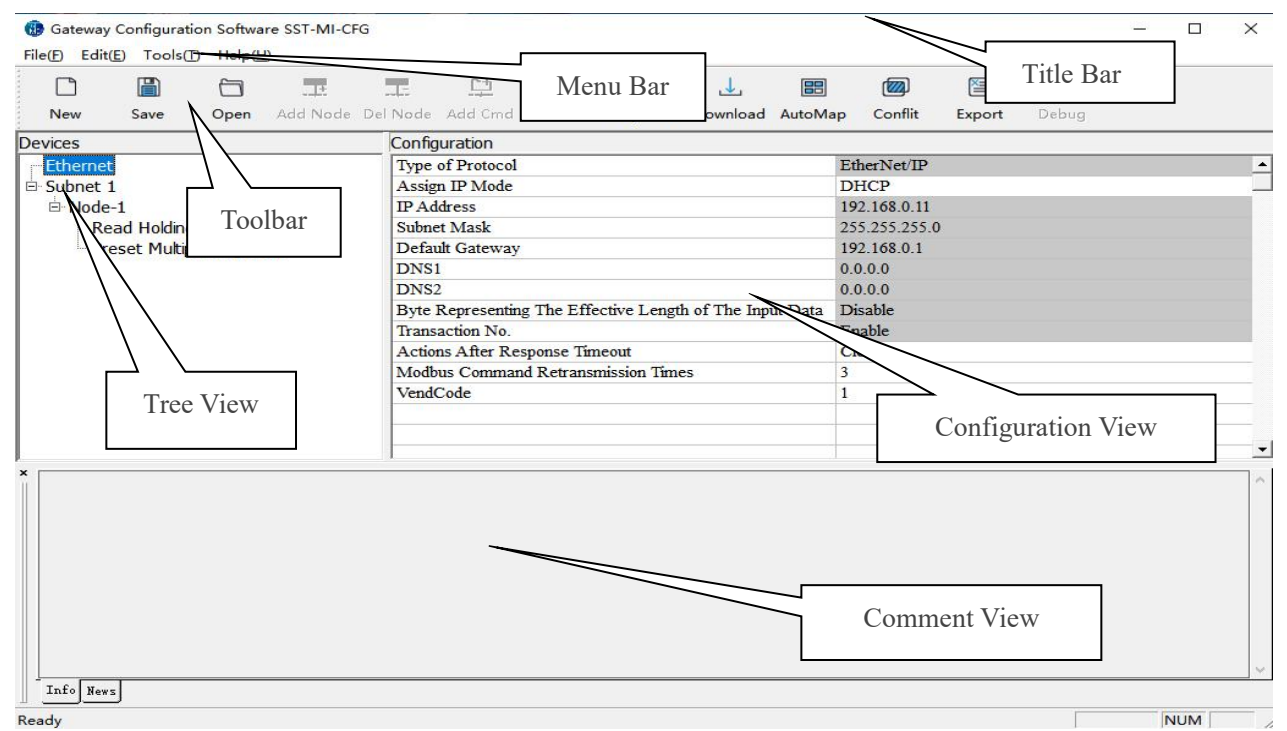
Install the EDS file in the configuration software of the EtherNet/IP Master station. Configure the EtherNet/IP network as required. Make sure that the configuration matches the configuration present in the GT100-EI-RS. Refer to the instructions in [Chapter 6.3](#) and [6.4](#).

5 Software Instructions

5.1 Software Interface Description

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

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



Toolbar interface shown as follows:



- 

New: Create a new configuration project.
- 

Save: Save current configuration.
- 

Open: Open a configuration project.

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Add Node

Add Node: Add a Modbus slave node.



Del Node

Delete Node: Delete a Modbus slave node.



Add Cmd

Add Command: Add a Modbus command.



Del Cmd

Delete Command: Delete a Modbus command.



Upload

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



Download

Download: Download the configuration file to the gateway.



AutoMap

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



Conflict

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



Export

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



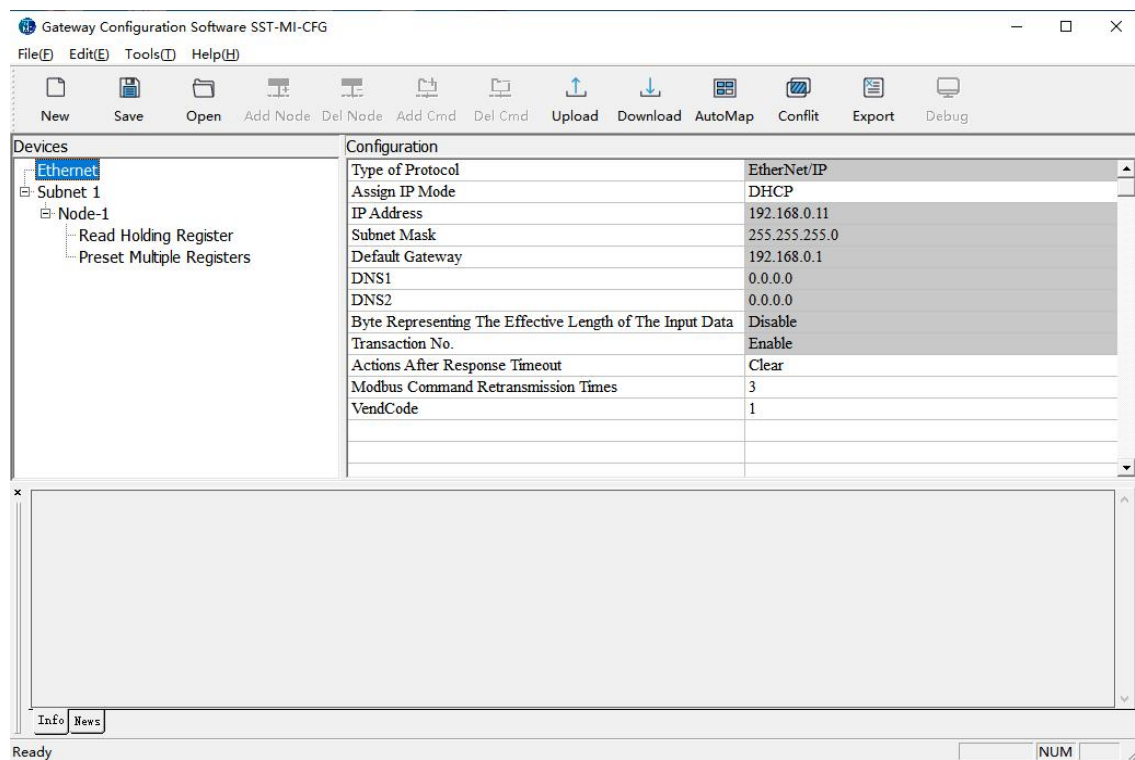
Debug

Debug: Reserved.

5.2 Device View

5.2.1 Ethernet Configuration View

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



- Assign IP Mode:** Manual Assign, DHCP.
- IP Address:** Sets the IP address of the device.
- Default Gateway:** Sets the gateway address of the device.
- Byte Representing The Effective Length of The Input Data:** This function is available when the subnet type is selected as "User Config". This function has the following options:
 - Enable: The first byte in the Ethernet input data indicates the length of the receiving data frame through serial.
 - Disable: No bytes in the Ethernet input data are used to indicate the serial data length.
- Transaction No.:** This function is available when the subnet protocol type is selected as “User Config”. This function has the following options:
 - Enable: Use transaction number.

Disable: Do not use transaction number.

Actions After Response Timeout: This function determines whether to clear EtherNet/IP input data when the number of Modbus comand 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.

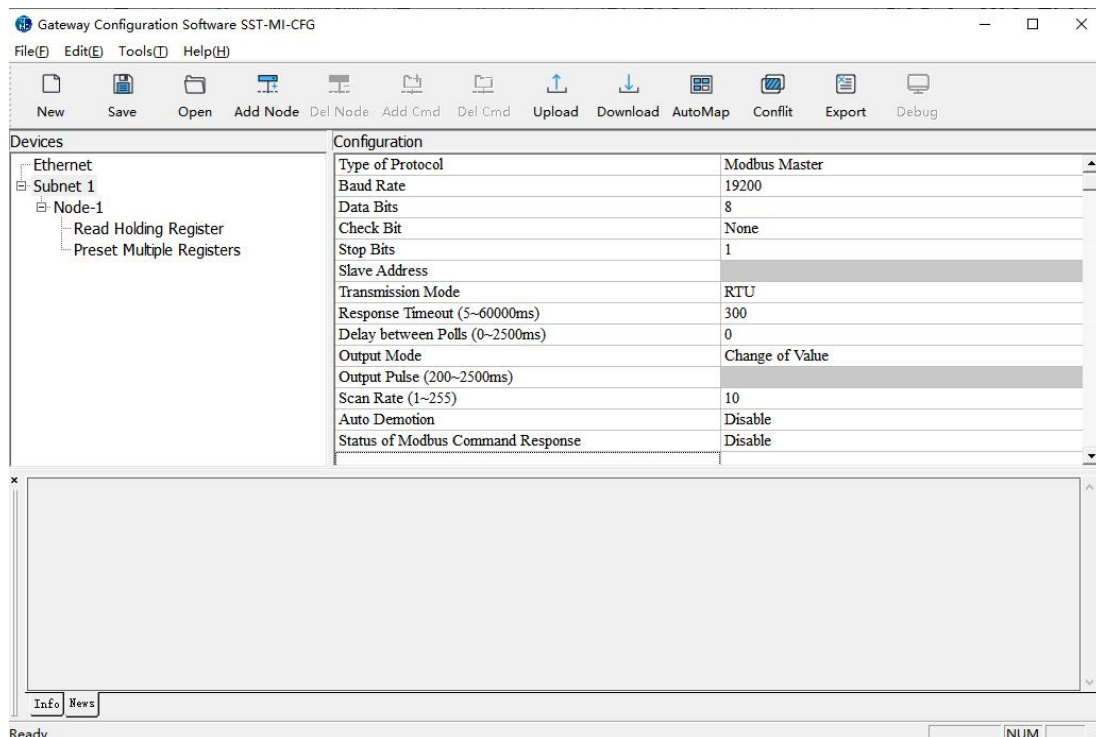
This function is disabled when the "User Config" protocol mode is selected. The Response Timeout Clear/Hold and Modbus command retry functions are also disabled in "User Config" protocol mode. These three functions are only available when the "Modbus Master" protocol mode is selected.

VendCode: The VendCode of GT100-EI-RS can only be 1.

5.2.2 Subnet Configuration View-Modbus Master

1. Modbus Master configuration view

The "Modbus Master" protocol mode configuration interface is shown below:



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



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Data Bits: 7, 8.

Check Bit: None, Odd, Even.

Stop Bits: 1, 2.

Transmission Mode: RTU or ASCII.

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.

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

Cycle: Sends Modbus write commands periodically 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.

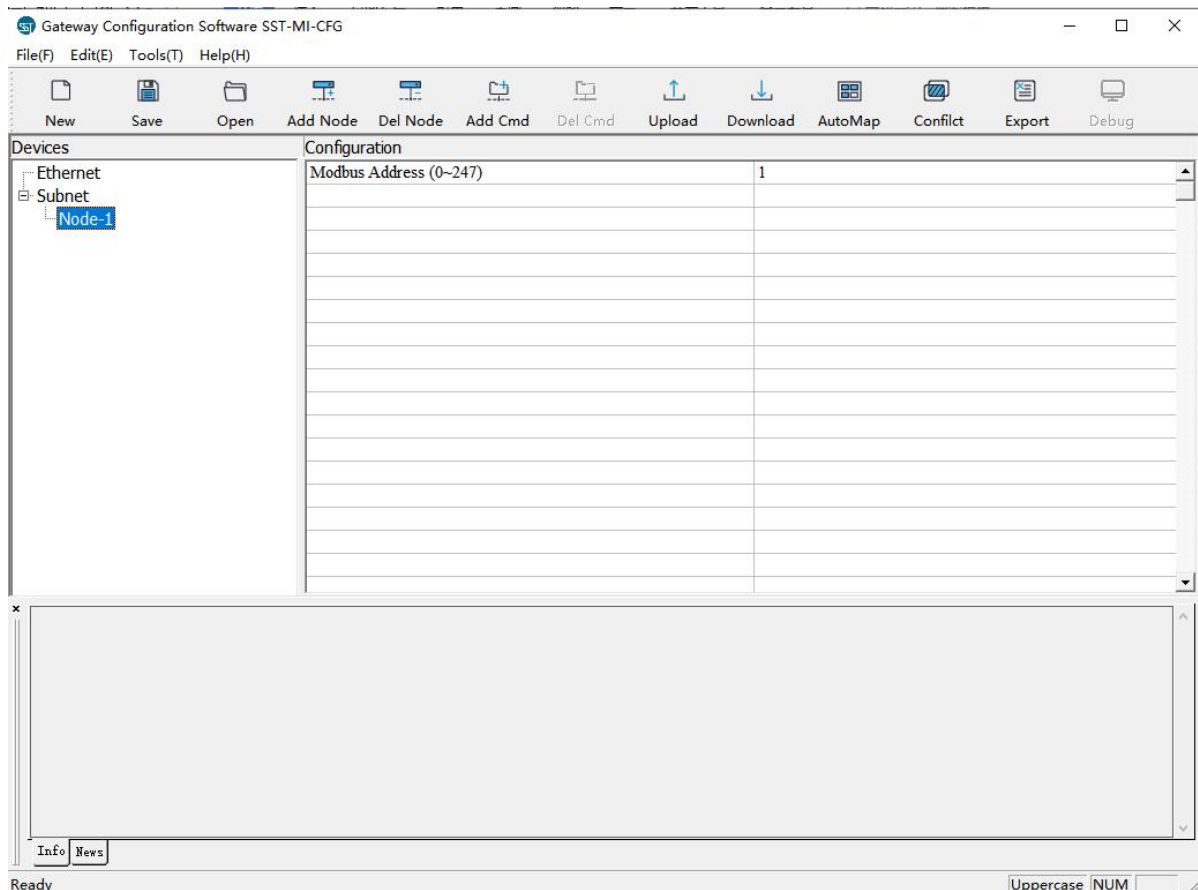
Scan Rate: Scan Rate is the ratio between fast scan cycles to slow scan cycles. If this parameter value is set to 10, then a fast scan command will be sent 10 times for every slow scan command.

