

HART / EtherNet/IP Gateway GT200-HT-EI

User Manual

V 1.0

REV B



SST Automation

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Catalog

| | |
|---|----|
| 1 Product Overview..... | 4 |
| 1.1 Product Function..... | 4 |
| 1.2 Product Features..... | 4 |
| 1.3 Technical Specifications..... | 4 |
| 1.4 Safety and Explosion-Proof Features..... | 5 |
| 1.5 Related Products..... | 5 |
| 1.6 Revision History..... | 6 |
| 2 Quick Start Guide..... | 7 |
| 2.1 Pre-configured Settings..... | 7 |
| 2.2 Software Configuration..... | 7 |
| 2.3 Configuration Notes..... | 10 |
| 3 Hardware Descriptions..... | 14 |
| 3.1 Product Appearance..... | 14 |
| 3.2 Indicators..... | 15 |
| 3.3 DIP Switch/Button..... | 15 |
| 3.3.1 Button..... | 15 |
| 3.3.2 DIP Switch..... | 15 |
| 3.3.3 Internal / External Sampling Resistor Switch..... | 16 |
| 3.4 Interface..... | 17 |
| 3.4.1 Power Interface..... | 17 |
| 3.4.2 Ethernet Interface..... | 17 |
| 3.4.3 HART Interface..... | 18 |
| 3.5 Topology of GT200-HT-EI and Fieldbus Devices..... | 19 |
| 4 Configuration Software Instructions..... | 21 |
| 4.1 Pre-configuration Attention..... | 21 |
| 4.2 Software Function Specifications..... | 23 |
| 4.2.1 Upload Gateway Configuration..... | 23 |
| 4.2.2 Configure the Ethernet..... | 24 |
| 4.2.3 Configure the HART Fieldbus..... | 25 |
| 4.2.4 Conflict Detection..... | 33 |
| 4.2.5 Automatic Memory-Mapped..... | 34 |
| 4.2.6 Download Configuration..... | 35 |
| 4.2.7 Memory Data Display..... | 35 |
| 4.2.8 Diagnose..... | 36 |
| 4.2.9 Debug Assistant..... | 40 |
| 4.2.10 Slave Scan..... | 42 |
| 4.2.11 Switching Tools..... | 45 |
| 5 HART Master Working Principle..... | 46 |



GT200-HT-EI **HART/EtherNet/IP Gateway**

User Manual

| | |
|---|----|
| 5.1 Flowchart of Executing One HART Command..... | 50 |
| 6 EtherNet/IP Connection Parameters Set..... | 51 |
| 7 How to Read-write I/O Data..... | 52 |
| 7.1 I/O Way to Read-write Data (Recommended)..... | 52 |
| 7.2 Read and Write Data using MSG..... | 56 |
| 7.2.1 Read MSG Data..... | 56 |
| 7.2.2 Write MSG Data..... | 60 |
| 8 Installation..... | 65 |
| 8.1 Machine Dimension..... | 65 |
| 8.2 Installation Method..... | 65 |

1 Product Overview

1.1 Product Function

GT200-HT-EI is a gateway that can provide a seamless connection between HART and EtherNet/IP. It can connect HART slave devices to EtherNet/IP network and realize bi-directional data exchange easily. The HART side can be configured as a primary or secondary master, and the EtherNet / IP side works as a slave.

1.2 Product Features

- Easy to use: Users only need to refer to the product manual and application instances and can realize data communication of gateway in a short time according to the requirements of the configuration;
- Powerful function: Support fast acquisition of HART slave address and modification, single-point mode of coexistence of HART communication and 4~20mA data acquisition, HART side supports the primary master and the secondary master;
- Multi debugging functions: The configuration software SST-HI-CFG can provide visual display of data exchange, HART command diagnostics and communication debugging functions etc., which greatly facilitates user's communication test.

1.3 Technical Specifications

- [1] EtherNet/IP network is independent with HART network;
- [2] Ethernet 10/100M self-adaptive;
- [3] IP address conflict detection;
- [4] Support ODVA standard EtherNet/IP communication protocol;
- [5] Used as a primary or a secondary HART master;
- [6] Supports single-point and multi-point mode at the HART side;
- [7] Under single-point mode, support data burst operation from slave;

- [8] Supports one HART-channel, under multi-point mode, support connecting at most 13 HART slaves with gateway internal resistor and support connecting 15 HART slaves with an external resistor (250Ω);
- [9] Supports all commands of the HART protocol;
- [10] Each HART command can be configured for change-of-state output, polling output, initialization output or disable output;
- [11] Supports up to 127 HART commands, HART output data buffer is up to 1000 bytes, and the input data buffer is up to 1600 bytes;
- [12] Supports an internal or external HART sampling resistor;
- [13] Max input and output bytes of EtherNet/IP:
 - Max input bytes: 256 bytes;
 - Max output bytes: 256 bytes;
- [14] Power: 24VDC (11V~30V), 70mA (24VDC);
- [15] Working circumstance temperature: -40 °F ~140 °F (-40 °C ~60 °C), Humidity: 5%~ 95% (without condensation);
- [16] External dimensions (W*H*D): 0.98 in*3.94 in *3.54 in (25mm*100mm*90mm);
- [17] Installation: 1.38 in (35mm) DIN RAIL;
- [18] Protection Level: IP20;

1.4 Safety and Explosion-Proof Features

GT200-HT-EI is not the product with the features of safety and explosion-proof, please put it in the control room when using.

1.5 Related Products

The related products include: GT200-HT-RS, GT100-EI-RS etc.

If you want to get more information about these products, please visit SSTCOMM website:
<http://www.sstcomm.com>.

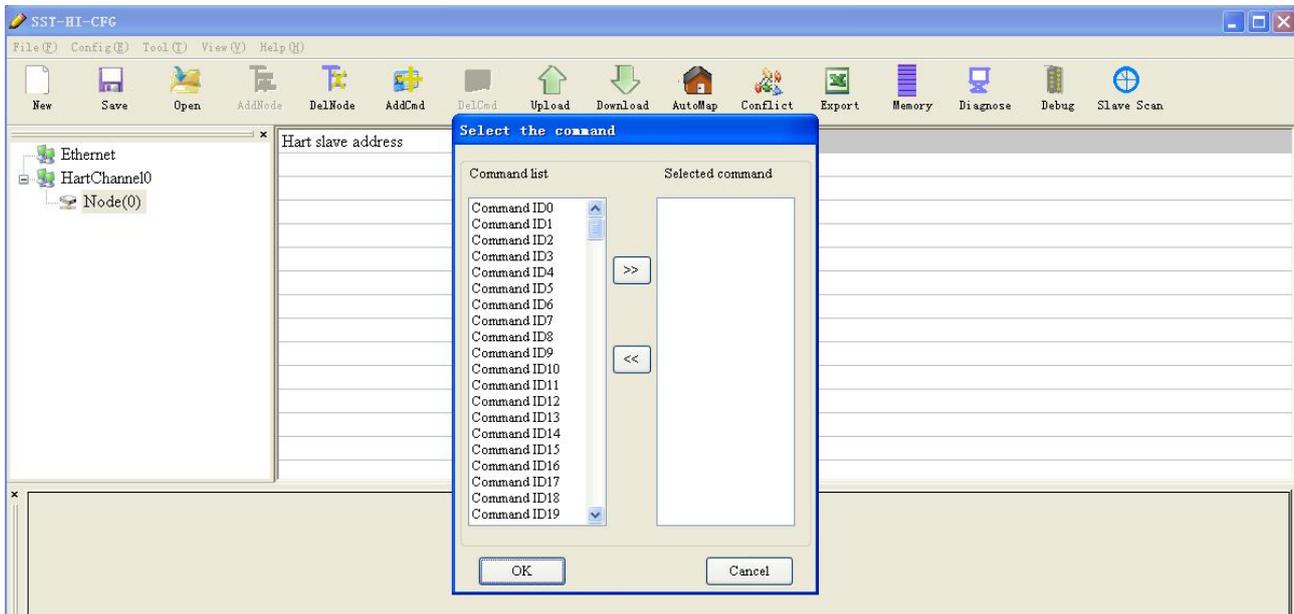


1.6 Revision History

| Revision | Date | Chapter | Description |
|----------|-----------|---------|--|
| REV A | 9/29/2017 | Part | Add configuration notes into chapter 2; Part of hardware and software chapter modified and standardization. |
| REV B | 4/20/2020 | Part | Part modifications for chapter 6; |

GT200-HT-EI HART/EtherNet/IP Gateway User Manual

the dialog box, and then click OK to return.

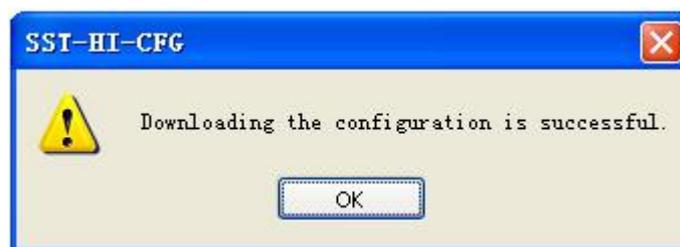
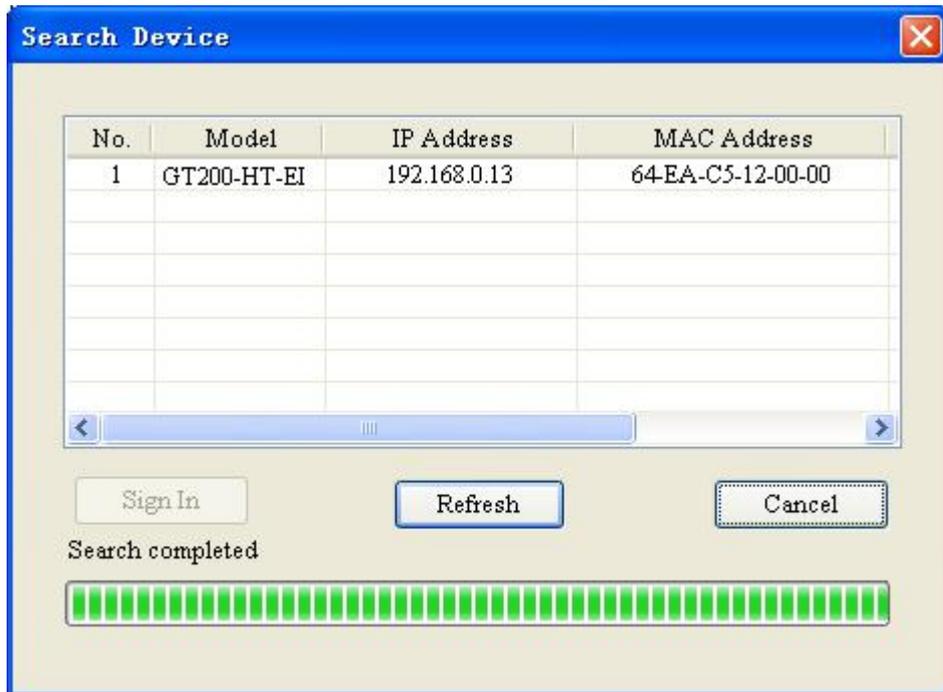


6. Click the “Command ID1”, the configuration table on the right is configured as below:

| | |
|---|----------------|
| Configuration Mode | Basic |
| Mode of outputting commands | Polling output |
| Memory starting address of sending data | 3000 |
| EtherNet/IP register starting address of sending data | 0 |
| Sending data length (BYTE) | 0 |
| Sending data length (WORD) | 0 |
| Memory starting address of receiving data | 0 |
| EtherNet/IP register starting address of receiving data | 0 |
| Receiving data length (BYTE) | 0 |
| Receiving data length (WORD) | 0 |
| Command index | 0 |



7. Click the tool , in the pop-up dialog box, select the serial port that gateway is connected to the computer, click OK and then click Download data:

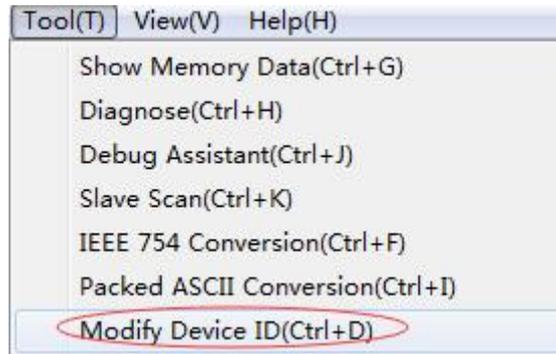


2.3 Configuration Notes

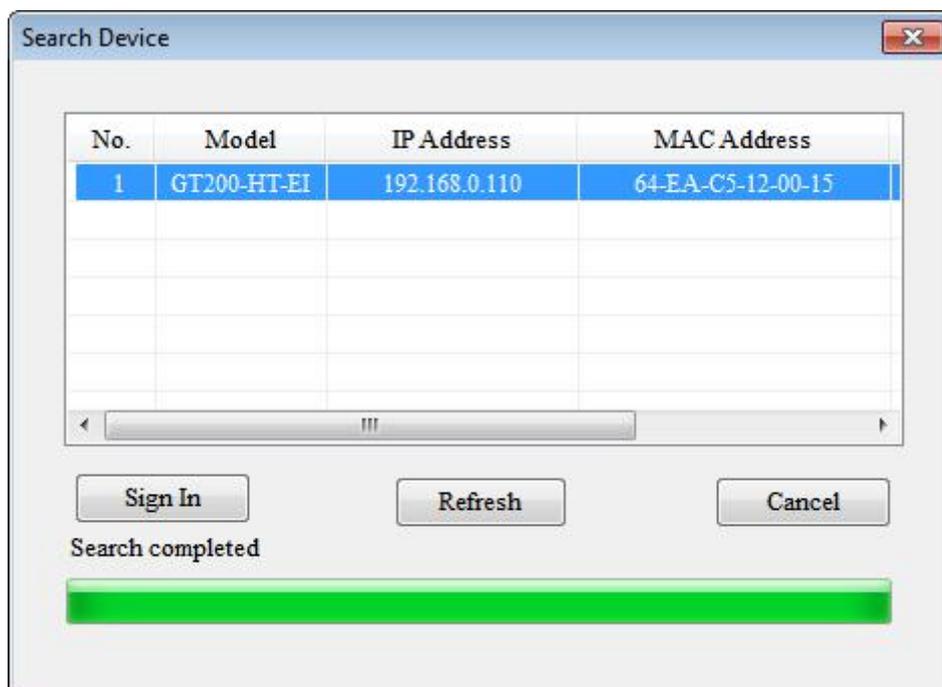
Normally, users need to modify Device ID before establishing hardware communication.

1. Click "tool" → "Modify Device ID(Ctrl+D)"

GT200-HT-EI HART/EtherNet/IP Gateway User Manual



2. Select current device



3. Write the appropriate ID



4. Click "Modify"

GT200-HT-EI HART/EtherNet/IP Gateway

User Manual



GT200-HT-EI HART/EtherNet/IP Gateway User Manual

The screenshot displays the RSNetWork for EtherNet/IP software interface. The main window is titled "EtherNet/IP - RSNetWork for EtherNet/IP". It features a menu bar (File, Edit, View, Network, Device, Diagnostic, Tools, Help) and a toolbar. The interface is divided into several panes:

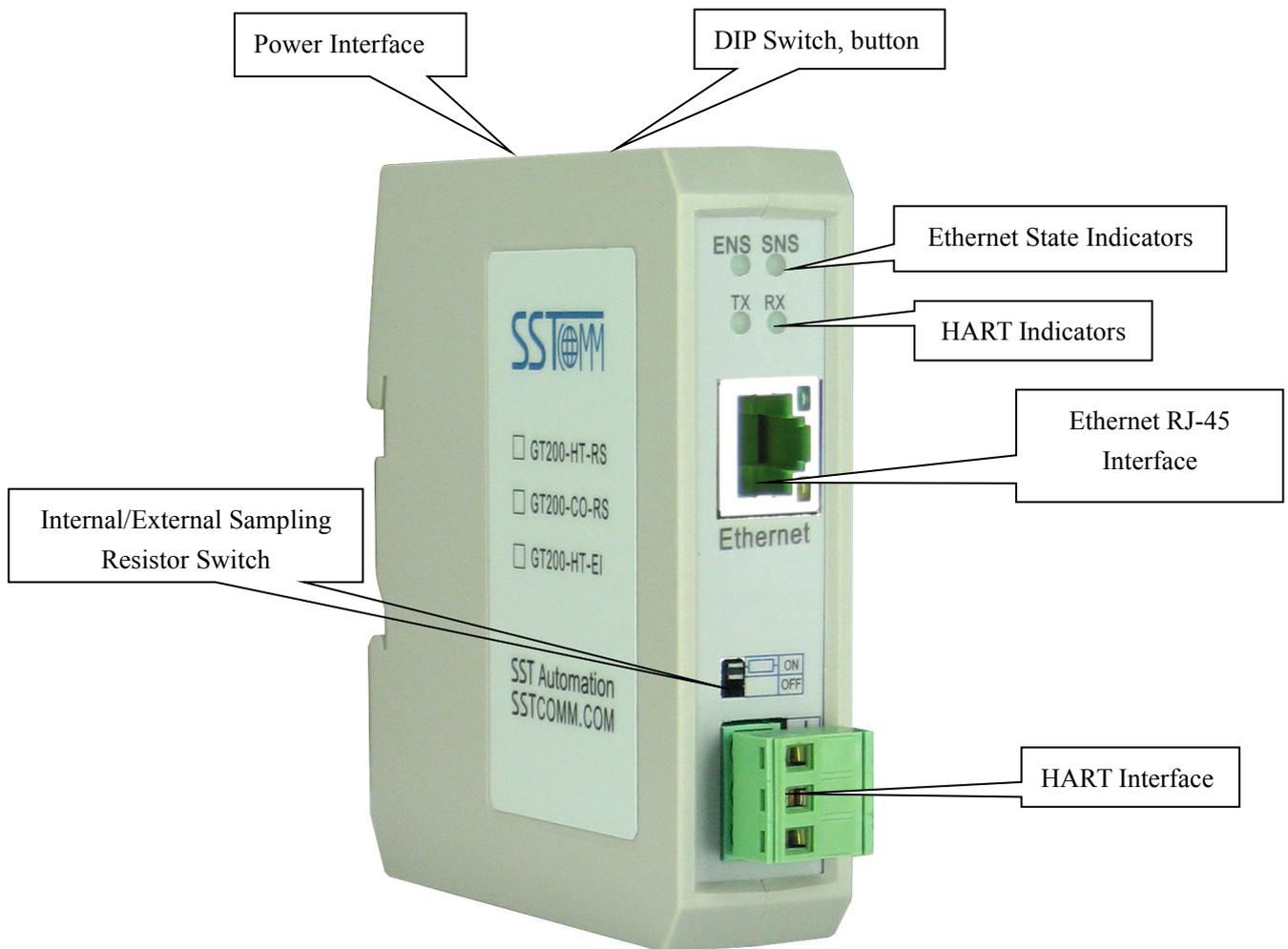
- Device Usage:** A table showing device usage statistics.

| Worst Case | Device Usages | Current | Connection | Address | Current | Devices not | Current |
|--------------|---------------|---------|------------|----------|---------|-------------|---------|
| Minimum | Address: | Current | Connection | Address: | Current | Devices not | Current |
| Maximum CPU: | | | Consume: | | | | 0 |
| | | | Produce: | | | | |
- Hardware:** A tree view on the left showing the network topology. The selected device is "Hart to Ethernet/IP Gateway" (1756-A7/A). The main area shows a network diagram with IP addresses 192.168.0.110 and 192.168.0.147.
- Messages:** A log window at the bottom showing system messages.

| Message Code | Date | Description |
|--------------|--------------------|---|
| ES5VC:000D | 2017-9-15 16:40:36 | Unable to load EDS file information for device. [Device ID - Vendor (1), Type (12), Code (14), Major (3), Minor (10)] |
| ENET:01E4 | 2017-9-15 16:40:31 | Mode changed to online. The communication timeout is 3000 msec. The online path is M-09051A5E3C3A41A8_ETHIP-1. |
| ENET:01E5 | 2017-9-15 16:40:30 | Mode changed to offline. |
| ES5VC:000D | 2017-9-15 16:33:33 | Unable to load EDS file information for device. [Device ID - Vendor (1), Type (12), Code (14), Major (3), Minor (10)] |
| ENET:01E4 | 2017-9-15 16:33:22 | Mode changed to online. The communication timeout is 3000 msec. The online path is M-09051A5E3C3A41A8_ETHIP-1. |

3 Hardware Descriptions

3.1 Product Appearance



Note: This picture is for reference only. Product appearance should refer to the real object.

