

GW-2500iM Series

User Manual

Tiny Modbus TCP to RTU/ASCII Security Gateway

Ver. 1.0, May 2026



WARRANTY

All products manufactured by ICP DAS are warranted against defective materials for a period of one year from the date of delivery to the original purchaser.

WARNING

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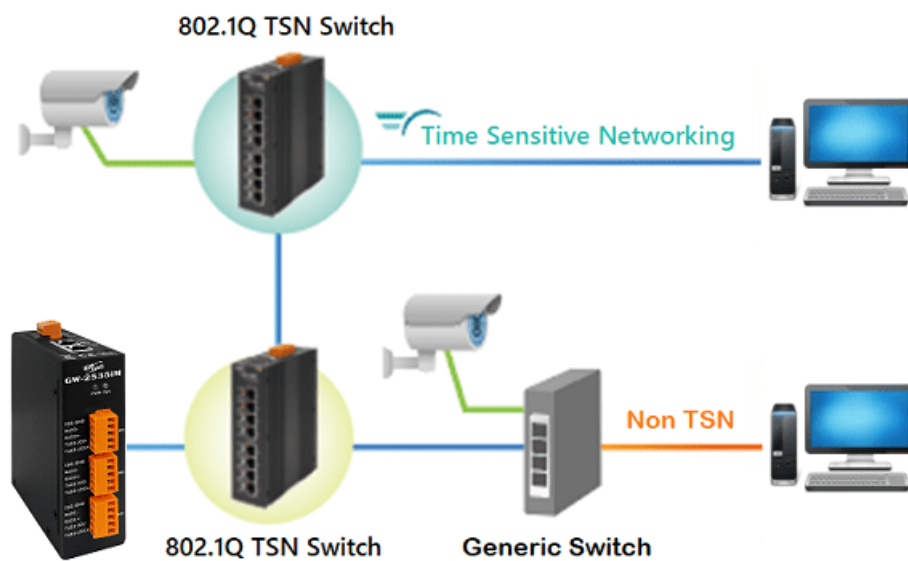
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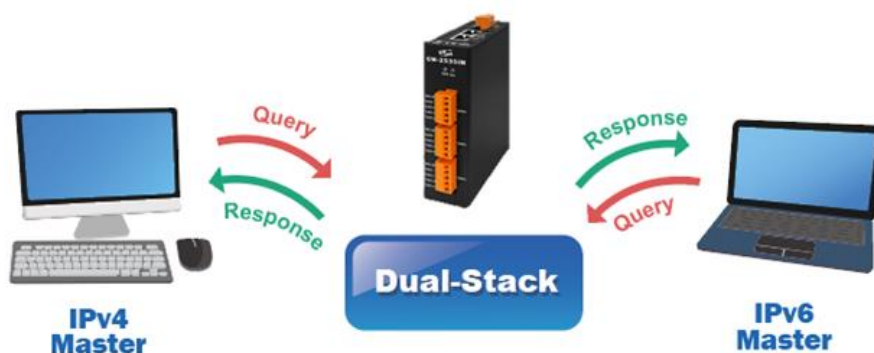
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1. Introduction

Modbus has become the de facto standard protocol for industrial communication, and is now the most commonly available means of connecting industrial electronic devices. Modbus allows for communication between many devices connected to the same RS-485 network, for example, a system that measures temperature and humidity and communicates the results to a computer. Modbus is often used to connect a supervisory computer with a remote terminal unit (RTU) in supervisory control and data acquisition (SCADA) systems.



The GW-2500iM module is a Modbus TCP/UDP to RTU/ASCII gateway that enables a Modbus TCP/UDP host to communicate with serial Modbus RTU/ASCII devices through an Ethernet network, and eliminates the inherent cable length limitations of legacy serial communication devices. The module can be used to create pair-connection applications (as well as serial-bridge or serial-tunnel applications), and can then route data over a TCP/IP connection between two serial Modbus RTU/ASCII devices, which is useful when connecting mainframe computers, servers or other serial devices that use Modbus RTU/ASCII protocols and do not themselves have Ethernet capability. And the GW-2500iM adopts the dual-stack technology to support the IPv4 and IPv6 simultaneously (version 2.2.0 or later).



In harsh industrial environments, the GW-2500iM series also adds 3000 V_{DC} and +/- 4 kV ESD protection component that diverts the potentially damaging charge away from sensitive circuit to protect the module and equipment from the sudden and momentary electric current.

The GW-2500iM module features a powerful 32-bit MCU that enables efficient handling of network traffic, and also has a built-in web server that provides an intuitive web management interface that allows users to modify the configuration of the module, including the DHCP/Static IP, the gateway/mask settings and the serial port settings.

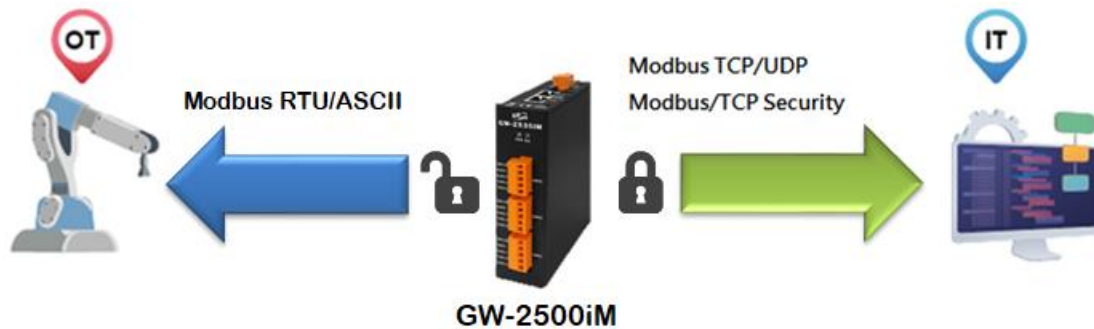


The GW-2500iM module offers true IEEE 802.3af-compliant (classification, Class 2) Power over Ethernet (PoE) functionality using a standard Category 5 Ethernet cable to receive power from a PoE switch, such as the NS-205PSE. If there is no PoE switch on site, the module will also accept power input from a DC adapter. The GW-2500iM module is designed for ultra-low power consumption, reducing the hidden costs resulting from increasing fuel and electricity prices, especially when a large number of modules are installed. Reducing the amount of electricity consumed by choosing energy-efficient equipment can also have a positive impact on maintaining a green environment.

Comparison of Modules:

Series Features	PPDS-700	PDS-700	DS-700	tDS-700 DS-2200	GW-2500iM
Virtual COM	✓	✓	✓	✓	-
Programmable	✓	✓	-	-	-
PoE	✓	-	-	✓	✓
Modbus Gateway	✓	-	-	-	✓
Multi-client	About 20 Sockets			1 Sockets/Port	32 Sockets/Port
Security services	-			-	✓
Remarks	Professional	Powerful	Isolation for DS-715	Cost-effective, Entry-level	Cost-effective, Entry-level

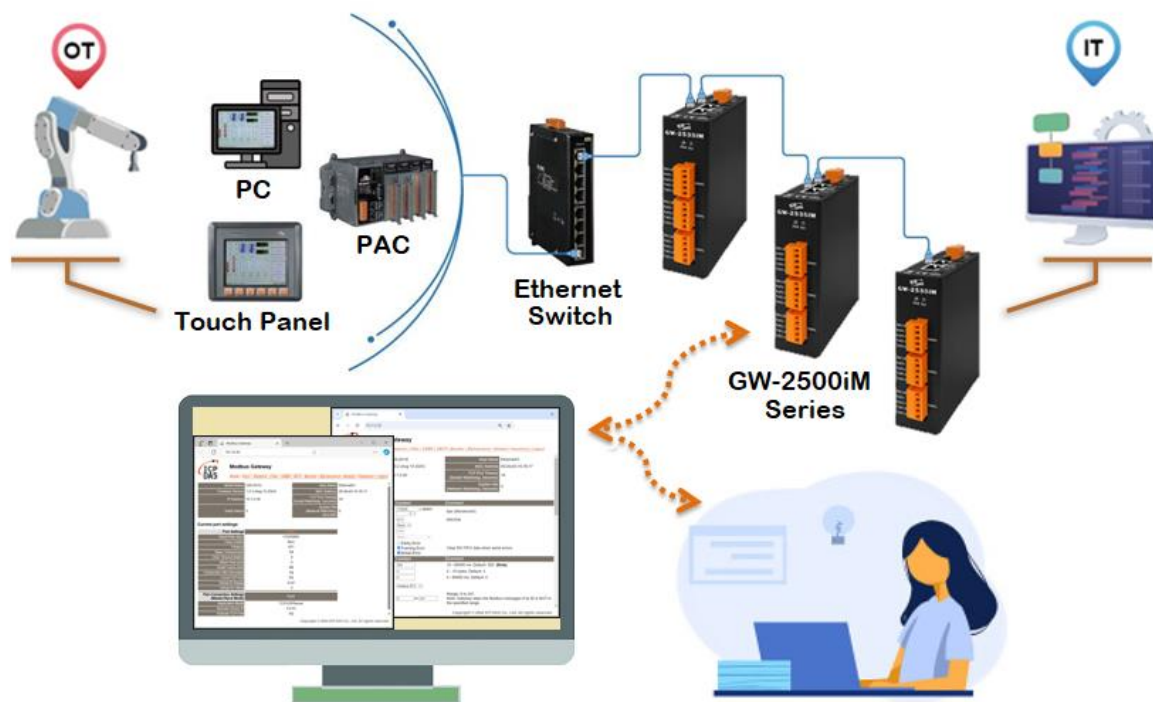
1.1 Features



- ✓ Supports Modbus TCP/UDP master and slave
- ✓ Supports Modbus RTU/ASCII master and slave
- ✓ Max. connections (masters) per serial port: 32
- ✓ Read-cache ensures faster Modbus TCP/UDP response
- ✓ Supports UDP responder for device discovery (UDP Search)
- ✓ Static IP or DHCP network configuration for IPv4
- ✓ Link-local Address and SLAAC(Stateless address auto-configuration) for IPv6
- ✓ Supports IPv4 and IPv6 simultaneously with dual-stack
- ✓ Easy firmware update via the Ethernet (BOOTP, TFTP)
- ✓ Tiny Web server for configuration (HTTP)
- ✓ Contains a 32-bit MCU that efficiently handles network traffic
- ✓ 10/100 Base-TX Ethernet, RJ-45 x1 (Auto-negotiating, auto MDI/MDIX, LED Indicators)
- ✓ Supports 2-port Ethernet Switch (LAN Bypass), Daisy-Chain wire
- ✓ Includes redundant power inputs: PoE (IEEE 802.3af, Class 2) and DC jack
- ✓ Allows automatic RS-485 direction control
- ✓ Power or Signal isolation for i versions
- ✓ +/- 4 kV ESD protection
- ✓ Male DB-9 or terminal block connector for easy wiring
- ✓ Tiny form-factor and low power consumption
- ✓ RoHS compliant with no Halogen
- ✓ Cost-effective Modbus Gateway

1.2 Applications

- ✓ Factory Automation
- ✓ Building Automation
- ✓ Home Automation
- ✓ Remote Diagnosis and Management



More Information

- **Documentation**

GW-2500iM Series

<https://www.icpdas.com/en/download/index.php?nation=US&kind1=&model=&kw=GW-2500>

- **Firmware**

GW-2500iM Series

<https://www.icpdas.com/en/download/show.php?num=2750>

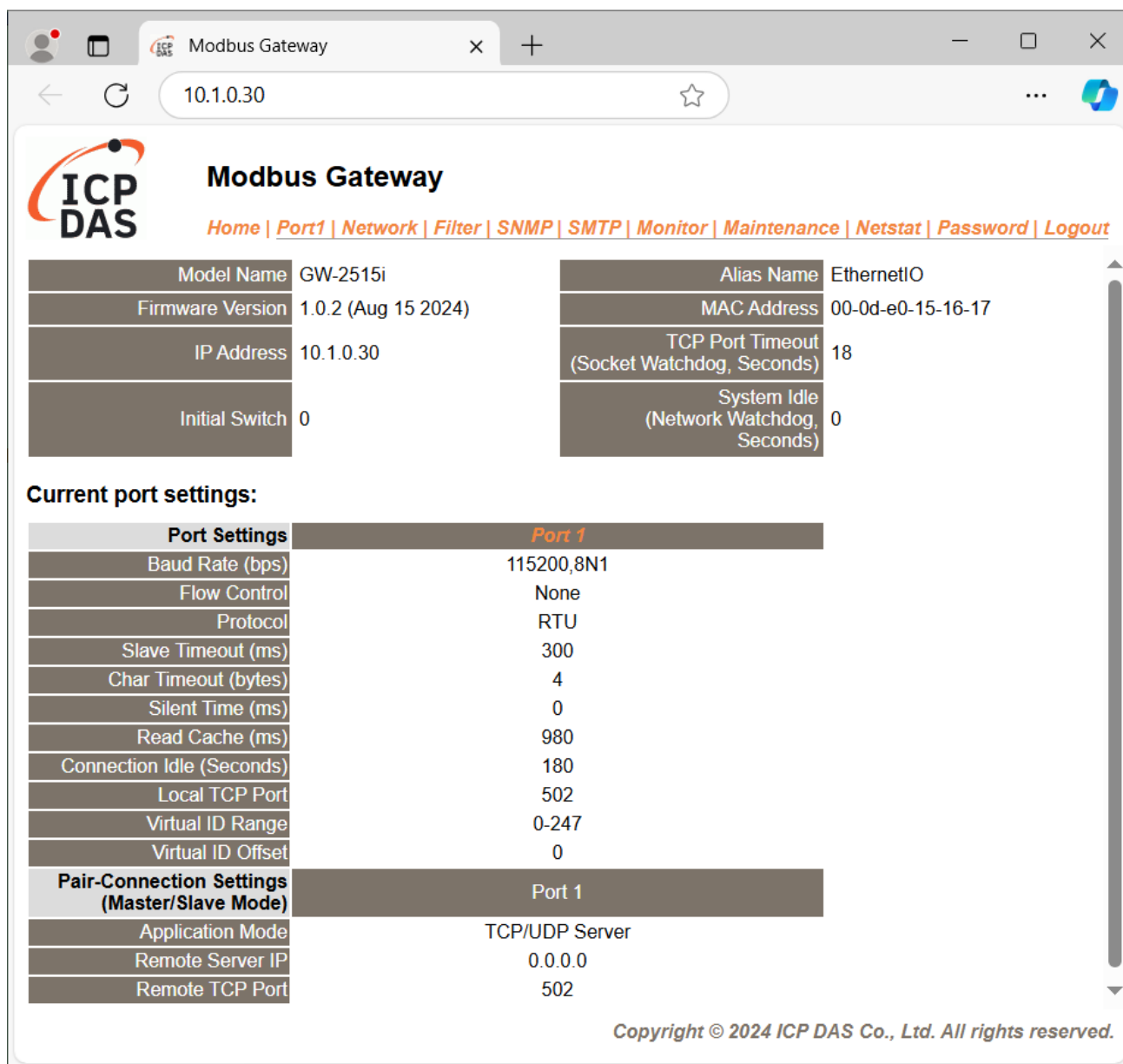
- **Software**

eSearch Utility

https://www.icpdas.com/en/product/guide+Software+Utility_Driver+eSearch__Utility

1.3 Web Server Technology

Web server technology enables the GW-2500iM to be configured via a standard web browser interface, e.g., Google Chrome, Internet Explorer, or Firefox, etc. This means that it is easy to check the configuration of the GW-2500iM via an Ethernet network without needing to install any other software tools, thereby reducing the learning curve required for maintaining the device.



The screenshot displays the web interface of the Modbus Gateway, accessed via a browser at IP 10.1.0.30. The interface features the ICP DAS logo and a navigation menu with links: Home, Port1, Network, Filter, SNMP, SMTP, Monitor, Maintenance, Netstat, Password, and Logout. The main content area is divided into two columns of configuration parameters.

Model Name	GW-2515i	Alias Name	EthernetIO
Firmware Version	1.0.2 (Aug 15 2024)	MAC Address	00-0d-e0-15-16-17
IP Address	10.1.0.30	TCP Port Timeout (Socket Watchdog, Seconds)	18
Initial Switch	0	System Idle (Network Watchdog, Seconds)	0

Current port settings:

Port Settings	Port 1
Baud Rate (bps)	115200,8N1
Flow Control	None
Protocol	RTU
Slave Timeout (ms)	300
Char Timeout (bytes)	4
Silent Time (ms)	0
Read Cache (ms)	980
Connection Idle (Seconds)	180
Local TCP Port	502
Virtual ID Range	0-247
Virtual ID Offset	0
Pair-Connection Settings (Master/Slave Mode)	Port 1
Application Mode	TCP/UDP Server
Remote Server IP	0.0.0.0
Remote TCP Port	502

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2. Hardware Information

This chapter provides a detailed description of the front panel, the hardware specifications, the pin assignments, the wiring notes and the dimensions for the GW-2500iM series modules.

2.1 Specifications

Model		GW-2515iM	GW-2525iM	GW-2535iM	GW-2518iM	GW-2528iM
System						
CPU		32-bitMCU				
Communication Interface						
Ethernet		2-Port 10/100 Base-TX Ethernet Switch with LAN Bypass, RJ-45 x 2 (Auto-negotiating, Auto-MDI/MDIX, LED indicator)				
PoE		Yes				
COM Port		1 x RS-422/485	2 x RS-422/485	3 x RS-422/485	1 x RS-232/422/485	2 x RS-232/422/485
Self-Tuner		Yes, automatic RS-485 direction control				
RS-485	Bias Resistor	Yes, 1 KΩ				
	Node	254 (max.)				
UART		16c550 or compatible				
Power Isolation		1000 V _{DC}				
Signal Isolation		3000 V _{DC}				
ESD Protection		+/-4 kV				
COM Port Format						
Baud Rate		115200 bps Max.				
Data Bit		5, 6, 7, 8				
Parity		None, Odd, Even, Mark, Space				
Stop Bit		1, 2				
Power						
Power Input		PoE: IEEE 802.3af, Class 2, DC jack: +12 ~ 48 V _{DC}				
Power Consumption		0.07 A @ 24 V _{DC}				
Mechanism						
Dimensions (W x L x H)		106 mm x 33 mm x 119 mm				
Mounting		DIN-Rail				
Flammability		Fire Retardant Materials (UL94-V0 Level)				
Environment						
Operating Temperature		-25 ~ +75 °C				
Storage Temperature		-30 ~ +80 °C				
Humidity		10 ~ 90% RH, non-condensing				
Note: COM1/COM2/COM3 = TCP Port 502/503/504						

2.2 Appearance



PoE and Ethernet RJ-45 Jack

The GW-2500iM series module is equipped with two RJ-45 jacks that are used as the 10/100 Base-TX Ethernet port and features networking capabilities, only ETH1 supports PoE power supply. When an Ethernet link is detected and an Ethernet packet is received, the **Link/Act LED (Orange)** indicator will be illuminated. When power is supplied via PoE (Power-over-Ethernet), the **PoE LED (Green)** indicator will be illuminated.

+12 to +48 Vdc Jack

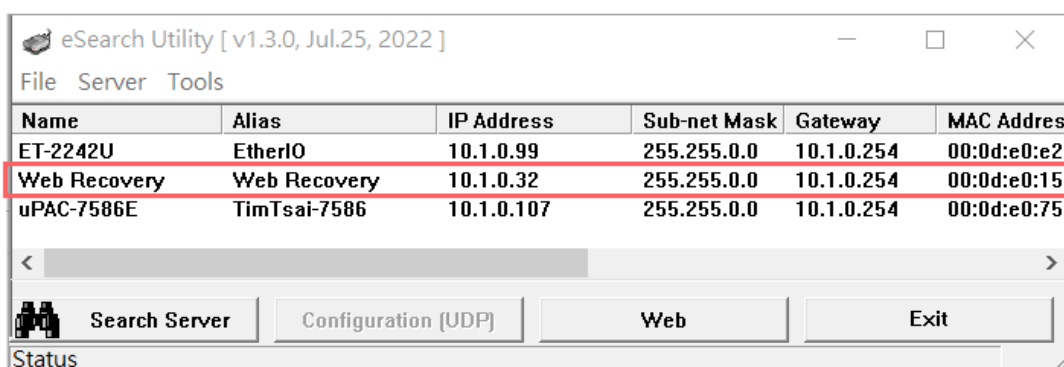
The GW-2500iM series is equipped with a +12V_{DC} to +48 V_{DC} terminal that can be used to connect a power supply. If no PoE switch is available on site, a DC adapter can be used to power the GW-2500iM module.

Reset button

It can help you to upload the firmware in rescue mode when your GW-2500iM fails to recovery/update firmware in a normal way.



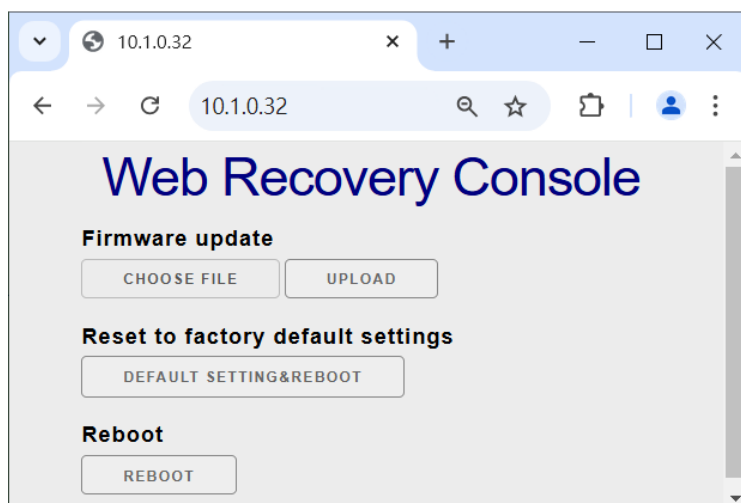
Function	LED Color	LED Behavior
Power on (PWR)	Red	Steady ON
Running Firmware (Sys.)	GREEN	Slow flashing – Once about every 1 second



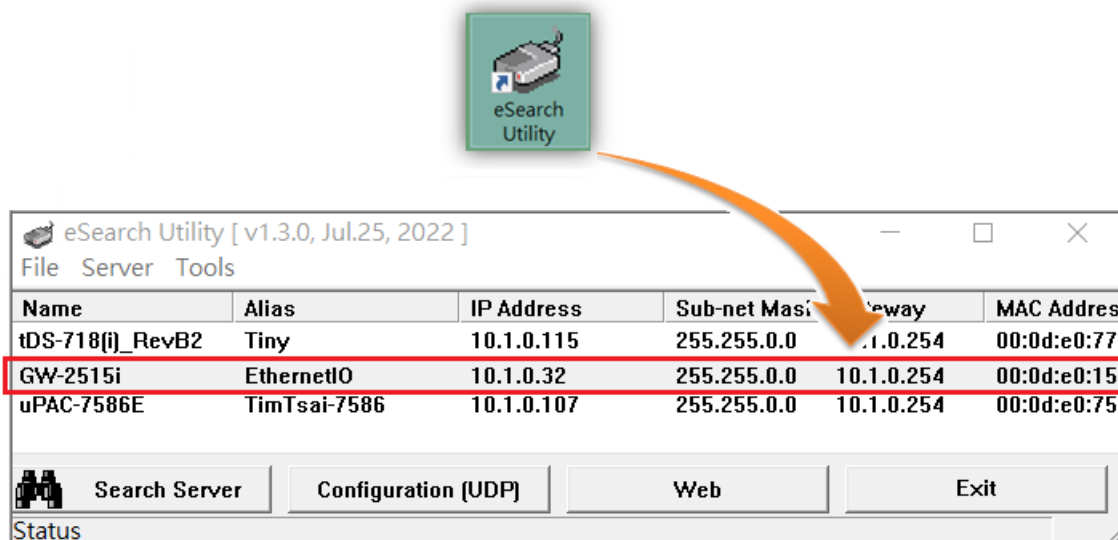
Reset

There are 6 recovery processes as shown below:

- 1) Turn off the Power.
- 2) Keep pressing the reset button then turn on the power.
- 3) Hold the reset button for about 5~10 seconds, the **Green** LED will flashing.
- 4) Open the eSearch Utility and scan devices, you will see that the name is "**Web Recovery**".
- 5) Open the Web browser, such as Google Chrome, enter the IP address of the GW-2500iM module in the address bar and then click "Enter", you will see the Recovery menu.
- 6) Click "**Firmware update**" or "**Reset to factory default settings**" button to begin the restore process.



Clicking “Search Server” on eSearch Utility again, you will see the module name as a “GW-2515i”.



LED Indicator

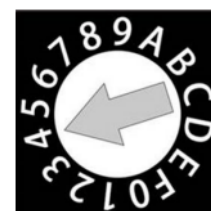
Once power is supplied to the GW-2500iM series module, the system LED indicator will illuminate.

An overview of the system LED functions is given below:

Function	Color	LED Behavior
Power on (PWR)	Red 	Steady ON
Running Firmware (Sys.)	GREEN 	Slow flashing – Once about every 1 second

Rotary Switch

Rotary switch is a mode selector. All selectors can be set by the user (range 0~15).

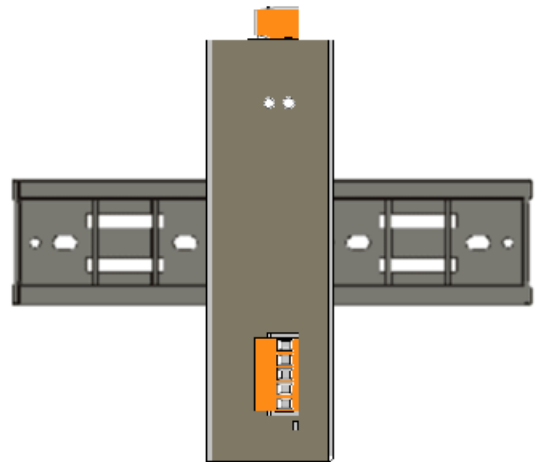


Serial COM Ports

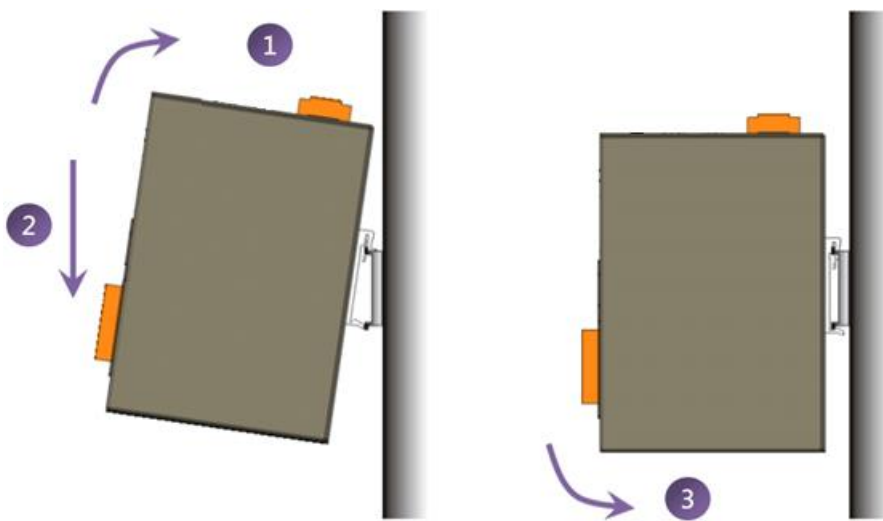
The number of serial COM Ports available depends on the type of GW-2500iM module. For more detailed information regarding the pin assignments for the Serial COM ports.

DIN-Rail Mounting

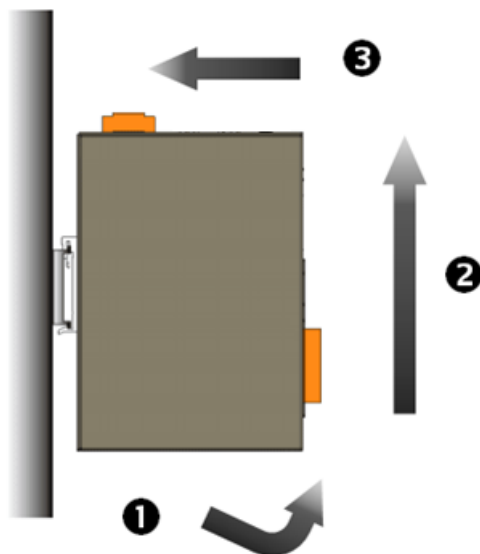
The GW-2500iM series modules include simple rail clips on the bottom of the chassis that allow them to be reliably mounted on a DIN-Rail or a wall. For more detailed information regarding DIN-Rail Mounting, refer to the illustration in figure below.



