

Modbus TCP / PROFINET Gateway GT200-PN-MT

User Manual

V2.0



SST Automation

E-mail: support@sstautomation.com

www.SSTAutomation.com



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.

Copyright

Copyright © 2024 by SST Automation. All rights reserved.

Trademark



is the registered trade mark of SST Automation.

Technical Support Contact Information

www.sstautomation.com

E-mail: Support@sstautomation.com

Table of Contents

1 Product Overview	5
1.1 Product Overview	5
1.2 Product Features	5
1.3 Technical Specifications	5
1.4 Related Products	8
1.5 Revision History	8
2 Hardware Descriptions	9
2.1 Product Appearance	9
2.2 Indicators	10
2.3 Button	10
2.4 Interface	11
2.4.1 Power Interface	11
2.4.2 Ethernet Interface	11
3 Hardware Installation	12
3.1 Mechanical Dimension	12
3.2 Installation Method	12
4 Quick Start Guide	13
4.1 Connection	13
2.2 Configuration	13
5 Software Instructions	15
5.1 Main Interface	15
5.2 Tree View Operations	17
5.2.1 Edit the Items in the Left Tree View	17
5.3 The Operation of Configuration Interface	19
5.3.1 Interface of PROFINET Configuration	19
5.3.2 Modbus TCP Client Configuration	20
5.3.3 Modbus TCP Server Configuration	26
5.4 Tool	28
5.4.1 Locate	28
5.4.2 View Device Information	29
5.4.3 Upload Config and Download Config	30
5.4.5 Auto Mapping	32
5.4.6 Conflict Detect	32
5.4.7 Export Xls	34
5.4.8 Debug	35
5.5 Save and Open Configuration	36
5.5.1 Save Configuration Project	36
5.5.2 Open Configuration Project	37
6 Working Principle	38
6.1 Modbus TCP Master	38



GT200-PN-MT
Modbus TCP/PROFINET Gateway
User Manual

6.2 Modbus TCP Server	39
7 Typical Application	41
7.1 Modbus TCP Server devices Interconnect with PROFINET Master PLC	41
7.2 Modbus TCP Client Devices Interconnect with PROFINET Master PLC	42



1 Product Overview

1.1 Product Overview

The GT200-PN-MT is a gateway which can realize the interconnection of different industrial Ethernet devices. The gateway supports Modbus TCP client/server and PROFINET slave. It can finish the data exchange between Modbus TCP network and PROFINET network. It supports the interconnection of Schneider PLCs and Siemens PLCs, and can also connect the Modbus TCP server devices to the PROFINET network.

1.2 Product Features

- Dual network segment communication capability: Provides dual Ethernet ports for each network, specially designed to meet the data transmission needs between different network segments
- Large-capacity data processing: With a maximum input and output of 1428 bytes, it can meet various large-volume application scenarios and help users process more business-critical data.
- Efficient communication mode: Provides two output command modes, serial output and parallel output, to meet diverse communication needs and improve the over all communication efficiency of the system.
- Real-time network monitoring: Built-in network status monitoring function, real-time monitoring of the device connection status on the PROFINET or Modbus TCP side to ensure the continuity of device online and data transmission.
- Flexible access device: Modbus TCP port configuration is flexible, supports more device access, meets large-scale system integration needs, and improves interoperability between devices.

1.3 Technical Specifications

[1] The gateway has 4 Ethernet interfaces (PROFINET P1/P2 and Modbus TCP P3/P4):

- ◆ PROFINET Ethernet interfaces supports cascading, Modbus TCP network port supports cascading.
- ◆ Cascading between PROFINET network port and Modbus TCP network port is not supported.

[2] PROFINET side acts as a slave device.



GT200-PN-MT

Modbus TCP/PROFINET Gateway

User Manual

- ◆ Support RT and IRT protocols of standard PROFINET.
- ◆ Supports PROFINET MRP ring redundancy function.
- ◆ Supports ODVA standard PROFINET protocol.
- ◆ PROFINET supports up to 32 slots, the maximum number of input bytes is 1440 and the maximum number of output bytes is 1440.(The length available to the user is limited by the specific PLC and PDU size of the communication module. When configuration the slot, each slot will take up 1 or 2 bytes of status bit information, so it can actually store up to 1428 bytes of valid data, 512+512+256+128+16+4) Slots can be configured in the PLC.
- ◆ The supported PROFINET module types are as follows:
 - **Input 001 byte**
 - **Input 002 bytes**
 - **Input 004 bytes**
 - **Input 008 bytes**
 - **Input 016 bytes**
 - **Input 032 bytes**
 - **Input 064 bytes**
 - **Input 128 bytes**
 - **Input 256 bytes**
 - **Input 512 bytes**
 - **Output 001 byte**
 - **Output 002 bytes**
 - **Output 004 bytes**
 - **Output 008 bytes**
 - **Output 016 bytes**
 - **Output 032 bytes**
 - **Output 064 bytes**
 - **Output 128 bytes**
 - **Output 256 bytes**

- **Output 512 bytes**
- **Input / Output 001 byte**
- **Input / Output 002 bytes**
- **Input / Output 004 bytes**
- **Input / Output 008bytes**
- **Input / Output 016 bytes**
- **Input / Output 032 bytes**
- **Input / Output 064 bytes**
- **Input / Output 128 bytes**
- **Input/Output 256 bytes**
- **Input/Output 512 bytes**

[1] Modbus TCP side:

- ◆ Supports byte swap function: no swap, two byte swap, four byte swap.
- ◆ Supports server port setting, the default is 502.

[2] Modbus TCP act as client:

- ◆ Supports access to up to 72 Modbus TCP servers/slaves.
- ◆ Supports founction codes: 01H, 02H, 03H, 04H, 05H, 06H, 0FH, 10H, 17H.
- ◆ Supports up to 300 commands.
- ◆ Supports 2 command output modes: serial output and parallel output.

[3] Modbus TCP act as server:

- ◆ Support connect up to 72 modbus TCP clients/masters.
- ◆ Supports founction code: 03H, 04H, 06H, 16H, 17H.
- ◆ Supports the exchange of function codes 1 and 2 and function codes 3 and 4.

[4] Power supply: 24VDC (9~30VDC), 90mA (24VDC).

[5] Operating temperature: -4°F~140°F (-20°C~60°C). Humidity: 5% ~ 95% (non-condensing).

[6] Dimensions (W*H*D): 1.3 in*4.6 in*4.1 in (34mm*116mm*105mm).

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

[8] Protection level: IP20.



1.4 Related Products

The related products include: GT200-PN-RS, GT200-DP-MT etc.

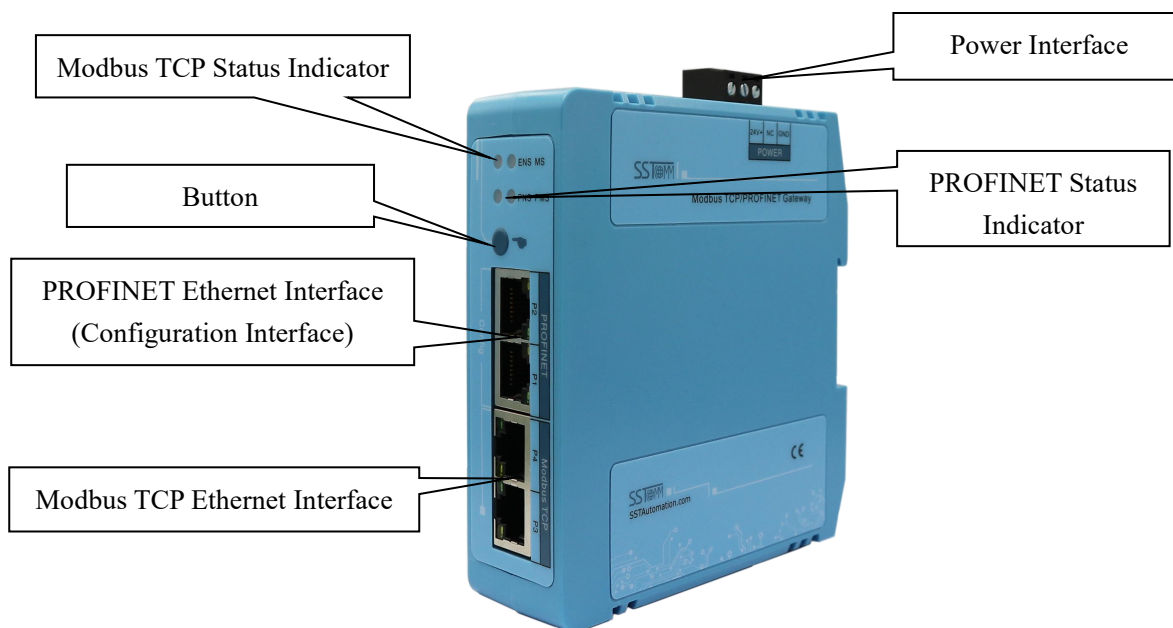
To get more information about related products, please visit SSTCOMM website: www.sstautomation.com

1.5 Revision History

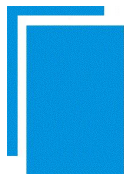
Revision	Date	Chapter	Description
V2.0	10/24/2024	PART	Increase the Modbus TCP connection performance, support PROFINET MRP ring redundancy function.
V1.2	7/25/2024	ALL	New Release

2 Hardware Descriptions

2.1 Product Appearance



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

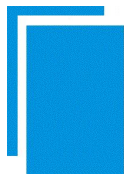


2.2 Indicators

Indicators	Status	Descriptions
MS	Green on	Startup completed
	Blinking(Red) (lasts 3 seconds)	Locate Function
PMS	Green on	PROFINET connection is established
	Blinking(Red) (lasts 3 seconds)	Start-up state, waiting to initialize
PNS	Green on	Establish a connection with the PLC and communicate normally
	Red on	Network cable not plugged in
	Blinking(Red) (1Hz)	Initialize completed, not established a connection with the PLC
	Blinking(Red) (2Hz)	The physical connection does not match the configuration in IRT mode
ENS Modbus TCP Client Mode (Modbus TCP network status indicator)	Green on	Modbus TCP all node connections have been established
	Green blinking quickly (on 500ms, off 500ms)	Modbus TCP connection is not established
	Green blinking slowly (1700ms on, 300ms off)	Modbus TCP Some nodes have been connected (Not all nodes have been connected)
	Blinking(Red) (lasts 3 seconds)	Node disconnection
	Blinking(Red)	All nodes are disconnected (failed to establish connection)
ENS Modbus TCP Server Mode (Modbus TCP network status indicator)	Green on	Modbus TCP connection established
	Blinking(Green)	Modbus TCP connection not established or disconnected
	Blinking(Red) (lasts 3 seconds)	Node disconnection

2.3 Button

Restore Factory Settings: Press and hold the button for 5 seconds within 10 seconds after the device is powered on (the PMS light is always on). The PMS light will green blinking (2Hz), and click the button within 5 seconds, the PMS light will off, the device will be restored to factory settings and automatically restart. If the button is not pressed within 5 seconds, the PMS light will return to normal display, and the device will resume normal



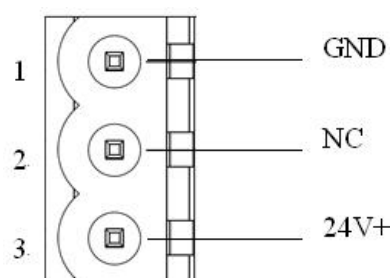
operation.