Automatic Demotion: Reserved.

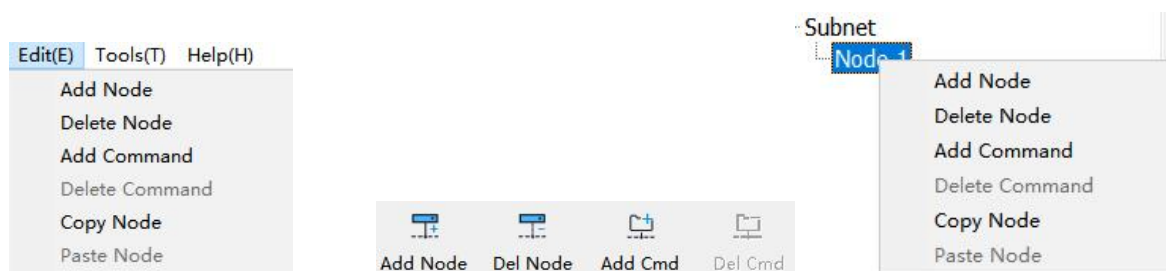
Status of Modbus Command Response: Reserved.

2. Node Configuration

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



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



- (1) Add node: Right click on Subnet or existing nodes, and then perform the operation of adding a new node.

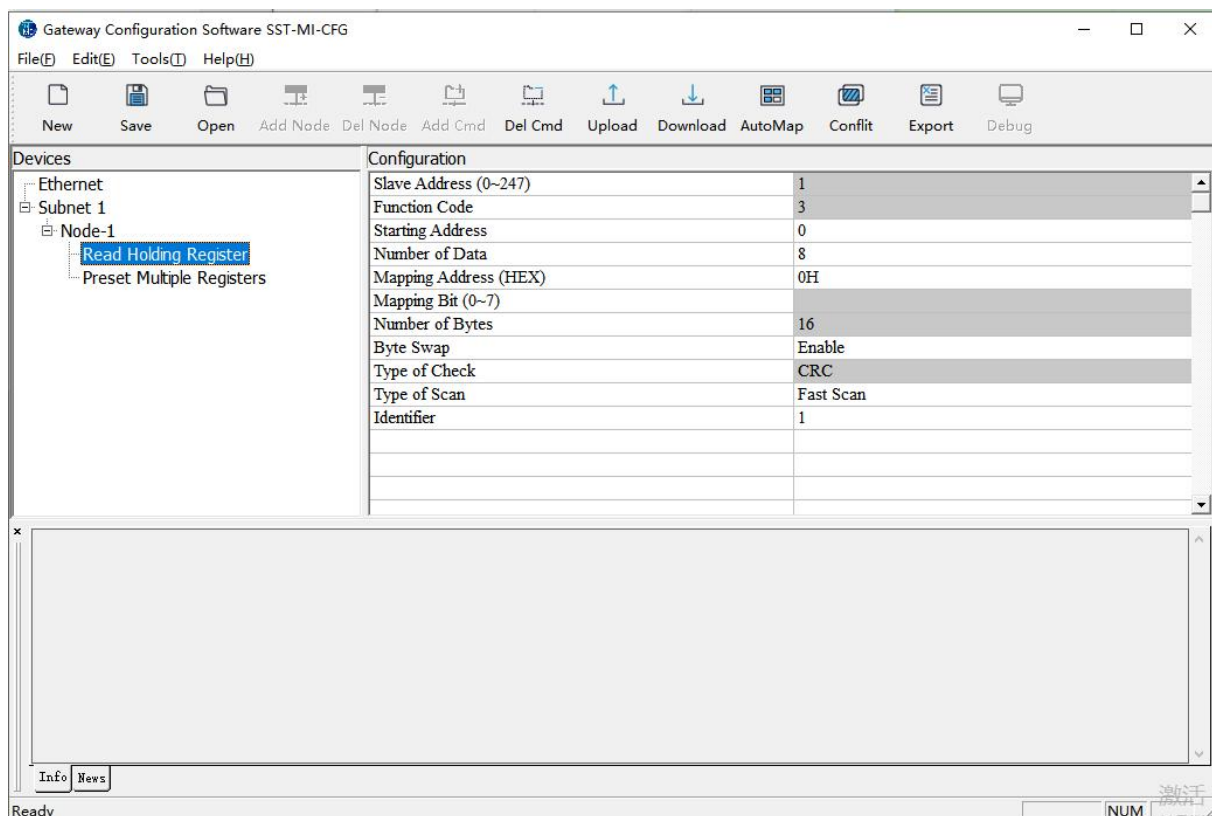
Then there will be a new node named "Node-x" under subnet.

- (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
- 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:



Starting Address: the starting address of the register/switching value/coil in Modbus slave device. The range of the parameter value is 0 to 65535.

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.

Here is the example of PLC address (base 1) and corresponding protocol address (base 0).

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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.

Number of Data: Register/switching value/coil numbers.

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

Address range that data is mapped in the module memory.

Read command: 0x0000~0x01EB.

Write command: 0x4000~0x41EB.

Users can also use this area after write command is about local data exchange: 0x0000~0x01EB.

Mapping Bit (0~7): For the bit operation command, means the position where the start bit is in the byte, range 0~7.

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

Byte Swap: No swap, swap. Modbus byte order is the most significant byte (MSB) first, EtherNet/IP byte order is the least significant byte (LSB) first. Users may need to exchange byte order to get the right value.

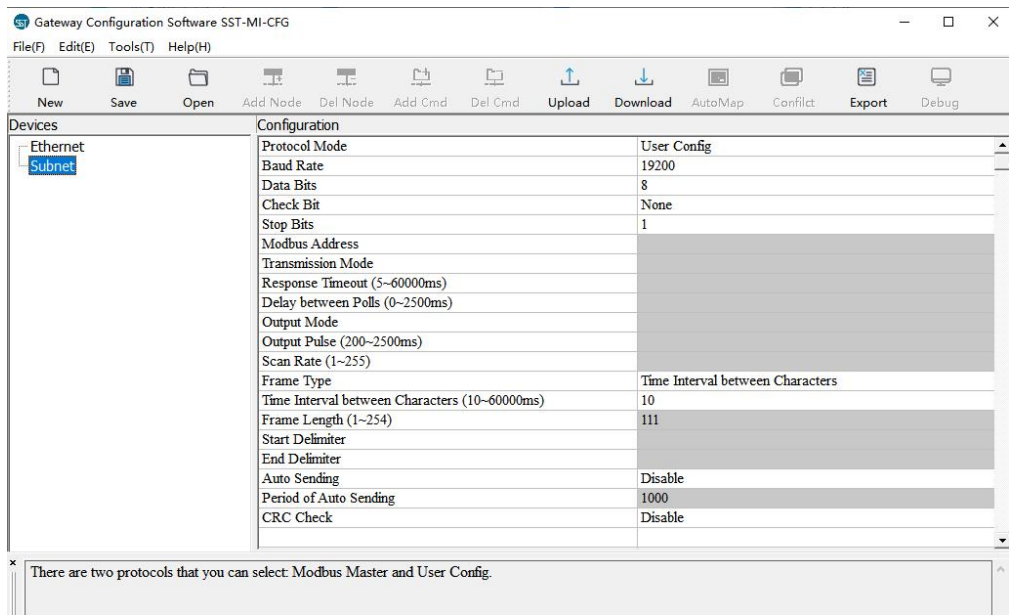
Type of Scan: There are two ways, fast and slow scan. Every Modbus command can be set to fast scan or slow scan. The gateway will send Modbus command according to the "Scan Rate". Scan Rate is ratio of fast scan to slow scan.

Identifier: Reserved.

5.2.3 Subnet Configuration View-User Config

When you 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 as below:



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

Data Bits: 7, 8.

Check Bit: None, Odd, Even.

Stop Bits: 1, 2.

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.

Frame Length: To determine the end of one frame serial data by judging the length of frame.

Delimiter: To judge by setting start delimiter and end delimiter of one frame data.

Auto Sending: Enable, Disable.

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

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

5.3 Tools

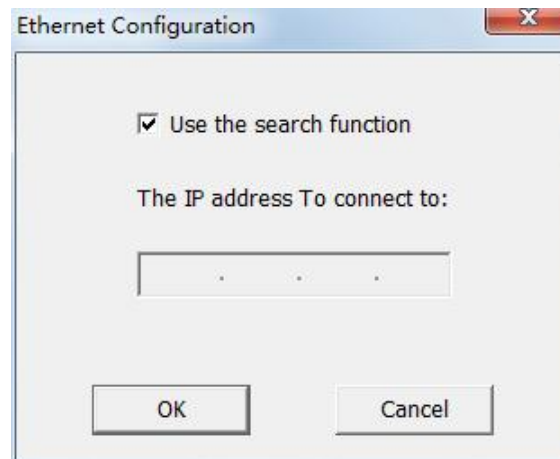
The "Tools" tab on the menu bar contains the following functions:

- Ethernet Connection
- Upload
- Download
- Calculate Mapping Address
- Mapping Address Conflict Detection
- Export EXCEL

5.3.1 Ethernet Configuration

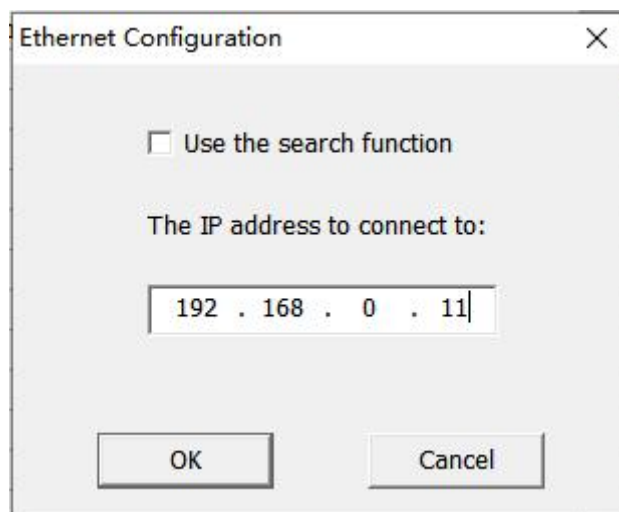
“Ethernet configuration” has two options.

