

460PSA - Protocol Gateway

Product User Guide

Software Build Date: November 21st 2013
Version 2

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Overview

The PSA gateway connects a PROFINET IO Controller to as many as 2 ASCII devices.

The gateway can connect the following combinations of ASCII devices:

- **1 – RS232 ASCII device**
- **1 or 2 – RS485 ASCII devices**
 - **If connecting 2 RS485 ASCII devices, the default jumper configuration will need to be modified (see Port Configuration page for more details).**
- **1 – RS232 ASCII device AND 1 – RS485 ASCII device**

By following this guide, you will be able to configure the PSA gateway.

You will set the gateway's network settings, configure device specific parameters for initial operation, and integrate the device into your application.

For further customization and advanced use, please reference the appendices located on the CD. If at any time you need further assistance do not hesitate to call Real Time Automation support.

Support Hours are Monday-Friday 8am-5pm CST

Support: 262-439-4022

Toll free: 800-249-1612

Email: support@rtaautomation.com

Required Tools and Data

You will need the following tools:

- The gateway
- The provided CD-ROM
 - IPSetup.exe can also be downloaded:
<http://www.rtaautomation.com/support/460EDX/>
- A PC with an internet browser
 - Browser configuration is Firefox / Internet Explorer / Google Chrome compatible
- The supplied Ethernet crossover cable
- A 7-30 VDC power source

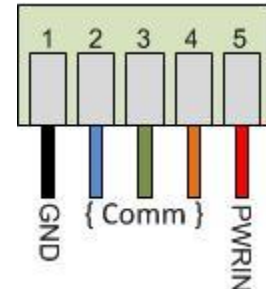
Accessing the Main Page

The following steps will allow you to connect to the browser based configuration of the gateway.

1) Connect a 7-30 VDC power source to the gateway.

a. **Warning** improper wiring will cause unit failure

b. Use the Barrel Connector **OR** the Screw Terminals power connection, **NOT** both



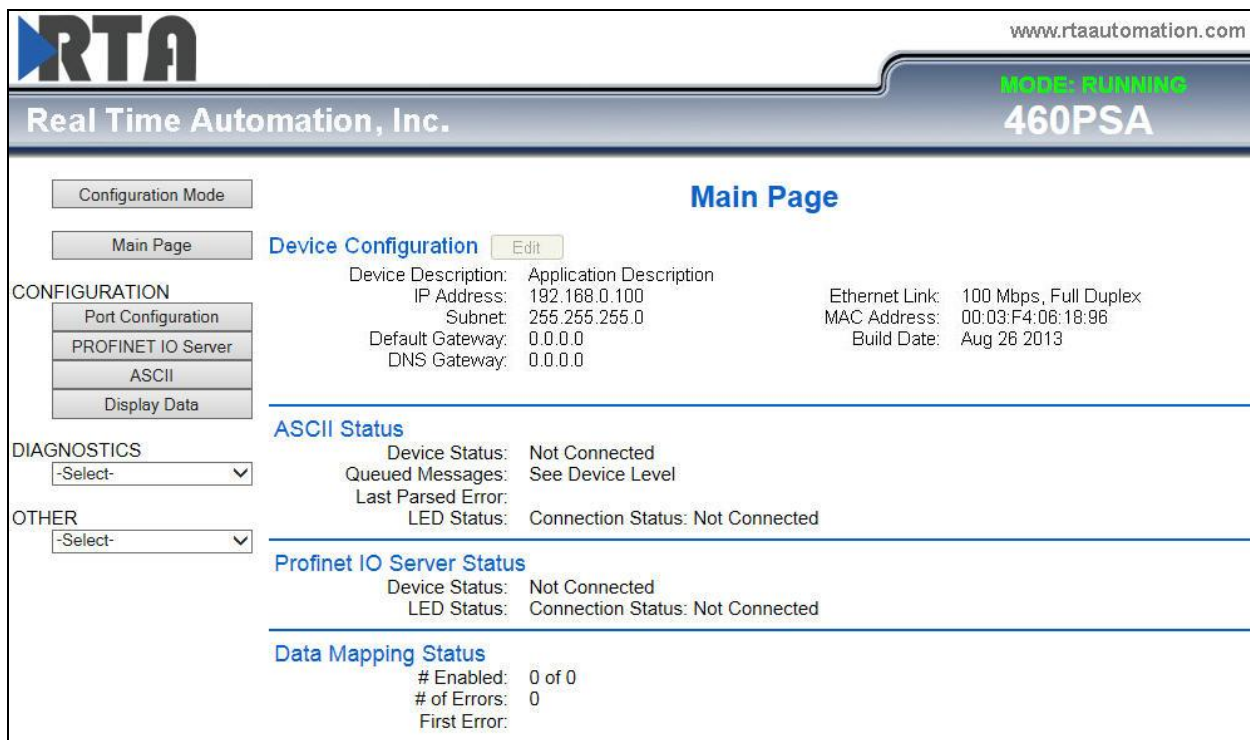
2) Using the supplied crossover cable, connect the gateway to your PC.

3) Insert the provided CD-ROM.

4) Run the IPSetup.exe program from the CD-ROM.

5) Configure the IP Settings of the gateway to be on the same subnet as your PC.

6) Click **Launch Webpage**. The Main page should appear.



RTA Real Time Automation, Inc. www.rtaautomation.com

MODE: RUNNING
460PSA

Main Page

Configuration Mode:

CONFIGURATION

- Port Configuration
- PROFINET IO Server
- ASCII
- Display Data

DIAGNOSTICS

-Select- ▼

OTHER

-Select- ▼

Device Configuration

Device Description:	Application Description	Ethernet Link:	100 Mbps, Full Duplex
IP Address:	192.168.0.100	MAC Address:	00:03:F4:06:18:96
Subnet:	255.255.255.0	Build Date:	Aug 26 2013
Default Gateway:	0.0.0.0		
DNS Gateway:	0.0.0.0		

ASCII Status

Device Status: Not Connected
Queued Messages: See Device Level
Last Parsed Error:
LED Status: Connection Status: Not Connected

Profinet IO Server Status

Device Status: Not Connected
LED Status: Connection Status: Not Connected

Data Mapping Status

Enabled: 0 of 0
of Errors: 0
First Error:

Default IP Address is 192.168.0.100.

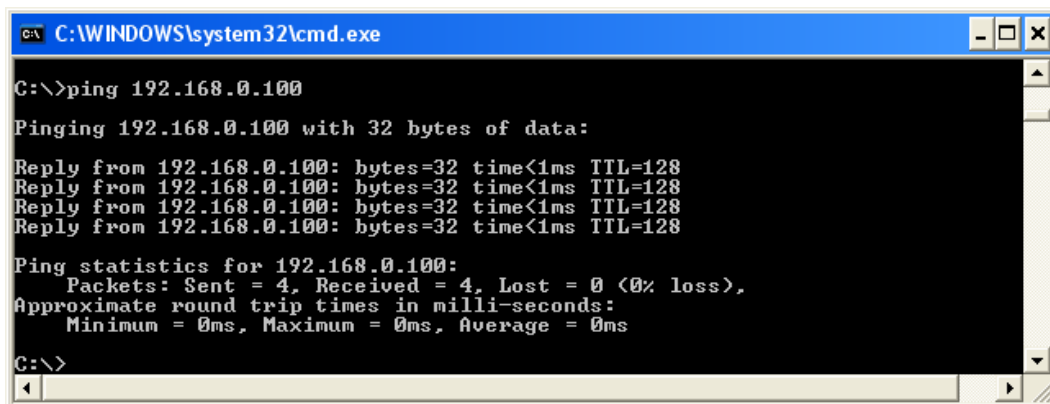
Default Subnet is 255.255.255.0.

Error: Main Page Does Not Launch

If the Main Page does not launch please verify the following:

1. Check that the PC is set for a Static IP Address
 - a. Open a MS-DOS Command Prompt
 - b. Type "ipconfig" and press enter
 - c. Note the PC's IP Address, Subnet, and Default Gateway
 - i. An invalid IP Address would be: 169.254.x.x
2. The gateway must be on the same Network/Subnet as the PC

