# Industrial Gateway Communication Device

# IE-UGW- 2TX-2RS232/485
# IE-UGW- 2TX-4RS232/485

User Manual

Weidmüller

## Important Notes

Please read all the information in this manual before installing the product.

The information in the manual applies through Industrial Gateway Version 1.00.*nn*, where *nn* is the build number.

This manual assumes that you have a full working knowledge of the relevant equipment.

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## Preface

Read this introduction to become familiar with the rest of the manual. This preface covers the following topics:

- Who should use this manual
- How to use this manual
- Technical support
- Conventions used in this manual

## Who Should Use This Manual

Use this manual if you are responsible for installing and running a Industrial Gateway.

## How to Use This Manual

This manual provides step-by-step instructions for installing and running a Industrial Gateway using the embedded Gateway software.

## Technical Support

For technical support, please contact your local distributor or contact Weidmuller, Inc. at: (800) 849-9343 from 8:00 am to 5:00 pm Eastern Standard Time or send an email to supportus@weidmueller.com

## Conventions Used in This Manual

The following conventions are used throughout this manual:

- Bulleted lists (like this one) provide information not procedural steps.
- Numbered lists provide sequential steps or hierarchical information.
- *Italic* type is used for emphasis
- **Bold** type identifies headings and sub-headings

| | |
|---|---|
| **WARNING** | Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. These messages help you to identify a hazard, avoid a hazard, and recognize the consequences. |

| | |
|---|---|
| **ATTENTION** | Actions ou situations risquant d'entraîner des blessures pouvant être mortelles, des dégâts matériels ou des pertes financières. Les messages « Attention » vous aident à identifier un danger, à éviter ce danger et discerner les conséquences. |

| | |
|---|---|
| **NOTE** | Identifies information that is critical for successful application and understanding of the product. |

# Chapter 1
# Industrial Gateway Overview

## Section 1.1

The Industrial Gateway, IE-UGW (Gateway) allows you to read tag values from different kinds of programmable logic controllers/devices, and to write those values to the same controller, or to different controllers.

The Gateway may access programmable logic controllers (PLCs) and related automation equipment serially, using any of the two or four serial ports, or via the two Ethernet ports on the front of the Gateway.

Network access to the Gateway is available via either of the Ethernet ports. Through the Gateway Graphical User Interface (GUI), accessible from the Gateway, devices and tags can be configured and sets of source and destination tag pairs, called tag maps, can be created. A rate of copy can be set, or specify copy initiation based on a change in value of a trigger tag, between different controllers, or between tags on the same controller.
A tag map represents a collection of source and destination Tag Pairs. The software processes the copies between tag pairs by reading the tag(s) from the source controller and writing the tag(s) to the destination controller at the specified rate.

The protocols of the source and destination devices do not need to be the same.

The data types of the source and destination tags can also be different. However, copies between STRING and non-STRING data types are not permitted. For more information on copy limitations, see Adding Tag Maps.

The Gateway provides an OLED display on its faceplate. The company logo is displayed until the network interface becomes available. The display shows 2 lines of 16 characters that show the network interface status of the network.

If power fails, the Gateway reboots once power is present again. All processes restart and the database integrity is checked. If the database is missing or corrupt, a new default database is created. This allows you to log-in and restore a back-up.

| NOTE | To physically install the Industrial Gateway hardware, refer to the installation instructions provided with your Industrial Gateway when it shipped. |
|---|---|

To review features and other important information, refer to the release notes.

When running the Industrial Gateway software, to access context-sensitive, embedded, online help from each of the main Gateway dialogs, click the following button on the upper right-hand side of the Gateway menu bar:

## Section 1.2 Industrial Gateway Overview

Refer to the listed chapter for the following information:

- Chapter 2, Installing the Industrial Gateway
- Chapter 3, Using the Industrial Gateway Interface
- Chapter 4, Technical Reference
- Index

# Chapter 2
# Installing the Industrial Gateway

| NOTE | To physically install the Industrial Gateway hardware, refer to the installation instructions provided with your Industrial Gateway when it shipped. |
|---|---|

## Section 2.1 Hardware Specifications

This table contains the Industrial Gateway hardware specifications:

| General | Communications |
|---|---|
| • Processor ARM (792 MHz)<br>• 512 Mbyte 16-bit RAM (400 MHz)<br>• 4 Gigabytes flash memory<br>• Real-time clock, approx. 40 to 50 days backup. Does not require a battery.<br>• DIN Rail mounting with latch/Keyhole mountings on rear of enclosure for screw mounting<br>• Model numbers support: IE-UGW-2TX-2RS232/485 and IE-UGW-2TX-4RS232/485 support:<br>- Modbus ASCII<br>- Modbus RTU<br>- Modbus TCP<br>- EtherNet/IP<br>- EtherNet/IP-PCCC<br>- DirectNET<br>- CCM<br>- HostLink<br>- DF1-PCCC<br>- DF1-CIP<br>- PPI<br>- S7Comm | • Two or Four, configurable, isolated, RS-232//RS-485 serial ports. (Channels 1 and 2 share power and ground. Channels 3 and 4 share power and ground.)<br>• Two isolated, managed Ethernet ports, 10/100 Mbyte Base-TX [PORT1, PORT2] |

| Temperature | Dimensions |
|---|---|
| • **Ambient Temperature**<br>- 0° C to 55° C (32° F to 130° F)<br>• **Storage/Non-Operating Temperature**<br>- -25 °C to 70° C (-13 °F to 158 °F)<br>• **Humidity**<br>- 5% to 95% noncondensing at 60°C | • **Height × Width × Length**<br>- 5.50 in. × 1.90 in. × 4.08 in. (139.70 mm. × 48.26 mm. × 101.98 mm.)<br>• **Weight**<br>- 12.80 oz. (0.36 kg.) |
| **Electrical** | |
| • **External Power Supply**<br>- 10 W peak maximum<br>- 12/24 VDC–3 W maximum steady state.<br>• **Reboot on Power Failure**. If power fails, the Gateway reboots once power is present, restarts all processes, and checks database integrity. If the database is missing or corrupt, a new default database is created. This allows you to log-in and restore a back-up.<br>• **Input Power Connectors**<br>- 2-position (dual row) 4-pin header<br>- Associated four-pin, female plug | • **Isolation**<br>- Ethernet ports: 1500 VAC, 50 to 60 Hz for sixty seconds and 250 VAC working voltage<br>- DC power and serial ports: 707 VDC for 60 seconds and 120 VAC working voltage<br>- Must use isolated power supply (50 VDC isolation between FGND and GND on power connector), and 50 VDC working voltage. Tested at 707 VDC for one minute. |

| LEDs/Controls | |
|---|---|
| • **ETH PORT1/PORT2 LEDs:**<br>– **Green LED**: Blinking when transmitting or receiving data at 100 Mbytes/second.<br>– **Yellow LED**:<br>❖ ON: ON when linked;<br>❖ Blinking when traffic is on the line.<br>• **SERIAL Ports** Communication parameters are software-configurable. See Troubleshooting Serial Ports:<br>– **Green LED**<br>❖ ON: Linked<br>❖ Blinking at *n* seconds when receiving traffic online<br>– **Yellow LED**<br>❖ ON: Linked<br>❖ Blinking at *n* seconds when transmitting traffic online<br>• **STATUS LED**<br>– **Power**<br>❖ ON: Green; Power OK<br>❖ Blink: Green; booting<br>❖ ON: Red; Error<br>❖ Blink: Red: Reset | • **Reset** (pinhole on front of Gateway). You may choose to:<br>– Retain its current configuration. To do so, insert a paper clip into the **RESET** switch on the Gateway and press gently and briefly. As soon as you release the button, the Gateway reboots. Status LED blinks red.<br>– Reset to factory defaults. Insert the paper clip and press gently for more than 15 seconds. Status LED blinks red.<br>• **Display** button:<br>– Press to wake up the display.<br>• **LED** (128 × 32-pixel OLED display):<br>– Detailed module and function status reporting. |

| Certifications | Industry Standard |
|---|---|
| UL Safety | UL 61010-2-201 Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 2-201: Particular Requirements for Control Equipment (first edition issued February 2013) (NRAQ, NRAQ7)<br>UL 62368-01 Information Technology Equipment Safety Standard |
| UL Hazardous Locations | ULH ANSI/ISA–12.12.01-Non-incendive Electrical Equipment for Use in Class I, Division 2 Hazardous (Classified) Locations T4 or better<br>cULH CSA C22.2 No. 213-M1987–Non-incendive Electrical Equipment for use in Class I Division 2 Hazardous Locations–March 1987 |

| Certifications | Industry Standard |
|---|---|
| ATEX | IEC 60079-0: Explosive atmospheres - Part 0: Equipment - General requirements<br>IEC 60079-7– Explosive atmospheres - Part 7: Equipment protection by increased safety "e" |
| CE EMC directive | EN61131-2:2007, EN61010-1:2010, EN61000-6-4:2006, EN61000-6-2:2005, EN61000-6-1:2007, EN60079-0:2009, EN690079-15:2010, EN60079-0:2011 |
| CCC Ex | GB3836.1, GB3836.3<br>GBEx Certificate: 2021312310000322 |
| UKCA | BS 61131-2, BS 61000-6-4, BS 61000-6-2, BS 60079-0, BS 60079-7 |
| ROROC | Arrêté ministériel n° 6404-15 du 29 ramadan 1436 (16 juillet 2015) NM EN 61131-2, NM EN 61000-6-4, NM EN 61000-6-2 |
| CE EMC directive | EN61131-2, EN61000-6-4, EN61000-6-2 |
| FCC | 47 CFR Part 15 Class A |

