# Modbus/BACnet IP Gateway GT200-BM-RS

**User Manual** 

**REV 1.4** 





**SST Automation** E-mail: SUPPORT@SSTCOMM.COM WWW.SSTCOMM.COM

### GT200-BM-RS

Modbus/BACnet IP Gateway

User Manual

# Catalog

1 Product Overview	
1.1 Product Function	3
1.2 Product Features	3
1.3 Technical Specifications	
2 Hardware Descriptions	5
2.1 Product Appearance	5
2.2 Indicators	6
2.3 Configuration Switch	6
2.4 Interface	7
2.4.1 Dual Power Interface	7
2.4.2 Ethernet Interface	8
2.4.3 RS-232/RS-485 Interface	9
3 Software Instructions	12
3.1 Notes before Configuration	12
3.2 Quick Start Guide	13
3.3 Scan Equipment	13
3.3.1 Scan All Equipment of Ethernet	14
3.3.2 IP Search	14
3.4 Configuration	16
3.4.1 Configure Ethernet Parameters	17
3.4.2 Configure Serial and Modbus Parameters	18
3.4.3 Command Configuration	20
3.5 Locate	23
3.6 Remote Reset	
3.7 Open and Save Configuration	24
4 Typical Application	
5 Installation	29
5.1 Machine Dimension	29
5.2 Installation Method	30



# **1 Product Overview**

#### **1.1 Product Function**

GT200-BM-RS is a gateway which can exchange data between Modbus serial protocol to the BACnet IP protocol. The gateway acts as the slave at the BACnet IP side and the master at the Modbus side.

#### **1.2 Product Features**

- Redundant power supply;
- One independent RS-485 interface or RS-232 interface with 1KV optical isolation;
- Ethernet 10/100M adaptive;
- Network security settings;
- Provides online scanning and configuration;
- Modbus command has auto demotion function and error handling functions;
- Easy-to-use configuration software SST-BM-CFG.

#### **1.3 Technical Specifications**

- [1] The gateway can achieve the communication between BACnet and Modbus;
- [2] Ethernet 10/100M adaptive;
- [3] Supports up to 500 BACnet BIs, 300 BOs, 300 BVs, 500 AIs, 300AOs, 300 AVs, 500 MSIs and 100MSOs,

and the sum of all kinds of BACnet IP objects should not exceed 1264;

[4] Supports the following BACnet IP services: Who Is, I Am, Who Has, I Have, Read Property, Write Property, Read Property Multiple;

[5] Serial port can support up to 100 Modbus commands;



[6] Serial interface is RS-485, half-duplex, and baud rate support: 1200~115200 bps; Parity support: none, odd,

even, space and mark; 1 or 2 stop bits optional; RS-232 interface can be customized.

[7] One independent RS-485 interface or RS-232 interface with 1KV optical isolation;

- [8] Power supply: 24VDC (11V ~ 30V DC), 90mA (24VDC);
- [9] Operating temp: -4°F to 140°F (-20°C to 60 °C), relative humidity: 5% ~ 95% (non-condensing);
- [10] External dimension (W\*H\*D): 1.57 in\*4.92 in\*4.33 in (40mm\*125mm\*110mm);
- [11] Installation: 35mm DIN rail;
- [12] Protection class: IP20;





# **2** Hardware Descriptions

#### **2.1 Product Appearance**





#### **2.2 Indicators**

Indicators	State	Description			
	Green On	IP address with no confliction			
ENS	Red On	IP address with confliction			
	Red Blinking	DHCP, BOOTP, IP address conflict detection			
CNIC	Green On	BACnet IP interface data is received or transmitted			
5115	Green Blinking	BACnet IP interface data is not received or transmitte			
ENS (Orange) and SNS	Simultaneously On	At the power			
(Orange)	Blink Alternately	Configuration Mode			
(Orange: Red and green on	Blink Alternately (for 3	Liss locating function			
at the same time)	seconds)	Use locating function			
Sorial TV	Green Blinking	Serial data is transmitting			
Sellai IA	OFF	No serial data is transmitting			
Sorial DV	Green Blinking	Serial data is receiving			
Sellal KA	OFF	No serial data is receiving			

#### **2.3 Configuration Switch**

Configuration switch is located on the bottom of the gateway, bit 1 is mode bit, and bit 2 is function bit.



Mode (Bit 1)	Function (Bit 2)	Mode	Description
Off	Off	Run mode	BACnet IP and Modbus RTU data can be exchanged; Allow reading and writing configuration data. After reconfiguring GT200-BM-RS, it needs to restart. Then, the configuration will take effect.