Mounting on a DIN-Rail



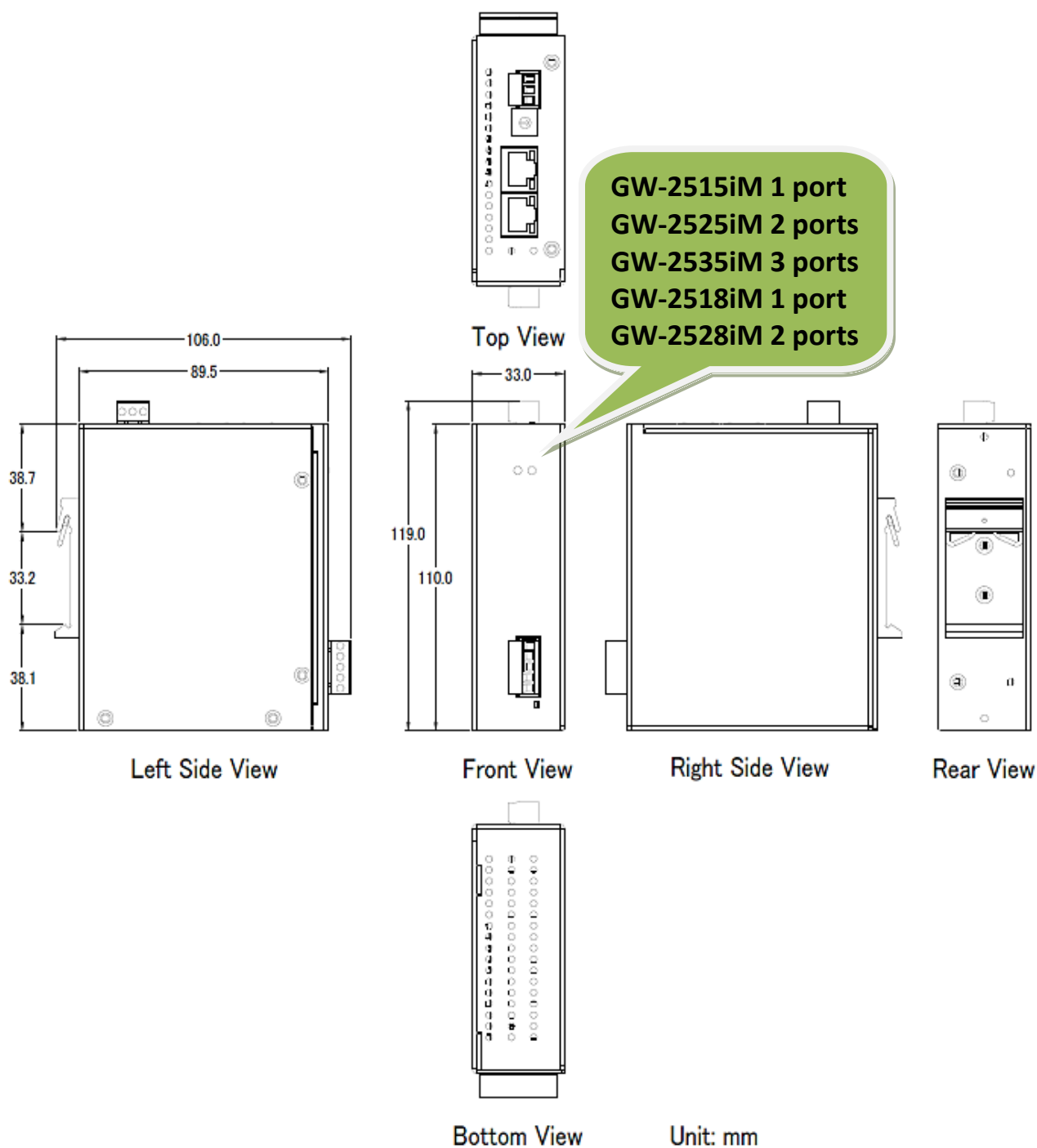
Dismounting from a DIN-Rail



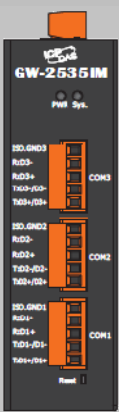
2.3 Dimensions

The following diagrams provide the dimensions of the GW-2500iM series module. All dimensions are in millimeters.

➤ **GW-2515/2525iM/2535iM/2518iM/2528iM (Unit: mm)**



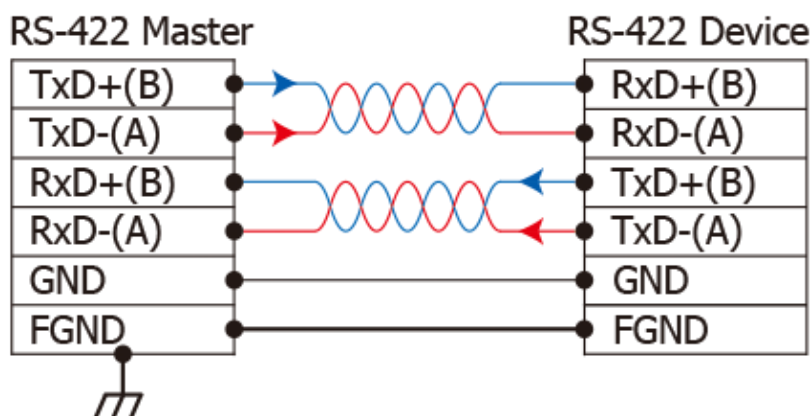
2.4 Pin Assignments

Model				
Terminal No.		GW-2515iM	GW-2525iM	GW-2535iM
		Pin Assignment		
COM3	05	—	—	ISO.GND
	04	—	—	RxD3-
	03	—	—	RxD3+
	02	—	—	TxD3-/D3-
	01	—	—	TxD3+/D3+
COM2	05	—	ISO.GND	ISO.GND
	04	—	RxD2-	RxD2-
	03	—	RxD2+	RxD2+
	02	—	TxD2-/D2-	TxD2-/D2-
	01	—	TxD2+/D2+	TxD2+/D2+
COM1	05	ISO.GND	ISO.GND	ISO.GND
	04	RxD1-	RxD1-	RxD1-
	03	RxD1+	RxD1+	RxD1+
	02	TxD1-/D1-	TxD1-/D1-	TxD1-/D1-
	01	TxD1+/D1+	TxD1+/D1+	TxD1+/D1+

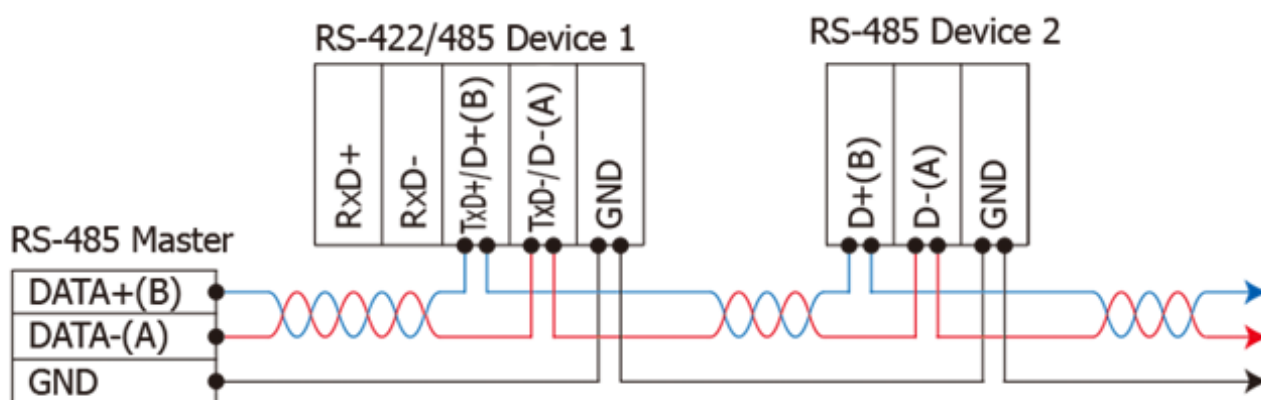
Model			
Terminal No.		GW-2518iM	GW-2528iM
		Pin Assignment	
COM2	08	—	ISO.GND
	07	—	RxD2
	06	—	TxD2
	05	—	ISO.GND
	04	—	RxD2-
	03	—	RxD2+
	02	—	TxD2-/D2-
COM1	01	—	TxD2+/D2+
	08	ISO.GND	ISO.GND
	07	RxD1	RxD1
	06	TxD1	TxD1
	05	ISO.GND	ISO.GND
	04	RxD1-	RxD1-
	03	RxD1+	RxD1+
	02	TxD1-/D1-	TxD1-/D1-
	01	TxD1+/D1+	TxD1+/D1+

2.5 Wiring Notes for RS-485/422 Interfaces

RS-422 Wiring



RS-485 Wiring



2-wire Only Device

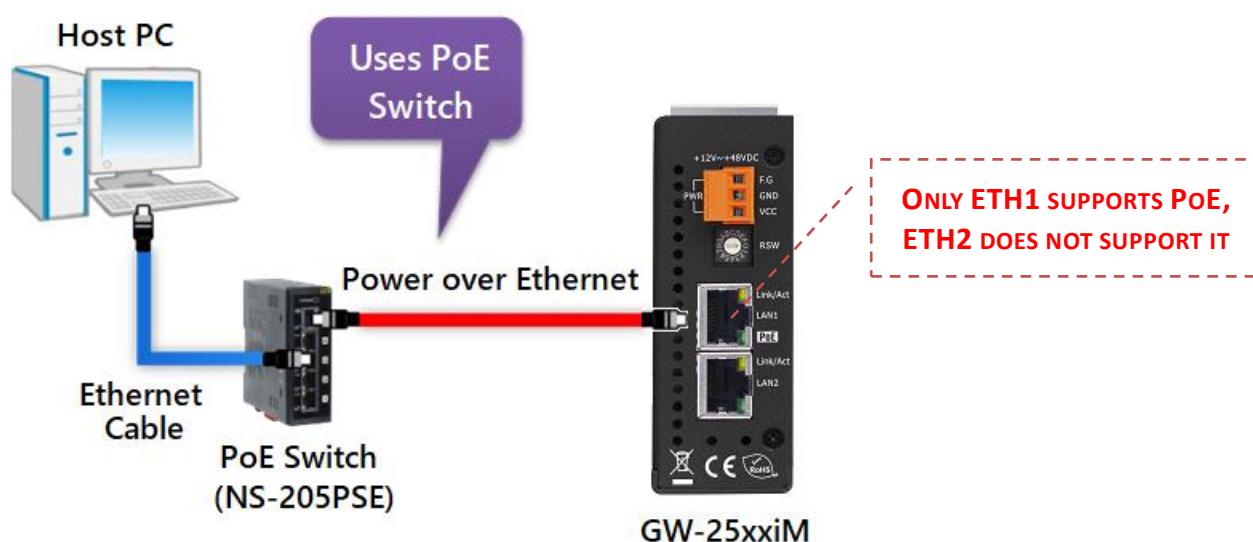
Notes:

1. Usually, you have to connect all signal grounds of RS-422/485 devices together to reduce common-mode voltage between devices.
2. Twisted-pair cable must be used for the D+/- wires.
3. Both two ends of the cable may require a termination resistor connected across the two wires (D+ and D-). Typically 120 Ω resistors are used.
4. The D+ and B pins are positive-voltage pins, and D- and A pins are negative-voltage pins in the above figure. The B/A pins may be defined in another way depending on devices, please check it first.

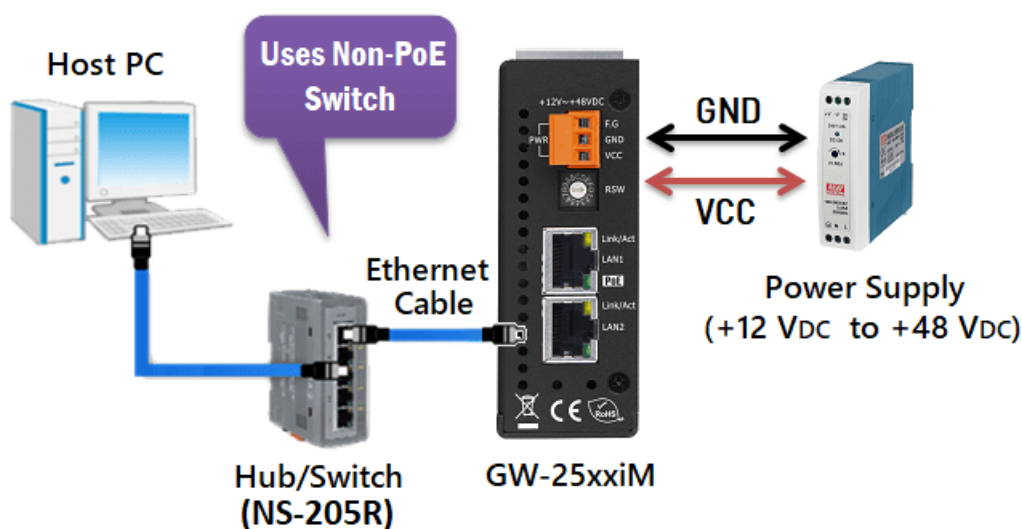
2.6 Connecting the Power and Host PC

1. Ensure that the network settings on your PC are configured correctly.
2. Ensure that the Windows firewall or any Anti-Virus firewall software is correctly configured or temporarily disable these functions; otherwise the **“Search Servers”** function in the eSearch Utility may not work as required. You may need to contact your System Administrator for more details of how to do this.
3. Connect both the GW-2500iM and the Host computer to the same sub-network or the same Ethernet Switch, and then supply power (PoE or +12 to +48 Vdc) to the GW-2500iM.

● PoE POWER SUPPLY



● +12 TO +48 VDC JACK POWER SUPPLY (NON-POE)



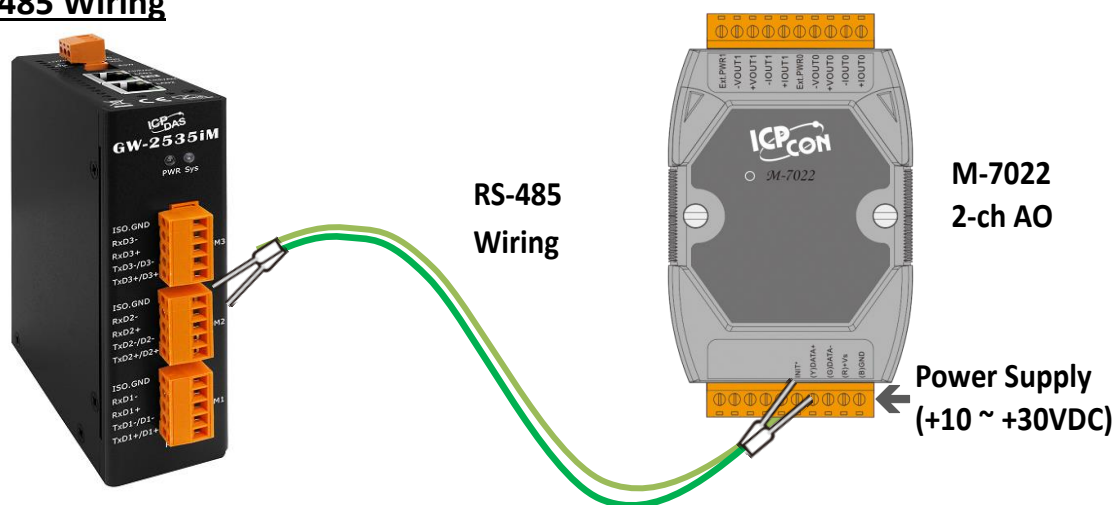
4. Verify that the System (Sys.) LED indicator is flashing.

2.7 Connecting the Modbus Devices

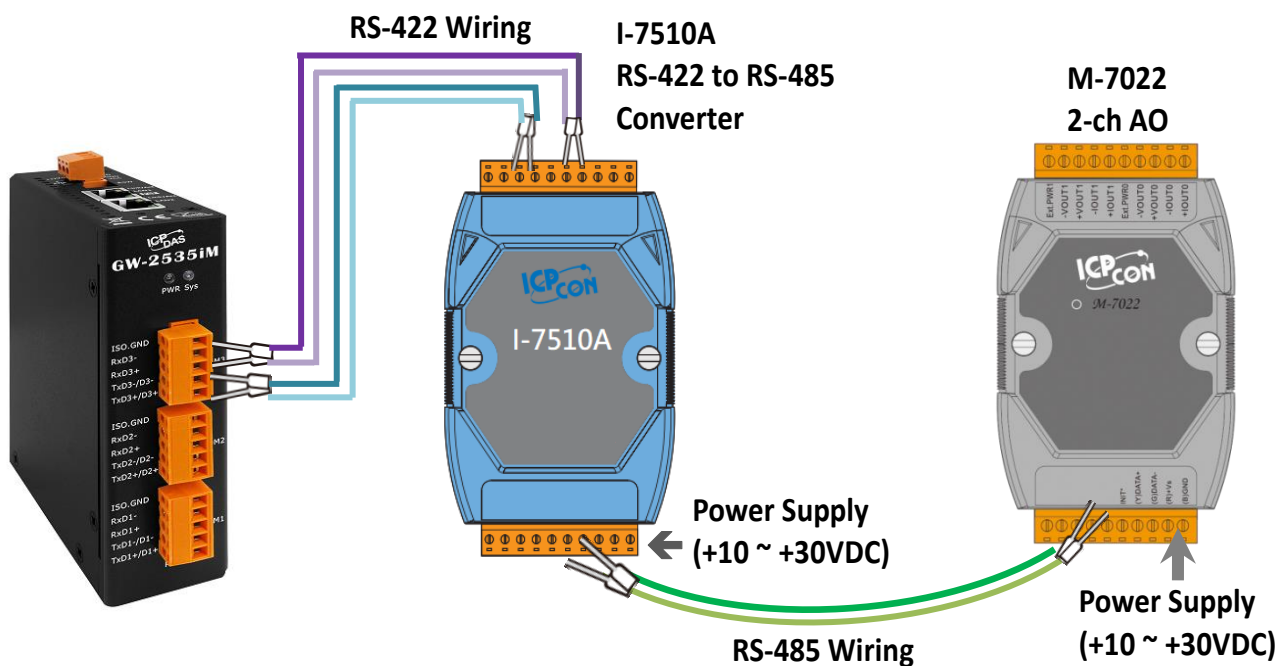
Note: The wiring and supply power method vary depending on your Modbus device. Here, the M-7022 module is used as an example. For other Modbus device or third party Modbus device, refer to the product user manual for relevant information.

Connect the GW-2500iM with Modbus device (e.g., M-7022, optional) and supply power (+10 to +30 V_{DC}) to the Modbus device. For more detailed information related to wiring options for RS-422/485, refer to [Section 2.5 "Wiring Notes for RS-485/422 Interfaces"](#).

➤ RS-485 Wiring



➤ RS-422 Wiring



3. Getting Started for GW-2500iM series on IPv4

This chapter provides detailed information about the “Self-Test” process, which is used to confirm that the GW-2500iM series module is operating correctly. Before beginning the “Self-Test” process, the wiring test, Ethernet configuration and search/Modbus utility driver installation procedures must first be fully completed. Follow the procedure described below:

Note: This chapter is based on IPv4 environment.

3.1 Configuring Network Settings

1. Download the **eSearch Utility** and install it according to the installation instructions.

The eSearch Utility can be obtained from the ICP DAS web site.

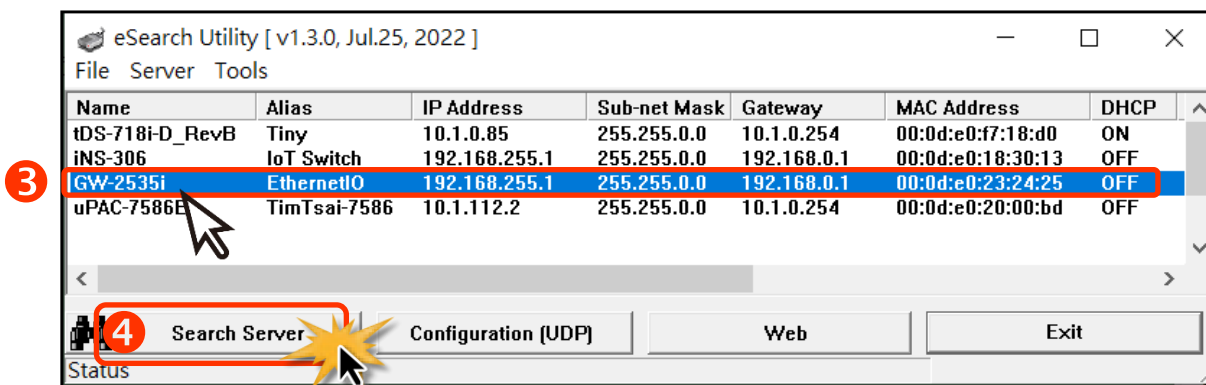
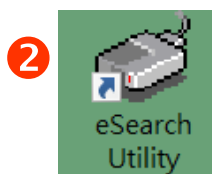
The location of the download link is shown below:



https://www.icpdas.com/en/product/guide+Software+Utility_Driver+eSearch_Utility



2. Double click the **eSearch Utility** shortcut on the desktop.
3. Click the “**Search Servers**” button to search your GW-2500iM.
4. Once the search process is complete, double-click on the module name to open the “**Configure Server**” dialog box.



Factory Default Settings of GW-2500iM Series Module:

IPv4 settings		Writable
IP Address	192.168.255.1	✓
Subnet Mask	255.255.0.0	✓
Gateway	192.168.0.1	✓
IPv6 settings		Writable
User-defined	fc00::1	✓
Link-Local	EUI-64 format	×
SLAAC	Auto-Configure	×

5. Enter the network settings information, including the **IP, Mask, Gateway addresses**, and then click “**OK**” button. The new settings for the GW-2500iM will take effect within 2 seconds.
- If you don't know the correct network configuration information, contact your Network Administrator to obtain the details.

Configure Server (UDP)

Server Name : GW-2535i IPv6 Address : fc00::1

DHCP: 5 0: OFF Sub-net Mask : 255.255.0.0 Alias: Ethernet10

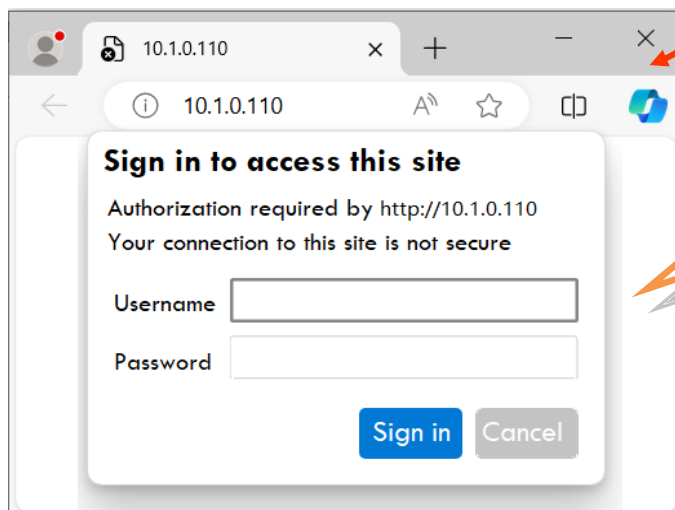
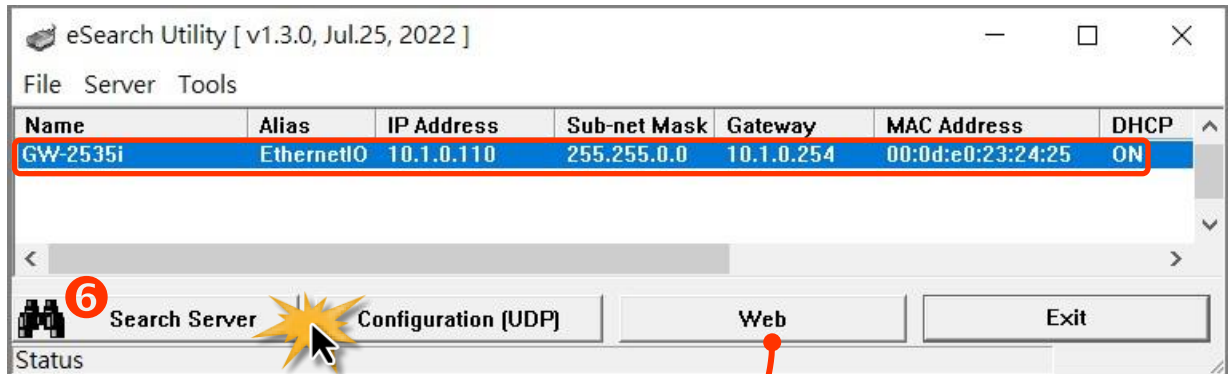
IP Address : 10.1.0.110 Gateway : 10.1.0.254 MAC: 00:0d:e0:23:24:25

Warning!!
Contact your Network Administrator to get correct configuration before any changing!

OK Cancel

Note: The DHCP feature is only valid on IPv4.

6. Wait 2 seconds and click **“Search Servers”** button again to ensure the GW-2500iM is working well with new configuration.
7. Click the **“Web”** button to log in to the web configuration pages.
(Or enter the URL address of the GW-2500iM in the address bar of the browser.)



Default value:
User Name : **Admin**
Password : **Admin**

8. Enter the **Username** and **password** in the login password field.

3.2 Configuring the Serial Port

1. Open a web browser, such as Google Chrome, Internet Explorer, or Firefox, enter the IP address of the GW-2500iM module in the address bar and then click “Enter”, or click the “**Web**” button in the **eSearch Utility**.
2. To enhance the security, you are prompted to change the password when you login to the module for the first time.
3. Go to the “**Password**” setting, user can modify the default password: **Admin** in the **Current password** field. Next, input your new password in the **Password** and **Confirm password** fields, then click the “**Submit**” button.

ICP DAS Modbus Gateway

Home | Port1 | Network | Filter | SNMP | SMTP | Monitor | Maintenance | Netstat | **Password** | Logout

Model Name	GW-2515i	Alias Name	EthernetIO
Firmware Version	1.0.2 (Aug 15 2024)	MAC Address	00-0d-e0-15-16-17
IP Address	10.1.0.30	TCP Port Timeout (Socket Watchdog, Seconds)	18
Initial Switch	0	System Idle (Network Watchdog, Seconds)	0

Privilege Management

No.	Account	Password	Confirm Password	Authority	Enabled
1	Admin			Admin ▼	☒
2				Admin ▼	☐
3				Admin ▼	☐
4				Admin ▼	☐
5				Admin ▼	☐

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4. Click the **"Port1"** tab to display the Port1 Settings page. Select the appropriate Baud Rate, Data Format and Modbus Protocol (e.g., 19200, 8N2 and Modbus RTU) from the relevant drop down options.

The screenshot shows the Modbus Gateway web interface. The browser address bar displays 10.1.0.30. The page title is "Modbus Gateway". The navigation menu includes: Home | Port1 | Network | Filter | SNMP | SMTP | Monitor | Maintenance | Netstat | Password | Logout.

Device Information:

Model Name	GW-2515i	Alias Name	EthernetIO
Firmware Version	1.0.2 (Aug 15 2024)	MAC Address	00-0d-e0-15-16-17
IP Address	10.1.0.30	TCP Port Timeout (Socket Watchdog, Seconds)	18
Initial Switch	0	System Idle (Network Watchdog, Seconds)	0

Port 1 Settings

Port Settings	Current	Updated	Comment
Baud Rate	115200	115200 (select)	bps (bits/second)
Data Size	8	8	bits/char
Parity	None	None	
Stop Bits	1	1	
Flow Control	None	None	
Remove Errors	FE BE	☐ Parity Error ☒ Framing Error ☒ Break Error	Clear RX FIFO data when serial errors.

Modbus Settings

Modbus Settings	Current	Updated	Comment
Slave Timeout	300	300	10 - 65000 ms, Default: 300. (Note)
Char Timeout	4	4	4 - 15 bytes, Default: 4
Silent Time	0	0	0 - 65000 ms, Default: 0
Protocol	Modbus RTU	Modbus RTU	
Virtual ID Range	0 - 247	0 to 247	Range: 0 to 247. Note: Gateway skips the Modbus messages if its ID is NOT in the specified range.

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Notes:

1. The Baud Rate, Data Format and Modbus protocol settings depends on your Modbus device.
2. Only one protocol can be used for each serial port.

5. Click **“Submit”** to save your settings.

ICP DAS Modbus Gateway

[Home](#) | [Port1](#) | [Network](#) | [Filter](#) | [SNMP](#) | [SMTP](#) | [Monitor](#) | [Maintenance](#) | [Netstat](#) | [Password](#) | [Logout](#)

Virtual ID Range 0 - 247 to Range: 0 to 247.
Note: Gateway skips the Modbus messages if its ID is NOT in the specified range.

Virtual ID Offset 0 Offset: -246 to 246, No change=0. For example:
Virtual ID = 1 to 10, offset = 10, then physical Slave ID = 11 to 20.
Virtual ID = 31 to 40, offset = -10, then physical Slave ID = 21 to 30.