3.2 Indicators

| Indicator | State | State Description |
|---|--------------------|--|
| ENS (IP indicators) | Red off | IP address launch is normal |
| | Red blinking | DHCP |
| SNS (EtherNet/IP network indicator) | Green on | EtherNet/IP connection is established, communication is normal |
| | Green blinking | EtherNet/IP connection is not established |
| TX, RX (HART data transmit/receive indicator) | TX, Green blinking | HART Bus data sending |
| | RX, Green blinking | No data is sending |

3.3 DIP Switch/Button

3.3.1 Button

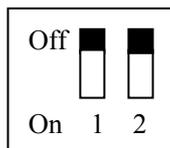
The button is located at the top of the product and used to update new firmware.

| Action | Description |
|--|-----------------|
| Hold before power on, release after power on | update firmware |

Note: Under normal conditions, please don't press this button if not necessary!

3.3.2 DIP Switch

DIP switch is located at the top of product, bit 1 is the function bit and bit 2 is the mode bit. Turn bit 2 and bit 1 to off, power on the product (or restart the product: power off and power on) to let it work under the run mode.

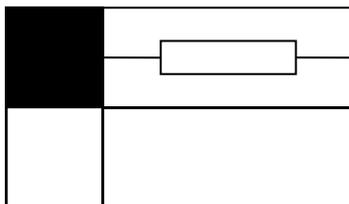


| Mode (bit 2) | Function (bit 1) | Description |
|--------------|------------------|--|
| Off | Off | Run mode, allow configuration , it can exchange data between HART and EtherNet/IP |
| Off | On | Debug mode, it can exchange data between HART and EtherNet/IP, allow debugging and configuration |
| On | Off | Configuration mode, IP address is fixed 192.168.0.11, it can only read and write configuration data under this mode, not allowing communication between EtherNet/IP and HART |
| On | On | Run mode, prohibit configuration and debugging, it can exchange data between HART and EtherNet/IP only |

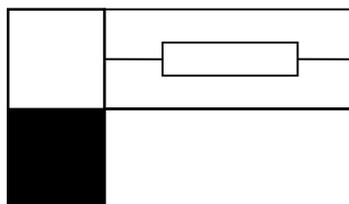
Note: ①After re-configuring the switch, you have to restart the GT200-HT-EI to make the settings take effect!
(Power off then Power On)

3.3.3 Internal / External Sampling Resistor Switch

GT200-HT-EI can choose using the internal sampling resistor or external sampling resistor to get the HART signal. The specification of the internal resistor is 270Ω, 2W. When the power of the sampling resistor is more than 2W, you must use an external resistor.



Switch to ON, using the internal sampling resistor

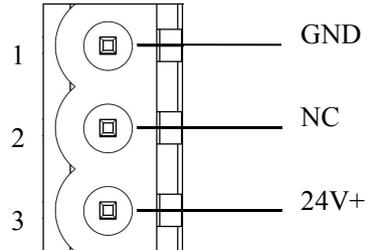


Switch to OFF, using the external sampling resistor

3.4 Interface

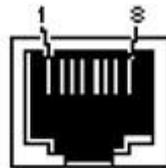
3.4.1 Power Interface

GT200-HT-EI has one power interface. Please use 24VDC power supply to connect it.



| Pin | Function |
|-----|-----------------------|
| 1 | Power GND |
| 2 | NC(Not Connected) |
| 3 | 24V+, DC Positive 24V |

3.4.2 Ethernet Interface

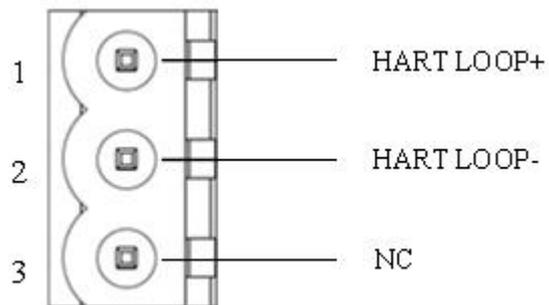


RJ-45 port

Ethernet interface uses RJ-45 connector; its pin (standard Ethernet signal) is defined as below:

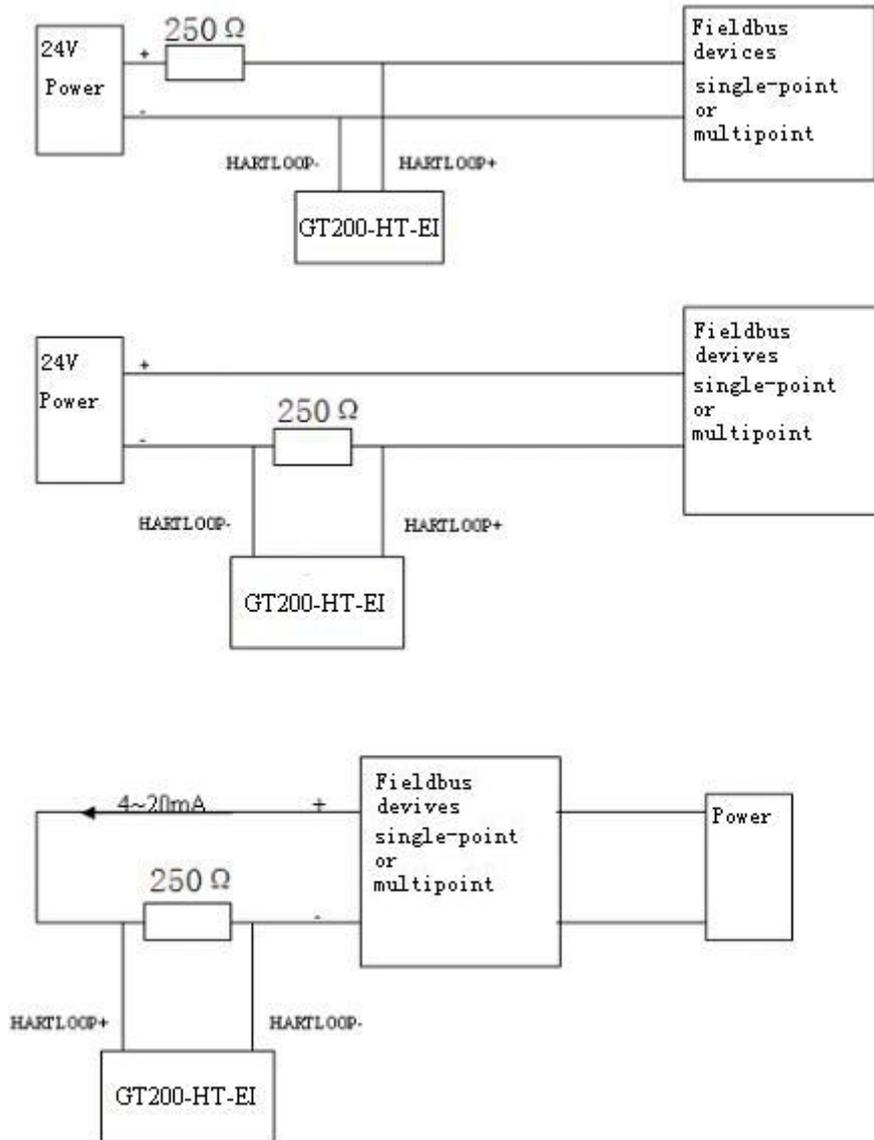
| Pin | Signal Description |
|-----|-------------------------------|
| S1 | TXD+, Tranceive Data+, Output |
| S2 | TXD-, Tranceive Data-, Output |
| S3 | RXD+, Receive Data+, Input |
| S4 | Bi-directional Data+ |
| S5 | Bi-directional Data- |
| S6 | RXD-, Receive Data-, Input |
| S7 | Bi-directional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

3.4.3 HART Interface

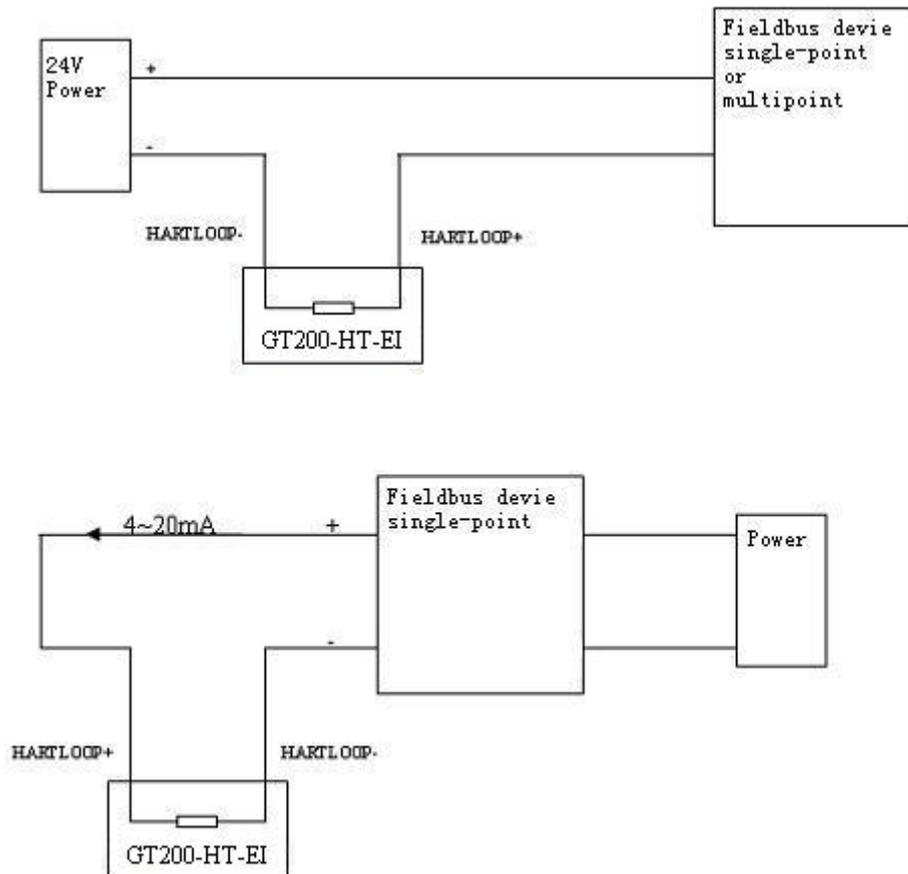


| Pin | Function |
|-----|------------------------------|
| 1 | Connect HART signal positive |
| 2 | Connect HART signal negative |
| 3 | NC |

3.5 Topology of GT200-HT-EI and Fieldbus Devices



Not using the internal resistor!



Using the internal resistor!

Note: 1. Some HART slave instrument need to perform self-test and other internal work when power is on, they may not start HART communication, then gateway cannot receive the response data of the instrument right now. It is recommended the HART slave instrument and gateway uses separate power supply so that the gateway can immediately establish communication with instrument.

2. When configuring HART commands in the software SST-HI-CFG, the commands need to be configured according to the actual demands. To improve the speed of bus communication, it is recommended not to configure the empty node (in fact, not connected to the node) and empty commands (the actual unnecessary commands).

4 Configuration Software Instructions

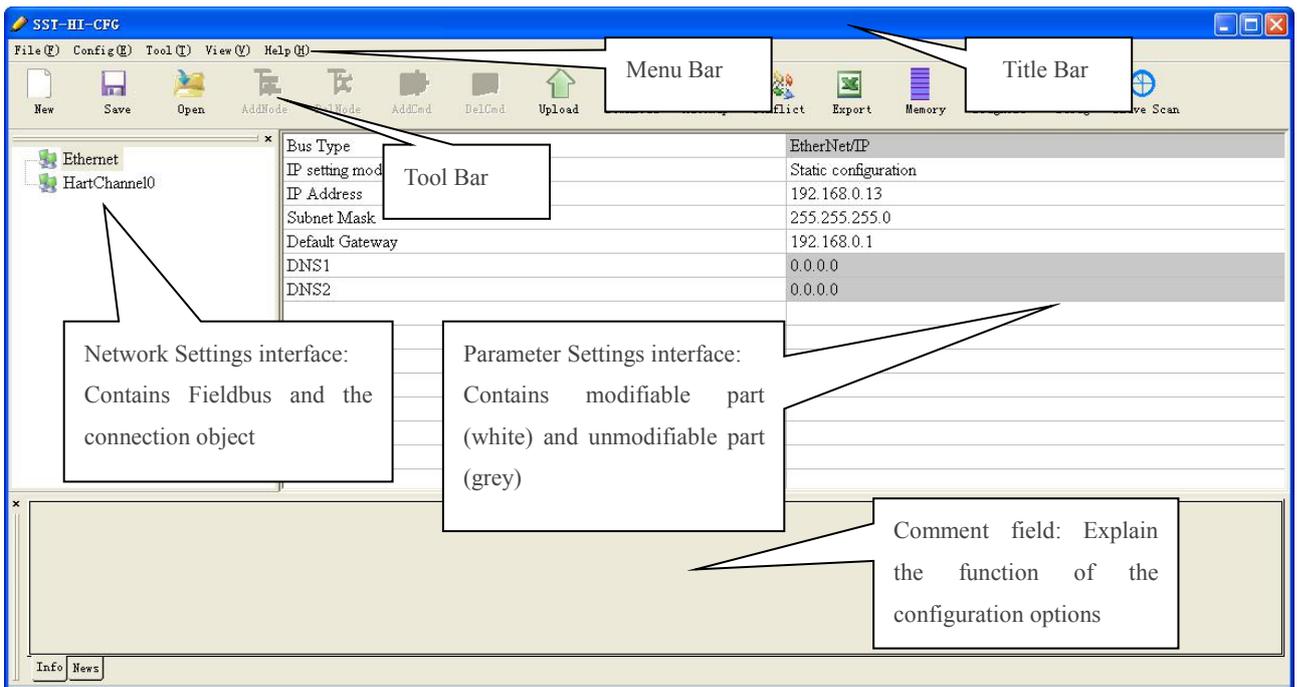
4.1 Pre-configuration Attention

SST-HI-CFG is configuring software based on Windows platform, and used to configure HART series products.

The following describes how to use the software SST-HI-CFG to configure the product GT200-HT-EI. You may also check the software user manual to get detailed usage.



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



Tool Bar:

Toolbar interface shown as follow:



The function from left to right is: New, Save, Open, AddNode, DelNode, AddCmd, DelCmd, Upload, Download, AutoMap, Conflict, Export, Memory, Diagnose, Debug and Slave Scan.