## Section 2.2 Serial Port Pinouts

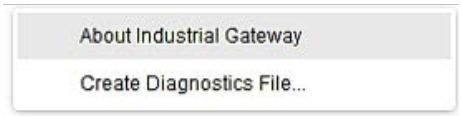
This table contains the serial port pinouts:

| RJ-45 Pin | RS-232 | RS-485 |
|---|---|---|
| 1 | **1** Not used RI (DCE)+ | 1 |
| 2 | **2** Not used CD (DCE) | 2 |
| 3 | **3** Not used DTR (DTE) | 3 |
| 4 | **4** COM/GND | **4** GND |
| 5 | **5** RXD (DCE) | 5 |
| 6 | **6** TXD (DTE) | **6** T-/R- |
| 7 | **7** CTS (DCE) | 7 |
| 8 | **8** RTS/RTR (DTE) | **8** T+/R+ |

## Section 2.3 Getting Hardware and Software Information

Right click anywhere on the white or gray area of the Gateway graphics user interface to bring up a menu that allows you to view Gateway hardware equipment information, the current firmware version, and to access an option to create a diagnostics file to send to Weidmuller, Inc.
To access this information:

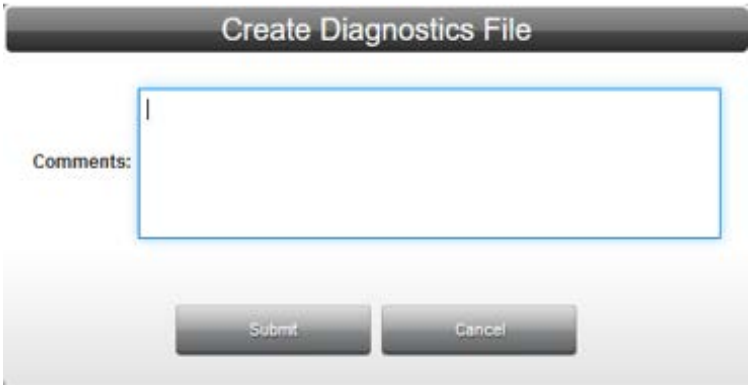
1. If needed, log onto the Gateway:
   See Logging onto the Gateway User Interface
2. Right click on a Gateway white or gray area:
   The following popup menu appears:



3. View the information using the following options:

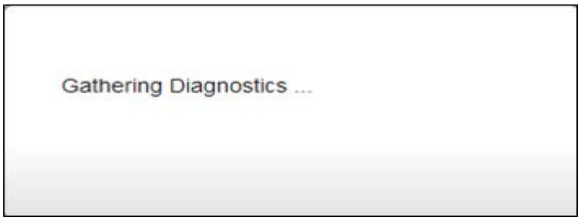
- About Industrial Gateway
  Displays the firmware release of the current Gateway firmware version, unique Serial Number, product-specific model number, and unique MAC address:

- Create Diagnostics File. Creates a diagnostic file to be sent to Technical Support for troubleshooting purposes:




  - *Comments.* Enter any information that helps technical services to diagnose and troubleshoot your problem.
  - *Submit.* Saves comments and creates the diagnostics file.
  - *Cancel.* Exits without saving the diagnostics information.

The software prompts you that it is gathering the diagnostics information:



The software prompts you when the download is complete:

4. Click **Ok**.
5. Navigate to the directory to retrieve the saved files for sending to Weidmuller, Inc. Technical Support. These files are normally downloaded to your Downloads directory if you have not requested a download location.

## Section 2.4 Viewing Serial LED Operation

Gateway serial LEDs work as follows.

- Green LED (top): Blinks: Receiving traffic on the line. Each byte of traffic turns on the LED for 200 ms (±50 ms).
- Yellow LED (bottom): Blinks: Transmitting traffic on the line. Each byte of traffic turns on the LED for 200 ms (±50 ms).

## Section 2.5 Viewing OLED Interface Information

The Gateway front panel contains a 128×32-bit OLED display. This display shows the IP address and indicates error conditions. During startup, the OLED shows the company logo until the network interface becomes available. To help ensure longevity, the OLED displays turns off five minutes after the network interface becomes available after power is turned on or after a reboot or restart. Press the Display Button to wake-up the display for ninety seconds.

The display shows two lines of 16 characters each. Information displayed includes:

- **Link down** message. Indicates that no IP address is assigned.
- ***.*.*.*** message. Indicates that an IP address is assigned but is not displayed according to the security options.
- ***IP_address*** message. Indicates that the displays IP address is assigned.

Network status messages use the following, additional conventions.

The first network interface status page lists the ports and the current status. Ports are prefaced with the letter P, and the port number. Network status line lists the ports. Network status line 1 shows the status.

Example 1:

Display page 1:

- **P1**
- **Link down**

Display page 2:

- **P2**
- **192.168.164.187**

Example 2:

Display page 1:

- **P1,**
  **P2:**
- ***.*.*.***

## Section 2.6 General Public License Information

As part of the Industrial Gateway product, Weidmuller, Inc. uses software licensed under GNU General Public License, version 2: GPL version 2.0

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## Section 2.7 NGINX

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## Section 2.8 Limited Warranty

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This warranty shall not apply to any such equipment which shall have been repaired or altered except by Weidmuller, Inc. or which shall have been subject to misuse, neglect, or accident. In no case shall the liability of Weidmuller, Inc. exceed the purchase price. The aforementioned provisions do not extend the original warranty period of any product which has either been repaired or replaced by Weidmuller, Inc.

# Chapter 3
# Using the Industrial Gateway

Log onto the Industrial Gateway User Interface to set up and manage Gateway functions. The Gateway has a single user account (Admin), and a single password associated with that account. Each time you close and restart the browser, the software prompts you to log in again. The software will also log you out after 30 minutes of inactivity.

If you start the software, log in, and then clear your cache, refreshing the screen returns you to the login window, and prompts you to re-enter your password. Refreshing without clearing the cache refreshes the current window.

| | |
|---|---|
| **NOTE** | All fields that show a red asterisk (*) are required |

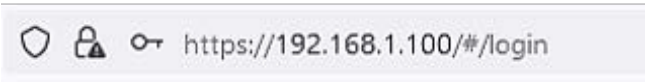
| | |
|---|---|
| **NOTE** | Using Google Chrome as your network browser is highly recommended. If needed, download and install on your personal computer from https://www.google.com/chrome/ |

| | |
|---|---|
| **NOTE** | When connecting to the Gateway for the first time, the default, Static IP address will be 192.168.1.100. Gateway address is 192.168.1.1. DNS1 address is 8.8.8.8 (Google). Once you have logged in, you should change the IP address. See Configuring Network Settings for the Gateway. |

## Section 3.1 Logging onto the Industrial Gateway User Interface

To log onto the Industrial Gateway:

1. Start your **Chrome** web browser software. The browser window appears. In the address bar, type **192.168.1.100**:



The Industrial Gateway User Interface dialog appears with the logon fields:

For a complete description of the user interface see About the Industrial Gateway User Interface Window.

2. The first time you access the Gateway's User Interface (GUI), type in (enter) password **Detmold**. The default username and password for the Industrial Gateway are:

| NOTE | |
|---|---|
| | The Password field is case-sensitive. |

- **Username**. Permanent Username is admin. Grayed out.
- **Password**. Default password is **Detmold** and is case sensitive.

3. Once you enter a password, the **Submit** button activates. Click **Submit**.

4. On the first login (and on the first login after a factory reset), the software provides a dialog for you to change your password. Enter a new password, and confirm the password. Do NOT lose the password as you will not be able to access your system and will need to do a factory reset to regain access using the original password. You may change the password you selected at any time with the User Information dialog. See About the Industrial Gateway User Interface Window.

## Section 3.2 About the Industrial Gateway User Interface Window

The Industrial Gateway User Interface Window is used to configure the Gateway to communicate with programmable logic controllers/devices, and to copy tag values between tags on the same or different controllers:

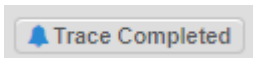
The User Interface Window contains:

- **Industrial Gateway User Interface Title Bar**. Displays company name and logo.
- **Industrial Gateway User Interface Menu Bar**. Accesses **Trace** alert, **ETH1** communications connection information, and logout and embedded help options.
- **Industrial Gateway User Interface Configuration Work Area**. Allows you to configure Gateway operation.

### 3.2.1 Industrial Gateway User Interface Title Bar

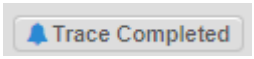
The Industrial Gateway User title bar shows the company name and logo.

