HART / EtherNet/IP Gateway GT200-HT-EI

User Manual

V 1.0

REV B





SST Automation

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User Manual

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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;



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- [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 $^{\circ}$ F ~140 $^{\circ}$ F (-40 $^{\circ}$ C ~60 $^{\circ}$ 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.

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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;

2 Quick Start Guide

2.1 Pre-configured Settings

- 1. Turn bit 2 (Mode bit) of DIP switch to "ON";
- Connect the Gateway's Ethernet interface and that of the computer with a network cable, wiring methods see chapter 3.4.2 of this manual;
- 3. Power on the gateway, double click the SST-HI-CFG software icon to start the gateway configuration.

2.2 Software Configuration

- 1. Run the SST-HI-CFG software installed on your computer.
- 2. Click "Ethernet" in the tree view on the left, the configuration table is shown on the right as below:

File(E) Config(E) Tool(I) View(V)	() Help (f)
New Save Open A	🔽 🎉 📂 📖 🏠 Upload Download AutoMap Conflict Export Memory Diagnose Debug Slave Scan
	Bus Type EtherNet/IP
	IP setting mode Static configuration
	IP Address 192.168.0.10
	Subnet Mask 255.255.0
	Default Gateway 192.168.0.1
	DNS1 0.0.0
	DNS2 0.0.0

3. Click "HartChannel0" in the tree view on the left, the configuration table is shown on the right as below:

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🤌 SST-F	II-CFC															
File(E)	Config(E) T	ool(I) Vie	w(V) Helj	• (E)			Th.		-			_		- 20		
	100	24	1	*				4	· 👩	22	1		.		Θ	
New	Save	Open	AddNode	DelNode	AddCmd	DelCmd	Upload	Download	AutoMap	Conflic	t Export	Memory	Diagnose	Debug	Slave Scan	
The D	thornot			Master type							Primary Mas	ter				
	Int Channel	1		Network mo	de						Point to poin	t				
- 23	anchanneid			Maximum rep	etitions						3					
				Polling Enable	È.						Enable					
				Delay betwee	n polls						256					
				Response tim	eout						256					

After configuration, press "Enter" button to confirm. Please notice that the default setting of "Network Mode" is "Point to Point".

Note: HART protocol specifies that the slave device which address is 0 must work in single-point mode. In single-point mode the digital communication and analog communication can exist at the same time. When the device with slave address 1~15 works in multi-point mode, the analog output of the device is the minimum value (e.g. 4mA), only allows digital communication. The protocol also specifies that the default factory address of field device is 0.

4. Right-click HartChannel0, in the pop-up menu, select "Add Node", as shown below:



5. Right-click "Node(0)", in the pop-up menu selects "Add Command" to add a command (Command ID1) in



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the dialog box, and then click OK to return.

File () Config () Tool () View () New Save Delkole Addoor Delkole Addoor Delkole View () New Save Delkole Addoor Delkole Delkole	🥜 SST-H	L-CFG															
New Save Open Addies Del Node Del	File(F) C	onfig(E) To	ol(I) Vie	ew (V) Help (<u>H</u>)												
Ethernet Hart slave address Command list Selected command Selected (0) Command ID1 Command ID2 Command ID3 Command ID4 Command ID4 >> Command ID5 Command ID6 Command ID6 Command ID6 Command ID7 Command ID6 Command ID7 Command ID8 Command ID1 Command ID1 Command ID1 Command ID1 Command ID13 Command ID13 Command ID14 Command ID13 Command ID13 Command ID14 Command ID18 Command ID18 Command ID18	New	Save) Open	AddNode	Tr DelNode	AddCm d	DelCnd	Upload	Download	Autollap	Conflict	Export	Memory	Di agnose) Debug	Slave Scan	
Alternet Command list Selected command Y Command ID1 Command ID1 Command ID4 Command ID4 Command ID4 Command ID4 Command ID6 Command ID6 Command ID6 Command ID7 Command ID6 Command ID7 Command ID8 Command ID1 Command ID8 Command ID1 Command ID6 Command ID1 Command ID6 Command ID6 Command ID1 Command ID1 Command ID1 Command ID13 Command ID13 Command ID14 Command ID15 Command ID15 Command ID16 Command ID18 Command ID18 Command ID18 Command ID18 Command ID19 V				× H	art slave ad	dress	Delter	the col									
		hernet urtChannel0 Node(0)					Comma Comma	nd list md ID0 md ID1 md ID2 md ID3 md ID4 md ID6 md ID7 md ID8 md ID10 md ID10 md ID113 md ID13 md ID13 md ID15 md ID15 md ID17 md ID18 md ID19 md ID10 md ID2 md ID2 md ID2 md ID2 md ID2 md ID2 md ID10 md	>	Selected o	ommand						

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

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1	GT200-HT-EI	192.168.0.13	64-EA-C5-12-00)-00
				>
	Download			
	Click or configu	"Download" to down ration information	load	

2.3 Configuration Notes

1

Normally, users need to modify Device ID before establishing hardware communication. 1. Click"tool"→"Modify Device ID(Ctrl+D)"



OK

GT200-HT-EI HART/EtherNet/IP Gateway User Manual Tool(T) View(V) Help(H) Show Memory Data(Ctrl+G) Diagnose(Ctrl+H) Debug Assistant(Ctrl+J) Slave Scan(Ctrl+K) IEEE 754 Conversion(Ctrl+F) Packed ASCII Conversion(Ctrl+I) Modify Device ID(Ctrl+D)

2. Select current device

No.	Model	IP Address	MAC Address
1	GT200-HT-EI	192.168.0.110	64-EA-C5-12-00-15
•		III	
Si	en In	Refresh	Cancel
	.	Keiresii	Cancer