2.4 Interface

2.4.1 Power Interface

The GT200-PN-MT has one power interface, recommended for a 24V DC power supply.

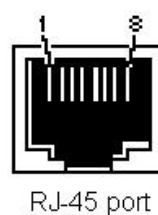
Pin	Function
1	GND
2	NC, not connected
3	24V+ , DC 24V



2.4.2 Ethernet Interface

The Ethernet interface uses RJ45 interface, follows the IEEE802.3u 100BASE-T standard. Its pinout (standard Ethernet signal) is defined as below:

Pin	Signal Description
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-



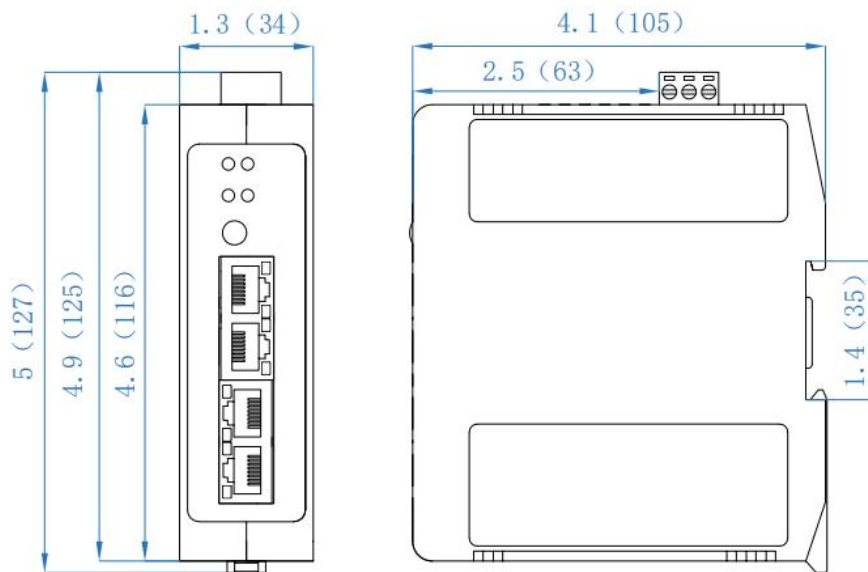


3 Hardware Installation

3.1 Mechanical Dimension

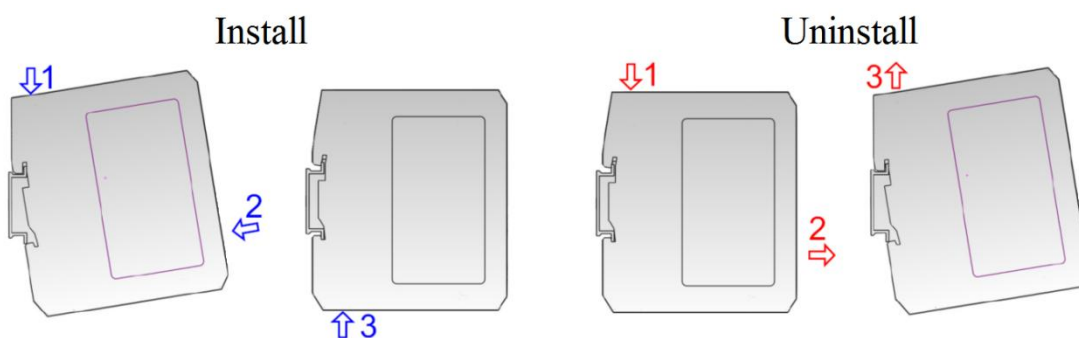
Size (width * height * depth):

1.3 in * 4.6 in * 4.1 in (34mm * 116mm * 105mm)



3.2 Installation Method

Using 1.4 in (35mm) DIN RAIL.



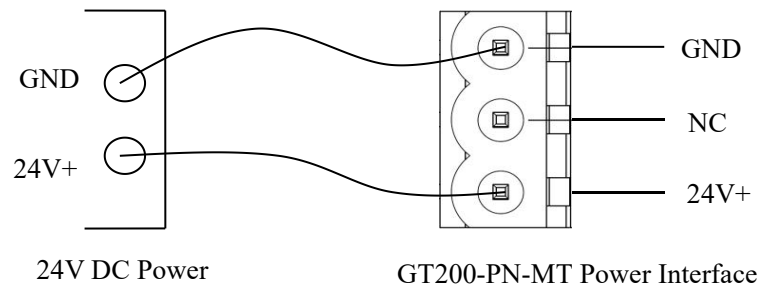


4 Quick Start Guide

4.1 Connection

1. Connect the power supply as follows.

Note: Please do not power on the devices before finishing all the connections.



2. Connect the gateway's PROFINET network port to the PC with a network cable for configuring the gateway.
And use other network cables to connect to Modbus TCP network and PROFINET network equipment.
3. Power on the GT200-PN-MT gateway.

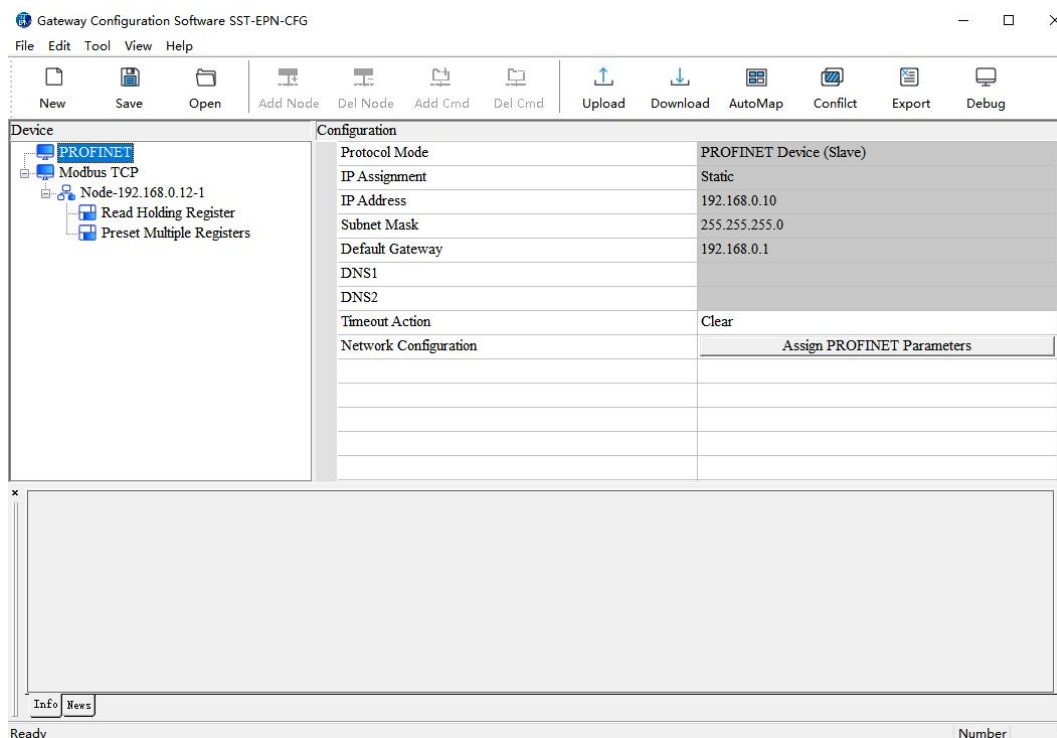
2.2 Configuration

1. Download the configuration software SST-EPN-CFG from <https://www.sstautomation.com/Download1/> and install it. Open the software and enter the configuration interface.
2. Configure the PROFINET Interface parameters.