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



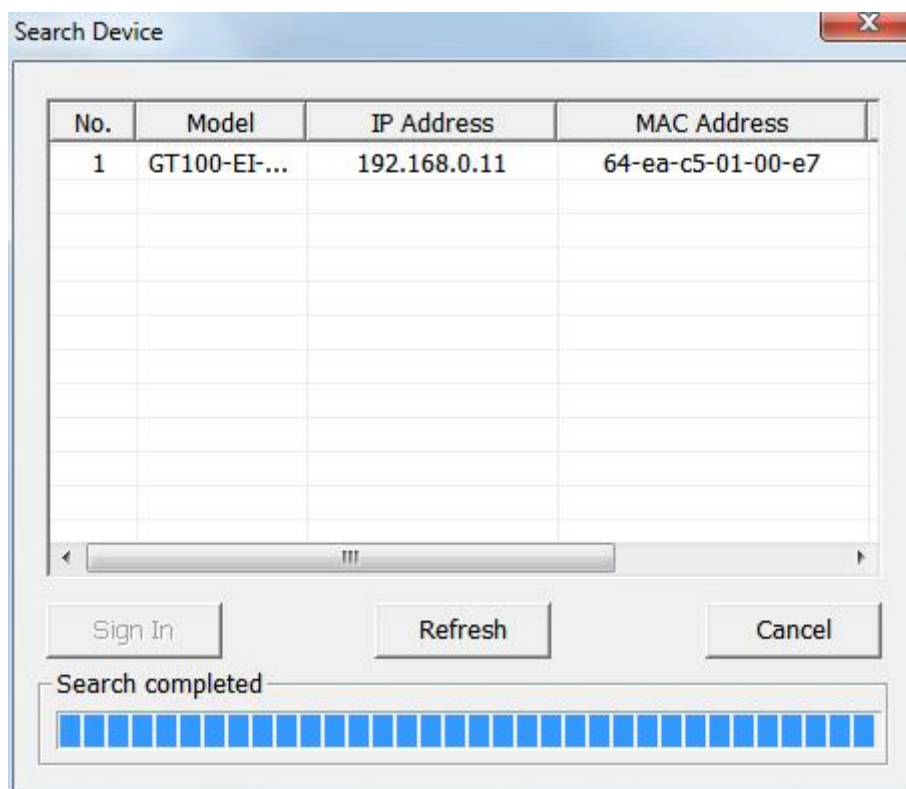
- (2) When “use the search function” is not checked, users can search a gateway with the specified IP address.

Fill in the IP address of the gateway you want to search, and click “OK” button to confirm search.



5.3.2 Upload

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

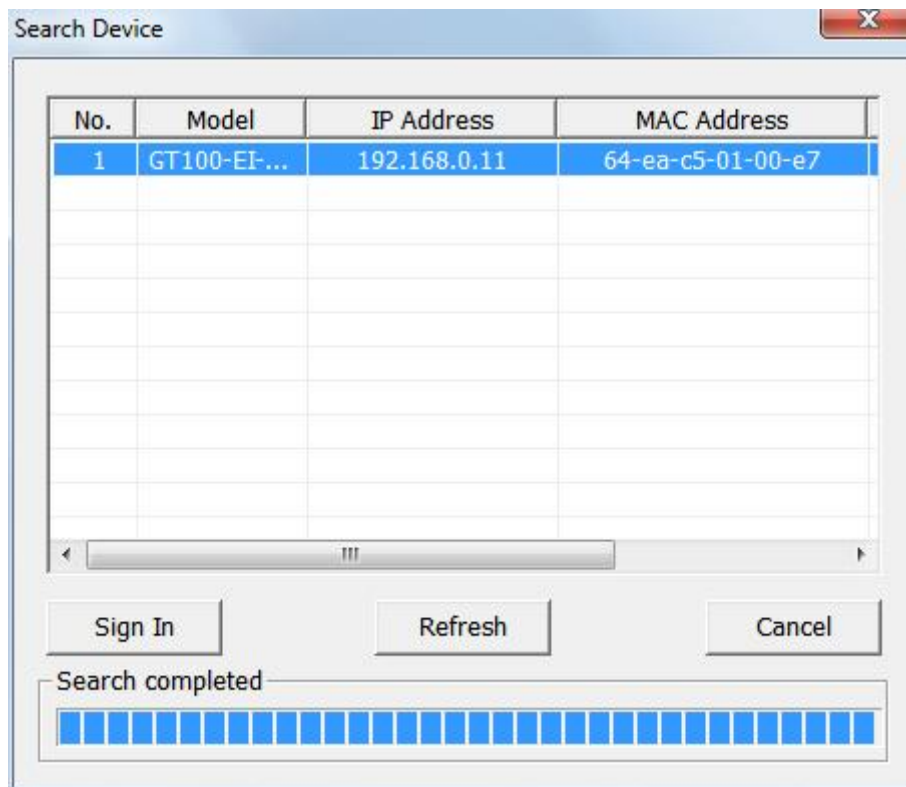


Select the device, click Sign In.

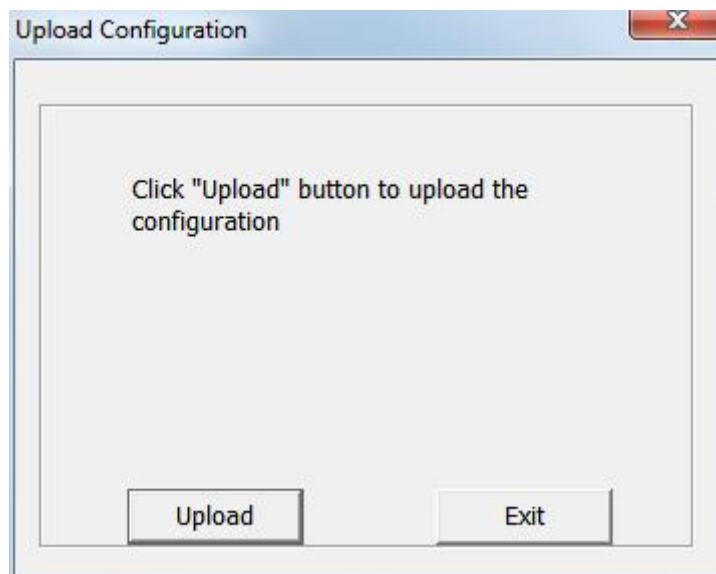
GT100-EI-RS

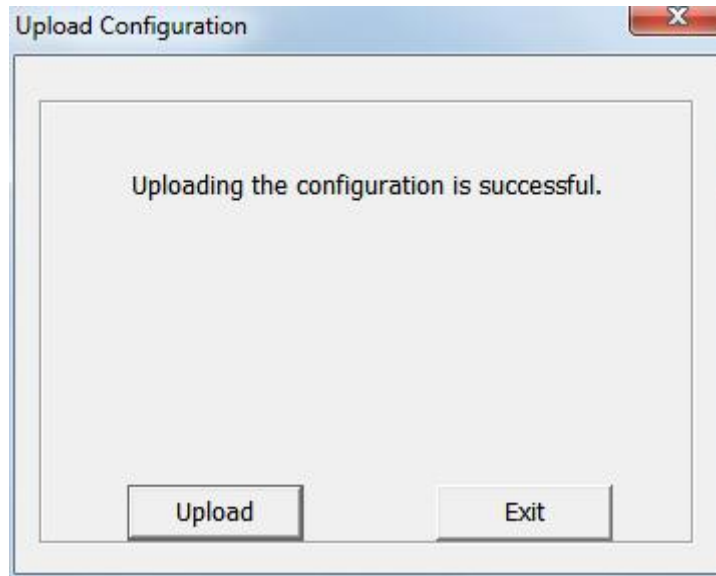
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Click Upload.



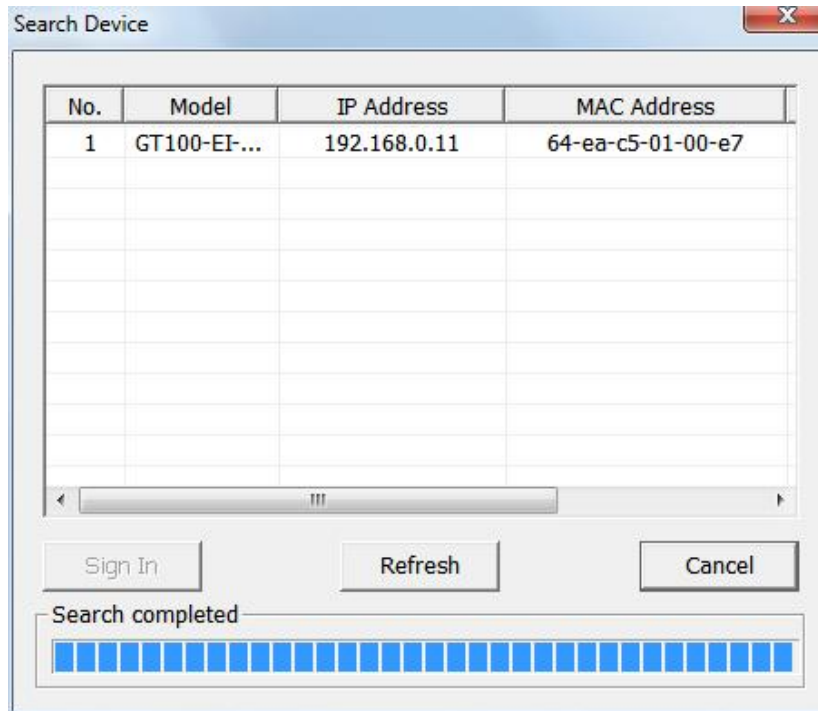


If the gateway cannot be searched:

- Please 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.
- Please test the network connection first. Please refer to the note "[How to Use the Ping Command](#)" located on our Support page on the sstautomation.com website.

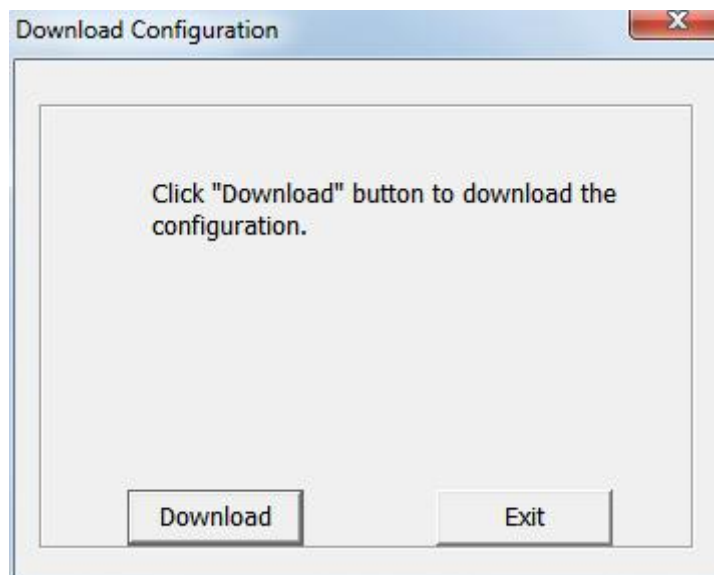
5.3.3 Download

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

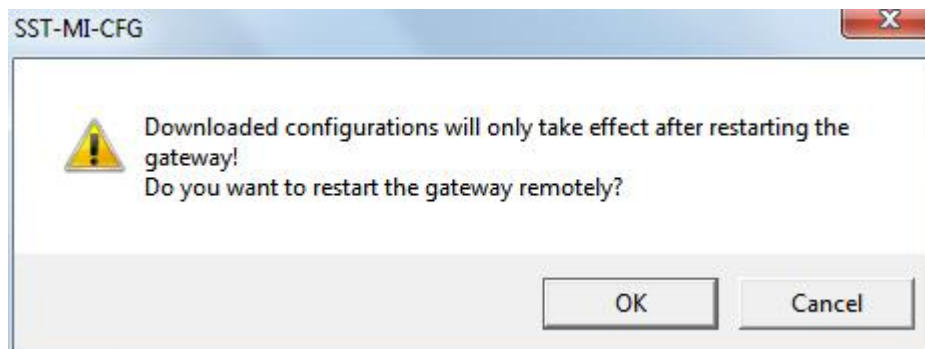


Note: Please confirm the configurations are correct before downloading configurations (you can use "Export EXCEL" function and it can help you check the configurations).

Select the device, click Sign In and download the configuration to the gateway.



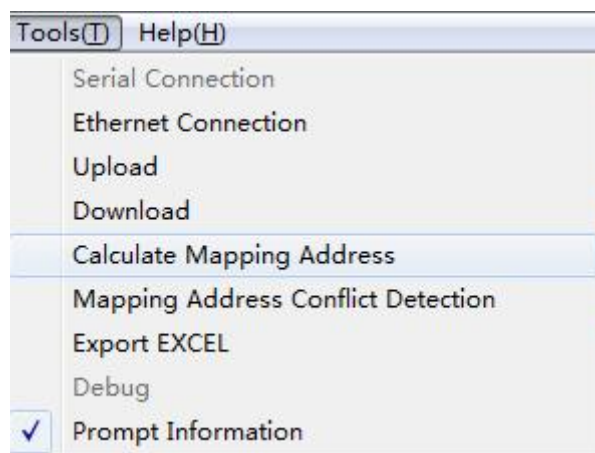
After downloading, it will pop up the dialog box as below:



Click OK will restart the gateway remotely.