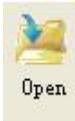
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New: Create a new configuration file



Save: Save the configuration file



Open: Open the configuration file



AddNode: Add a HART slave node



DelNode: Delete a HART slave node



AddCmd: Add a HART command



DelCmd: Delete a HART command



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



Download: Download the configuration file to the gateway



AutoMap: Used to automatically calculate the mapped memory address without conflict by each

command

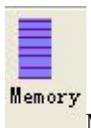


Conflict: To check whether there are some conflicts with configured commands in the gateway

memory data buffer



Export: Output current configuration to the local hard disk and saved as Excel spreadsheet form



Memory: Show the data exchange inside of the gateway



Diagnose: through this function could analyze operating condition of fieldbus device; also it can finish

some certain analysis



Debug: through this function could send any request frame to Hart fieldbus and show the response

information received in HART, convenient to debug

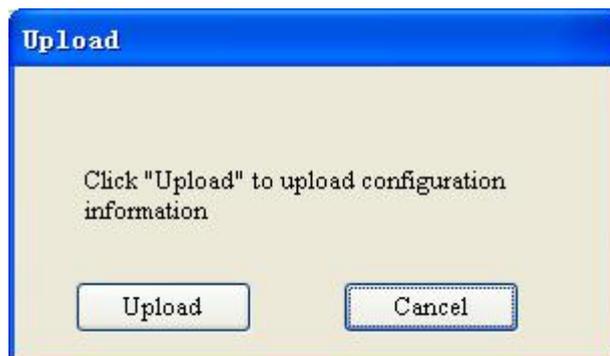
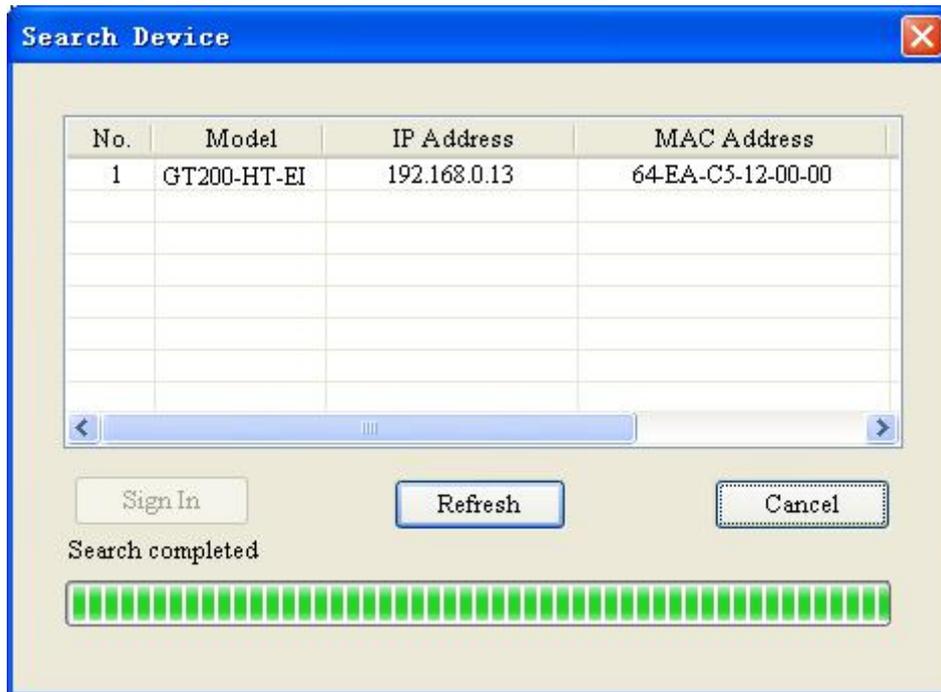


Slave Scan: This function can scan and calculate how many slave devices and relevant slave address which HART master is connecting, and also supports changing slave address

4.2 Software Function Specifications

4.2.1 Upload Gateway Configuration

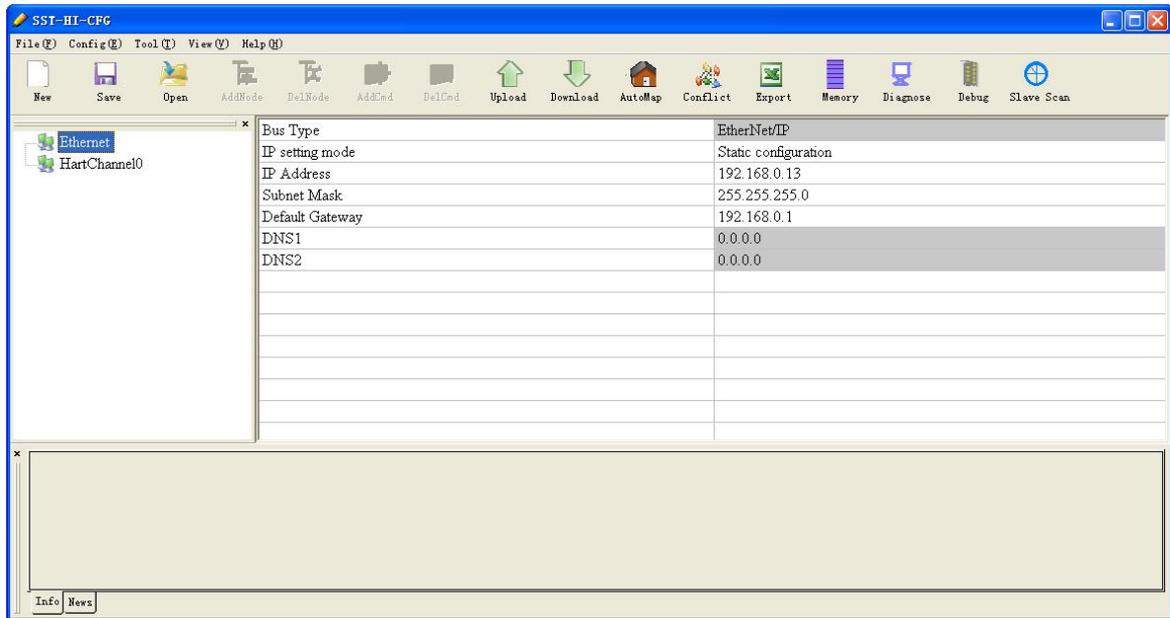
Open the software “SST-HI-CFG”, Click on upload icon  , Select the gateway what you used in the pop-up dialog box, and click “OK” and then “upload data”, if it shows “upload successfully”, which indicates that configuration file has been uploaded to the SST-HI-CFG.



4.2.2 Configure the Ethernet

In the device view interface, click Ethernet, click Ethernet, the configuration interface will be shown as below:

GT200-HT-EI HART/EtherNet/IP Gateway User Manual



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

Assign IP Mode: Manual Assign, DHCP;

IP Address: Set the IP address of the device;

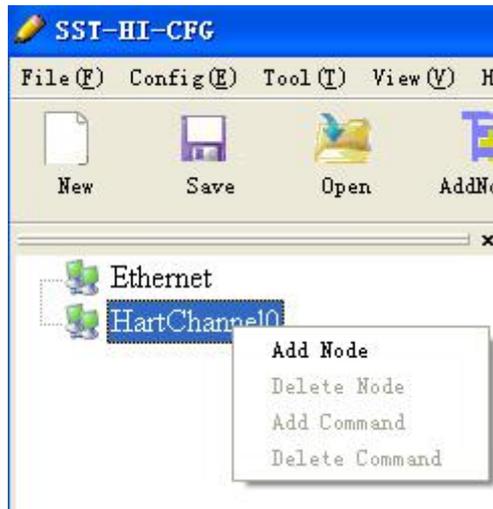
Subnet Mask: Set the subnet mask of GT200-HT-EI;

Gateway Address: Set the gateway address of the device;

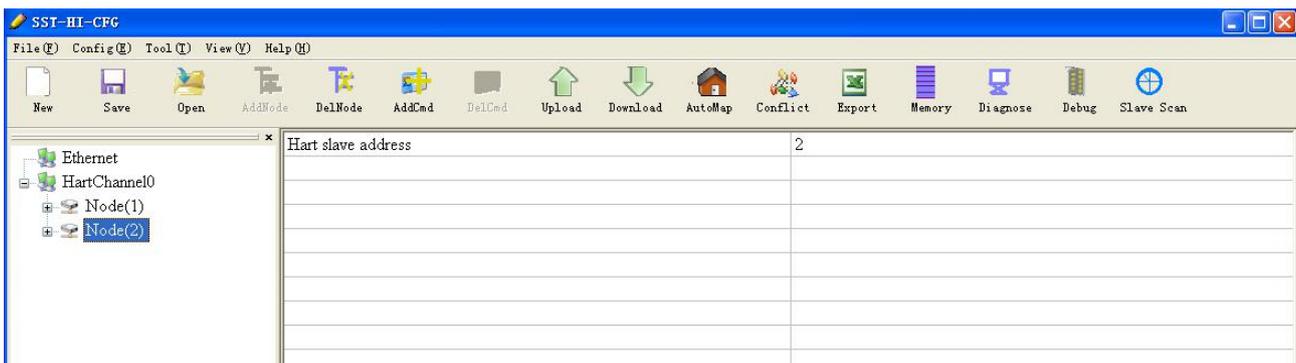
4.2.3 Configure the HART Fieldbus

4.2.3.1 Set the Parameters of HART Channel

Click the HartChannel0 in the tree view and the configuration section will appear on the right:



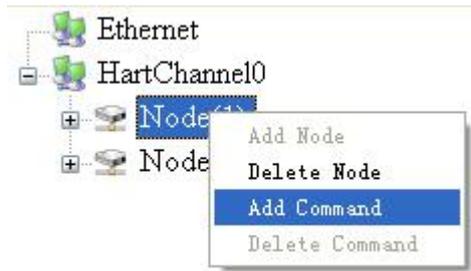
Click the added node, set slave address in the right configuration plate, and please notice that HART channel can only be equipped with one slave node which address is 0 when configured in the single point mode.



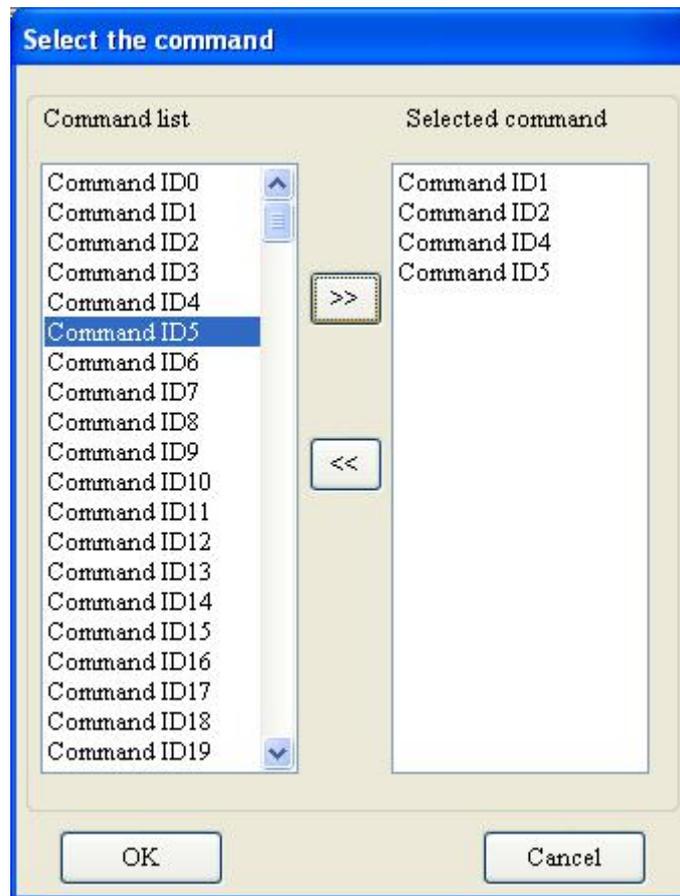
Note: When configured node numbers are more than the actual connected devices, the redundant node will lead to the longer time of polling circle; so, it is recommended that configured node numbers should be the same as actual devices.

4.2.3.3 Add a HART Command

Select the "Node (x)", Right click the mouse and click "Add Command".



Choose the command you want in the popup menu, and then click “OK” to exit:

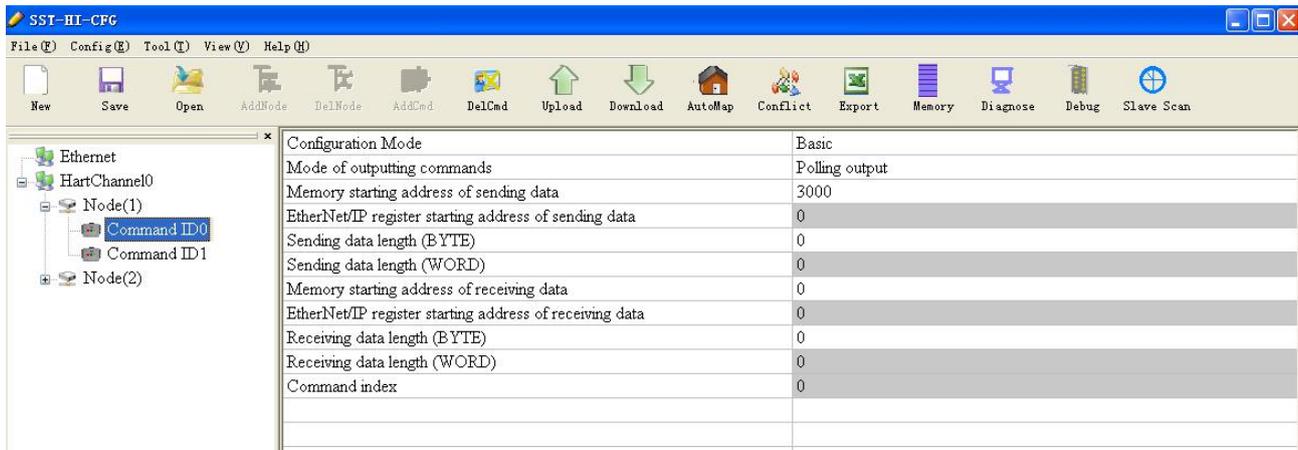


Note: the same command can only be configured once in one node.

4.2.3.4 Configure HART Commands

Click the command number in the tree view; you will see the configuration plate in the right place:

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Configuration Mode: basic and advanced optional, “basic” is shown as above, “advanced” configuration can refer to chapter 4.2.3.7;

Mode of outputting command: You can use the execution way of the command, change-of-state, polling output, Initialization output and disable output optional;

- ✓ Change-of-state output: Execute this command once s data buffer of HART changes
- ✓ Polling output: This order is put in the polling list, executed periodically
- ✓ Initialization output: Execute the command only once when power is on
- ✓ Disable output: the command will not be sent.

Memory starting address of sending data: Set the memory starting address of output data by this command, the range is 3000~3999;

The register starting address of sending data: the property is automatically calculated by gateway, used for register addressing;

Sending data length (byte): used to set the length of output data by this command;

Sending data length (word): the property is automatically calculated by gateway, used for user checking output data length, 1 word=2 byte;

Memory starting address of receiving data: set the memory address of input data by this command. Response data only includes data area of HART frame;

The register starting address of receiving data: the property is automatically calculated by gateway, used for register addressing;

Receiving data length (byte): set the length of input data by this command;

Receiving data length (word): the property is automatically calculated by gateway, used for user checking output data length conveniently, 1 word=2 byte;

Command index: the property is automatically calculated by the configuration software, it indicates the index in the configured command list this command belongs to.

4.2.3.5 Delete Commands

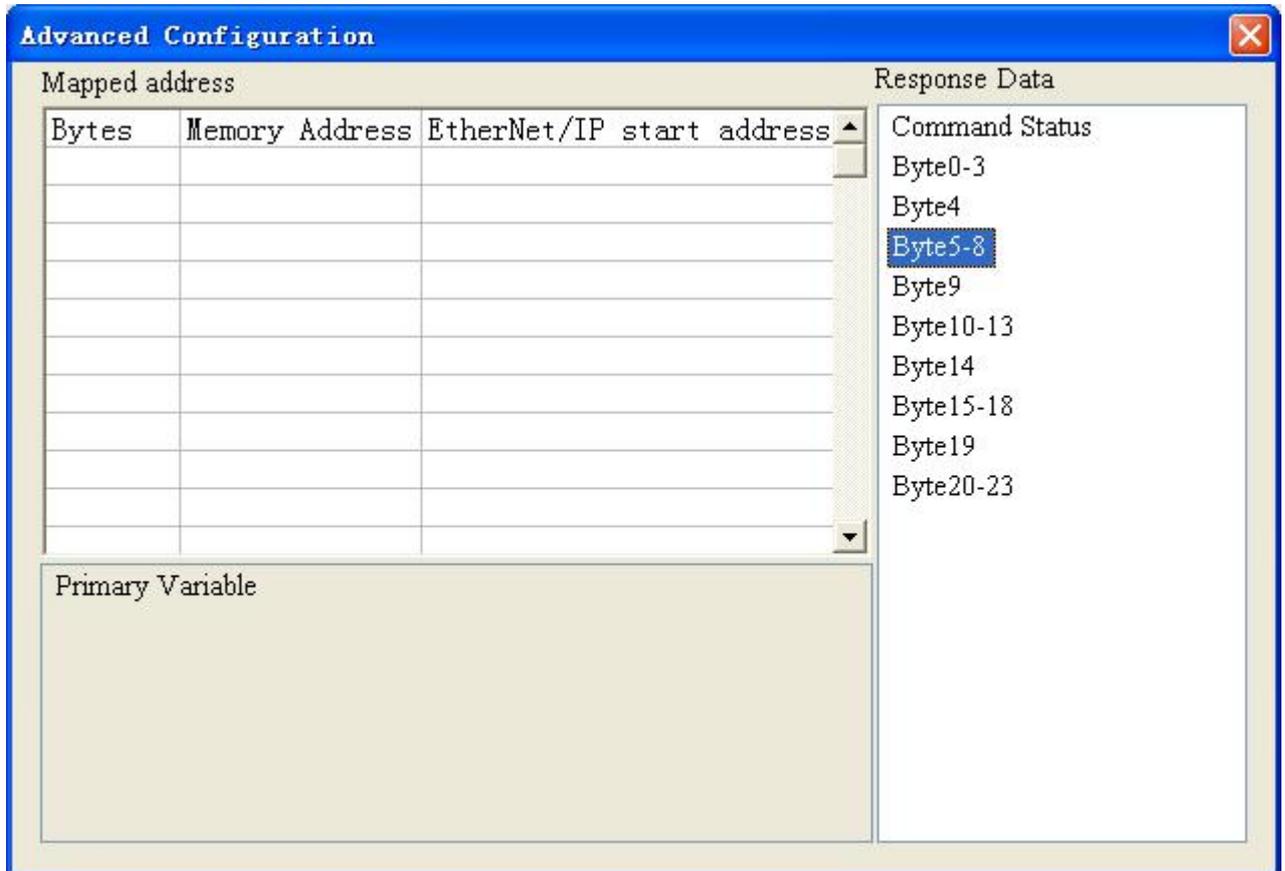
Select the command need to be deleted, Right click the mouse and click “Delete Command”. Through the menu command can also be the same action.

4.2.3.6 Delete Nodes

Select the node needed to be deleted, Right click the mouse and click “Delete Node”. Through the menu command can also be the same action.

4.2.3.7 Advanced Options to Configure Slave Commands

When using HART command configuration, sometimes users want to get one part data of one command. For example, No.1 HART command. The float value of main variable is only needed, no need to get unit of main variable, this is why advanced option exists. Advanced options is actually the execution of “segment mapping function”, it cut the response data of HART command and get the segment data. Users can get any part data they want. Below is the interface of Advanced Options:



There are many parts in “response data”. For example, “Command Status” means the communication status and relevant code of HART response command, “Byte0-3” means byte 0 to 3 of data area of HART response command, and so on.

In the above example, click “Byte5-8” will show the Primary Variable in the left bottom area. Other column has the relevant explanation.