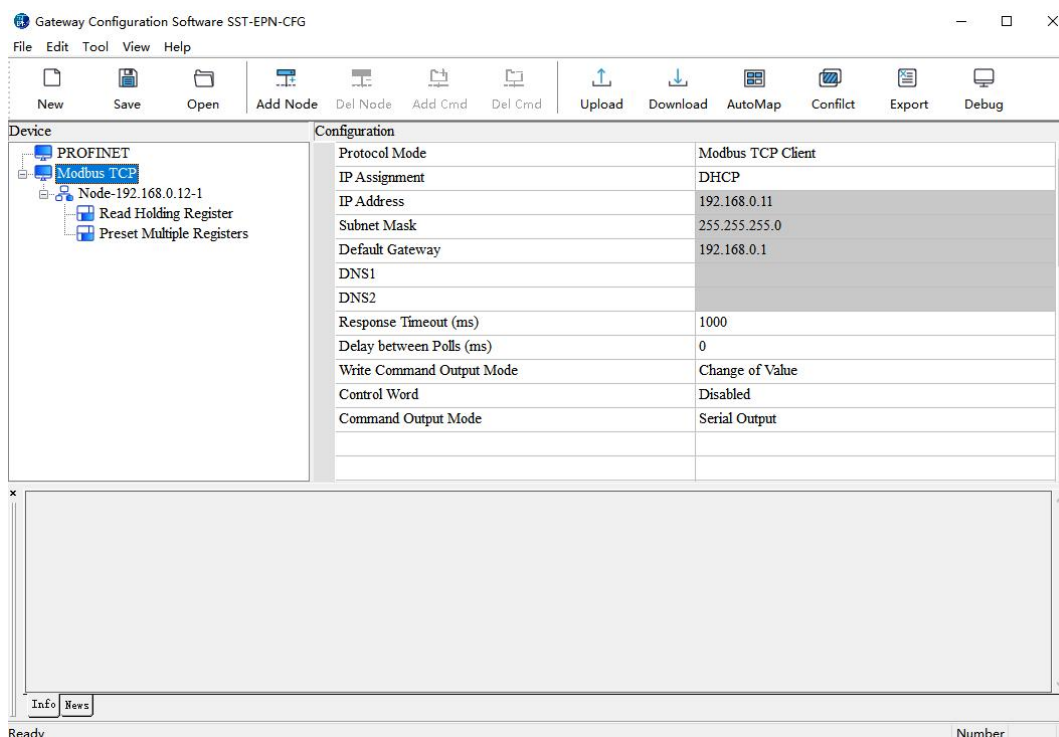
GT200-PN-MT

Modbus TCP/PROFINET Gateway

User Manual



3. Configure the Modbus TCP Interface parameters.



4. Check the mapping buffer. Use the "Auto Mapping" functions.

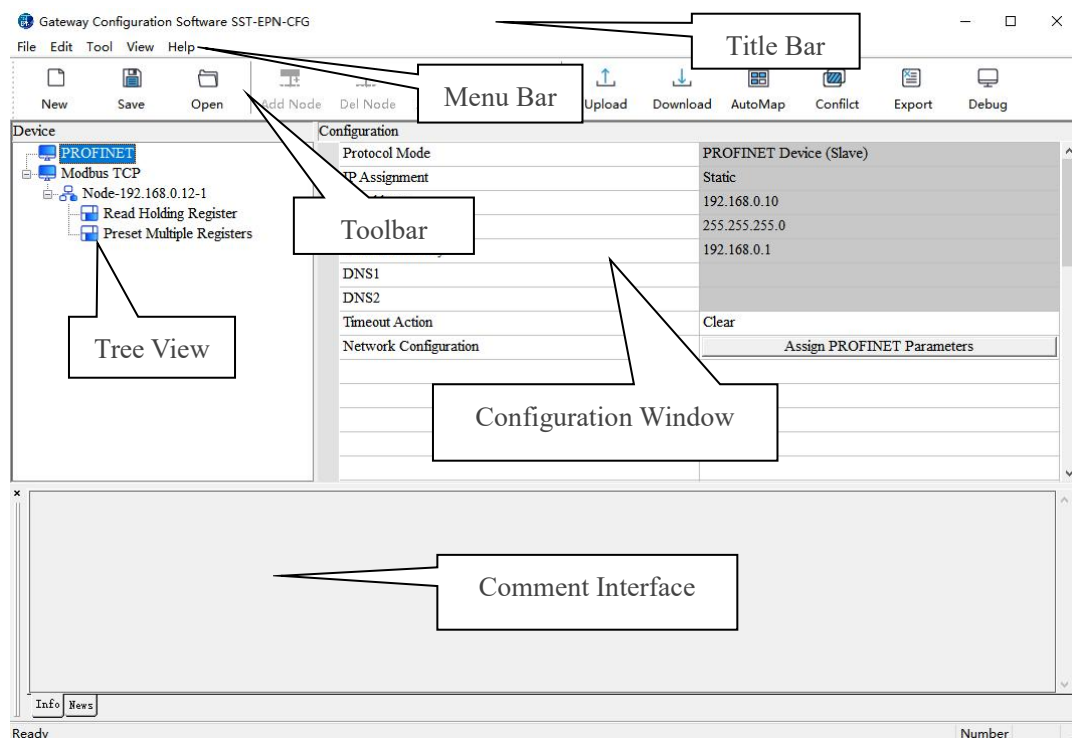
5. Save the configuration and download to the gateway.

5 Software Instructions

5.1 Main Interface

SST-EPN-CFG is the software based on Windows platform. It is used to configure GT200-PN-MT series gateway and set the relevant parameters of two different industrial Ethernet.

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



Remark: All the gray part in the software cannot be changed.

Toolbar

Toolbar is shown as below:



The toolbar provides icon shortcuts to major functions.

GT200-PN-MT

Modbus TCP/PROFINET Gateway

User Manual



New

New: Create a new configuration project.



Save

Save: Save current configuration.



Open

Open: Open a configuration project.



Add Node

Add Node: Add a Modbus TCP server node.



Del Node

Del Node: Delete a Modbus TCP server node.



Add Cmd

Add Command: Add a Modbus command.



Del Cmd

Delete Command: Delete a Modbus command.



Upload

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



Download

Download Config: Download the configuration file to the gateway.



AutoMap

Auto Mapping: Used to automatically calculate the mapped memory address without confliction by each command.



Conflict

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



Export

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



Debug

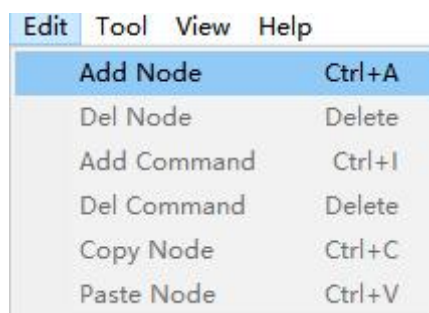
Debug: Monitor the gateway memory buffer data.

5.2 Tree View Operations

5.2.1 Edit the Items in the Left Tree View

Users can edit the items in the left tree view three different ways:

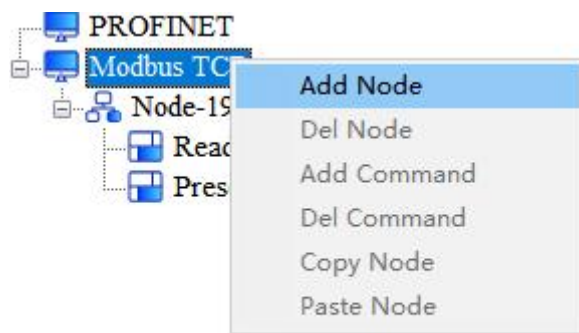
1. Edit with the Node in the menu.



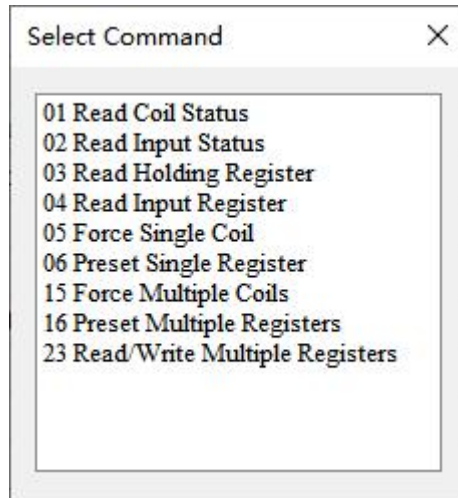
2. Edit with the icon in the toolbar. Please see "[Toolbar](#)" chapter for details.



3. Right click on the item.



- 1) Add nodes: Right click on serial or existing nodes, and then perform the operation of adding a new node. Then there is a new node named "Node-x" under serial .
- 2) Delete nodes: Right click on the node to be deleted, and then perform the operation of deleting the node. The node and its all commands will be deleted.
- 3) Add commands: Right click on the node, and then perform the operation of adding command to add a command for the node. The dialog box will be shown as follow:



Select the command: Double click the command

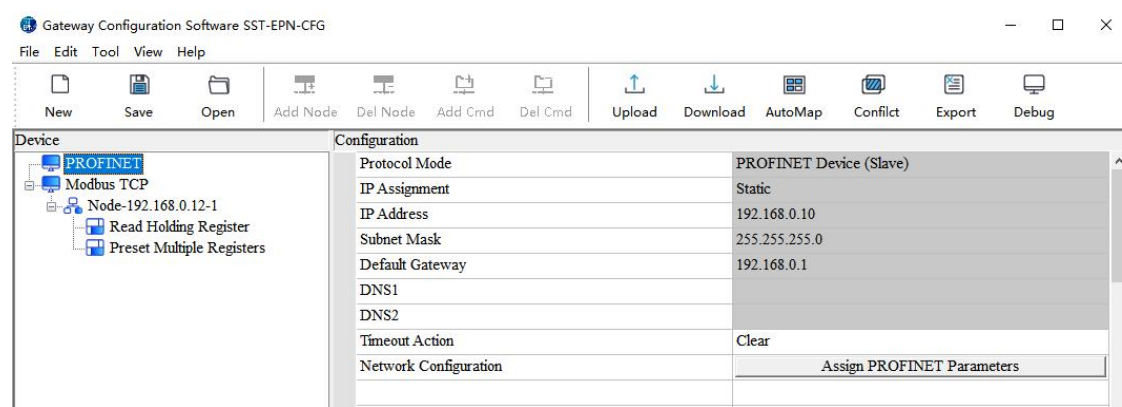
4) Delete commands: Right-click on the command and then perform the operation of deleting the command.