Once you have both devices on the same network, you should be able to ping the gateway using a MS-DOS Command Prompt.



```
C:\WINDOWS\system32\cmd.exe

C:\>ping 192.168.0.100

Pinging 192.168.0.100 with 32 bytes of data:

Reply from 192.168.0.100: bytes=32 time<1ms TTL=128
Reply from 192.168.0.100: bytes=32 time<1ms TTL=128
Reply from 192.168.0.100: bytes=32 time<1ms TTL=128
Reply from 192.168.0.100: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.0.100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

If you are able to successfully ping your gateway, open a browser and try to view the main page of the gateway by entering the IP Address of the gateway as the URL.



Main Page

The main page is where important information about your gateway and its connections are displayed.

Mode (orange box below):

Running Mode:

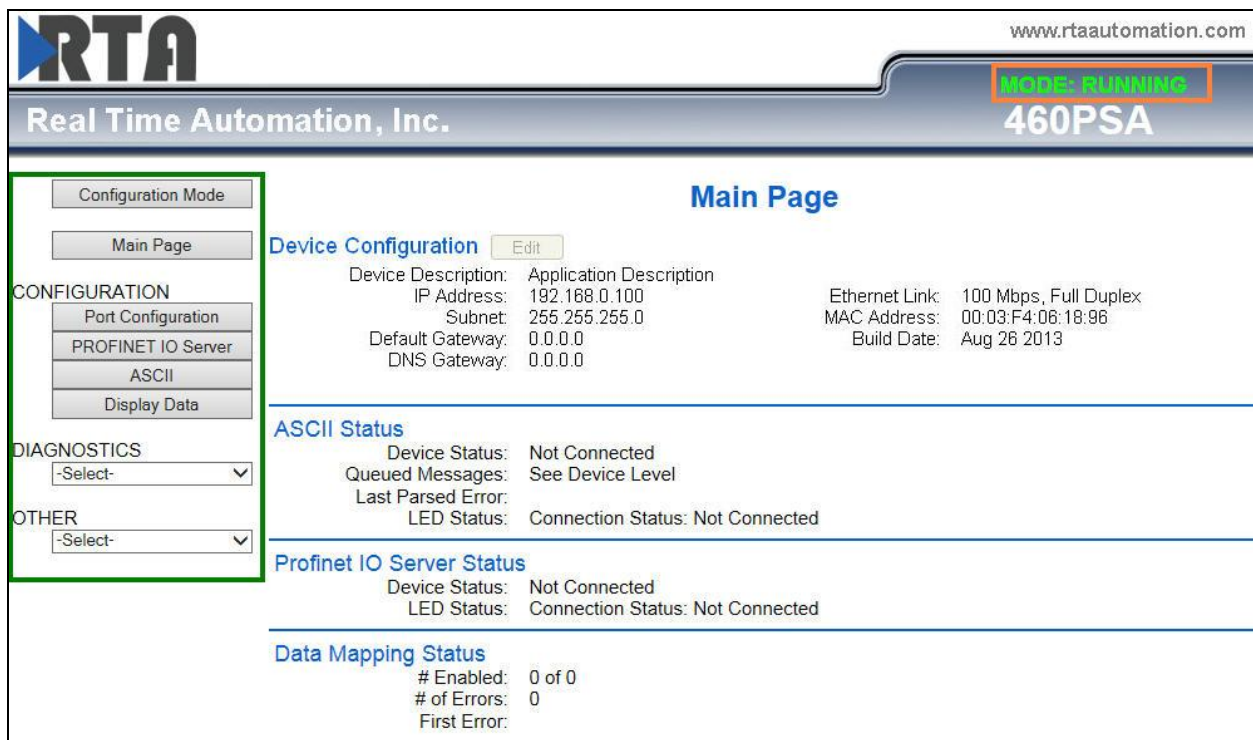
- Protocol communications are enabled
- Configuration cannot be changed during Running Mode. If changes are needed, click the **Configuration Mode** button shown in the green box below

Configuring Mode:

- Protocol communication is stopped and no data is transmitted
- Configuration is allowed

Navigation (green box below):

You can easily switch between modes and navigate between pages (Configuration, Diagnostics, and Other pages) using the buttons on the left hand side.



The screenshot shows the RTA 460PSA Main Page. The top header includes the RTA logo, the company name "Real Time Automation, Inc.", and the website "www.rtaautomation.com". The current mode is "MODE: RUNNING" (highlighted in an orange box) and the device is "460PSA". On the left, a navigation menu (highlighted in a green box) contains buttons for "Configuration Mode", "Main Page", "CONFIGURATION" (with sub-items: Port Configuration, PROFINET IO Server, ASCII, Display Data), "DIAGNOSTICS" (with a dropdown), and "OTHER" (with a dropdown). The main content area is titled "Main Page" and displays the following information:

- Device Configuration** (with an "Edit" button):
 - Device Description: Application Description
 - IP Address: 192.168.0.100
 - Subnet: 255.255.255.0
 - Default Gateway: 0.0.0.0
 - DNS Gateway: 0.0.0.0
 - Ethernet Link: 100 Mbps, Full Duplex
 - MAC Address: 00:03:F4:06:18:96
 - Build Date: Aug 26 2013
- ASCII Status**:
 - Device Status: Not Connected
 - Queued Messages: See Device Level
 - Last Parsed Error: LED Status: Connection Status: Not Connected
- Profinet IO Server Status**:
 - Device Status: Not Connected
 - LED Status: Connection Status: Not Connected
- Data Mapping Status**:
 - # Enabled: 0 of 0
 - # of Errors: 0
 - First Error:

Device Configuration

The device configuration area is where you assign the device description, IP address, and other network parameters. Changes can only be made when the gateway is in Configuration Mode. Click the **Edit** button to make these changes.



www.rtaautomation.com

MODE: CONFIGURING

460

Real Time Automation, Inc.

Main Page

Device Configuration **Edit**

CONFIGURATION

BACnet/IP Server

Allen-Bradley PLC

Display Data

Restart Now

Refresh

Device Description: Application Description

IP Address: 10.1.54.201

Subnet: 255.255.0.0

Default Gateway: 0.0.0.0

DNS Gateway: 0.0.0.0

Ethernet Link: Auto-Negotiate

MAC Address: 00:03:F4:06:5E:4C

Build Date: May 7 2013

Save Parameters

Once you are done configuring the Description and the Network Settings, click the **Save Parameters** button.

If you are changing the IP Address of the gateway, the change will not take effect until the unit has been rebooted. After reboot, you must enter the new IP Address into the URL.

It is recommended to leave the DNS Gateway set to 0.0.0.0 and the Ethernet Link as Auto-Negotiate. If configuring the gateway to use E-mail, the DNS Gateway must be set.

Port Configuration

The Port Configuration page is where you set port specific parameters. These settings must match the settings of the device(s) that you are connecting to.

When you have completed your port configuration, click the **Save Parameters** button.

Comm Ports Configuration

Enable Port 0: ☐

Mode: RS485 (2-wire; Half Duplex) ▾

Baud: 19200 ▾

Parity: None ▾

Data Bits: 8 ▾

Stop Bits: 1 ▾

Flow Control: None ▾

RTS: High (default) ▾ (RS232 only)

DTR: High (default) ▾ (RS232 only)

RS485 (2-Wire)

Enable Port 1: ☐

Mode: RS232 ▾

Baud: 19200 ▾

Parity: None ▾

Data Bits: 8 ▾

Stop Bits: 1 ▾

Flow Control: None ▾

RTS: High (default) ▾ (RS232 only)

DTR: High (default) ▾ (RS232 only)

RS232

The default jumper configurations are setup for the following serial modes:

- Port 0 - RS485
- Port 1 - RS232

If you require a different serial mode, please refer to the **Hardware_Jumper_Configuration.pdf** on the CD to make jumper changes.

PROFINET IO Server Configuration

Click the **PROFINET IO Server** button to display the PROFINET configuration page.

- 1) **Device Label:** Enter a label to identify the PROFINET IO Server within the Controller. This name must match the Device Name field in the PROFINET IO Controller. It is case-sensitive.

Profinet IO Server Configuration	Help
Device Label: <input type="text" value="ps01"/>	

WARNING:

This gateway does not support the assignment of the IP address via the IO controller function. This function must be disabled for the system to function properly.

PROFINET IO Server Slot Configuration

The bottom area of the PROFINET IO Server Configuration page lets you configure multiple Input and Output Slots.

- 1) Data Size is configurable. Options include: 8, 16, 32, 64, and 128 Bytes.
- 2) Data Format sets the formatting of the data. Automap will use this packing size to map data to/from the other protocol.

There are two ways to configure this protocol:

- Auto-Server Mode(Default)
- Manual Mode

NOTE: You may go back and forth between modes, but when reverting from Manual Mode to Auto-Server Mode, all changes made in Manual Mode will be discarded.

Input Slots (460PSA to Profinet IO)

Slot	Data Size (Bytes)	Data Format
1	Disabled ▼	16 Bit Int ▼
2	Disabled ▼	16 Bit Int ▼
3	Disabled ▼	16 Bit Int ▼
4	Disabled ▼	16 Bit Int ▼
5	Disabled ▼	16 Bit Int ▼
6	Disabled ▼	16 Bit Int ▼
7	Disabled ▼	16 Bit Int ▼
8	Disabled ▼	16 Bit Int ▼
9	Disabled ▼	16 Bit Int ▼
10	Disabled ▼	16 Bit Int ▼

Output Slots (Profinet IO to 460PSA)

Slot	Data Size (Bytes)	Data Format
11	Disabled ▼	16 Bit Int ▼
12	Disabled ▼	16 Bit Int ▼
13	Disabled ▼	16 Bit Int ▼
14	Disabled ▼	16 Bit Int ▼
15	Disabled ▼	16 Bit Int ▼
16	Disabled ▼	16 Bit Int ▼
17	Disabled ▼	16 Bit Int ▼
18	Disabled ▼	16 Bit Int ▼
19	Disabled ▼	16 Bit Int ▼
20	Disabled ▼	16 Bit Int ▼

PROFINET IO Server Slot Configuration: Auto-Server Mode (Default)

While in Auto-Server mode the Data Groups themselves cannot be edited. Auto-Server Mode looks at the other protocol and then configures the Data Groups to match. The Data Size and Data Formats will be defined after the other protocol is configured.

The data will be configured according to the following rules:

- Any 8 Bit Signed/Unsigned data will be mapped as **8 Bit Int or 8 Bit Uint**, matching signs whenever possible.
- Any 16 Bit Signed/Unsigned data will be mapped as **16 Bit Int or 16 Bit Uint**, matching signs whenever possible.
- Any 32 Bit Signed/Unsigned data will be mapped as **32 Bit Int or 32 Bit Uint**, matching signs whenever possible.
- Any 64 Bit Signed/Unsigned data will be mapped as **64 Bit Int or 64 Bit Uint**, matching signs whenever possible.
- Any 32 Bit Float will be mapped as **32 Bit Float**.
- Any 64 Bit Float will be mapped as **64 Bit Float**.
- Any Strings will be mapped as **Short String**.
- Any Coils or 8/16/32 Bit Binary Packs will be mapped as **Binary 8 Bit Pack/Binary 16 Bit Pack/Binary 32 Bit Pack**, matching bit sizes whenever possible.
- The Input or Output direction depends on whether it is configured as an Input/Read or Output/Write on the other protocol.
- If the other protocol exceeds the number of data size supported, then nothing will be mapped. You will see all the Data Size values remain at Disabled and the main page will display the following error:



ERROR XX_460 Re-initialization (Auto-Config Failed -9)

- To fix this error, simply decrease the amount of data you configured on the other protocol so that the max data size is not exceeded OR call customer support to increase the limits.

To edit slot data sizes or formats you will need to go into Manual Mode.

PROFINET IO Server Slot Configuration: Manual Mode

- Click the **Edit Data Groups** button to switch from Auto-Server Mode to Manual Mode. Once clicked the button will read **Auto-Configure Server**. The fields next to the different Slots can now be edited.
 - When prompted, click **OK** to confirm mode change or **Cancel** to remain in Auto Mode.
 - Click **OK** again to keep current Data Group settings or click **Cancel** to discard the current configuration.
- Input Slots: Select the data size, in bytes, to move data from the gateway to the Controller. Then select the data format for that slot.
- Output Slots: Select the data size, in bytes, to move data from the Controller to the gateway. Then select the data format for that slot.

Example:

Siemens PLC Configuration:

Slot	Module	Order number	I address	Q address	Diagnostic address:	Comment
0	PS01	6ES7 300-0CA00			2042*	
X1	Interface				2041*	
P1	RJ45 10/100				2040*	
1	8 bytes I		0...7			
2	128 bytes I		128...255			
3						
4						
5						
6						
7						
8						
9						
10						