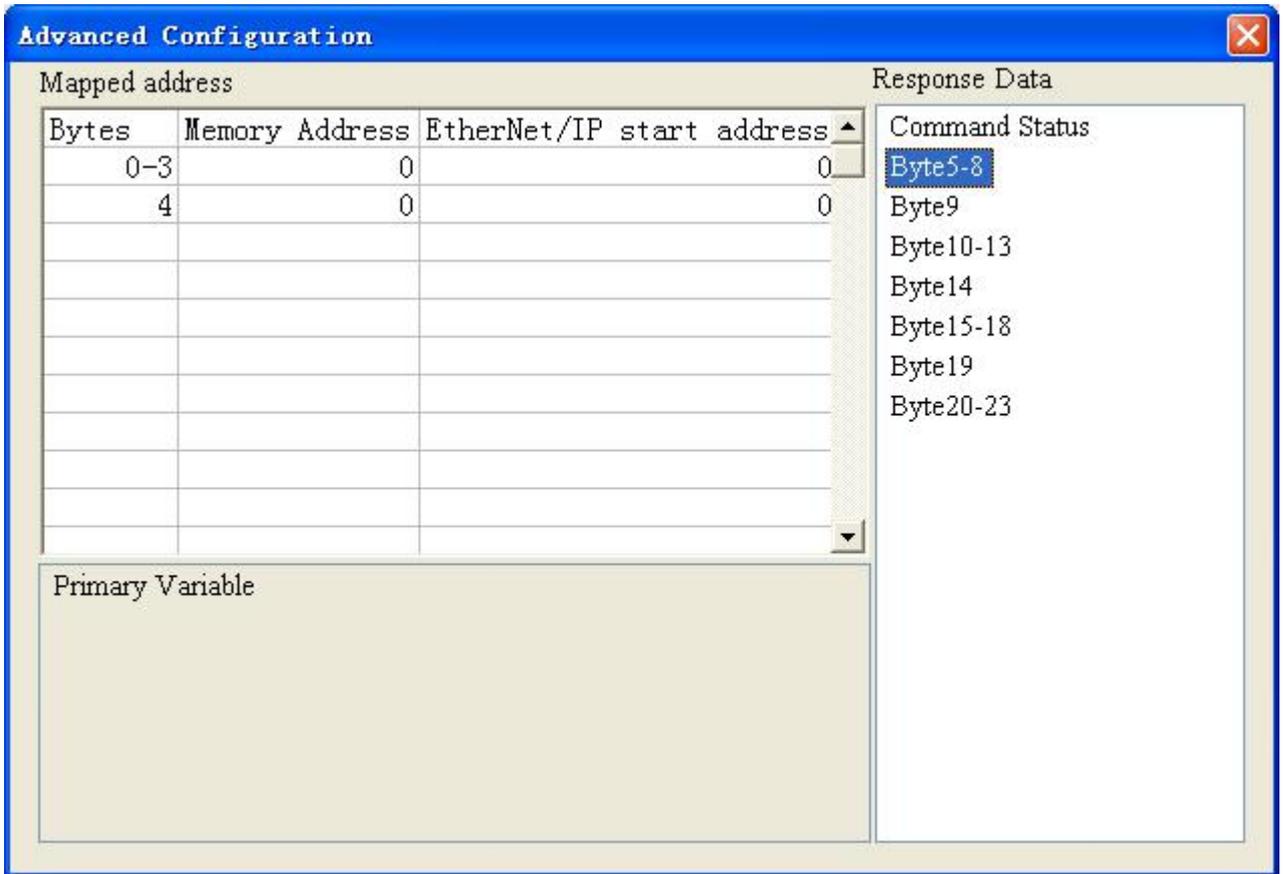
First to explain the “Mapped Address”:

Bytes: response bytes of “Response Data”;

Memory Address: assigned memory address which this byte is located in memory buffer area of GT200-HT-EI;

EtherNet/IP register address: the relevant EtherNet/IP register address of “Memory Address”; Note: this address is not a single address, which is the same memory area which it occupied.

Choose “Byte0-3” and “Byte4”, click auto mapping, as shown below:



Close the dialog box, download the configuration into GT200-HT-EI.

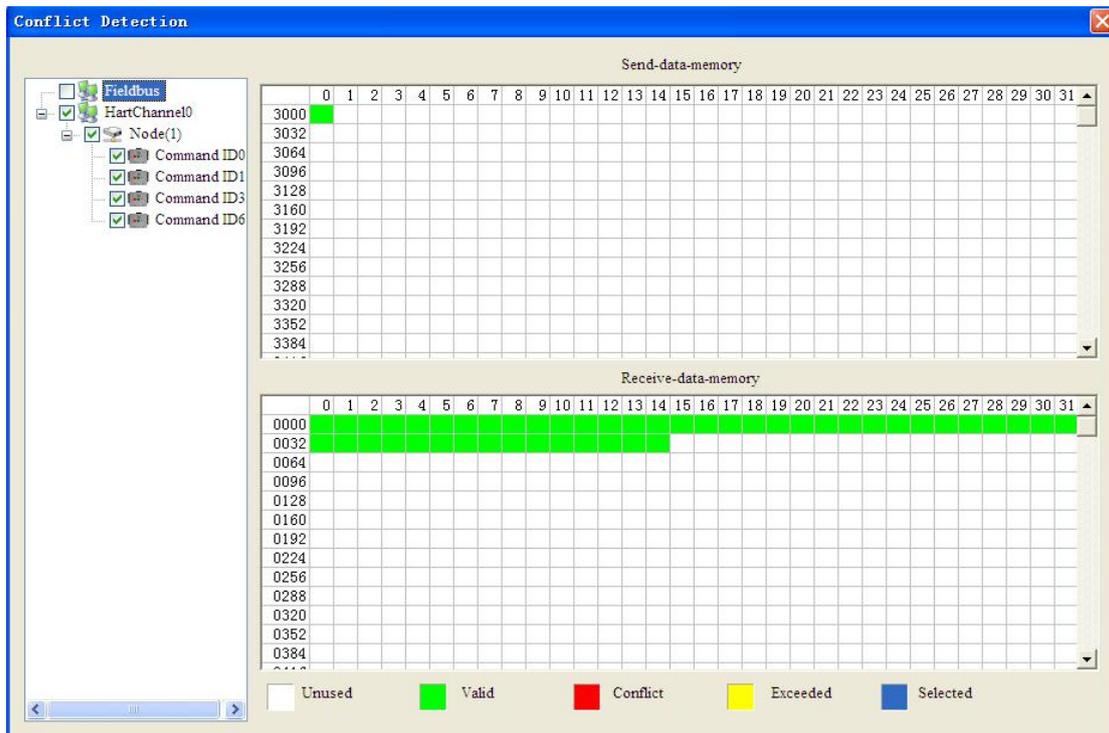
Others are the same with “Basic Mode”.

4.2.4 Conflict Detection

Conflict detection is used to check the distribution condition of the input and output data of all commands stored in the memory.



Click  icon will show the conflict detection interface as follow:



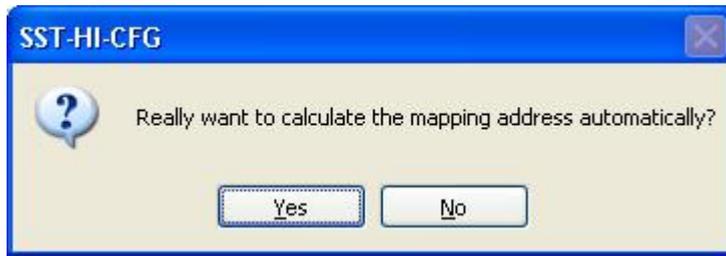
The left side of the tree view is configuration commands, the right side of the tree view is data memory address including receive data storage address and send data storage. Upper side is memory distribution of the HART's sending data; lower side is memory distribution of the HART's receiving data. When one memory unit is configured with two commands or more, the memory unit will display red color. When the distributed memory exceeds the defined scale of gateway, the exceeding part will display yellow color. White color area shows the usable memory. Green color area indicates occupied memory. Clicking one command, the distribution chart shown in blue will show the storage location of input/output data.

4.2.5 Automatic Memory-Mapped

Automap will automatically distribute the memory with no conflict according to the input/output bytes number by users' commands.



You should set the correct input/output bytes for each commands, then click Automap label, select “yes” in the



popup menu.

4.2.6 Download Configuration



Click the icon ; it will download the configuration into the gateway.

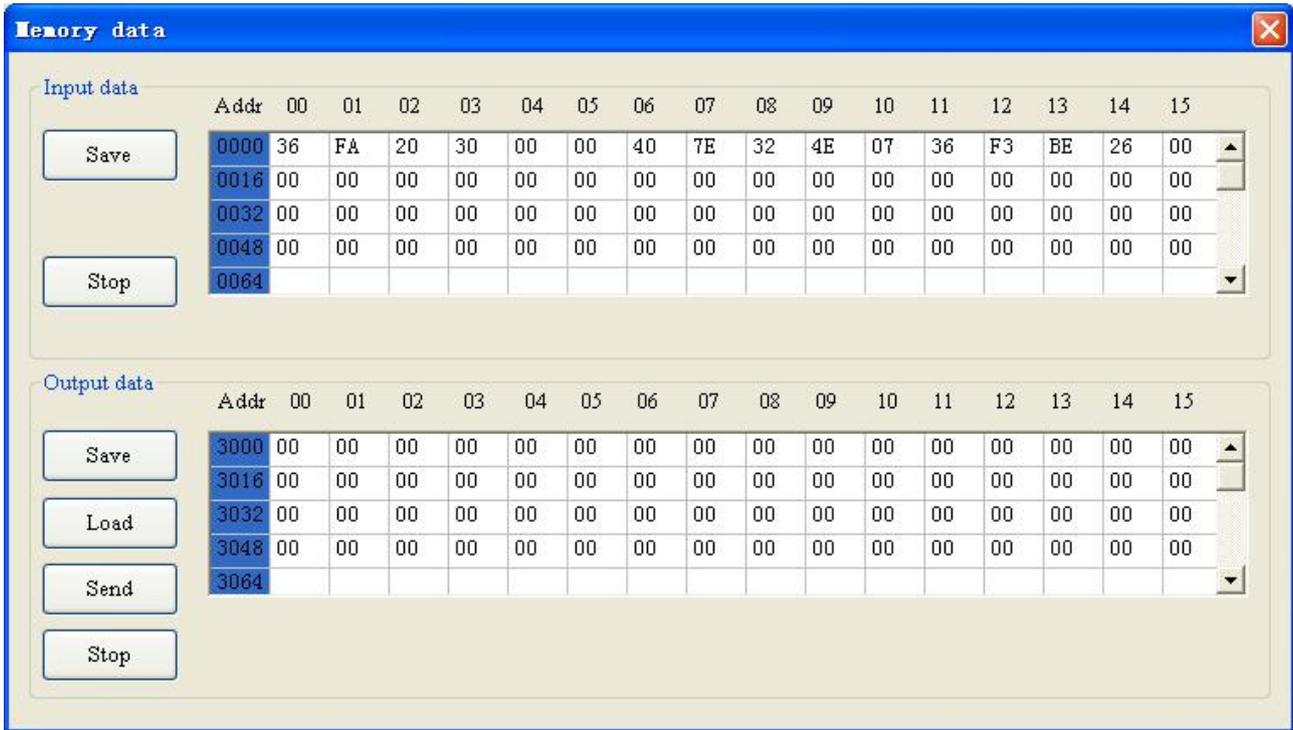
4.2.7 Memory Data Display

Show the data exchange inside of the gateway, users can use this function to debug the HART fieldbus in the absence of the EtherNet/IP side. Steps are as follows:

1. Ensure that the GT200-HT-EI's function bit of DIP switch is in the ON state and the mode bit of DIP switch is in the OFF state, restart the gateway. GT200-HT-EI is in the debug mode.
2. Use a network line to connect the GT200-HT-EI's RJ-45 port and computer. Open the software



“SST-HI-CFG”, Click “Tool—Show Memory Data” or click on the icon , choose the correct gateway in the device scanning window, interface is as follows:



As is shown in the table, upper table shows the memory distribution of HART input data, lower table shows the output data. When you need to change the output data, click the “stop” button firstly, then change the related data or load the already saved data table, at last, click the “sending data”.

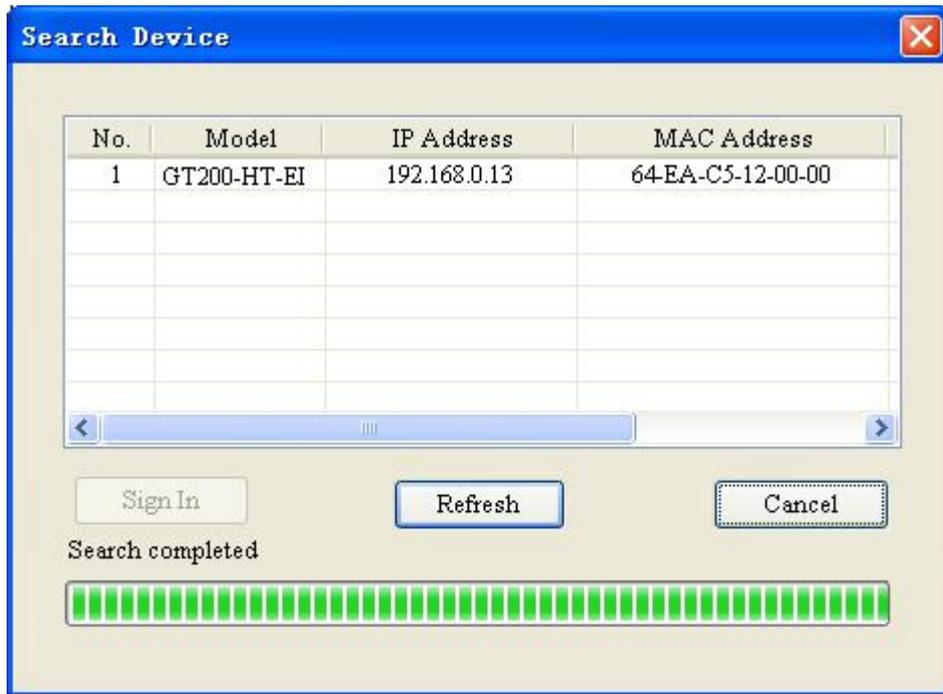
4.2.8 Diagnose

Through this function users will know which device is not communicating, execution condition of configured commands, data transmit of gateway and displays of certain command, operating steps are as follows:

1. Ensure that the GT200-HT-EI’s function bit of DIP switch is in the ON state and the mode bit of DIP switch is in the OFF state, restart the gateway. GT200-HT-EI is in the debug mode.
2. Use a network line to connect the GT200-HT-EI’s RJ-45 port and computer , Open the software



“SST-HI-CFG”, click “Tool—Diagnose” or click on the icon , the software first pop up one dialog box to choose the gateway and click “OK”, interface is as follows:



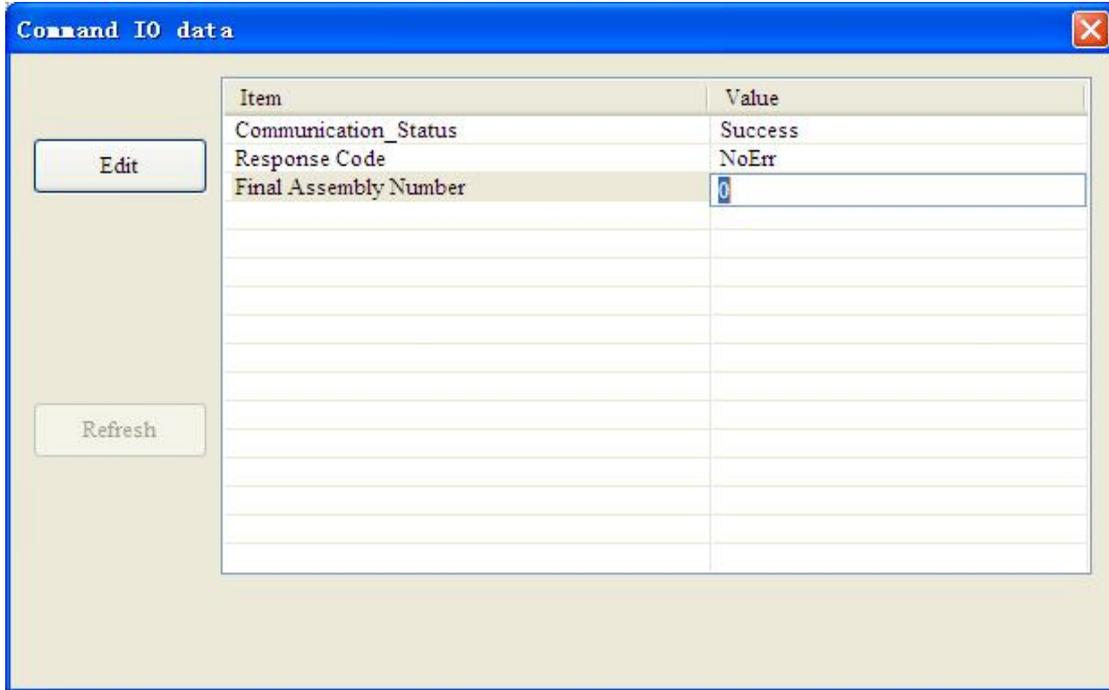
3. Click “Upload data” will see a picture as below:



4. Click “confirm” button to get in the interface of diagnose

command.

Double click “CMD19” will show the window as below:



Click the value or attribute you want to change, like “Final Assembly Number”, change relevant values, and click “Modify” can execute this operation of write command.