### 3.2.2 Industrial Gateway User Interface Menu Bar

| NOTE | When there is a trace status update, the following icon appears in the menu bar status bar:<br>  <br><br>This button provides a shortcut to the Diagnostics page. For further information, see Tracing Data. |
|---|---|

The Gateway User Interface menu bar also provides access to the logout button, the password change dialog, and the embedded help button:

- **Trace alert**. If you are not viewing the Diagnostics page when a running trace completes, the following button appears in the menu bar. If you are on a different window when a trace completes, to remove the alert and switch to the Diagnostics page, click the **Trace Completed** button:

  If you are already on the Diagnostics page when a trace completes, this button does not appear in the menu bar. If you simply navigate to the Diagnostics page without using the **Trace Completed** button, the button also disappears from the menu bar.
- Logging Off. To log off the Gateway, select the Log Off :

  The firmware logs you off the Gateway.
- Changing the Password. To access the Change Password page, select the Change Password icon:
  See Changing Password.

- To access embedded help, select the Help icon:

  See Viewing Help Information.

### 3.2.3 Industrial Gateway User Interface Work Area

To access the work area, log into the software.

The work area appears:

Use the work area for setting up all Industrial Gateway configuration options. You may access help about all options from Using the Industrial Gateway User Interface (in the online help).

## Section 3.3 Configuring Devices

The Industrial Gateway is used to configure devices and tags. This configuration specifies the connections, protocols, communication parameters, and tags on a connected PLC/device so that the Gateway can communicate without errors.

| NOTE | The information you provide when configuring a device and its tags must exactly match the actual configuration of the connected PLC and the tags defined. All of this information may be retrieved using the automation software used to configure and program the PLC. |
|---|---|

You may add as many device profiles as you wish to the Gateway. The number of serial devices you may physically connect to a Gateway is limited by the number of ports. The number of device profiles you may add is limited only by disk space. The number of devices and tags you can configure also depends on available Gateway memory (disk space on the Gateway).

When you add a device, you must also configure its associated tags so that the Gateway correctly copies tags. Each device name must be unique. Tag names on each device must be unique although tag names may be duplicated on a different device.

The Gateway also provides a series of pre-defined $System tags. For a list of these tags, see the System Tags List.

The Heartbeat is one of these tags and can be used with your PLC(s) to verify that the Gateway is indeed communicating with devices.

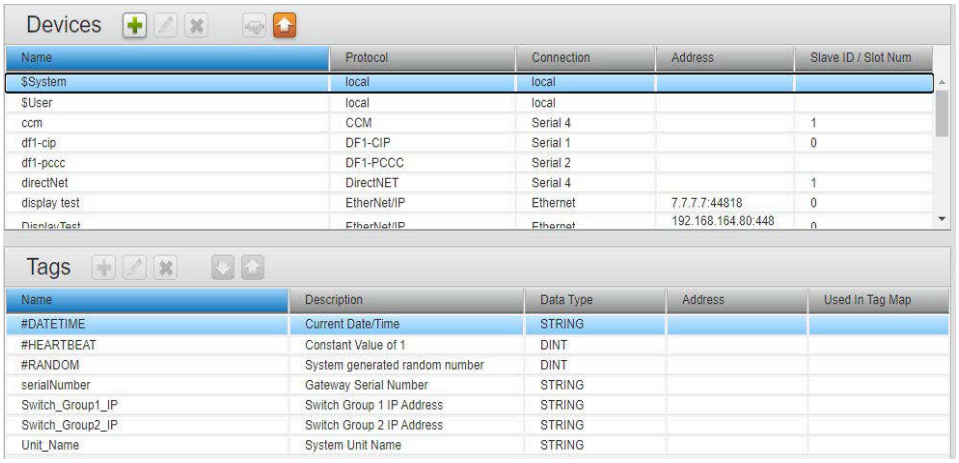
To use this tag, configure a corresponding tag in the PLC(s) to monitor the Heartbeat tag of the gateway. Because the Heartbeat tag is a constant value of 1, a couple of rungs of ladder logic are required to set the tag value to 0, and to monitor that the value is set back to 1 by the Gateway within a specified period of time.

The Gateway also provides user-defined ($User), single-element read and write tags of type BOOL, INT, SINT, DINT, REAL, and STRING. These are non-array tags. Tags for the $User and $System devices do not have an address, but the address must be configured for all other tags.

To add, modify, or delete devices and/or tags:

1. Click the Devices icon:

The Devices window appears:




2. View or specify the following options:

| Icon | Location/Function | Access |
|---|---|---|
| | Devices/Add a device: | Adding Devices |
| | Devices/Modify a device: | Modifying Devices |
| | Devices/Delete a device from the Gateway: | Deleting Devices |
| | Devices/Test device connection: | Testing Device Connections |
| | Devices/Export device and tag data: | Exporting Device and Tag Data |
| | Tags/Add a tag: | Adding Tags |
| | Tags/Modify a tag: | Modifying Tags |
| | Tags/Delete a tag from the Gateway: | Deleting Tags |
| | Tags/Import a list of tags into the Gateway: | Importing Tags |

| Icon | Location/Function | Access |
|---|---|---|
| | Export a list of tags from the Industrial Gateway: | Exporting Tags |

### 3.3.1 Adding Devices

All supported PLCs and protocols are listed below.

Gateway supports the following PLCs:

- PLC-5
- SLC 500
- ControlLogix
- CompactLogix
- MicroLogix
- Micro 800 (includes Micro850)
- Schneider M340 and Quantum 140
- Siemens S7-200/300/1200/1500

Gateway supports the following protocol families:

- EtherNet/IP, DF1-CIP
- EtherNet/IP-PCCC, DF1-PCCC
- ModbusTCP, ModbusRTU, ModbusASCII
- S7Comm, (S7-200, S7-300, S7-1200, S7-1500 only), PPI
- DirectNET/CCM/HostLink

Tag address formats are not compatible between protocol families. If you change the protocol of a previously configured device to a protocol from a different family, you are required to delete all existing tags from a device.

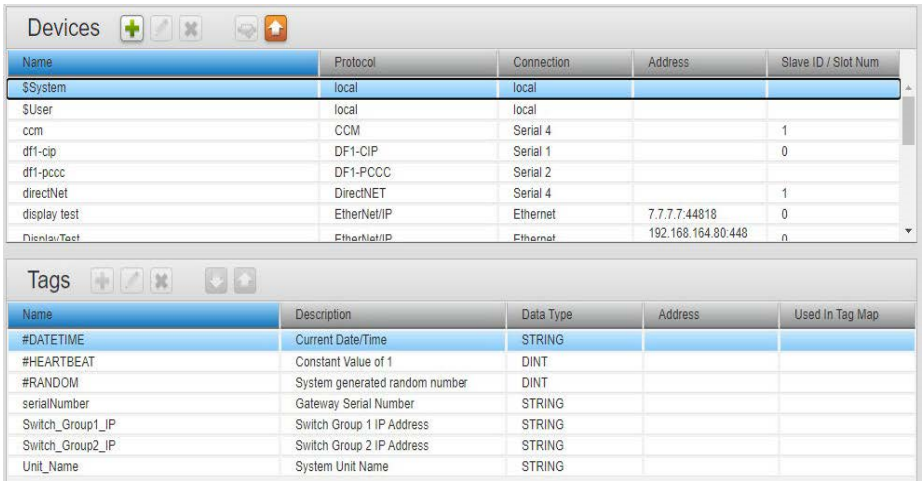
Examples: You may switch a device from EtherNet/IP to DF1-CIP without deleting tags. You may not switch from EtherNet/IP to PPI without deleting all the tags on the device. During a protocol switch, the software prompts you that this is the case before deleting the tags from the PLC.

To review the supported data types in a table, see Viewing Data Types Supported by Protocols.

To add a device:

1. Click the Devices icon:

The Devices window appears:




2. In the Devices section, click the following icon:

The Device Properties dialog appears.
(Available fields change according to protocol selection):

3. View or specify the following Devices options:
   - **Device Name**. Enter the device name. This is a human-readable name.
   - **Protocol.** Select the communication protocol used by the device you are configuring. The Device Properties dialog changes according to the protocol selected. For more information and ranges see Protocol Attribute List.

     If you choose a serial protocol, options are:

- If you choose a **Serial** protocol, the following options are:
  - *DF1-CIP*. Options are:
    - Serial Port. Serial port you are using to communicate with a PLC. To configure this port, see Configuring Serial Communications Setup.
    - Slot Number. Station number of your PLC on the network. Value to enter here is dependent on your PLC controller setup.
    - Checksum. Select either **CRC** or **BCC** checksum methods. Please check your PLC setting to find out the checksum method your PLC uses.
    - ACK Timeout *milliseconds*. After the Gateway sends out a request to the target device, it waits for **ACK Timeout** value in milliseconds to pass before the Gateway considers that there is no response from the target device.
    - NAK Retries. Send command for number of retries if there is a response from the PLC but response is a negative acknowledgment.
    - ENQ Retries. Send command for number of retries if there is a response from PLC but the response is that the PLC is busy.
  - *DF1-PCCC*. Options are:
    - Serial Port. Serial port you are using to communicate with a PLC. To configure this port, see Configuring Serial Communications Setup.
    - Checksum. Select either **CRC** or **BCC** checksum methods. Please check your PLC setting to find out the checksum method your PLC uses.
    - ACK Timeout *milliseconds*. After the Gateway sends out a request to the target device, it waits for **ACK Timeout** value in milliseconds to pass before the Gateway considers that there is no response from target device.
    - NAK Retries. Send command for number of retries if there is a response from the PLC but response is a negative acknowledgement.
    - ENQ Retries. Send command for number of retries if there is a response from PLC but the response is that the PLC is busy.