11	32 bytes Q			0...31		
12						
13						
14						

Gateway Configuration:

Input Slots

Slot	Data Size (Bytes)	Data Format
1	8	16 Bit Uint
2	128	64 Bit Float
3	Disabled	16 Bit Int
4	Disabled	16 Bit Int
5	Disabled	16 Bit Int

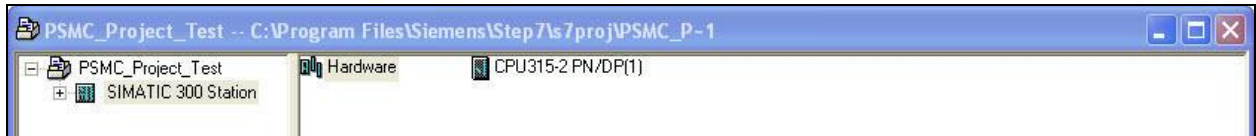
Output Slots

Slot	Data Size (Bytes)	Data Format
11	32	32 Bit Int
12	Disabled	16 Bit Int
13	Disabled	16 Bit Int
14	Disabled	16 Bit Int
15	Disabled	16 Bit Int

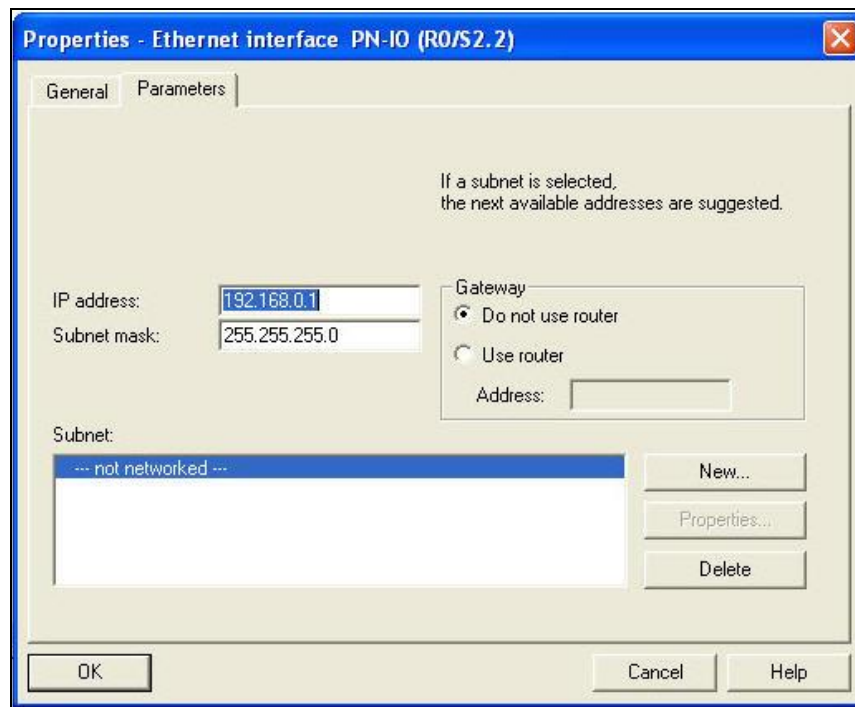
Setting up the PLC- Example Using Simatic Step 7 software

This is how you would set up the example on the previous page using Simatic Step 7:

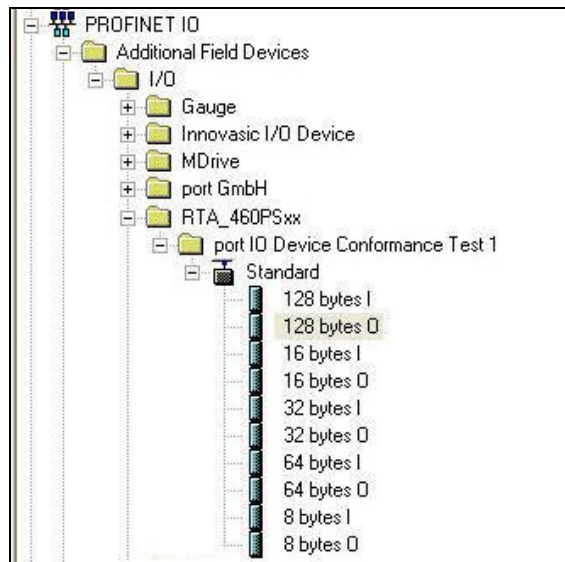
1. Use the .gsd file provided on the CD that shipped with the unit.
2. In your project, click the CPU and you should see the Hardware option in the right pane. Double click on the Hardware icon.



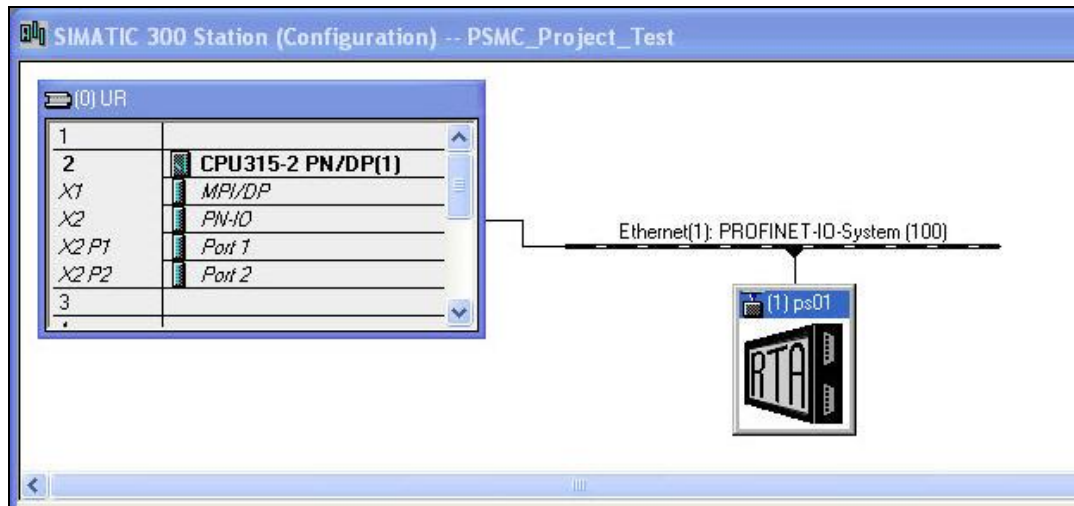
3. Right-click on the PN-IO block and select **Insert PROFINET IO System**.
4. In the properties window, set the IP Address to match that of the PROFINET I/O Controller and press **New** and **OK**.



5. Find the RTA device in the I/O tree. It will be under PROFINET IO->Additional Field Devices->I/O ->RTA_460PSxx->port IO Device Conformance Test 1->Standard.



6. Once found, drag the Standard icon into the network line you created in Step 4.



7. Double-click the gateway icon to open the properties window. Make sure the **Device Name** field matches exactly (case-sensitive) to the **Device Label** field in the PROFINET IO Server Configuration page. Uncheck the **Assign IP Address via IO controller option** and press **OK**.

Properties - ps01

General Identification

Short description: PS01
RTA460 IO Gateway

Order No./ firmware: 6GK1 953-0CA00 / Z1.0

Family: RTA_460PSxx

Device name: ps01

GSD file: GSDML-V2.2-RTA-460PN-20120202.xml
Change Release Number...

Node in PROFINET IO System:

Device number: 1 PROFINET-IO-System (100)

IP address: Ethernet...

☐ Assign IP address via IO controller

Comment:

OK Cancel Help

- Expand the Standard node on the right panel to show the available modules to insert (Refer to the picture in Step 5).

Input Slots			Output Slots		
Slot	Data Size (Bytes)	Data Format	Slot	Data Size (Bytes)	Data Format
1	8	16 Bit Uint	11	32	32 Bit Int
2	128	64 Bit Float	12	Disabled	16 Bit Int
3	Disabled	16 Bit Int	13	Disabled	16 Bit Int
4	Disabled	16 Bit Int	14	Disabled	16 Bit Int
5	Disabled	16 Bit Int	15	Disabled	16 Bit Int

To match the above configuration in the 460 gateway, add one 8-byte input module to slot 1, one 128-byte input module to slot 2, and one 32-byte output module to slot 11.

Siemens PLC Configuration:

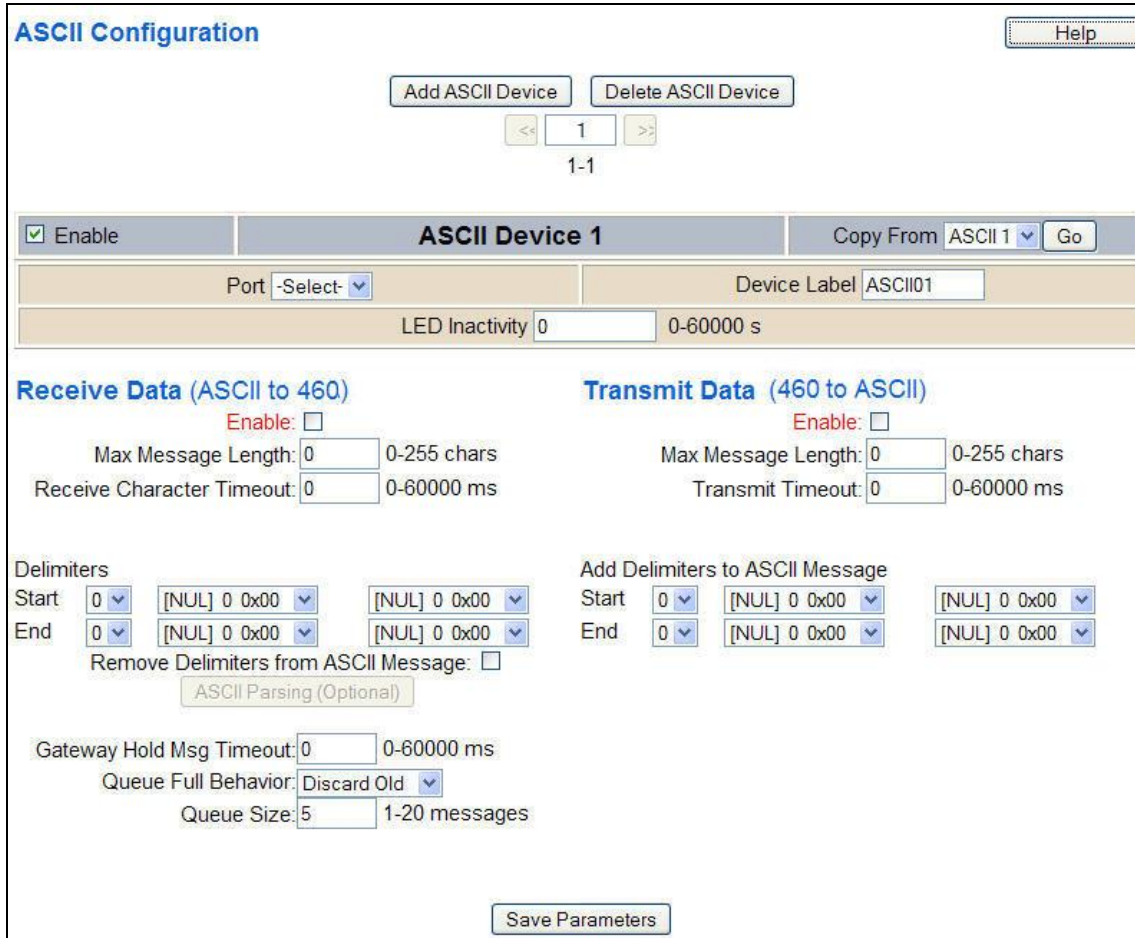
(1) PS01						
Slot	Module	Order number	I address	Q address	Diagnostic address:	Comment
0	PS01	6ES7 303-1EA00			2042*	
X1	Interface				2041*	
F1	PS145 10/10				2040*	
1	8 bytes I		0...7			
2	128 bytes I		128...255			
3						
4						
5						
6						
7						
8						
9						
10						
11	32 bytes Q			0...31		
12						
13						
14						

9. When finished, click the **Save and Compile** button and then the **Download to PLC** button.



ASCII Configuration

Click the **ASCII** button to access the primary configuration page for this device.



The screenshot shows the 'ASCII Configuration' web interface. At the top, there are buttons for 'Add ASCII Device' and 'Delete ASCII Device', along with a page indicator '1-1'. Below this is a section for 'ASCII Device 1' with an 'Enable' checkbox checked. It includes a 'Copy From' dropdown set to 'ASCII 1' and a 'Go' button. The configuration fields include 'Port' (a dropdown menu), 'Device Label' (set to 'ASCII01'), and 'LED Inactivity' (set to '0' seconds). The interface is divided into two main sections: 'Receive Data (ASCII to 460)' and 'Transmit Data (460 to ASCII)'. Each section has an 'Enable' checkbox, 'Max Message Length' (0-255 chars), and 'Receive/Transmit Character Timeout' (0-60000 ms). Below these are 'Delimiters' settings for 'Start' and 'End' characters, each with three dropdown menus. There is a checkbox for 'Remove Delimiters from ASCII Message' and a button for 'ASCII Parsing (Optional)'. At the bottom, there are settings for 'Gateway Hold Msg Timeout' (0-60000 ms), 'Queue Full Behavior' (set to 'Discard Old'), and 'Queue Size' (5 messages). A 'Save Parameters' button is located at the bottom right.

- 1) To add an additional ASCII connection, click the **Add ASCII Device** button. This button will be grayed out if the max number of ASCII devices has already been configured. Repeat steps 2-5 for each device.
 - To remove a device, click the **Delete ASCII Device** button.
 - To copy parameters from a device you have already configured, select the device you wish to copy from in the *Copy From* dropdown menu. Then, click the **Go** button. Once copied, you can make any changes necessary.
- 2) The **Enable** check box should be selected for the device.
- 3) **Port:** Select which serial port is being used for communication. This port must be configured on the Port Configuration page. If it has not yet been configured, it will not display in this dropdown.
- 4) Enter a **Device Label** to identify the device within the gateway.
- 5) **LED Inactivity Timeout:** Enter the amount of time, in seconds, to wait before flashing the LED red indicating that no messages have been received or transmitted during this time.

Receive Data

This side is configured to receive data from the ASCII device into the gateway.

Receive Data (ASCII to 460)

Enable: ☐

Max Message Length: 0-255 chars

Receive Character Timeout: 0-60000 ms

Delimiters

Start

End

Remove Delimiters from ASCII Message: ☐

ASCII Parsing (Optional)

Gateway Hold Msg Timeout: 0-60000 ms

Queue Full Behavior:

Queue Size: 1-20 messages

Use the following fields to determine when a message has been received.

1. **Enable:** Check this box to move data from the ASCII device to the Gateway.
2. **Max Message Length:** Enter the max number of characters that can be received by the gateway.
Example: Max Message Length is set to 5 and the message of "helloworld" was sent by the ASCII device. This will be sent to the other protocol as "hello" followed by "world" as two messages.
3. **Receive Character Timeout:** Enter the max amount of time (in ms) between characters that the gateway will wait before issuing a timeout and calling the message complete.
4. **Number of Start Delimiters:** Select the number of delimiters that the gateway should look for before the gateway processes the data.
5. **Select Start Delimiters:** Select the Start Delimiters that the gateway should look for.
6. **Number of End Delimiters:** Select the number of delimiters that the gateway should look for to call a message complete.
7. **Select End Delimiters:** Select the End Delimiters that the gateway should look for.
8. **Remove Delimiters from ASCII Message:** If checked, the gateway will remove all delimiters that have been configured before sending it to the other protocol.
9. **ASCII Parsing (Optional):** Additional parsing can be performed on the string before being passed to the other protocol. See the ASCII Parsing section for more information.
10. **Gateway Hold Msg Timeout:** Enter the amount of time (in ms) to wait before sending a new message to the other protocol.
11. **Queue Full Behavior:** Select which message to discard when the Queue is full. Once the Queue is full, the gateway will discard either the oldest or newest message. (Only used if Gateway Hold Msg Timeout is non-zero.)
12. **Queue Size:** Select how many complete messages the gateway will hold before starting to discard. (Only used if Gateway Hold Msg Timeout is non-zero.)

Transmit Data

This side is configured to transmit data from the gateway into the ASCII device.

Transmit Data (460 to ASCII)
Enable: ☐
Max Message Length: 0-255 chars
Transmit Timeout: 0-60000 ms

Add Delimiters to ASCII Message

Start	<input type="text" value="0"/>	<input type="text" value="[NUL] 0 0x00"/>	<input type="text" value="[NUL] 0 0x00"/>
End	<input type="text" value="0"/>	<input type="text" value="[NUL] 0 0x00"/>	<input type="text" value="[NUL] 0 0x00"/>

Use the following fields to help the 460 determine when an entire message has been received.

1. **Enable:** Check this box for moving data from the Gateway to the ASCII device.
2. **Max Message Length:** Enter the max number of characters that can be transmitted by the gateway.
3. **Transmit Timeout:** Enter the amount of time (in ms) that the gateway waits before sending an ASCII message (0 Sends Immediately). If the data has changed before the time expires, the gateway immediately sends the message to the ASCII device.
4. **Number of Start Delimiters:** Select the number of delimiters that will be added to the ASCII string.
5. **Select Start Delimiters:** Select the Start Delimiters that should be added to the ASCII string.
6. **Number of End Delimiters:** Select the number of delimiters that will be added to the ASCII string.
7. **Select End Delimiters:** Select the End Delimiters that should be added to the ASCII string.

ASCII Configuration – ASCII Parsing

Click the **ASCII Parsing (Optional)** button at the bottom of the ASCII Configuration page to access the ASCII Parsing Configuration page for this device.

ASCII Parsing Configuration

Help

<< 1 >>

1-1

ASCII Device 1 (ASCII01)

Number of Fields: 1 1-50

Parsing Delimiter: UNUSED ▼

Update Fields