3. Write the appropriate ID

dify Device ID	
Device ID:	Amended to:
1376	1376
Cancel	Modify

4. Click"Modify"

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Address	s 192.168.0.110 - Hart to Ether ? 🔀
General	evice Usages EDS File Connections Received
@	Hart to EtherNet/IP Gateway
<u>N</u> ame:	Hart to EtherNet/IP Gateway
<u>D</u> escription	с <u> </u>
State:	
Add <u>r</u> ess:	192.168.0.110
Device lo	dentity [Primary]
<u>V</u> endor:	SSTCOMM [1376]
<u>T</u> ype:	Communication Adapter [12]
Devi <u>c</u> e:	Hart to EtherNet/IP Gateway [2035]
Catalog:	ENetIP Gateway
M <u>aj</u> or Re	v.: 1 💌 Mjnor Rev.: 001 💌

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EtherNet/IP - RSNetWorx for EtherNet/		
File Edit View Network Device Diagnostics Tool	l: Yelp	a 1
🎦 🗃 - 🖬 🎒 🐒 🖻 🖻 📢 🕀 🔾 👔	1: 健・素 4- 図 34	
M Forst Case Device Vsages Addres: Nininum Resinum CFU:	Curren Address Curren Curren Connection Devices not O Connume: Produce:	
Hardware 2 Commiscien Adapter Category Commiscien Adapter Commiscien Adapter Commiscien State Programable Logic Controller Robell Attomation aixeellaneo SAMport Drives on EtherKel/IP Cover Cover Controller Robell Attomation - Allene The Robell Attomation - Allene The Robell Attomation - Allene The Cover Commiscient - Allene The Robell Attomation - Allene The Rob	1756-A7/A	
x		
Message Code Date	Description	<u>^</u>
ESRVC: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:81E4 2017-9-15 16:40:31	Mode changed to online. The communication timeout is 3000 msec. The online path is M-09051A5E3C3A4!AB_ETHIP-1.	
2017-9-15 16:40:30	Mode changed to offline.	
ESRVC: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)]	
2017-9-15 16:33:22	Mode changed to online. The communication timeout is 3000 msec. The online path is M-09051ASE3C3A4!AB_ETHIP-1.	~
ž K		>
Ready	0n1	ine Not Browsing



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	Red off	IP address launch is normal				
(IP indicators)	Red blinking	DHCP				
		EtherNet/IP connection is				
SNS	Green on	established, communication is				
(EtherNet/IP network		normal				
indicator)	Graan blinking	EtherNet/IP connection is not				
	Oreen blinking	established				
TV DV (IIADT data	TX, Green	UAPT Due data conding				
TA, KA (HAKT data	blinking	HART Bus data sending				
indicator)	RX, Green	No data is conding				
mulcator)	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,	undata firmulara
release after power on	update minware

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.



GT200-HT HART/Eth	T-EI erNet/IP Gatewa	ау
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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





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



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 ^{55THICEG} to enter the main interface of software:

🤌 SST-	HI-CFG									~				
File(F)	Config(E) To	ol(I) Vie	ew(V) Hei	ь ^р (Н)				J Manu Da				Tidle Dee		
		24	T,	کل				мени ва	r	2		The Bar	Ð	
New	Save	Open	AddNod	e 1Node	AddCmd	DelCmd	Upload		-,lf	lict Export	Memory L		ve Scan	
	Ethernet		× 1	Bus Type		-				EtherNet/IP				
- 🧏 I	HartChannel0			IP setting mod IP Address	Tool	Bar				Static configu 192 168 0 1	aration 3			
	Ν			Subnet Mask						255.255.255	.0			
				Default Gatew	ay					192.168.0.1				
		\backslash		DNS1						0.0.0.0				
		\backslash		DIN52						0.0.0.0				
	Notwor	le Catti	nga in	arfaaa		Dorom	atar Cat	inga intarfa			\sim			
	INCLWOI	k Setti	ngs m	lerface.		Param	eler Sel	ings interna	ce.					
	Contain	s Fiel	ldbus	and the		Conta	ins m	odifiable	part					
	connect	ion ob	ject			(white) and u	nmodifiable	part					
				ļ		(grey)								
×											Commo	t field: En	nlain	
									/		Commen	it iteld. Ex	piain	
								_			the fu	nction of	the	
											configur	ation options		
Info	News													

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

T. AddNode

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 confliction 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 Slave Scan: This function can scan and calculate how many salve devices and relevant salve 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 Upload, 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.

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1	GT200-HT-EI	192.168.0.13	64-EA-C5-12-00-00
()	an In	Bafrash	Const
earch	completed	Refresh	Cancei

Upload	
Click "Upload" to upload configuration information	
Upload Cancel	
SST-HI-CFG	
Uploading the configuration is succe	ssful.

4.2.2 Configure the Ethernet

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

SST HI CRC															
e(F) Config(E)	Tool(T) Vi	ew (V) He	1թ (Η)												-
New Save) Open	AddNoo	le DelNode	AddCmd	DelCmd	Upload	U. Download	AutoMap	Confl	ict Export	Hemory	Di agnose) Debug	Slave Scan	
🐲 Ethernet		×	Bus Type							EtherNet/IP					
HartChanne	10		IP setting mo	de						Static configu	ration				
			IP Address Subnet Mask							255 255 255	, 				
			Default Gates	way						192.168.0.1					
			DNS1							0.0.0.0					
			DNS2							0.0.0.0					

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:



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✓ SST-HI-CFG										
File(E) Config(E) Tool(E) View(V) H	elp (H)									
New Save Open AddNo	de DelNode AddImd	DelCmd Vp:	load Download	AutoMap Co	anflict (Export Me	emory Diagn) ose Debug	Slave Scan	
×	Master type				Prima	ry Master				
Ethernet	Network mode				Point	to point				
HartChannel	Maximum repetitions 3									
	Polling Enable				Enabl	e				
	Delay between polls				256					
	Response timeout				256					
×	31				N.					
Info News										

Master type: Primary master, Secondary master

Network mode: Select the networks mode as single or multiple points, under the single point the gateway can only communicate with the slave device whose address is 0;

Maximum number of repetitions: Select the number of retransmission commands, ranging from 0 to 5;

Polling Enable: whether to use the polling function, "Enable" means that use the polling function;

Delay between polls: set the time of the polling command (the time interval from a command to send to start the next command), the range of $256 \sim 65535$ ms;

Response timeout: set the maximum time that the gateway waits for the slave device to respond, ranging from 256 to 65535 ms.