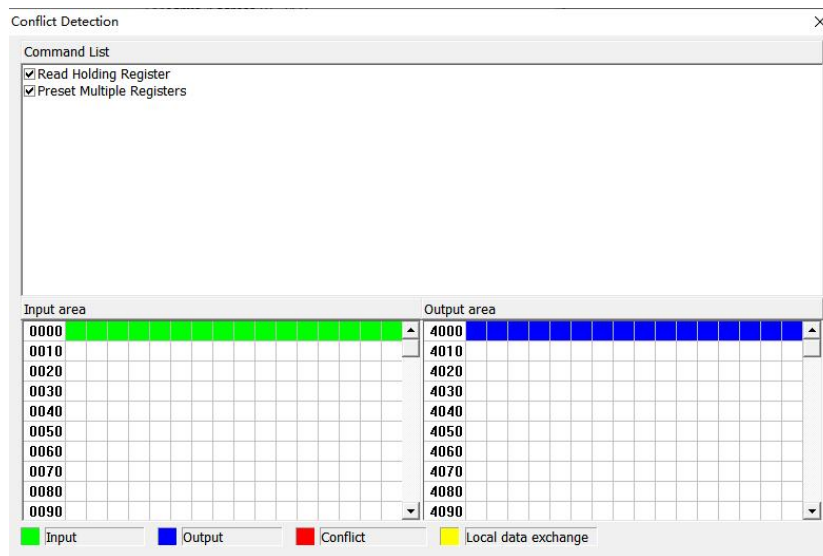
5.3.4 Calculate Auto Mapping

The mapping address of every command in the gateway must be calculated by fixed formula, users can use "Calculate Mapping Address" to calculate mapping address automatically.



5.3.5 Mapping Address Conflict Detection

It is used to check whether there exists confliction in "memory mapping data". If users find confliction, it can be adjusted in time. The interface is shown below:



(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.



(2) Memory Mapping Area Operation

Memory mapping area divides into input area and output area.

Input mapping address range: 0x0000 ~ 0x01EB.

Output mapping address range: 0x4000 ~ 0x41EB.

Each grid represents one byte address.

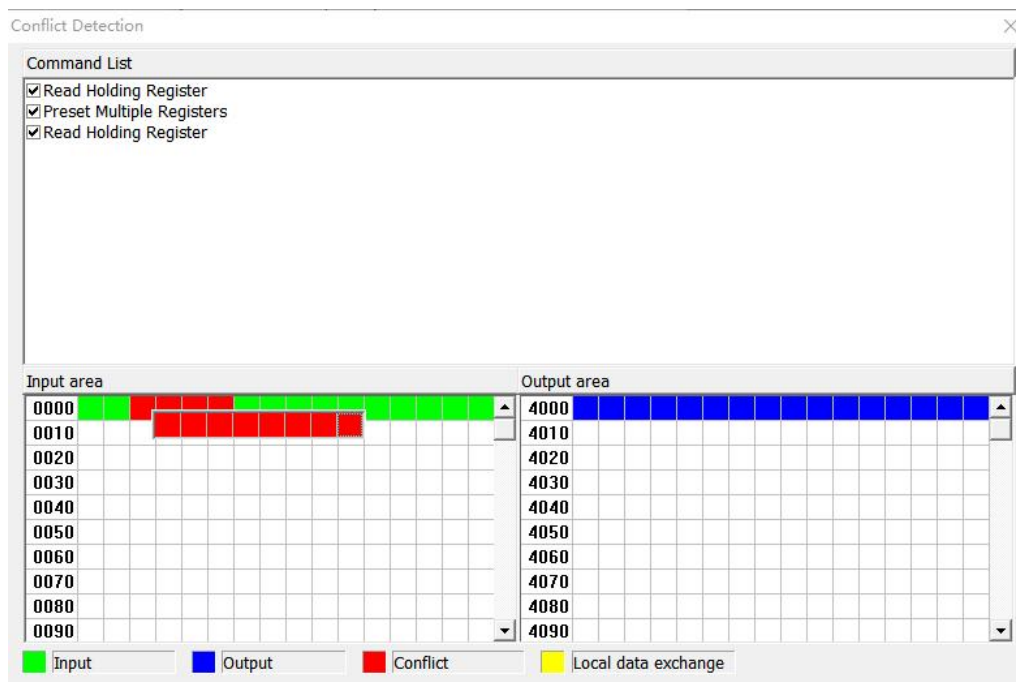
Green: Read command is shown in input mapping area, it will be in green without conflict.

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.

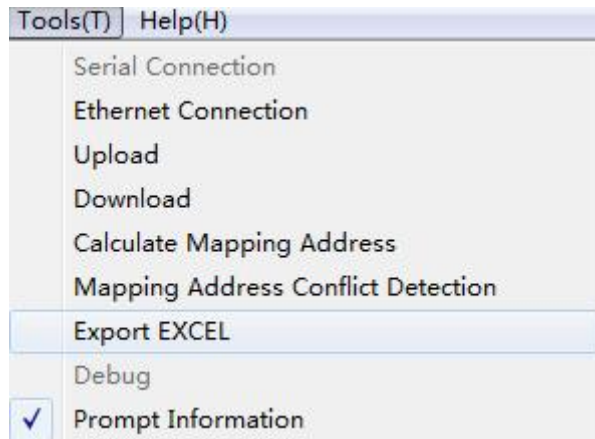
Click input/output area grids, each bit of relevant byte in the grid will show whether each bit is occupied. As is shown below:



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.

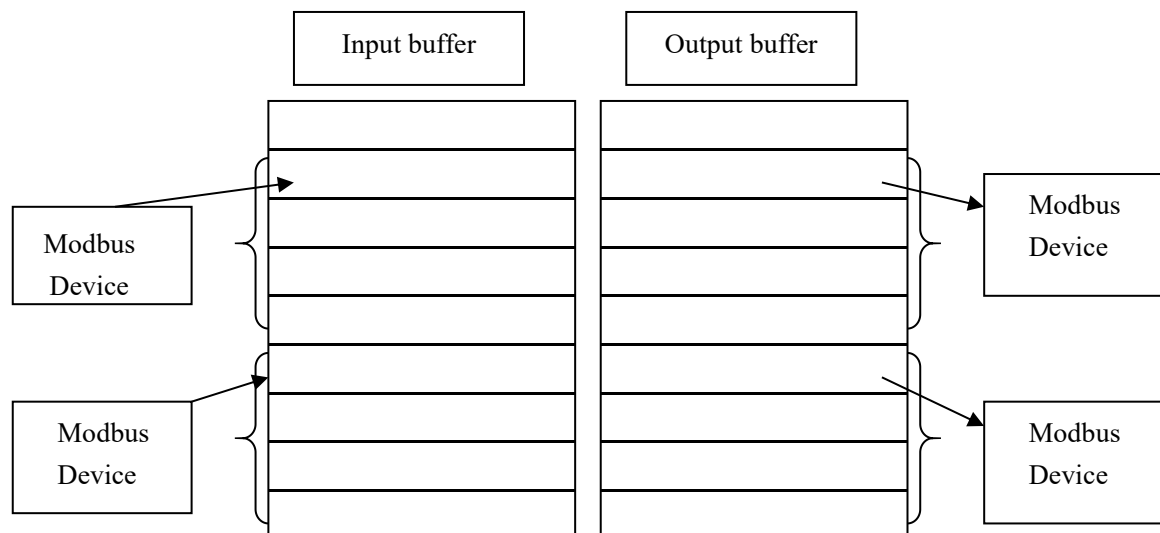


After clicking save, it will open the excel file automatically.

6 Working Principle

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 buffer is all for 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.



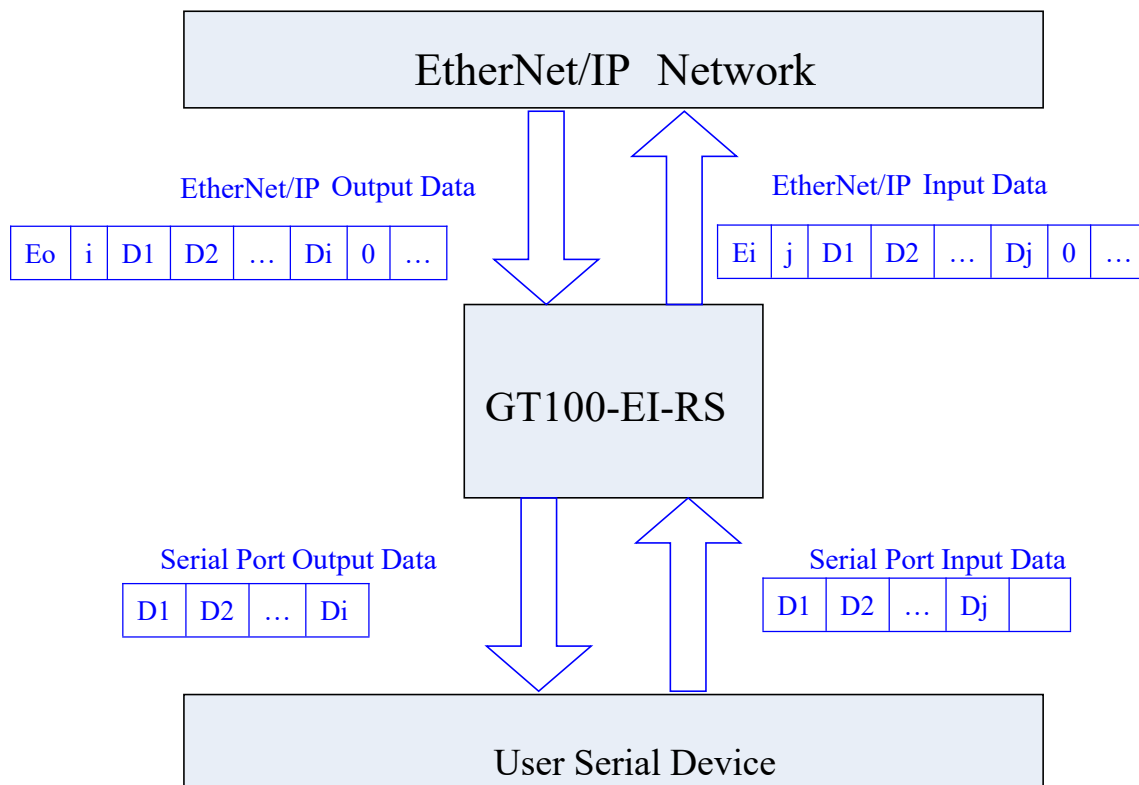
Users can configure at most 48 commands, each one Modbus command can read one group of continuous Modbus registers.



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 form serial. " D_1 " to " D_j " are data receiving form 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][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:

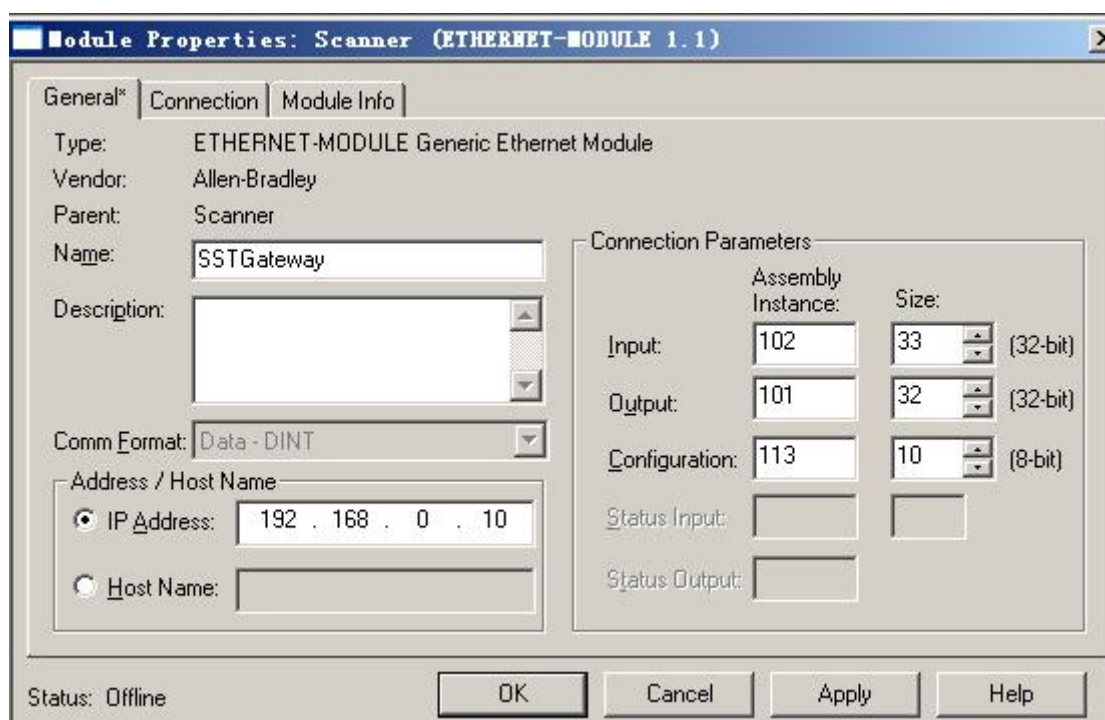
[01][03][04][05][06][00][00][00][00]

6.3 EtherNet/IP Connection Parameters

Connection parameters the gateway provides are as below:

- a. Input Instance: 102 (128 Bytes), 112 (256 Bytes), 122 (492 Bytes).
- b. Output Instance: 101 (128 Bytes), 111 (256 Bytes), 121 (492 Bytes).
- c. Configuration Instance: 103 (10 Bytes), 113 (10 Bytes), 123 (10 Bytes).