Field	Start Location	Length	Data Type	Internal Tag Name
1:	1	0	String ▼	Field01

Save Parameters

Sample/Test Data:

Show Results

Field	Result
1:	

* The length of result is greater than 64 characters

- Number of Fields:** This indicates how many values the ASCII data can be parsed into (up to 50 values per message).
- Parsing Delimiter:** This option is used if the fields of the ASCII message are separated by a single Delimiter, such as a “,” character. If a single Delimiter does not separate the fields, select this field to be UNUSED and then use the character length fields below to parse the message.
- Start Location & Length:**
 - If a Parsing Delimiter is used, the **Start Location** will be first character of the data between the Delimiters. The **Length** will be number of characters from the Start Location to form the value. If the **Length** is 0, the gateway will read the entire parsed message from the **Start Location** to the next delimiter.
 - If the Parsing Delimiter is unused, then the **Start Location** will be the first character of the entire message received. The **Length** will be the number of characters from the Start Location to form the value. If the **Length** is 0, the gateway will read the entire parsed message from the **Start Location** to the end of the ASCII message.
- Data Type:** Select the data type of the parsed value.
- Internal Tag Name:** Enter a name to reference this tag within the gateway. This value is used on the display page and the mapping page.

ASCII Configuration – ASCII Parsing Examples

Example #1 - Parsing a message using the Parsing Delimiter option:

In this example, we are separating the fields in the string “12.25,SP100,temp setpoint” by a comma delimiter. The first value is being parsed into a float data type, while the second and third values are being parsed into a string data type. The output is seen below:

ASCII Device 1 (ASCII01)				
Number of Fields: 3		1-50		
		Parsing Delimiter: , 44 0x2c		
Update Fields				
Field	Start Location	Length	Data Type	Internal Tag Name
1:	1	0	32 Bit Float	Field01
2:	1	0	String	Field02
3:	1	0	String	Field03
Save Parameters				
Sample/Test Data:		12.25,SP100,temp setpoint		Show Results
Field	Result			
1:	12.25			
2:	SP100			
3:	temp setpoint			

Example #2 - Parsing a message without the Parsing Delimiter option:

In this example, we are separating the fields in the string “12.25,SP100,temp setpoint” using the start and length fields. The first value is being parsed from the 1st character for a length of 5 and stored into a float data type. The second value is being parsed from the 7th character of the entire ASCII message for a length of 5 characters and stored into a string data type. The third value is being parsed starting from the 13th character for the rest of the remaining characters and stored into a string. The fourth value contains the entire ASCII message and is stored into a string. The output is seen below:

ASCII Device 1 (ASCII01)				
Number of Fields: 4		1-50		
		Parsing Delimiter: UNUSED		
Update Fields				
Field	Start Location	Length	Data Type	Internal Tag Name
1:	1	5	32 Bit Float	Field01
2:	7	5	String	Field02
3:	13	0	String	Field03
4:	1	0	String	Field04
Save Parameters				
Sample/Test Data: 12.25,SP100,temp setpoint				Show Results
Field	Result			
1:	12.25			
2:	SP100			
3:	temp setpoint			
4:	12.25,SP100,temp setpoint			

Example #3 - Parsing a message using the Parsing Delimiter option and Start Location and Length:

In this example, we are separating the fields in the string "12.25,SP100,temp setpoint" using the comma delimiter, the start, and length fields. The first value is being parsed from the 1st character for a length of 2 and stored into an integer data type. The second value is being parsed from the 3rd character of the second comma-parsed field for the remainder of that field and stored into an integer data type. The third value is being parsed starting from the 1st character of the third comma-parsed field for that entire field and stored into a string. The output is seen below.

ASCII Device 1 (ASCII01)				
Number of Fields: 3		1-50		
		Parsing Delimiter: , 44 0x2c		
Update Fields				
Field	Start Location	Length	Data Type	Internal Tag Name
1:	1	2	16 Bit Int	Field01
2:	3	0	16 Bit Int	Field02
3:	1	0	String	Field03
Save Parameters				
Sample/Test Data: 12.25,SP100,temp setpoint				Show Results
Field	Result			
1:	12			
2:	100			
3:	temp setpoint			


ASCII Configuration – ASCII Message Counter

There is an additional ASCII variable that is very useful to access within our gateway's mating protocol. This data variable will need to be added manually since it will not be mapped using Auto-Map.

RecvCount- indicates how many ASCII messages have been successfully read by our gateway for that device. A successful incoming message means that at least one of our three end cases (Max Length, Timeout or Delimiters) have been met. This will match the Diagnostic Variable Successful Receive Count for each ASCII device.

This variable can be mapped to the mating protocol using the Data Mapping webpage. It is mapped just like the Status_XY variable described in the [Data Mapping- Adding Diagnostic Information](#) section of this userguide.

Example: For this example the other protocol in our gateway is the Allen-Bradley PLC. As you can see from the picture below, the RecvCount for ASCII Device 1 is mapped to the first index of a PLC tag array called test_cnt. The data type of this tag is an Int32 to match the data type of RecvCount. The tag test_cnt[0] will now hold the number of successfully read messages from ASCII Device 1.

Mapping 1		
Source	Enable Manipulation	Destination
Group: ASCII01 RecvCount (UInt32) Start: RecvCount End: RecvCount	<input type="checkbox"/> Enable Manipulation 	Group: ETC01 test_cnt[0] (Int32) Start: test_cnt[0] End: test_cnt[0]

Application Use: This is particularly useful for application connecting devices like barcode scanners and weigh scales. Since the gateway will cyclically update the mating protocol with the last ASCII message sent a change in the RecvCount is the only way to know you have a new message if the value from the ASCII device is the same value as the last message.

Mapping - Transferring Data between Devices

There are 5 ways to move data from one protocol to the other. You can combine any of the following options to customize your gateway as needed.

Option 1 – Data Auto-Map: The gateway will automatically take the data type (excluding strings) from one protocol and look for the same data type defined in the other protocol. If there isn't a matching data type, the gateway will map the data to the largest available data type. See Data Auto-Map section for more details.

Option 2 – String Auto-Map: The gateway will automatically take the string data type from one protocol and map it into the other. See String Auto-Map section for more details.

Option 3 – Manual Map: If you don't want to use the Auto-Map function, you must use the manual mapping feature to configure translations.

Option 4 – Manipulation/Scaling: You can customize your data by using math operations, scaling, or bit manipulation. See Data Mapping-Explanation section for more details.

Option 5 – Move Diagnostic Information: You can manually move diagnostic information from the gateway to either protocol. Diagnostic Information is not mapped in Auto-Map mode. See Diagnostic Info section for more details.

Display Mapping and Values

The Display Data and Display String pages are where you can view the actual data for each mapping that is set up.

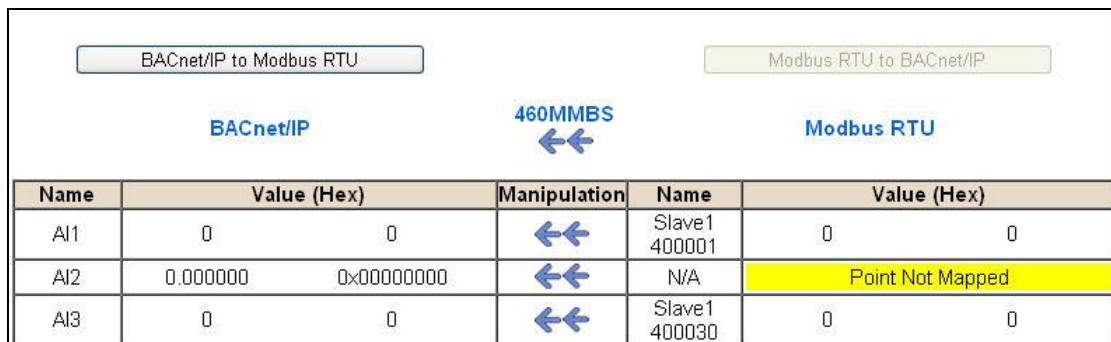
Display Data

Click on the **Display Data** button to view how the data is mapped and what the values of each mapping are. Here you will see how each data point (excluding strings) is mapped. To view, select the device from the dropdown menu and click **View** to generate the information regarding that device. Then select either the **Protocol 1 to Protocol 2** or **Protocol 2 to Protocol 1** button, correlating to the direction you wish to see the data.



The screenshot shows the 'Display Data' window. It has a title bar 'Display Data' and two buttons: 'Edit Mapping' and 'View as Text'. Below the title bar, there is a 'Select a Device' dropdown menu showing 'Modbus TCP Server IP Address: 0.0.0.0' and a 'View' button. At the bottom, there are two buttons: 'Protocol 1 to Protocol 2' and 'Protocol 2 to Protocol 1'.

This page is very useful when verifying that all data is mapped somehow from one protocol to another. If a data point is not mapped, it will display on this page in a yellow highlighted box.



The screenshot shows a mapping table between BACnet/IP and Modbus RTU. The table has two main sections: 'BACnet/IP' and 'Modbus RTU', separated by a '460MMBS' label with a double arrow. The 'BACnet/IP' section has columns for 'Name', 'Value (Hex)', and 'Manipulation'. The 'Modbus RTU' section has columns for 'Name' and 'Value (Hex)'. The table shows three rows of data. The first row maps 'AI1' to 'Slave1 400001'. The second row shows 'AI2' with a value of '0x00000000' and a 'Point Not Mapped' status. The third row maps 'AI3' to 'Slave1 400030'.

BACnet/IP			Modbus RTU	
Name	Value (Hex)	Manipulation	Name	Value (Hex)
AI1	0 0	↔	Slave1 400001	0 0
AI2	0.000000 0x00000000	↔	N/A	Point Not Mapped
AI3	0 0	↔	Slave1 400030	0 0

In the above example, we see the following:

- Modbus 400001 from Slave 1 is being mapped to AI1 on BACnet