- *ModbusRTU*. Options are:
  - Serial Port. Serial port you are using to communicate with a PLC. To configure this port, see Configuring Serial Communications Setup.
  - Slave ID. Modbus Node number of slave device.
  - Response Timeout. Defines how long (in seconds), the device waits for a reply to be received after a Modbus command is sent.
  - Retry Count. Tells the device how many times to retry sending a Modbus command when no reply is received to the sent command.
  - End of Message Delay *n* characters. The Gateway starts a timer after the first byte of a response is received. When the timer detects the delay interval specified by this option, and there is also no signal on the serial communication channel, the message is considered ended.
  - Min Command Delay *n* milliseconds. Defines the delay time between characters of commands sent to the Modbus device.
- *ModbusASCII*. Options are:
  - Serial Port. Serial port you are using to communicate with a PLC. To configure this port, see Configuring Serial Communications Setup.
  - Slave ID. Modbus Node number of slave device.
  - Response Timeout. Defines how long the device waits for a reply to be received after a Modbus command is sent.
  - Retry Count. Tells the Modbus device how many times to retry sending a Modbus command when no reply is received to the sent command.
  - End of Message Delay *n* characters. The Gateway starts a timer after the first byte of a response is received. When the timer detects the delay interval specified by this option, and there is also no signal on the serial communication channel, the message is considered ended.
  - Min Command Delay *n* milliseconds. Defines the delay time between characters of commands sent to the Modbus device.

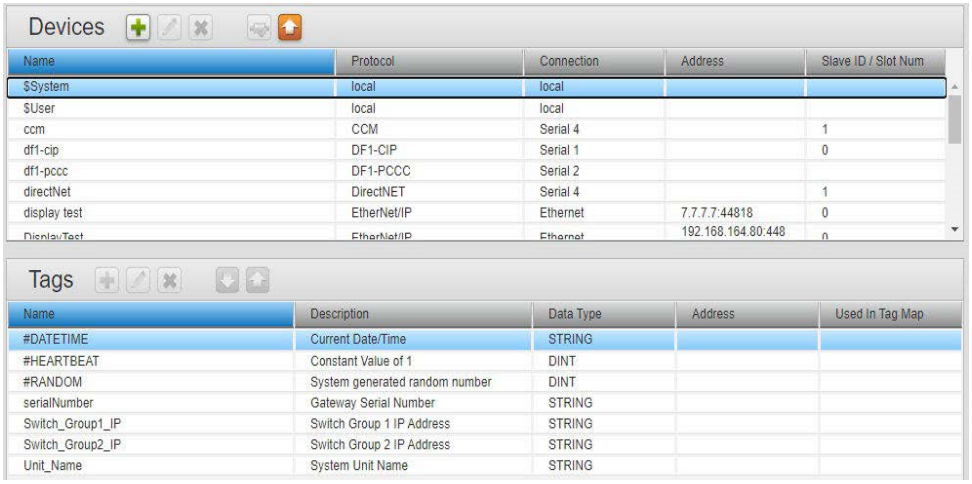
- *PPI*. Siemens S7-200 protocol. Communicates via RS-485. Options are:
  - Serial Port. Serial port you are using to communicate with a PLC. To configure this port, see Configuring Serial Communications Setup.
  - Node Address. Address for the protocol is set to 2 by default.
- *DirectNet*. Options are:
  - Serial Port. Serial port you are using to communicate with a PLC. To configure this port, see Configuring Serial Communications Setup.
  - Station Address. Enter an integer (range 1 to 90).
  - Timeout. Define Short, Medium, or Long.
  - Retries. Define Normal or Short.
  - Response Delay. Specify response delay (range 0 to 500 milliseconds).
- *CCM.* Options are:
  - Serial Port. Serial port you are using to communicate with a PLC. To configure this port, see Configuring Serial Communications Setup.
  - Station Address. Enter an integer (range 1 to 90).
  - Timeout. Define Short, Medium, or Long.
  - Retries. Define Normal or Short.
  - Response Delay. Specify response delay (range 0 to 500 milliseconds).
- *HostLink.* Options are:
  - Serial Port. Serial port you are using to communicate with a PLC. To configure this port, see Configuring Serial Communications Setup.
  - Station Address. Enter an integer (range 1 to 90).
  - Timeout. Define Short, Medium, or Long.
  - Retries. Define Normal or Short.
  - Response Delay. Specify response delay (range 0 to 500 milliseconds).

- If you choose **Ethernet**, options are:
  - *EtherNet/IP*. Options are:
    - TCP Port. For EtherNet/IP, the default port setting is **44818**. If needed by your system, you can change this port number.
    - Address. Specifies PLC IP address.
    - Slot Number. When the port selected is Ethernet, and the protocol selected is EtherNet/IP, you must specify an associated slot number between 0 and 16.
  - *ModbusTCP*. Options are:
    - TCP Port. For ModbusTCP, the default port setting is **502**. If needed by your system, you can change this port number.
    - Address. Specifies PLC IP address.
    - Slave ID. For Modbus TCP, the range of possible values is 1 to 247, depending on the device.
  - *EtherNet/IP-PCCC*. Options are:
    - TCP Port. For EtherNet/IP-PCCC, the default port setting is **44818**. If needed by your system, you can change this port number.
    - Address. Specifies PLC IP address.
  - *S7comm*. Options are:
    - TCP Port. For S7Comm, the default port setting is **102**. If needed by your system, you can change this port number.
    - Address. Specifies PLC IP address.
    - PLC Type. Lists PLCs supported by this protocol.
    - Keep Alive. Specifies how long the Gateway keeps the connection alive during intervals when there is no activity between the PLC and the Gateway. Default value is **30** seconds. Keep in mind that you should use the same interval here as you use on the PLC's Ethernet communication setting.
    - TSAP. (Transport Services Access Point). It uniquely identifies specific instantiation of the transport service. It is possible to configure a S7-200 PLC to have multiple TSAPs to facilitate simultaneous communication between the PLC and multiple applications. Values must be hexadecimal.
- **Test Device Connection**. See Testing Device Connections.
- **Submit**. Saves changes on Gateway and exits.
- **Cancel**. Exits without saving changes on Gateway.

### 3.3.2 Modifying Devices

To modify device information:

1. Access the Devices window:
   See Configuring Devices.
   The Devices window




2. Select a listing and click the following icon on the Devices toolbar:

3. The Device Properties dialog appears. Change information in the listed fields:
   See Adding Devices.
4. When finished making changes, click either of the following to exit:
   - **Submit**. Saves changes on the Industrial Gateway and exits.
   - **Cancel**. Exits without saving changes on Industrial Gateway.

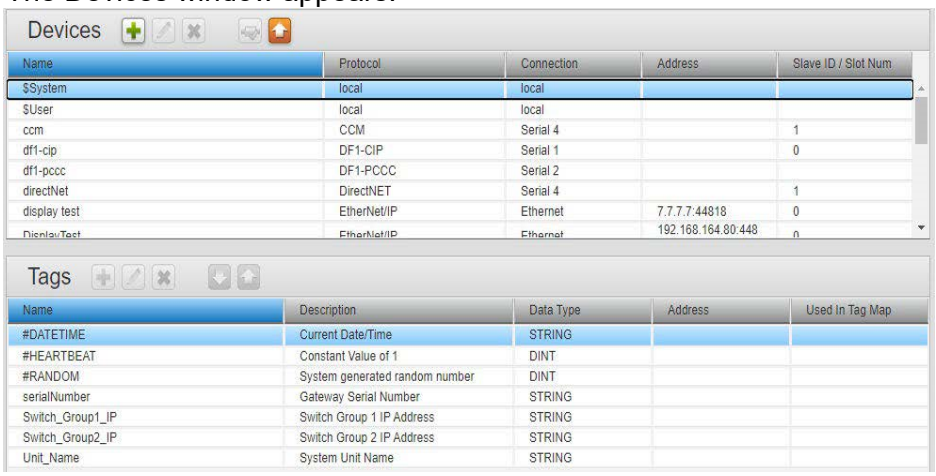
### 3.3.3 Deleting Devices

You may delete devices such as controllers that have been added to the Gateway. If you attempt to delete a device that has tags that are part of a tag map, the software prompts you that this is the case before deleting the device. The message differs according to the tag map status.