Modbus TCP Settings			
	Current	Updated	Comment
Queue Timeout	1000	1000	1000 - 65000 ms, Default: 1000. (Note)
Read Cache	980	980	0 - 65000 ms, Disable: 0
Local TCP Port	502	502	Default: 502
MTCP Length Swap	0	0	0:TX/RX=High byte first. 1:TX=High, RX=Low byte first. 3:TX/RX=Low byte first. 2:TX=Low, RX=High byte first./td>
Connection Idle	180	180	0 - 65000 seconds, Default: 180, Disable: 0
Enable TLS	0	☐	For Modbus/TCP (Modbus Security) Server mode
Certificate Login	0	☐	For Modbus/TCP (Modbus Security) Server mode

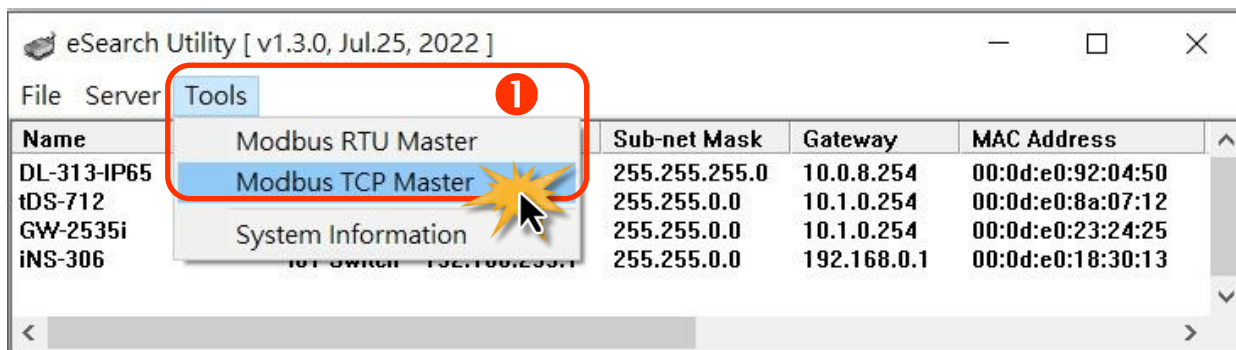
Pair-Connection Settings (Master/Slave Mode)			
	Current	Updated	Comment
Application Mode	Server	Server	Server: Modbus TCP/UDP master to Modbus RTU/ASCII slave Client: Modbus RTU/ASCII master to Modbus TCP/UDP slave

Submit

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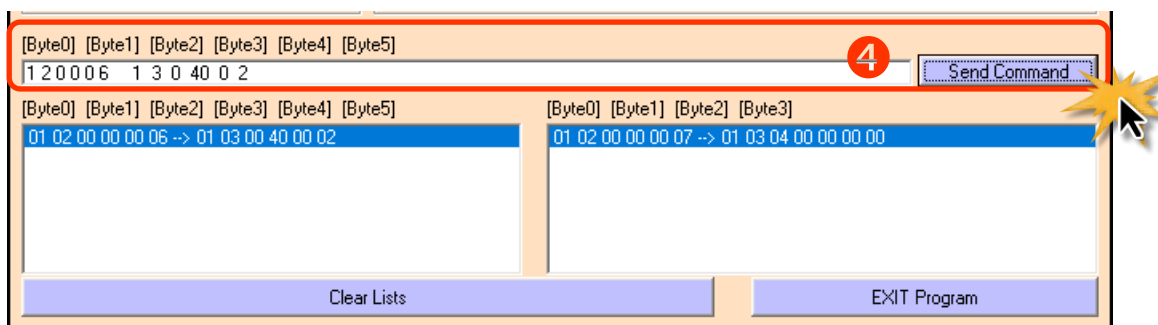
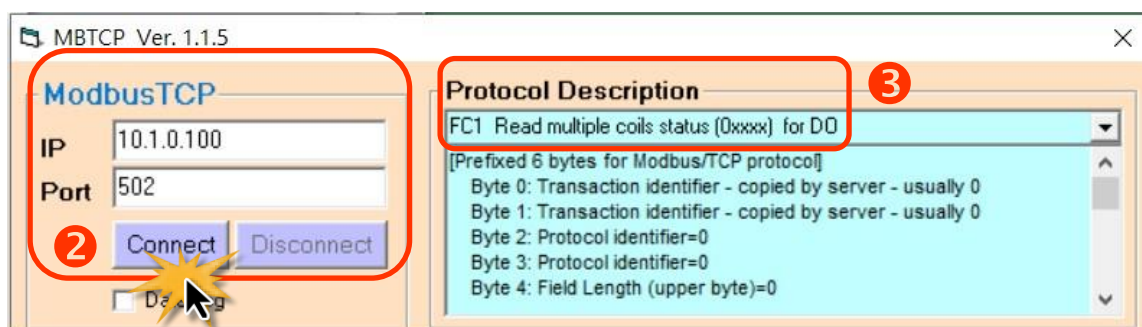
3.3 Self-Test

1. In the eSearch Utility, select the **“Modbus TCP Master”** item from the **“Tools”** menu to open the Modbus TCP Master Utility.



2. In the Modbus TCP Master Utility, enter the **IP address of GW-2500iM** in the **“Modbus TCP”** section, and then click the **“Connect”** button to connect to the GW-2500iM.
3. Refer to **“Protocol Description”** section and type the Modbus command in the **“Command”** field then click the **“Send command”** button.
4. If the response data is correct, it means the test is success.

Note: The Modbus command settings depends on your Modbus device.



4. Getting Started for GW-2500iM series on IPv6

This chapter provides detailed information about the “Self-Test” process, which is used to confirm that the GW-2500iM series module is operating correctly. Before beginning the “Self-Test” process, the wiring test, Ethernet configuration and search/Modbus utility driver installation procedures must first be fully completed. Follow the procedure described below:

Note: This chapter is based on IPv6 environment.

4.1 Configuring Network Settings

1. Download the **eSearch Utility** and install it according to the installation instructions.

1

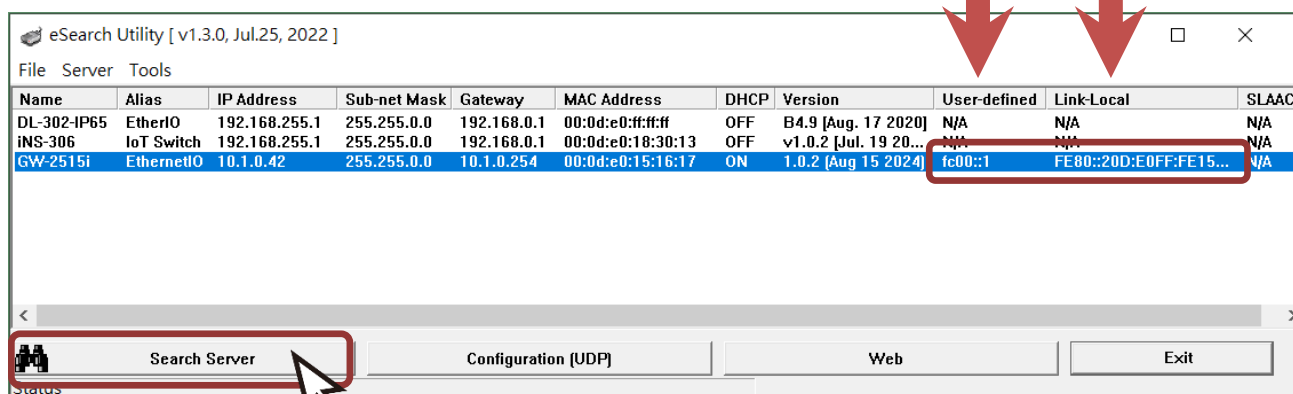
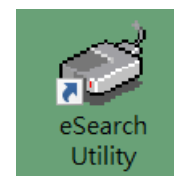


The eSearch Utility can be obtained from the link below:

 https://www.icpdas.com/en/product/guide+Software+Utility_Driver+eSearch_Utility

2. Double click the **eSearch Utility** shortcut on the desktop.
3. Click the “**Search Servers**” button to search your GW-2500.

2



3

4. Every IPv6 device has the Link-Local address. You can view the Link-Local address of the GW-2500iM module in the “**Link-Local**” field without configuring. If your environment supports Stateless Address Auto-configuration (SLAAC), the SLAAC field will display the SLAAC address when the SLAAC configuration is completed. You can click the “**Search Servers**” button again to update the state.

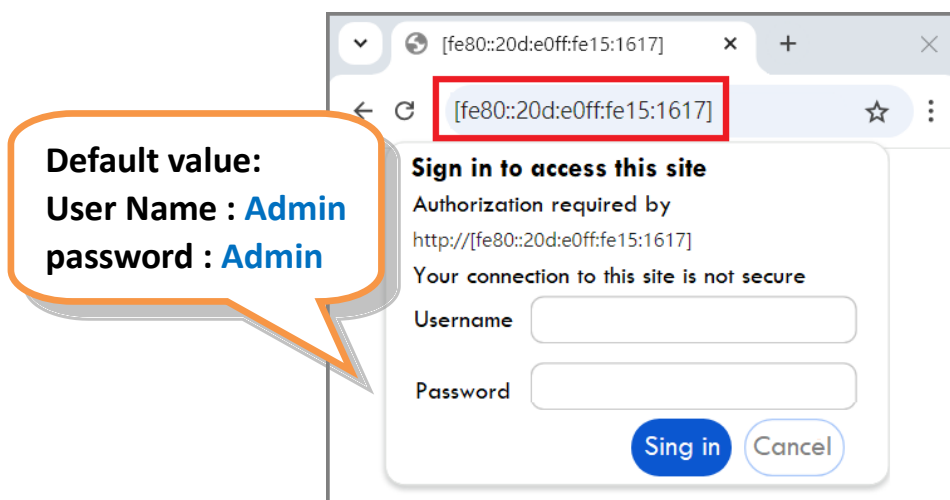
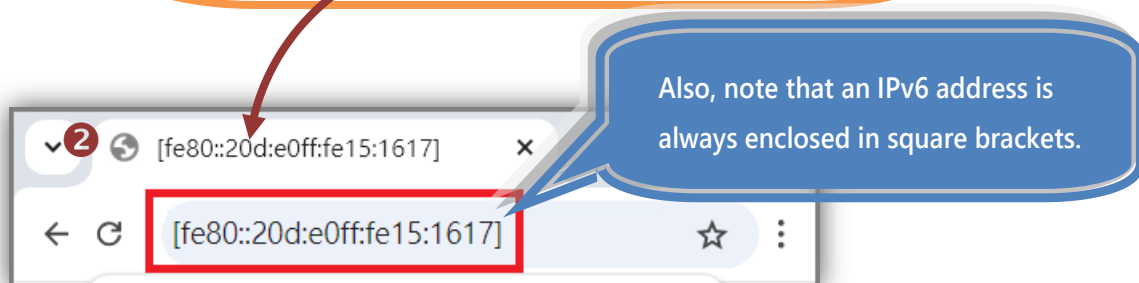
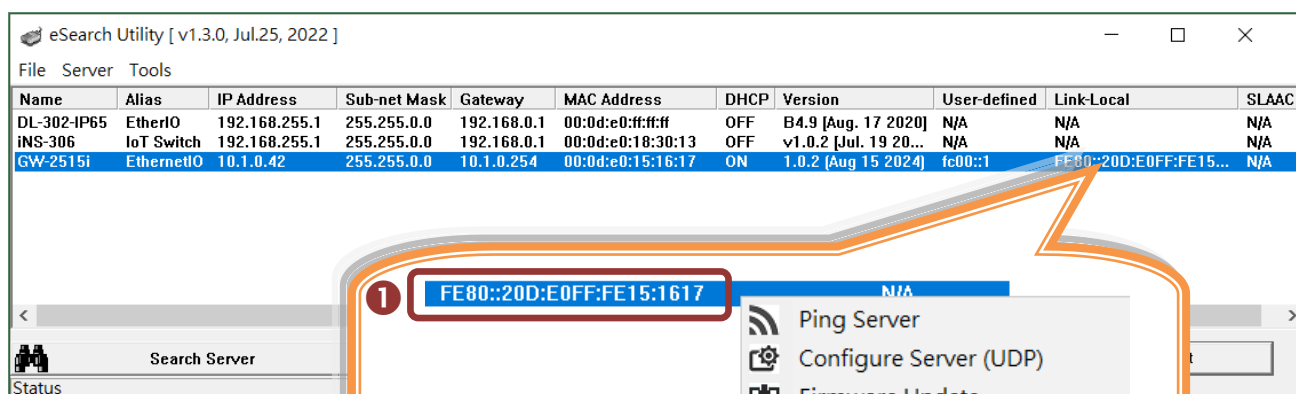
Factory Default Settings of GW-2500 Series Module:

IPv4 settings		Writable
IP Address	192.168.255.1	✓
Subnet Mask	255.255.0.0	✓
Gateway	192.168.0.1	✓
IPv6 settings		Writable
User-defined	fc00::1	✓
Link-Local	EUI-64 format	✗
SLAAC	Auto-Configure	✗

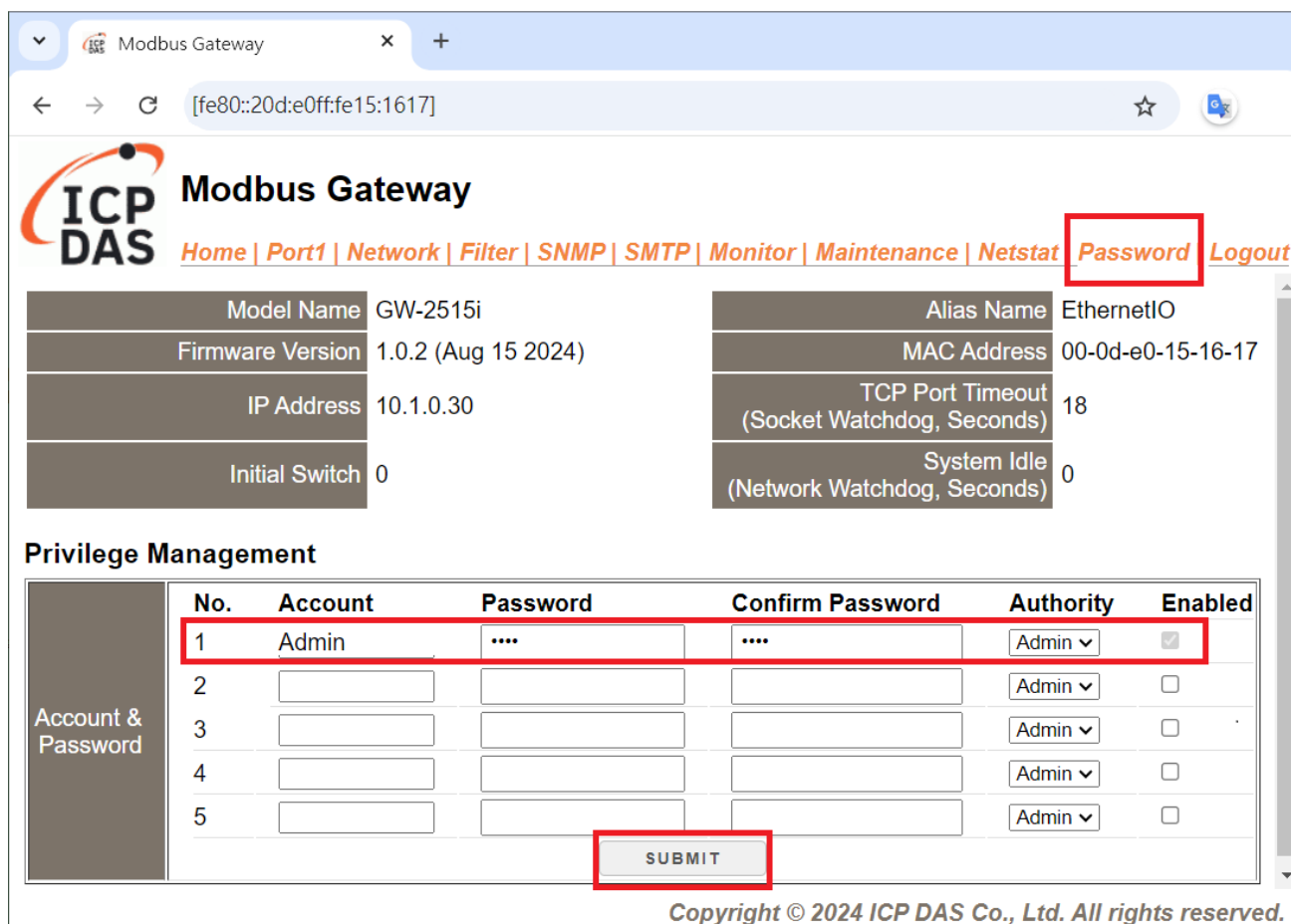
4.2 Configuring the Serial Port

1. Right Click on the Link-Local field and click the **“Copy to Clipboard”** to copy the **“Link-Local address”** of the GW-2500iM module.
2. Paste the **“Link-Local address”** of the GW-2500iM module in the address bar of the browser and add the brackets, i.e., [Link-Local address].

Note: The Web button use the IPv4 address to access the Web Server, not IPv6 address.



- To enhance the security, you are prompted to change the password when you login to the module for the first time.
- Go to the “**Password**” setting, user can modify the default password: **Admin** in the **Current password** field. Next, input your new password in the **Password** and **Confirm password** fields, then click the “**Submit**” button.



Modbus Gateway

Home | Port1 | Network | Filter | SNMP | SMTP | Monitor | Maintenance | Netstat | **Password** | Logout

Model Name	GW-2515i	Alias Name	EthernetIO
Firmware Version	1.0.2 (Aug 15 2024)	MAC Address	00-0d-e0-15-16-17
IP Address	10.1.0.30	TCP Port Timeout (Socket Watchdog, Seconds)	18
Initial Switch	0	System Idle (Network Watchdog, Seconds)	0

Privilege Management

No.	Account	Password	Confirm Password	Authority	Enabled
1	Admin			Admin ▼	☒
2				Admin ▼	☐
3				Admin ▼	☐
4				Admin ▼	☐
5				Admin ▼	☐

SUBMIT

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- Click the “**Port1**” tab to display the Port1 Settings page.

Select the appropriate Baud Rate, Data Format and Modbus Protocol (e.g., 19200, 8N2 and Modbus RTU) from the relevant drop down options.

ICP DAS **Modbus Gateway**

Home | **Port1** | Network | Filter | SNMP | SMTP | Monitor | Maintenance | Password | Logout

Model Name	GW-2535i	Alias Name	EthernetIO
Firmware Version	1.0.2 (May 8 2024)	MAC Address	00-0d-e0-23-24-25
IP Address	10.1.0.110	TCP Port Timeout (Socket Watchdog, Seconds)	18
Initial Switch	E	System Idle (Network Watchdog, Seconds)	0

Port 1 Settings

Port Settings	Current	Updated	Comment
Baud Rate	115200	115200 (select)	bps (bits/second)
Data Size	8	8	bits/char
Parity	None	None	
Stop Bits	1	1	
Flow Control	None	None	
Remove Errors	FE BE	☐ Parity Error ☒ Framing Error ☒ Break Error	Clear RX FIFO data when serial errors.

Modbus Settings

Modbus Settings	Current	Updated	Comment
Slave Timeout	300	300	10 - 65000 ms (step 10), Default: 300. (Note)
Char Timeout	4	4	4 - 15 bytes, Default: 4
Silent Time	0	0	0 - 65000 ms (step 10), Default: 0
Protocol	Modbus RTU	Modbus RTU	
Virtual ID Range	0 - 247	0 to 247	Range: 0 to 247. Note: Gateway skips the Modbus messages if its ID is NOT in the specified range.
Virtual ID Offset	0	0	Offset: -246 to 246, No change=0. For example: Virtual ID = 1 to 10, offset = 10, then physical Slave ID = 11 to 20. Virtual ID = 31 to 40, offset = -10, then physical Slave ID = 21 to 30.

Modbus TCP Settings

Modbus TCP Settings	Current	Updated	Comment
Queue Timeout	1000	1000	1000 - 65000 ms (step 10), Default: 1000. (Note)
Read Cache	980	980	0 - 65000 ms (step 10), Disable: 0
Local TCP Port	502	502	Default: 502
MTCP Length Swap	0	0	0:TX/RX=High byte first. 1:TX=High, RX=Low byte first. 3:TX/RX=Low byte first. 2:TX=Low, RX=High byte first.
Connection Idle	180	180	0 - 65000 seconds, Default: 180, Disable: 0

Pair-Connection Settings (Master/Slave Mode)

Pair-Connection Settings (Master/Slave Mode)	Current	Updated	Comment
Application Mode	Server	Server	Server: Modbus TCP/UDP master to Modbus RTU/ASCII slave Client: Modbus RTU/ASCII master to Modbus TCP/UDP slave

Submit

Notes:

1. The Baud Rate, Data Format and Modbus protocol settings depends on your Modbus device.
2. Only one protocol can be used for each serial port.

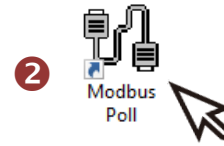
6. Click **“Submit”** to save your settings.

4.3 Self-Test

1. Download and install the “Modbus Poll” test program at below link.

<https://www.modbustools.com/download.html>

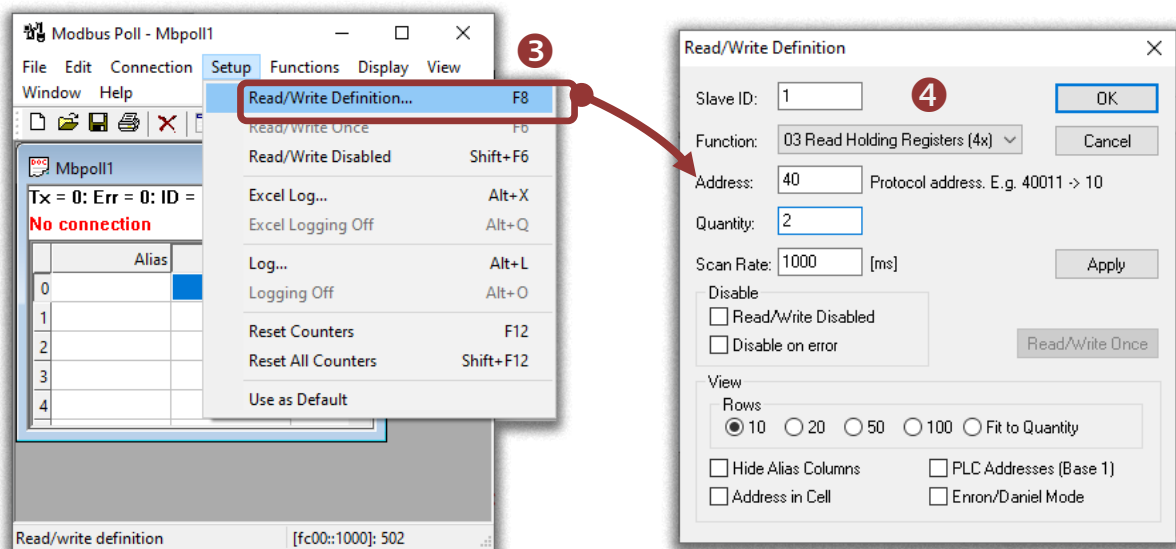
2. Double-click the Modbus Poll shortcut to open.



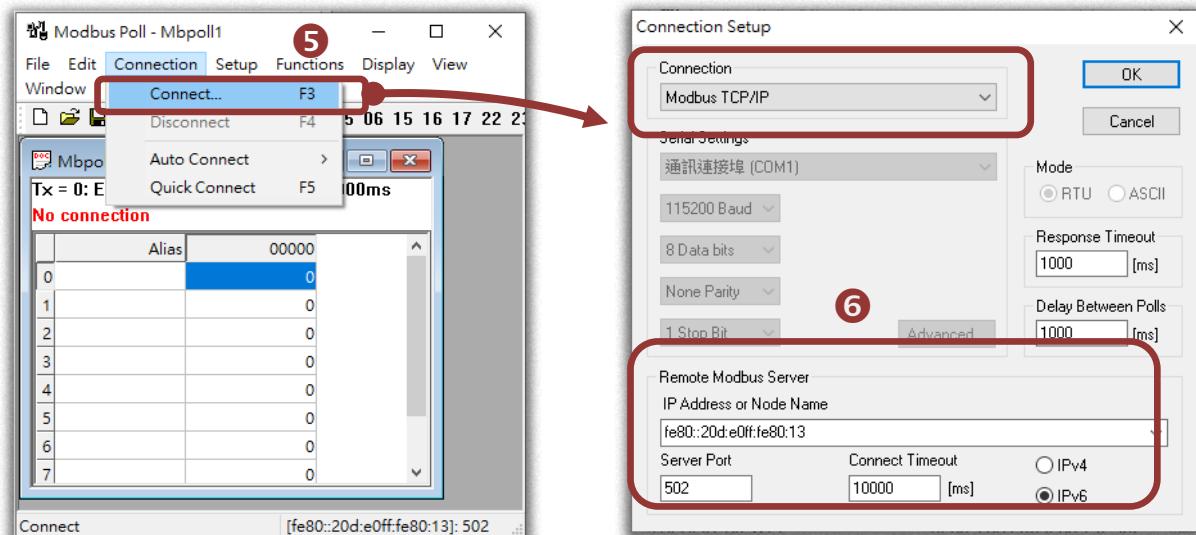
3. Select the “Read/Write Definition...” item from the “Setup” menu to open the “Read/Write Definition” dialog box.

4. Configure the settings for the Slave.

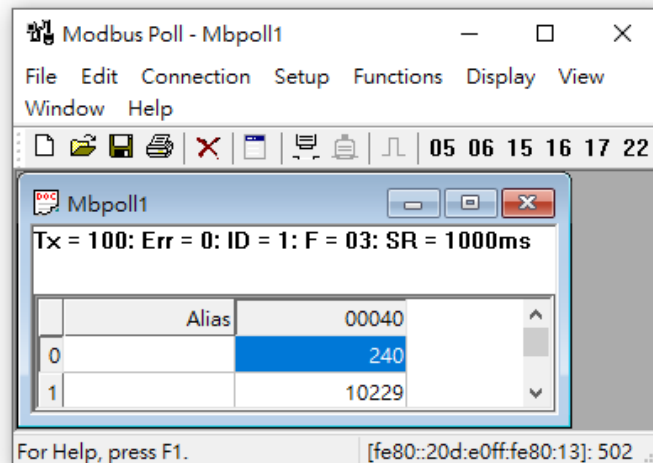
Note: The Modbus Slave settings depends on your Modbus device.



5. Select the “Connect...” item from the “Connection” menu to open the “Connection Setup” dialog box.
6. Configure the IPv6 address and TCP port (default: 502) of GW-2500iM and click “OK” to connect the GW-2500iM for testing.



7. If the response data is correct, it means the test is success.



5. Web Configuration

Once the GW-2500iM series module has been correctly configured and is functioning normally on the network, the configuration details can be retrieved or modified using either the eSearch Utility described above, or via a standard web browser.

5.1 Logging in to the GW-2500iM Web Server

The embedded GW-2500iM series web server can be accessed from any computer that has an Internet connection.

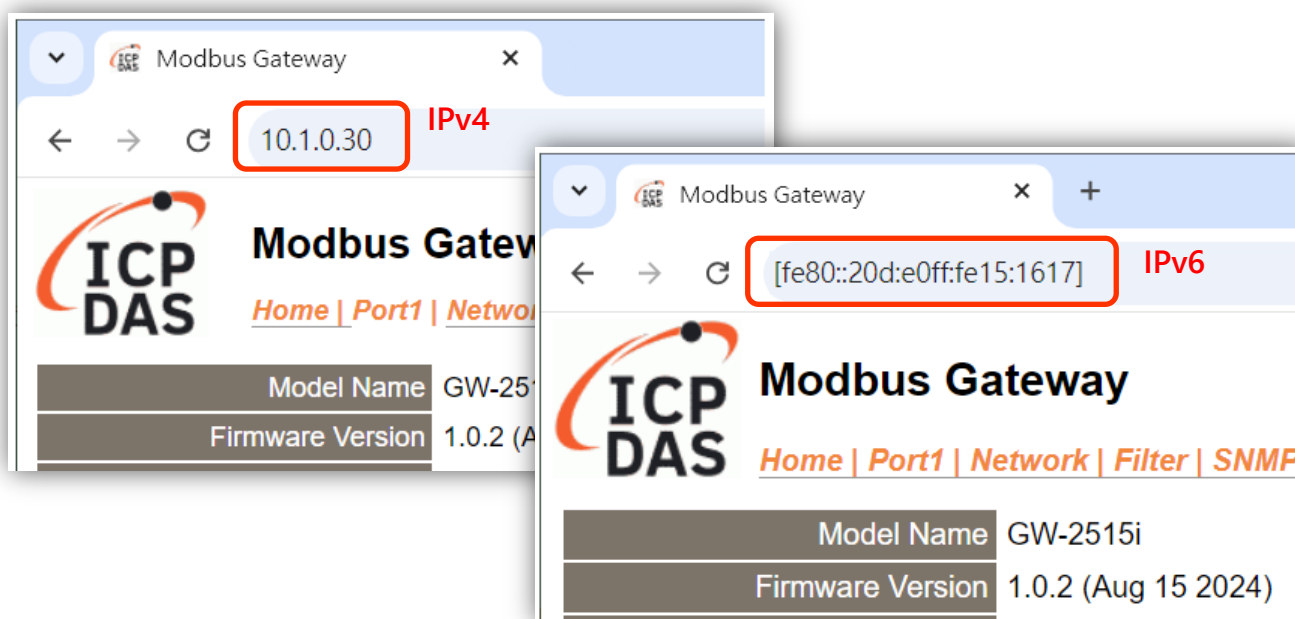


STEP 1: OPEN A NEW BROWSER WINDOW

Open a web browser, for example, Google Chrome or Firefox, which are reliable and popular Internet browsers that can be used to configure GW-2500iM series module.