	GT200-B Modbus/E	<i>M-RS</i> BACnet IP G	ateway
	User Man	ual	
Off	On	Pun modo	BACnet IP and Modbus RTU data can be exchanged;
OII	Oli	Kull mode	Prohibit reading and writing configuration data.
		Configuration	IP address is fixed at 192.168.0.188; this mode can only read
On	Off	C	and write configuration data but cannot communicate between
		Mode	BACnetIP and Modbus RTU.
		Configuration	IP address is fixed at 192.168.0.188; this mode can only read
On	On	0	configuration data but cannot communicate between BACnet IP
		Mode	and Modbus RTU.

#### **2.4 Interface**

#### 2.4.1 Dual Power Interface

GT200-BM-RS uses a 24V DC power supply; it has two power interfaces with redundancy function. Users can

use one or two power supply.



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

If users need to use one power supply for backup, when one supply fails, another power can continue to supply power to ensure the normal operation of the equipment.

Power wiring is shown as below:





#### 2.4.2 Ethernet Interface

Ethernet interface uses RJ-45 connector, 10/100M adaptive. The pin definition (standard Ethernet signal) is shown as below:



RJ-45 port



#### GT200-BM-RS Modbus/BACnet IP Gateway

#### **User Manual**

Pin	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-

#### 2.4.3 RS-232/RS-485 Interface

GT200-BM-RS supports one port RS-232 or RS-485. RS-232 interface pins are defined as follows:



Pin	Function
1	TX, connect with TX of user device
2	RX, connect with RX of user device
3	GND

RS-485 interface pins are defined as follows:





 Pin
 Function

 1
 B+, RS-485

 2
 A-, RS-485

 3
 GND

The RS-485 interface of GT200-BM-RS is a standard one, and the RS-485 characteristics of the product are shown as follows:

#### 1. The basic characteristics of RS-485 transmission technology

①Network topology: Linear bus, there are active bus terminal resistors at both sides.

(2) Transmission rate: 1200 bps~115.2Kbps.

(3)Media: Shielded twisted-pair cable and also can cancel the shielding, depending on environmental conditions

(EMC).

(4) Site number: 32 stations per subsection (without repeater), and can increase up to 127 stations (with repeater).

⑤Plug connection: 3-pin pluggable terminal.

#### 2. The main points on the installation of RS-485 transmission equipment

(1)All the equipment are connected with RS-485 bus;

②Each Subsection can be connected up to 32 sites;

(3) The farthest two end of the bus has a terminal resistor -  $120\Omega$  1/2W to ensure reliable operation of the network.





When RS-485 communicates under the point-to-multipoint mode, in order to prevent the reflection and interference of the signal, it requires connecting a terminal resistor in the farthest two ends of the each line; the parameter is  $120\Omega \ 1/2W$ . There are no parallel terminal resistors at the serial port side of GT200-BM-RS.



## **3** Software Instructions

Double click the software application and install the configuration software SST-BM-CFG. You can easily follow the prompts to complete the installation, then open the installed configuration software and begin to configure the GT200-BM-RS.

**Notes:** The factory network setting of GT200-BM-RS is DHCP. If the network does not have the DHCP server, the configuration switch (bit 1) should be in the configuration state (on), restart GT200-BM-RS gateway to let the settings take effect. The IP address of GT200-BM-RS is fixed 192.168.0.188, subnet mask is 255.255.255.0 and gateway address is 192.168.0.1.

#### 3.1 Notes before Configuration

SST-BM-CFG is a product based on Windows platform, and used to configure parameters of GT200-BM-RS and GT200-BM-2RS. When configuring GT200-BM-RS, the Modbus Master I must be configured and used.

Please make sure the user's computer and the GT200-BM-RS which need to be configured are in the same network before you run the software.

Double click the icon to access the main interface:



#### *GT200-BM-RS* Modbus/BACnet IP Gateway

#### **User Manual**

Search Equipment	No.	Model	IP Address	MAC Address	Firmware Version	Name	State
IP Search							
Locate							
Configuration							
Remote Reset							
Communication Test	<						

#### 3.2 Quick Start Guide

- ➤ Correctly wire the power line, network cable and RS-485 cable;
- ➢ Power on the GT200-BM-RS gateway;
- According to actual field condition of your Modbus slave device, modify the GT200-BM-RS configuration according to this manual and download the configuration to the gateway;
- Connect with the Modbus slave devices;
- Connect with the BACnet IP master;

#### 3.3 Search Equipment

Before configuring parameters of GT200-BM-RS, the user need search the gateway using the software. The software provides two ways to search the gateway for the user.