5) Copy node: Left click on the existing node, choose the node and execute the operation of copying nodes (include all commands under the node)

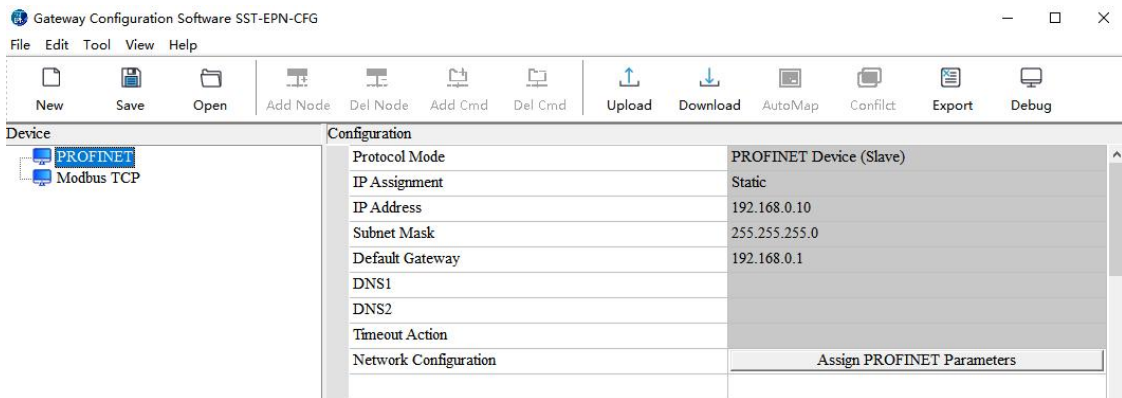
6) Paste node: Left click and choose any existing node, execute operation of pasting node. Then under the serial tree you can see a new node (include all commands under the node). Parameters of new node is default setting, it needs to be reset.

5.3 The Operation of Configuration Interface

5.3.1 Interface of PROFINET Configuration



Mdobus TCP Client Mode-PROFINET Configuration Interface



Mdobus TCP Server Mode-PROFINET Configuration Interface

- Protocol Mode:** The gateway functions as a PROFINET Device (Slave).
- IP Assignment:** Static IP addressing (manual configuration) is the only mode supported.
- Note:** To modify the PROFINET network parameters, please click the [Assign PROFINET Parameters] button.
- IP Address:** Shows the configured IP address of the gateway's PROFINET interface.
- Note:** To modify the PROFINET interface IP address, please click the [Assign PROFINET Parameters] button.
- Subnet Mask:** Shows the configured subnet mask of the gateway's PROFINET interface.
- Note:** To modify the PROFINET interface subnet mask, please click the [Assign PROFINET Parameters] button.
- Default Gateway:** Shows the configured network default gateway IP address for the PROFINET interface.

Note: To modify PROFINET network default gateway IP address, please click the [Assign PROFINET Parameters] button.

Timeout Action: The action the gateway will take when it fails to receive a correct response message from any Modbus node after sending read commands.

Clear: Set the PROFINET input data to zero.

Hold: Keep the PROFINET input data unchanged.

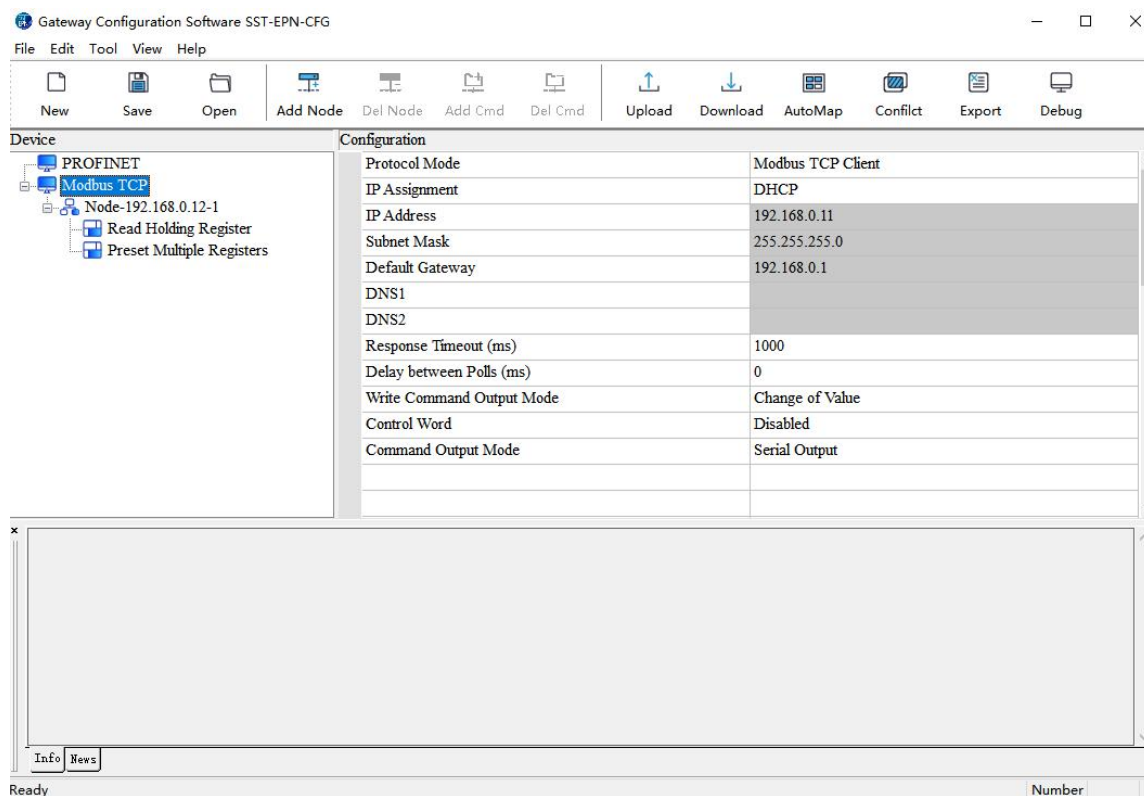
Default Value: Clear

Note: This setting is only available in Modbus TCP Client mode.

Network Configuration: Assign the gateway's IP address and device name.

5.3.2 Modbus TCP Client Configuration

Configurable items include: Protocol Mode, IP Assignment, Response Timeout (ms), Delay between Polls (ms), Write Command Output Mode, Control Word and Command Output Mode.



Protocol Mode: Sets the Modbus TCP operation mode of the gateway.



GT200-PN-MT Modbus TCP/PROFINET Gateway User Manual

Modbus TCP Client: The gateway functions as a Modbus TCP Client (Master) to connect to Modbus TCP Server (Slave) devices.

Modbus TCP Server: The gateway functions as a Modbus TCP Server (Slave) to connect to Modbus TCP Client (Master) controllers.

IP Assignment: Sets how the IP address of the gateway's Modbus TCP interface is configured.

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 gateway's Modbus TCP interface.

Note: This setting is only available in Static IP Configuration mode.

Subnet Mask: Sets the subnet mask of the gateway's Modbus TCP interface.

Note: This setting is only available in Static IP Configuration mode.

Default Gateway: Sets the network default gateway IP address for the Modbus TCP interface.

Note: This setting is only available in Static IP Configuration mode.

Response Timeout (ms): The amount of time, measured in milliseconds (ms), that the gateway should wait to receive a response from a Modbus TCP Server for a command before issuing a response timeout error.

Range: 300-60000ms. **Default Value:** 1000ms.

Delay between Polls (ms): The amount of time, measured in milliseconds (ms), the gateway should wait after receiving a response from a Modbus TCP Server before sending the next request.

Range: 0-2500ms. **Default Value:** 0ms.

Write Command Output Mode: Sets the output mode for Modbus write commands sent from the gateway to Modbus TCP Clients. There are four types of output modes supported:

Cyclic: Write commands are sent cyclically in the same way that Modbus read commands are sent.

Disabled: The gateway will not send any write commands.

Change of Value: Write commands are only sent when the output data changes.

Control Word Trigger: The behavior of this mode will depend on whether the Control Word parameter is enabled or disabled.

If the Control Word parameter is disabled, the gateway will only send a single write command when the output data value changes. After sending the write command once, it will no longer send any more write commands until the gateway is power cycled or restarted. When there is a change in the output data corresponding to the write command, it will only Control Word Trigger and will not be output again (until it is repowered on or restarted).

If the Control Word parameter is enabled, the gateway will send out a write command to a specified node whenever the corresponding bit in the Control Word parameter for that node is toggled from 0 to 1. After the command is sent, the corresponding Control Word bit will need to be toggled from 0 to 1 again before the next one can be sent out.

Control Word: When this setting is enabled, a block of data will be reserved at the beginning of the PROFINET 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 the corresponding command is enabled. When a bit is set to 0, the corresponding command is disabled.

Write Command Output Mode + Control Word:

Change of Value + All Commands = Each command corresponds to 1 bit, according to the control bit is set to 1 and 0 to control the sending of the corresponding command. The function of the status word is equivalent to a switch. Setting the address to 1 means that the corresponding command allows communication, and 0 means that communication is forbidden.

Change of Value + Only Write Command = Same as above, read command communicates normally, only when the write command control bit is 1, the write command can output data change, the control bit is 0, the write command cannot be output.

Cycle+ All Commands = Each command corresponds to 1 bit, according to setting the control bit to 1 or 0, to control the sending of the corresponding command. The function of the status word is equivalent to a switch. Setting the address to 1 means that the corresponding command allows communication, and 0 means communication is forbidden.

Cycle + Only Write Command = Same as above, read command communicates normally, only for write command, when the corresponding control bit is 1, write command can be output continuously.

Forbidden+ All Commands = The function of the status word is useless, the writing command is forbidden and the communication of the reading command is normal.

Forbidden + Only Write Command = same as above.

Control Word Trigger + All Commands = When it is enable, the value of the control word must be set to 0 first, and then set to 1, now a read command or write command can be issued. After the communication is finished, it needs to be set to 0 first, and then set to 1 to execute the next command.

Control Word Trigger + Only Write Command = Same as above, read command communicates normally, only for write command.

Control Word Trigger + Disable = Write command starts from the gateway power on, as long as the output data is not 0, it will only Control Word Trigger, and then no longer output, unless the gateway is reset or restarted.

Command Output Mode: Sets how commands are sent from the gateway to Modbus TCP Server devices.