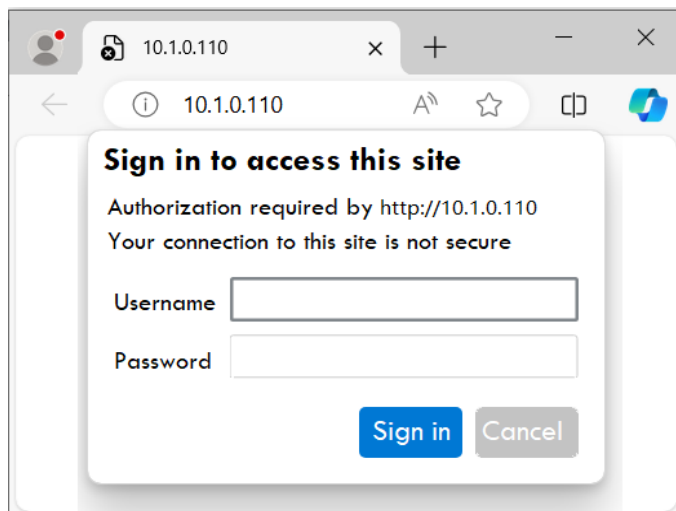
STEP 2: ENTER THE URL FOR THE GW-2500iM WEB SERVER

Ensure that you have correctly configured the network settings for the GW-2500iM series module, and then enter the URL for the GW-2500iM web server in the address bar of the browser.



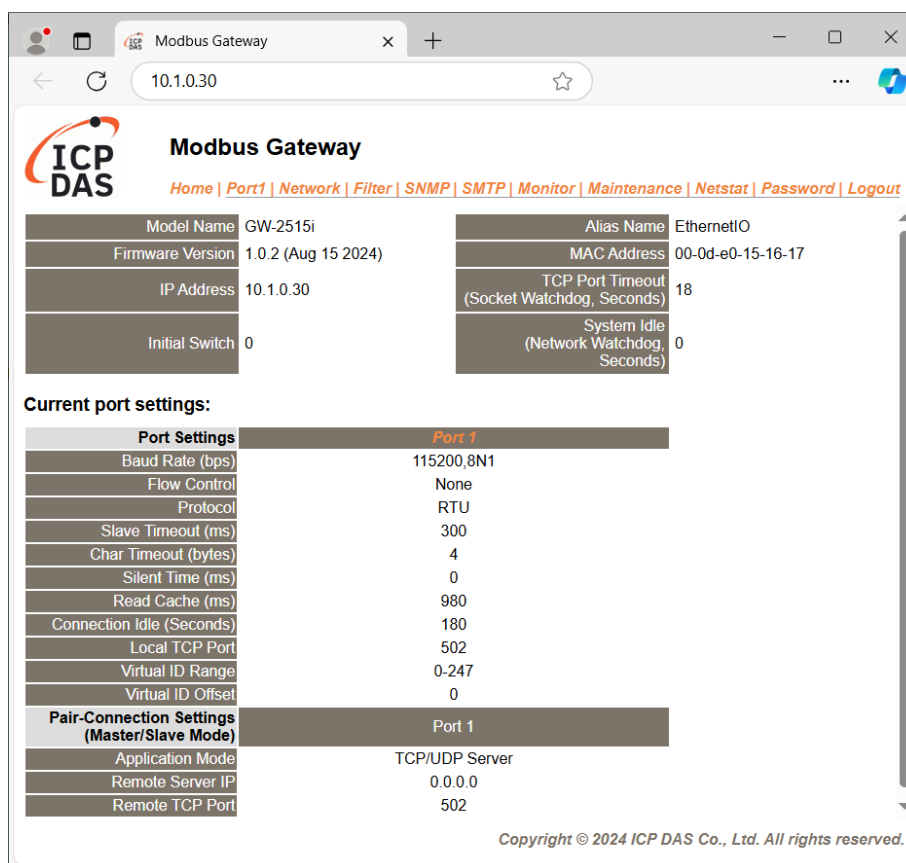
STEP 3: ENTER THE PASSWORD

After connecting to the IP address, the login page is displayed. Enter your password in the **Login password** field, and then click the “Sign in” button to continue. (If this is the first time you login, refer to [Section 3.4](#) to change the factory default password.)



STEP 4: LOG IN TO THE GW-2500iM WEB SERVER

After logging into the GW-2500iM web server, the main page will be displayed.



5.2 Home Page

The **Home** link connects to the main page, which contains two parts.



The first part of this page provides basic information about the GW-2500iM hardware and software. The software and hardware information section includes information related to the Model Name, the current Firmware version, the IP Address, the current position of the Initial Switch, the Alias, the MAC Address, and the TCP Port, and the System Timeout values. **If the firmware for the GW-2500iM module is updated, you can check the version information here.**

Model Name	GW-2515i	Alias Name	EthernetIO
Firmware Version	1.0.2 (Aug 15 2024)	MAC Address	00-0d-e0-15-16-17
IP Address	10.1.0.30	TCP Port Timeout (Socket Watchdog, Seconds)	18
Initial Switch	0	System Idle (Network Watchdog, Seconds)	0

The lower section provides information related to the port settings and pair-connection settings.

Current port settings:	
Port Settings	Port 1
Baud Rate (bps)	115200,8N1
Flow Control	None
Protocol	RTU
Slave Timeout (ms)	300
Char Timeout (bytes)	4
Silent Time (ms)	0
Read Cache (ms)	980
Connection Idle (Seconds)	180
Local TCP Port	502
Virtual ID Range	0-247
Virtual ID Offset	0
Pair-Connection Settings (Master/Slave Mode)	Port 1
Application Mode	TCP/UDP Server
Remote Server IP	0.0.0.0
Remote TCP Port	502

5.3 Network Page

After clicking the **Network** tab, the **Network** page will be displayed, allowing you to verify the current settings, configure the IP Address, and the general parameters, and restore the default settings for the GW-2500iM module, each of which will be described in more detail below.



5.3.1 IP Address Selection

The **Address Type**, **Static IPv4 Address**, **Subnet Mask** and **Default Gateway** values are the most important network settings and should always correspond to the LAN configuration. If they do not match, the GW-2500iM module will not operate correctly in IPv4.

The **IPv6 Link Local Address** always effective in the same link layer. The **IPv6 SLAAC Address** will be configured by the Router automatically, and the default router is the link-local address of the router. The **IPv6 User-defined Address** can be defined by the User. It's more convenient for using in the simple application. The **IPv6 User-defined Address** can be routed if its prefix as same as **IPv6 SLAAC Address**.

If the settings are changed while the module is operating, any connection currently in use will be lost and an error will occur. If your environment doesn't support the IPv6, please ignore the **IPv6 Address** fields.

The following is an overview of the parameters contained in the **IP Address Selection** section:

Item	Description
Address Type	Static IP: If no DHCP server is installed on the network, the network settings can be configured manually. Refer to Section “Manual Configuration” for more details.
	DHCP: The Dynamic Host Configuration Protocol (DHCP) is a network application protocol that automatically assigns an IPv4 address to each device. Refer to Section “Dynamic Configuration” for more details. Note: The DHCP function doesn't effective on IPv6.
Static IPv4 Address	Each GW-2500iM connected to the network must have its own unique IP address. This parameter is used to assign a specific IPv4 address.
Subnet Mask	This parameter is used to assign the subnet mask for the GW-2500iM. The subnet mask indicates which portion of the IPv4 address is used to identify the local network or subnet.
Default Gateway	This parameter is used to assign the IPv4 Address of the Gateway to be used by the GW-2500iM. A Gateway (or router) is a device that is used to connect an individual network to one or more additional networks.
MAC Address	This parameter is used to set a user-defined MAC address, which must be in the format FF-FF-FF-FF-FF-FF.
IPv6 Link Local Address	Each IPv6 device connected to the network must have a link-local address. It always effective in the same link layer. It is auto-configured by EUI-64. If your environment doesn't support the IPv6, please ignore this field.
IPv6 SLAAC Address	The GW-2500iM supports stateless address auto configuration (SLAAC). It will be configured by the Router automatically, and the default router is the link-local address of the router. The router should provide the prefix and the GW-2500iM will calculate the Host ID by EUI-64. If your environment doesn't support the SLAAC, please ignore this field.
SLAAC Timeout (SLAAC Watchdog)	This parameter is used to configure the SLAAC timeout value. If the SLAAC address doesn't be configured in the specified time, the system will be rebooted to configure the SLAAC address again. Timeout value range: 30 to 65535 (seconds); Disable = 0;
IPv6 User-defined Address	It can be defined by the User. It's more convenient than using the link-local address in the simple application. This address can be routed if the prefix as same as IPv6 SLAAC Address. If your environment doesn't support the IPv6, please ignore this field.
Update Settings	Click this button to save the revised settings to the GW-2500iM.

Manual Configuration

When using manual configuration, the network settings should be assigned in the following manner:

Step 1: Select the “**Static IP**” option from the “**Address Type**” drop-down menu.

Step 2: Enter the relevant details in the respective **network settings** fields. If your environment doesn’t support the IPv6, please ignore the “**IPv6 User-defined Address**” fields.

Step 3: Click the “**Update Settings**” button to complete the configuration.

IP Address

IPv4 Address	
Address Type	Static IP ▾ ①
Static IPv4 Address	192 . 168 . 255 . 1
Subnet Mask	255 . 255 . 0 . 0 ②
Default Gateway	192 . 168 . 0 . 1
MAC Address	00-0d-e0-15-16-17 (Format: FF-FF-FF-FF-FF-FF)
IPv6 Address	
Link Local Address	FE80::20D:E0FF:FE15:1617 ②
SLAAC Address	0:0:0:0:0:0:0
SLAAC Timeout	0 (30 ~ 65000 seconds, 0 = Default Disabled)
User-defined Address	fc00::1
DNS Settings	
Auto DNS Configuration	Enable ▾ (Auto DNS Server Configuration by IPv4 DHCP, default enabled.)
Preferred DNS Server IP	8.8.8.8 IPv4 example: 208.67.222.222 , IPv6 example: 2620:119:35::35
Alternate DNS Server IP	8.8.4.4 IPv4 example: 208.67.220.220 , IPv6 example: 2620:119:53::53
Update Settings ③	

Note: The IPv6 Link Local Address is auto-configured by EUI-64.

Note: The IPv6 SLAAC Address is auto-configured by Router. The router should provide the prefix and the GW-2500iM will calculate the Host ID by EUI-64.

Dynamic Configuration

Dynamic configuration is very easy to perform. If a DHCP server is connected to your network, an IPv4 network address can be dynamically configured by using the following procedure:

Step 1: Select the “DHCP” option from the “Address Type” drop-down menu.

Step 2: Click the “Update Settings” button to complete the configuration.

IP Address

IPv4 Address	
Address Type	DHCP 1
Static IPv4 Address	192 . 168 . 255 . 1
Subnet Mask	255 . 255 . 0 . 0
Default Gateway	192 . 168 . 0 . 1
MAC Address	00-0d-e0-15-16-17 (Format: FF-FF-FF-FF-FF-FF)
IPv6 Address	
Link Local Address	FE80::20D:E0FF:FE15:1617
SLAAC Address	0:0:0:0:0:0:0:0
SLAAC Timeout	0 (30 ~ 65000 seconds, 0 = Default Disabled)
User-defined Address	fc00::1
DNS Settings Client Mode Only	
Auto DNS Configuration	Enable 2 (Auto DNS Server Configuration by IPv4 DHCP, default enabled.)
Preferred DNS Server IP	8.8.8.8 IPv4 example: 208.67.222.222 , IPv6 example: 2620:119:35::35
Alternate DNS Server IP	8.8.4.4 IPv4 example: 208.67.220.220 , IPv6 example: 2620:119:53::53
Update Settings 2	

Note: The DHCP is ineffective on IPv6.

Note: The IPv6 Link Local Address is auto-configured by EUI-64.

Note: The IPv6 SLAAC Address is auto-configured by Router. The router should provide the prefix and the GW-2500iM will calculate the Host ID by EUI-64.

5.3.2 General Settings

General Settings

Ethernet Speed	Auto v	(Auto=10/100 Mbps Auto-negotiation)
HTTP port	80	(Default= 80)
Alias Name	EthernetIO	(Max. 18 chars)
System Timeout (Network Watchdog)	0	(30 ~ 65000 seconds, Default: 0, Disable: 0)
UDP Heartbeat	0	(20 ~ 300 seconds, 0 = Default Disabled)
UDP Configuration	Enable v	(Enable/Disable the UDP Configuration, Enable=default.)
Update Settings		

The following is an overview of the parameters contained in the **General Settings** section:

Item	Description	Default
Ethernet Speed	This parameter is used to set the Ethernet speed. The default value is Auto (Auto = 10/100 Mbps Auto-negotiation).	Auto
HTTP Port	This parameter is used to assign specific a HTTP port of GW-2500iM. The GW-2500iM needs to be restarted when the HTTP port is changed. You need manually type the new HTTP port in the address bar of the browser. The default is 80. For example: if the HTTP port is set to 81, then enter the "IP address: HTTP port" (10.0.8.123:81).	80
Alias Name	This parameter is used to assign an alias for each GW-2500iM to assist with easy identification.	EthernetIO
System Timeout (Network Watchdog)	This parameter is used to configure the system timeout value. If there is no activity on the network for a specific period of time, the system will be rebooted based on the configured system timeout value. Timeout value range: 30 to 65535 (seconds); Disable = 0;	300
UDP Heartbeat	This parameter is used to configure the interval of the UDP heartbeat packet. Interval value range: 20 to 300 (seconds); Disable = 0;	20
UDP Configuration	This parameter is used to enable or disable UDP configuration function.	Enable
Update Settings	Click this button to save the revised settings to the GW-2500iM.	

5.3.3 Modbus Settings

Modbus Settings

Gateway Net ID	255 (Default: 255) Note: This is reserved for gateway, NOT for accessing slave devices. Assign an new gateway ID if it is conflict with slave devices.
CRC Exception	1 (Default: 1) 0: Gateway returns raw data including CRC when CRC error. 1: Gateway reports exception 0x43 when CRC error. 2: Gateway drops packet when CRC error.
Protocol Exception	☒ Reports exception 0x41 when slave response is invalid Modbus message.
Timeout Exception	☒ Gateway reports exception 0x0B for slave no response, and 0x4B for data timeout.
Busy Exception	☒ Gateway reports exception 0x06 when queued requests are full.
Check TCP Header	☒ Drops packet when Modbus TCP header (protocol ID, length) is wrong.
Update Settings	

The following is an overview of the parameters contained in the **Modbus Settings** section:

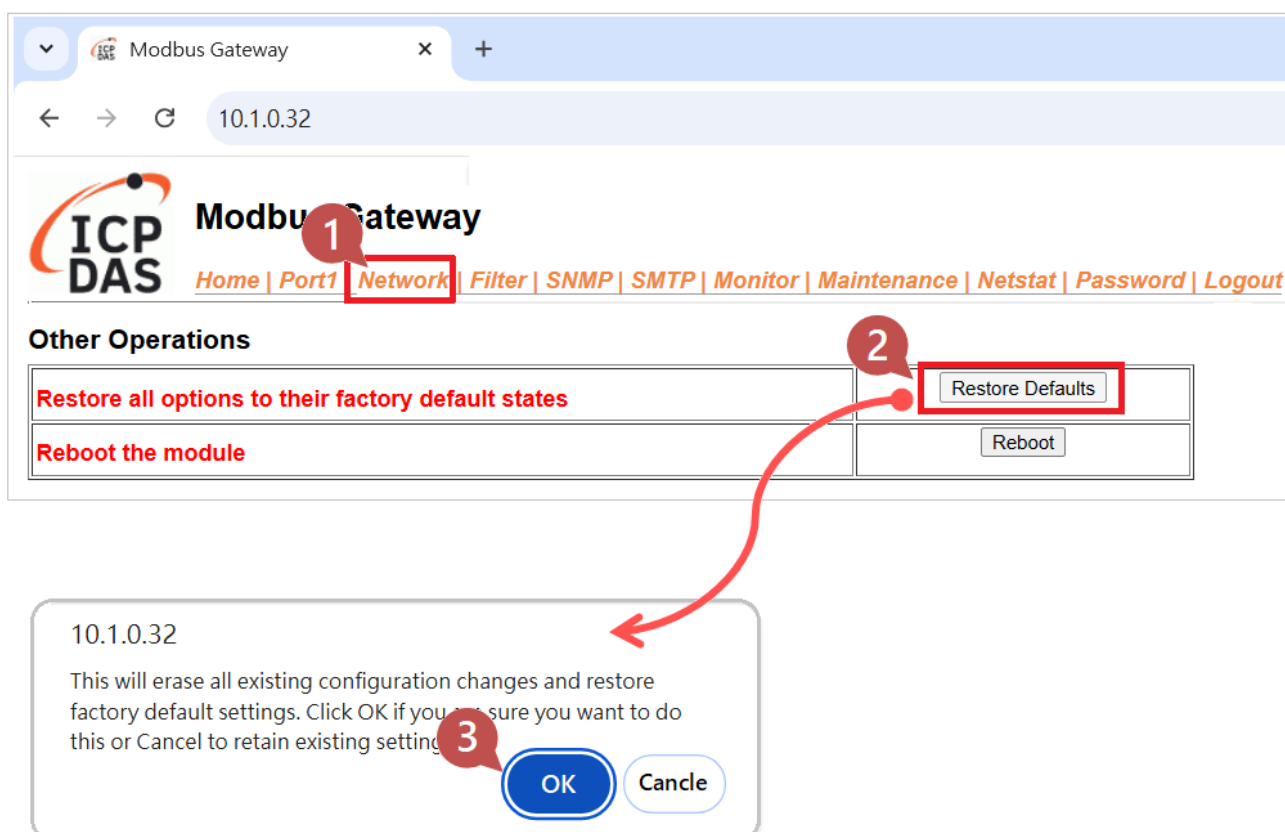
Item	Description	Default
Gateway Net ID	This is reserved for gateway. (Not used to set the slave device)	255
Protocol Exception	This parameter is used to enable or disable whether the slave response is checked for compatibility with the Modbus RTU format. If the slave response is an invalid Modbus message, a 0x41 exception code will be reported. Enable =1; Disable = 0.	1
CRC Exception	This parameter is used to enable or disable whether the validity of the RTU/ASCII CRC of the slave response is checked. 0 = Returns the raw data, including the CRC, if a CRC error occurs; 1 = Reports a 0x43 exception code if a CRC error occurs; 2 = Drops the packet if a CRC error occurs.	1
Timeout Exception	This parameter is used to enable or disable whether a slave/data timeout exception error is reported by the Gateway. If There is no response from a slave device, a 0x0B exception error will be reported. If serial data is being received, a 0x4B exception will be reported. Enable =1; Disable = 0.	1
Busy Exception	This parameter is used to enable or disable whether a busy exception code (0x06) is reported if the Gateway request queue is full. Enable =1; Disable = 0.	1
Check TCP Header	This parameter is used to enable or disable the drop-packet function when the Modbus TCP header is invalid. Enable = 1; Disable = 0.	1
Update Settings	Click this button to save the revised settings to the GW-2500iM.	

5.3.4 Restore to factory default states

Use the following procedure to reset all parameters to their original factory default settings:

Step 1: Click the “**Restore Defaults**” button to reset the configuration.

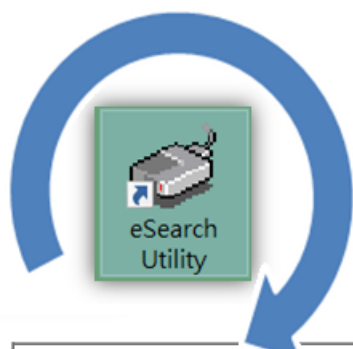
Step 2: Click the “**OK**” button in the message dialog box.



The following is an overview of the factory default settings:

IPv4 Network Settings		IPv6 Network Settings	
IPv4 Address	192.168.255.1	User-defined	fc00::1
Gateway Address	192.168.0.1	Link-Local	Auto-configure
Subnet Mask	255.255.0.0	SLAAC	Auto-configure
DHCP	Disabled		

Step 3: Check whether the module has been reset to the original factory default settings for use with the eSearch Utility. Refer to [Chapter 3 “Getting Started for GW-2500iM series using IPv4”](#), [Chapter 4 “Getting Started for GW-2500iM series using IPv6”](#) for more details.



eSearch Utility [v1.5.0, Jul.25, 2022]
File Server Tools

Name	Alias	IP Address	Sub-net Mask	Gateway	MAC Address
tDS-718(i)_RevB2	Tiny	10.1.0.115	255.255.0.0	10.1.0.254	00:0d:e0:77:
GW-2515i	EthernetIO	192.168.255.1	255.255.0.0	192.168.0.1	00:0d:e0:15:
uPAC-7586E	TimTsai-7586	10.1.0.107	255.255.0.0	10.1.0.254	00:0d:e0:75:

Search Server Configuration (UDP) Web Exit

Status

Configure Server (UDP)

Server Name : GW-2515i IPv6 Address : fc00::1

DHCP: 0: OFF Sub-net Mask : 255.255.0.0 Alias: EthernetIO

IP Address : 10.1.0.32 Gateway : 192.168.0.1 MAC: 00:0d:e0:15:16:17

Warning!!
Contact your Network Administrator to get correct configuration before any changing!

OK Cancel

The **Reboot** function: can be used to force the GW-2500iM to reboot or to remotely reboot the module. After the GW-2500iM module has rebooted, the original login screen will be displayed requesting that you enter your Login Password before continuing.

5.4 Serial Port Page



After clicking the **Port1** tab, the serial port settings page will be displayed, allowing you to configure the settings for the GW-2500iM, including the Baud Rate, Data Format, Slave Timeout, Char Timeout, Silent Time, Read Cache, Modbus Protocol and Pair-connection parameters, etc., each of which will be described in more detail below.

5.4.1 COM Port Settings

Port 1 Settings			
Port Settings	Current	Updated	Comment
Baud Rate	115200	115200 (select v)	bps (bits/second)
Data Size	8	8 v	bits/char
Parity	None	None v	
Stop Bits	1	1 v	
Flow Control	None	None v	
Remove Errors	FE BE	☐ Parity Error ☒ Framing Error ☒ Break Error	Clear RX FIFO data when serial errors.
Modbus Settings	Current	Updated	Comment
Slave Timeout	300	300	10 - 65000 ms, Default: 300. (Note)
Char Timeout	4	4	4 - 15 bytes, Default: 4
Silent Time	0	0	0 - 65000 ms, Default: 0
Protocol	Modbus RTU	Modbus RTU v	
Virtual ID Range	0 - 247	0 to 247	Range: 0 to 247. Note: Gateway skips the Modbus messages if its ID is NOT in the specified range.
Virtual ID Offset	0	0	Offset: -246 to 246, No change=0. For example: Virtual ID = 1 to 10, offset = 10, then physical Slave ID = 11 to 20. Virtual ID = 31 to 40, offset = -10, then physical Slave ID = 21 to 30.
Modbus TCP Settings	Current	Updated	Comment
Queue Timeout	1000	1000	1000 - 65000 ms, Default: 1000. (Note)
Read Cache	980	980	0 - 65000 ms, Disable: 0
Local TCP Port	502	502	Default: 502
MTCP Length Swap	0	0	0:TX/RX=High byte first. 1:TX=High, RX=Low byte first. 3:TX/RX=Low byte first. 2:TX=Low, RX=High byte first./td>
Connection Idle	180	180	0 - 65000 seconds, Default: 180, Disable: 0
Enable TLS	0	☐	For Modbus/TCP (Modbus Security) Server mode
Certificate Login	0	☐	For Modbus/TCP (Modbus Security) Server mode
Pair-Connection Settings (Master/Slave Mode)	Current	Updated	Comment
Application Mode	Server	Server v	Server: Modbus TCP/UDP master to Modbus RTU/ASCII slave Client: Modbus RTU/ASCII master to Modbus TCP/UDP slave
Submit			

The following is an overview of the parameters contained in the **Settings– Port1 Settings** section:

Item	Description	Default
Port Settings		
Baud Rate (bps)	This parameter is used to set the Baud Rate for the COM ports.	115200
Data Size (bits)	This parameter is used to set the Data Size for the COM ports.	8
Parity	This parameter is used to set the Parity for the COM ports.	None
Stop Bits (bits)	This parameter is used to set the Stop Bits for the COM ports.	1
Flow Control	This parameter is used to enable or disable hardware flow control (CTS/RTS) function	None
Remove Errors	Clear the Rx FIFO when the Parity 、 Framing 、 Break Error occurs.	FE, BE
Modbus Settings		
Slave Timeout (ms)	This parameter is used to set the waiting time that should elapse after last character of the request sent to the device before the timeout is activated. The GW-2500iM will report a 0x0B exception code if there is no response from the slave device before the timeout period expires, or will report a 0x4B exception code if the slave device is still sending data when the timeout is activated. The Slave Timeout value must be set to less than the response timeout configured in the client software.	300
Char Timeout (bytes)	Modbus RTU requires 3.5 char time between messages. This parameter is used to set the waiting time (based on bytes) that should elapse after last byte of data of the response is received from the slave device is activated. If no more data is received before the timeout period expires, then the transmission of this packet is deemed to have been completed and the GW-2500iM begins processing the packet. Valid range: 4 to 15 (bytes);	4
Silent Time (ms)	This parameter is used to set the idle time that should elapse before sending each request to the serial port. This causes the serial bus to be "silent" for the specified period, and allows slower slave devices more time to process previous requests and responses, thereby reducing communication problems. Valid range: 10, 20 to 65530 (ms);	0
Protocol	This parameter is used to configure the serial port that's used by the Modbus RTU or Modbus ASCII protocol.	Modbus RTU
Virtual ID Range	This parameter is used to set the range for restricting the Device ID. This port only handles the Net ID in the range.	1-247
Virtual ID Offset	This parameter is used to set the offset value for the Device ID. For more detailed information, refer to “FAQ: How do I access multiple Modbus TCP slave devices from a single Modbus RTU/ASCII master device.”	0

Item	Description	Default
Modbus TCP Settings		
Read Cache (ms)	When sharing Modbus RTU/ASCII device/data between several master devices, the read-cache function can be used to reduce the loading on the serial communication and ensure faster TCP responses. Valid range: 10, 20to 65530 (ms); Disable = 0.	980
Local TCP Port	This parameter is used to configure the Modbus TCP port. Note: The default COM1/COM2/COM3 = TCP Ports 502/503/504.	502
MTCP Length Swap	Swap the High/Low byte reading order of Length in the Modbus TCP header.	0
Connection Idle (seconds)	If Modbus TCP communication is idle for a specified period of time, the system will automatically terminate the connection. Valid range: 1 to 65535 (seconds); Disable= 0;	180

5.4.2 Pair-Connection Settings

The following is an overview of the parameters contained in the – **Pair-Connection Settings (Master/Slave Mode)** section:

Item	Description	
Pair-Connection Settings (Master/Slave Mode)		
Application Mode	Server (default)	Client
Network Protocol	-	Select the Modbus protocol (Modbus TCP or UDP) and the Internet protocol (IPv4 or IPv6) for the remote device
Remote Server IP	-	The IP address for the remote device
Remote TCP Port	-	The TCP Port number for the remote device
Submit	Click this button to save the revised settings to the GW-2500iM.	

Note: For more detailed information, refer to [Section 6.3 “Pair-Connection Applications”](#).

5.5 Filter Page



The **Filter** page is used to query or edit the IP Filter List. The IP Filter List restricts the access of packets based on the IP header. If the filter function is enabled, only clients whose IP is specified in the IP Filter List can access the GW-2500iM.

Filter Setting:

Accessible IP	IPv4/v6 Address (example: 10.0.8.123, fe80:0:0:a8ee:dc07:1cda:5678)
IP0	
IP1	
IP2	
IP3	
IP4	
Enable IP Filter	☐ Check to enable. (Default disabled)

Update Setting

Note: Remember to include the IP address of your configuration computer.

Enable the IP Filter:

Step 1: Enter the IP address that is allowed to access the module in the IP0 ~ IP4 fields.

Step 2: Tick the **Check to enable** checkbox in the Enable IP Filter field.

Step 3: Click the **“Update Setting”** button to update the settings.

Disable the IP Filter:

Step 1: Uncheck the **Check to enable** checkbox in the Enable IP Filter field.

Step 2: Click the **“Update Setting”** button to update the settings.

5.6 SNMP Page



The GW-2500iM series module supports the standard SNMP v3c protocol. Through this protocol, the GW-2500iM series module can transmit modules information to the SNMP Network Management Software or device to help administrators to monitor the status of the modules in real-time.

If the Trap function is enabled, the GW-2500iM module can actively send messages to the SNMP manager terminal when the module restarts. The detailed description is as follows.

Note: The GW-2500iM module currently supports these MIB-II management items such as sysContact, sysLocation, sysDescr, and sysName.