- Nothing is being moved from Modbus to AI2 on BACnet
- Modbus 400030 from Slave 1 is being mapped to AI3 on BACnet

NOTE: If a data point is mapped twice, only the first instance of it will show here. EX: If Modbus 400001 & 400040 from Slave 1 are both mapped to AI1, only 400001 will show as being mapped to AI1.

To view the actual data mappings, click the **Edit Mapping** button. For more details, see the Data Mapping-Explanation section.

To view the data mappings purely as text, click the **View as Text** button. For more details, see the View Data Mapping as Text section.

Display String

Click the **Display String** button to view how the string data types are mapped and what the values of each string are. Here you will see how each string from each protocol is mapped to the other. To view, select the source or destination group and the String from the dropdown menu to generate the information regarding that device. The string data will be displayed in both hex and ASCII.

A screenshot of the "Display String" web interface. The title "Display String" is in blue text on the left. On the right, there are two buttons: "Edit Mapping" and "View as Text". Below the title, there is a label "Select a Group" followed by a dropdown menu showing "Src: MC02 400001". To the right of this is the text "and a String" followed by another dropdown menu showing "400001". Further right, it says "(0 bytes)".

Display String

Edit Mapping

View as Text

Select a Group Src: MC02 400001 and a String 400001 (0 bytes)

To view the string mappings, click the **Edit Mapping** button. For more details see the String Mapping-Explanation section.

To view the string mappings purely as text, click the **View as Text** button. For more details see the View String Mapping as Text section.

Data and String Mapping – Auto-Map

The Auto-Map function looks at both of the protocols and will map the data between the two protocols as best as it can so that all data is mapped. Inputs of like data types will map to outputs of the other protocols like data types first. If a matching data type cannot be found, then the largest available data type will be used. Only when there is no other option is data truncated and mapped into a smaller data type.

If the Auto-Map function does not map the data as you want or you want to add/modify the mappings, you may do so by going into Manual-Map mode.

The following are examples of the Auto-Map function.

- 1) This example shows a common valid setup.

Source		Destination
8-bit Sint	—————	8-bit Sint
16-bit Int	—————	16-bit Int

- a. Both Source values were able to be mapped to a corresponding Destination value.

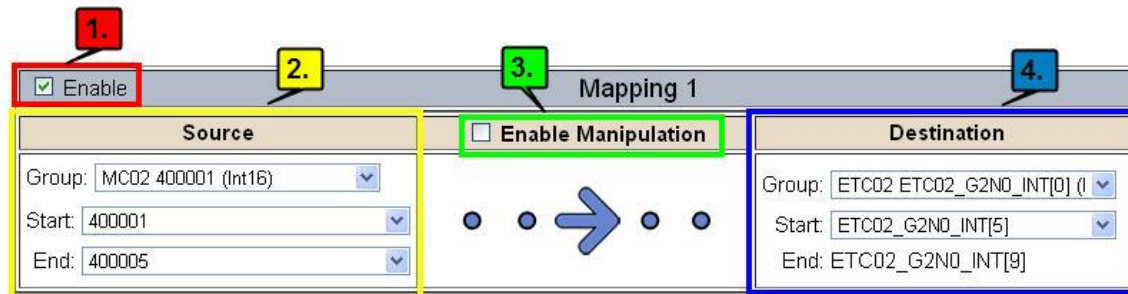
- 2) This example shows how Auto-Map will make its best guess.

Source		Destination
8-bit Sint	—————	8-bit Sint
16-bit Int	—————	16-bit Int
32-bit Uint	—————	32-bit Uint
32-bit Float	—————	32-bit Uint

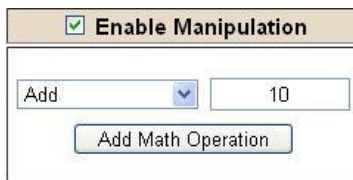
- a. The 32-bit Float from the Source location could not find a matching Destination data-type. After all other like data types were mapped, the only data type available was the 2nd 32-bit Uint data type. Auto-Map was completed even though the data in the Float will be truncated.

Data Mapping – Explanation

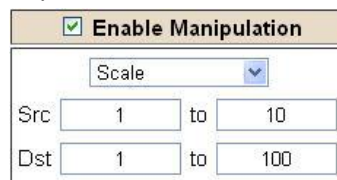
Below are the different parts that can be modified to make up a data mapping.



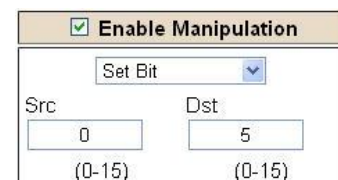
1. Enable (red box above): Check to enable mapping. If not checked, this mapping is skipped.
2. Source Field (yellow box above) :
 - a. Group - Select the data group you set up in the protocol config to use for this mapping.
 - b. Start - This is the starting point for this mapping.
 - c. End - This is the final point to be included for this mapping.
3. Manipulation Area (green box above) :
 - a. Enable the Data Manipulation. This can be enabled for any mapping.
 - b. Click **Add Math Operation** for each operation needed. Up to 3 are allowed unless you are using the Scale, Set Bit, or Invert Bit functions. If using Scale, Set Bit, or Invert Bit, then only 1 operation is allowed.
 - c. Select the Operation(s) to perform.
 - i. Math Operations are preformed in the order they are selected.
 - ii. If more than one point is selected on the source, the Math Operations will be performed on every point.
 - d. Enter the value(s) for the operation.



Example of Add (similar for Subtract, Multiple, Divide, and MOD). This will add a value of 10 to the source field before it is written to the destination field.



Example of Scale. This will scale the source values from 1-10 into 1-100 for the destination.



Example of Set Bit (similar to Invert Bit). This will take the value of the 0th source bit and copy it into the value of the 5th destination bit.

4. Destination Field (blue box above) :
 - a. Group - Select the data group you set up in the protocol config to use for this mapping.
 - b. Start - This is the starting point for where the data is being stored.
 - c. End - The End point is derived from the length of the source and cannot be modified.

Data Mapping – Adding Diagnostic Information

Data Mapping offers 5 different types of information in addition to any scan lines specified for each protocol.

1. Temporary Ram (Int 64)
 - a. This offers five levels of 64bit Integer space to assist in multiple stages of math operations. For example, you may wish to scale and then add 5. You can set up a single translation to scale with the destination as the temporary ram. Then another translation to add 5 with the source as the temporary ram.
 - b. The gateway will automatically convert the Source to fit the Destination, so there is no need for Int 8, 16, 32 since the 64 may be used for any case.

Mapping 1		
Source	Enable Manipulation	Destination
Group: Temporary Ram0 (Int64)	Scale	Group: Temporary Ram0 (Int64)
Start: Ram0	Src 1 to 10	Start: Ram1
End: Ram0	Dst 1 to 100	End: Ram1

Mapping 2		
Source	Enable Manipulation	Destination
Group: Temporary Ram0 (Int64)	Add 5	Group: Temporary Ram0 (Int64)
Start: Ram1	Add Math Operation	Start: Ram2
End: Ram1		End: Ram2

In this example, Ram0 is scaled into Ram1. Ram1 is then increased by 5 and stored into Ram2. Ram0 and Ram2 could be considered a source or destination group.

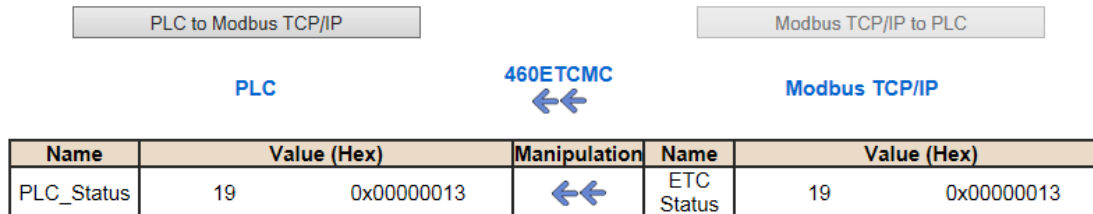
2. Temporary Ram (Double)
 - a. This is similar to the Temporary Ram (Int 64), except manipulations will be conducted against the 64bit floating point to allow for large data.
3. Ticks Per Second
 - a. Our gateway operates at 200 ticks per second. This equates to one tick every 5ms. Thus, mapping this to a destination will give easy confirmation of data flow without involving one of the two protocols.
4. XY_NetBmpStat
 - a. If a protocol is a Client/Master, there is a Network Bitmap Status that is provided. Since a Client/Master may be trying to communicate with multiple devices on the network, it may be beneficial to know if a Server/Slave device is down. By using this Network Bitmap Status you can expose the connection statuses of individual devices.
 - b. 0x00000002 shows that only device 2 is connected
 - c. 0x00000003 shows that only devices 1 and 2 are connected

- d. 0x00000004 shows that only device 3 is connected
5. Status_XY
- a. There are two Statuses provided, one for each protocol. This gives access to the overall status of that Protocol. Each Bit has its own meaning as follows:

Common Status: **0x000000FF (bit 0-7) 1st byte**

Hex:	Bit Position:	Decimal:	Explanation:
0x00	0	0	if we are a Slave/Server
0x01	0	1	if we are a Master/Client
0x02	1	2	connected (0 not connected)
0x04	2	4	first time scan
0x08	3	8	idle (usually added to connected)
0x10	4	16	running (usually added to connected)
0x20	5	32	value to come
0x40	6	64	recoverable fault
0x80	7	128	nonrecoverable fault

For this example the ETC Status is mapped to a PLC tag called PLC_Status



Example: ETC Status is 0x00000013 (19 decimal), here is the break down

Hex	Bit	Decimal	Explanation
0x01	0(on)	1	if we are a Master/Client
0x02	1(on)	2	connected (0 not connected)
0x10	4(on)	16	running (usually added to connected)
Total:	0x13	19	

External Faults: **0x0000FF00 (bit 8-15) 2nd byte**

Hex:	Bit Position:	Decimal:	Explanation:
0x00	8	0	local control
0x01	8	256	remotely idle
0x02	9	512	remotely faulted
0x04	10	1,024	idle due to dependency
0x08	11	2,048	faulted due to dependency

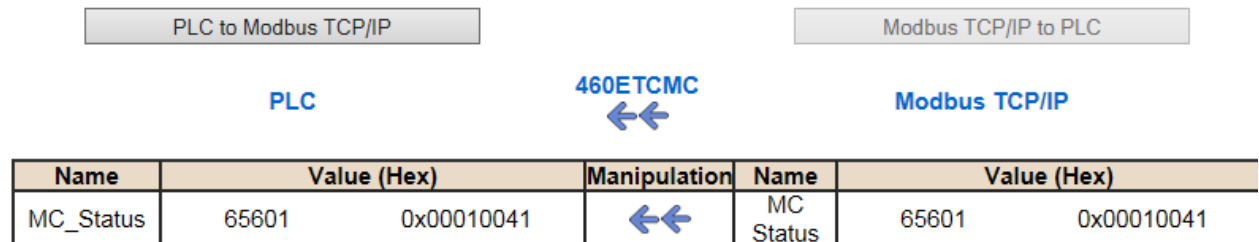
Recoverable Faults: 0x00FF0000 (bit 16-23) 3rd byte

Hex:	Bit Position:	Decimal:	Explanation:
0x01	16	65,536	recoverable fault - timed out
0x02	17	131,072	recoverable fault - Slave err

Non-Recoverable Faults 0xFF000000 (bit 24-31) 4th byte

Hex:	Bit Position:	Decimal:	Explanation:
0x01	24	16,777,216	nonrecoverable fault - task fatal err
0x02	25	33,554,432	nonrecoverable fault - config missing
0x04	26	67,108,864	nonrecoverable fault - bad hardware port
0x08	27	134,217,728	nonrecoverable fault - config err
0x10	28	268,435,456	Configuration Mode
0x20	29	536,870,912	No Ethernet Cable Plugged In

For this example the MC Status is mapped to a PLC tag called MC_Status



Example: MC Status is 0x00010041 (65601 decimal), here is the break down, we know that bytes 1 and 3 are being used, so here is the break down,

Common Status:

Hex:	Bit:	Decimal:	Explanation:
0x01	0(on)	1	if we are a Master/Client
0x40	6(on)	64	recoverable fault

Recoverable Faults:

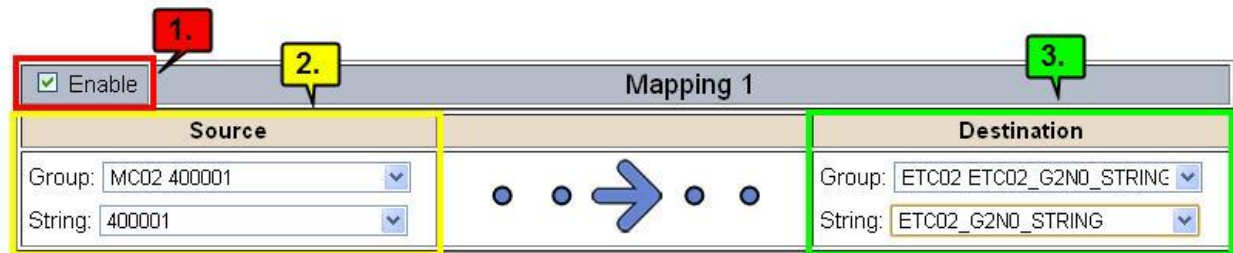
Hex:	Bit:	Decimal:	Explanation:
0x01	16	65,536	recoverable fault - timed