4.2.3.2 Add a Slave Node

Select the"HartChannel0", Right click the mouse and select "Add Node" in the pop-up menu.

GT200-HT-E HART/EtherN	/ let/IP Gateway	
User Manual		
	🌽 SST−HI−CFG	
	File(F) Config(E) Tool(I) View(V)	He
		V.
	Mew Save Upen Add	×
	- 🤹 Ethernet 	7
	Add Node Delete Node	
	Add Command Delete Command	

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.

🥜 SST-	HI-CFG															
File(E)	Config(E) T	ool(<u>T</u>) Vie	w 🕐 🕹 Help (<u>H</u>)												
New	Save) Open	TEL AddNode	TK DelNode	AddCmd	BelCmd	Upload	Download	AutoMap	Conflict	Export	Memory	Q Di agnose) Debug	Slave Scan	
- In -	Citle ann ait		×H	art slave ad	dress					2						
	Eulernei HartChannelf	1														
- yzy -	Node(1)															
Đ	Node(2)															

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".

GT200-HT-EI HART/EtherN	et/IP Gatewa	у	
User Manual			
	Sector Strengt Sector Strengt Sector Strengt St	nelO Add Node Delete Node Add Command	
		Delete Command	

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

ommand list	Selected command
ommand ID0 ommand ID1 ommand ID2 ommand ID3 ommand ID3 ommand ID4 ommand ID4 ommand ID5 ommand ID7 ommand ID7 ommand ID9 ommand ID10 ommand ID12 ommand ID12 ommand ID13 ommand ID13 ommand ID14 ommand ID15 ommand ID15 ommand ID15 ommand ID15 ommand ID17 ommand ID18 ommand ID18 ommand ID18 ommand ID18	Command ID1 Command ID2 Command ID4 Command ID5

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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🤌 SST–	HI-CFG															
File(F)	Config(E)	Tool(I) Vie	w(V) Help(<u>H</u>)												
New	Save) Open	TEL AddNode	T DelNode	AddCm d	pelCmd	P Upload	U. Download	AutoMap	Conflict	Export	Memory	D i agnose) Debug	Slave Scan	
allen 1			× 0	onfiguration	Mode					Ba	isic					
	stnernet	~	N	lode of outp	utting com	mands				Po	lling output					
	HartChannel	U	N	femory start	ing addres	of sending	, data			30	00					
P -2	Z Node(I)	1700	E	therNet/IP r	egister star	ting addres	s of sendin	ıg data		0						
	Com	nand IDU	S	ending data i	length (BY	TE)				0						
	Comr	nand ID I	S	ending data i	length (WC	DRD)				0						
±	🖉 Node(2)		N	femory start	ing addres	of receivin	ng data			0						
			E	therNet/IP r	egister star	ting addres	s of receiv	ing data		0						
			R	eceiving data	a length (B	YTE)				0						
			R	eceiving data	a length (W	ORD)				0						
			C	ommand ind	lex					0						

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;

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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:



SST-HI-CFG														
e (E) Config (E) Tool (T) New Save Ope	View(V) He n AddNor	lp (f) de DelNode	AddCmd	pelCmd	Upload	Download	AutoMap	Conflict	Export	Memory	Diagnose) Debug	Slave Scan	
 Ethernet HartChannel0 Node(1) Command ID Command ID Node(2) 	10 1	Configuration Mode of outp Memory start EtherNet/P r Sending data Sending data Receive Data Command inc	Mode utting comming address egister start length (BY length (WC Project Co lex	nands of sending address IE))RD) nfiguration	data s of sendin	g data		Ad Pol 300 0 0 0	vanced ling output 00		Configu	ration		

Most of the options in the interface are described in detail in chapter 4.2.3.4, so here we don't describe it. The below is the example of No.3 HART command, to show how to use "Segment Mapping" function, we can see one "configuration" button after the "receive data project configuration" option, click it:

User Manual

Bytes Memory Address EtherNet/IP start address Command Status Byte0-3 Byte4
Image: Stress of the stress of th

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:



User Manual

Mapped add	dress		Response Data
Primary V	Memory Address 0 0 0 0 ariable	EtherNet/IP start address	Command Status Byte5-8 Byte9 Byte10-13 Byte14 Byte15-18 Byte19 Byte20-23

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.