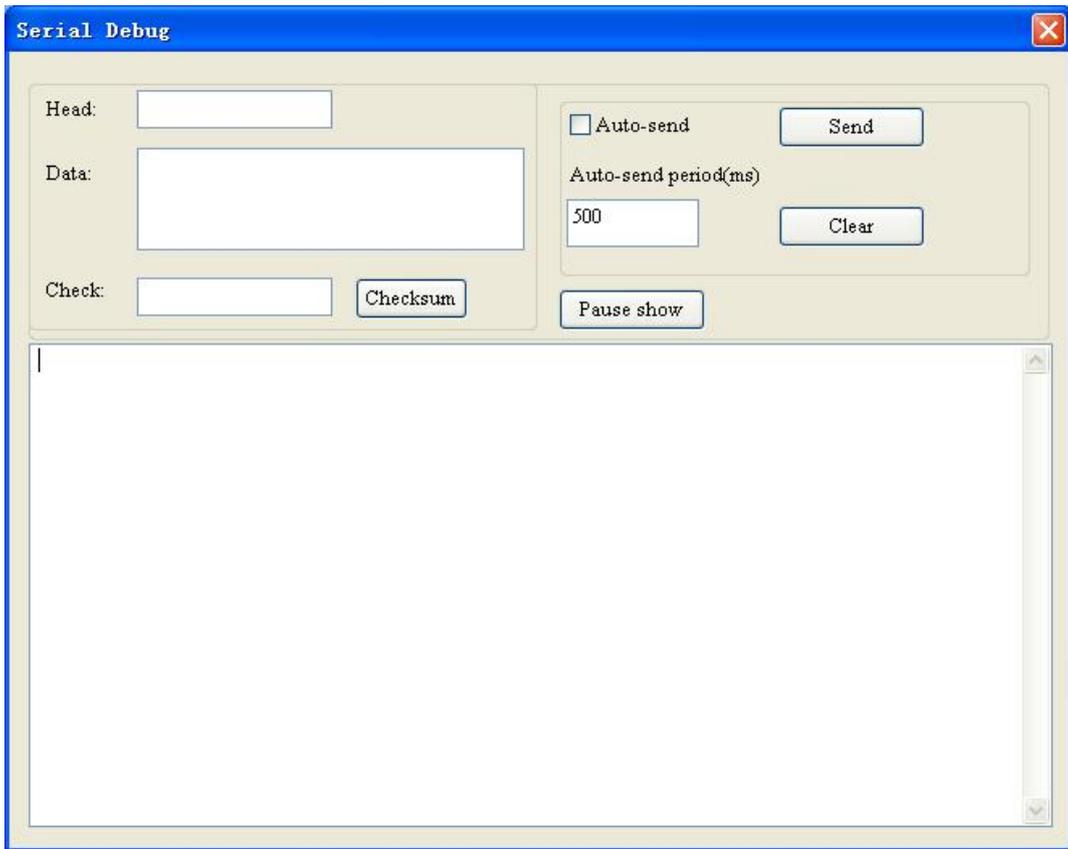
4.2.9 Debug Assistant

The Ethernet generic debugging feature can send any messages to the HART and monitor the data received from the gateway on the HART.. Steps are as follows:

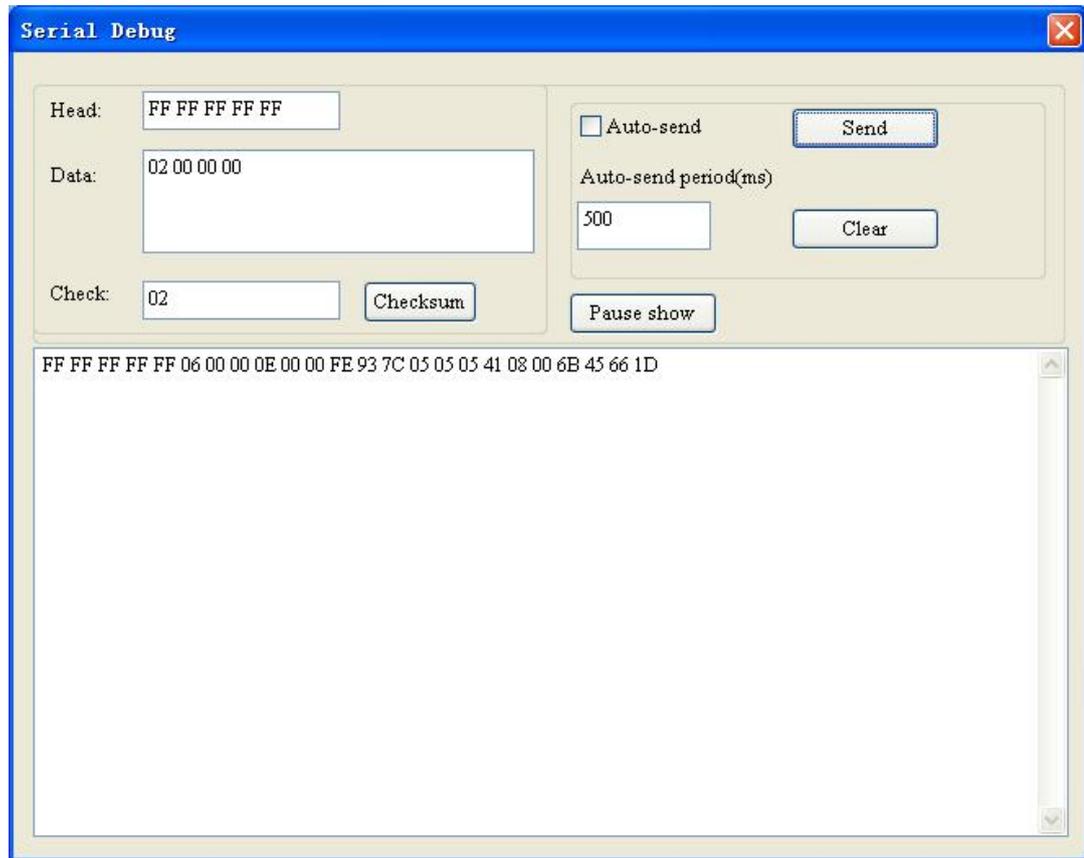
1. Ensure that the GT200-HT-EI’s function bit of DIP switch is in the ON state and the mode bit of DIP switch is in the OFF state, restart the gateway. Now GT200-HT-EI is in the debug mode.
2. Use a network line to connect the GT200-HT-EI’s RJ-45 port and computer, Open the software



“SST-HI-CFG”, Click “Tool—Debug Assistant” or click on the icon , Interface is as follows:



In this interface, click “Auto-send” or “Send” will combine data head, data, and check code into one frame and send out it. The data that the gateway received from HART fieldbus will be shown in the blank place below. The Checksum button only checks part of the data. Here is an example.



In this example, command 0 is composed of data head, data and check code. It uses short address; when you click “Send”, you will get the response data.

Note: Under this function, gateway will stop to execute the configured command; Turn off this function, gateway will return to execute the configured command.

4.2.10 Slave Scan

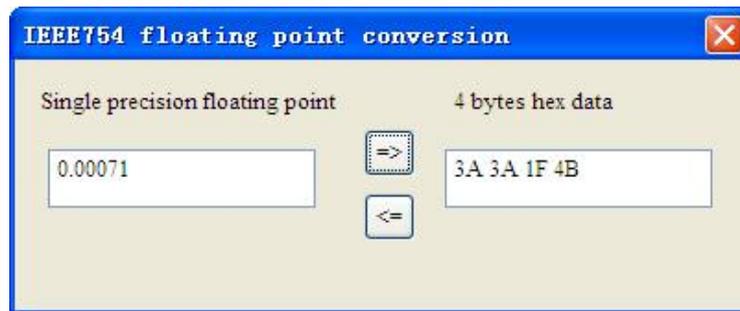
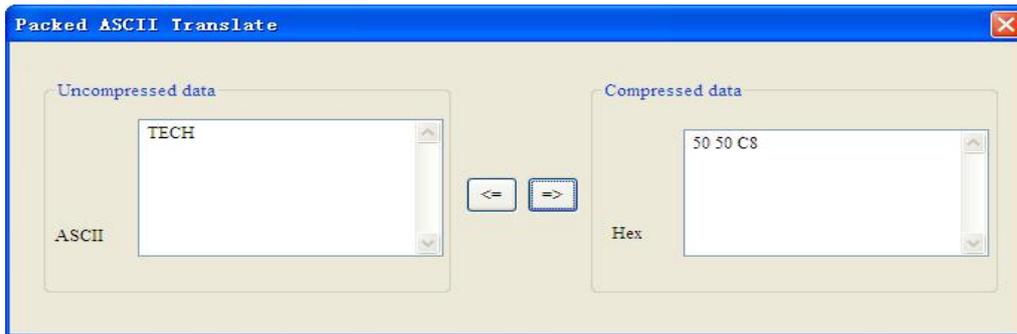
The slave scan function can help users to check the HART slave address and modify the slave address. The operation steps are:

- 1) Dial the DIP switch of GT200-HT-EI to 1ON2OFF to let the gateway into debug mode.
- 2) Use a network line to connect GT200-HT-EI to computer, open SST-HI-CFG software, click

“Tool->Slave Scan” or click icon  “Slave Scan”, the software will pop up a dialog box to choose the scanned gateway and click “OK”, as shown below:

4.2.11 Switching Tools

In the “Tools” menu, there are two practical tools: They are used to switch between IEEE754 and PACKED ASCII conveniently.



5 HART Master Working Principle

Inside the gateway it opens up a length of 5000 bytes of memory as the data exchange of input and output buffers. Memory of 0 to 2999 acts as the storage area of the HART input data and device status. Memory of 3000 to 4999 acts as storage area of the HART output data and control variables. The specific assignment shown in the table below:

| | Gateway memory address | Description |
|----------------|----------------------------|---|
| Read-only part | 0-1599 | The HART data input area |
| | 1600-1619 | Device 0_cmd0 data |
| | 1620-1639 | Device 1_cmd0 data |
| | |Device 15_cmd0 data |
| | 1920 | Gateway status |
| | 1921 | Send times of Gateway's HART port |
| | 1922 | Receive times of Gateway's HART port |
| | 1923 | HART communication error times |
| | 1924-1943 | Reserved |
| | 1944 | Device 0_cmd0's response status |
| | 1945 | Device 1_cmd0's response status |
| | |Device15_cmd0's response status |
| | 1960-2119 | The response status of the user command |
| | 2120-2391 | Reserved |
| | 2392 | Universal receive label |
| | 2393 | Universal receive Error Counter |
| | 2394-2395 | Universal receive data length |
| | 2396-2695 | Universal receive data |
| | 2696-2999 | Reserved |
| | Readable and writable part | 3000-3999 |
| 4000 | | Reset to send, receive, error counter |

GT200-HT-EI HART/EtherNet/IP Gateway

User Manual

| | | |
|--|-----------|----------------------------|
| | 4001 | Polling enabled |
| | 4002 | Trigger label |
| | 4003 | Trigger command number |
| | 4004-4269 | Reserved |
| | 4270 | Universal send label |
| | 4271 | Universal mode enabled |
| | 4272-4273 | Universal send data length |
| | 4274-4573 | Universal to send data |

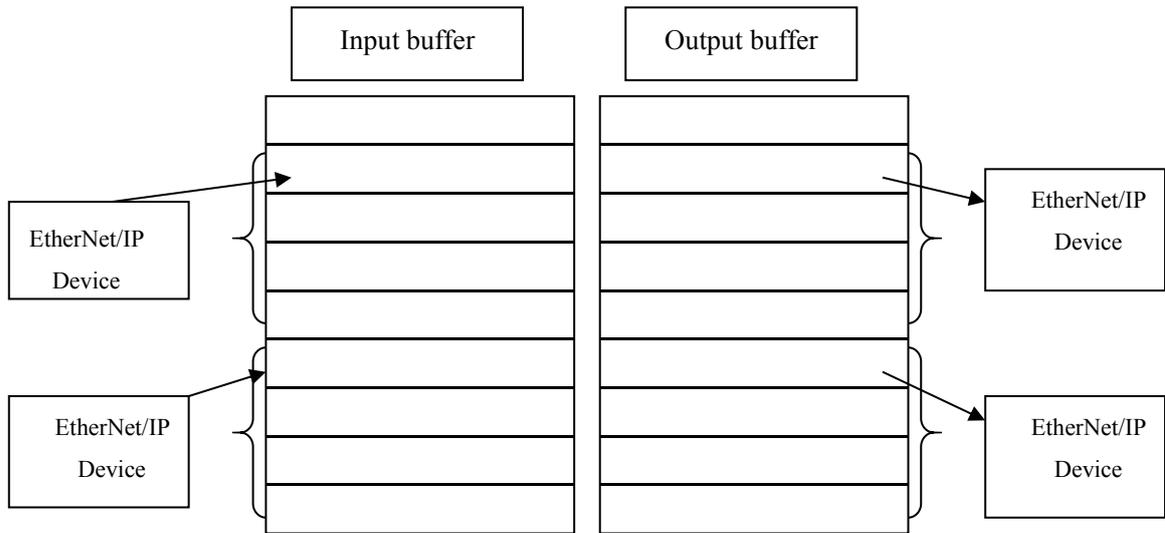
- The HART data input area: Store the data that HART slave device sends to gateway.
- The HART data output area: Store the data that the gateway sends to the HART slave device.
- Device 0_cmd0~ Device 15_cmd0: When operating a slave command for the first time, the gateway internal will automatically execute the No. 0 command to obtain the device information (to obtain the long address). The response data of this internal command is stored in this area.
- Gateway status: The gateway status indicates what the gateway state is in the HART network, defined as:
 - 0---- No HART communication
 - 1----sending
 - 2---- Waiting for a response
 - 3---- Handling a response
- Send times of HART port on gateway: The HART send counter
- Receive times of HART port on gateway: The HART receive counter
- HART communication error times: The HART Receive error counter
- The response status of Device 0_cmd0~ Device 15_cmd0: Show that the response status of the internal command
- The response status of user command: Show that the response status of the user command
 - Command state is defined:
 - 0---- Not executed
 - 1---- Correct response
 - 2---- Parity error
 - 3---- No answer

4---- Error defined in agreement

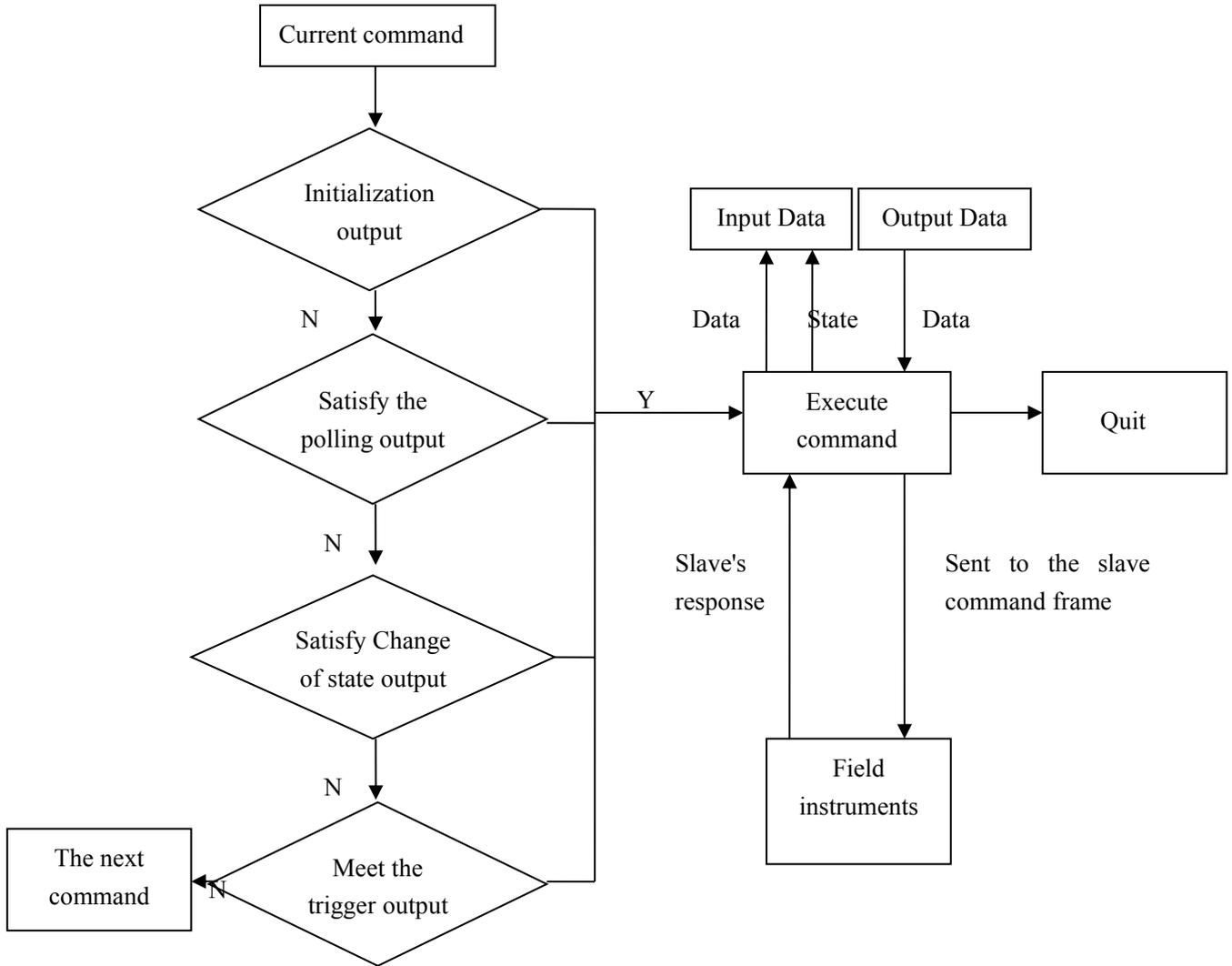
5---- Not connected

- Universal Receive label: The receive label under the universal mode, this value which changes one time indicates that HART end receives a HART frame
- Universal receive data length: Indicating the received data length under the universal mode
- Universal Receive Error Counter: Indicate the universal receive error number
- Universal receive data: Store the received data at HART side under the universal mode
- Reset send, receive, error counter: The gateway's control signal, when the value of memory changes, gateway causes all the counter to 0
- Polling is enabled: This bit is readable and writable, writing 1 enables the polling output, writing 0 disables polling output; Reading 1 indicates that the polling state is enabled, 0 indicates that the polling is in the disabled state
- Trigger label: Change the value will result in a trigger operation
- Trigger command number: Command number executed by trigger operation
- Universal mode enabled: The value of 1 indicates a universal transfer function is enabled, otherwise disables universal transport function
- Universal send label: The send label under the universal mode, this value changes in time will lead to send a HART frame
- The universal send data length: The length of send data under the universal mode
- Universal to send data: Data needs to send under the universal mode

Data exchange between HART and EtherNet/IP of GT200-HT-EI 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 master. HART read command will write the read data to the network input buffer for EtherNet/IP accessing. EtherNet/IP write data command writes data to HART data output buffer, HART write register command gets data from this area, and export to relevant HART slave devices through write command.



5.1 Flowchart of Executing One HART Command

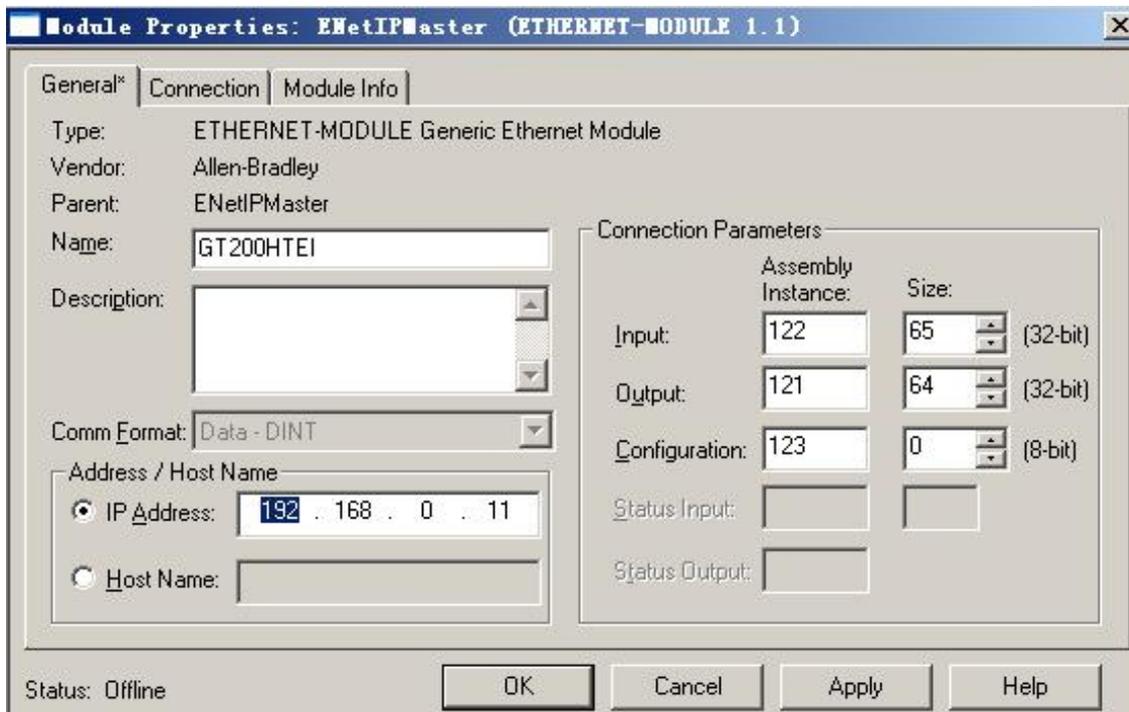


6 EtherNet/IP Connection Parameters Set

Connection parameters the gateway provides are as below:

- a. Input Instance: 102 (64 Bytes), 112 (128 Bytes), 122 (256 Bytes);
- b. Output Instance: 101 (64 Bytes), 111 (128 Bytes), 121 (256 Bytes);
- c. Configuration Instance: 103 (0 Bytes), 113 (0 Bytes), 123 (0 Bytes).