Total: 0x010041 65,601

String Mapping – Explanation

Below are the different parts that can be modified to make up a string mapping.

String data types can only be mapped to other string data types. There is no manipulation that can be done on the string.

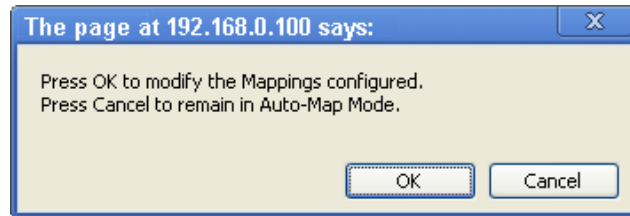


The screenshot shows the 'Mapping 1' configuration window. It has three main sections: an 'Enable' checkbox at the top left, a 'Source' field in the middle left, and a 'Destination' field in the middle right. The 'Enable' checkbox is checked and highlighted with a red box labeled '1.'. The 'Source' field is highlighted with a yellow box labeled '2.' and contains 'Group: MC02 400001' and 'String: 400001'. The 'Destination' field is highlighted with a green box labeled '3.' and contains 'Group: ETC02 ETC02_G2ND_STRING' and 'String: ETC02_G2ND_STRING'. A blue arrow points from the Source to the Destination.

1. Enable (red box above): Check to enable mapping. If not checked, this mapping is skipped.
2. Source Field (yellow box above):
 - a. Group - Select the string data group you set up in the protocol config to use for this mapping.
 - b. String - This is the string used for this mapping.
3. Destination Field (green box above):
 - a. Group - Select the string data group you set up in the protocol config to use for this mapping.
 - b. String - This is the string where the data is being stored.

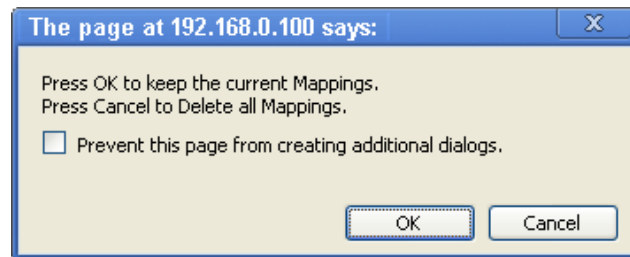
Mapping – Auto-Map Mode to Manual-Map Mode

To transition from Auto-Map mode to Manual-Map mode, click the **Edit Mapping** button. After you click this button, you will be prompted to confirm if this is really what you want to do.



Click **OK** to proceed to Manual Map mode or click **Cancel** to remain in Auto-Map mode.

There are 2 options on how to proceed from here.

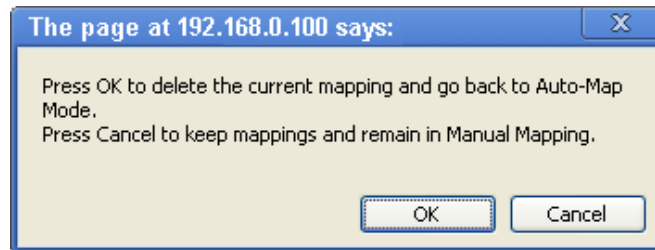


- 1) To keep the mappings that are already configured press **OK**.
 - a. You would want this option if you are adding additional mappings or you want to modify the mapping(s) that already exist.
- 2) To delete the mappings that are already there and start over press **Cancel**.

To modify the number of mappings, enter a number next to **# of Mappings to Configure** and click the **Set Max # of Mappings** button. You can always add more mappings if needed.

Mapping – Manual-Map Mode to Auto-Map Mode

To transition from Manual-Map mode to Auto-Map mode, click the **Auto Map Mode** button. After you click this button, you will be prompted to confirm if this is really what you want to do.



Click **OK** to proceed to delete all current mappings and go to Auto-Map mode. Click **Cancel** to keep all mappings and remain in Manual-Map mode.

NOTE: Once you revert back to Auto-Map mode there is no way to recover the mappings you lost. Any mappings you added will be deleted as well.

View Data Mapping as Text

The View as Text page displays the point to point mapping(s) you set up in the Data Mapping section. This will also display any manipulation(s) that are configured.

Each line on this page will read as follows:

Mapping number: *source point* **Len:** *Number of points mapped -> manipulation (if blank then no manipulation) -> destination point*

If you are looking for a specific point to see if it is mapped, you can do a find in this text box for your point in question. Example: you defined 20 Registers starting at register 1 and want to see if 400011 is mapped. If it is not in this text box then it is not mapped and no data will be transferred.

This is the text display for the example shown under the *Data Mapping- Adding Diagnostic Information* section.

Data Mapping				
Mapping 1:	Temporary Ram0	Len: 1	-> 1:10 Scale to 1:100 ->	Temporary Ram1
Mapping 2:	Temporary Ram1	Len: 1	-> Add 5 ->	Temporary Ram2

View String Mapping as Text

The View as Text page displays the string mapping(s) you set up in the String Mapping section.

Each line on this page will read as follows:

Mapping number: *source point -> Copy -> destination point*

If you are looking for a specific point to see if it is mapped, you can do a find in this text box for your point in question. Example: you defined 20 String Tags in the PLC and want to see if “Test_String” in the Logix PLC is mapped. If it is not in this text box then it is not mapped and no data will be transferred.

String Mapping

Mapping 1:	Logix Test_String	-> Copy ->	MC02 400001
------------	-------------------	------------	-------------

Security Configuration

You can configure Security for 3 administrators, 5 users, and 1 guest.

THIS IS **NOT** A TOTAL SECURITY FEATURE

The security feature offers a way to password protect access to diagnostics and configuration on the network. The security feature does not protect against “Air Gap” threats. If the gateway can be physically accessed, security can be reset. All security can be disabled if physical contact can be made. From the login page, you would click the **Reset Password** button twice and be forced to do a hard reboot (power down) on the gateway within 15 minutes of clicking the button. This process should be used in the event a password is forgotten.

Note: Only Admins have configuration access to all web pages.

1. Log Out Timer: The system will automatically log inactive users off after this period of time.
2. Username: Enter a username, max of 32 characters.
3. Password: Enter a password for the username, max of 32 characters, case sensitive.
 - a. Re-enter the Password
4. E-mail: In case the password was forgotten, a user can have their password e-mailed to them if e-mail was configured.
5. Hint: A helpful reminder of what the password is.

Security Configuration
Help

Log Out Timer: 5 0-15 min

Admin Configuration

Admin	Username	Password	Re-enter Password	Email	Hint
1				Not Configured	
2				Not Configured	
3				Not Configured	

Admin Contact Information

User Configuration

User	Username	Password	Re-enter Password	Email	Hint
1				Not Configured	
2				Not Configured	
3				Not Configured	
4				Not Configured	
5				Not Configured	

Save Parameters

Security Configuration-Security Levels

Each webpage in our gateway can have a separate security level associated with it for each user.

Security Levels:

1. **Full Access:** Capability to view and configure a web page.
2. **View Access:** Capability to view a web page, but cannot configure parameters.
3. **No Access:** No capability of viewing the web page and page will be removed from Navigation.

User 1: View

User 1:
User 2:
User 3:
User 4:
User 5:
Guest

Web Page	Security
All Web Pages	No Access Set
Web Page	Security
Main Page	Full Access
Device Configuration	Full Access
Port Configuration	Full Access
BACnet/IP Server	Full Access
Modbus RTU Master	Full Access
View Mapping	Full Access
Mapping	Full Access
Setup LED's	Full Access
Diagnostic Info	Full Access
Logging	Full Access
Display Data	Full Access
Export Configuration	Full Access
Import Configuration	Full Access
Save As Template	Full Access
Load From Template	Full Access
Utilities	Full Access
Email Configuration	Full Access
Alarm Configuration	Full Access
String Mapping	Full Access
View String Mapping	Full Access
Display String	Full Access

Save Parameters

Security - Log In

Username: Name of the user to login.

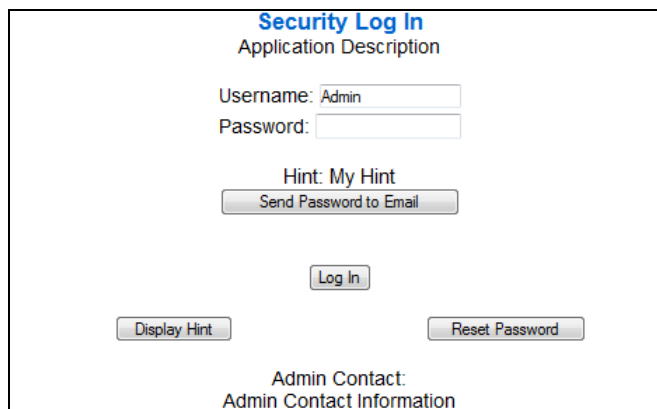
Password: Password of the user to login.

Log In: If login is successful, the user will be redirected to the Main Page.

Send Password to Email: Sends the specified User's Password to the email configured for that user.

Display Hint: Displays the hint specified for the User if one was set up.

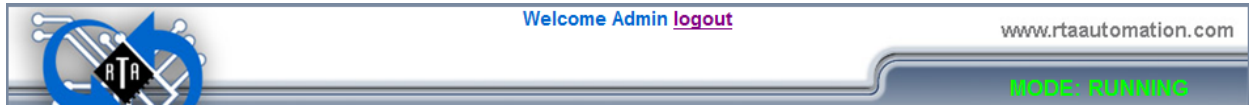
Reset Password: This is used to reset security settings. Confirm reset password must be selected to confirm this action. Once confirmed, there is a 15 minute window to do a hard reset of the gateway by physically removing and restoring power from the gateway. Once power is restored, you may navigate to the IP address of the gateway as normal.



The image shows a screenshot of a web application titled "Security Log In". Below the title is the text "Application Description". There are two input fields: "Username: Admin" and "Password:". Below these is a "Hint: My Hint" label and a "Send Password to Email" button. In the center is a "Log In" button. At the bottom are two buttons: "Display Hint" on the left and "Reset Password" on the right. Below the buttons is the text "Admin Contact:" followed by "Admin Contact Information".

Security - Log Out

Once a user is done with a session they may click **logout** at the top of any page. The user may also be logged out for inactivity based off of the Log Out Timer specified during the configuration.



Closing the browser is not sufficient to log out.

Email Configuration

You can configure up to 10 email addresses.

1. SMTP Mail Username: The email address that the smtp server has set up to use.
2. SMTP Mail Password: If authentication is required, enter the smtp Server's password (Optional).
3. SMTP Server: Enter the Name of the SMTP Server or the IP Address of the Server.
4. From E-mail: Enter the e-mail that will show up as the sender.
5. To E-mail: Enter the e-mail that is to receive the e-mail.
6. E-mail Group: Choose a group for the user. This is used in other web pages.

Click the **Save Parameters** button to commit the changes and reboot the gateway.

Email Configuration

Number of Emails to Configure: 0-10