SNMP v2c/v3 Agent Configuration

System Info	Setting	
Contact		(Max. 47 chars)
Location		(Max. 47 chars)
Description	http://www.icpdas.com	(Max. 47 chars)
Name	ICP DAS	(Max. 47 chars)
Function	Setting	
Read-Only Community	public	(Max. 47 chars, example: public)
Read-Write Community	private	(Max. 47 chars, example: private)
Trap Community		(Max. 47 chars, example: public)
Manager / Trap IP #1	10.0.8.123 (IPv4/v6 Address, example: 10.0.8.123, fe80:0:0:a8ee:dc07:1cda:5678)	
Manager / Trap IP #2		
Generic Trap	☐ Cold Start, ☐ Warm Start	
Enable SNMP v2c	☐ Check to enable. (Default disabled)	
Enable SNMP v3	☐ Check to enable. (Default disabled, Trap supported v2c only)	
Engine ID	8611081DA2151617	
Security Level	None	
Auth protocol	MD5	
Privacy protocol	DES	
Update Settings		

SNMP Specific Trap

is required after SNMP configuration.

5.6.1 SNMP Configuration Setting

The following is an overview of the parameters contained in the **System Info** section:

Item	Description	Default Value
Contact	The module contact person	User
Location	The module location	Site
Description	The description of the module	Modbus Gateway
Name	The name of the module	Device

The following is an overview of the parameters contained in the **Function** section:

Item	Description	Default Value
Read-Only Community	Set the community name of the module for read-only data	public
Read-Write Community	Set the community name of the module for read-write data	private
Trap Community	Set the community name of the module for the trap	public
Manager / Trap IP #1	Set the IP address of Trap IP #1	0.0.0.0
Manager / Trap IP #2	Set the IP address of Trap IP #2	0.0.0.0
Generic Trap	Enable the Cold Start or Warm Start function	Disabled
Enable SNMP v2c	Tick the Check to enable checkbox to enable the SNMP communication function or uncheck the item to disable it.	Disabled
Update Settings	Click this button to save the revised settings to the GW-2500iM. The new settings will take effect after the module is restarted.	



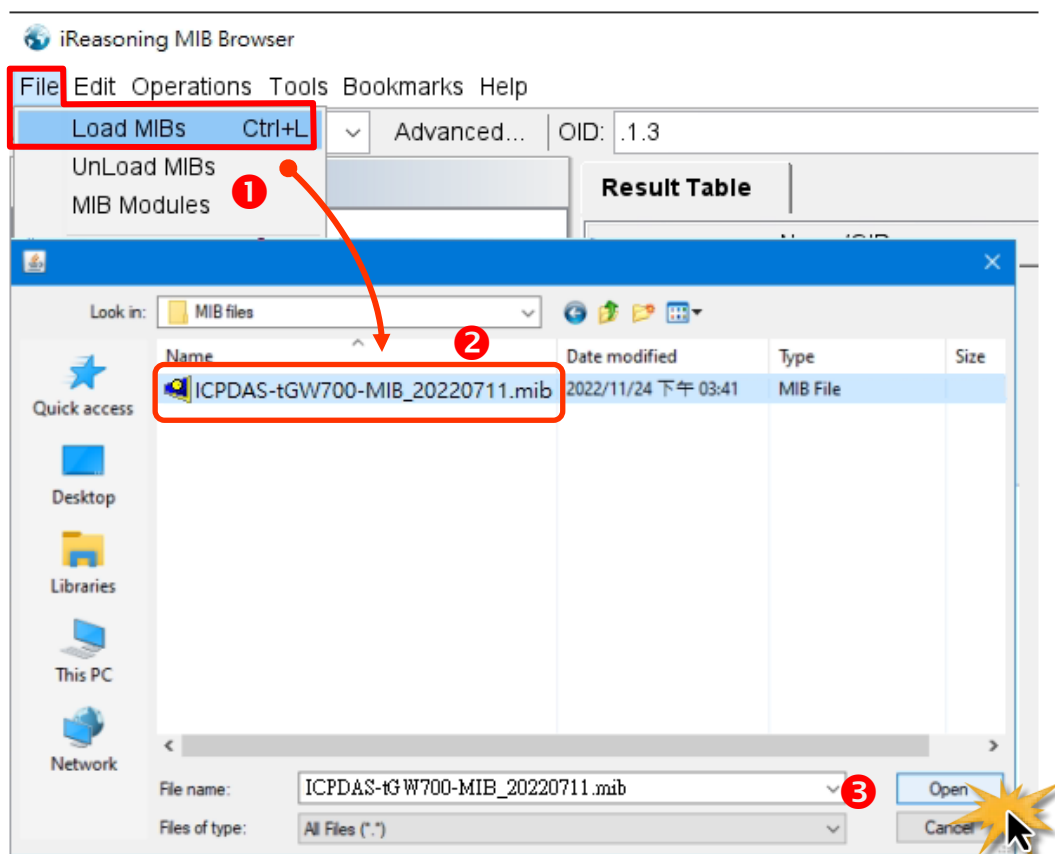
5.6.2 SNMP I/O Example

This article takes **iReasoning** MIB Browser V14 as an example (hereinafter referred to as MIB Browser). Please download the installer program from its official website and run the installer.

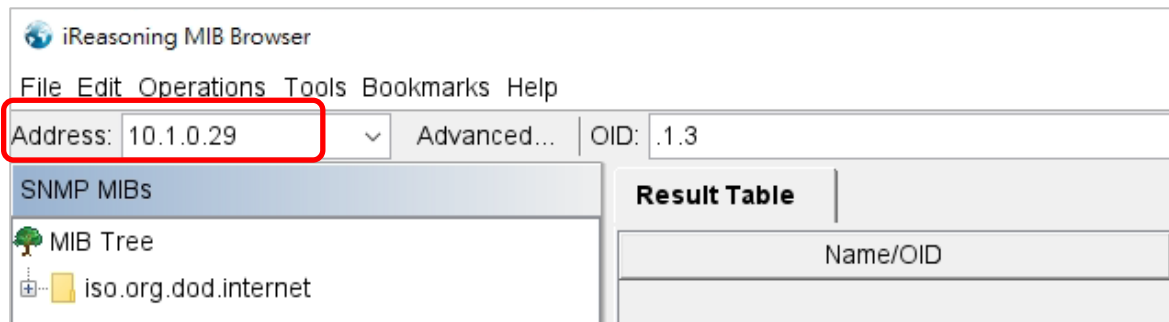
<http://www.ireasoning.com/mibbrowser.shtml>

Step 1: Start the MIB Browser.

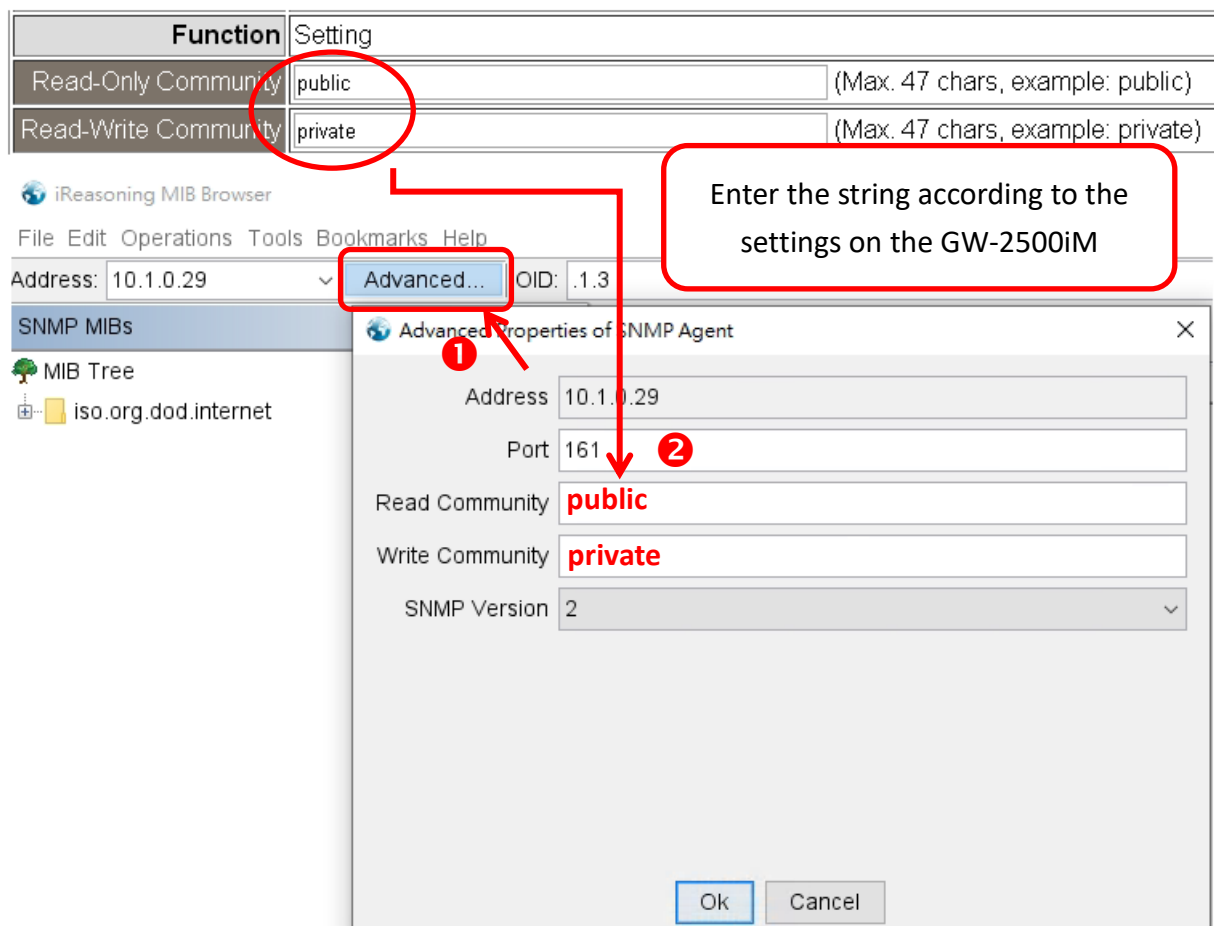
Click the **File** => **Load MIBs** on the menu bar and click the specified MIB file of the module (e.g. ICPDAS-tGW700-MIB_20220711.mib), then click the Open button to open it.



Step 2: Enter the IP address of the GW-2500iM module in the **Address** field.



Step 3: Click “**Advanced**” to set the parameters of the SNMP agent. Enter the string in the Read/Write Community fields according to the Read-Only Community / Read-Write Community settings on the GW-2500iM. If these strings are different on both sides, the agent will not work correctly.



Note: If the Write Community field is not set, a Timeout error will occur during execution.

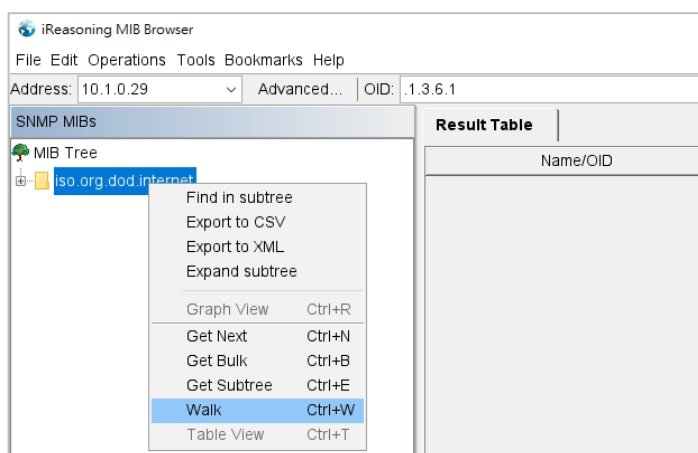
Step 4: Enter the IP address of MIB Browser in the **Manager/Trap IP #1** field, check the **Check to enable** checkbox to enable the SNMP function, then click **Update Settings** to save the changes. Finally, click the **Reboot** button to reboot the GW-2500iM module.

Function	Setting
Read-Only Community	public (Max. 47 chars, example: public)
Read-Write Community	private (Max. 47 chars, example: private)
Trap Community	public (Max. 47 chars, example: public)
1 Manager / Trap IP #1	10.1.0.25 (IPv4/v6 Address, example: 10.0.8.123, fe80:0:0:0:a8ee:dc07:1cda:5678)
Manager / Trap IP #2	0.0.0.0
Generic Trap	☐ Cold Start, ☐ Warm Start
2 Enable SNMP v2c	☒ Check to enable. (Default disabled)
Enable SNMP v3	☐ Check to enable. (Default disabled, Trap supported v2c only)
Engine ID	8611081DA2151617
Security Level	None
Auth protocol	MD5
Privacy protocol	DES
3 Update Settings 	

4 **SNMP Specific Trap**
Reboot is required after SNMP configuration.

Read the information of the GW-2500iM – The Walk command

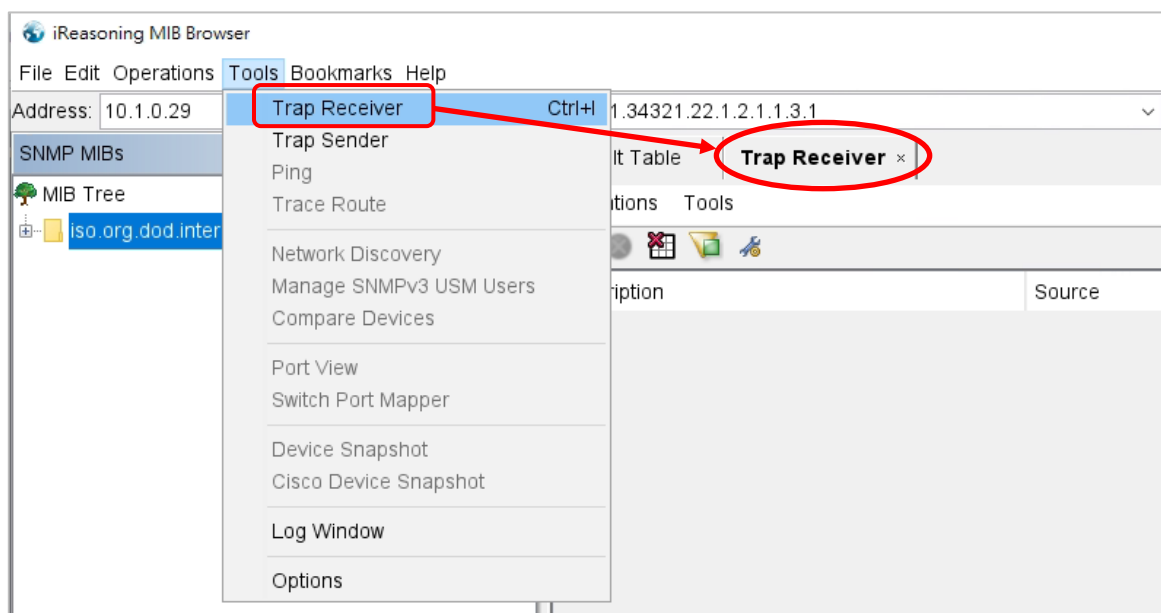
Right-click the **iso.org.dod.internet** folder on the left side and click **Walk** to display the information of the GW-2500iM in the **Result Table**



Result Table				
Name/OID	Value	Type	IP.Port	
snmpInSetRequests.0	0	Counter32	10.1.0.29...	
snmpInGetResponses.0	0	Counter32	10.1.0.29...	
snmpInTraps.0	0	Counter32	10.1.0.29...	
snmpOutTooBigs.0	0	Counter32	10.1.0.29...	
snmpOutNoSuchNames.0	0	Counter32	10.1.0.29...	
snmpOutBadValues.0	0	Counter32	10.1.0.29...	
snmpOutGenErrs.0	0	Counter32	10.1.0.29...	
snmpOutGetRequests.0	0	Counter32	10.1.0.29...	
snmpOutGetNexts.0	0	Counter32	10.1.0.29...	
snmpOutSetRequests.0	0	Counter32	10.1.0.29...	
snmpOutGetResponses.0	3	Counter32	10.1.0.29...	
snmpOutTraps.0	0	Counter32	10.1.0.29...	
snmpEnableAuthenTraps.0	disabled (2)	Integer	10.1.0.29...	
.1.3.6.1.2.1.11.31.0	0	Counter32	10.1.0.29...	
.1.3.6.1.2.1.11.32.0	0	Counter32	10.1.0.29...	
modelName.0	tGW-715/715L_RevB2	OctetString	10.1.0.29...	
aliasName.0	Tiny	OctetString	10.1.0.29...	
firmwareVersion.0	B2.3.8 [May.11 2023]	OctetString	10.1.0.29...	
webServerPort.0	80	Integer	10.1.0.29...	
comIndex.1	1	Integer	10.1.0.29...	
comName.1	Port1	OctetString	10.1.0.29...	
modbusTcpPort.1	502	Integer	10.1.0.29...	
modbusTcpPort.1	(Snmp End Of Mib View)	EndOfMibView	10.1.0.29...	

5.6.3 SNMP Trap Example

Step 1: Click **Tools => Trap Receiver** on the menu bar to display the window for receiving the Trap messages.



Step 2: The Trap types for the alarms that receive from the GW-2500iM module are as follows.

1. Cold Start Trap:

The Cold Start Trap will be sent when the module restarts after it has been powered off.

2. Warm Start Trap:

The Warm Start Trap will be sent when the module restarts without turning off the power, for example, the reboot command or the watchdog mechanism.

Click the Trap message to view the details

Description	Source	Time	Severity
warmStart	10.1.0.29	2023-06-13 14:40:31	

Source:	10.1.0.29	Timestamp:	4.5 seconds	SNMP Version:	1
Enterprise:	snmp			Community:	public
Specific:	0	Generic:	warmStart		
Description:	warmStart				

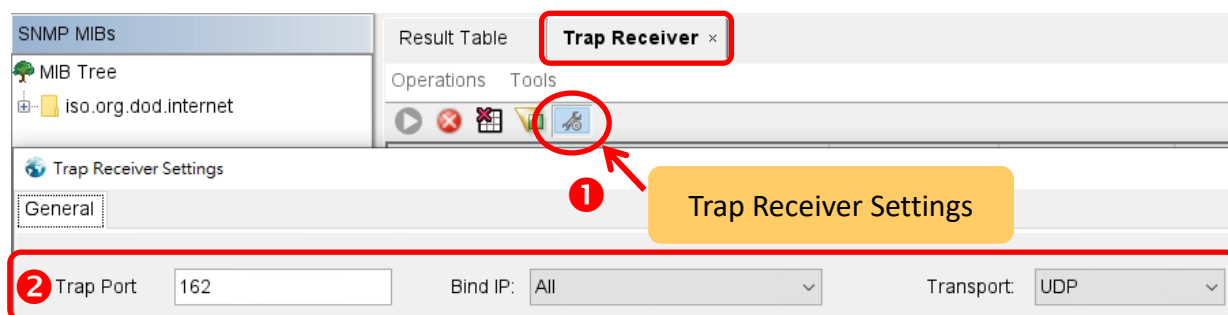
Item	Description
Source	The IP address of the Trap from the module.
Timestamp	The time elapsed since the last startup of the module.
SNMP Version	The version of SNMP
Enterprise	The name of the enterprise
Community	SNMP community name according to the Trap Community setting on the GW-2500iM
Specific	Specific ID
Generic	Generic ID
Description	Trap Information

5.6.4 SNMP Troubleshooting

Unable to receive the Trap message from the module

1. Check the setting of the Windows firewall or the Anti-virus software. These functions can be disabled during the testing
2. Check the setting of the Trap port. Using **iReasoning MIB Browser** as an example:

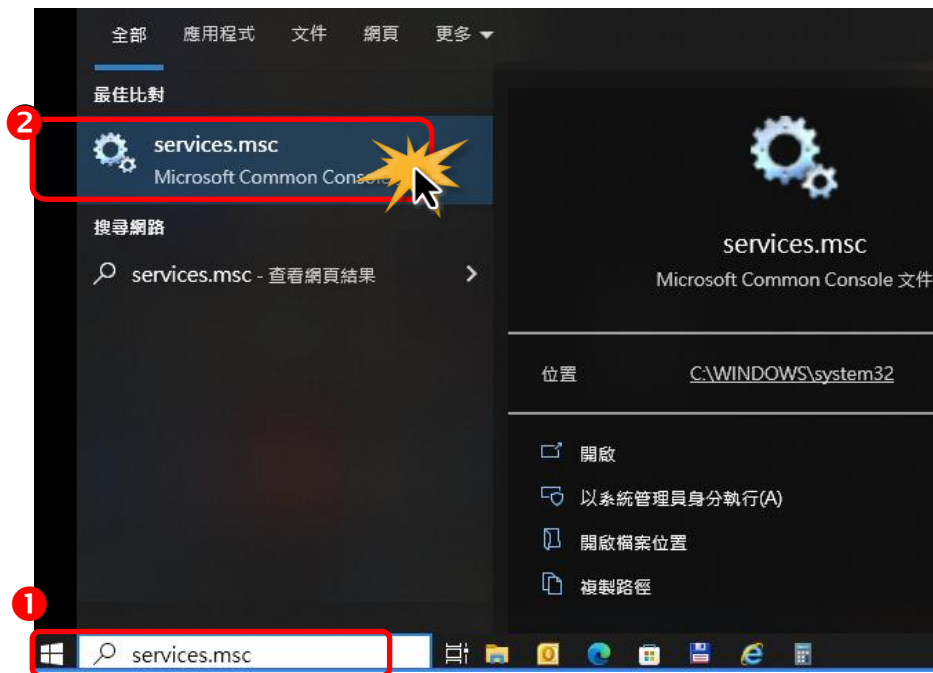
Click the **Trap Receiver Settings** button on the **Trap Receiver** page to open the window. Then, confirm the **Trap Port**, **Bind IP**, and **Transport** settings. The GW-2500iM uses the default Trap port 162 according to the SNMP specification.



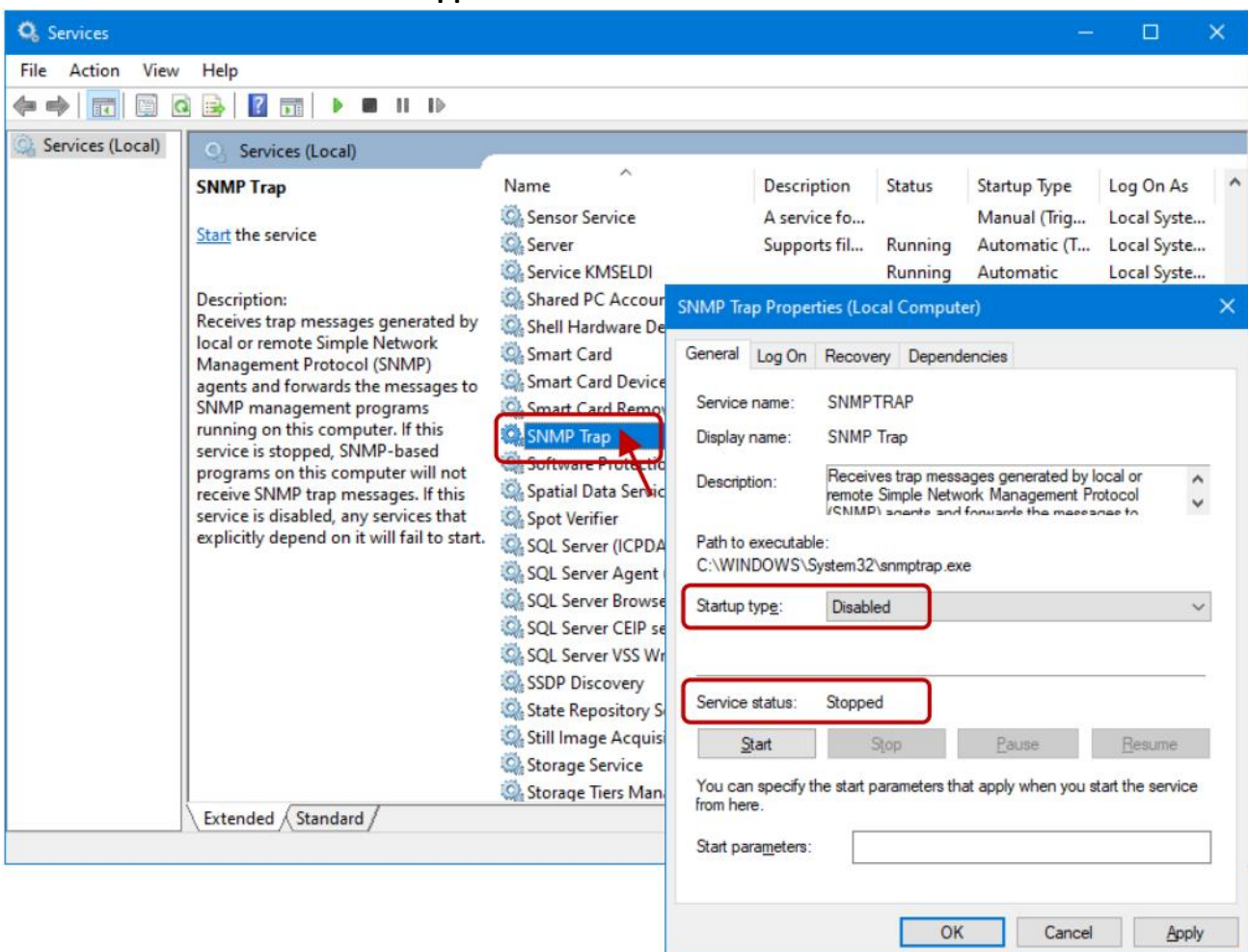
3. Disable Windows SNMP Trap Service

Note: The configuration screen varies according to the Windows version.
The following screens are on Windows 10.

Step 1: Enter services.msc in the command bar and click to open the Windows service tool.



Step 2: Double-click the SNMP Trap and confirm the Startup type is set to “Disabled” and the Service status is set to “Stopped”.



5.7 SMTP Page

SMTP is a typical client-server protocol. This SMTP client allows you to quickly send email messages through an SMTP server. This application also supports message attachments and SSL for secure connections.


Modbus Gateway

[Home](#) | [Port1](#) | [Network](#) | [Filter](#) | [SNMP](#) | **SMTP** | [Monitor](#) | [Maintenance](#) | [Netstat](#) | [Password](#) | [Logout](#)

IP Address 10.1.0.100

TCP Port Timeout (Socket Watchdog, Seconds) 18

Initial Switch 0

System Idle (Network Watchdog, Seconds) 0

SMTP Client

SMTP Settings	
Mail Server	mail.icpdas.com
Port	587
Account	ICPDAS_cindy
Authentication	☒ Enable Password :
Encrypt	None ▼ None SSL/TLS
Mail From	icpdas_gw@icpdas.com
Mail To	icpdas_gw@gmail.com
Subject	GW-SMTP
Send Event	☐ Cold Start, ☒ Warm Start
Enable SMTP	☐ Check to enable. (Default disabled)
Update Settings	

SMTP Security Authentication Certificate

SMTP Settings	
Trusted Certificate (Default)	CHOOSE FILE UPLOAD REMOVE

Test

SMTP Settings	
Test Mail	SEND

5.8 Maintenance Page

The Maintenance Page allows you to quickly setup Time server setting, Firmware update, Time-Sensitive, networking and IEEE 802.1X Authentication.

5.8.1 Time Server Settings

To click the [Maintenance] page, you will see the “Time Server Settings” and “Realtime Clock” sections.

Time Server Settings

SNTP Server	time.nist.gov (Max. 64 chars)
Interval (Seconds)	86400 (Default= 86400)
Time Zone	(GMT -8:00) Pacific Time (US & Canada) ▼
Last Sync Time	2024/12/24 18:28:30
Enable SNTP	Enable ▼ (Enable/Disable the SNTP Configuration, Enable=default.)
Update Settings	

Realtime Clock

Module Date&Time	2024 / 12 / 25 下午 05 : 06 : 20 📅
Update Settings	

5.8.2 Advanced Setting

To click the [Maintenance] page, you will see the “Advanced Settings” section.