GT200-HT-EI HART/EtherNet/IP Gateway **User Manual** Conflict Detection Send-data-memory 🔲 🌉 Fieldbus 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 0 W de HartChannel0 3000 - V Se Node(1) 3032 3064 Command IDO 3096 Command ID1 3128 Command ID3 3160 Command ID6 3192 3224 3256 3288 3320 3352 3384 -Receive-data-memory 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 🔺 0 1 0000 003<mark>2</mark> 0064 0096 0128 0160 0192 0224 0256 0288 0320 0352 0384 -Unused Valid Conflict Exceeded Selected 13

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





4.2.6 Download Configuration

Click the icon Download; 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:

- 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 ^{Memory}, choose the correct gateway in the device scanning window, interface is as follows:

User Manual

ut data																		
	Addr	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	
Save	0000	36	FA	20	30	00	00	40	7E	32	4E	07	36	F3	BE	26	00	٠
	0016	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	
	0032	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	
	0048	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	
Stop	0064																	•
tput data	Addr	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	
tput data	Addr	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	
tput data Save	Addr 3000	00	01	02	03	04	05	06	07	08	09	10	11 00 00	12 00 00	13 00 00	14 00	15 00	
tput data Save	Addr 3000 3016 3032	00 00 00	01 00 00 00	02 00 00 00	03 00 00 00	04 00 00 00	05 00 00 00	06 00 00 00	07 00 00 00	08	09 00 00 00	10 00 00 00	11 00 00 00	12 00 00 00	13 00 00 00	14 00 00 00	15 00 00 00	
tput data Save Load	Addr 3000 3016 3032 3048	00 00 00 00	01 00 00 00 00	02 00 00 00 00	03 00 00 00 00	04 00 00 00 00	05 00 00 00 00	06 00 00 00	07 00 00 00 00	08 00 00 00 00	09 00 00 00 00	10 00 00 00 00	11 00 00 00 00	12 00 00 00 00	13 00 00 00 00	14 00 00 00 00	15 00 00 00 00	
tput data Save Load	Addr 3000 3016 3032 3048 3064	00 00 00 00	01 00 00 00 00	02 00 00 00 00 00	03 00 00 00 00 00	04 00 00 00 00 00	05 00 00 00 00 00	06 00 00 00 00	07 00 00 00 00 00	08 00 00 00 00 00	09 00 00 00 00 00	10 00 00 00 00	11 00 00 00 00	12 00 00 00 00	13 00 00 00 00	14 00 00 00 00	15 00 00 00 00	
tput data Save Load Send	Addr 3000 3016 3032 3048 3064	00 00 00 00	01 00 00 00 00	02 00 00 00 00 00	03 00 00 00 00 00	04 00 00 00 00	05 00 00 00 00	06 00 00 00 00	07 00 00 00 00	08 00 00 00 00	09 00 00 00 00	10 00 00 00 00	11 00 00 00 00	12 00 00 00 00	13 00 00 00 00	14 00 00 00 00	15 00 00 00 00	

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:

- 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 dialog box to choose the gateway and click "OK", interface is as follows:



User Manual

	Model	IP Address	MAC Address
1	GT200-HT-EI	192.168.0.13	64-EA-C5-12-00-00
1315	sin in	Refresh	Cancel
earch	completed		
arch	completed Upload		

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



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

Diagnose		X
😑 💐 HartChannel0	Item	Value
Node(0)	System State machine	SENDING
G	Request times	47
	Response times	47
	Error times	0

Click on "HartChannel0" in this interface, it will show the status of HART fieldbus part in the right place, press "Refresh" button will update the data once, click on "Periodically refresh", the software will update the data every 500ms.

5. Click Node(x), it is shown as below

User Manual

🔙 HartChannel0	Item	Value
Mode(0)	Command ID0	Response correct
	Command ID1	Response correct
	Command ID3	Response correct
eration		

It shows the response status of configured commands.

Click "Refresh" will fresh these command status, "Periodically refresh" will fresh command status once.

6. Double click command 1,3, 12,17 will show their command information, command 17 can start data input.

Item		Value
Communicat	tion Status	Success
Response C	ode	NoErr
Primary Vari	able Current	0.000000
Primary Vari	able Units Code	(null)
Primary Vari	able	0.000000
Secondary V	variable Units	(null)
Secondary V	Variable	0.000000
Tertiary Var	iable Units Code	(null)
Tertiary Var	iable	0.000000
4th Variable	Units Code	(null)
4th Variable		0.000000

Click the"Refresh" button will update the data, click the "Edit" button doesn't work in the Read-only



command.

Double click "CMD19" will show the window as below:

Command IO da	ata		X
Edit	Item Communication_Status Response Code Final Assembly Number	Value Success NoErr	
Refresh			

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:

- 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 Debug, Interface is as follows:



User Manual

Iead:		Auto-send	Send	
Data:		Auto-send period(ms)	Clear	
heck:	Checksum	Pause show		

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.

Head: FFFFFFFFF Auto-send	Send
Data: 02 00 00 00 Auto-send period(ms))
500	Clear
Check: 02 Checksum	
Pause show	
FF FF FF FF FF 06 00 00 0E 00 00 FE 93 7C 05 05 05 41 08 00 6B 45 66 1D	

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 ", the software will pop up a dialog box to choose the scanned gateway and click "OK", as shown below:



User Manual

No.	Model	IP Address	MAC Address
1	GT200-HT-EI	192.168.0.13	64-EA-C5-12-00-00
<			
	an In		
631	Bum	Refresh	Cancel

Slave address	Long	addı	ess		Compa	ny l	[D	
							_	
							_	
							_	
								-
1. I. II.Co II.				0				

Click "Start" in "Slave Scan" interface, it will show the short address, long address and ID of HART slave devices which are connecting gateway.

Move to the relevant device and right click it, and click "Modify slave address" will show "Modify slave



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Slave Scan 0 to 15 Scan range: Slave address Long address Company ID * 13-7C-6B-45-66 0 -Stop The scan is complete! Start

×

address" interface, input the address you want to change in "Modified to" text.

~	
Slave Address:	Amended to:
0	1
Cancel	Modify

After modification, it means HART slave address has been modified, repower the gateway.





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.

Uncompressed data TECH S0 50 C8
ASCII
ASCII Hex

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	Description
	memory	
	address	
	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
Reac	1924-1943	Reserved
1-onl	1944	Device 0_cmd0's response status
y pai	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
Re	3000-3999	The HART data output area
and ritable part	4000	Reset to send, receive, error counter

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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.
- Solution 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

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4---- Error defined in agreement5---- 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.