#### **3.3.1 Search All Equipment of Ethernet**

Click "Search equipment" button of the main interface, the software will search all of the available GT200-BM-RS equipment and list them in the main interface.

Search Equipment	No.	Model	IP Address	MAC Add	Firmware	Name	State
IP Search							
Locate							
Configuration							
Remote Reset							
Communication Test							

#### **3.3.2 IP Search**

Click "IP Search" button of the main interface will pop up a dialog box, and user need to enter the IP address of the equipment.



#### GT200-BM-RS Modbus/BACnet IP Gateway

#### User Manual

ch Equipment	No.	Model	IP Address	MAC Add	Firmware	Name	State
IP Search							
Locate							
mfourstion							
mote Reset							
unication Test							
	ſ			_		-	

After entering the correct IP address, the software will search GT200-BM-RS with this IP address in the network, and list the information of the equipment in the main interface.

Search Equipment	No.	Model	IP Address	MAC Add	Firmware	Name	State
Dearen Ederbuene	• 1	GT200-BM	192.168.0	00-40-9D	1.1	SSTCOMM	Allow rem
IP Search							
Locate							
Configuration							
Remote Reset							
communication Test	<						
	]	M		Onen		Evia	

Note: If the users select the "IP search", users need to enter correct IP address or it will not search





equipment.

### 3.4 Configuration

Select the equipment to be configured in the list, and the function like "Locate", "Configuration", "Remote Reset", "Import" and "Export" will become available:

SST-B <b>II</b> -CFG							
Search Equipment	No.	Model GT200-BM	IP Address 192.168.0	MAC Add 00-40-9D	Firmware 1.1	Name SSTCOMM	State Allow rem
IP Search							
Locate							
Configuration							
Remote Reset							
Communication Test	<						
	(	New		Open		Exit	

Click "Configuration" button will pop up the window:



GT20 Mod	00-BM-RS bus/BACnet	IP Gatewa	ıy		
User	Manual				
Configuration					
Device	Configuration			BACnet Object	
BACost IP Server	Derrice name	Tart		Divoluti Object	
A days blacker	Assign TP Mode	Manual Accien			
B WIOCOUS Master I	TP Address	192 168 0 10			
□ 2 Node(1)	Subnet Mask	255 255 255 0			
- 🛄 Read Holding Registe:	Default Gateway	192 168 0 1			
💼 Preset Multiple Regist	DNS1	0.0.0.0			
	DNS2	0. 0. 0. 0			
222	Byte-exchange	Disable			
	BACnet IP Port	47808			
	Device Instance	100			
	1				
	F		Hint		
	t ou can comig me ronowing parameter	Yeelfu L wore'L Yamee'Soroli	n Maski Delani, Galeway (, Dirofi)		IF Device Histanice.

#### **3.4.1 Configure Ethernet Parameters**

Ethernet parameters include: "Device Name", "Assign IP Mode", "IP Address", "Subnet Mask", "Default Gateway", "DNS1", "DNS2".

Device	Confi	guration	
BACnet IP Server	Device Name	Device1	
Modbus Master I	Assign IP Mode	Manual Assign	
Node(1)	IP Address	192.168.0.10	
Read Holding Pagista	Subnet Mask	255. 255. 255. 0	
Breast Multiple Pagiste	Default Gateway	192.168.0.1	
Preset Multiple Regist	DNS1	0.0.0	
lodbus Master II	DNS2	0.0.0	
	Byte Swap	Disable	
	BACnet IP Port	47808	
	Device Instance	100	

• Device Name - Enter a name used to identify the device in order to distinguish from other devices;



Note: The name cannot have spaces, up to 16 characters.

- Assign IP Mode Set the IP address assign mode of the device;
- IP address Set the IP address of the device;
- Subnet Mask Set the subnet mask of the device;
- Default Gateway Set the gateway address for the device;
- DNS1 The first domain name server (LAN cannot set);
- DNS2 Standby domain name server;
- Byte Swap Does not currently support;
- BACnet IP port Set the BACnet IP port number of GT200-BM-RS;
- Device Instance Set device instance number GT200-BM-RS.