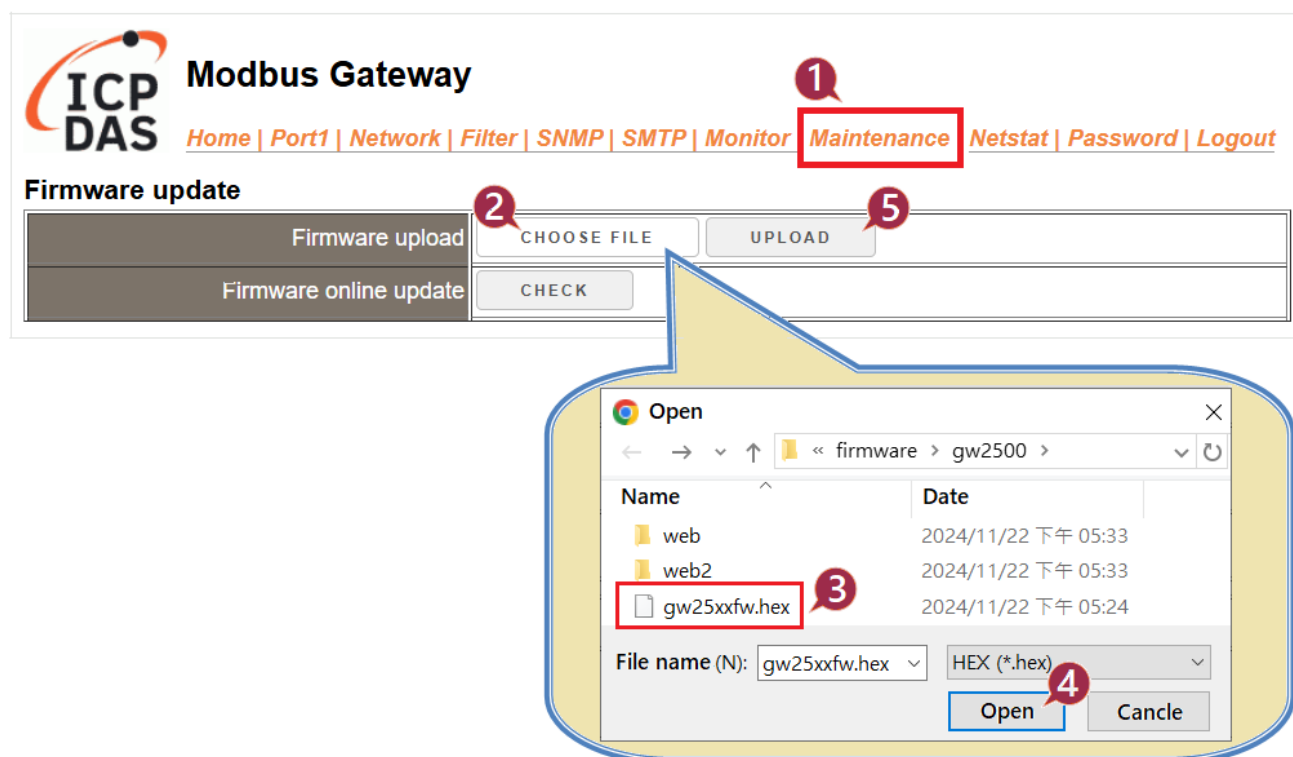
Advanced Setting

Web Server	http + https ▼ (Enable/Disable the Web Server, http+https=default.)
HTTPS Port	443
mDNS	Enable ▼ (Enable/Disable mDNS, Enable=default.)
NetBIOS	Enable ▼ (Enable/Disable NetBios, Enable=default.)
LLDP	Enable ▼ (Enable/Disable the LLDP Service, Enable=default.)
UPNP	Enable ▼ (Enable/Disable the UPNP Service, Enable=default.)
Bluetooth (option)	Disable ▼ (Enable/Disable the Bluetooth module, Disable=default.)
Telnet Server	Disable ▼ (Enable/Disable the Telnet Server, Disable=default.)
Resource Watchdog	Disable ▼ (Enable/Disable Reboot, if resource low, Disable=default.)
Ethernet Watchdog	Disable ▼ (Enable/Disable Reboot, if Ethernet error, Disable=default.)
Engineering Mode	Disable ▼ (Enable/Disable Engineering Mode, Disable=default.)
Broadcast Storm Protection	Enable ▼ (Enable/Disable Reboot Broadcast Storm Protection, Enable=default.)
CPU Idle Mode	Disable ▼ (Enable/Disable CPU Idle Mode, Disable for maximum performance, Disable=default.)
Update Settings	

5.8.3 Firmware Update

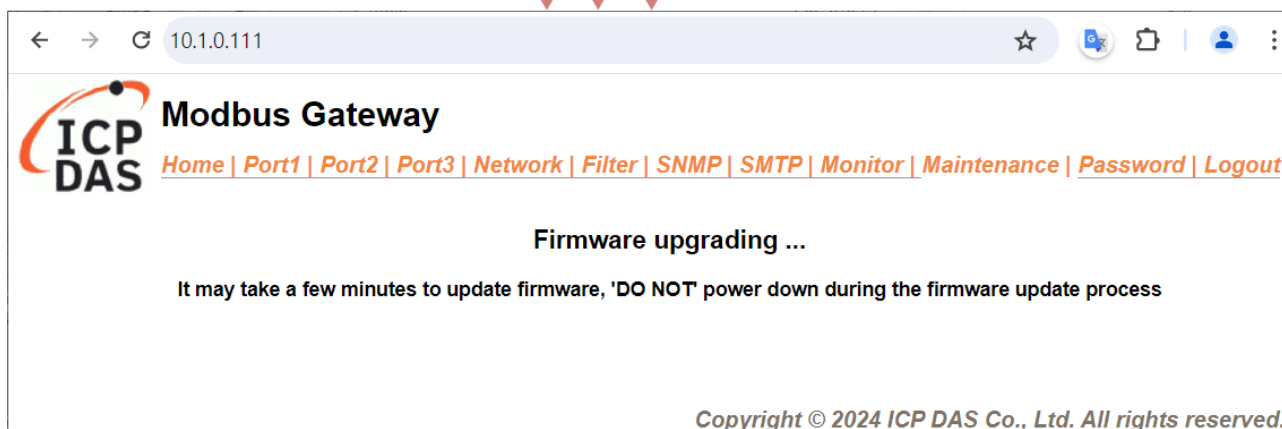
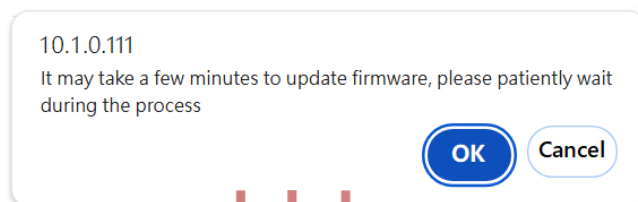
Firmware update requires initialization and local network operations. Traditional firmware update requires adjusting the Reset button and reboots the module manually for the initialization of firmware update, while new way allows user to initialize the module via web interface without adjusting the hardware switch. Initialization via web is useful when module is installed in remote site and can be accessed by a remote PC.

To click the [Maintenance] page, you will see the “Firmware update” section.



Note:

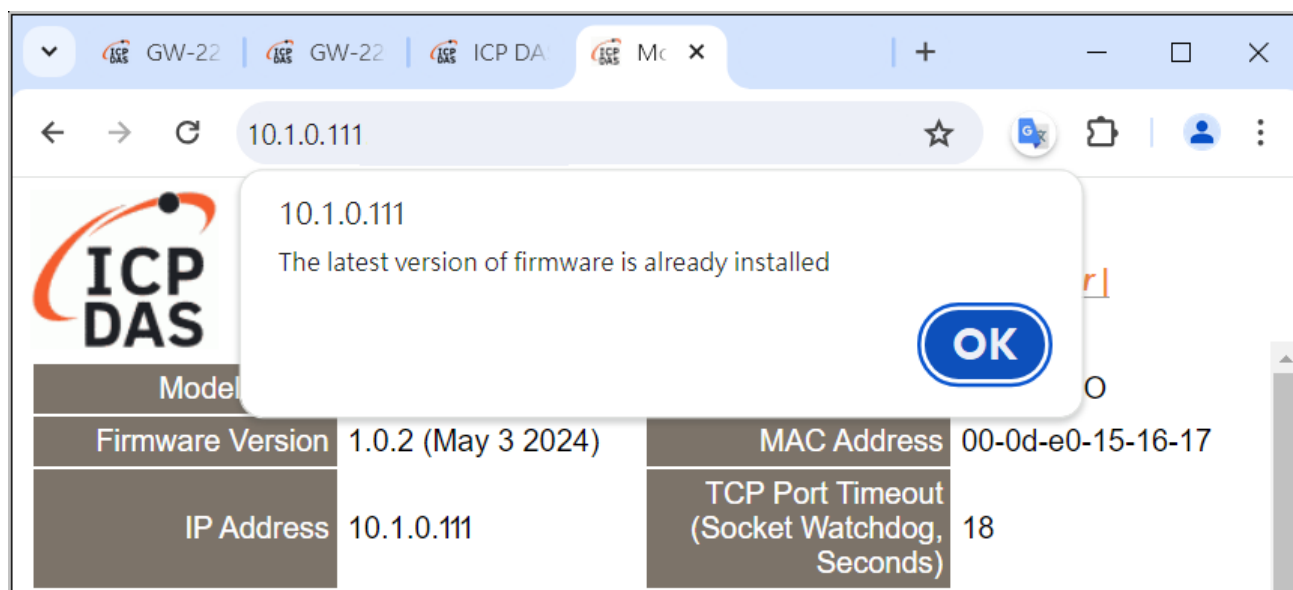
If the remote firmware update is failed, then the traditional firmware update (Local) is required to make the module working again.



For detailed information regarding how to use this function to update the Firmware for GW-2500iM series module, refer to the “GW-2500iM Firmware Update Manual (EN)”. The download address is shown below:

GW-2500iM :

<https://www.icpdas.com/en/download/show.php?num=2750>



5.8.4 Time-Sensitive Networking

To click the [Maintenance] page, you will see the “Time-Sensitive Networking (TNS)” section.

Time-Sensitive Networking (TSN)

Precision Time Protocol	
Protocol	Disable ▾
PTP Offset	Uncalibrated
802.1Q Tag-based VLAN	
Application	Disable ▾
VLAN ID (Dec)	600
Priority	0 (lowest) ▾
Protocol	TCP ▾
Port	502
Update Settings	

5.8.5 IEEE 802.1X Authentication

To click the [Maintenance] page, you will see the “IEEE 802.1X Authentication” section.

IEEE 802.1X Authentication

Protocol	Disable ▾
Username	
Password	****
Status	Disable
Update Settings	

5.8.6 Backup / Restore Setting

To click the [Maintenance] page, you will see the “Settings Backup/Restore” and “Rules Backup/Restore” sections.

Settings Backup/Restore

Download Settings (Backup)	<button>DOWNLOAD</button>	
Upload Settings (Restore)	<button>CHOOSE FILE</button>	<button>UPLOAD&REBOOT</button>

Rules Backup/Restore

Download Rules (Backup)	<button>DOWNLOAD</button>	
Upload Rules (Restore)	<button>CHOOSE FILE</button>	<button>UPLOAD</button>

5.8.7 DLL Plug-in

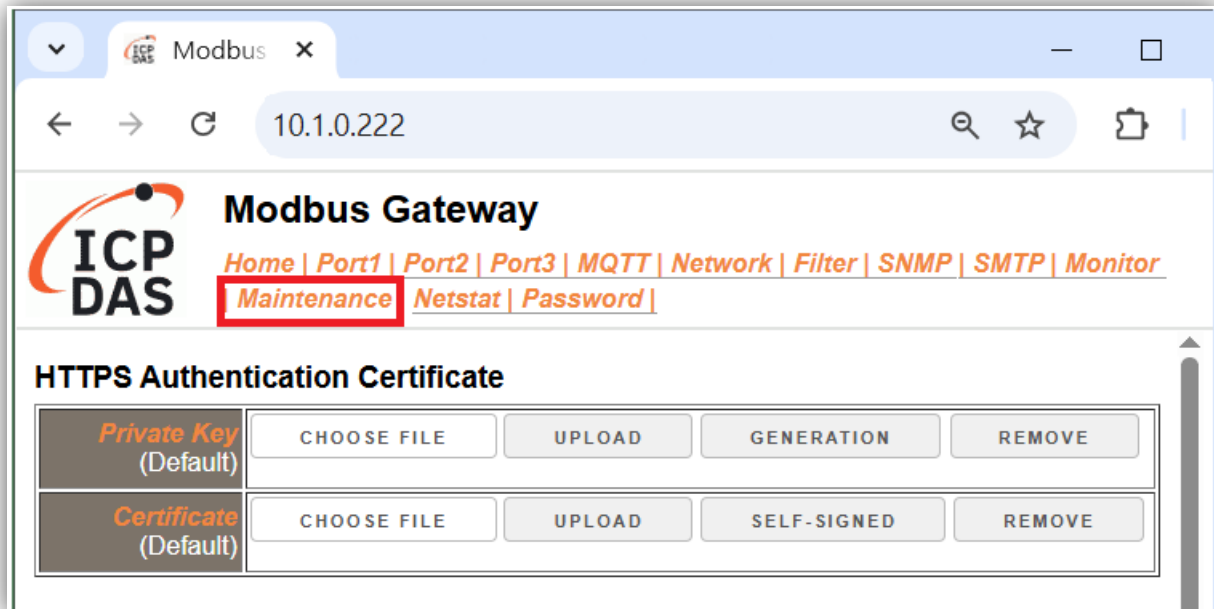
To click the [Maintenance] page, you will see the “DLL Plug-in” section.

DLL Plug-in

Load plug-in when boot	☐ Enable	<button>UPDATE SETTINGS</button>	
Plug-in (Not Exist)	<button>CHOOSE FILE</button>	<button>UPLOAD</button>	<button>REMOVE</button>

5.8.8 HTTPS Server Authentication certificate

To click the [Maintenance] page, you will see the “HTTPS Authentication Certificate” section.



The HTTPS Authentication Certificate function provides secure encrypted communication for your HTTPS connections, which consists of the following sections:

- ◆ Private Key – The private key is a secure entity and should be stored in a file with restricted access.
- ◆ Certificate – The certificates are an important component of Transport Layer Security (TLS, sometimes called by its older name SSL), where they prevent an attacker from impersonating a secure website or other server.

NOTE:

- ★ The HTTPS server key/certificate is used for encryption when communicating with browsers.
- ★ The GW-2500iM is supplied with a pre-installed default certificate that enables direct HTTPS communication.

5.8.8.1 HTTPS Server – Private Key

This is a cryptographic key that identifies your server. Keep this secure and never share it.

HTTPS Authentication Certificate

Private Key (Default)	1 CHOOSE FILE	2 UPLOAD	3 GENERATION	4 REMOVE
Certificate (Default)	CHOOSE FILE	UPLOAD	SELF-SIGNED	REMOVE

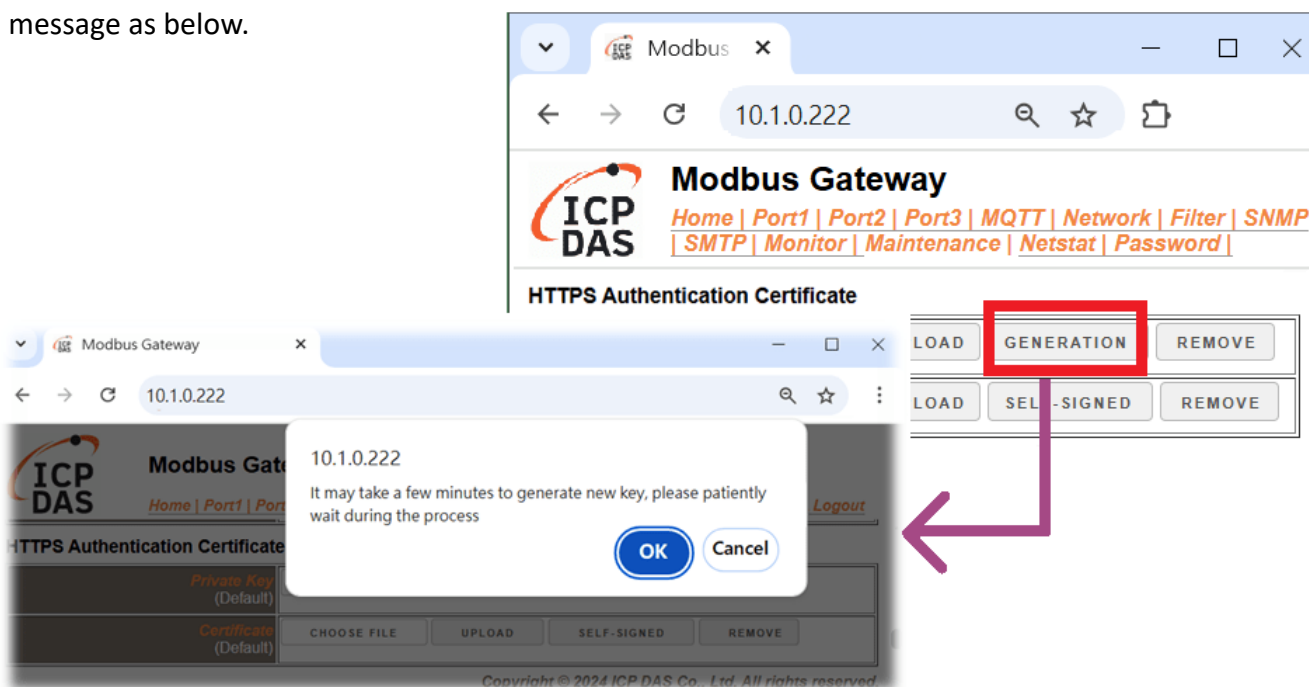
The following is an overview of the functions contained in the **Private Key** section:

Item		Description
1	Choose File	Click “Choose File” and select your Private Key (file names often use extensions like .key, .pem, .crt, .cer or .pfx).
2	Upload	After choose a private key file, you could upload your own private key.
3	Generation	A unique private key is generated on the server. You could generate a new private key.
4	Remove	Remove the current private key.

Users can follow these instructions to generate a private key:

STEP 1

To click the **[GENERATION]** button in the “Private Key” section, the GW-2500iM will show the message as below.



STEP 2

Once you click the **[OK]** button, the GW-2500iM will generate a new key.

5.8.8.2 HTTPS Server – Certificate

This is a certificate that proves your server's identity to connecting clients.

HTTPS Authentication Certificate

Private Key (Default)	CHOOSE FILE	UPLOAD	GENERATION	REMOVE
Certificate (Default)	1 CHOOSE FILE	2 UPLOAD	3 SELF-SIGNED	4 REMOVE

The following is an overview of the functions contained in the **Self-Signed** section:

Item		Description
1	Choose File	Click "Choose File" and select your CA certificate (file names often use extensions like .key, .pem, .crt, .cer or .pfx).
2	Upload	After choose a certificate file, you could upload your own certificate files.
3	Self-signed	You could create a self-signed certificate.
4	Remove	Remove the current Certificate.

Users can follow these instructions to create a self-signed certificate:

STEP 1

To click the [SELF-SIGNED] button in the "Certificate" section, and then you will see the "HTTPS Server Certificate – Self-Signed" page. The screen will be as follows:

The screenshot shows the Modbus Gateway web interface. In the 'HTTPS Authentication Certificate' section, the 'SELF-SIGNED' button under the 'Certificate (Default)' row is highlighted with a red box. A purple arrow points from this button to a separate form titled 'HTTPS Server Certificate - Self-Signed'.

HTTPS Server Certificate - Self-Signed

Common Name:

Organization:

Organization Unit:

Locality:

State:

Country:

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STEP 2

Enter the following information for the self-signed certificate manually. The screen will be as follows:

The image shows two screenshots of the Modbus Gateway web interface. The left screenshot shows the 'HTTPS Server Certificate - Self-Signed' form with empty input fields and numbered steps 1 through 7. The right screenshot shows the form filled with example values: Common Name (ICPDAS-HTTPS-CA), Organization (ICPDAS), Organization Unit (ICPDAS-RD), Locality (Hsinchu), State (Taiwan), and Country (TW). The SUBMIT button is highlighted with a red box in the right screenshot. A red arrow points from the left screenshot to the right one.

The following is an overview of the parameters contained in the **Self-Signed** section:

Item		Description	For example
1	Common Name	The fully qualified server name.	ICPDAS-HTTPS-CA Or gw.icpdas.com
2	Organization	This parameter is used to set the name of your organization.	ICPDAS
3	Organization Unit	This parameter is used to set the name of your organization unit.	ICPDAS-RD
4	Locality	This parameter is used to set the location where your organization is located.	Hsinchu
5	State	This parameter is used to set the state where your organization is located.	Taiwan
6	Country	This parameter is used to set the country where your organization is located.	TW
7	Submit	Click this button to save the revised settings to the GW-2500iM.	

Finally, click [**Submit**] button in order to save the certificate and commit your changes. If you leave the changes uncommitted, it will get lost and the signed certificate cannot be installed.

5.8.9 MODBUS/TCP Security Authentication certificate

To click the [Maintenance] page, you will see the “MODBUS/TCP Security Authentication Certificate” section.

MODBUS/TCP Security Authentication Certificate

Trusted Certificate (Default)	CHOOSE FILE	UPLOAD	REMOVE	
Private Key (Default)	CHOOSE FILE	UPLOAD	GENERATION	REMOVE
Certificate (Default)	CHOOSE FILE	UPLOAD	SELF-SIGNED	REMOVE

5.9 Monitor Page



Current Connection Status:

Connection	Port 1
Application Mode	TCP/UDP Server
Connected IP1	-
IP2	-
IP3	-
IP4	-
Available Connections	32
Host Query (Client mode)	Port 1
Query State	-
Last Query Time	-
Remote Server IP	-
Connection State	-
Modbus TCP/UDP	Port 1
Sent Packets	0
Received Packets	0
Dropped Packets	0
Queued Packets	0
(No Buffer) Busy Packets	0
(Queue-Timeout) Busy Packets	0
Last Sent	-
Last Received	-
Modbus RTU/ASCII	Port 1
Sent Packets	0
Received Packets	0
Dropped Packets	0
(No Response) Slave Timeouts	0
(Receiving) Slave Timeouts	0
Buffer Usages	0%
Cache Hits	0%
Last Sent	-
Last Received	-
Communication	Port 1
Maximum Response Time (ms)	0
First Error (Hex)	0,0,0
Last Error (Hex)	0,0,0
Remove PE/FE/BE (bytes)	0

[Clear Last Error](#)

Note:

1. [Click here](#) for error codes and descriptions.
2. The "**Busy Error**" can occur if there are too many Modbus requests in the queue. To resolve this, increase timeout and scan time on all Master (Client) software.
3. The **Maximum Response Time** above is the round trip time between the Gateway and the Slave.

After clicking the **Monitor** tab, the Current Connection Status page will be displayed showing detailed information regarding the current status of the serial port connection settings for the GW-2500iM.

5.10 Netstat Page

Netstat is a handy tool that can help you understand and troubleshoot your network, as well as detect and resolve network security issues.


Modbus Gateway

[Home](#) | [Port1](#) | [Network](#) | [Filter](#) | [SNMP](#) | [SMTP](#) | [Monitor](#) | [Maintenance](#) | **[Netstat](#)** | [Password](#) | [Logout](#)

Model Name	GW-2515i	Alias Name	EthernetIO
Firmware Version	1.0.2 (Nov 22 2024)	MAC Address	00-0d-e0-15-16-17
IP Address	10.1.0.100	TCP Port Timeout (Socket Watchdog, Seconds)	18
Initial Switch	0	System Idle (Network Watchdog, Seconds)	0

Security event

DoS/DDoS Event	0
----------------	---

TCP Connection

TCP Server	Service (Listen port)	Remote IP	Remote Port
Listen & Established	http (80)		
		10.1.0.94	51547
	modbus/tcp 3 (504)		
	modbus/tcp 2 (503)		
	modbus/tcp 1 (502)		
	https (443)		

System Logger

System Logger	2054/04/10,00:30:21:reset switch status = 0 2054/04/10,00:30:21:RotarySwitch = 0x0, boardID = 0x0, SubID = 0xf, 543 128 144 2054/04/10,00:30:21:GW-2K Runtime build at Nov 22 2024, 17:24:12 2054/04/10,00:30:21:meminfo : Free 147348K / Total 178784K, Flash : 16 MB 2054/04/10,00:30:21:ModuleID = D7ED6D75, ResetReason=1 2054/04/10,00:30:21:CPU Speed2=400Mhz, TICK_PER_USEC=400
	Clear

5.11 Password Page

After clicking the **Password** tab, the **Privilege Management** page will be displayed.

Follow the steps below to reset or create a new your account and password.

Step 1: Enter the account and password in the field. (Use the default password “**Admin**” for the first login)

Step 2: Enter the new password in the “**Confirm new password**” fields and make it enable.

Step 3: Click the “**Submit**” button to update the account and password.

Modbus Gateway

Home | Port1 | Network | Filter | SNMP | SMTP | Monitor | Maintenance | Netstat | **Password** | Logout

Model Name	GW-2515i	Alias Name	Ethernet
Firmware Version	1.0.2 (Aug 15 2024)	MAC Address	00-0d-e0-15-16-17
IP Address	10.1.0.30	TCP Port Timeout (Socket Watchdog, Seconds)	18
Initial Switch	0	System Idle (Network Watchdog, Seconds)	0

Privilege Management

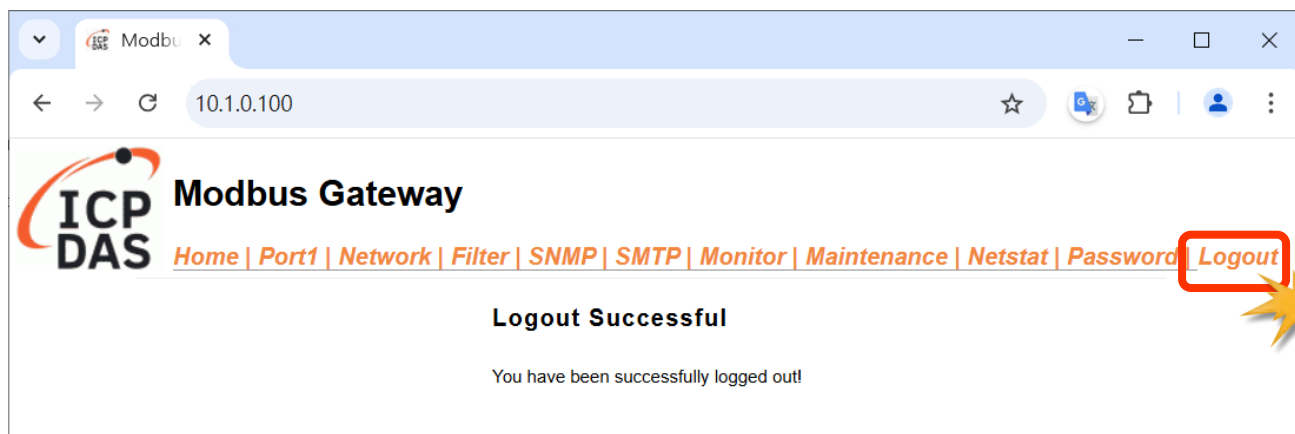
No.	Account	Password	Confirm Password	Authority	Enabled
1	Admin			Admin ▼	☒
2	ICPDAS	icpdas	icpdas	Admin ▼	☒
3				Admin ▼	☐
4				Admin ▼	☐
5				Admin ▼	☐

SUBMIT

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5.12 Logout Page

After clicking the **Logout** tab, you will be immediately logged out from the system and be returned to the login page.

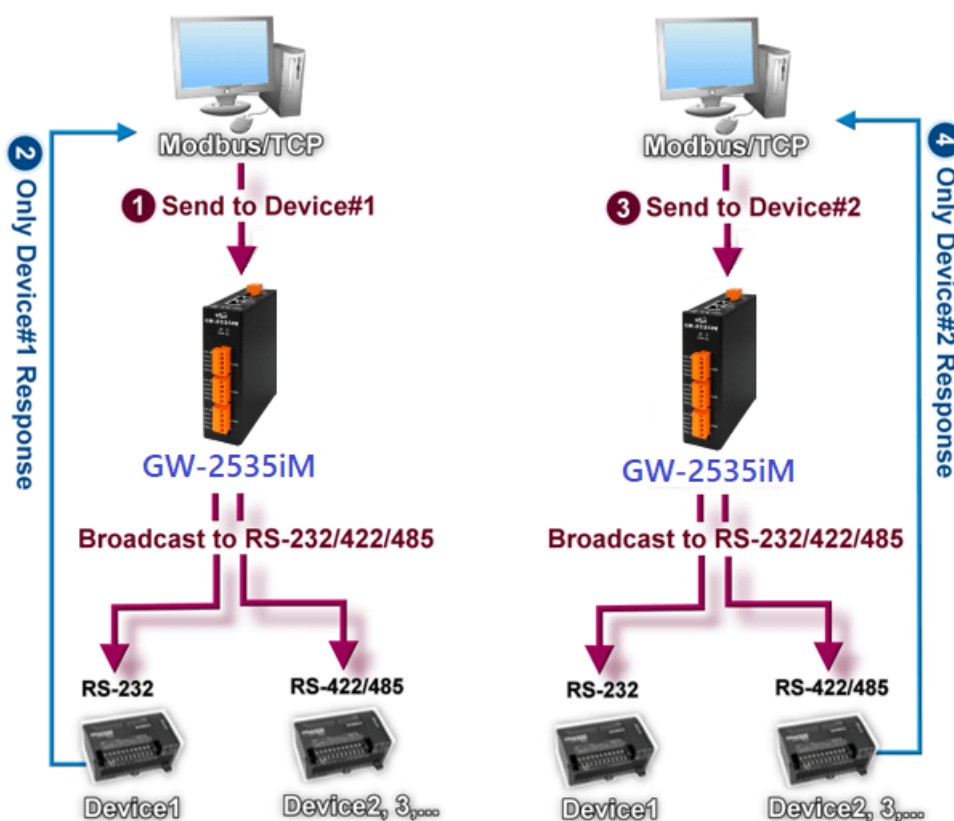


6. Typical Applications

This chapter provides some examples of typical scenarios for the GW-2500iM series module, including applications focused on the Modbus Gateway, Modbus Net ID, Pair-connection and TCP Client Mode, etc...

6.1 Modbus Gateway

The GW-2500iM series module is a Modbus TCP/UDP to RTU/ASCII gateway that enables a Modbus TCP/UDP host to communicate with serial Modbus RTU/ASCII devices through an Ethernet network, and eliminates the inherent cable length limitations of legacy serial communication devices.