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5.1 Flowchart of Executing One HART Command



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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:

Type: ETHERNET-MODULE Generic Etherr Vendor: Allen-Bradley Baranti ENet/DMaster	net Module	
Parent: ENetIPMaster Name: GT200HTEI Description:	Connection Parameters Assembly Instance: Input: 121	Size:
Comm Eormat: Data - DINT	Output: 123 Configuration: 123 Status Input:	0 <u>+</u> (8-bit)





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:

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lodule	Description	Vendor
 1769-L35E Ether. 1788-EN2DN/A 1788-ENBT/A 1788-EWEB/A 1794-AENT/A 1794-AENT/B Drivelogix5730 ETHERNET-BRIDGE ETHERNET-MODULE EtherNet/IP PH-PSSCENA/A E) Drives HMI 	. 10/100 Mbps Ethernet Port on CompactLogix5335E 1788 Ethernet to DeviceNet Linking Device 1788 10/100 Mbps Ethernet Bridge, Twisted-Pai 1788 10/100 Mbps Ethernet Bridge w/Enhanced W 1794 10/100 Mbps Ethernet Adapter, Twisted-Pa 1794 10/100 Mbps Ethernet Adapter, Twisted-Pa 10/100 Mbps Ethernet Port on DriveLogix5730 Generic EtherNet/IP CIP Bridge Generic Ethernet Module SoftLogix5800 EtherNet/IP Ethernet Adapter, Twisted-Pair Media	Allen-Bradley Allen-Bradley Allen-Bradley Allen-Bradley Allen-Bradley Allen-Bradley Allen-Bradley Allen-Bradley Allen-Bradley Parker Hannifin Corp.
		Þ
•		
•	[Eind Add Favorite

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

Type: ETHERNET-MODULE Generic Ethernet Vendor: Allen-Bradley Parent: ENetIPMaster	Module	This means 256 byte input and 256 byte output
Name: GT200HTEI Description: Set name of EtherNet IP slave	Assemb Instance Input: 122	ly Size: 65 ↔ (32-bit) 64 ↔ (32-bit)
Address / Host Name IP Address: 192 . 168 . 0 . 11 C Host Name: IP address of GT200-HT-EI	Configuration: 123 Status Input: tatus Output:	0 <u>→</u> (8-bit)

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



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Name: Name the added EtherNet/IP salve 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:

Bodule Properties: Baster (ETHERHET-BODULE 1.1)	×
General Connection Module Info	1
Requested Packet Interval (RPI): 10.0 + ms (1.0 + 3200.0 ms)	
Major Fault On Controller If Connection Fails While in Run Mode	
Module Fault	
Status: Offline OK Cancel Apply Help	

After setting this interval, click "OK" to save. Double click "Controller Tags", unfold "GT200HTEI:O", as shown below:

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a RSLogix 5000 - Test1 in ene3500704.ACD [1756-	-L55]* - [Controller Tags - Testi	(controller)]						_ 8 ×
Eile Edit View Search Logic Communications To	ols	<u>M</u> indow Help							_ <u>-</u> ×
🎦 🗃 🛃 🎒 🐰 🖻 💼 📨 🖂 HE6121		- KK - P	200						
945- J. E put	P/	ath: AB_ETHIP-1\192168.0.147\Backpla	ne\0*	2					
	4	Traffering Linestonering and a							
No Porces	H		(L)-				F		
	»IN	Favorites Add-On A Alarms A Bit	Timer/Counter	InnubC	utput 🖌 Co	nnare 🖌 Compu	terte		
Hedundancy vy	- 1		1		~	A			
	S	cope: 🚺 Test1 💌 Show		IM, ALAF	IM_ANALOG	ALARM_DIGITA	L, AXIS_CONSUMED	D, AXIS_GENERIC, AXIS_GENERIC_DRIVE, AXIS_SERVO, AXIS_SER	VO_DRIVE, A
- Controller Testi		Name 🛆	Value 🔶	Force N	ast Style	Data Type	Description		<u> </u>
Controller Tags		ENE35001:C	{}	(.	}	AB:ETHERN	2		
Controller Fault Handler		ENE35001:I	{}	(.	}	AB:ETHERN			
Power-Up Handler		E-ENE35001:0	{}	{.	}	AB:ETHERN	•		
H MainTask		E-GT200HTEI:C	{}	{.	}	AB:ETHERN			
🖃 🚭 MainProgram		E-GT200HTEI:I	{}	{.	}	AB:ETHERN			
- Program Tags		GT200HTEI:0	()	{.)	AB:ETHERN			
MainRoutine	Fi	GT200HTEL0 Data	()	1.	Decima	DINT[64]			
Unscheduled Frograms / Phases	H	F:GT200HTEI:0 Data(0)			Decima	DINT	0		
Ungrouped Axes	Н	F-GT200HTELO Data(1)	0		Decima	DINT			
Add-On Instructions	Н		0		Decime	DINT	-		
🖻 🔄 Data Types	H		0		Decima	DINT	0		
User-Defined	Н		0		Decima	DINT			
Add-On-Defined	Н	G G I ZUUH I EI:U.D ata[4]	U		Decima	DINT			
🕀 🙀 Predefined	Н	LT:GT200HTEI:0.Data[5]	0		Decima	DINT			
🗄 🚂 Module-Defined	Н	GT200HTEI:0.Data[6]	0		Decima	DINT			
Trends	Ц	GT200HTEI:0.Data[7]	0		Decima	DINT			
- 1/U Configuration		E GT200HTEI:0.Data[8]	0		Decima	DINT			
130 Jackplate, 1130 A		GT200HTEI:0.Data[9]	0		Decima	DINT			
- 🗍 [1] 1756-DNB DNet	Π	臣-GT200HTEI:0.Data(10)	0		Decima	DINT			
- 🗍 [2] 1756-ENBT/A ENetIPMaster	П	E-GT200HTEI:0.Data[11]	0		Decima	DINT	Q		
E thernet	П	E GT200HTELO Data[12]	0		Decima	DINT			
1756-FNBT/A FNatTPNastar	H	E-GT200HTELO Deta[12]	0		Decima	DINT			
- 1 [4] 1756-ENET/B Master B	Н		0		Decine	DINT			
E 🚼 Ethernet 👻	Н		0		Decima	DINT			
Description	1	Ionitor Tags / Edit Tags	/		Uecima		(
	السمي		-			1.			
●开始 ▲ @ Test	:\Do	cuments and Se 🦉 I. bmm - 画际	1					5 0 3	16:11
In the store lest		Jan on the second secon							