User	SMTP Mail Username	SMTP Mail Password	SMTP Server	From Email	To Email	Email Group
1	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Group A ▼

Alarm Configuration

1. Alarm Delay upon Powerup: At Powerup, the gateway will have values of '0' stored for all data. This may cause alarms to trigger before these values are updated by the mating protocols. Set this field to provide needed time to update fields before considering values for alarms.

Alarm Configuration

Help

Alarm Delay upon Powerup: 0-3600 s

of Alarms to Configure: 0-100

<< >>

☒ Enable

Alarm 1				
Data Point	Set Error	Clear Error	Alarm Name	Email
<div>Ticks Since Powerup (Uint32) ▾</div> <div>Ticks Since Powerup ▾</div>	<div>>= ▾</div> <div>1000</div>	<div>None ▾</div> <div>0</div>	<div>Gateway_test</div>	<div>Group A ▾</div>

<< >>

2. Enter the number of alarms to configure and click **Set Max # Alarms** to generate those lines.
3. In the Data Point Section:
 - a. Top dropdown: select the Data Group. This dropdown menu will contain all groups that go from the gateway to the network.
 - b. Lower dropdown: select the Data Point's Specific Point. This is used to select which point in the group will be monitored for alarms.
4. In the Set Error Section:
 - a. Select the Set Error Operation in the top dropdown menu. Available options are <, >, <=, >=, !=, ==, and Change of State (COS). This is the operation that will be used to compare the Data Point value against the Error Value to determine if the alarm needs to be set.
 - b. Select the Set Error Value. This value is used as: 'Data Point's Value' 'Operation' 'Value.'
Ex: Ticks Since Powerup >= 1000. This will set the alarm after 1000 ticks have elapsed since the unit powered up.

5. In the Clear Error Section:
 - a. Select the Clear Error Operation. Available options are <, >, <=, >=, !=, ==, and Change of State (COS). This is the operation that will be used to compare the Data Point value against the Error Value to determine if the alarm needs to be cleared.
 - b. Select the Clear Error Value.
-Ex: Ticks Since Powerup >= 5000. This will clear the alarm after 5000 ticks have elapsed since the unit powered up.
6. Enter an Alarm Name. This will make the alarm unique and will be available in the Alarm Status page as well as in the email generated by the alarm.
7. Select an email to associate this alarm with. When an alarm is set, it sends an email. When an alarm is cleared, it will also send an email.

Click the **Save Parameters** button to commit the changes to memory and reboot the gateway.

Diagnostics – Alarm Status

Alarm Status will only display under the Diagnostic menu tab if at least 1 Alarm is enabled.

1. # Alarms Enabled: This is a count of enabled alarms.
2. # Alarms Active: This is how many alarms are presently active (set).
3. Last Active Alarm: This is the last alarm that the gateway detected.
4. **Clear # of Times Active:** This will reset all alarms ' # of Times Active' to 0.
5. Alarm #: The reference number to the given alarm on the alarm setup page.
6. Name: The name of the alarm.
7. Status: The current status of the alarm, either OK or ALARM.
8. # of Times Active: This count represents the number of times this alarm has become active. If an alarm is triggered, this count will increment.

Alarm Status

Alarms Enabled: 1
Alarms Active: 0
Last Active Alarm:

Alarm#	Name	Status	# of Times Active
1	Alarm Example	OK	0

Alarms – Active

While one or more alarms are active, every page will display 'Alarms Active' at the top of the page. This will no longer be displayed if all active alarms have been cleared.



Alarms Active

www.rtaautomation.com

Real Time Automation, Inc.

MODE: RUNNING
460

When an alarm is activated, the following will occur:

1. A one-time notification will be sent out to the email associated with the alarm.
 - a. For duplicate emails to occur, the alarm must be cleared and then become active again.
2. # Alarms Active and # of Times Active will be incremented.
3. Status of the Individual Alarm will be set to *Alarm*.
4. Last Active Alarm field will be populated with details on what triggered the alarm.

Alarm Status

Alarms Enabled: 1
Alarms Active: 1
Last Active Alarm: Alarm 1 is Set: Actual: 0 < Limit: 20

Clear # of Times Active

Alarm#	Name	Status	# of Times Active
1	Alarm Example	Alarm	1

Alarms – Clear

When an alarm is cleared, the following will occur:

- A one-time notification will be sent to the email associated with the alarm.
 - For duplicate emails to occur, the alarm must become active and then be cleared again.
- Total # *Alarms Active* will decrement. *Last Active Alarm* will not be changed.
- Status of the Individual Alarm will be reset to *OK*.

Alarm Status

Alarms Enabled: 1
Alarms Active: 0
Last Active Alarm: Alarm 1 is Set: Actual: 0 < Limit: 20

Clear # of Times Active

Alarm#	Name	Status	# of Times Active
1	Alarm Example	OK	1

Diagnostics Info

The Diagnostic page is where you will be able view the gateway's translations and protocol specific status information.

For protocol specific diagnostic information, refer to the next three pages.

Diagnostics – Data and String Mapping

The Diagnostics->Diagnostic Info->System section displays the number of translations that are enabled, for both Data and String data types, the number of mappings that have an error, and the first mapping that has an error.

Enabled: Number of mappings that are enabled.

Error: The number of mappings that are enabled that have an error.

First Error: This is a detailed description of the first mapping that has an error.

Common Errors:

1. Destination or Source Point does not exist
-Solution: Re-map the mapping
2. Source or Destination Pointer too small
- There is not enough space on either the Source, or the Destination for the data you want to copy. This is typically seen when the Destination is smaller than the amount of data being transferred to it.
3. Range Discard, Min or Max Value
- The actual data value is outside of the defined range
4. Math Error
- Operation value cannot be 0
5. Scaling Error
- Source Min must be smaller than Source Max
- Destination Min must be smaller than Destination Max

Diagnostics – PROFINET IO Server

Select the **PROFINET IO Server** in the dropdown menu on the Diagnostic page to view a breakdown of the diagnostics and common strings that are displayed on the page.

Clear All Values - *This will only affect Displayed Values.*

1. This will return all values displayed to 0.
2. If Viewing PROFINET IO Server, this will only clear the values for the PROFINET IO Server section of the gateway.

Device Status

1. Connected - A PROFINET IO Controller has a connection for the gateway.
2. Not Connected:
 - a. The PROFINET IO Controller has not opened up communication to the gateway.
 - b. The PROFINET IO Server has an invalid configuration or no parameters configured.

Diagnostics (MAC: 00:03:F4:06:5E:4C)

Profinet IO Server

View

Clear All Values

View

Help

Device Status

Not Connected

LED Status

Connection Status: Not Connected

Variables

Parameters Read:	3
Parameters Written:	0
PN Ethernet Pkts Rcvd:	0
PN Ethernet Pkts Sent:	1
UDP Pkts Rcvd:	0
UDP Pkts Sent:	0
OutData Pkts Rcvd:	0
Connection Timeouts:	0

LED Status:


1. Good Communication (Solid Green) – Connected to a PROFINET IO Controller and Online.
2. Not Connected (Flashing Green) – Configured but no PROFINET IO Connection was established.
3. Fatal Error (Solid Red) –
 - a. Invalid Configuration or Parameters
 - b. No input/output slots configured within the gateway
4. Connection Timeout (Flashing Red) –
 - a. Not connected to a PROFINET IO Controller
 - b. No Ethernet cable is plugged in
 - c. PROFINET IO Controller does not have the gateway configured
 - d. PROFINET IO Controller was communicating to the gateway and is no longer communicating

Variables:

1. Parameters Read: Rollover counter for the number of Acyclic Messages parameters read by the IO Controller.
2. Parameters Written: Rollover counter for the number of Acyclic Messages parameters written by the IO Controller.
3. PN Ethernet Pkts Rcvd: Rollover counter for the number of PROFINET Ethernet packets received.
4. PN Ethernet Pkts Sent: Rollover counter for the number of PROFINET Ethernet packets sent.
5. UDP Pkts Rcvd: Rollover counter for the number of PROFINET UDP packets received.
6. UDP Pkts Sent: Rollover counter for the number of PROFINET UDP packets sent.
7. OutData Pkts Rcvd: Rollover counter for the number of PROFINET IO cyclic data packets transmitted and/or received.
8. Connection Timeouts: Rollover counter for the number of connection timeouts between the gateway and the IO Controller. If this counter is incrementing, check the Ethernet connection and verify the gateway is in the IO Controller.

Diagnostics – ASCII

Select ASCII in the top dropdown menu on the Diagnostic page to view a breakdown of the diagnostics that are displayed on the page. You may also view individual ASCII device counters and messages by selecting the device in the *All ASCII* dropdown and clicking **View**.



The screenshot shows the 'Diagnostics' page for a specific ASCII device (MAC: 00:03:F4:06:5E:4C). The page has a header with the title 'Diagnostics' and the MAC address. Below the header, there are two dropdown menus: 'ASCII' and 'All ASCII', each with a 'View' button. To the right of these dropdowns are buttons for 'Clear All Values', 'Help', and 'Clear Buffers'. The main content area is divided into several sections: 'Device Status' (showing 'Connected and Running'), 'LED Status' (showing 'Connection Status: Connected'), 'Variables' (a table of counters), and 'Status Strings' (showing 'Queued Messages: See Device Level' and 'Last Parsed Error:').