#### **3.4.2** Configure Serial and Modbus Parameters

Serial parameters include: "Baud Rate", "Check Bit", "Stop Bits" and "Data Bits"	erial parameters include: "Baud Rate", "Ch	eck Bit", "Stop Bits" and "Data Bits	" etc.
--	--	--------------------------------------	--------

onfiguration						
Device	Configurat	ion		BACnet Object	t	
ACnet IP Server	Baud Rate	9600				
Modbus Master I	Data Bits	8 bits				
Node(1)	Check Bit	None				
Des d Helding Desiste	Stop Bits	1 bit				
Read Holding Registe	Transmission Mode	RTU				
Preset Multiple Regist	Response Timeout	300				
Modbus Master II	Delay between Polls	0				
	Output Mode	Change of Value				
	Scan Rate	10				
	Enable Auto Demotion	Disable				
	Auto Demotion	3				
	Auto Demotion Time	60000				
	How to Action after N succe	ccim Clear Data				
	now to notion ditter a succe	Salt older bate				
			(c)			



- Baud Rate 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400;
- Data Bits 8 (currently only support 8 data bits);
- Check Bit None, Odd, Even, Mark, Space;
- Stop Bits 1, 2;
- Transmission mode -RTU;
- Response timeout When the Modbus master send commands, the time waiting for response from the slave, the range is 300~60000ms;
- Delay between polls After one Modbus command has been sent and has received correct response, the delay time before next command being sent, the range is: 0 ~ 2500ms;
- Output Mode Modbus write command (command output) has two output modes: cycle and change of value output;

Change of Value: When the output data has changed, it outputs the write command and stop outputting after receiving correct response;

Cycle: the same with Modbus read command output mode, and output according to the scan rate;

- Scan Rate Ratio of slow scan cycle to fast scan cycle;
- Enable Auto Demotion Default value is Disable. When Enable Auto Demotion and a command is a fast scan command without correct response for N times, then the command will demote a slow scan command. This parameter is valid for Modbus reading command and cycle writing command.
- Auto demotion After n times Modbus command response failure to automatically degrade to slow scan;
- Auto Demotion Time When the Demotion Time timeout the command will promote a fast command. The range of the parameter value is 3000 to 600000ms.
- How to action after N successive response timeout Clear Data; Hold Data

Note: The gray parts cannot be changed.





#### **3.4.3** Command Configuration

1. Add and delete nodes. Right-click the "Modbus Master I", choose "Add Node".

Modhus	footor I
Node	Add Node
	Delete Node
E E	Add Command
Modhue	Delete Command

Right click the node and select "Delete Node".

	Add Node
	Delete Node
Aodbu	Add Command
513927-04119-	Delete Command

2. Add command

Right click "Node (x)" and select "Add Command".







Select one command; double click to add the command;

For each Modbus commands' setting, SST-BM-CFG will automatically map the Modbus commands to the corresponding BACnet objects after configuring.

Device	Configu	ation			BACnet Object		
BACnet IP Server	Function Code	3	Object Type	Object Name	Register Count	Data Type	Scale
Modhus Master I	Starting Address	U	AI	AI1	1	UINT16	1.00
Node(1)	Number of Register	2	AI	AI2	1	UINT16	1.00
Des d Halding Desiste	Mapping Address(HEX)						
Read Holding Register	Mapping Bit	0					
Preset Multiple Regist	Number of Byte	0					
Modbus Master II	Byte-exchange	Non-exchange					
	Type of Check	CRC					
	Type of Scan	Fast Scan					
	Mnemonic						
	1						
				-			1
	1		Hrint			700	
	Line of the owned in the Park		o unput out of a too all o anoppa			, 10 0 10 0 2010.	
	Auto Assign Object Nan	Download	Garra		ivnort	Evit	



WWW.SSTCOMM.COM

Read coil Status - fill in the number of data, automatically mapped to BACnet BI (binary input). Take above picture as an example;

Read input status - mapped to BACnet BI (binary input);

Read Holding Registers - mapped to BACnet AI (analog input) or MI (multistate input); as is shown below, left

click the "AI" will pop up the drop-down the menu.

Device	Configuration		BACnet Object					
BACnet IP Server	Function Code	3	Object Type	Object Name	Register Count	Data Type	Scale	
Modbus Master I	Starting Address	0	AL	AT1	1	UINT16	1.00	
Ser Node(1)	Number of Register	2	AI	V AI2	1	UINT16	1.00	
Read Holding Pergister	Mapping Address(HEX)		AL					
Durat Mathial During	Mapping Bit	0	MI					

See picture above:

- Object type: AI and MI optional, default is AI;
- Object Name: Editable, the maximum data length it supports is 12;
- Register Count: 1 and 2 optional, default is 1 (Map one Modbus register to a BACnet object);
- Data Types : BOOL, INT16 (signed 16-bit integer data), UINT16 (unsigned 16-bit integer data), INT32 (signed 32-bit integer data), INT32V (INT32 Inverse, contrary to high and low word INT32), UINT32 (unsigned 32-bit integer data), UINT32V (UINT32 Inverse, contrary to high and low word of UINT32), Float, and FloatV (Float Inverse, contrary to high and low word of Float) optional (different display for different types of BACnet object);
- Scaling: You can edit , range: 0.01 to 100, default: 1.0.