Take configuration parameters of RSLogix5000 as an example:

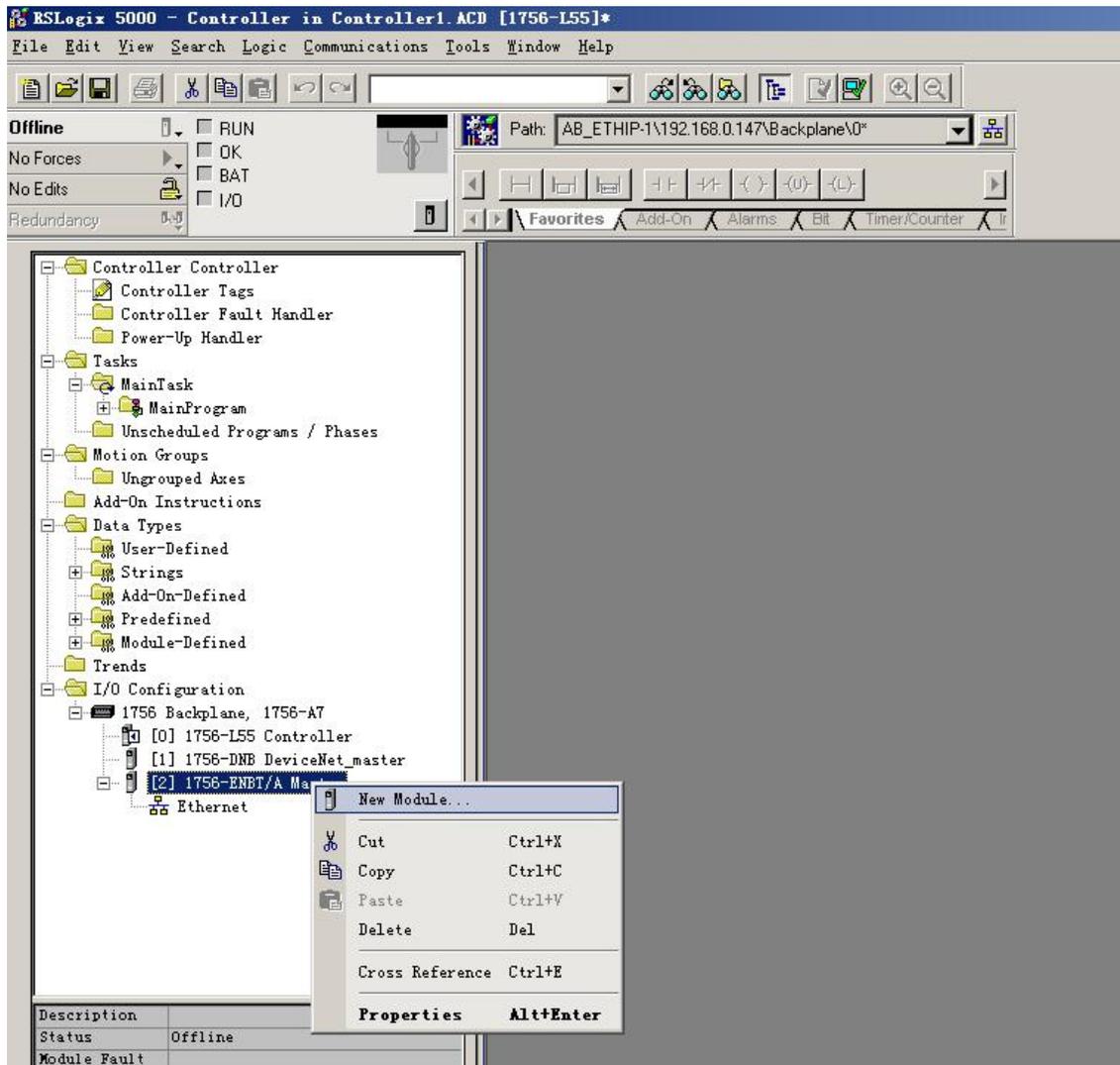


7 How to Read-write I/O Data

7.1 I/O Way to Read-write Data (Recommended)

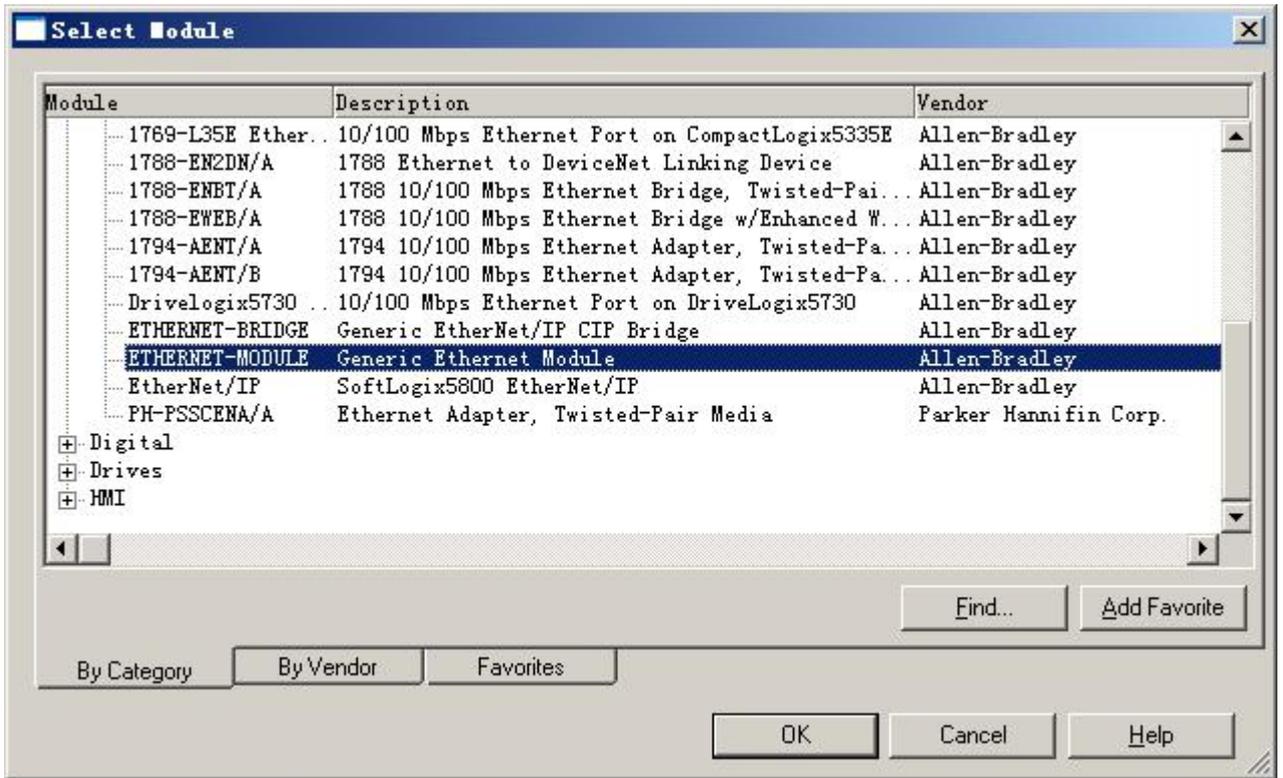
The following RSLogix 5000 as an example of how to read-write I/O data.

Right click on EtherNet/IP master module, click “New Module”, as shown below:

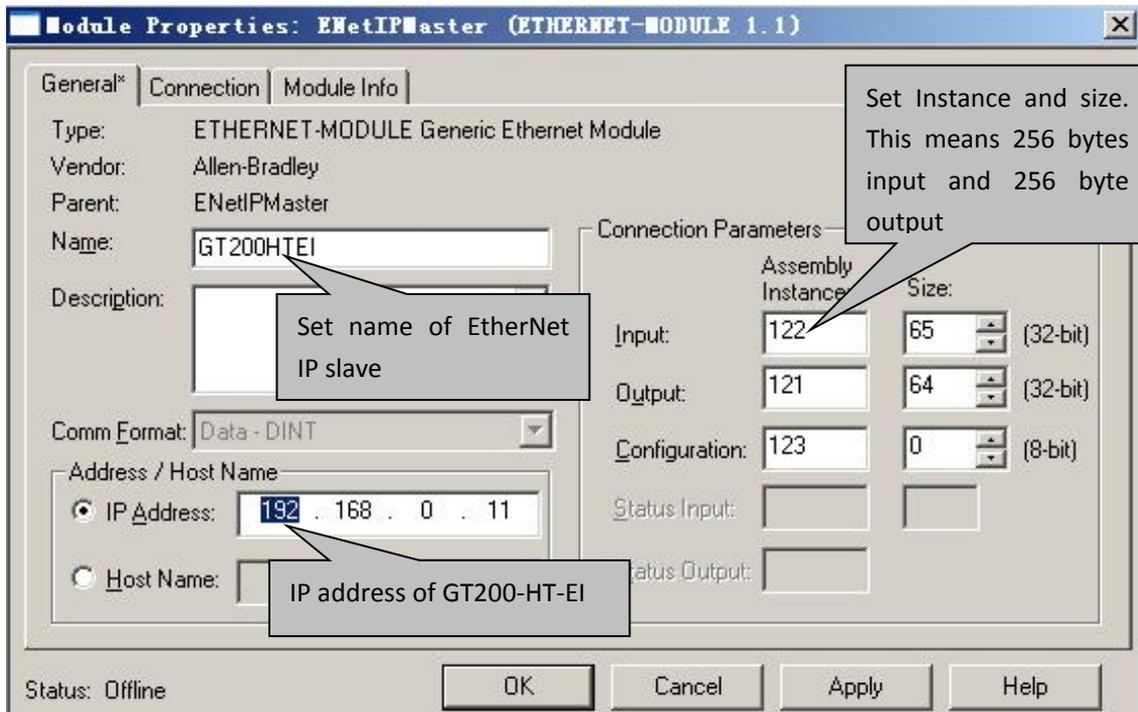


In the pop-up dialog box, unfold “+” before “Communications”, choose “ETHERNET-MODULE”, click “OK”, as shown below:

GT200-HT-EI HART/EtherNet/IP Gateway User Manual



Configure relevant information of GT200-HT-EI 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 slave module (GT200-HT-EI module).

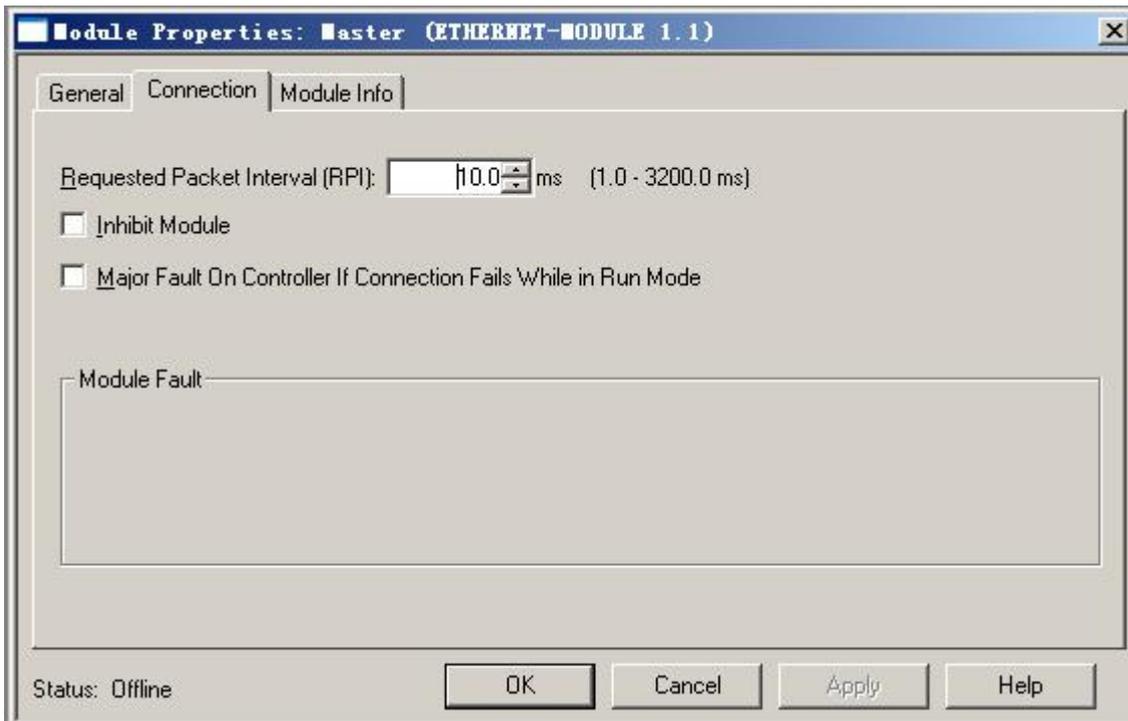
Comm Format: Configure data types. Users can choose data types as DINT, INT, SINT and REAL, etc. After confirmation, this cannot be changed. If you want to change data types, you can create new module.

IP Address: Set IP address of the EtherNet/IP slave module (IP address of GT200-HT-EI). IP address of GT200-HT-EI is the address downloaded into module through software SST-HI-CFG.

Connection Parameters: Set Connection parameters during communication, this parameter GT200-HT-EI supports can refer to past chapter.

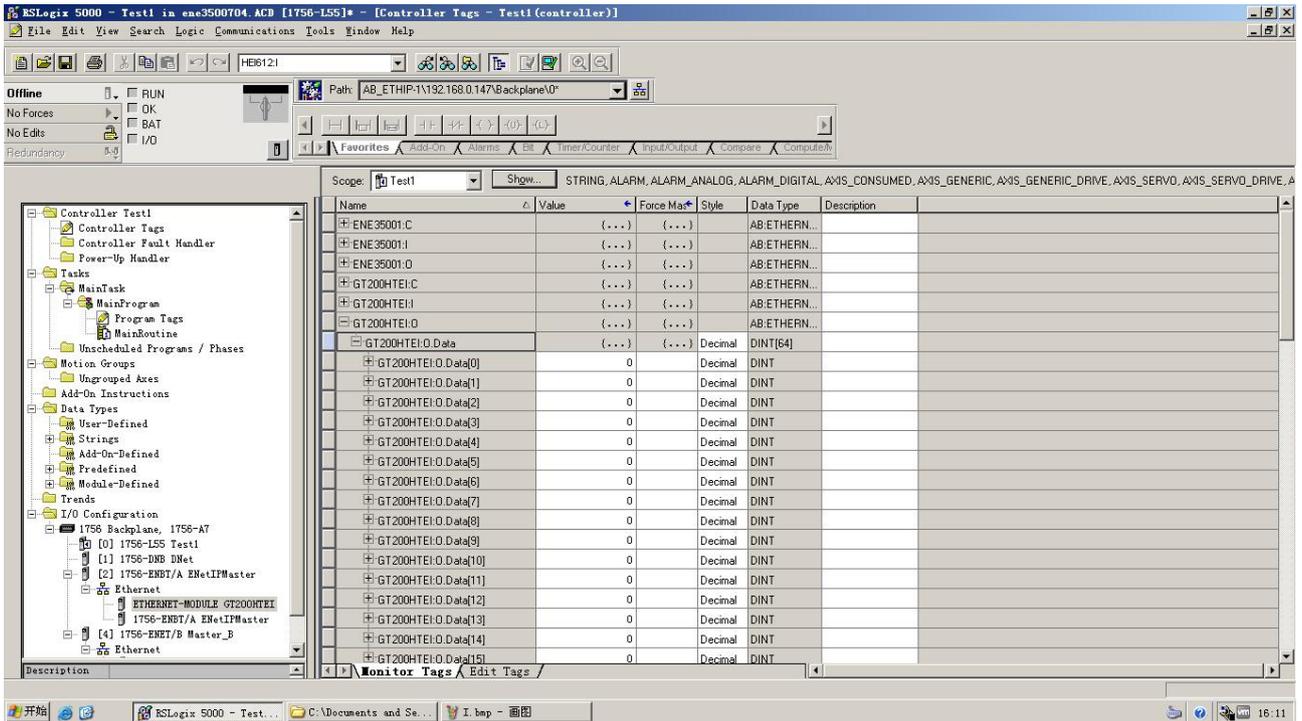
Note: “Size” (configured bytes) in the above picture should be the consistent with relevant input and output bytes of Instance in the above chapter.

Click “OK”, set master 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 “GT200HTEI:O”, as shown below:

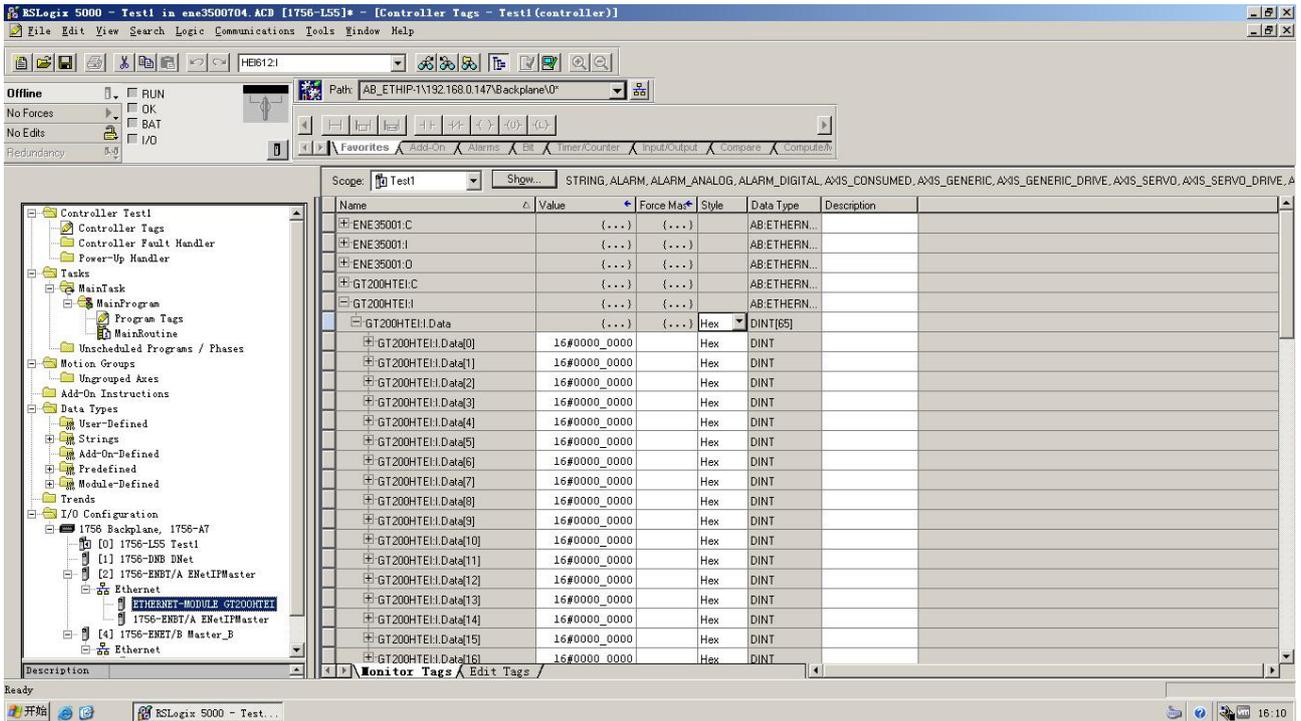
GT200-HT-EI HART/EtherNet/IP Gateway User Manual



In the above picture, GT200HTEI:O.Data[0]~GT200HTEI:O.Data[255] is the corresponding output data address of GT200-HT-EI module in master.