Variables	
Successful Transmit Count:	0
Successful Receive Count:	2
Received due to Length:	0
Received due to Delimiters:	0
Received due to Timeout:	2
Received but Discarded:	0
Successful Parsed Messages:	2
Failed Parsed Messages:	0

Clear All Values - This will only affect current displayed values.

1. This will return all values displayed to 0 and clear the Status Strings.

Example: If Viewing ASCII – Port 0, this will only clear the values for Port 0. This will reduce the *All ASCII* values indirectly.

Clear Buffers - This will clear the Next Message to Send from Queue buffer and Current Message being received from ASCII buffer and any message stored in the Queue.

Device Status - This will only display when viewing *All ASCII*.

1. Connected and Running– The gateway is connected to all of the ASCII devices and data is being received/transmitted.
2. Not Connected – There have been no messages received or transmitted.
 - a) Verify that the serial / TCP/IP / USB settings match your device.
3. Fatal Error: Hardware Port Not Configured – The port selected on the ASCII Configuration page is not configured.
 - a) Verify the ASCII device is enabled and configured.
 - b) Verify the port configured matches the port enabled.

LED Status - This is the Status for *All ASCII* or the specific ASCII device selected.

1. Solid Green (Connected)– The gateway is receiving/transmitting data within the Inactivity period for all of the ASCII devices that are configured and enabled.
2. Flashing Green (Not Connected) – No messages have been received or transmitted.
3. Flashing Red (Connection Timeout) – The only way to get out of this state is with a valid received message.
 - a. Data has been discarded due to the queue being full.
 - b. Data has not been received/transmitted within the Inactivity period.

Variables - These are the values for *All ASCII* or the ASCII device selected.

Successful Transmit Count:

-Number of Messages that the gateway has transmitted to the ASCII device

Successful Receive Count:

-Number of Complete Messages that the gateway has received from the ASCII device

Received due to Length:

-Number of Messages Completed due to the Max Message Length being reached

Received due to Delimiters:

-Number of Messages Completed due to the Start or End Delimiters being seen

Received due to Timeout:

-Number of Messages Completed due to the Receive Character Timeout being reached

Received but Discarded:

-Number of Messages that are Complete but discarded due to the Queue being full

-Change the Gateway Hold Msg Timeout to be less than what you currently have set

Successful Parsed Messages:

-Number of Messages that are Complete and have been successfully parsed

Failed Parsed Messages:

-Number of Messages that are Complete but have not been parsed successfully

Status Strings - These are the values for *All ASCII* or the ASCII device selected.

Queued Messages:

-The Gateway will hold up to 20 (configurable) complete messages to send to the other protocol

-This will only increment if the Gateway Hold Msg Timeout is non-zero and messages are being received faster than we can send to the other protocol

Last Parsed Error:

-Last parsed error the gateway encountered

Common Error Messages:

1. **Number of Fields Invalid:** The total number of parsed fields is greater than the number of fields the gateway was expecting
2. **Discard:** The Field has been discarded
3. **Invalid Length for Field:** Number of characters parsed is greater than the number of characters that the gateway is expecting
4. **Calculated Length of Data exceeds 255 Characters:** Number of characters parsed within a field exceeds 255 characters

Buffers

Last Message Sent:

- Last Complete Message the gateway received from the ASCII device, processed, and sent to the other protocol

Next Message to Send from Queue:

- This is the Next Complete Message that the gateway has already received and processed from the ASCII device, and will be sent next to the other protocol

Current Message being Received from ASCII:

- The Current data that the gateway is receiving
- Need to hit one of the three end cases to call a message complete
 1. Max Message Length (max number of characters to receive)
 2. Receive Character Timeout (max time to wait after a character to call the current message complete)
 3. Delimiters (gateway has not received the delimiters that are specified)

Last Message Sent to ASCII:

- Last Message that the gateway sent to the ASCII device

Note: The concatenated delimiters are not displayed in this message but will be transmitted with the message

Send Data from Gateway to ASCII (Used for Testing Only):

- Enter a message to send to your ASCII device
- Can be used to test communication and test formatting of messages

Status Strings

Queued Messages: 0 of 10

Last Parsed Error:

Last Message Sent (7 bytes)

0000: 74 65 73 74 69 6E 67testing

Next Message to Send from Queue (0 bytes)

Current Message being Received from ASCII (0 bytes)

Last Message Sent to ASCII (0 bytes)

Send Data from Gateway to ASCII (Used for Testing Only)

Send ASCII Message

LED Configuration

To modify the behavior of the LEDs on the 460 gateway, navigate to Other->Setup LEDs.

The LED Configuration page lets you configure the LEDs on the gateway.

Each LED may be set to Disabled, Protocol 1, or Protocol 2. If either Protocol is a Master/Client, you may set the LED to represent either all Slaves/Servers configured in our gateway or a particular Slave/Server device.

To select a particular Slave/Server device:

- a) Select the protocol in the left dropdown menu.
- b) Click **Save Parameters** to generate the second dropdown menu.
- c) Select the individual Slave/Server in the right dropdown menu.

Click the **Save Parameters** button to commit the changes and reboot the gateway.

LED 1 is the LED closest to the Ethernet port on the gateway device.

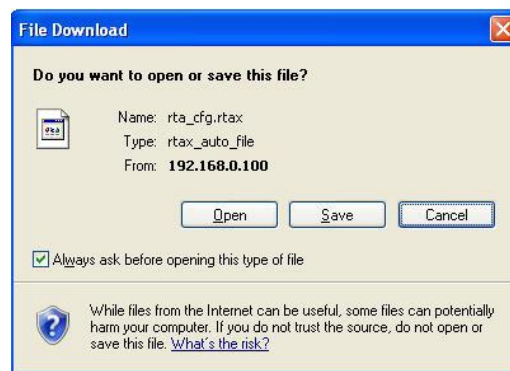
Configuration Files

To access the configuration files in the 460 gateway, navigate to other->Export/Import Config.

Export Configuration

The export tool allows you to save your gateway configuration for backup or to be exported into another gateway. This file is named *rta_cfg.rtax* by default. Network settings will not be saved in this configuration since they must be unique for each gateway.

Upon clicking the **Save Configuration to File** button, you will be prompted to select a location to save the file.



Import Configuration

You can import a previously exported configuration file or a configuration file from another device into the 460 gateway whenever it is in Configuration Mode.

Upon clicking the **Choose File** button, you will be prompted to select a location from which to load the saved file. Once the location is selected, click the **Load Configuration** button.

If it has successfully loaded, the gateway will indicate that it was successful and a message will appear under the Load Configuration button indicating you should reboot the gateway.

If it encountered an error while trying to load the saved configuration, the gateway will indicate the first error it found and a brief description about it under the Load Configuration button. The configuration file is xml and can be modified with any text editor. Once that error is fixed, try loading again until it is successful.

Utilities

The Utilities screen displays information about the gateway including Operation Time, File System Usage, Memory Usage, and Memory Block Usage.

Here you can also:

- View the Revisions of the Software for each Stack.
- View all of the Flash Files within the gateway.
- Identify your device by clicking the **Start Flashing LED's** button. By clicking this button, the two diagnostic LED's will flash red and green. Once you have identified which device you are working with, click the button again to put the LED's back into running mode.
- Configure the size of the Log through the Log Configuration.
- Remove the Configuration File and Flash Files within the gateway (the gateway needs to be rebooted 2 times).
- Bring the device back to its last power up settings.
- Bring the device back to its original manufacturing defaults (the Gateway needs to be rebooted 2 times).

Utilities Page	
Operation Time Since Last Reboot	0 days, 0 hours, 5 mins, 46 secs
File System Usage	Bytes Used: 278528 (35.42%) Bytes Free: 507904 (64.58%) Bytes Bad: 0 (0.00%)
Memory Usage	Bytes Used: 438216 (41.79%) Bytes Free: 810360 (58.21%)
Used Memory Blocks	Memory Blocks Used: 41 out of 2000
Revisions	<input type="button" value="Listing of Revisions"/>
File List	<input type="button" value="File List"/>
Identify Device	<input type="button" value="Start Flashing LED's"/>
Setup Log	<input type="button" value="Log Configuration"/>
Reformat Flash	<input type="button" value="Reformat Flash"/>
Revert To Last Powerup	<input type="button" value="Revert to Last Powerup"/>
Revert All	<input type="button" value="Revert to Manufacturing Defaults"/>

Completing the Installation

You have now set up your gateway for communication and are ready to place the device in your application.

Support for your device is available any time.

Support: 262-439-4022

Toll free: 800-249-1612

Email: support@rtaautomation.com