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:

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# RSLogix 5000 - Test1 in ene3500704.ACD [1756	5-155]# - [Controller Tags - Testi	(controller)]				X
Eile Edit View Search Logic Communications To	ools <u>W</u> indow Help					_[#] ×
	- & & & & &					
Offline	Path: AB_ETHIP-11192.168.0.14718ackpia	ane tu"				
No Forces		<i>w</i> 1			4	
No Edits		14-7-				
Redundancy 👧	Favorites & Add-On & Alarms & B	t A Timer/Counter A Inpi	utoutput 🖌 comp	pare 🖌 Compute	110	
	Scope: Test1 - Show	STRING, ALARM, A	LARM_ANALOG, A	ALARM_DIGITAL,	AXIS_CONSUMED,	AXIS_GENERIC, AXIS_GENERIC_DRIVE, AXIS_SERVO, AXIS_SERVO_DRIVE, A
	Name A	Value	e Mast Style	Data Type	Description	
Controller Testi	E-ENE35001:C	()	()	AB:ETHERN		
Controller Fault Handler	E:ENE35001:I	{}	{}	AB:ETHERN		
Power-Up Handler	E:ENE35001:0	()	{}	AB'ETHEBN	6	
E Tasks	E GT200HTELC	()	()	48 FTHEBN		
- A MainTask		()	()	ADIETHEDN		
- Program Tags		()	() Hay T	DINITICE	<u></u>	
MainRoutine		()	() Hex	DINT[65]	(
- Unscheduled Programs / Phases	En a 1 200H TECL Data[0]	16#0000_0000	Hex	DINT		
- Motion Groups	H-GT200HTEI:I.Data[1]	16#0000_0000	Hex	DINT	a	
Add-On Instructions	± GT200HTEI:I.Data[2]	16#0000_0000	Hex	DINT		
- Bata Types	GT200HTEI:I.Data[3]	16#0000_0000	Hex	DINT		
- Green User-Defined	E-GT200HTEI:I.Data[4]	16#0000_0000	Hex	DINT		
🕀 🛄 Strings	GT200HTEI:I.Data[5]	16#0000_0000	Hex	DINT		
	E-GT200HTEI:I.Data[6]	16#0000_0000	Hex	DINT		
H Module-Defined	E-GT200HTEI:I.Data[7]	16#0000 0000	Hex	DINT		
Trends	E-GT200HTEI:I.Data[8]	16#0000 0000	Hex	DINT		
🖻 🚔 I/O Configuration	T-GT200HTEH Data[9]	16#0000_0000	Hey	DINT	6	
🖃 🖅 1756 Backplane, 1756-A7		16#0000_0000	Hou	DINT		
[4] [0] 1756-L55 Test1 		16#0000_0000	Llaw	DINT	÷	
- [2] 1756-ENBT/A ENetIPMaster		16#0000_0000	nex	DINT		
E 25 Ethernet	ET 200H TEI:I.Data[12]	16#0000_0000	Hex	DINT		
ETHERNET-MODULE GT200HTEI	# GT200HTEI:I.Data[13]	16#0000_0000	Hex	DINT		
1756-ENBT/A ENetIPMaster	+ GT200HTEI:I.Data[14]	16#0000_0000	Hex	DINT	8	
- [4] I/SD-EMEI/B Master_B	# GT200HTEI:I.Data[15]	16#0000_0000	Hex	DINT		
Description A	E-GT200HTEI:I.Data[16]	16#0000 0000	Hex	DINT		
Paula A	Monitor lags A Edit Tags	1		1		
neady						
2017年1月 🤌 🞯 🛛 🏙 RSLogix 5000 - Test						Sec. 16:10

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]".

User Manual

Name	△ Value	Force Mask	Style	Data Type	Description	
⊞-Local:1:I	{	.) {	}	AB:1756_DN		
⊞-Local:1:0	{	.} {	}	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		1

Right click "ReadTagR1", select "Configure "ReadTagR1"":

	New Tag	Ctrl+W					
ur T	Edit "ReadTagR1" Edit "ReadTagR1" Properties Configure "ReadTagR1"	Alt+Enter Ctrl+I		FileMisc.	🕻 File/Shift 🔏 Se	quèncer	
Ī.	Edit "MESSAGE" Data Type		k +	Style	Data Type	Description	
	Go to Cross Reference for "ReadTagR1"	Ctrl+E	}		AB:1756_DN		
	Message Path Editor		- }		AB:1756_DN		
	<u>G</u> o To	Ctrl+G	}	Hex	SINT[260]		
			}	Hex	SINT[260]		
	loggle Bit	Utr1+T	}	Hex	SINT[260]		
	Force On		}	Decimal	SINT[260]		
	Force Off		}		MESSAGE		
			}		MESSAGE		
	Remove Force		}	1	MESSAGE		
. *	Cut	Ctrl+X	}		MESSAGE		
. 🖻	Сору	Ctrl+C	}	Hex	SINT[600]		
. 6	Paste	Ctrl+V	}	Decimal	SINT[600]		
-	Paste Pass-Through		}	Hex	SINT[600]		
-	Delete	Del	}	Decimal	SINT[600]		
	Find All "ReadTagR1"		}		MESSAGE		
I IIII	neaurauni interesti i		}		MESSAGE		

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)



User Manual

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

Message Type: CIP Generic	
Service Type: Get Attribute Single Service Code: e (Hex) Instance: 122 Attribute: 3 (Hex)	Source Element: Image: Constraint of the second s
DEnable DEnable Waiting OStart Error Coc Extended Error	⊙ Done Done O ☐ Timed Ou ←

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.