To delete a device:

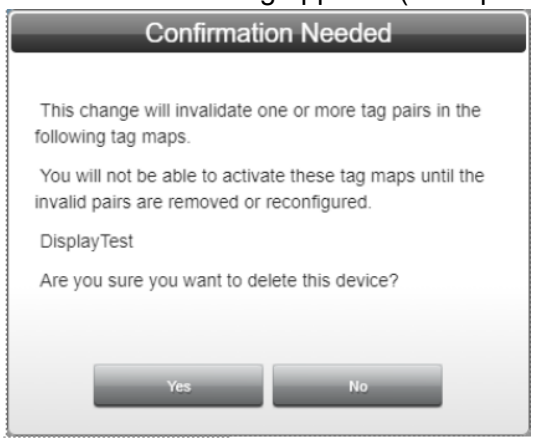
1. Click the Devices icon:

The Devices window appears:




2. Select a device from the list.
3. Click the Delete icon on the Devices tool bar:

A confirmation dialog appears (example message):




4. Confirm the deletion:

| NOTE | Deleting a device also removes any associated tags that are associated with the device. Any tag maps that use those tags will be disabled. If a map with a (now) deleted tag was active, it will be deactivated. |
|---|---|

- **Yes**. Deletes the selected device from the Industrial Gateway and exits.
- **No**. Exits without deleting the selected device from the Industrial Gateway.

### 3.3.4 Testing Device Connections

You may test the device connectivity to verify a connection exists between the Industrial Gateway and a PLC, (not between a computer and the Industrial Gateway). The test also validates, when possible, that the protocol is selected correctly.

| NOTE | When testing an S7Comm PLC, the testing utility cannot distinguish between different S7Comm PLC types. Example: If you connect an S7-1500 device and configure it as an S7-200 device, the connection test will be successful even though the configuration is incorrect. |
|---|---|

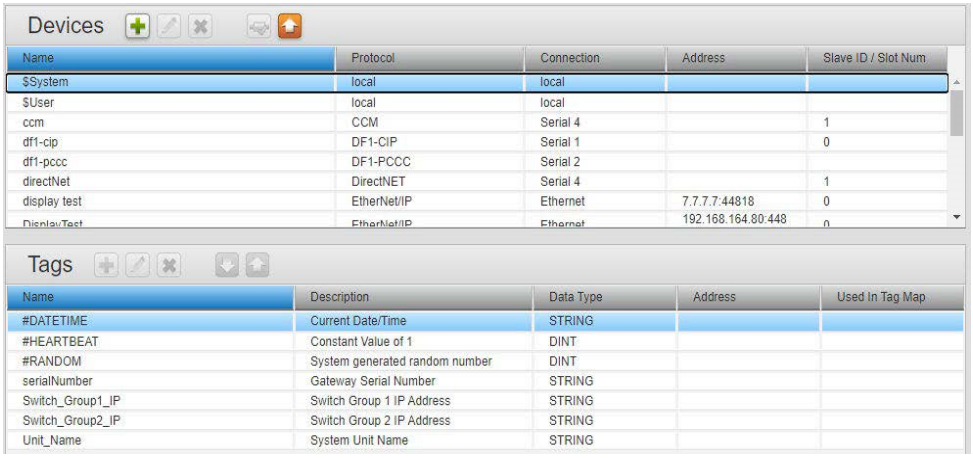
| NOTE | The Modbus RTU option now tests 9600, 19200, and 38400 when the device connection. |
|---|---|

| NOTE | Due to the large variety of devices, the Test Device Connection definitive. If a Test Connection fails and it is believed that the Properties are correct, proceed with adding a tag, creating a Tag verifying that a tag can be read from or written to. |
|---|---|

To test connections:

1. Click the Devices icon:

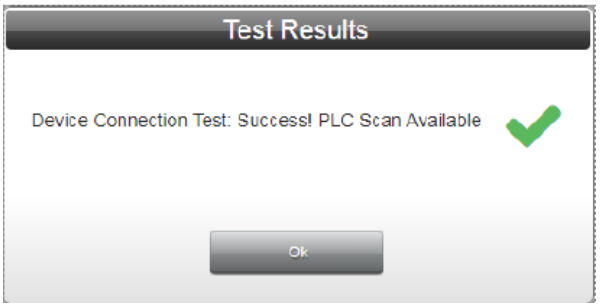
The Devices window appears:




2. In the Devices section, click the following icon:

The Gateway software attempts to communicate with the device. The dialog that appears shows the protocol of the device tested, and whether or not you can access the device from the Gateway.

If successful, the following Test Results dialog appears:




If unsuccessful, the following dialog appears. The dialog contains an error message that lets you know the type of problem encountered (see below). However, test results are not definitive:

3. Messages you see after you click the **Device** ping icon are self-explanatory. If your connection was unsuccessful, the dialog describes the detected issue, and suggests a fix for the detected issue. For a list of all associated messages, refer to Industrial Gateway Messages.

### 3.3.5 Exporting Device and Tag Data

You may export a device and tag data set as a compressed, downloadable .csv file. The rows and fields in the file record the parameters configured for a single device, including all tags that are associated with the device. Each row holds information for a single tag. Fields that are not applicable contain a pair of empty quotation marks.

Row one of the exported .csv file contains:

'Device Name', 'Connection', 'Protocol', 'TCP Port', 'Address', 'Slot Number'

Example Excel File Output:

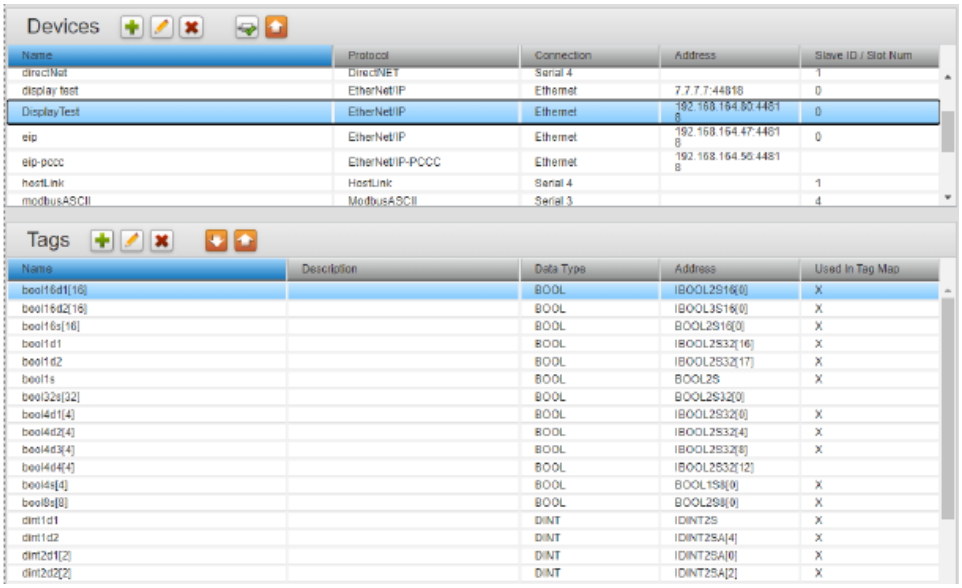
| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | 'S7comm' | 'Ethernet | 'S7comm' | '102' | '192.168.1 | '30' |
| 2 | 'SourceIN' | 'VW186' | '' | 'INT' | '' | '' |
| 3 | 'TestInt' | 'VW240' | '' | 'INT' | '' | '' |
| 4 | 'ArrayDes' | 'VW1860' | '' | 'INT' | 'null' | '' |
| 5 | 'ArraySou' | 'VW1780' | '' | 'INT' | 'null' | '' |
| 6 | 'VD220' | 'VD220' | '' | 'BOOL' | '' | '' |
| 7 | 'VD320' | 'VD320' | '' | 'BOOL' | '' | '' |
| 8 | 'V220.16' | 'V220.16' | '' | 'BOOL' | '' | '' |
| 9 | 'V320.16' | 'V320.16' | '' | 'BOOL' | '' | '' |
| 10 | 'DINT1S' | 'VD232' | '' | 'DINT' | '' | '' |
| 11 | 'IDINT1S' | 'VD250' | '' | 'DINT' | '' | '' |

Subsequent rows contain tag information written as follows:
'TagName', 'TagAddress', 'Description', 'DataType'

To export a device and tag data set:

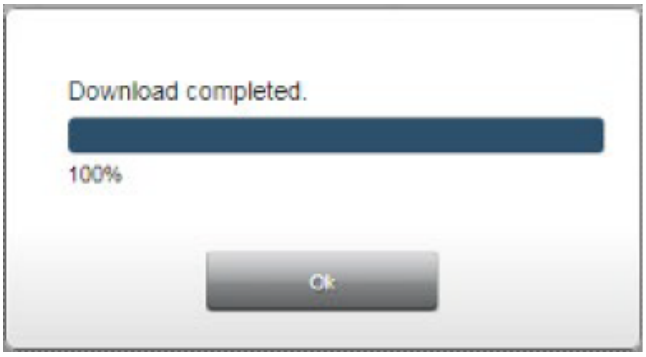
1. Click the Devices icon:

The Devices window appears:




2. In the Devices section, click the following icon:

The User Interface informs you that it is downloading the export file.