Take configuration parameters of RSLogix5000 as an example:



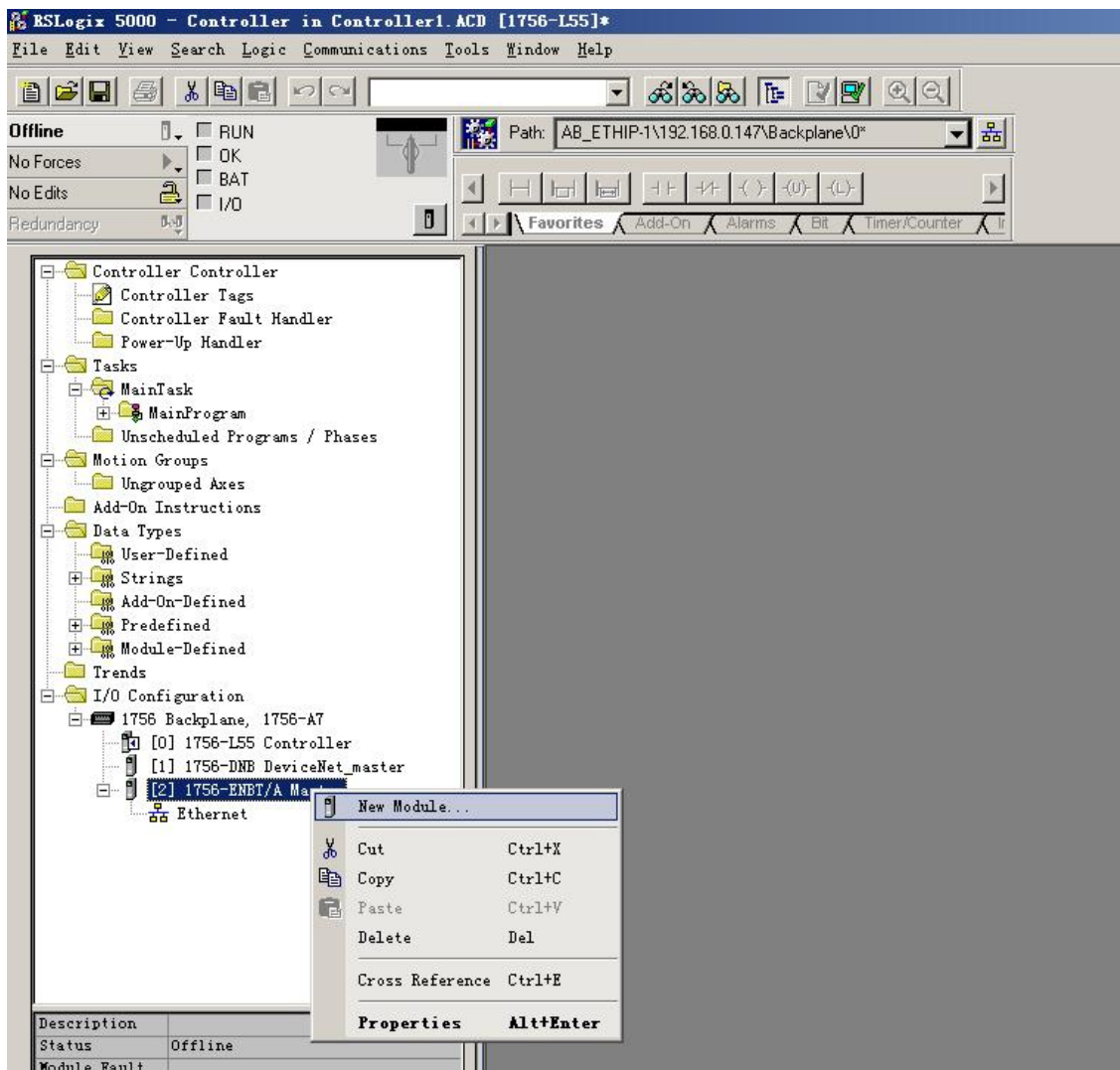
Notes: The "Size" (the bytes number that has been configured) in the above picture, is consistent with the input/output bytes number of Instance which has been configured in the configuration software SST-MI-CFG). In the above picture, "Size" is 32 (32x32/8=128) in the output bytes Instance101. Now, the relevant bytes number should also be 128 in the configuration software.

6.4 How to Read/Write I/O Data

6.4.1 Read and Write Data using I/O mode(Recommended)

The following RSLogix 5000 example will describe how to read/write I/O data using I/O mode.

Right click on EtherNet/IP scanner module, click "New Module", as shown below:

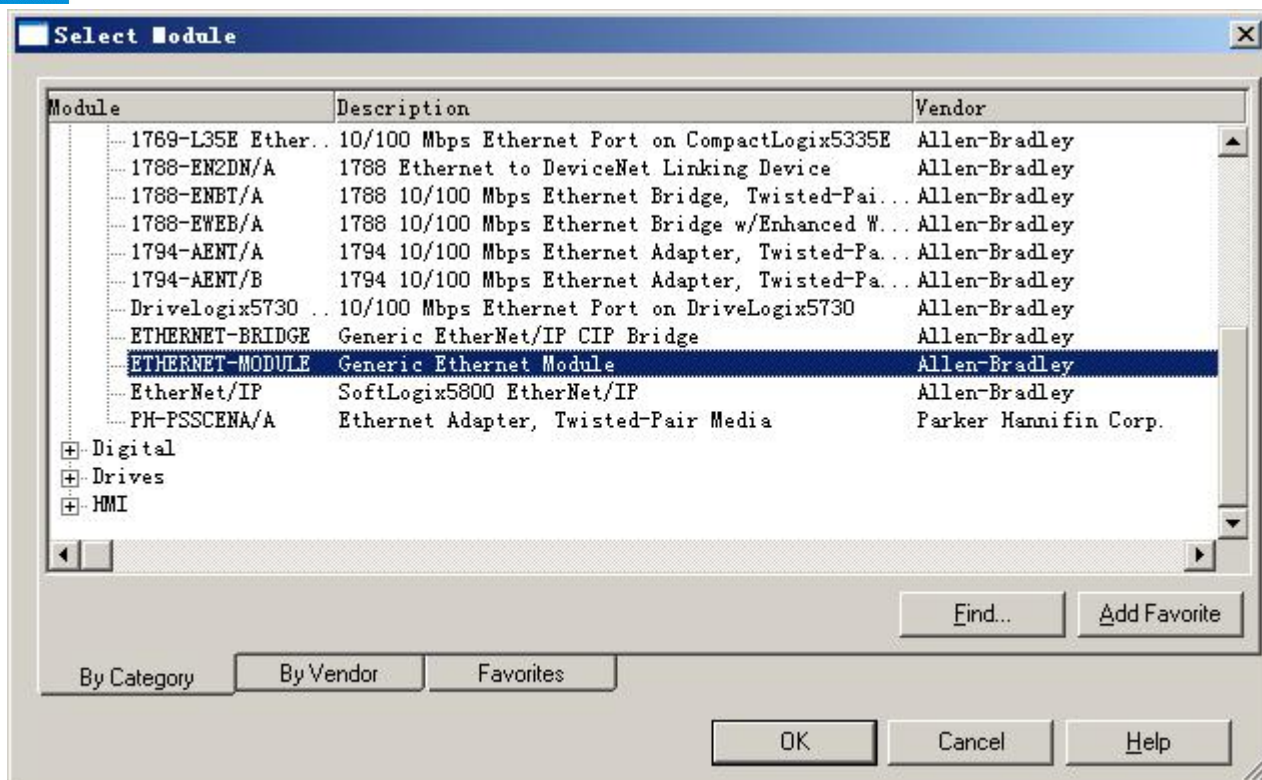


In the pop-up dialog box, unfold "+" before "Communications", choose "ETHERNET-MODULE", click "OK", as shown below:

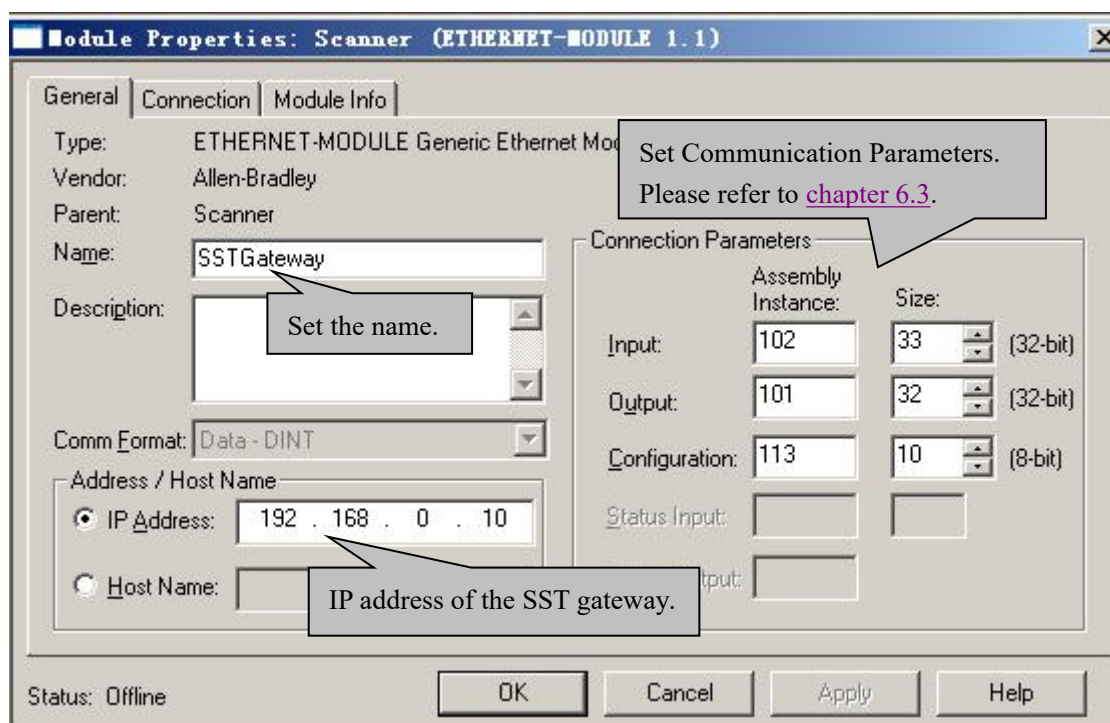
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Configure relevant information of GT100-EI-RS in the pop-up window, as shown below:



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

Name: Name the added EtherNet/IP adapter module (GT100-EI-RS module).