Serial Output: All commands for a single Modbus TCP Server device are sent one by one. The next command is sent only after a response is received or a timeout occurs.

Parallel Output: All commands for a single Modbus TCP Server device are sent simultaneously.

1. Node

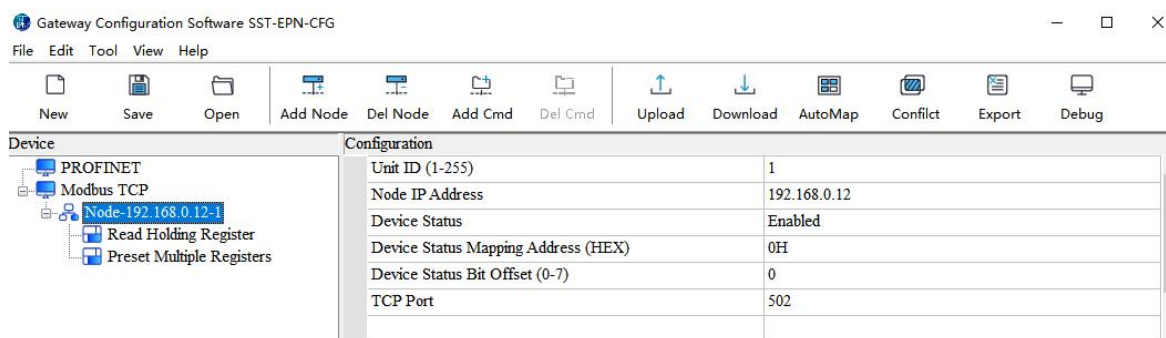
The Configuration view supports three types of operation: Edit Menu, Edit Toolbar and Right click edit Menu.

[1] **Add node:** Left click on Modbus TCP or existing nodes, and then perform the operation of adding a new node. Then there is a new node named "New node" under Modbus TCP.

[2] **Delete node:** Left click on the node to be deleted, and then perform the operation of deleting the node. The node and all commands will be deleted.

- [3] **Copy node:** Left click the existing node, choose the node and execute the operation of copying nodes (include all commands under the node)
- [4] **Paste node:** Left click and choose any existing node, execute operation of paste node. Then at the Ethernet rear part you can see a new node (include all commands under the node). Node parameters of new node is default setting, it needs to be reset.

The node interface is displayed as follows:



Unit ID (1-255): The Unit ID address (Slave ID) of the target Modbus TCP Server node. Range: 1-255.

Node IP Address: The IP address of the target Modbus TCP Server node.

Device Status: When this setting is enabled, 1 bit of data will be reserved in the PROFINET input data buffer to monitor the connection status of this Modbus TCP Server node on the network.

The location of this Device Status bit on the PROFINET input data buffer can be configured using the "Mapping Address(HEX)" and "Bit Offset (0-7)" settings in this window.

The Device Status setting registers supports the following options: "Disabled" and "Enabled".

Default Value: Enabled.

Device Status Mapping Address (HEX): Sets the byte address location of the Device Status parameter in the gateway's input memory buffer, which corresponds to the PROFINET input data buffer.

Range: 0x0000-0x0593.

The [AutoMap] button can be used to let the software automatically calculate and fill in this field.

Device Status Bit Offset (0-7): Sets the bit location of the Device Status parameter within the byte address specified in the "Device Status Mapping Address(HEX)" field. Range: 0-7.

TCP Port: The TCP port number used by the target Modbus TCP Server node.

Range: 1-65535. Default Value: 502.

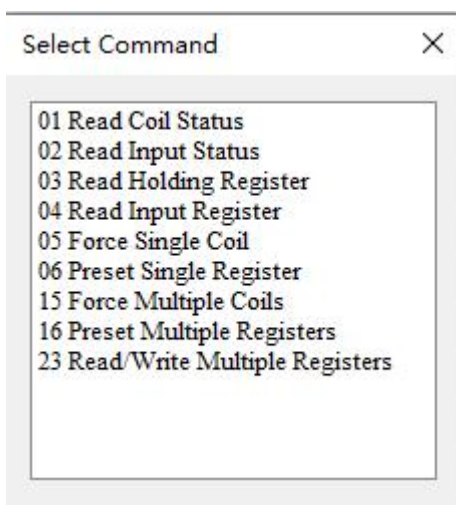
2. Command

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

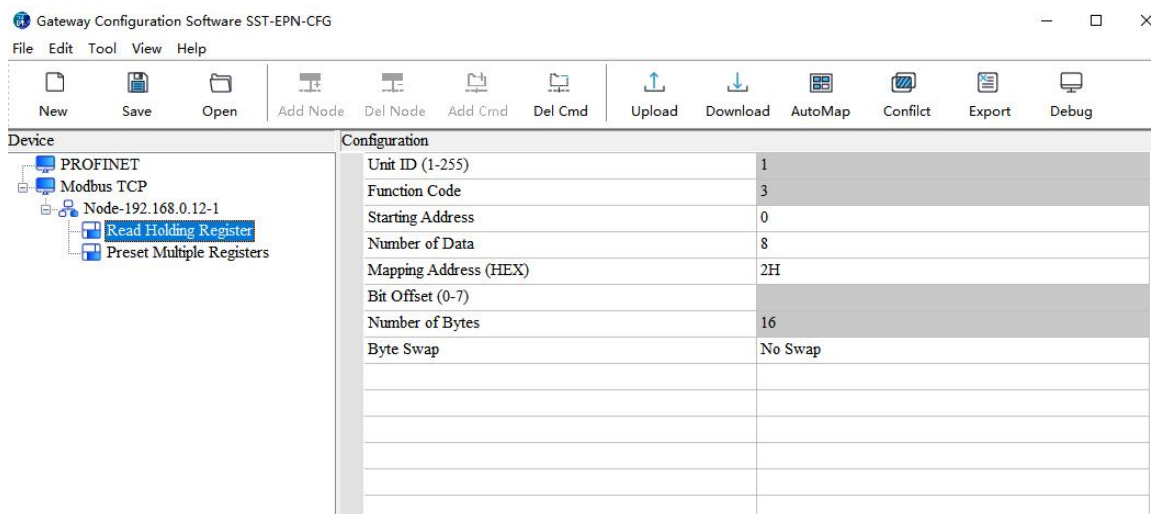
[1] **Add command:** Left click on the node, and then perform the operation of adding command to add a command for the node.

[2] **Delete command:** Left click on the command to be deleted, perform the operation of deleting the command.

It supports the commands: 01, 02, 03, 04, 05, 06, 15 and 16. Double click the command to select the command.



The command interface is displayed as follows:



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.

Following table shows the PLC address and corresponding protocol address examples:

Command	PLC address examples	Corresponding protocol address
Coil state	00001~00010	00000~00009
Input state	10001~10010	00000~00009
Holding register	40001~40010	00000~00009
Input register	30001~30010	00000~00009

Number of Data: number of register/switching value/coil in Modbus server.

Function code (3, 4, 16, 23). Range: 1-127.

Function code (1, 2, 15). Range: 1-400.

Mapping Address (HEX): The mapping address range of data in module memory:

Read command: 0x0000-0x0593.

Write command: 0x4000-0x4593.

Write commands as a local data exchange can also use the region: 0x0000-0x0593.

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.

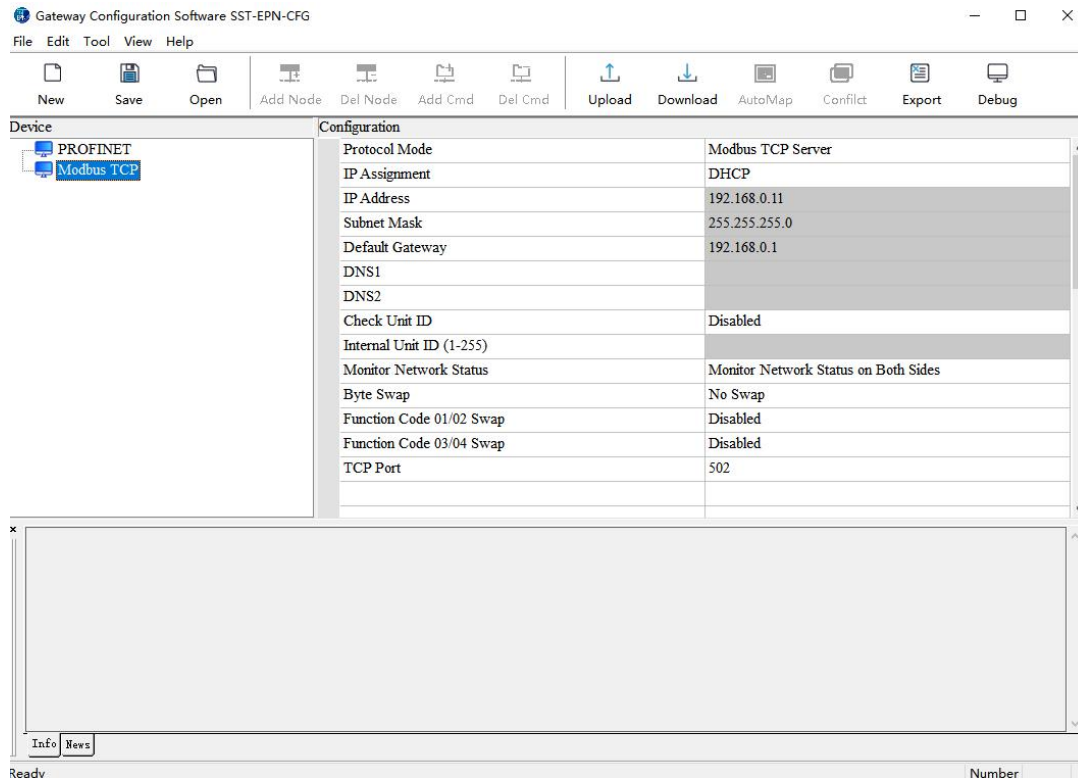
Byte Swap: There are three types: No Swap, Two Bytes Swap, Four Bytes Swap.