Depending on the browser, browser settings, and computer operation system, you may be prompted to choose your download location, or the exported file is downloaded to the Downloads directory (or other, designated folder).

### 3.3.6 Adding Tags

Tags are data elements on a Data I/O device, such as a programmable logic controller. Legacy controllers and Modbus-based controllers have numeric addressing requirements. Later controllers may allow naming tags with logical (human-readable) tag names. Most interaction with these devices uses tags. Restricted characters that may not be used in tag names are: ampersand, angle brackets, back-quote, backslash, caret, curly braces, double-quote, percent sign, semi-colon, and single-quote, comma, and period. Neither device names nor tag names starting with a dollar sign may be configured. A complete tag specification consists of a device name and a tag name. Syntax is enforced by the software. Problems are generally due to an incorrectly configured device or an incorrect tag address.
Example of tag: **PumpController2.Level3**.

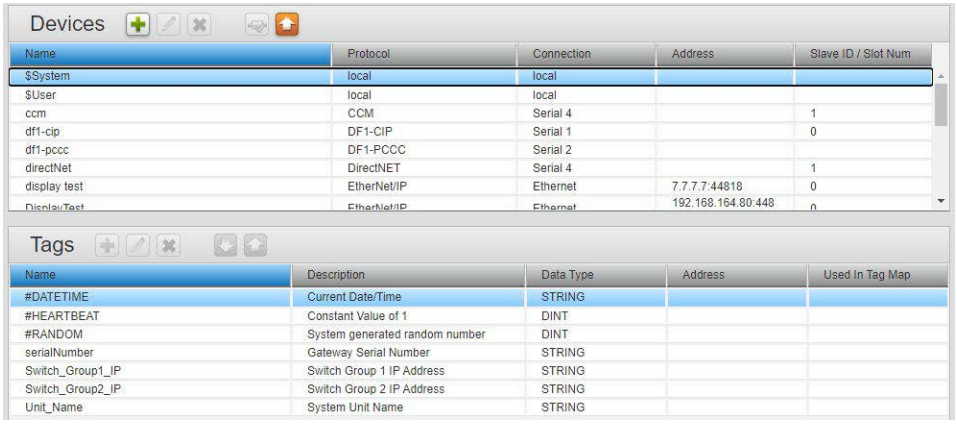
| **NOTE** | If you experience difficulty communicating with your PLC after adding tags, as a first step, ensure you have used the correct tag syntax. Using an incorrect syntax for a tag means that the Gateway will not be able to read the tag on the PLC. See Configuring Tag Data Types. |
|---|---|

| **NOTE** | If you try to change the configuration of a tag that is used in a tag map, the software warns you when you try to submit the change.<br>Tags that are in use in a tag map are identified in the tag list.<br>You may also add $User tags. You may define single-element (non-array), read/write tags of type BOOL, INT, SINT, DINT, REAL, or STRING. |
|---|---|

To add a tag:

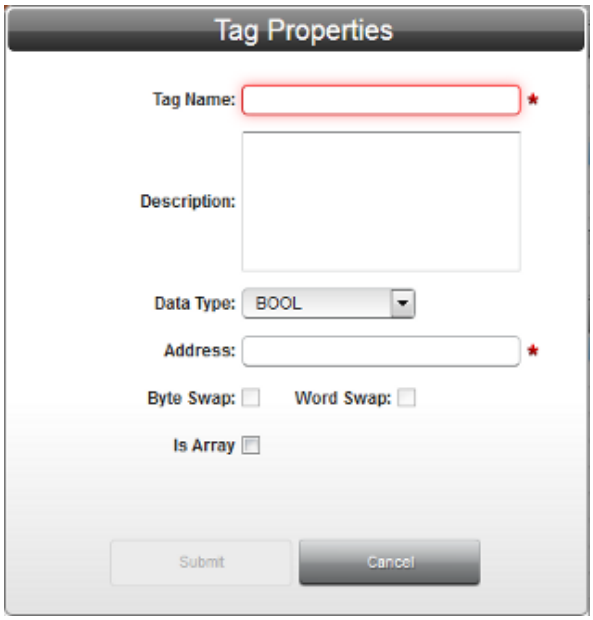
1. Click the Devices icon:

The Devices window appears:




2. Click the following Tags icon:

The Tag Properties dialog appears.
(Default dialog shows no tag information):




3. From the Tag Properties dialog, view or specify the following options:
   - **Tag Name**. Enter name of tag (must be unique). The descriptive name may differ from the tag address.
     Example: **TAG001.**
     If you change the name of an existing tag that is used in a tag map, the new name will be reflected in the tag map.
   - **Description**. Enter tag description.
     Example: **Input_PLC01**
   - **Data Type**. Select data type for tag.
   - **Address**. Enter address of tag to be copied. The tag address is a unique string representing the tag identifier as found on the PLC. The Address must exactly match the address of the tag defined on the PLC, and each tag must have an address. (Tags for $User device do not have an address.)

| NOTE | Memory Types I, Q, and M are supported for S7comms.<br>Type DB (Global DB memory) is not supported at this time. |
|---|---|

| NOTE | If you specify an offset that results in an operation that exceeds the controller-defined length of the array, either the element transfer is truncated, or other undefined behavior occurs, depending on the type of device and protocol in use. |
|---|---|

When a tag address is configured to represent an array, the address format includes an array offset. The format varies depending on the protocol. For instance, the address for a tag on a PCCC device might be N7:15 where 15 is the offset. The copy then starts from N7, element 15. For an EtherNet/IP protocol, the address might be specified as MyTag[12], meaning the copy starts from MyTag element 12.

- **Byte Swap**. Interchanges the two bytes of every word when they are read from the source PLC and before they are written to a destination PLC. Only enabled when the Data Type selected is at least 16 bits. Example: Source word = **0×12345678**. Destination word = **0×34127856**.
- **Word Swap**. Interchanges the two words of every double word when they are read from the source PLC and before they are written to a destination PLC. Only enabled when the Data Type selected is at least 32 bits. Example: Source double word = **0×12345678.** Destination double word = **0×56781234.**

| NOTE | You may use byte swap and word swap options at the same time. **Example: Source = 0×12345678.** Destination = **0×78563412**. |
|---|---|

| NOTE | A STRING (array of characters) is also byte/word swappable. |
|---|---|

- **Is Array**. Identifies the tag description as an array. Using tag arrays provides you with maximum performance for the copy operation. Minimum array size is 1; the maximum depends on data type and protocol but must never exceed 500.
  Each element must be the same, and the software assumes that the elements are contiguous in controller memory.
  Example Array: **BOOLDestArray[8]**

| NOTE | The upper limit for the maximum number of array elements varies based on protocol and data type. Each protocol has a limit on how large the request packet can be. Therefore, for a given protocol, 100 INTs might be most that can be read in a single operation. |
|---|---|

| NOTE | String array copies are supported ONLY for EtherNet/IP and DF1/CIP string array copies. |
|---|---|

- *Length*. When **Is Array** is selected, length specifies the number of elements to be read or written.

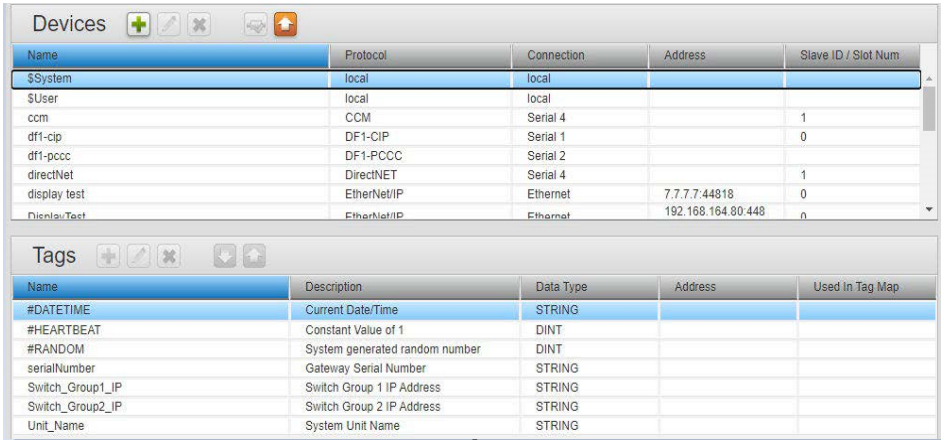
  Example: A tag configured on the Gateway may refer to a device tag of INT[1000], of which four elements are of interest, starting at offset 68. In this example, the tag address field would be entered on the Gateway as INT[67]. Array elements use zero-based addressing and the length field would be specified as 4.

- **Submit**. Saves changes on Industrial Gateway and exits.
- **Cancel**. Exits without saving changes on Industrial Gateway.

### 3.3.7 Modifying Tags

To modify tag information:

1. Access the Devices window:
   See Configuring Devices.
   The Devices window appears:




2. Select an entry in the Tags table and click the following icon:

3. The Tag Properties dialog appears. Change information in the listed fields:
   See Adding Tags
4. When finished making changes, click either of the following to exit:
   - **Submit**. Saves changes on the Gateway and exits.
   - **Cancel**. Exits without saving changes on Gateway.