Unfold “GT200HTEI:I”, as shown below:

GT200-HT-EI HART/EtherNet/IP Gateway User Manual



In the above picture, four bytes of GT200HTEI:I.Data[0]~GT200HTEI:I.Data[3] is real time frame head of EtherNet/IP slave. GT200HTEI:I.Data[4]~GT200HTEI:I.Data[259] is the corresponding input data address of GT200-HT-EI module in master.

7.2 Read and Write Data using MSG

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

7.2.1 Read MSG Data

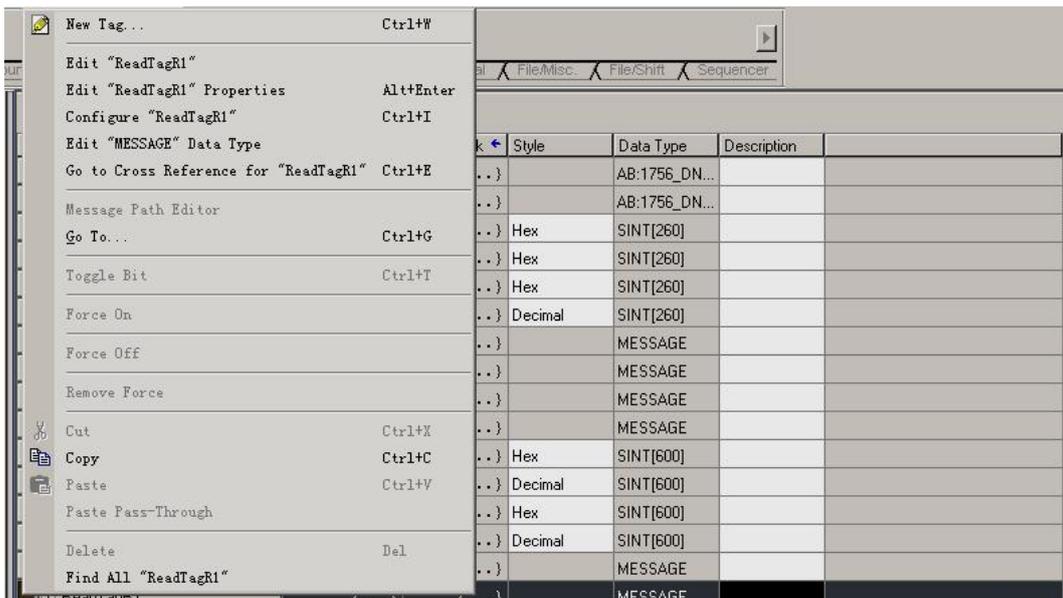
Create a new project; it is in the “Offline” mode. Add two new tags “ReadTagR1” and “ReadDataR1” under the “Controller Tags” and set the type of “ReadTagR1” as “MESSAGE” and “ReadDataR1” as “DINT[500]”.

GT200-HT-EI HART/EtherNet/IP Gateway User Manual

Scope: MyEnetIP_proj Show... Show All

| Name | Value | Force Mask | Style | Data Type | Description |
|------------|-------|------------|---------|---------------|-------------|
| Local:1:I | {...} | {...} | | AB:1756_DN... | |
| Local:1:O | {...} | {...} | | AB:1756_DN... | |
| Local:1:S | {...} | {...} | | AB:1756_DN... | |
| MsgDataR | {...} | {...} | Hex | SINT[260] | |
| MsgDataR1 | {...} | {...} | Hex | SINT[260] | |
| MsgDataW | {...} | {...} | Hex | SINT[260] | |
| MsgDataW1 | {...} | {...} | Decimal | SINT[260] | |
| MsgTagR | {...} | {...} | | MESSAGE | |
| MsgTagR1 | {...} | {...} | | MESSAGE | |
| MsgTagW | {...} | {...} | | MESSAGE | |
| MsgTagW1 | {...} | {...} | | MESSAGE | |
| ReadDataR | {...} | {...} | Hex | SINT[600] | |
| ReadDataR1 | {...} | {...} | Decimal | SINT[600] | |
| ReadDataW | {...} | {...} | Hex | SINT[600] | |
| ReadDataW1 | {...} | {...} | Decimal | SINT[600] | |
| ReadTagR | {...} | {...} | | MESSAGE | |
| ReadTagR1 | {...} | {...} | | MESSAGE | |
| ReadTagW | {...} | {...} | | MESSAGE | |
| ReadTagW1 | {...} | {...} | | MESSAGE | |

Right click “ReadTagR1”, select “Configure “ReadTagR1””:



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

Message Type: CIP Generic

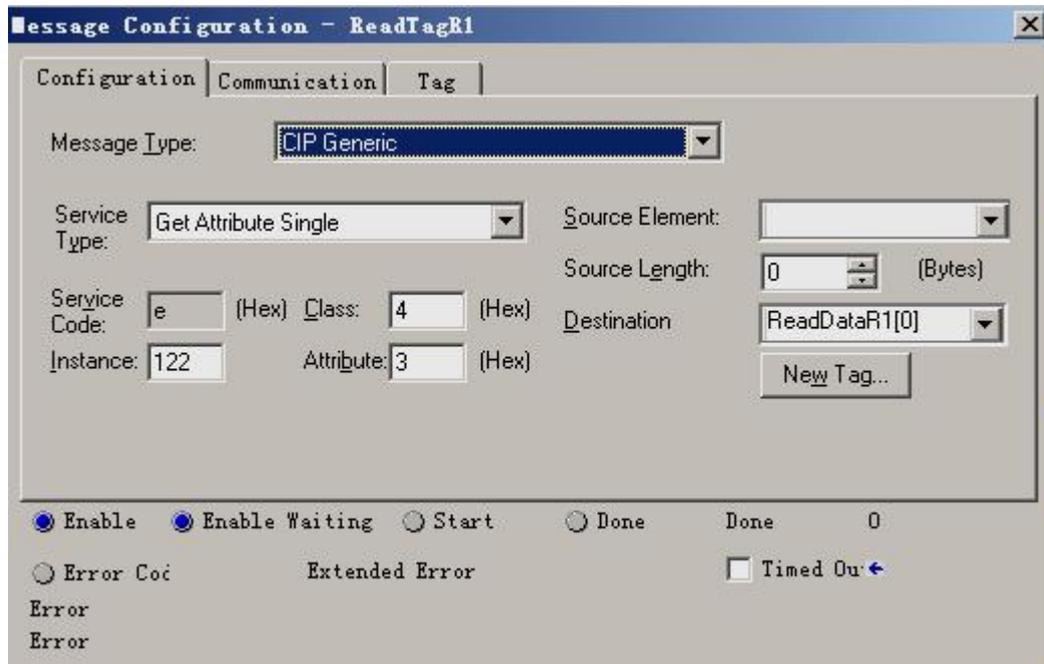
Service Type: Select “Get Attribute Single”, now, relevant service code will become “e (Hex)”

Class: 4 (Hex)

Instance: 102 (64 Bytes), 112 (128 Bytes) and 122 (256 Bytes) can be set

Attribute: 3 (Hex)

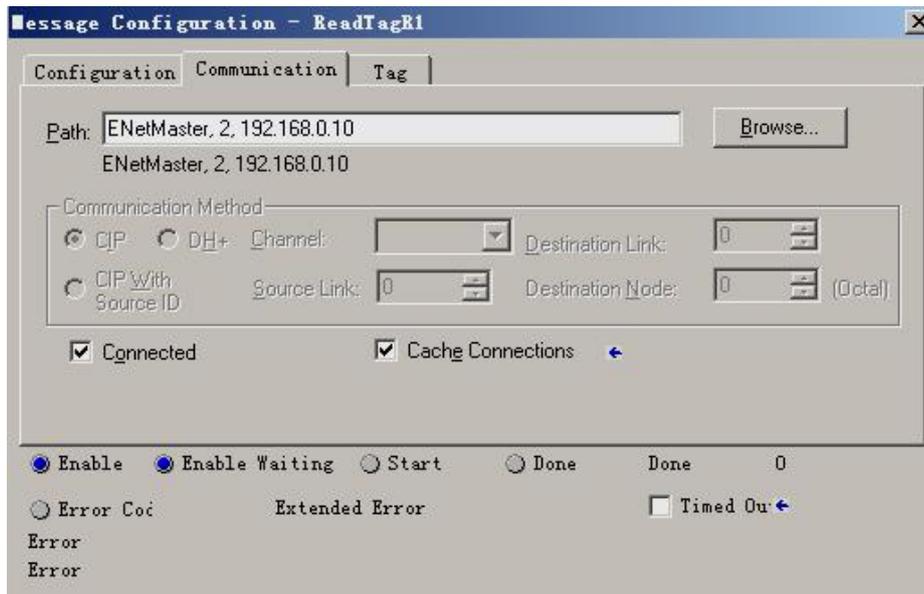
Destination: Select “ReadDataR1[0]” label, now, the data that have been got will be saved in this tag.



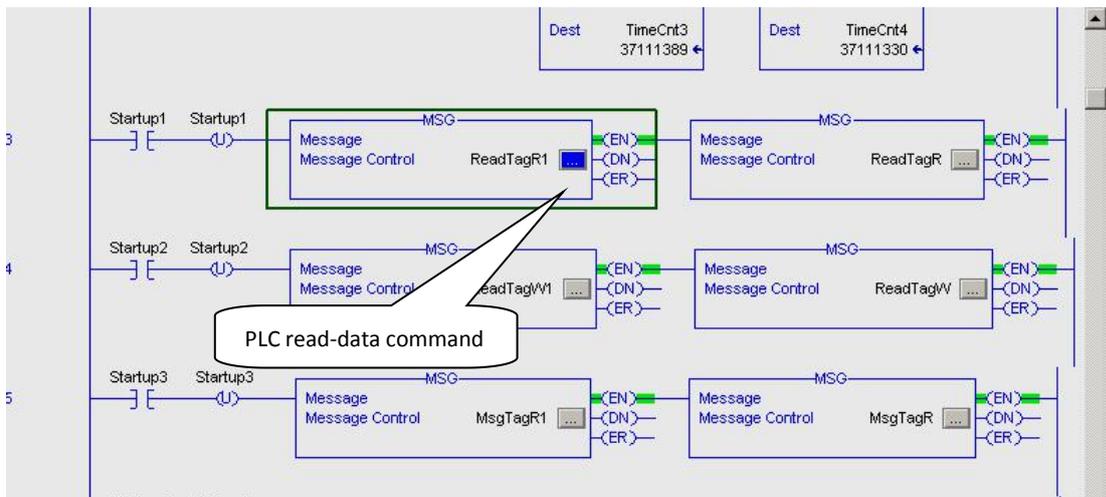
Choose “Communication” label, input the relevant path of EtherNet/IP slave in the blank space behind the Path, the path format is: EthetNet IP hostname, EtherNet/IP master slot No., IP address of EtherNet/IP slave, after setting the path, click “Apply”, “Confirm”. As is shown below:

In this instance, EtherNet/IP master name is “ENetMaster”, EtherNet/IP master slot No. Is “2”, EtherNet/IP slave (GT200-HT-EI) is “192.168.0.10”. IP address of GT200-HT-EI is the address which is downloaded into the module through SST-HI-CFG.

GT200-HT-EI HART/EtherNet/IP Gateway User Manual



Add a “MSG” command in “MainRoutine” under the “MainProgram” and choose “ReadTagR1” as “Message Control”, as shown below:

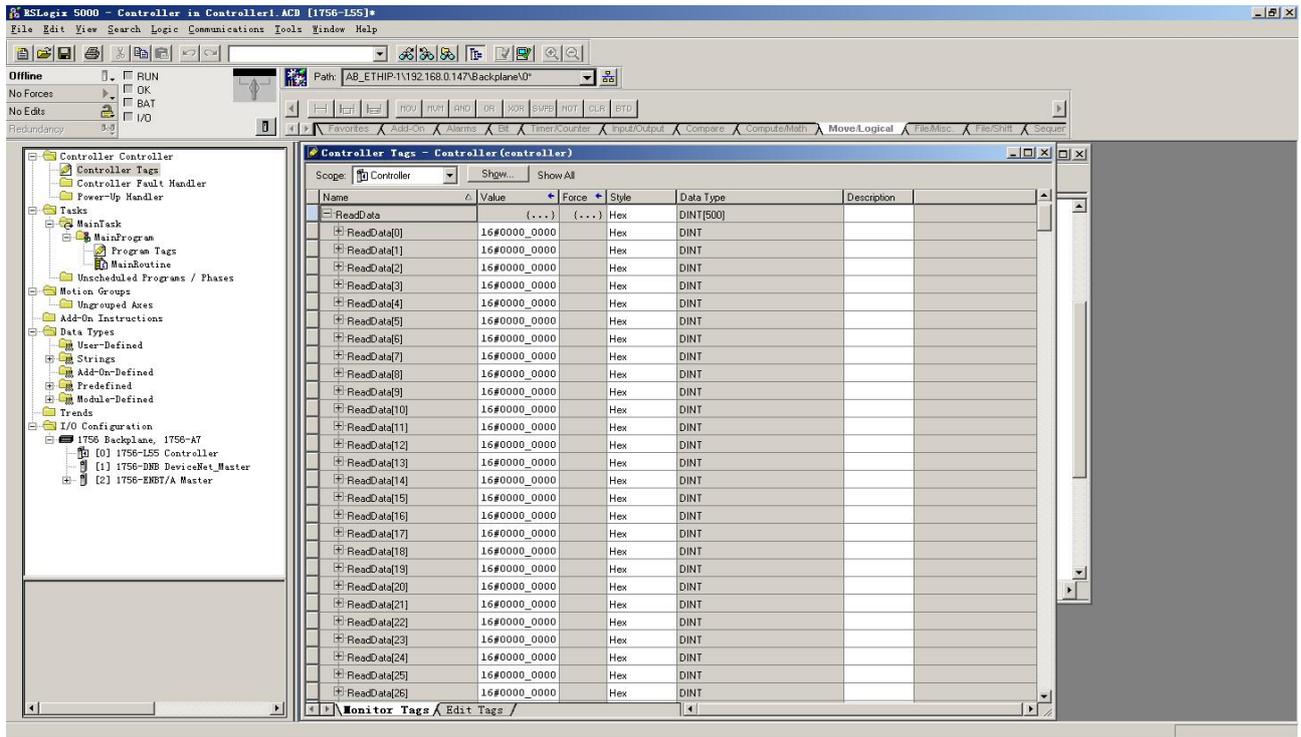


This is a simple command which can send a read request, it still needs to add some logic commands to trigger this command in common program. About the detailed information, please refer to RSLogix5000.

Download the program to the PLC and set PLC into “Online” state.

Click “Control Tags” and select “Monitor Tags”, unfold “ReadDataR1”, as shown below. Address ReadDataR1[0] saves the data that GT200-HT-EI read data from HART slave through the gateway.

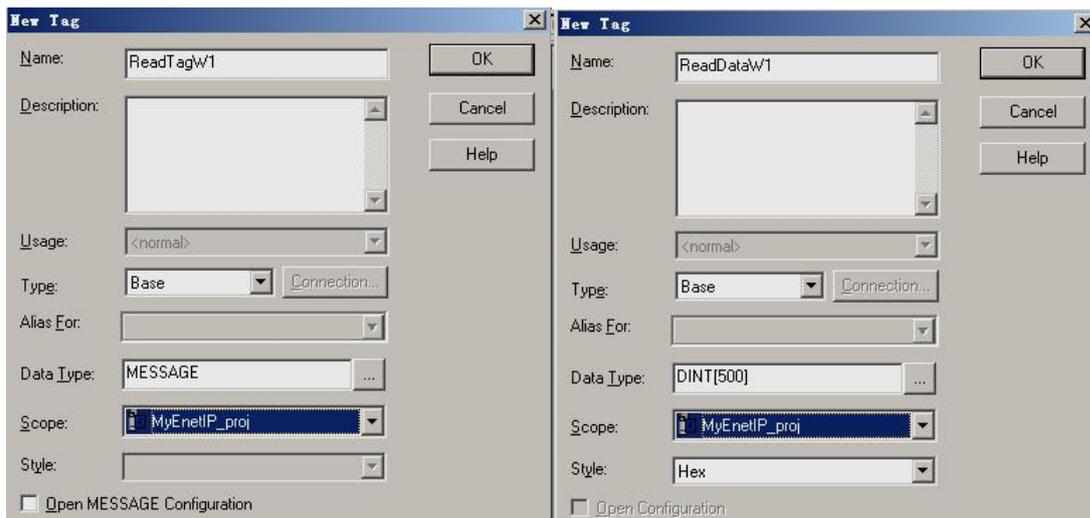
GT200-HT-EI HART/EtherNet/IP Gateway User Manual



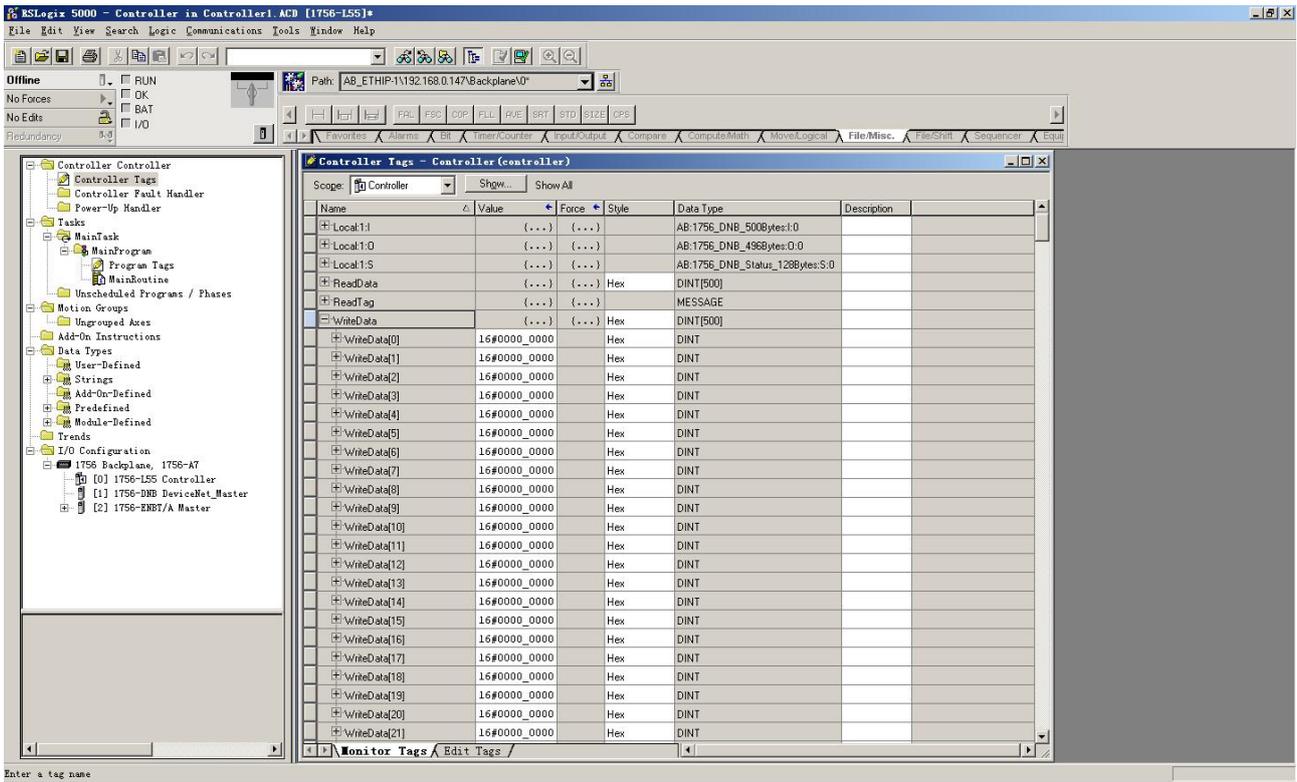
7.2.2 Write MSG Data

Enter the “Offline” mode, add two new tags “ReadTagW1” and ReadDataW1” under the “Controller Tags”.