User Manual

onfiguration '	communication	Tag		
Path: ENetMaste	r, 2, 192.168.0.10	8		Browse
ENetMaste	, 2, 192.168.0.10			
- Communication	Nethod			
C CIP C D	<u>H</u> + <u>C</u> hannel:		Destination Link:	0 👘
$\mathbf{C} \stackrel{CIP\underline{W}}{_{SourceID}}$	<u>S</u> ource Link:	0 🕂	Destination <u>N</u> ode:	0 😤 (Octal)
Connected		🔽 Cach <u>e</u> Cor	inections 🖕	
) Enable 🌒 Er	able Waiting	🔾 Start	🔾 Done 🛛 Done	0

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

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

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.

User Manual

BESLogix 5000 - Controller in Controller1.	ACD [1756-155]*						_ <u>5</u> ×
File Fale Test Search Fogle Communications Te	ors gradow nerp						
	න් නි න						
Offline . BUN	Path: AB_ETHIP-1\192.168.0	l.147\Backplane\0* _	- *				
No Forces	rat free bary by a filmer former		and the second				4
No Edits		AND OR XOR SWEB NUT	CLR BTD			<u></u>	
Redundancy 0.0	▲ Favorites & Add-On &	Alarms 🖌 Bit 👗 Timer/Counter	r 🕻 Input/Output 🔏	Compare 🖌 Compute	Math \lambda Move/Logical 🔏 FileMisc. 🖌	File/Shift 🖌 Seque	<u>n</u>
🖃 😋 Controller Controller	Controller Tags - Co	ntroller (controller)					
- Controller Tags	Scope: 1 Controller	Show Show All					
Controller Fault Handler	IN IN THE	() (alua t Earca	+ Stule	Data Tupa	Description	1.	
E Tasks	- ReadData) Hey	DINTISOO	Description		
🖻 🤯 MainTask	E BeadData[0]	16#0000_0000	Hay	DINT			
- MainProgram	TheadData[0]	16#0000_0000	Hou	DINT			
MainRoutine	TheadData[1]	16#0000_0000	How	DINT			
- Conscheduled Programs / Phases	# ReadData[2]	16#0000_0000	Hey	DINT			
Motion Groups	E ReadData[3]	16#0000_0000	Hay	DINT			
Add-On Instructions	TheadData[4]	16#0000_0000	Hav	DINT			
🖨 🚞 Data Types	# BeadData[6]	16#0000_0000	Hey	DINT			
User-Defined	T BeadData[7]	16#0000_0000	Hey	DINT			
Add-On-Defined	F BeadData[8]	16#0000_0000	Hey	DINT			
🕀 🙀 Predefined	# BeadData[9]	16#0000_0000	Hex	DINT			
H Module-Defined	#BeadData[10]	16#0000 0000	Hex	DINT			
I fends	E BeadData[11]	16#0000 0000	Hex	DINT			
🖻 🖅 1756 Backplane, 1758-A7	E BeadData[12]	16#0000 0000	Hex	DINT			
[4] [0] 1756-L55 Controller	# BeadData[13]	16#0000 0000	Hex	DINT			
E [2] 1756-ENBT/A Master	E BeadData[14]	16#0000 0000	Hex	DINT			
	E BeadData[15]	16#0000 0000	Hex	DINT			
	# ReadData[16]	16#0000 0000	Hex	DINT			
	E ReadData[17]	16#0000_0000	Hex	DINT			
	+ ReadData[18]	16#0000 0000	Hex	DINT			
	E ReadData[19]	16#0000 0000	Hex	DINT			-1
	E ReadData[20]	16#0000_0000	Hex	DINT			
	E ReadData[21]	16#0000_0000	Hex	DINT			
	BeadData[22]	16#0000_0000	Hex	DINT			
	E ReadData[23]	16#0000_0000	Hex	DINT			
	E ReadData[24]	16#0000_0000	Hex	DINT			
	E ReadData[25]	16#0000_0000	Hex	DINT			
	E ReadData[26]	16#0000_0000	Hex	DINT		- I	
<u> </u>	In the Lonitor Tags	Edit Tags /					

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]":

New Tag		<u>×</u>	New Tag		×
<u>N</u> ame:	ReadTagW1	OK	<u>N</u> ame:	ReadDataW1	ОК
Description:		Cancel	Description:	-	Cancel
		Help			Help
	<u> </u>			<u> </u>	
<u>U</u> sage:	<normal></normal>		<u>U</u> sage:	<normal></normal>	
Тур <u>е</u> :	Base Connection		Typ <u>e</u> :	Base Connection	
Alias <u>F</u> or:	Y		Alias <u>F</u> or:		
Data <u>T</u> ype:	MESSAGE		Data <u>T</u> ype:	DINT[500]	
<u>S</u> cope:	MyEnetlP_proj		Scope:	MyEnetlP_proj	
Style:			Style:	Hex	
Den ME	SSAGE Configuration		C Open Cor	nfiguration	