No Swap: No byte order exchange.

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

Four Bytes Swap: The high and low bytes of the 4 bytes are exchanged, and the next high and second low bytes are exchanged. For example: 0x12345678, convert to 0x78563412.

5.3.3 Modbus TCP Server Configuration



The configurable parameters are as follows:

Protocol Mode: Sets the Modbus TCP operation mode of the gateway.

Modbus TCP Client: The gateway functions as a Modbus TCP Client (Master) to connect to Modbus TCP Server (Slave) devices.

Modbus TCP Server: The gateway functions as a Modbus TCP Server (Slave) to connect to Modbus TCP Client (Master) controllers.

IP Assignment: Sets how the IP address of the gateway's Modbus TCP interface is configured.

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 gateway's Modbus TCP interface.

Note: This setting is only available in Static IP Configuration mode.

Subnet Mask: Sets the subnet mask of the gateway's Modbus TCP interface.

Note: This setting is only available in Static IP Configuration mode.



Default Gateway: Sets the network default gateway IP address for the Modbus TCP interface.

Note: This setting is only available in Static IP Configuration mode.

Check Unit ID: Sets whether the gateway responds to all Modbus commands or only to those that match its internal Unit ID (Slave ID).

Enabled: As a Modbus TCP Server device, the gateway will only respond to Modbus commands that match its internal Unit ID (Slave ID).

Disabled: As a Modbus TCP Server device, the gateway will respond to any Modbus command from the Modbus TCP Client.

Internal Unit ID (1-255): Sets the gateway's Unit ID address (Slave ID) when the gateway functions as a Modbus TCP Server (Slave) device.

Note: This setting is only available when Check Unit ID is Enabled. Range: 1-255.

Monitor Network Status: When this setting is enabled, the gateway will monitor the connection status of the PROFINET/Modbus TCP networks.

Monitor Modbus TCP Network Status on PROFINET Side: The first two bytes of the PROFINET input data buffer are reserved to function as the Modbus TCP Status bytes. The data indicates the number of connections that the gateway has established with the Modbus TCP Client.

Monitor PROFINET Network Status on Modbus TCP Side: The first two bytes of the Modbus TCP input side will be reserved to function as the PROFINET Status bytes. The data content indicates the PROFINET communication fault status, where 1 indicates fault, and 0 indicates normal.

Byte Swap: When this setting is enabled, the gateway will rearrange the order of the data bytes that are sent or received. There are three options supported: No Swap, Two Byte Swap, and Four Byte Swap.

No Swap: No byte order change is made.

Two Byte Swap: Swaps the high and low bytes in a 2 byte group. For example: 0x1234 converts to 0x3412.

Four Byte Swap: Swaps the high and low bytes, and the middle high and middle low bytes in a 4 byte group. For example: 0x12345678 converts to 0x78563412.

Function Code 01/02 Swap: Sets which Modbus read commands from the Modbus TCP Client are used to read boolean data to/from PROFINET.

Disabled: Function Code 01 is used to read back data sent to PROFINET, and Function Code 02 is used to read

data from PROFINET.

Enabled: Function Code 01 is used to read data from PROFINET, and Function Code 02 is used to read back data sent to PROFINET.

Note: This setting does not affect Modbus write commands. Function Codes 05/15 are always used to send boolean data to PROFINET.

Function Code 03/04 Swap: Sets which Modbus read commands from the Modbus TCP Client are used to read register data to/from PROFINET.

Disabled: Function Code 03 is used to read back data sent to PROFINET, and Function Code 04 is used to read data from PROFINET.

Enabled: Function Code 03 is used to read data from PROFINET, and Function Code 04 is used to read back data sent to PROFINET.

Note: This setting does not affect Modbus write commands. Function Codes 06/16 are always used to send register data to PROFINET.

TCP Port: Sets the TCP port number for the gateway to use as a Modbus TCP Server device.

Range: 1-65535. Default Value: 502.

5.4 Tool

The "Tool" option on the menu bar contains the following functions:

- Upload Config
- Download Config
- Auto Mapping
- Conflict Detect
- Export Xls
- Debug

5.4.1 Locate

When users manage multiple GT200-PN-MT gateways, the "Locate" function can be used to identify gateway that

will be configured.

Users can click on the "Locate" button when the gateway is connected to Ethernet to make the MS indicators of the gateway red blinking alternately for 3 seconds to help them find it.

Device Select

IP Address	MAC Address	Device Name	Default Gateway	Subnet Mask
192.168.0.33	64-EA-C5-2D-01-49	gt200pnmt	192.168.0.33	255.255.255.0

Upload Refresh Device Info **Locate** Cancel

Search completed

5.4.2 View Device Information

Before configuring parameters, the user will need to search for the gateway using the software.

Click "Upload" or "Download" button of the main interface and the software will search all of the available devices and list them in the main interface. Click the "Device Info" button on the device select interface to check the device name, IP address, product version, device model, and MAC addresses for PROFINET.

Device Information

PROFINET:

Device Name	gt200pnmt
IP Address	192.168.0.33
Product Version	1.2
Device Model	GT200-PN-MT
MAC Address	64-EA-C5-2D-01-49

Modbus TCP:

IP Assignment	DHCP
IP Address	192.168.0.11
Subnet Mask	255.255.255.0
Default Gateway	192.168.0.1
MAC Address	64-EA-C5-2D-01-48

OK



5.4.3 Upload Config and Download Config

1. Upload Config

Select "Upload" to upload the gateway configuration information from the device to the software.

When uploading the configuration from the gateway to the software, the pop-up window is as below:

IP Address	MAC Address	Device Name	Default Gateway	Subnet Mask
192.168.0.33	64-EA-C5-2D-01-49	gt200prmt	192.168.0.33	255.255.255.0

Upload Refresh Device Info Locate Cancel

Search completed

Click "refresh" button will search equipment on the Ethernet again.

Select the gateway you want to configure and click "Upload" to enter into the upload dialog box. The interface is shown below:

Upload Configuration

Click "Upload" button to upload the configuration

Upload Exit

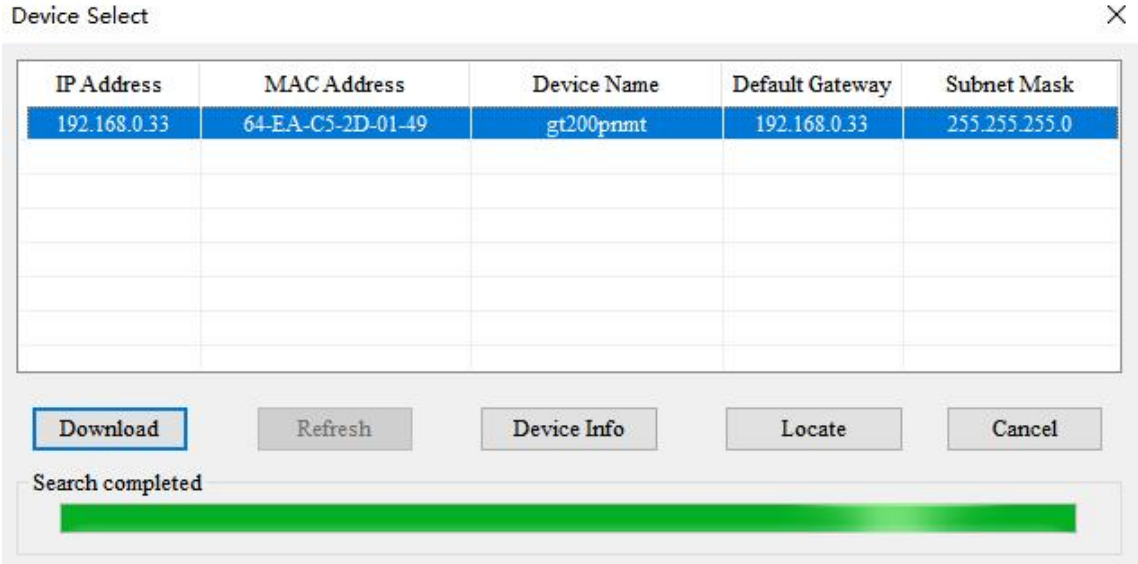
2. Download Config

GT200-PN-MT

Modbus TCP/PROFINET Gateway

User Manual

Select "Download" to download the configured gateway information to the gateway device. The operation of download configuration is the same as upload configuration:

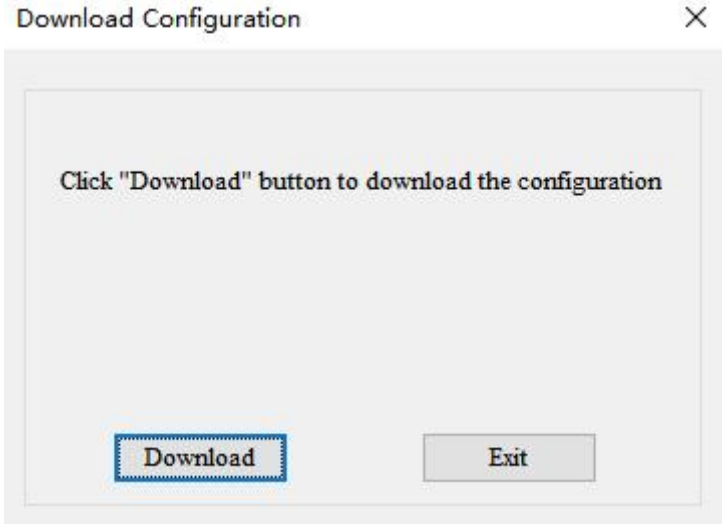


The "Device Select" dialog box contains a table with the following data:

IP Address	MAC Address	Device Name	Default Gateway	Subnet Mask
192.168.0.33	64-EA-C5-2D-01-49	gt200prmt	192.168.0.33	255.255.255.0

Below the table are buttons: Download, Refresh, Device Info, Locate, and Cancel. A progress bar at the bottom shows "Search completed" with a green bar.