### 3.3.8 Deleting Tags

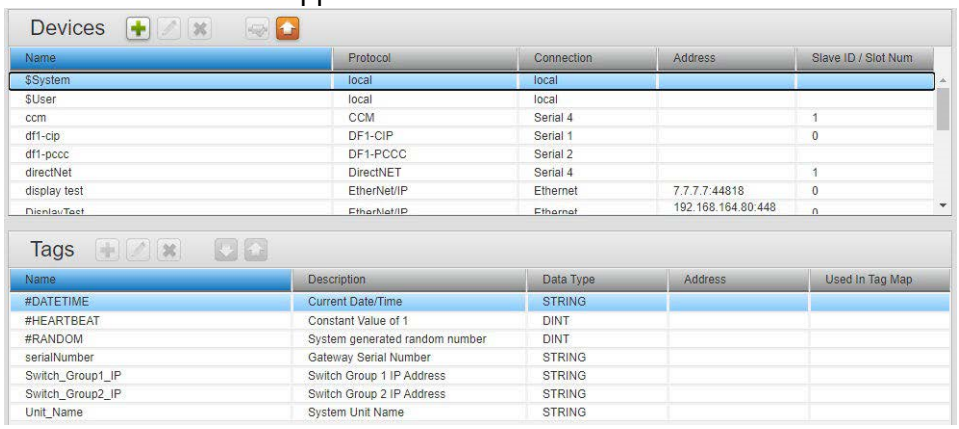
You may delete single tags in the Tags list by clicking on the tag and selecting the Delete icon. You may also delete multiple tags with a single click. To delete multiple tags in sequential order, hold down the **SHIFT** key and click the first and last tags in the sequence. If you wish to delete individual tags from a list, hold down the **CTRL** key and click the tags you wish to delete.

You may delete any tags that are not used in a tag map without any problem.

If you try to delete tags that are listed in any active tag map, the associated tag map is deactivated upon deletion of the tags. The software warns you this is the case before deleting the tag(s) and changing the tag map's status to inactive. If you try to delete tags that are part of one or more inactive tag maps the software warns you this is the case. You will not be able to activate a tag map with one or more missing tags.

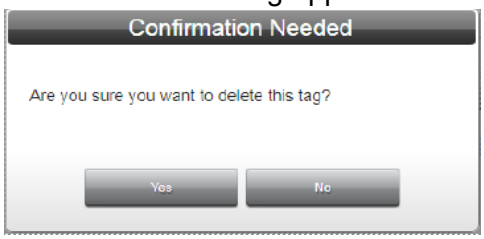
To delete a tag:

1. Access the Devices window:
   See Configuring Devices.
   The Devices window appears:



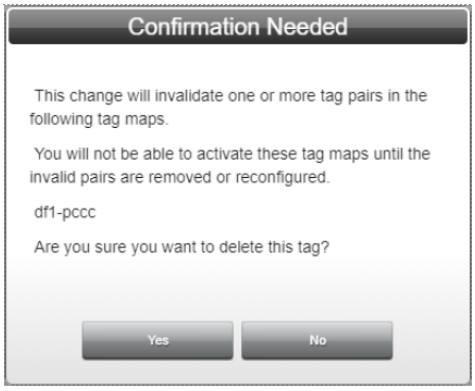

2. Select a device and one or more of the device tags from the list.
3. Click the Delete icon:

   A confirmation dialog appears:




4. Confirm the deletion:
   - **Yes**. Deletes the selected tag from the Industrial Gateway and exits.
   - **No**. Exits without deleting the selected tag from the Industrial Gateway.

If you try to delete a tag that is in use in a tag map, the software warns you this is the case. Once the tags are deleted, any associated tag maps are deactivated.




### 3.3.9 Importing Tags

| NOTE | The best method for adding tags to a Gateway is to export them from your PLC and edit the file to match the import format shown below. |
|---|---|

Commas and quotation marks between tag data values are required.
Example: "TagName", "Description",

"TagAddress","DataType",”ByteSwap”,”WordSwap”

**"RealArray”,"Testing","RealArrayAddr","real[2]",”0”,”1”**

In the following example, the description slot is empty but has quotation marks and comma:

**"CurrentDateTime","","CurrentMonthAddress","STRING",”0”,”0”.**

When a tag array is present, the Datatype column adds the array size after the type using square brackets.
Example: **STRING[4]** has 4 elements in an array of type STRING.

Gateway enforces the following import rules:

- If *TagAddress* is missing but *TagName* and *DataType* are present, then *TagName* is used as both name and address.
- If *TagAddress* is missing, the expected comma must still be present, consistent with commonly understood Excel .csv formatting rules.
- If the *TagName* is missing, then no Tag entry will be imported for that line.
- If *DataType* is missing, then no Tag entry will be imported for that line.
- If the Description has a comma, that field must be enclosed in quotation marks.
- If a line fails to conform to the expected .csv formatting, then no tag entry will be imported for that line.

- To specify an array, a bracketed length must be appended to the *DataType*. Example: **INT[10]** This indicates that the tag is an array, of 10 elements of type INT.
- Each tag in the import file must have a unique name. If the file has duplicate tag names in it, the entire file is rejected.
- If the file has tags with names that are duplicates of tag names already configured for the device, the duplicate lines are not imported.

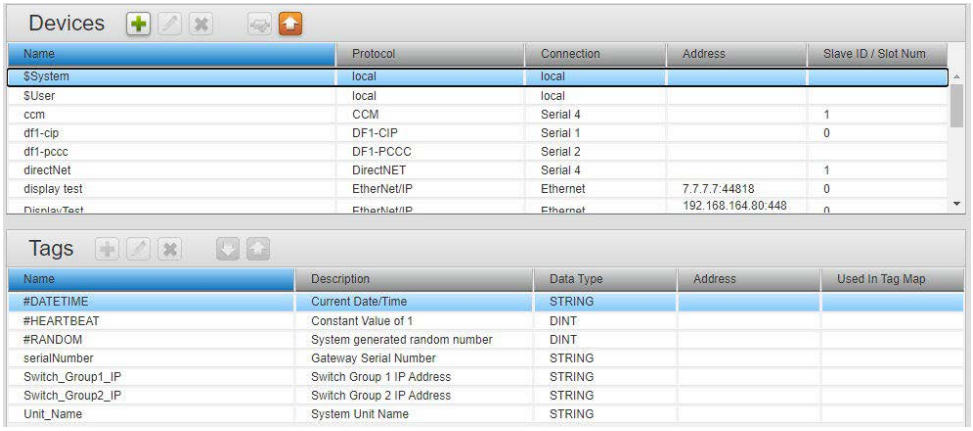
| **NOTE** | When a tag file is exported from the Gateway, each tag is on a separate line. |
|---|---|

| **NOTE** | Array tags have a minimum length of 1 and a maximum length that depends on protocol and data type. If tags are entered individually through the Tag Properties form, these array lengths are enforced by the user interface. |
|---|---|

To import a tag file:

1. Click the Devices icon:

The Devices window appears:




2. From the Devices list, select the device for which you wish to import tags.
3. From the dialog, click the following icon:

4. A file selection dialog appears. If necessary, navigate to the directory in which your tag files are located. This directory can be on a computer drive or on a network server.
5. Select the file and click **Open**. The tag file is imported, and the tags appear in your Tags dialog.

### 3.3.10 Exporting Tags

You can export a list of tags associated with a single device from the Gateway into an uncompressed, downloadable .csv file. Each row holds the information for a single tag. All fields are enclosed in quotes and separated by commas. If no description exists, the field is represented by a pair of empty quotation marks.

Format example:

"TagName","Description","TagAddress","DataType"

Example exported tag row:

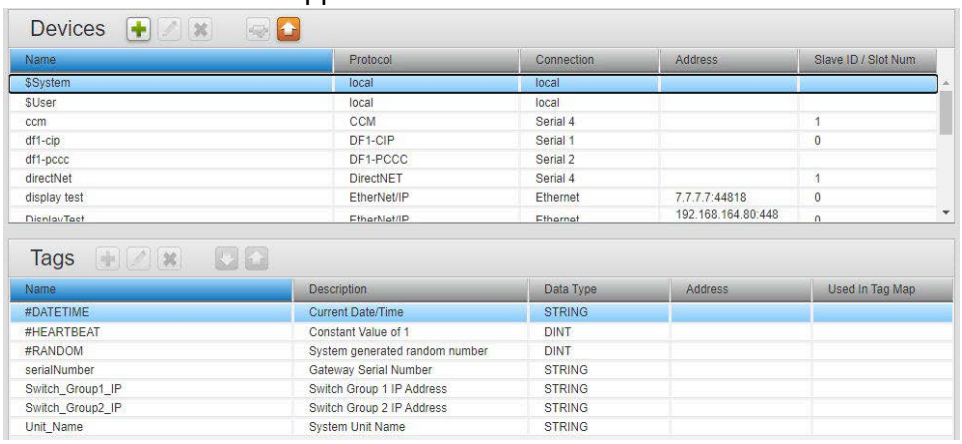
**"CurrentMonth","","CurrentMonthAddress","STRING" "0","0"**.