Read Input Register -- Mapping to the BACnet AI (analog input) or MI (multistate input ), you can choose;

Force Single Coil -- Mapping to the BACnet BO(binary output) or BV(binary value) ,you can choose;

Preset Single Register -- Mapping to the BACnet AO(analog output), AV(analog value) or MO(multistate output), you can choose;

Force Multiple Coils -- Mapping to the BACnet BO(binary output) or BV(binary value), you can choose;

Preset Multiple Registers -- Mapping to BACnet AO(analog output), AV(analog value) or MO(multistate output), you can choose.





#### 3.5 Locate

When users manage multiple GT200-BM-RS gateways, the "locate" function can be used to determine which device you are configuring.

Users click on the "locate" button and the device is still in the network, two orange indicator of the device alternately blinks a few seconds in order to find the device.

Search Equipment	No.	Model	IP Address	MAC Add	Firmware	Name	State
Section Equipment	2	GT200-B	192.168.0	00-40-9D	1.1	SSTCOMM	Allow ren
IP Search							
Locate							
Configuration							
Remote Reset							
ommunication Test							
	ſ			<u></u>			

#### **3.6 Remote Reset**

The function of "remote reset" is restarting the selected device. Select the equipment in the list first, click "Remote reset" button, it will pop up a confirmation dialog, then click "OK" to complete the operation.



#### GT200-BM-RS Modbus/BACnet IP Gateway

User Manual

Search Equipment	No.	Model	IP Address	MAC Add	Firmware	Name	State
]	<u> </u>	GT200-B	192.168.0	00-40-9D	1.1	SSTCOMM	Allow rem
IP Search							
Locate							
Configuration							
Remote Reset							
ommunication Test							

Remote Reset		X
Whether to reset th	ne equipment or not?	
OK	Cancel	

### 3.7 Open and Save Configuration

• Open the configuration - open and display the configuration data which is saved on the computer;



#### GT200-BM-RS Modbus/BACnet IP Gateway

#### User Manual

🤌 s:	ST-BE-CFG							
	Search Equipment	No.	Model GT200-B	IP Address 192.168.0	MAC Add 00-40-9D	Firmware 1.1	Name SSTCOMM	State Allow rem
	IP Search							
	Locate							
	Configuration							
	Remote Reset							
0	Communication Test							
			New		Open	$\supset$	Exit	

- Export to Excel the configuration parameters are saved to the computer (xls), one-to-one mapping relationship of each Modbus command and BACnet objects. They can easily be seen from the export of Excel;
- Save save the configuration parameters to a computer (. chg), for later viewing, attention to save this file;
- Select the device in the list, click on the "save" or "Export" button and select the path to complete the operation.

User I	Manual				
nfiguration					
Device	Configuration			BACnet Object	کار ک
BACnet IP Server	Device name	Test			
Modbus Master I	Assign IP Mode	Manual Assign			
Node(1)	IP Address	192.168.0.10			
Dead Helding Degister	Subnet Mask	255.255.255.0			
Desert Mathiata Desire	Default Gateway	192.168.0.1			
Preset Multiple Regist	DNS1	0.0.0			
wodbus Master II	DNS2	0.0.0			
	Byte-exchange	Disable			
	BACnet IP Port	47808			-
	Device Instance	100			
					-
	-				
	-				-
	1	U	1	1	1.

Note: The parameters are saved in the document, you can make changes to the data inside but please ensure correctness of the data, or incorrect data will be processed in accordance with the default values. Do not change the data keyword, and do not add spaces.

Do not change the keyword of data, and do not add spaces.

Save As	2 🛛
Save in: Desktop	• = • •
My Documents My Computer My Network Places	









# **4** Typical Application

GT200-BM-RS can connect Modbus slave devices to Ethernet bus. GT200-BM-RS is a bridge in the communication, and completes the conversation between BACnet and Modbus RTU.

The following is the typical application of GT200-BM-RS.



For example: The above chart multifunction energy monitoring instrument is a current measuring meter with Modbus slave station interface, the measurement of the current value is stored in the address 40001. In the SST-BM-CFG, configure the No.03 function code, start address is 0 (corresponds to the Modbus register 40001 address), and then the SST-BM-CFG will be automatically mapped to the BACnet object AnalogInput (analog input). On the BACnet master PC, the current value can be observed through corresponding AnalogInput.





## **5** Installation

#### **5.1 Machine Dimension**

Size: 1.57 in (width)\*4.92 in (height)\*4.33 in (depth)





#### **5.2 Installation Method**

Using 35mm DIN rail