Select the gateway you want to configure and click "Download" to enter into the download dialog box. The interface is shown below:



The "Download Configuration" dialog box contains the text: "Click 'Download' button to download the configuration". At the bottom are buttons: Download and Exit.

Notes:

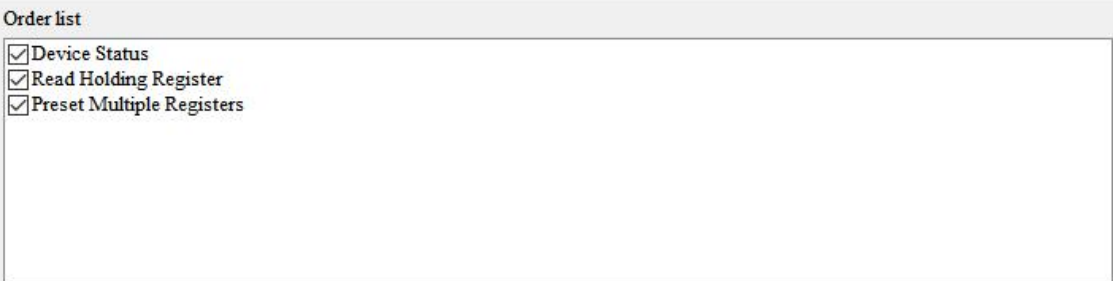
1. Before downloading, please confirm all configurations have been completed and right.
2. The downloaded configuration requires a gateway restart to take effect
3. Modbus TCP sets the IP address in DHCP mode by default. If there is no DHCP server or switch in the network, and the IP address is not obtained within about 30 seconds after power-on or restart, it will automatically revert to a fixed IP address. The fixed IP address is 192.168.0.11.

OFINET Gateway



Conflict in "Conflict Detection"

and confliction, it can be adjusted



n

command list interface. Check

meaningless. Click on

each command is used to check

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 Operation

Memory mapping area divides into input area and output area.

Input mapping address range: 0x0000~0x0593.

Output mapping address range: 0x4000~0x4593.

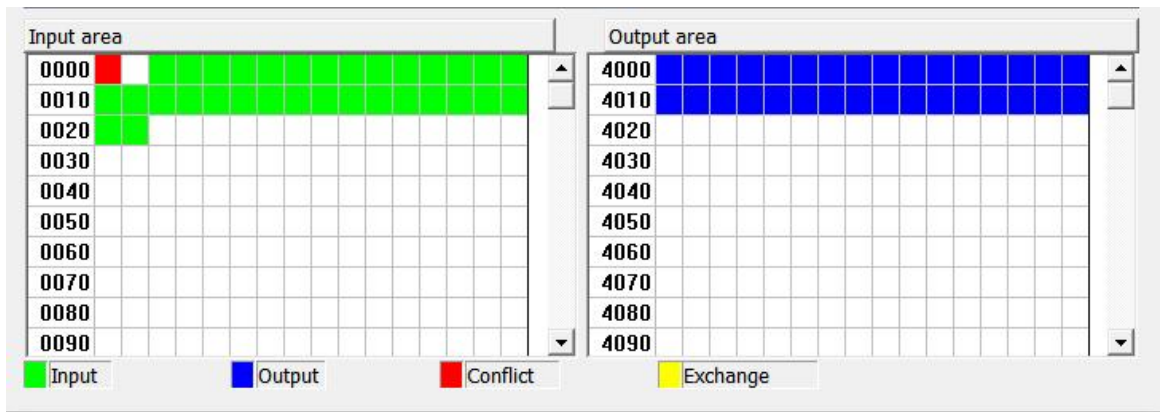
Each grid represents one byte address.

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

Yellow: Write command: When address mapping area is located in input area, it will be in yellow without conflict.

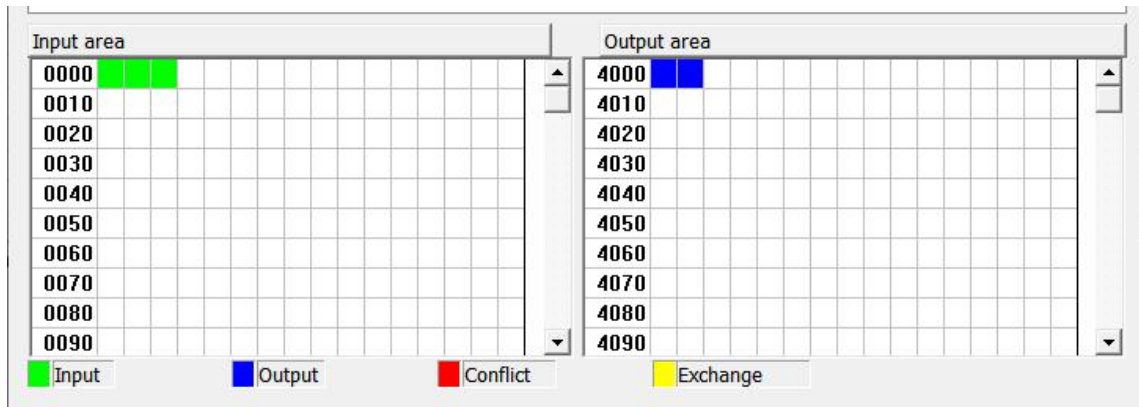
Blue: When address mapping area is located in output area, it will be in blue without conflict.

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



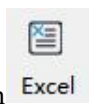
For bit operation command, the above grid displaying meaning works the same.

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

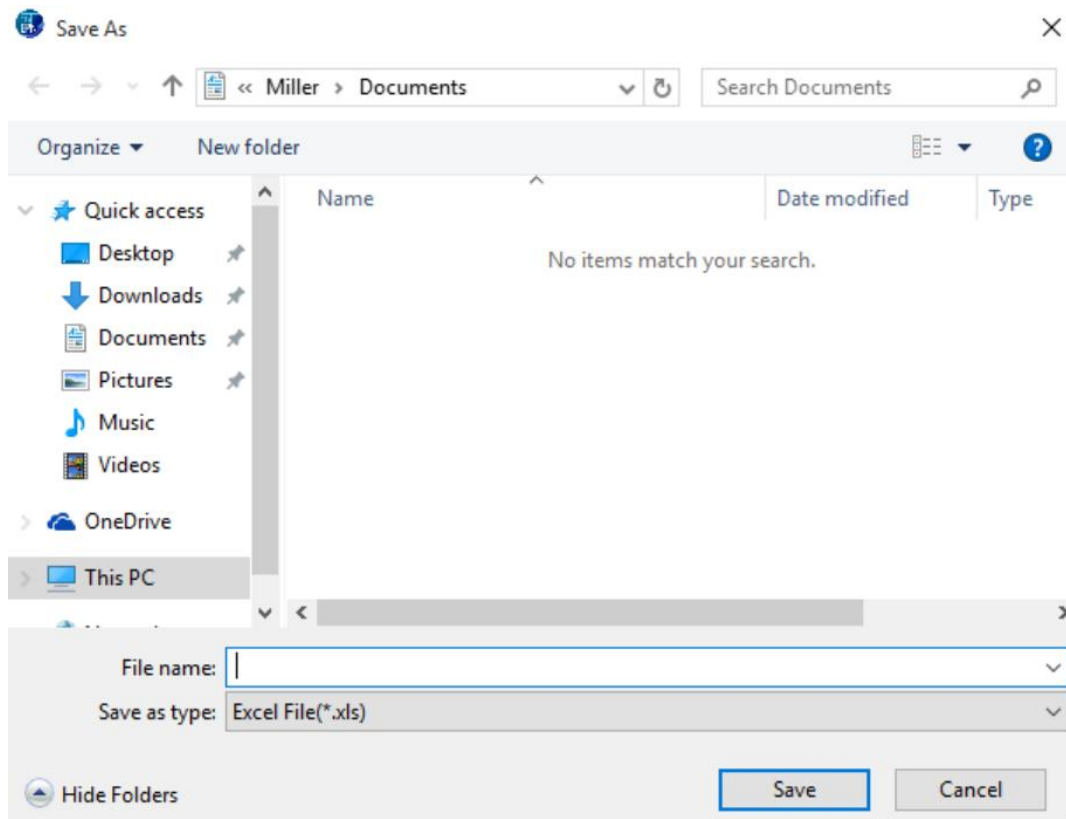


5.4.7 Export Xls

Excel configuration Excel file will help users to check the relevant configuration.



Select the excel icon , export the configuration information to excel and save. Select the appropriate path, shown as below:





5.4.8 Debug



Debug

This function is used to monitor the buffer data, select the monitor icon or click "Debug" in the tools and it will pop up the dialog box of searching equipment:

Device Select ✕

IP Address	MAC Address	Device Name	Default Gateway	Subnet Mask
192.168.0.33	64-EA-C5-2D-01-49	gt200prmt	192.168.0.33	255.255.255.0

Search completed

Click "Debug", it will pop up the data monitor dialog box below:

Debug

Buffer selection

☒ Input Buffer ☐ Output Buffer

Address	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
0x4000	03	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0x4010	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0x4020	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0x4030	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0x4040	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0x4050	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0x4060	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0x4070	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0x4080	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0x4090	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0x40A0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0x40B0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0x40C0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

Write Input Buffer Data

Address H

Data

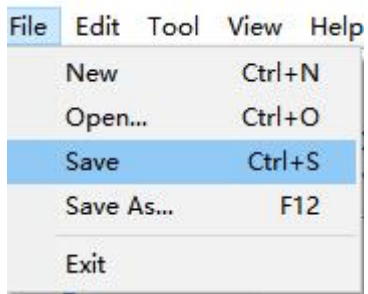
Position According to Address(Hex):

Click "Save Data" button can save relevant content to the PC hard disk.

5.5 Save and Open Configuration

5.5.1 Save Configuration Project

Click the "Save" button on the menu bar or toolbar to save the configured project as .xml file.