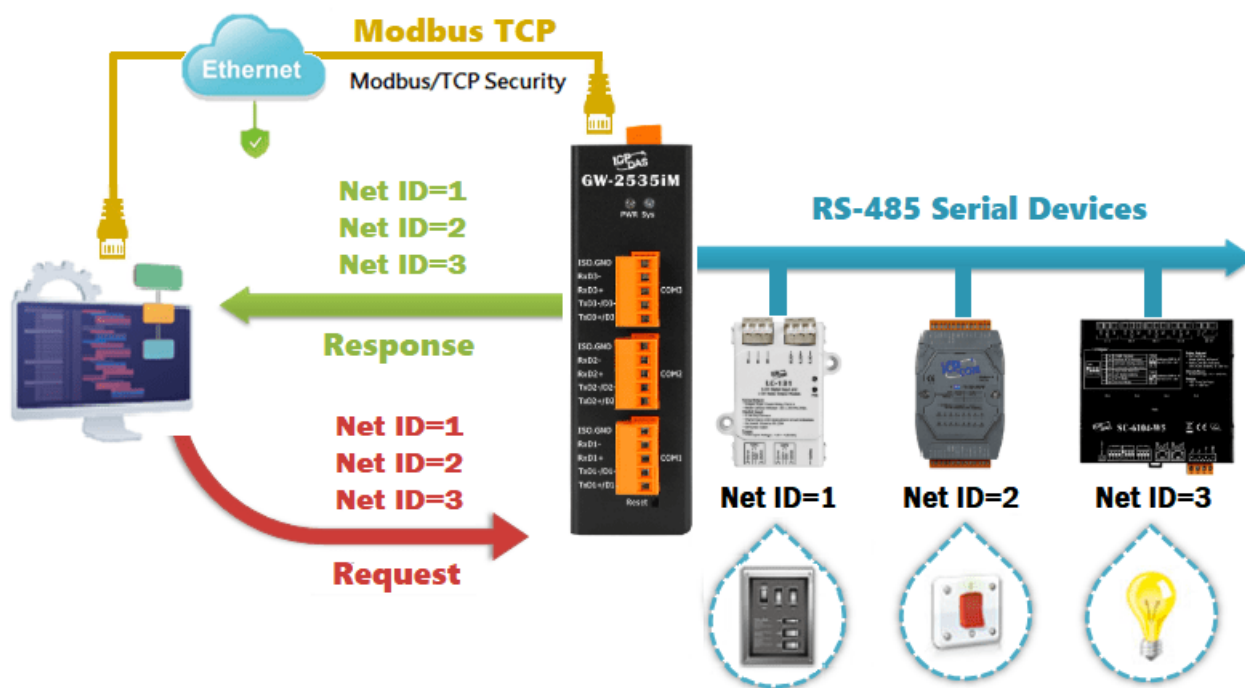


6.2 Modbus Net ID

The GW-2500iM series module is a gateway that can be used to convert between the Modbus TCP/UDP protocol and the Modbus RTU/ASCII protocol.

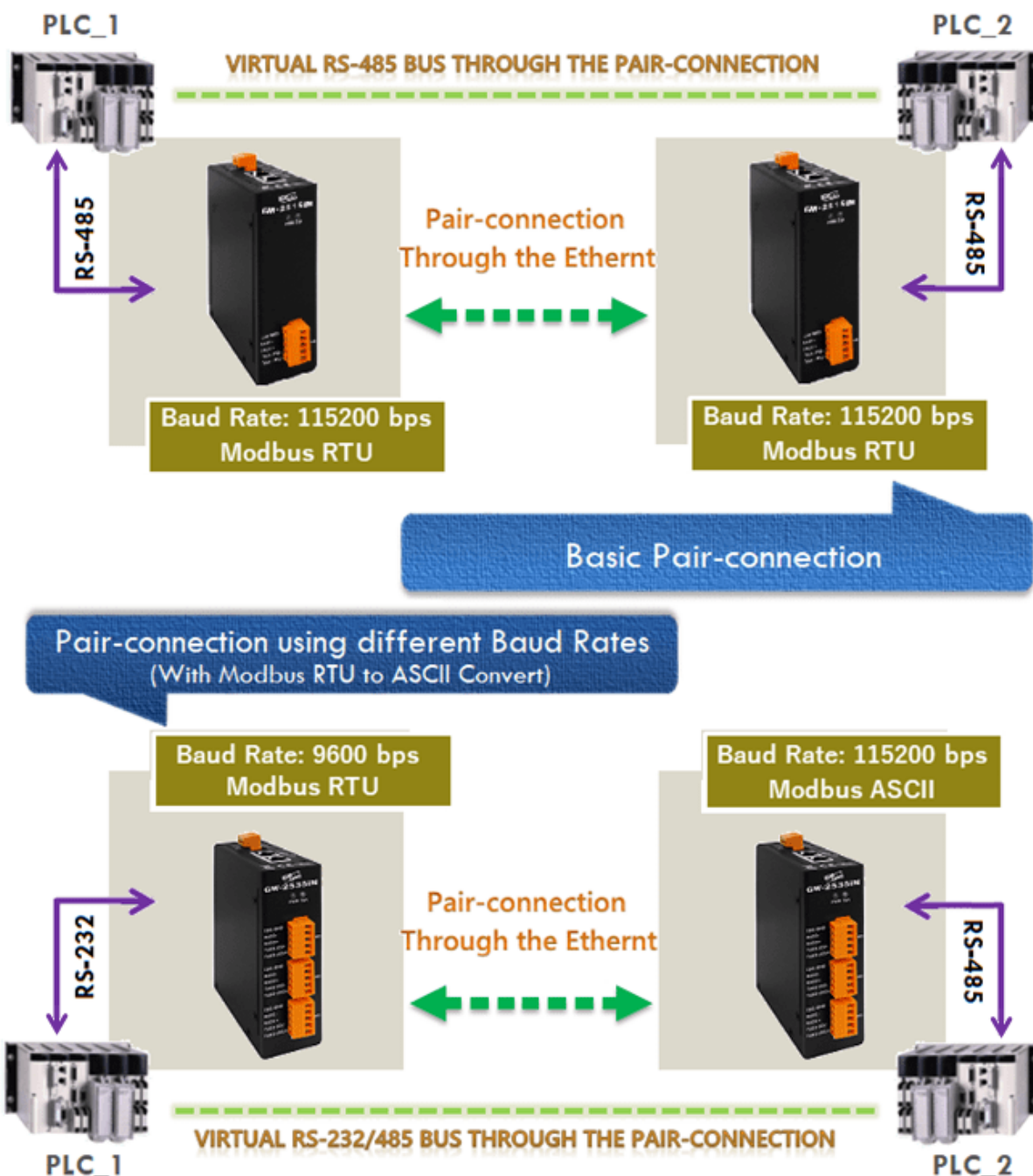
Consequently, SCADA/HMI applications is able to access each Modbus RTU/ASCII slave device via the GW-2500iM gateway by specifying correct Net ID of the intended slave device in each Modbus TCP request.

Note that the Net ID of the GW-2500iM gateway is reserved for specific control purposes, and is not used to access slave devices.



6.3 Pair-connection Applications

The GW-2500iM Modbus gateway can be used to create a pair-connection applications (as well as serial-bridge or serial-tunnel), and then route Modbus messages between two serial devices via TCP/IP, which is useful when connecting Modbus RTU/ASCII devices that do not themselves have Ethernet capability.



The following are examples of pair-connection tests:

➤ Pair-connection Settings:

Model	Port Settings (default)		Pair-connection Settings		
	Baud Rate	Data Format	Application Mode	Remote Server IP	Remote TCP Port (default)
 GW-2515iM #1	115200	8N1	Client	IP Address of GW-2535iM #2	502
 GW-2535iM #2	115200	8N1	Server	-	-

Note:

The Baud Rate and Data Format settings of the client and server **GW-2515iM #1** and **GW-2535iM #2**) depend on the COM ports of the PC (or the connected device).

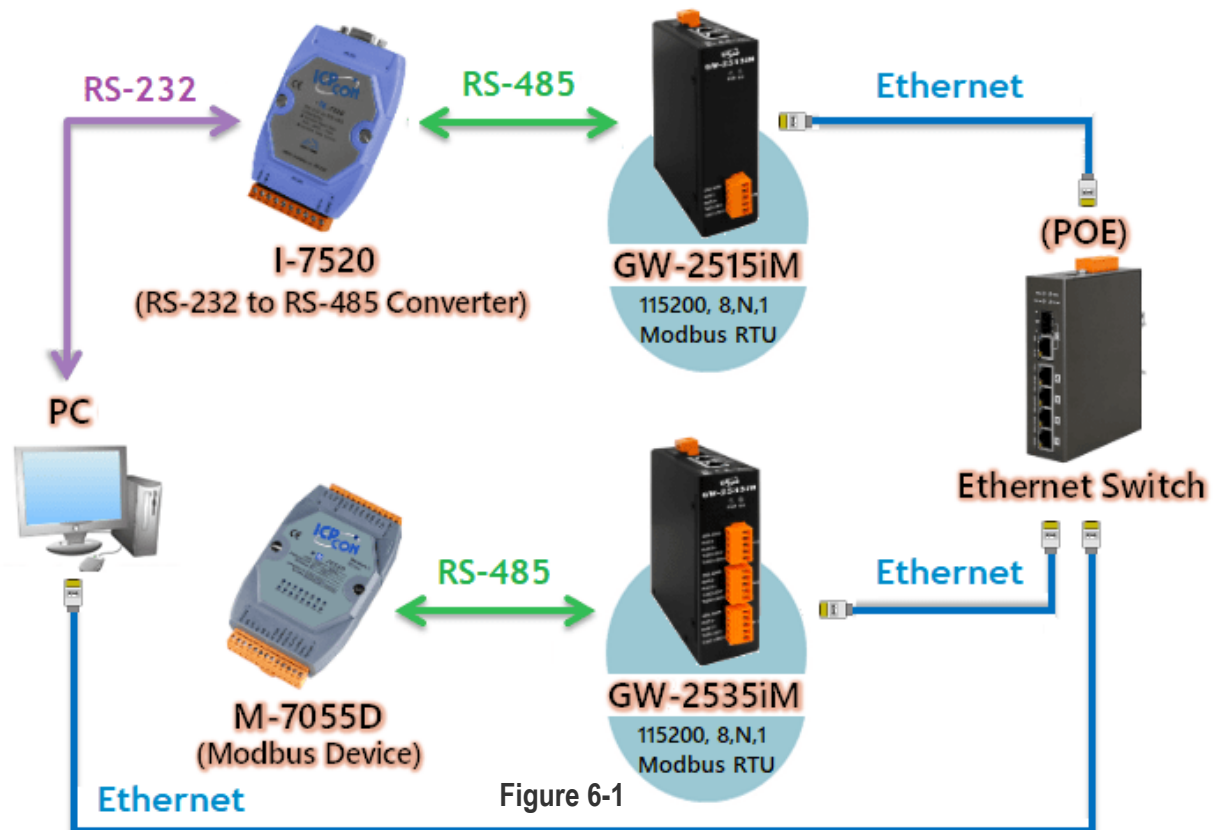
The serial port settings between **GW-2515iM #1** and **GW-2535iM #2** can be different.

Step 1: Connecting to a network, PC and Power

1. Confirm that the GW-2500iM modules are functioning correctly. For detailed information regarding how to install, configure and operate your GW-2500iM series module, refer to [Chapter 3 “Getting Started for IPv4”](#), [Chapter 4 “Getting Started for IPv6”](#) .
2. Use an I-7520 module (optional) to connect the COM1 of Host PC with COM1 of GW-2515iM #1. (I-7520 product page: <http://www.icpdas.com/en/product/I-7520>)
3. Connect the Modbus device (e.g., M-7055D, optional) to COM1 of GW-2535iM #2. (M-7055D product page: <http://www.icpdas.com/en/product/M-7055D-G>)

➤ Refer to **Figure 6-1** for an illustration of how to perform **Steps 1-1 to 1-3** of the procedure described above.

The image below shows an example of the setup for a pair-connection test:



Step 2: Configuring the Ethernet Settings

Contact your Network Administrator to obtain the correct and functioning network configuration for the GW-2500iM modules (including the **IP Address, Mask and Gateway details**).

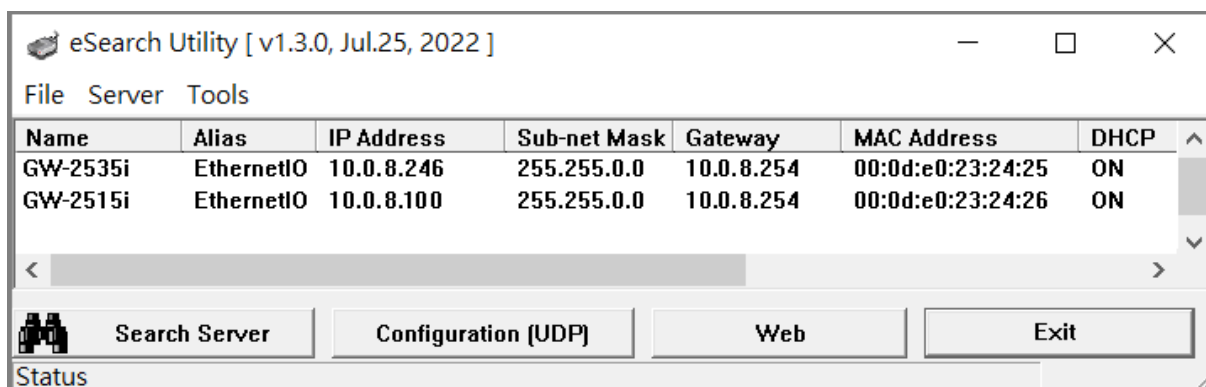


Figure 6-2

Step 3: Configuring the Pair-connection (Client Mode) on the Web Server for GW-2515iM #1

1. Open the eSearch Utility to search for the GW-2500iM modules connected to the network. Click the name of the first GW-2500iM module (GW-2515iM #1) to select it, and then click the **“Web”** button to launch a browser window to connect to the web server on the GW-2515iM #1 module. Alternatively, you can enter the URL for GW-2515iM #1 in the address bar of the browser.
2. When the login screen is displayed, enter the password in the **Login password** field, and then click the **“Sign in”** button to display the configuration page.

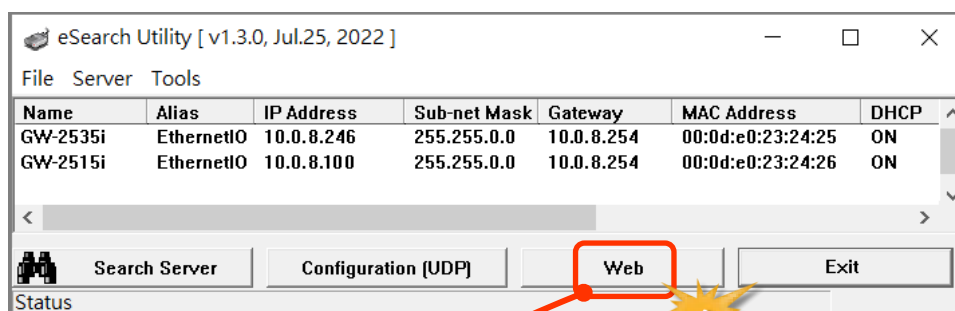
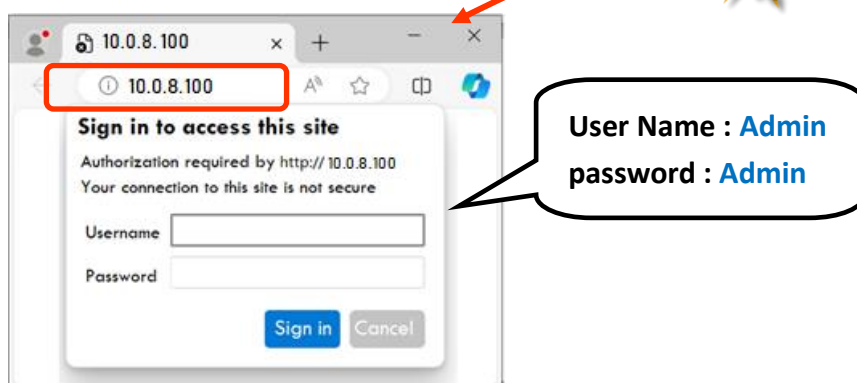


Figure 6-3



3. Click the **“Port1”** tab to display to the **Port1 Settings** page.



Figure 6-4

4. Select the appropriate **Baud Rate**, **Data Format** and **Modbus Protocol** settings from the relevant drop down options. The following is an example: Baud Rate (bps) **"115200"**, Data Bits (bits) **"8"**, Parity **"None"**, Stop Bits (bits) **"1"** and Modbus Protocol **"Modbus RTU"**.

Port 1 Settings

Port Settings	Current	Updated	Comment
Baud Rate	115200	115200 (select)	bps (bits/second)
Data Size	8	8	bits/char
Parity	None	None	
Stop Bits	1	1	
Flow Control	None	None	
Remove Errors	FE BE	☐ Parity Error ☒ Framing Error ☒ Break Error	Clear RX FIFO data when serial errors.
Modbus Settings	Current	Updated	Comment
Slave Timeout	300	300	10 - 65000 ms (step 10), Default: 300
Char Timeout	4	4	4 - 15 bytes, Default: 4
Silent Time	0	0	0 - 65000 ms (step 10), Default: 0
Protocol	Modbus RTU	Modbus RTU	

Figure 6-5

5. In the **Pair-connection Settings** area for Port1, check that the configuration details are the same as those shown below.

Field	Application Mode	Network Protocol	Remote Server IP	Remote TCP Port
Pair-connection Settings	Client	TCP / IPv4	10.0.8.246	502
		Modbus Protocol, IP address and TCP port for GW-2535iM #2		

6. Amend and details as required and then click the **"Submit"** button to complete the configuration.

Pair-Connection Settings (Master/Slave Mode)	Current	Updated	Comment
Application Mode	Client	Client	Server=Slave, Client=Master
Network Protocol	TCP / IPv4	TCP / IPv4	
Remote Server IP	10.0.8.246	10.0.8.246	For example : IPv4 = 10.0.8.100 IPv6 = fc00::1000
Remote TCP Port	502	502	
Submit			

Figure 6-6

Step 4: Configuring the Pair-connection (Server Mode) on the Web Server for GW-2535iM #2

1. In the eSearch Utility, click the name of the second GW-2500iM module (GW-2535iM #2) to select it, and then click the **“Web”** button to launch a browser window to connect to the web server on the GW-2535iM #2 module. Alternatively, you can enter the URL for GW-2535iM #2 in the address bar of the browser.
2. When the login screen is displayed, enter the password (use the default password **“admin”**) in the Password field, and then click the **“Submit”** button to display the configuration page.
3. Click the **“Port1”** tab to display the **Port1 Settings** page.
4. Select the appropriate **Baud Rate, Data Format and Modbus Protocol** settings from the relevant drop down options. The following is an example: Baud Rate (bps) **“9600”**, Data Bits (bits) **“8”**, Parity **“None”**, Stop Bits (bits) **“1”** and Modbus Protocol **“Modbus RTU”**.

➦ Refer to **Figures 6-3 to 6-5** for an illustration of how to perform **Steps 4-1 to 4-4** of the procedure described above.

5. In the **Pair-connection Settings** area for Port1, select **“Server”** from the **“Application Mode”** drop down options.
6. Amend any details as required and then click the **“Submit”** button to complete the configuration.

Pair-Connection Settings (Master/Slave Mode)	Current	Updated	Comment
Application Mode	Server	Server ▼	Server=Slave, Client=Master
Submit			

Figure 6-7

Step 5: Testing the Pair-connection Functions

1. In the eSearch Utility, select the “**Modbus RTU Master**” item from the “**Tools**” menu to open the Modbus TCP Master Utility.

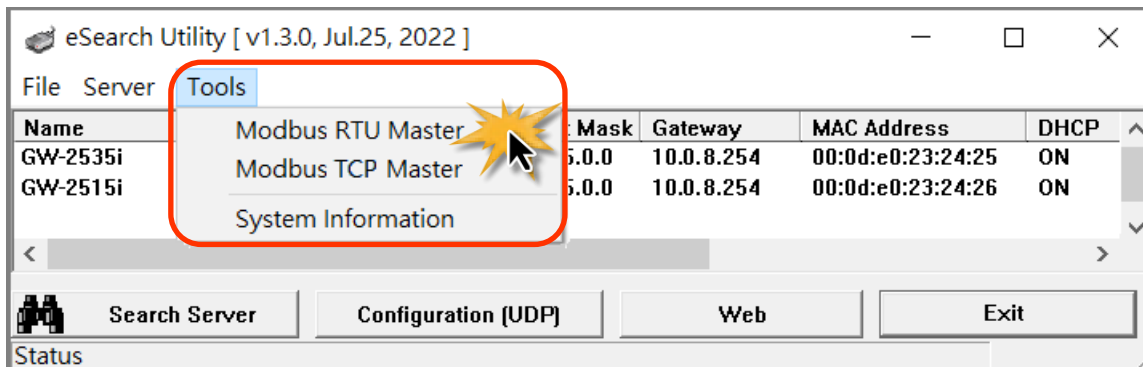


Figure 6-8

2. Select the appropriate COM port, Baud Rate and Data Format (e.g., COM1, 115200, N, 8, 1) settings for the GW-2500iM, and then click the “**Open**” button.

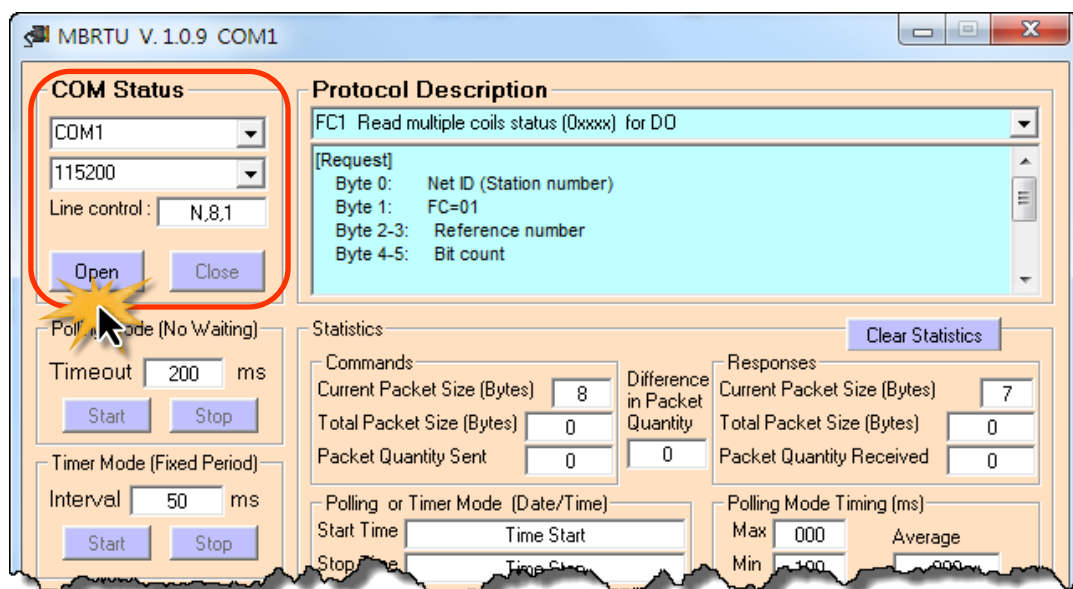


Figure 6-9

3. Refer to the "**Protocol Description**" field in the top right-hand section of the Modbus Utility window. You can **send a request command** and **confirm the response** is correct.

Step 1: Enter the **Modbus command** in the "**Command**" field

Step 2: Click the "**Send Command**" button.

Step 3: If the **response data** is correct, it means the test is success.

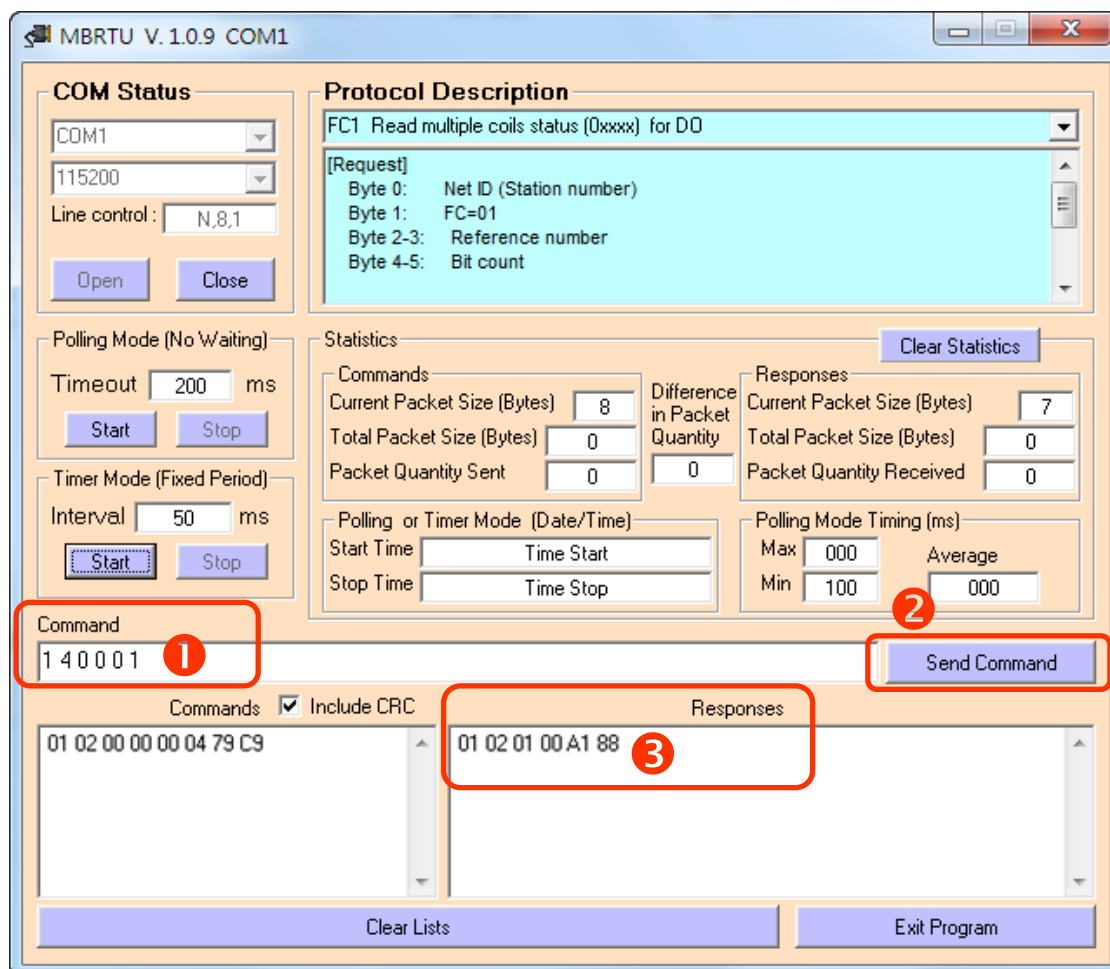


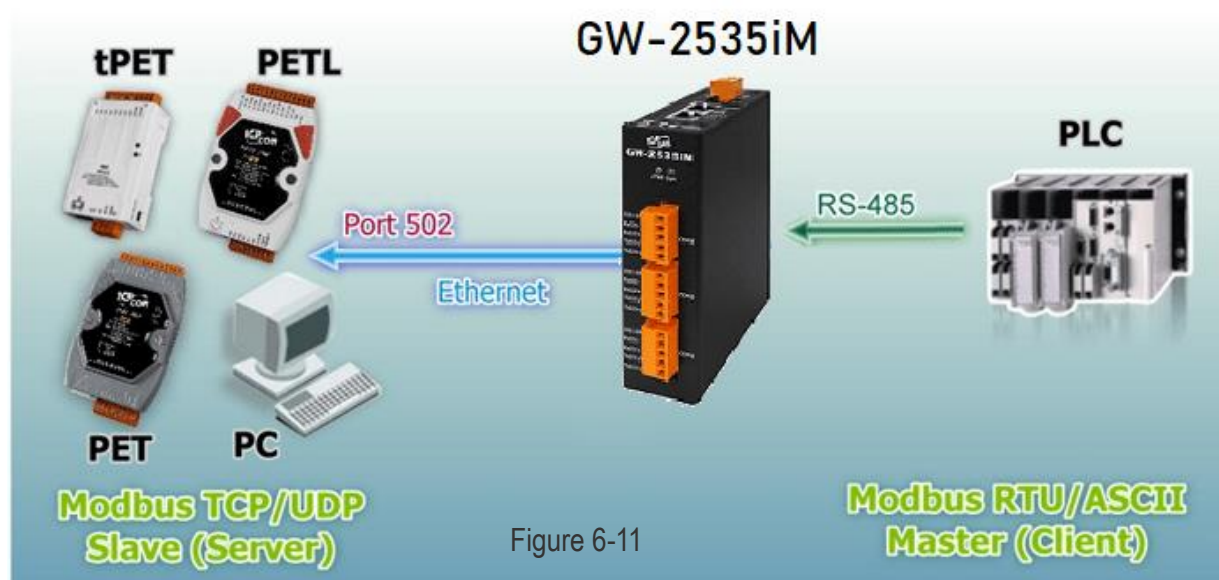
Figure 6-10

Notes:

1. The response will depend on which Modbus device is connected.
2. The Baud Rate and Data Format values depend on the serial port settings configured for the web configuration described above.