Define the type of “ReadTagW1” as “MESSAGE” and “ReadDataW1” as “DINT[500]”:



GT200-HT-EI HART/EtherNet/IP Gateway User Manual

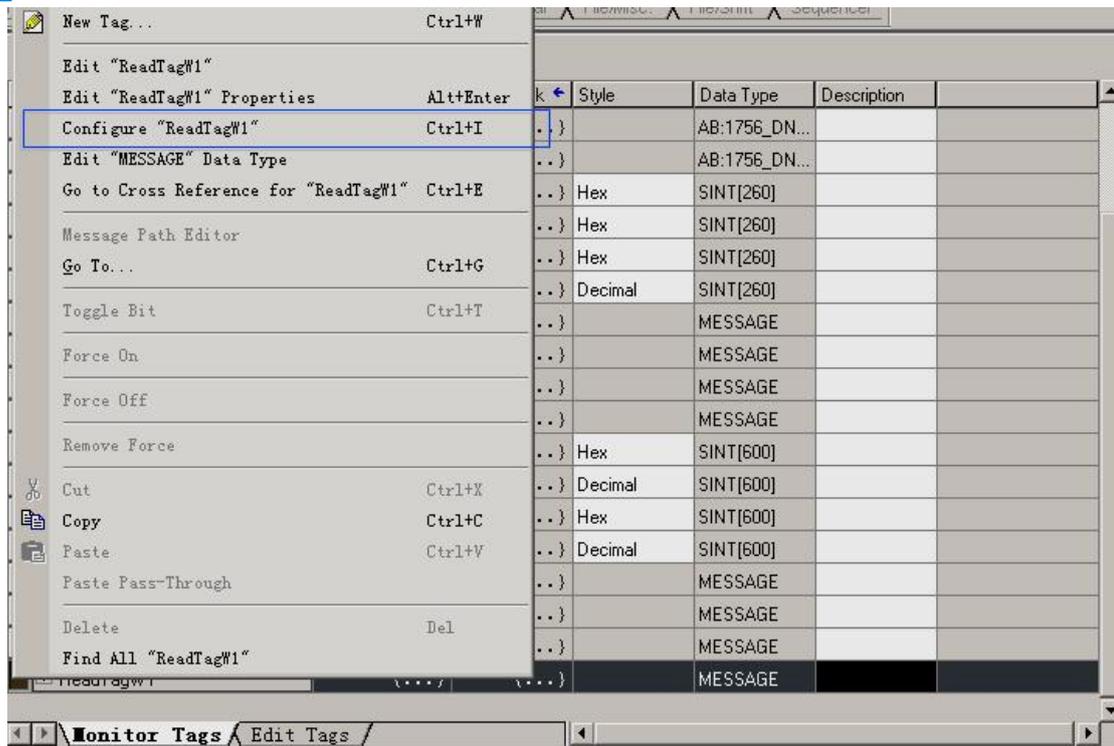


Enter the “Monitor Tags” interface; input some data beginning from address ReadDataW1[0] in the “ReadDataW1” tag. There data will be outputted to GT200-HT-EI through PLC and write these data to HART slave devices through HART write command.

Right click “ReadTagW1”, select “Configure “ReadTagW1””:

GT200-HT-EI HART/EtherNet/IP Gateway

User Manual



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 (64Bytes), 111 (128Bytes), 121 (256Bytes) optional

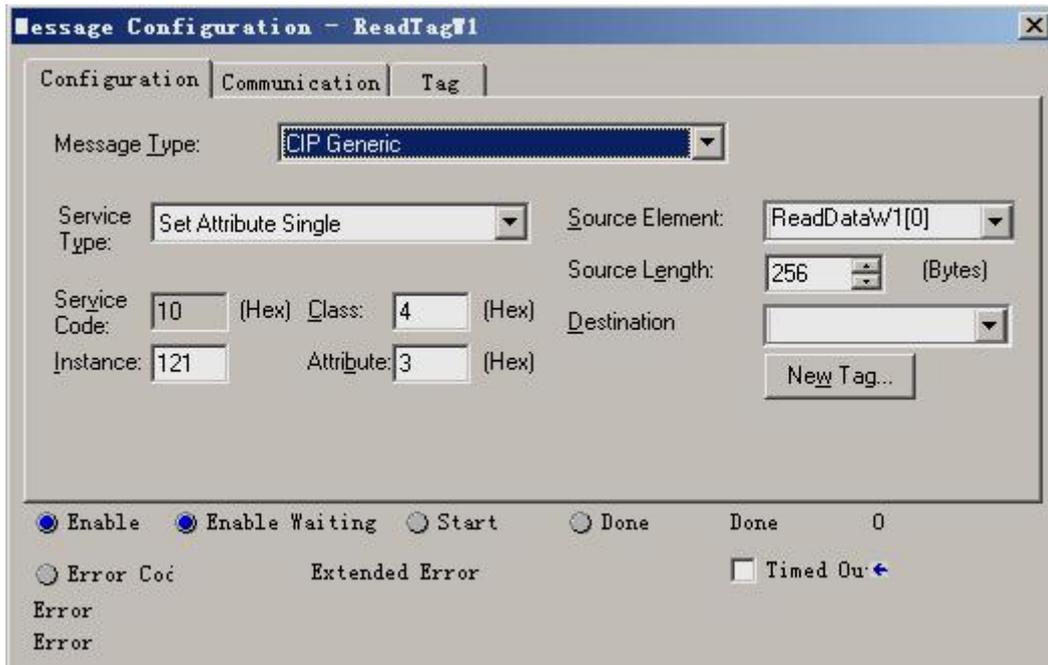
Attribute: 3 (Hex)

Source Element: Select "ReadDataW1" tag, it indicates the data in the "ReadDataW1" tag will become the data PLC outputs.

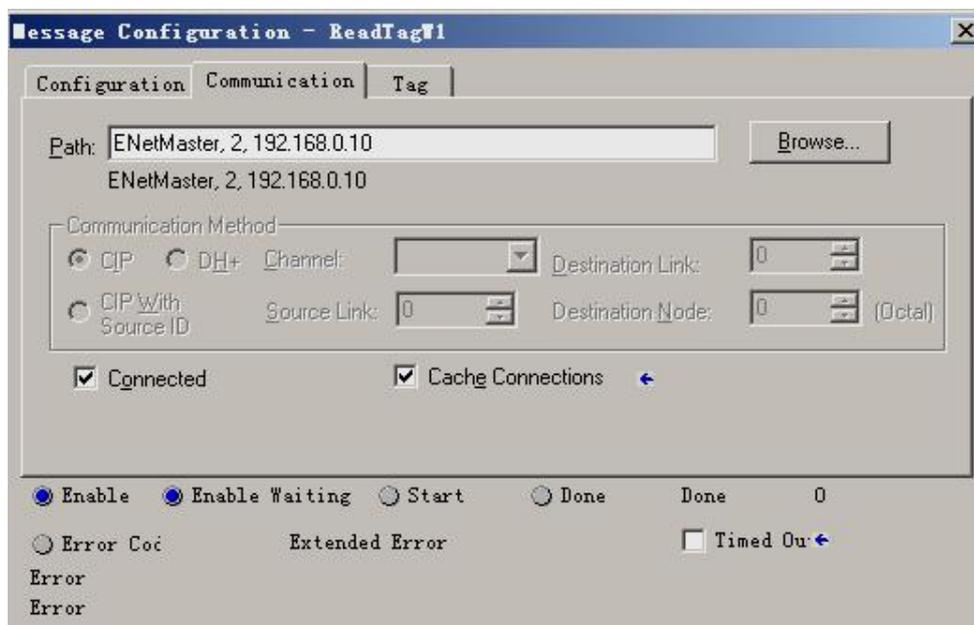
Source Length: Use byte as unit, this value should be less than or equal to the current selecting bytes which Instance represents.

GT200-HT-EI HART/EtherNet/IP Gateway

User Manual



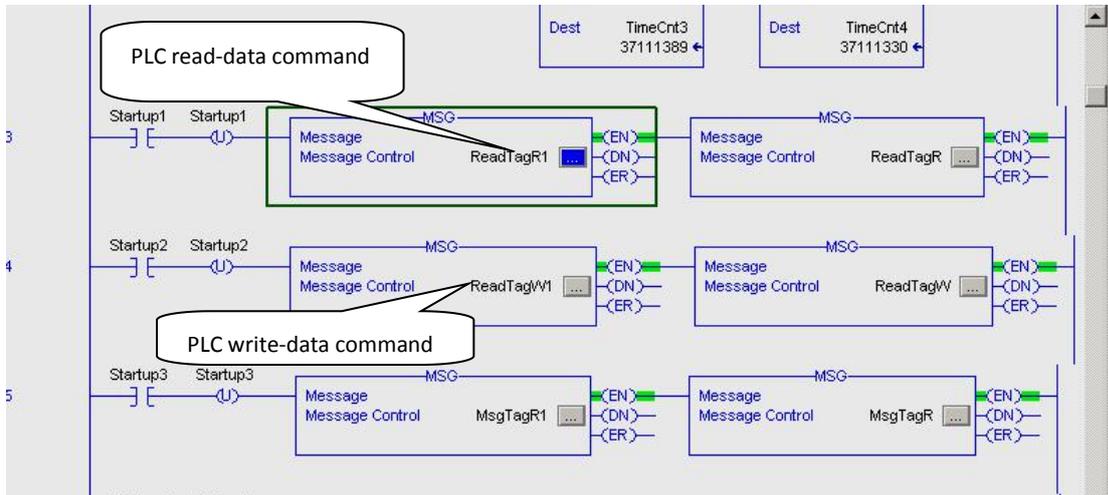
Choose “Communication” label, input the relevant path of connecting EtherNet/IP slave in the blank space behind the Path, the path format is: EtherNet IP hostname, EtherNet/IP master slot No., IP address of EtherNet/IP slave, after setting the path, click “Apply”, “Confirm”. As is shown below:



In this instance, EtherNet/IP hostname is “ENetMaster”, EtherNet/IP master slot No. Is “2”, EtherNet/IP slave (GT200-HT-EI) is “192.168.0.10”. IP address of GT200-HT-EI is the address which is downloaded into the

module through SST-HI-CFG.

Add a “MSG” command in “MainRoutine” under the “MainProgram” and choose “ReadTagW1” as “Message Control”, as shown below:

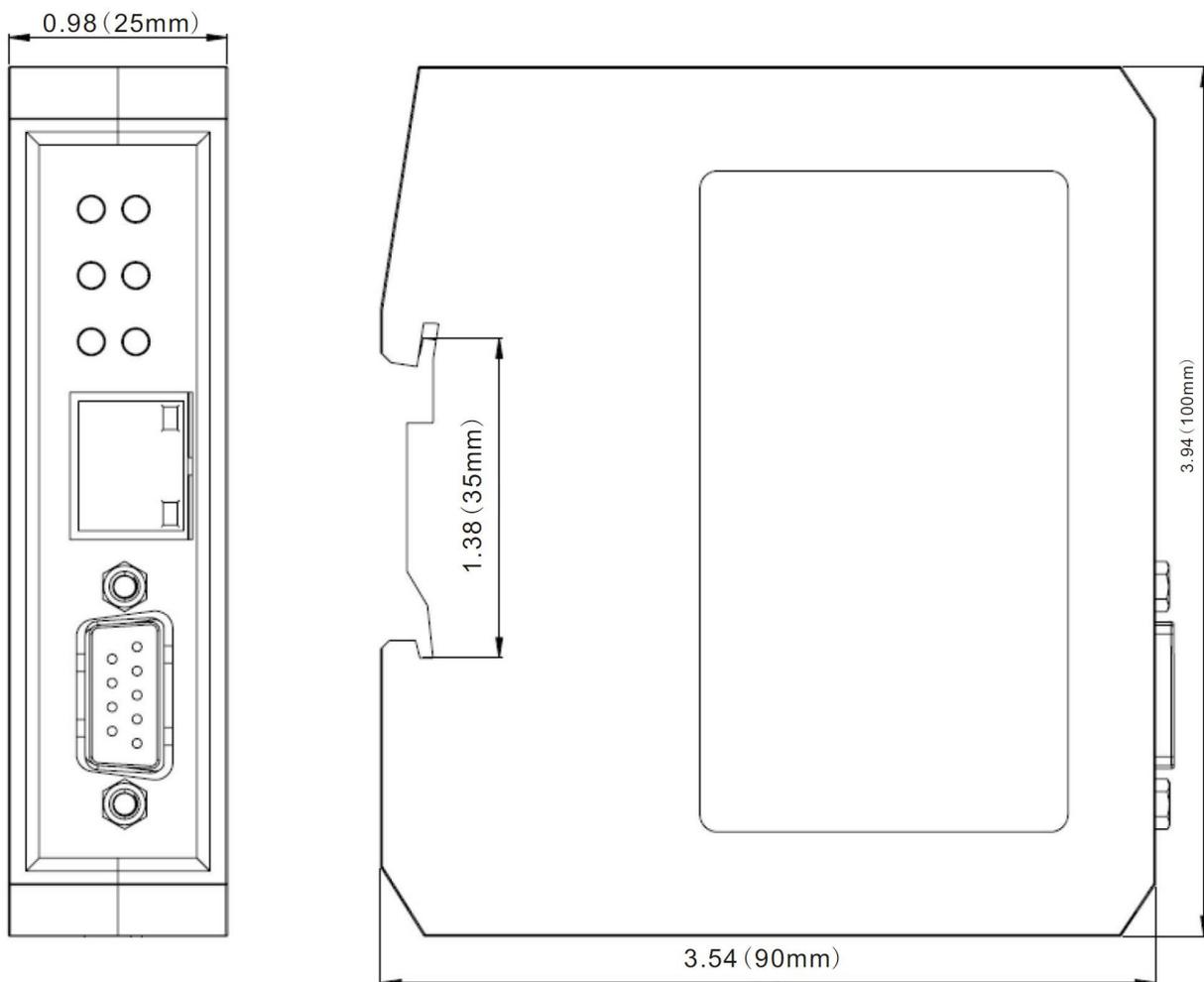


Download PLC program to the PLC and set PLC to “Online” state, the data in “ReadDataW1” will be outputted to HART slave through GT200-HT-EI (EtherNet/IP slave).

8 Installation

8.1 Machine Dimension

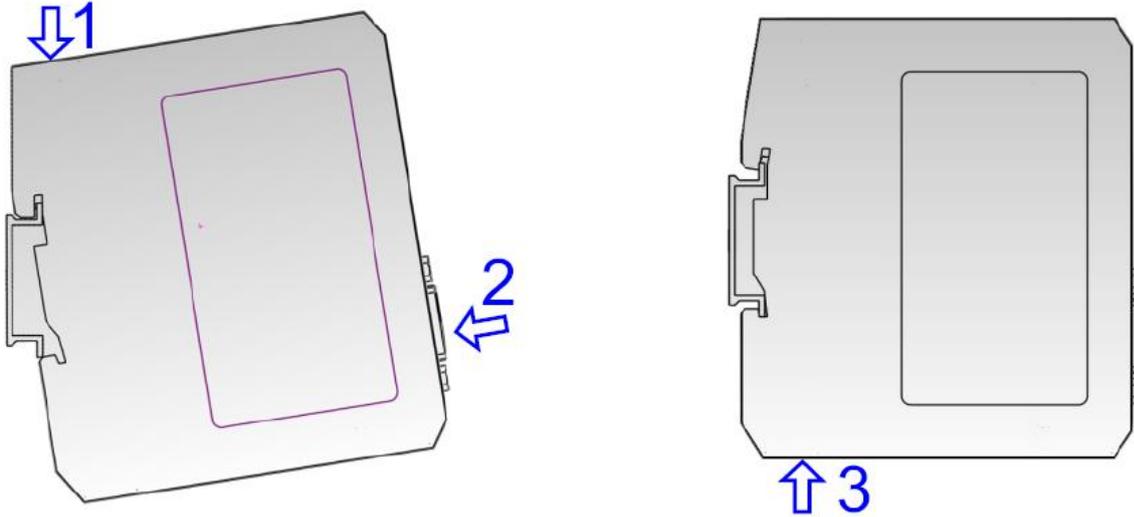
Size: 0.98 in (width)*3.94 in (height)*3.54 in (depth)



8.2 Installation Method

Using 1.38 in (35mm) DIN RAIL

Installing the gateway



Uninstalling the gateway