Comm Format: Configure data types. Users can choose data types as DINT, INT, SINT and REAL, etc. After

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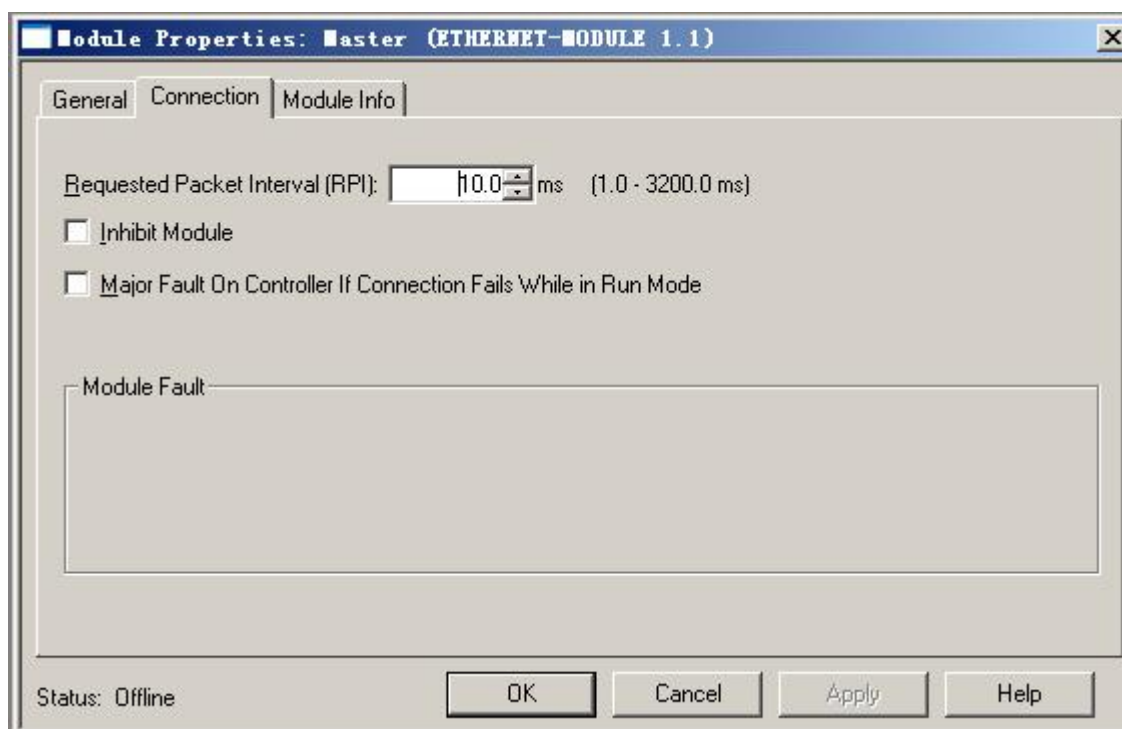
confirmation, this cannot be changed. If you want to change data types, you can create new module.

IP Address: Set IP address of the EtherNet/IP adapter module (IP address of GT100-EI-RS). IP address of GT100-EI-RS is the address downloaded into module through software SST-MI-CFG.

Connection Parameters: Set Connection parameters during communication, this parameter GT100-EI-RS supports can refer to past chapter.

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

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

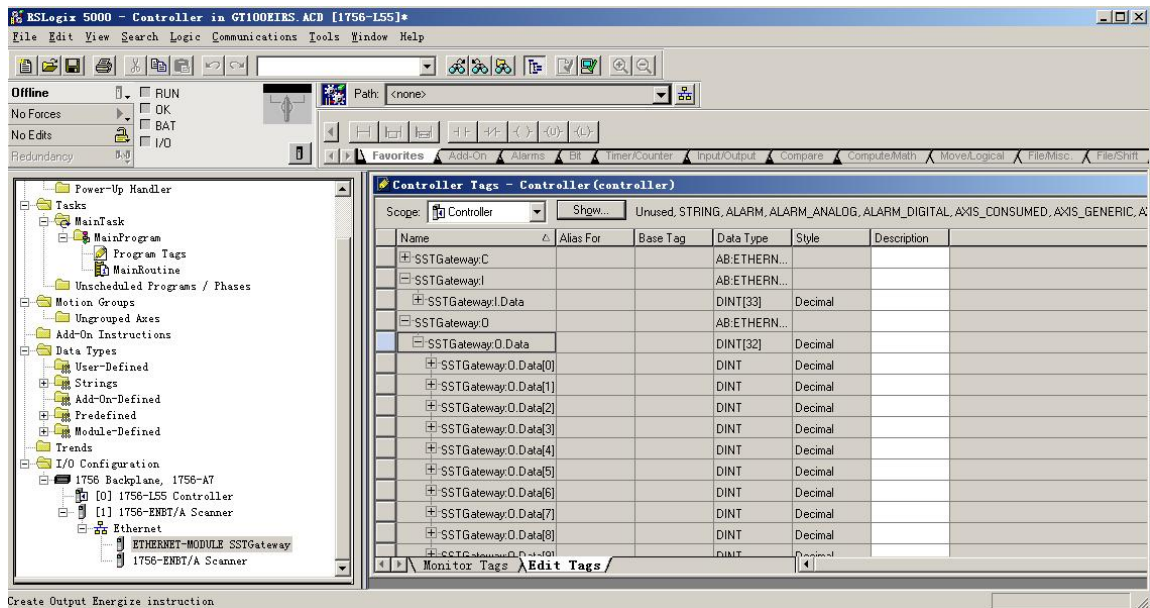


After setting this interval, click "OK" to save. Double click "Controller Tags", unfold "GT100EIRS: O", as shown below:

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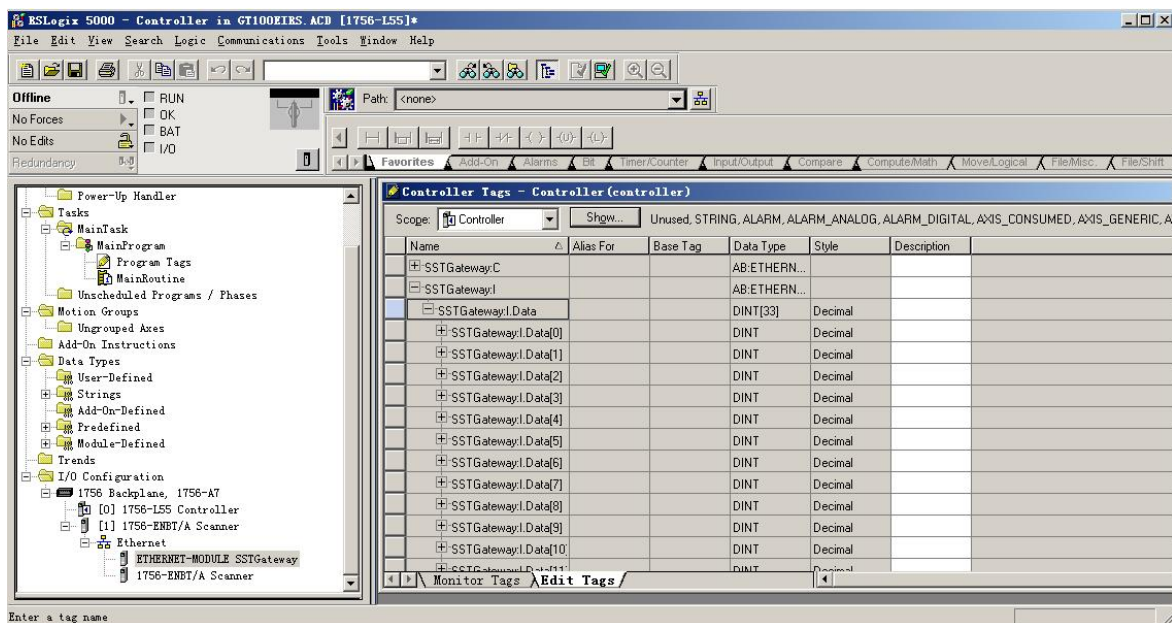
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In the above picture, SSTGateway:O.Data [0] ~SSTGateway:O.Data [31] is the corresponding output data address of GT100-EI-RS module in scanner.

Unfold "SSTGateway: I", as shown below:



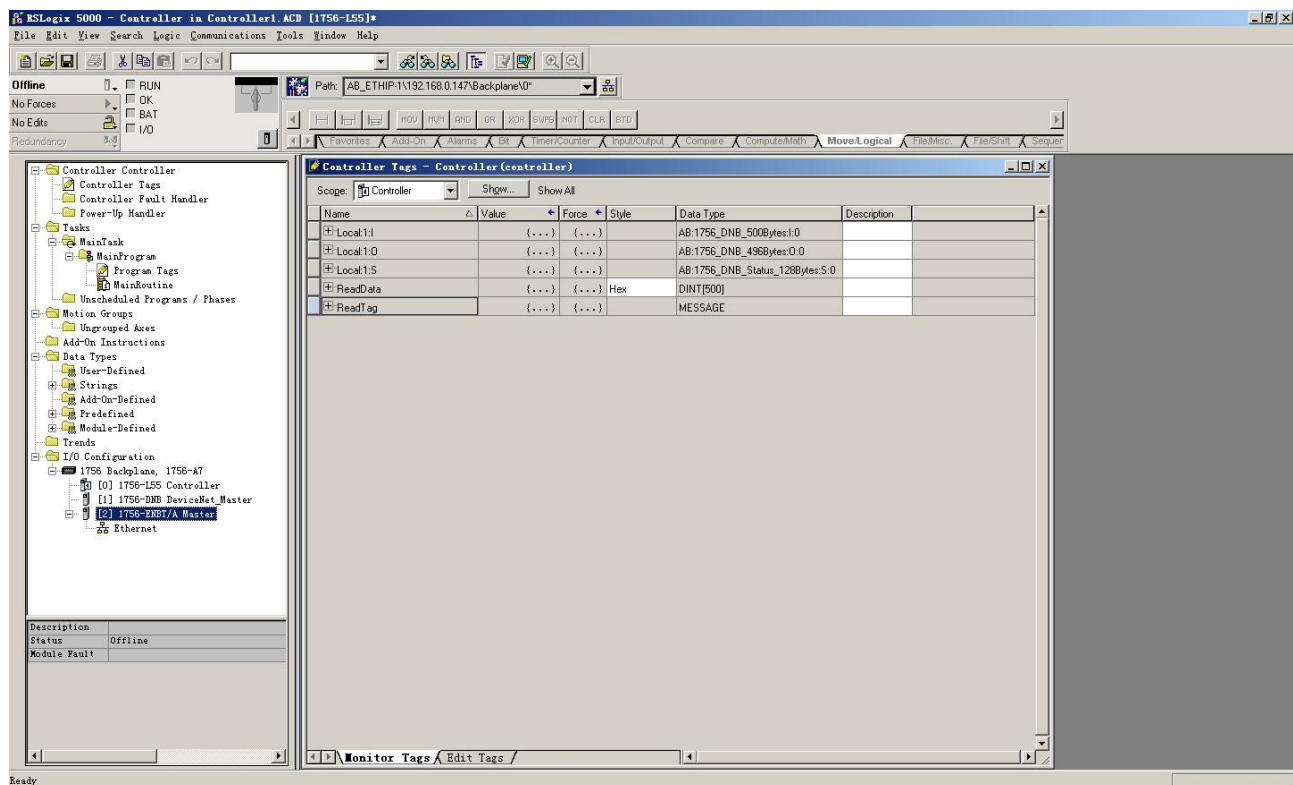
In the above picture, four bytes of SSTGateway: I. Data [0] is real time frame head of EtherNet/IP adapter. SSTGateway:I.Data [1] ~SSTGateway: I. Data [32] is the corresponding input data address of GT100-EI-RS module in scanner.

6.4.2 Read and Write Data using MSG

The following RSLogix 5000 example will describe how to read/write I/O data using MSG.

1 Read I/O Data

Create a new project. it is in the "Offline" mode. Add two new tags "ReadTag" and "ReadData" under the "Controller Tags" and set the type of "ReadTag" as "MESSAGE" and "ReadData" as "DINT [500]".