6.4 TCP Client Mode Applications

In TCP Client Mode, the GW-2500iM can actively establish a TCP connection to a specific Modbus TCP slave device. An example of how the complete system should operate is shown below:



The following are examples of pair-connection tests:

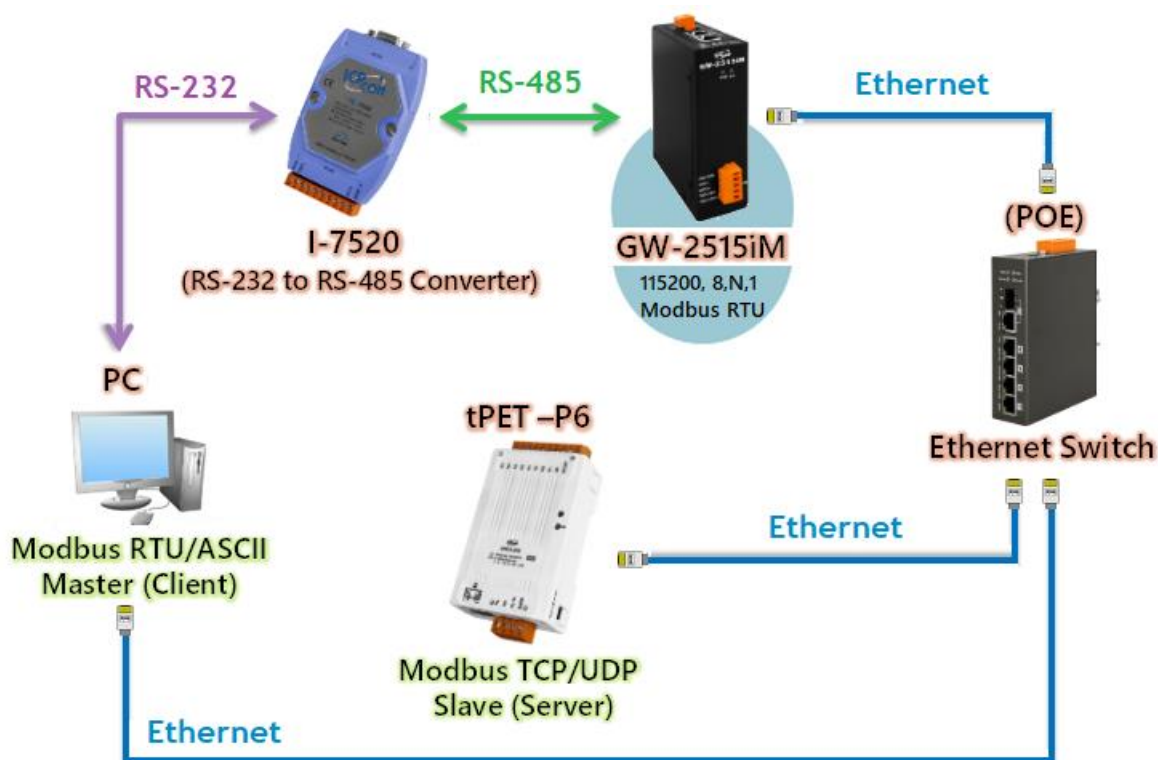
➤ **TCP Client Mode Settings:**

Model	Port Settings (default)		Pair-connection Settings		
	Baud Rate	Data Format	Application Mode	Remote Server IP	Remote TCP Port
GW-2515iM	115200	8, N, 1	Client	10.0.8.10	502
				IP address and TCP port for the tPET-P6 (Slave Device)	
tPET-P6 (Slave Device)	—	—	—	—	—

Step 1: Connecting to a network, a PC and a Power Supply

1. Confirm that the GW-2500iM device is functioning correctly. For detailed information regarding how to install, configure and operate your GW-2500iM series module, refer to [Chapter 3 “Getting Started for GW-2200iM series using IPv4”](#), [Chapter 4 “Getting Started for GW-2500iM series using IPv6”](#).
2. Connect both the GW-2515iM, the Slave Device (e.g. a tPET-P6, optional) and your computer to the same sub network or the same Ethernet Switch. For detailed information regarding RS-422/485 wiring, refer to [Section 2.5 “Wiring Notes for RS-422/485 Interfaces”](#).

The wiring diagram is as follows:



Step 2: Configuring the Ethernet Settings

Contact your Network Administrator to obtain a correct and functioning network configuration (including the **IP Address, Mask and Gateway details**) for the GW-2515iM module.

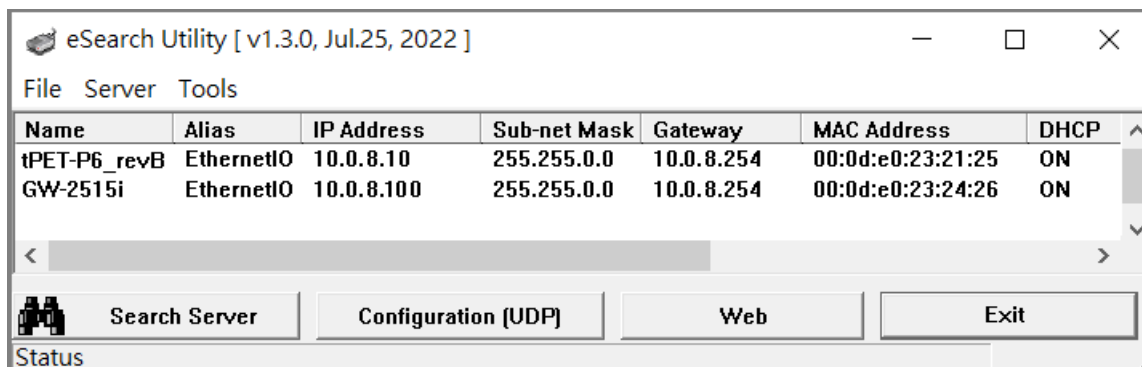


Figure 6-13

Step 3: Configuring Pair-connection (TCP Client Mode) on the Web Server for the GW-2500iM module

1. Open the eSearch Utility to search for the GW-2500iM modules connected to the network. Click the name of the first GW-2500iM module to select it, and then click the **“Web”** button to launch a browser window to connect to the web server on the GW-2500iM module. Alternatively, you can enter the URL for GW-2500iM in the address bar of the browser.
2. When the login screen is displayed, enter the password in the Password field, and then click the **“Sign in”** button to display the configuration page.



Figure 6-14

3. Click the “**Port1**” tab to display the **Port1 Settings** page.



Figure 6-15

4. Select the appropriate **Baud Rate**, **Data Format** and **Modbus Protocol** settings from the relevant drop down options. The following is an example: Baud Rate (bps) “**115200**”, Data Bits (bits) “**8**”, Parity “**None**”, Stop Bits (bits) “**1**” and Modbus Protocol “**Modbus RTU**”.

Port 1 Settings

Port Settings	Current	Updated	Comment
Baud Rate	115200	115200 (select ▼)	bps (bits/second)
Data Size	8	8 ▼	bits/char
Parity	None	None ▼	
Stop Bits	1	1 ▼	
Flow Control	None	None ▼	
Remove Errors	FE BE	☐ Parity Error ☒ Framing Error ☒ Break Error	Clear RX FIFO data when serial errors.
Modbus Settings	Current	Updated	Comment
Slave Timeout	300	300	10 - 65000 ms (step 10), Default: 300
Char Timeout	4	4	4 - 15 bytes, Default: 4
Silent Time	0	0	0 - 65000 ms (step 10), Default: 0
Protocol	Modbus RTU	Modbus RTU ▼	

Figure 6-16

5. In the **Pair-connection Settings** area of the Port1 Settings page, check that the configuration details are the same as those shown below.

Field	Application Mode	Network Protocol	Remote Server IP	Remote TCP Port
Pair-Connection Settings	Client	TCP / IPv4	10.0.8.10	502
		Modbus Protocol, IP address and TCP port of the slave device (e.g., tPET-P6)		

6. Amend any details as required and then click the **“Submit”** button to complete the configuration.

Pair-Connection Settings (Master/Slave Mode)	Current	Updated	Comment
Application Mode	Client	Client	Server=Slave, Client=Master
Network Protocol	TCP / IPv4	TCP / IPv4	
Remote Server IP	10.0.8.10	10.0.8.10	For example : IPv4 = 10.0.8.100 IPv6 = fc00::1000
Remote TCP Port	502	502	

Figure 6-17

Step 4: Testing the Pair-connection (TCP Client Mode) Functions

➤ For more detailed information regarding the testing procedure, refer to **Step 5 (Figures 6-8 to 6-10)** in the [Section 6.3 “Pair-connection Applications”](#).

7. Modbus Information

What is Modbus TCP/IP?

Modbus is a communication protocol developed by Modicon in 1979. You can also visit <http://www.modbus.org> to find more valuable information.

The Different versions of Modbus used today include Modbus RTU (based on serial communication interfaces such as RS485 and RS232), Modbus ASCII and Modbus TCP, which is the Modbus RTU protocol embedded into TCP packets.

Modbus TCP is an internet protocol. The protocol embeds a Modbus frame into a TCP frame so that a connection oriented approach is obtained, thereby making it reliable. The master queries the slave and the slave responds with the reply. The protocol is open and, hence, highly scalable.

7.1 Modbus Message Structure

Modbus devices communicate using a master-slave (client-server) technique in which only one device (the master/client) can initiate transactions (called queries). The other devices (slaves/servers) respond by supplying the requested data to the master, or by taking the action requested in the query.

A query from a master will consist of a slave address (or broadcast address), a function code defining the requested action, any required data, and an error checking field. A response from a slave consists of fields confirming the action taken, any data to be returned, and an error checking field.

Modbus TCP Message Structure

Byte 00~05	Byte 06~11
6-byte header	RTU Data

Leading 6 bytes of Modbus TCP protocol:

Byte 00	Byte 01	Byte 02	Byte 03	Byte 04	Byte 05
Transaction identifier		Protocol identifier		Length field (upper byte)	Length field (lower byte)

Transaction identifier: Assigned by Modbus TCP master (client)

Protocol identifier: 0

Length field (upper byte): 0 (since all messages are smaller than 256)

Length field (lower byte): Number of following RTU data bytes

RTU Data Structure

Byte 06	Byte 07	Byte 08-09	Byte 10-11
Net ID (Station number)	Function Code	Data Field	
		Reference number (Address Mapping)	Number of points

- **Net ID (Station Number):** specifies the address of the receiver (Modbus TCP slave).

The first byte in the message structure of Modbus is the receiver's address. The valid addresses are in the range of 0 to 247. Address 0 is used for broadcast, while addresses 1 to 247 are given to individual Modbus devices.

- **Function Code:** specifies the message type.

The second byte in the frame structure of the Modbus RTU is the function code. The function code describes what the slave is required to do. Valid function codes are between 1 and 255. The slave uses the same function code as the request to answer it. Only when an error occurs in the system will the highest bit of the function code be set to '1'. Hence the master will know whether the message has been transmitted correctly or not.

Code	Function	Reference (Address)
01 (0x01)	Read the Status of the Coils (Readback DOs)	0xxxx
02 (0x02)	Read the Status of the Input(Reads DIs)	1xxxx
03 (0x03)	Read the Holding Registers (Readback AOs)	4xxxx
04 (0x04)	Read the Input Registers (Reads AIs)	3xxxx
05 (0x05)	Force a Single Coil (Writes DO)	0xxxx
06 (0x06)	Preset a Single Register (Writes AO)	4xxxx
15 (0x0F)	Force Multiple Coils (Writes DOs)	0xxxx
16 (0x10)	Preset Multiple Registers (Writes AOs)	4xxxx

➤ **Data Field:** is the data block.

Data is transmitted in 8-, 16- and 32-bit format. The data for 16-bit registers is transmitted in high-byte first format. For example: 0x0A0B ==> 0x0A, 0x0B. The data for 32-bit registers is transmitted as two 16-bit registers, and is low-word first. For example: 0x0A0B0C0D ==> 0x0C, 0x0D, 0x0A, 0x0B.

The data field of messages sent between a master and a slave contains additional information about the action to be taken by the master or any information requested by the slave. If the master does not require this information, the data field can be empty.

Reference (Address)	Description
0xxxx	<u>Read/Write Discrete Outputs or Coils.</u> A 0x reference address is used to output device data to a digital output channel.
1xxxx	<u>Read Discrete Inputs.</u> The ON/OFF status of a 1x reference address is controlled by the corresponding digital input channel.
3xxxx	<u>Read Input Registers.</u> A 3x reference register contains a 16-bit number received from an external source, e.g. an analog signal.
4xxxx	<u>Read/Write Output or Holding Registers.</u> A 4x register is used to store 16bits of numerical data (binary or decimal), or to send the data from the CPU to an output channel.

Note: For details regarding address mapping (Reference Number) depends on your slave device.

01(0x01) Read the Status of the Coils (Readback DOs)

This function code is used to read either the current status of the coils or the current digital output readback value.

[Request]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x01
02-03	Starting DO Address	2 Bytes	Refer to the Modbus address depends on your slave device for more details. Byte 02 = high byte Byte 03 = low byte
04-05	Number of Points (Channels)	2 Bytes	Byte 04 = high byte Byte 05 = low byte

[Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x01
02	Byte Count	1 Byte	Byte Count of the Response ($n = (\text{Points} + 7) / 8$)
03	Data	n Bytes	n= 1; Byte 03 = data bit 7 to 0 n= 2; Byte 04 = data bit 15 to 8 n= m; Byte m+2 = data bit (8m-1) to 8(m-1)

[Error Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x81
02	Exception Code	1 Byte	Refer to the Modbus Standard Specifications for more details

02(0x02) Read the Status of the Input (Read DIs)

This function code is used to read the current digital input value.

[Request]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x02
02-03	Starting DI Address	2 Bytes	Refer to the Modbus address depends on your slave device for more details. Byte 02 = high byte Byte 03 = low byte
04-05	Number of Points (Channels)	2 Bytes	Byte 04 = high byte Byte 05 = low byte

[Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x02
02	Byte Count	1 Byte	Byte Count of Response ($n = (\text{Points} + 7) / 8$)
03	Data	n Bytes	n= 1; Byte 03 = data bit 7 to 0 n= 2; Byte 04 = data bit 15 to 8 n= m; Byte m+2 = data bit (8m-1) to 8(m-1)

[Error Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x82
02	Exception Code	1 Byte	Refer to the Modbus Standard Specifications for more details

03(0x03) Read the Holding Registers (Readback AOs)

This function code is used to readback either the current values in the holding registers or the analog output value.

[Request]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x03
02-03	Starting AO Address	2 Bytes	Refer to the Modbus address depends on your slave device for more details. Byte 02 = high byte Byte 03 = low byte
04-05	Number of 16-bit Registers (Channels)	2 Bytes	Word Count Byte 04 = high byte Byte 05 = low byte

[Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x03
02	Byte Count	1 Byte	Byte Count of the Response (n=Points x 2 Bytes)
03~	Register Values	n Bytes	Register Values n= 2; Byte 03 = high byte Byte 04 = low byte n= m; Byte 03 = high byte Byte 04 = low byte Byte m+1 = high byte Byte m+2 = low byte

[Error Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x83
02	Exception Code	1 Byte	Refer to the Modbus Standard Specifications for more details

04(0x04) Read the Input Registers (Read AIs)

This function code is used to read either the input registers or the current analog input value.

[Request]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x04
02-03	Starting AI Address	2 Bytes	Refer to the Modbus address depends on your slave device for more details. Byte 02 = high byte Byte 03 = low byte
04-05	Number of 16-bit Registers (Channels)	2 Bytes	Word Count Byte 04 = high byte Byte 05 = low byte

[Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x04
02	Byte Count	1 Byte	Byte Count of the Response (n=Points x 2 Bytes)
03~	Register Values	n Bytes	Register Values n= 2; Byte 03 = high byte Byte 04 = low byte n= m; Byte 03 = high byte Byte 04 = low byte Byte m+1 = high byte Byte m+2 = low byte

[Error Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x84
02	Exception Code	1 Byte	Refer to the Modbus Standard Specifications for more details.

05(0x05) Force a Single Coil (Write DO)

This function code is used to set the status of a single coil or a single digital output value.

[Request]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x05
02-03	DO Address	2 Bytes	Refer to the Modbus address depends on your slave device for more details. Byte 02 = high byte Byte 03 = low byte
04-05	Output Value	2 Bytes	0xFF 00 sets the output to ON. 0x00 00 sets the output to OFF. All other values are invalid and will not affect the coil. Byte 04 = high byte Byte 05 = low byte

[Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x05
02-03	DO Address	2 Bytes	The value is the same as Bytes 02-03 of the Request
04-05	Output Value	2 Bytes	The value is the same as Bytes 04-05 of the Request

[Error Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x85
02	Exception Code	1 Byte	Refer to the Modbus Standard Specifications for more details.

06(0x06) Preset a Single Register (Write AO)

This function code is used to set a specific holding register to store the configuration values.

[Request]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x06
02-03	AO Address	2 Bytes	Refer to the Modbus address depends on your slave device for more details. Byte 02 = high byte Byte 03 = low byte
04-05	Register Value	2 Bytes	Register Value Byte 04 = high byte Byte 05 = low byte

[Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x06
02-03	AO Address	2 Bytes	The value is the same as Bytes 02-03 of the Request
04-05	Register Value	2 Bytes	The value is the same as Bytes 04-05 of the Request

[Error Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x86
02	Exception Code	1 Byte	Refer to the Modbus Standard Specifications for more details.

15(0x0F) Force Multiple Coils (Write DOs)

This function code is used to set multiple coils status or write multiple digital output values.

[Request]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x0F
02-03	Starting DO Address	2 Bytes	Refer to the Modbus address depends on your slave device for more details. Byte 02 = high byte Byte 03 = low byte
04-05	Number of Output Channels (Points)	2 Bytes	Byte 04 = high byte Byte 05 = low byte
06	Byte count	1 Byte	$n = (\text{Points} + 7) / 8$
07	Output value	n Bytes	A bit corresponds to a channel. A value of 1 for a bit denotes that the channel is ON, while a value of 0 denotes that the channel is OFF. n= 1; Byte 07 = data bit 7 to 0 n= 2; Byte 08 = data bit 15 to 8 n= m; Byte m+6 = data bit (8m-1)to 8 (m-1)

[Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x0F
02-03	Starting DO Address	2 Bytes	The value is the same as Bytes 02-03 of the Request
04-05	Number of Output Channels (Points)	2Bytes	The value is the same as Bytes 04-05 of the Request

[Error Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1to 247
01	Function Code	1 Byte	0x8F
02	Exception Code	1 Byte	Refer to the Modbus Standard Specifications for more details.

16(0x10) Preset Multiple Registers (Write AOs)

This function code is used to set multiple holding registers that are used to store the configuration values.

[Request]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x10
02-03	Starting AO Address	2 Bytes	Refer to the Modbus address depends on your slave device for more details. Byte 02 = high byte Byte 03 = low byte
04-05	Number of 16-bit Registers (Channels)	2 Bytes	Word Count. Byte 04 = high byte Byte 05 = low byte
06	Byte Count	1 Byte	n = Points x 2 Bytes
07	Register Values	n Bytes	Register Values. n = 2; Byte 03 = high byte Byte 04 = low byte n = m; Byte 03 = high byte Byte 04 = low byte Byte m+1 = high byte Byte m+2 = low byte

[Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x10
02-03	Starting AO Address	2 Bytes	The value is the same as Bytes 02-03 of the Request
04-05	Number of 16-bit Registers (Channels)	2 Bytes	The value is the same as Bytes 04-05 of the Request

[Error Response]

Byte	Description	Size	Value
00	Net ID (Station Number)	1 Byte	1 to 247
01	Function Code	1 Byte	0x90
02	Exception Code	1 Byte	Refer to the Modbus Standard Specifications for more details.

7.2 Exception Codes

If an exception occurs during Modbus communication, the slave device will return an Exception Code in the response message. The following is an explanation of the Exception Codes:

➤ **Exception Codes:**

Code	Name and Description
0x01	ILLEGAL FUNCTION
	Indicates that the function code received in the query is not an allowable action for the slave. If not an allowable action for the slave. If a Poll Program Complete command was issued, this code indicates that no program function preceded it.
0x02	ILLEGAL DATA ADDRESS
	Indicates that the data address received in the query is not an allowable address for the slave.
0x03	ILLEGAL DATA VALUE
	Indicates that a value contained in the query data field is not an allowable value for the slave.
0x04	SLAVE DEVICE FAILURE
	Indicates that an unrecoverable error occurred while the slave was attempting to perform the requested action.
0x05	ACKNOWLEDGE
	Indicates that the slave has accepted the request and is processing it, but it will take an extended period of time to do so. This response is returned to prevent a timeout error from occurring in the master. The master can issue a Poll Program Complete message later to determine whether the processing is complete.
0x06	SLAVE DEVICE BUSY
	Indicates that the slave is engaged in processing a long-duration program command. The master should retransmit the message later when the slave is free.
0x07	NEGATIVE ACKNOWLEDGE
	Indicates that the extended file area failed to pass a consistency check, and the slave cannot perform the program function received in the query. This code is returned when a programming request using function code 13 or 14 decimal was unsuccessful. The master should request diagnostic or error information from the slave.
0x08	MEMORY PARITY ERROR
	Indicates that the slave attempted to read extended memory, but detected a parity error in the memory. The master can retransmit the request, but maintenance may be required on the slave device.

➤ **Defined Exception Codes for GW-2500iM:**

Code	Name and Description
0x0B	GATEWAY TARGET DEVICE FAILED TO RESPOND
	Timeout. The slave device does not respond within the timeout value, the GW-2500iM will return this code.
0x4B	GATEWAY TARGET DATA FAILED TO RESPOND
	Timeout. The slave device is still sending data when timed out, the GW-2500iM will return this code. Please use larger Slave Timeout value for the serial port of the GW-2500iM module.
0x41	MODBUS PROTOCOL FORMAT ERROR
	The GW-2500iM will return this code when slave response is invalid Modbus message.
0x42	WRONG DATA LENGTH
	The GW-2500iM will return this code when GW-2500iM received wrong data length. Please use larger Slave Timeout value for the serial port of the GW-2500iM module.
0x43	CRC ERROR
	The GW-2500iM will return this code when the CRC of the slave response is wrong.

Appendix A: Glossary

1. ARP (Address Resolution Protocol)

The Address Resolution Protocol (ARP) is a telecommunication protocol that is used to convert an IP address to a physical address, such as an Ethernet address.

Consider two machines A and B that share the same physical network. Each has an assigned IP address IP_A and IP_B , and a MAC address, MAC_A and MAC_B . The goal is to devise a low-level software application that hides the MAC addresses and allows higher-level programs to work only with the IP addresses. Ultimately, however, communication must be carried out by the physical networks using whatever MAC address scheme the hardware supplies.

Suppose machine A wants to send a packet to machine B across a physical network to which they are both attached, but A only has the Internet address for B, IP_B . The question arises: how does A map that address to the MAC address for B, MAC_B ?

ARP provides a method of dynamically mapping 32-bit IP address to the corresponding 48-bit MAC address. The term dynamic is used since the mapping is performed automatically and is normally not a concern for either the application user or the system administrator.

2. Clients and Servers

The client-server paradigm uses the direction of initiation to categorize whether a program is a client or server. In general, an application that initiates peer-to-peer communication is called a client. End users usually invoke client programs when they use network services.

By comparison, a server is any program that waits for incoming requests from a client program. The server receives a request from a client, performs the necessary action and returns the result to the client.

3. Ethernet

The term Ethernet generally refers to a standard published in 1982 by Digital Equipment Corp., Intel Corp. and Xerox Corp. Ethernet is the most popular physical layer Local Area Network (LAN) technology in use today.

4. Firmware

Firmware is an embedded software program or set of instructions programmed on a device that provides the necessary instructions for how the device communicated with other computer hardware, and is located or stored in a semi-permanent storage area, e.g., ROM, EEPROM, or Flash memory. Firmware can often be updated by downloading a file from the manufacturer's web site or FTP.

5. Gateway

Computers that interconnect two networks and pass packets from one to the other are called Internet Gateways or Internet Routers. Gateways route packets that are based on the destination network, rather than the destination host.

6. ICMP (Internet Control Message Protocol)

ICMP provides a method of communicating between the Internet Protocol software on one machine and the corresponding software on another. It allows a gateway to send error or control messages to other gateways, or allows a host to diagnose problems with the network communication.

7. Internet

Physically, the Internet is a collection of packet switching networks interconnected by gateways that together with the TCP/IP protocol, allows them to perform logically as a single, large and virtual network. The Internet recognizes hosts using 32-bit IP address.

8. IP (Internet Protocol) Address

Each interface on the Internet must have a unique IP address (also called an Internet address). These addresses are 32-bit numbers, and are normally written as four decimal numbers, one for each byte of the address for example “192.168.41.1”. This is called dotted-decimal notation.

9. MAC (Media Access Control) Address

To allow a computer to determine which packets are meant for it, each device attached to an Ethernet network is assigned a 48-bit integer known as its MAC address (also called the Ethernet address, the hardware address or the physical address). A MAC address is normally written as eight hexadecimal numbers, for example “00:71:88: AF: 12:3e:0f:01”. Ethernet hardware manufacturers purchase blocks of MAC addresses and assign them in sequence as they manufacture Ethernet interface hardware. Thus, no two hardware interfaces can have the same MAC address.

10. Packet

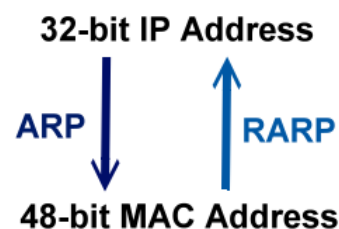
A packet is the unit of data sent across a physical network. It consists of a series of bits containing data and control information, including the source and the destination node (host) address, and is formatted for transmission from one node to another.

11. Ping

Ping is a network administration utility used to test the whether a host on an Internet network is active, and to measure the round-trip time for messages sent from the originating host to a destination computer. Ping operates by sending an ICMP echo request message to a host, expecting an ICMP echo reply to be returned. Normally, if a host cannot be pinged, Telnet or FTP cannot be used to connect to the host. Conversely, if Telnet or FTP cannot be used to connect to a host, Ping is often the starting point to determine the nature of the problem.

12. RARP (Reverse Address Resolution Protocol)

RARP provides a method of dynamically mapping 48-bit MAC address to the corresponding 32-bit IP address. RARP has now been replaced by the Bootstrap Protocol (BOOTP) and the modern Dynamic Host Configuration Protocol (DHCP).



13. Socket

Each TCP segment contains a source and destination port number that can be used to identify the sending and receiving application. These two values, along with the source and destination IP addresses in the IP header, uniquely identify each connection. The combination of an IP address and a port number is called a socket.

14. Subnet Mask

A Subnet mask, often simply called the “Mask”, is a 32-bit number that masks an IP address, and divides the IP address into the network address and the host address. Given its own IP address and its subnet mask, a host can determine whether a TCP/IP packet is destined for a host that is (1) on its own subnet, or (2) on a different network. If (1), the packet will be delivered directly; otherwise it will be delivered via a gateway or a router.

15. TCP (Transmission Control Protocol)

TCP is a set of rules used in combination with the Internet Protocol to send data in the form of message units between computers over the Internet. TCP provides a reliable flow of data between two hosts and is associated with tasks such as dividing the data passed to it from an application into appropriately sized chunks for the network layer below, acknowledging received packets, setting timeouts to make certain that the other end acknowledges packets that are sent, and so on.

16. TCP/IP

The Transmission Control Protocol (TCP) and the Internet Protocol (IP) are standard network protocols that are almost always implemented and used together in a combination known as TCP/IP. TCP/IP can be used to communicate across any set of interconnected networks.

17. UDP (User Datagram Protocol)

UDP is an Internet protocol that provides a much simpler service to the application layer as it only sends packets of data from one host to another, but there is no guarantee that the packets will reach the destination host. UDP is suitable for purposes where error checking and correction is either not necessary or is performed in the application.

Appendix B: Actual Baud Rate Measurement

Ideal Baud Rate (bps)	Actual Baud Rate (bps)	Error
300	298.48	0.51%
600	597.04	0.49%
1200	1197.6	0.20%
2400	2395.2	0.20%
4800	4790.4	0.20%
9600	9568.0	0.33%
14400	14392	0.05%
19200	19136	0.33%
38400	38464	0.17%
57600	57552	0.08%
115200	114960	0.21%
128000	128240	0.18%
230400	229920	0.21%
250000	250000	0.00%
256000	256400	0.15%
460800	459760	0.22%
921600	921600	0.00%

Note:

Recommended max baud rate is 115200 bps or below.

Because the loading of the module, we don't guarantee a proper operation if using a larger baud rate (over 115200 bps).

Appendix C: Revision History

This chapter provides revision history information to this document.

The table below shows the revision history.

Revision	Date	Description
1.0	Nov. 2025	Initial issue