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RSLogix 5000 - Controller in Controller1.ACI	0 [1756-155]* s Window Helm						
Life Bart Lies Search Bogic Communications Tool	s gindow help						
	<u>-</u> & & &	s 🖪 🖉 🖳 🔍 🔍 🔄					
Offline 🗍 🗸 🗐 RUN	Path: AB_ETHIP-1\192.168.0.	147\Backplane\0* 👻	器				
No Forces							
No Edits 🔒 🗉 🗛	HHH HI FAL FAC	COP FLL AVE SRT STD S	IZE CPS			*	
Redundancy by	Favorites & Alarms & Br	t 🔏 Timer/Counter 🔏 Input/Ou	put 🔏 Comp	pare 🕻 ComputeMath 🚶 MoveLogical 🕽	File/Misc. File/Shift	K Sequencer K Equit	
Controlling Controlling	Controller Tars - Con	troller (controller)					
Controller Tags	C BC L	Chan Chan					
Controller Fault Handler	Scope: 11 Controller	Show All					
Power-Up Handler	Name	△ Value Force	 Style 	Data Type	Description	_ _	
- A MainTask	E-Local:1:1	{}	.}	AB:1756_DNB_500Bytes:I:0			
😑 🕞 MainProgram	E-Local:1:0	{}	.)	AB:1756_DNB_496Bytes:0:0			
Program Tags	± Local:1:S	{}	.}	AB:1756_DNB_Status_128Bytes:S:0			
MainRoutine	± ReadData	{} {	} Hex	DINT[500]			
E G Motion Groups	±Read⊺ag	{} {	.}	MESSAGE			
- C Ungrouped Axes	- WriteData	() (} Hex	DINT[500]			
Add-On Instructions	WriteData[0]	16#0000_0000	Hex	DINT			
User-Defined	WriteData[1]	16#0000_0000	Hex	DINT			
🕀 🌆 Strings	WriteData[2]	16#0000_0000	Hex	DINT			
Add-On-Defined	WriteData[3]	16#0000_0000	Hex	DINT			
+ Module-Defined	⊞ WriteData[4]	16#0000_0000	Hex	DINT			
- Trends	⊕ WriteData[5]	16#0000_0000	Hex	DINT			
🖻 😂 I/O Configuration	+ WriteData[6]	16#0000_0000	Hex	DINT			
	₩riteData[7]	16#0000_0000	Hex	DINT			
[1] 1756-DNB DeviceNet Master		16#0000_0000	Hex	DINT			
😟 🖞 [2] 1756-ENBT/A Master	WriteData[9]	16#0000_0000	Hex	DINT			
	WriteData[10]	16#0000_0000	Hex	DINT			
	WriteData[11]	16#0000_0000	Hex	DINT			
	WriteData[12]	16#0000_0000	Hex	DINT			
	WriteData[13]	16#0000_0000	Hex	DINT			
	WriteData[14]	16#0000_0000	Hex	DINT			
	WriteData[15]	16#0000_0000	Hex	DINT			
	WriteData[16]	16#0000_0000	Hex	DINT			
	WriteData[17]	16#0000_0000	Hex	DINT			
	WriteData[18]	16#0000_0000	Hex	DINT			
	WriteData[19]	16#0000_0000	Hex	DINT			
		16#0000_0000	Hex	DINT			
	₩riteData[21]	16#0000_0000	Hex	DINT		*	
<u>к</u>	Ionitor Tags	dit Tags /			the state of the s		
Finter a tay name	R						

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"":

User Manual

2	New Tag	Ctrl+W		T REMARKS.			
	Edit "ReadTag#1" Edit "ReadTag#1" Properties	Alt+Enter	k	Style	Data Type	Description	
	Configure "ReadTagW1"	Ctrl+I	••}		AB:1756_DN		
-	Edit "MESSAGE" Data Type		}		AB:1756_DN		
	Go to Cross Reference for "ReadTagW1"	Ctrl+E	}	Hex	SINT[260]		
	Message Path Editor		}	Hex	SINT[260]		
	Go To	Ctrl+G	}	Hex	SINT[260]		
			}	Decimal	SINT[260]		
	Toggle Bit	Ctrl+T	}		MESSAGE		
	Force On		}		MESSAGE		
			}		MESSAGE		
	TOICE OIL		}		MESSAGE		
	Remove Force		}	Hex	SINT[600]		
Ж	Cut	Ctrl+X	}	Decimal	SINT[600]		
	Сору	Ctrl+C	}	Hex	SINT[600]		
B	Paste	Ctrl+V	}	Decimal	SINT[600]		
	Paste Pass-Through		}		MESSAGE		
	Delete	Del	• • • •		MESSAGE		
	Find All "ReadTagW1"	at the	}		MESSAGE		
-	Ticaul agwill (••7			MESSAGE		

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.

Iser Manual		
essage Configuration - ReadTagT1		
Configuration Communication Tag		
Message Type: CIP Generic	-	
Service Set Attribute Single	Source Element:	ReadDataW1[0]
	- Source Length:	256 - (Butes)
Service 10 (Hex) Class: 4 (Hex)	Destination	
Instance: 121 Attribute: 3 (Hex)	<u>D</u> com 10.000	New Tag
		<u> </u>
Enable Enable Kaiting Start	🔵 Done 🛛 I)one O
O. P. C. Ruta dad Rusan		Timed Out

Choose "Communication" label, input the relevant path of connecting 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:

Path: ENet	Master, 2,	192.168.0.10	1			<u>B</u> rowse	
ENeth	Aaster, 2, 1	192.168.0.10				-	
-Communic	ation Meth	rodbor				-	_
CIP	C D <u>H</u> +	<u>C</u> hannel:		Destin	ation Link:	0 +	1
$\mathbf{C} \stackrel{CIP}{\underset{Source}{\boxtimes}}$	ith : ID	Source Link	: 0	📑 Destin	ation <u>N</u> ode:	0 -) (Octa
☑ C <u>o</u> nne	ected		🔽 Cache	2 Connections	•		
	A						

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



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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

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Installing the gateway





Uninstalling the gateway