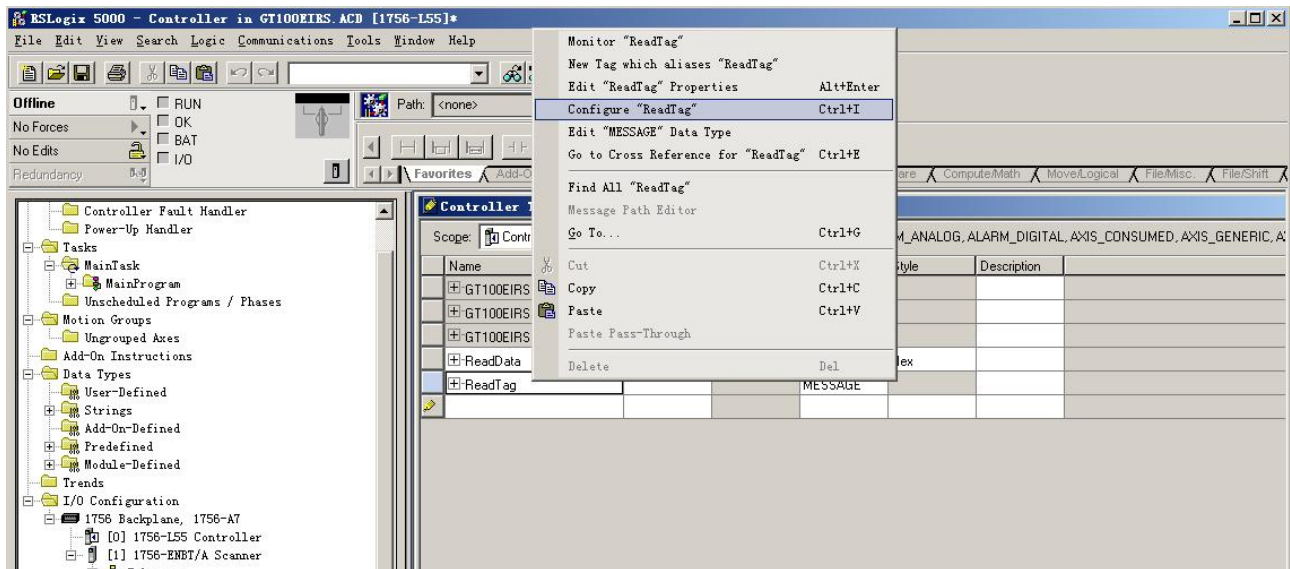


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Right click "ReadTag", select "Configure "ReadTag":



In the new pop-up window, it needs to set some parameters as below:

Message Type: CIP Generic

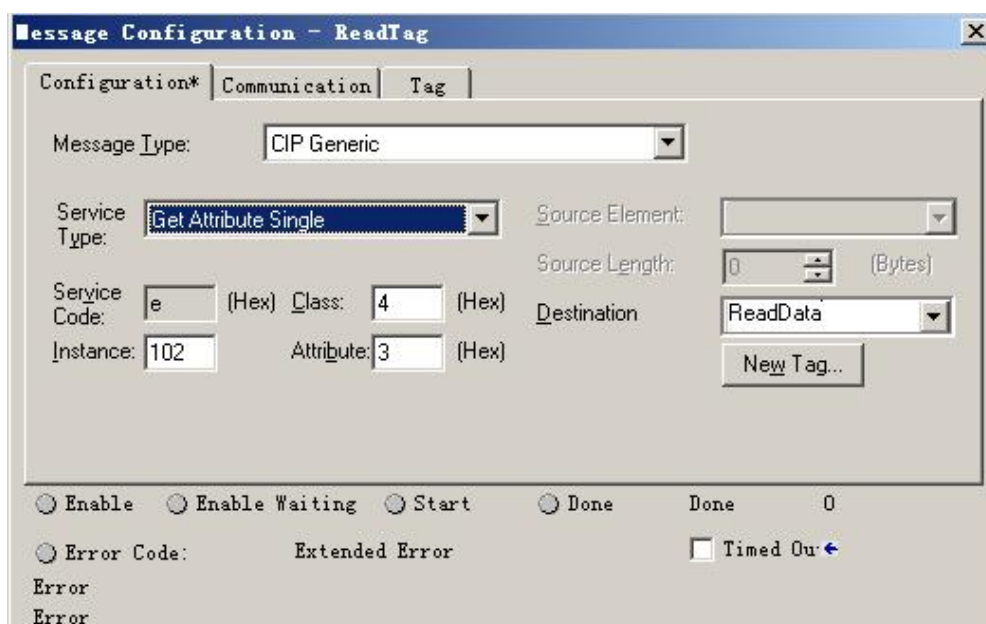
Service Type: Select "Get Attribute Single", now, relevant service code will become "e (Hex)"

Class: 4 (Hex)

Instance: 102 (128 Bytes), 112 (256 Bytes) and 122 (492 Bytes) can be set

Attribute: 3 (Hex)

Destination: Select "ReadData" label, now, the data that have been received will be saved in this tag.



Choose "Communication" label, input the relevant path of connecting EtherNet/IP adapter in the blank space

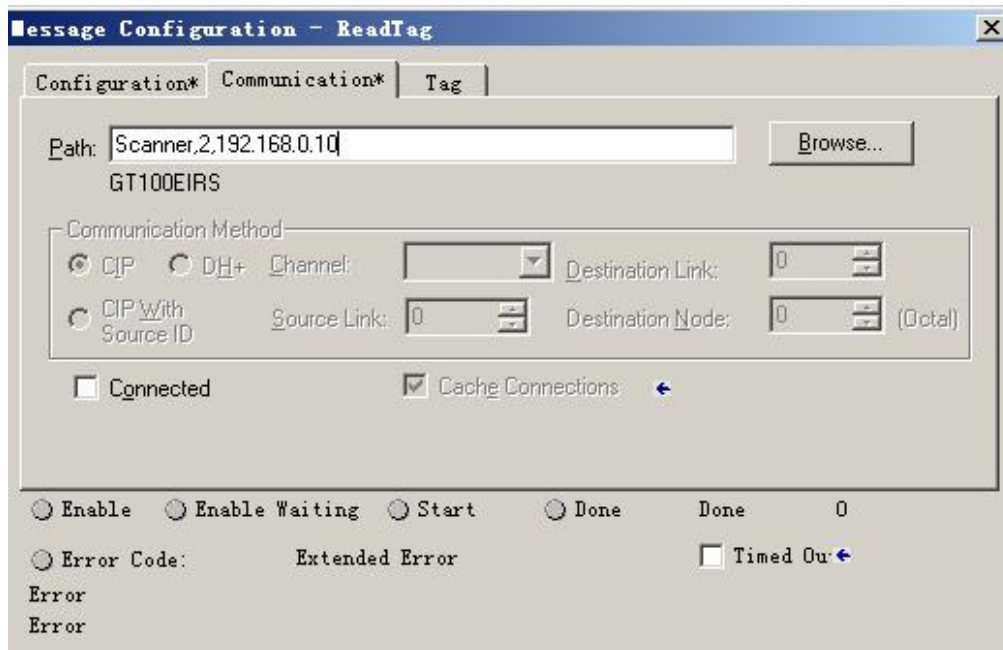
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behind the Path, the path format is: EtherNet/IP hostname, EtherNet/IP scanner slot No., IP address of EtherNet/IP adapter, after setting the path, click "Apply", "Confirm". As is shown below:

In this instance, EtherNet/IP hostname is "Scanner", EtherNet/IP scanner slot No. Is "2", EtherNet/IP adapter (GT100-EI-RS) is "192.168.0.10". IP address of GT100-EI-RS is the address which is downloaded into the module through SST-MI-CFG.

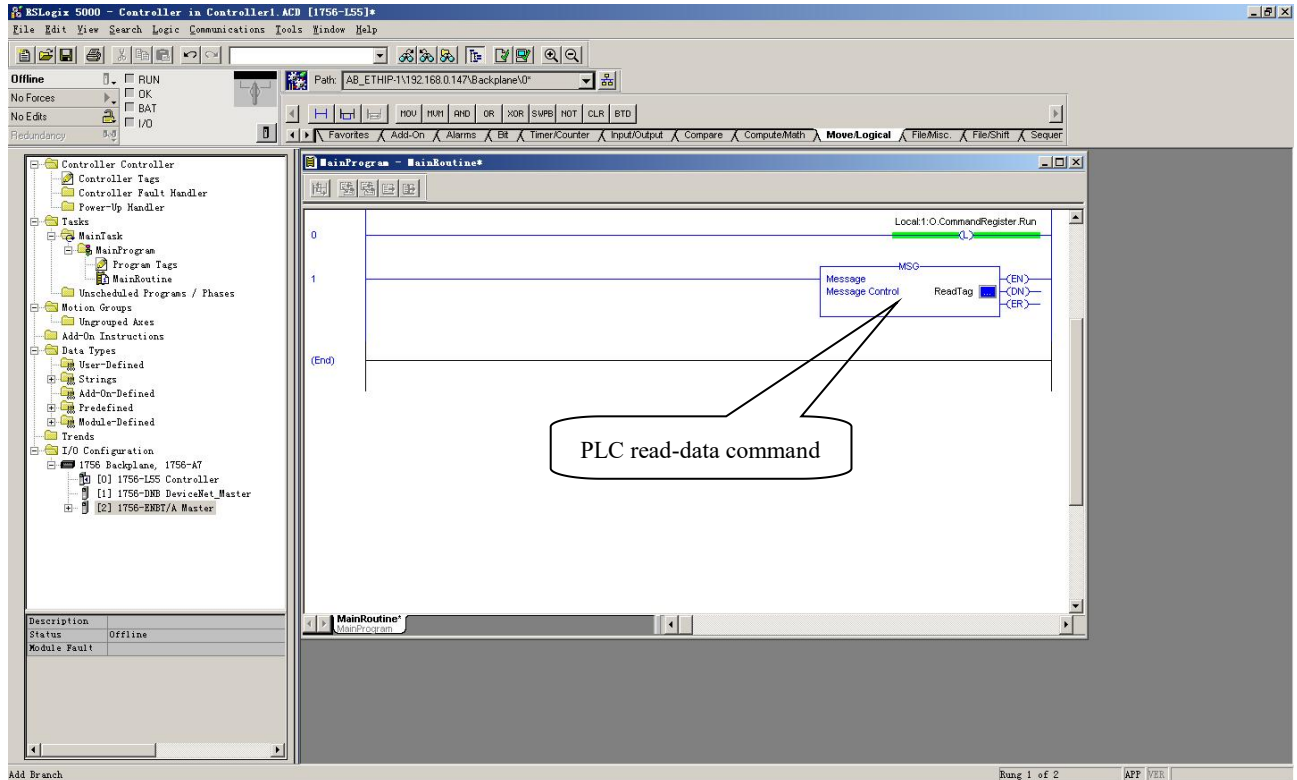


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Add a "MSG" command in "MainRoutine" under the "MainProgram" and choose "ReadTag" as "Message Control", as shown below:



This is a simple command which can sent a read request, it still needs to add some logic commands to trigger this command in common program. About the detailed information, please refer to RSLogix5000.

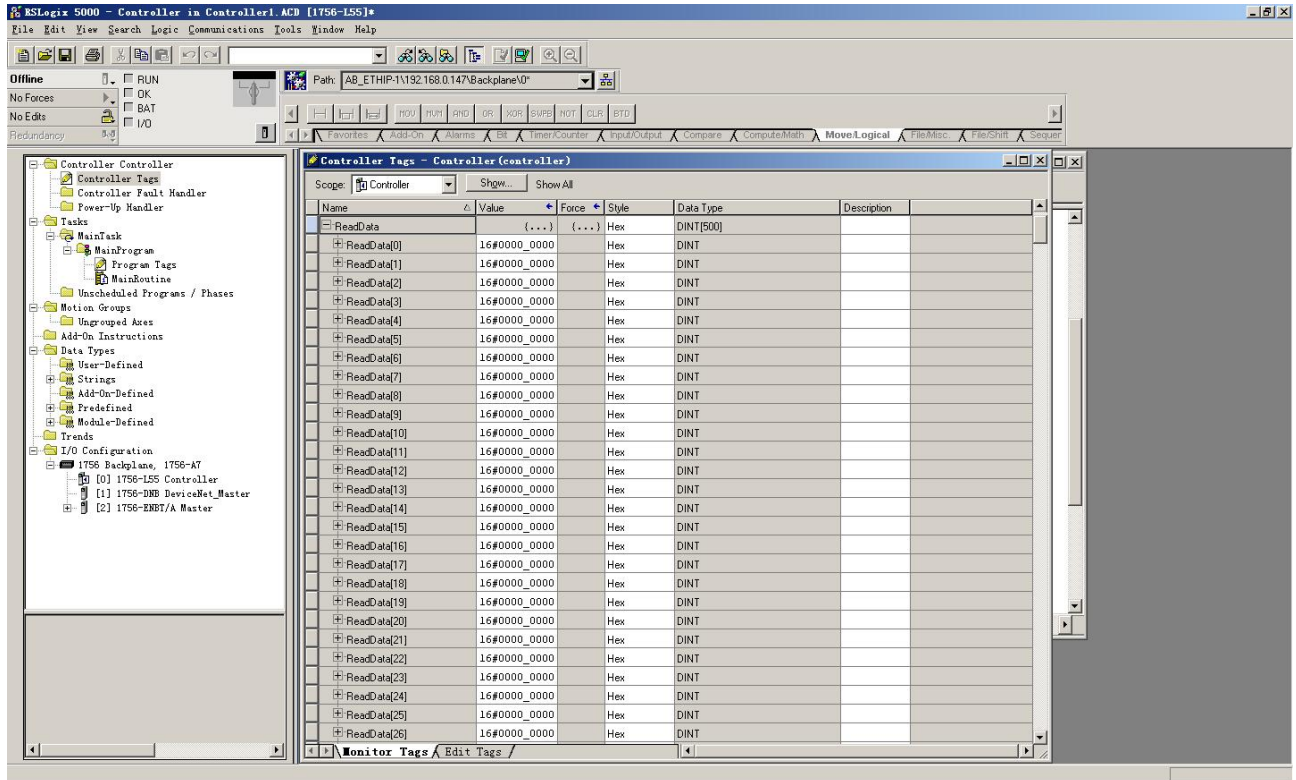
Download the program to the PLC and set PLC into "Online" state.