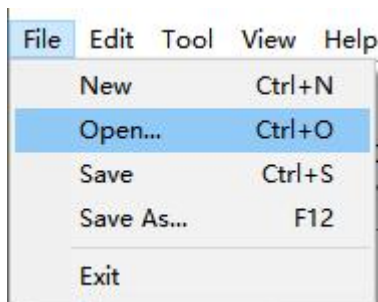
Menu bar



Toolbar

5.5.2 Open Configuration Project

Click the "Open" button on the menu bar or toolbar to open the saved.xml file.



Menu bar



Toolbar

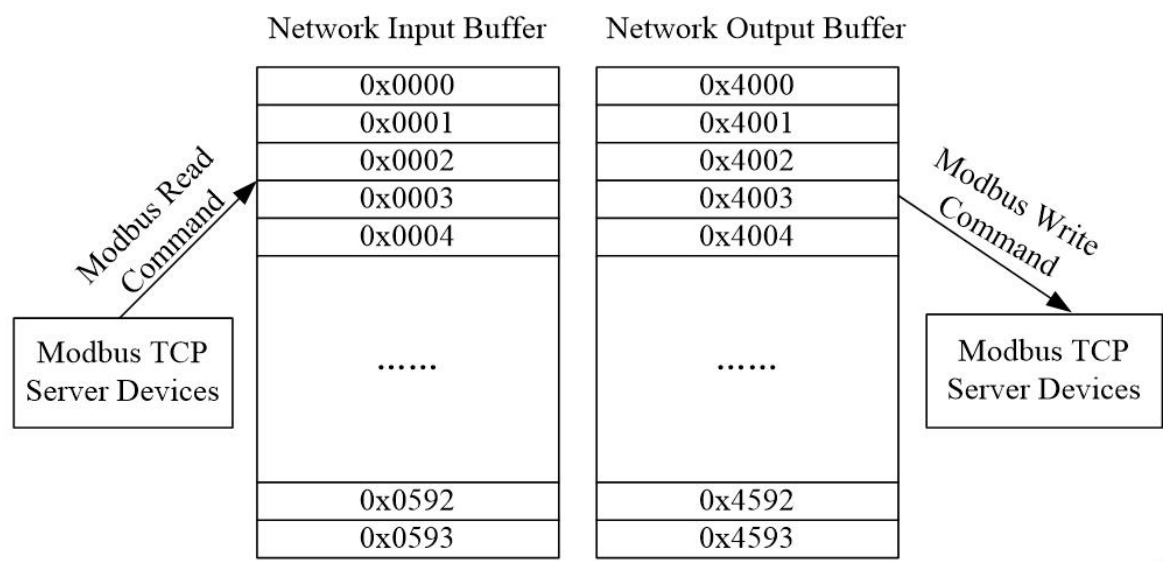
6 Working Principle

6.1 Modbus TCP Master

Ethernet supports Modbus TCP function, described as below:

Data exchange of Modbus TCP and PROFINET of GT200-PN-MT is set up through "mapping". There are two data buffer areas, one is PROFINET network input buffer and the other is PROFINET network output buffer.

Network input and output buffer is all for PROFINET master. When the gateway is Modbus TCP master, Modbus read command will write the read data to the network input buffer for PROFINET accessing. Modbus write register command gets data from network output buffer and export to the Modbus TCP server equipment through write command.



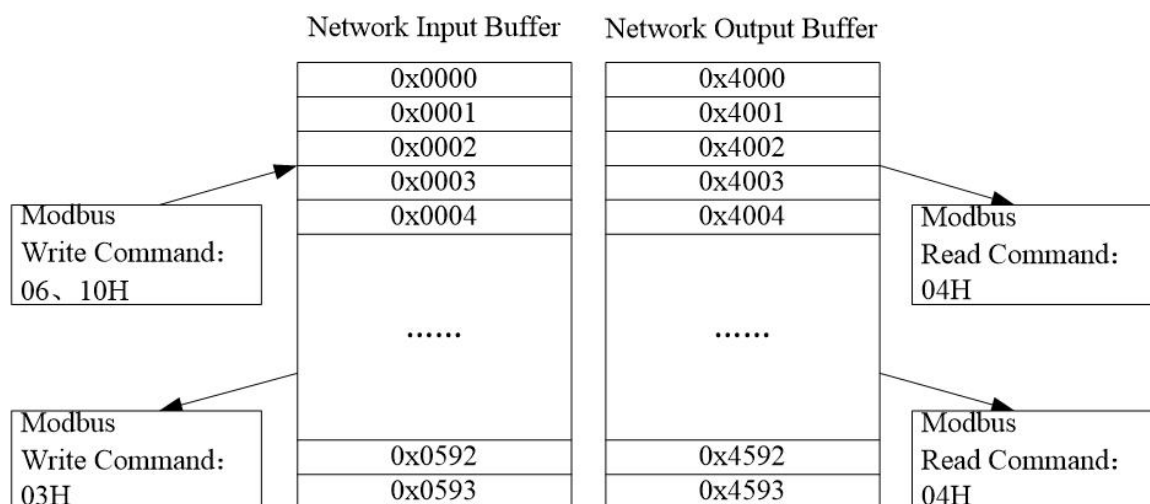
As is shown above: Network input buffer range is 0x0000~0x0593 (function code 01, 02, 03, 04, 23 as data input. function 05, 06, 15, 16, 23 as local data exchange). Network output buffer range is 0x4000~0x4593 (function code 05, 06, 15, 16,23 as data output).

Ethernet can support configuring at most 200 commands, each one can read one group of continuous Modbus registers.

6.2 Modbus TCP Server

1. Data Exchange

Data exchange of Modbus TCP and PROFINET of GT200-PN-MT is set up through "mapping". There are two data buffer areas, one is PROFINET network input buffer and the other is PROFINET network output buffer. Network input and output buffer is all for PROFINET. When the gateway is Modbus TCP server, Modbus write register command will write the read data to the network input buffer for PROFINET accessing. Modbus read command gets data from network output buffer and export to the Modbus TCP master equipment through response message.



The gateway acts as Modbus TCP server, support function: 03H, 04H, 06H 10H and 17H.

Network input buffer is Modbus TCP master output at the Modbus TCP side. It is mapped to the Modbus read holding register. Users can use 03 command to read back. It supports 03H, 06H,10H and 17H function code. Register starting address is 40001(0).

Network output buffer is Modbus TCP master input. It is mapped to Modbus input register. Users can use 04 function code to read data. It supports 04H function code. Register starting address is 30001 (0).

2. Network Status Monitor

When the gateway acts as Modbus TCP server, it has the network status monitor function. Described as below:

- a. PROFINET monitor data are located in the first word of input data, it monitors the numbers that Modbus TCP has been connected to master. If closed, then it doesn't input data.

Notes: "Open" monitor function means: in the SST-EPN-CFG configuration software, Ethernet parameters "network status indicators" is selected as "two ends network monitors with each other" or "PROFINET end monitors Modbus TCP network status". If "close" monitor function, that means in the configuration software, this parameter is "Modbus TCP end monitors PROFINET network status" or "no indicating".

- b. Modbus TCP server monitor data is fixed on the register of 35001 (5000). When PROFINET network fails, the register is set to 0 and 1 if network is normal.
- c. No matter open or close the monitor function, it can still get the network status of PROFINET by reading the register which address is 35001 (5000).
- d. If opened, it will map the register which address is 35001 (5000) to the register which address is 30001 (0), PROFINET output data starts to be mapped the address starting from 30002 (1).
- e. If closed, PROFINET output data will be mapped to the address starting from 30001 (1).

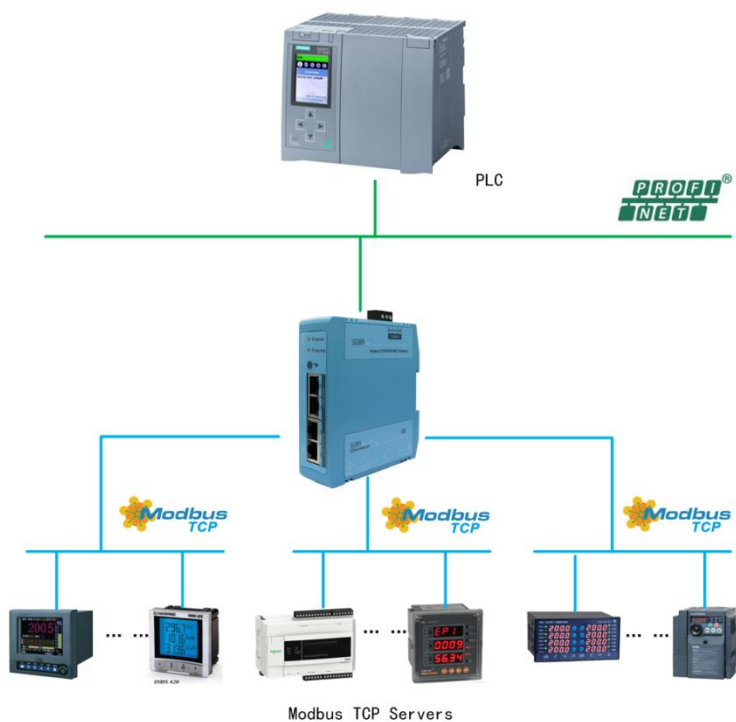
Notes: "Open" monitor function means: in the SST-EPN-CFG configuration software, Ethernet parameters "network status indicators" is selected as "two ends network monitors with each other" or "Modbus TCP end monitors PROFINET network status". If "close" monitor function, that means in the configuration software, this parameter is "PROFINET end monitors Modbus TCP network status" or "no indicating".

7 Typical Application

The GT200-PN-MT gateway can connect Modbus TCP devices to a PROFINET network. It functions as a bridge in the communication network to convert between Modbus TCP and PROFINET.

Here are some typical applications of GT200-PN-MT.

7.1 Modbus TCP Server devices Interconnect with PROFINET Master PLC



7.2 Modbus TCP Client Devices Interconnect with PROFINET Master PLC



In this two cases, different Modbus TCP client or server devices are connected to the same Siemens PLC with GT200-PN-MT gateway through Ethernet switch machine, in this way many Modbus TCP clients or servers can communicate with PROFINET master PLC.