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Click "Control Tags" and select "Monitor Tags", unfold "ReadData", you will see that PLC can read the data of Modbus slave through the gateway GT100-EI-RS.



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2 Write I/O Data

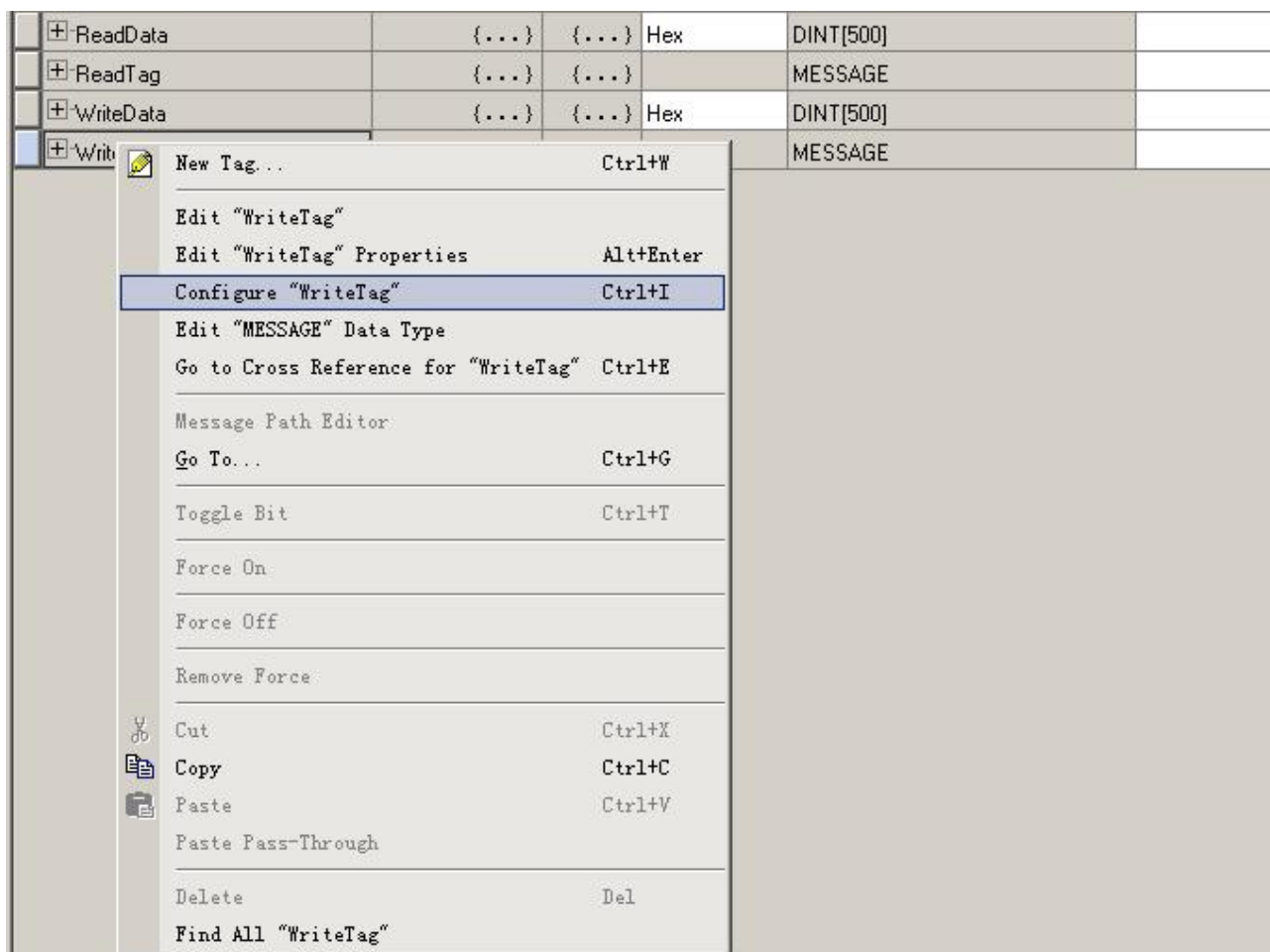
Enter the "Offline" mode, add two new tags "WriteTag" and "WriteData" under the "Controller Tags". Define the type of "WriteTag" as "MESSAGE" and "WriteData" as "DINT [500]":

The screenshot displays the RSLogix 5000 software interface. At the top, two 'New Tag' dialog boxes are shown side-by-side. The left dialog is for 'WriteData' with 'Data Type' set to 'DINT[500]'. The right dialog is for 'WriteTag' with 'Data Type' set to 'MESSAGE'. Below these, the main software window is visible in 'Offline' mode. The 'Controller Tags' table is open, showing a list of tags under the 'Controller' scope. The table has columns for Name, Value, Force, Style, Data Type, and Description. The 'WriteData' tag is highlighted, and its sub-tags are listed below it.

Name	Value	Force	Style	Data Type	Description
Local1:I	(...)	(...)		AB:1756_DNB_500Bytes:0	
Local1:O	(...)	(...)		AB:1756_DNB_496Bytes:0:0	
Local1:S	(...)	(...)		AB:1756_DNB_Status_128Bytes:0:0	
ReadData	(...)	(...)	Hex	DINT[500]	
ReadTag	(...)	(...)		MESSAGE	
WriteData	(...)	(...)	Hex	DINT[500]	
WriteData[0]	16#0000_0000		Hex	DINT	
WriteData[1]	16#0000_0000		Hex	DINT	
WriteData[2]	16#0000_0000		Hex	DINT	
WriteData[3]	16#0000_0000		Hex	DINT	
WriteData[4]	16#0000_0000		Hex	DINT	
WriteData[5]	16#0000_0000		Hex	DINT	
WriteData[6]	16#0000_0000		Hex	DINT	
WriteData[7]	16#0000_0000		Hex	DINT	
WriteData[8]	16#0000_0000		Hex	DINT	
WriteData[9]	16#0000_0000		Hex	DINT	
WriteData[10]	16#0000_0000		Hex	DINT	
WriteData[11]	16#0000_0000		Hex	DINT	
WriteData[12]	16#0000_0000		Hex	DINT	
WriteData[13]	16#0000_0000		Hex	DINT	
WriteData[14]	16#0000_0000		Hex	DINT	
WriteData[15]	16#0000_0000		Hex	DINT	
WriteData[16]	16#0000_0000		Hex	DINT	
WriteData[17]	16#0000_0000		Hex	DINT	
WriteData[18]	16#0000_0000		Hex	DINT	
WriteData[19]	16#0000_0000		Hex	DINT	
WriteData[20]	16#0000_0000		Hex	DINT	
WriteData[21]	16#0000_0000		Hex	DINT	

Enter the "Monitor Tags" interface. input some data beginning from address WriteData[0] in the "WriteData" tag. There data will be outputted to GT100-EI-RS through PLC and write these data to Modbus slave devices through Modbus write command.

Right click "WriteTag", select "Configure "WriteTag"":



In the new pop-up window, it needs to configure as below:

Message Type: CIP Generic

Service Type: Select "Set Attribute Single", now, relevant Service Code will become "10 (Hex)"

Class: 4 (Hex)

Instance: 101 (128Bytes), 111 (256Bytes) and 121 (492Bytes)

Attribute: 3 (Hex)

Source Element: Select "WriteData" tag, it indicates the data in the "WriteData" tag will become the data PLC outputs.

Source Length: Use byte as unit, this value should be less than or equal to the current selecting bytes which Instance represents (Configured bytes number in SST-MI-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: 128 (Bytes)

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

Instance: 101 Attribute: 3 (Hex)

New Tag...

☐ Enable ☐ Enable Waiting ☐ Start ☐ Done Done 0

☐ Error Code: Extended Error ☐ Timed Out

Error

Choose "Communication" label, input the relevant path of connecting EtherNet/IP adapter in the blank space behind the Path, the path format is: EthetNet IP hostname, EtherNet/IP scanner slot No., IP address of EtherNet/IP adapter, after setting the path, click "Apply", "Confirm". As is shown below:

Message Configuration - WriteTag

Configuration Communication* Tag

Path: Scanner,2,192.168.0.10 Browse...

SST_Gateway

Communication Method

☒ CIP ☐ DH+ Channel: Destination Link: 0

☐ CIP With Source ID Source Link: 0 Destination Node: 0 (Octal)

☐ Connected ☒ Cache Connections

☐ Enable ☐ Enable Waiting ☐ Start ☐ Done Done 0

☐ Error Code: Extended Error ☐ Timed Out

Error

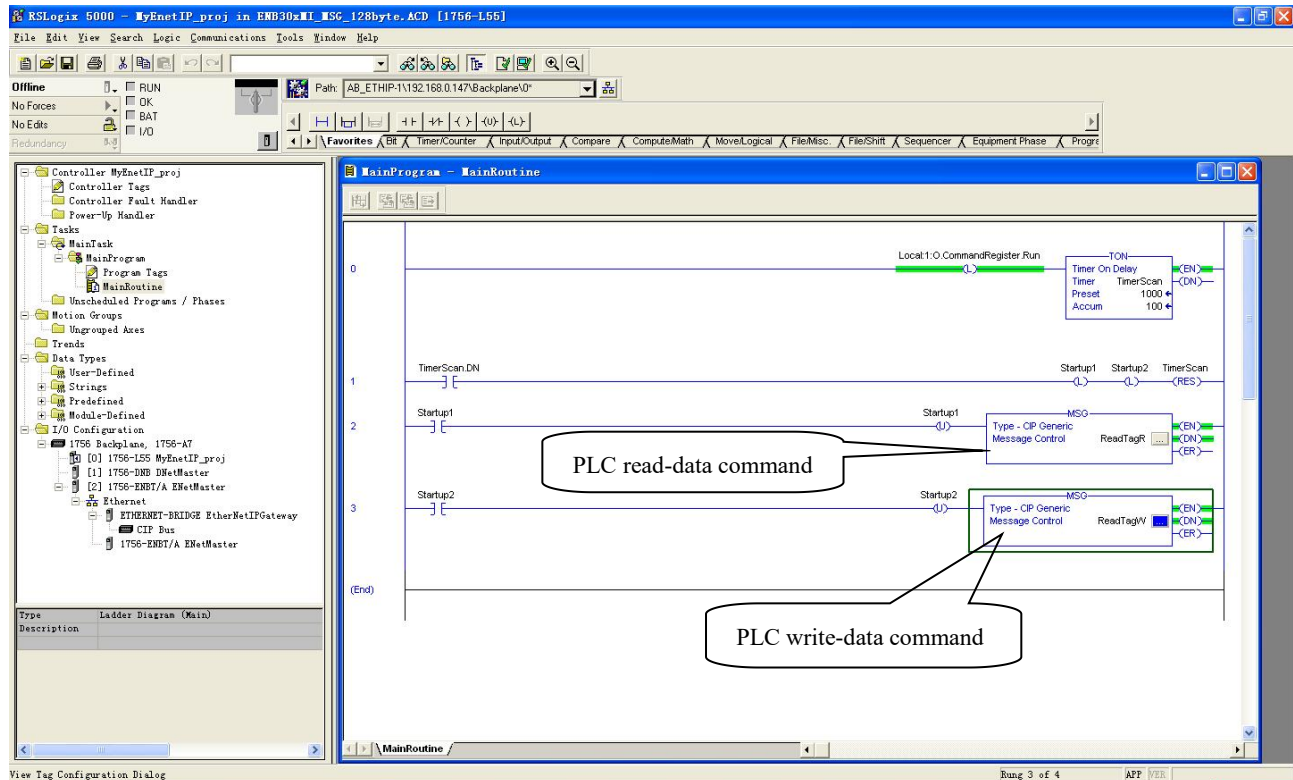
In this instance, EtherNet/IP hostname is "Scanner", EtherNet/IP scanner slot No. Is "2", EtherNet/IP adapter (GT100-EI-RS) is "192.168.0.10". IP address of GT100-EI-RS is the address which is downloaded into the module through SST-MI-CFG.

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Add a "MSG" command in "MainRoutine" under the "MainProgram" and choose "WriteTag" as "Message Control", as shown below:



Download PLC program to the PLC and set PLC to "Online" state, the data in "WriteData" will be outputted to Modbus slave through GT100-EI-RS (EtherNet/IP adapter).