When a tag array is present, the Datatype column adds the array size after the type using square brackets. Example: **STRING[4]** has 4 elements in an array of type STRING.

To export tags:

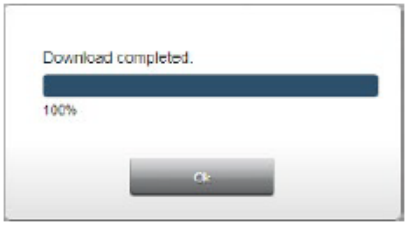
1. Click the Devices icon:

The Devices window appears:




2. From the Devices list, select the device for which you wish to import tags.
3. From the dialog, click the following icon:

The User Interface informs you that it is downloading the export file:




Depending on the browser, browser settings, and computer operating system, you may be prompted to choose your download location, or the exported file is downloaded to the Downloads directory (or other, designated folder).

## Section 3.4 Configuring Tag Maps

A tag map represents a collection of tag pairs (each of which consists of a source and a destination tag) together with a specification of when the copies are to occur. It is recommended that you group the tag pairs based on the frequency of the copy operation. Copies can occur on a periodic basis or when the value of a polled tag changes. Any configured tag may be specified as a source tag, but only user-configured tags may be specified as destination tags. You cannot use a $System tag as a destination tag and the system will not accept the designation.

The maximum number of tag pairs that may be defined in a single map is 100. The minimum is one. The maximum number of tag maps that can be defined is 50. The practicable number of tags that can be copied on schedule will depend on a variety of factors, such as the protocols of the source and destination devices, the speed of the slowest device, connection speed and network capacity, tag types, CPU availability, and specified frequency of copy operations.

The rate specified, whether On Change or Periodic, is directly related to the processing performance (CPU Load) of the Gateway. For example, a Tag Map with a period of 10 milliseconds will use more processing performance than a Tag Map with a period of 200 milliseconds. As Tag Maps are added, the CPU Load increases and processing performance decreases. The CPU Load can be viewed on the Diagnostics screen.

You create sets of source and destination tag pairs and set a rate of copy or specify copy initiation based on a change in the value of a polling tag. The software processes the sets by reading from the PLC source tag, and writing to the PLC destination tag, at the rate desired. The tags may be on PLCs connected to the Gateway via either a serial or an Ethernet connection. The Gateway manages the communication requirements of both the source and destination PLCs.

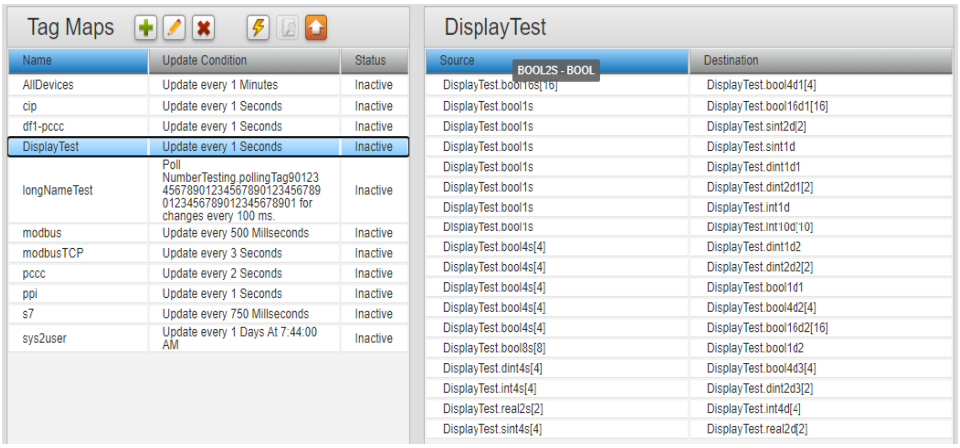
The Tag Map table provides an update field for each map that shows whether or not the map updates by polling a tag for a change at a defined interval, or updates at a specified a time interval.

| NOTE | The devices from which the tag values are being read do not have to be running the same protocol as the devices to which the tag values are being written. Exercise caution when copying between different tag types. There is minimal validation of tag types. When the source and destination tag types differ, data loss or a change of value may occur. For example, if a REAL is written to a DINT, the value will change, as the REAL uses IEEE format, which is transmitted bit-by-bit, rather than converted to the nearest integer value. If the value of the destination is too large to fit into the destination, the value will change as well, as only part of the source will be copied to the destination. Similarly, when a tag pair includes a signed and unsigned type, the value may change.<br>The one restriction is that tags of type STRING can only be copied to or from other tags of type STRING. For information about bit copying, see About Bit Copying Operations. |
|---|---|

To add, modify, or delete tag maps:

1. Click the Tag Maps icon:

The Tag Maps window appears:




2. In the Available Tag Maps work area, view or specify the following options:

| Icon | Function | Access |
|---|---|---|
| | Add a tag map: | Adding Tag Maps |
| | Modify a tag map: | Modifying Tag Maps |
| | Delete a tag map: | Deleting Tag Maps |
| | Activate a tag map: | Activating Tag Maps |
| | View live tag data | Viewing Live Tag Data |
| | Export tag maps | Exporting Tag Maps |

### 3.4.1 Adding Tag Maps

This topic explains how to create tag maps for copying between PLCs. A Tag Map represents a collection of Tag Pairs. A tag pair consists of a source tag and a destination tag. Any configured tag may be specified as a source tag, but only user-configured tags may be specified as destination tags.

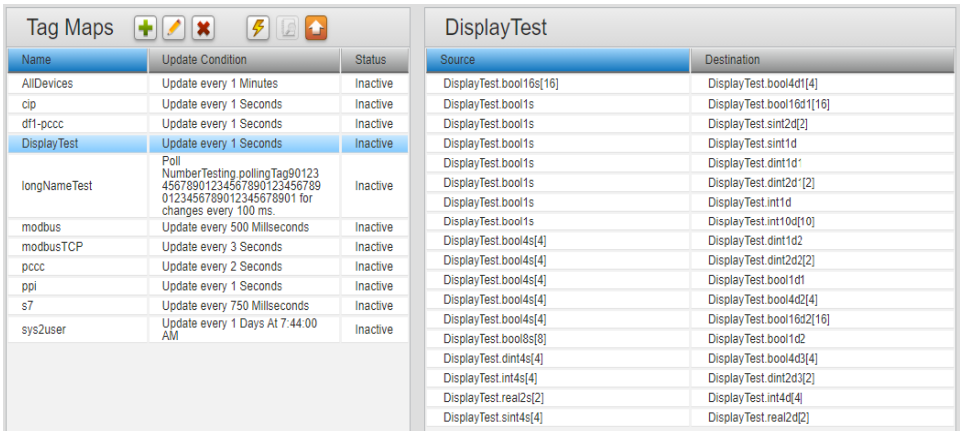
All tag pairs in a specific tag map are copied on the same periodic schedule or when the value of a single trigger tag changes, depending on the type of copy scheduling configured. If you select an array as a trigger tag, the software uses the 0th element of the array as the trigger tag.

- For more information about tags, see Adding Tags.
- For more overall information about tag maps, see Configuring Tag Maps.
- To better understand how tag copying works, see About Bit Copying Operations.

To create a tag map:

1. Click the Tag Maps icon:

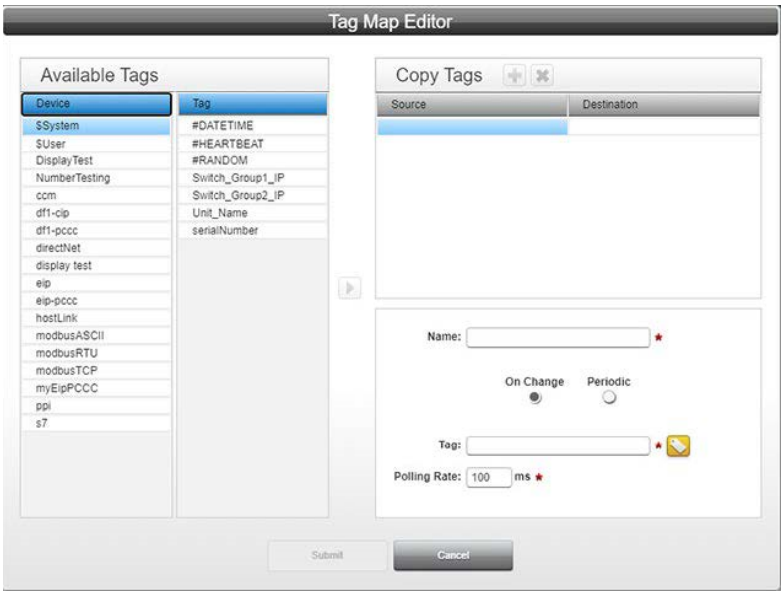
The following window appears:




2. Click the following Tag Maps window icon:

The Tag Map Editor appears. The Tag Map Editor has two work areas. The Available Tags list contains a list of all devices on the Gateway and associated tags.

The Copy Tags list enables you to configure tag pairs which specify the source and destination for a tag copy:



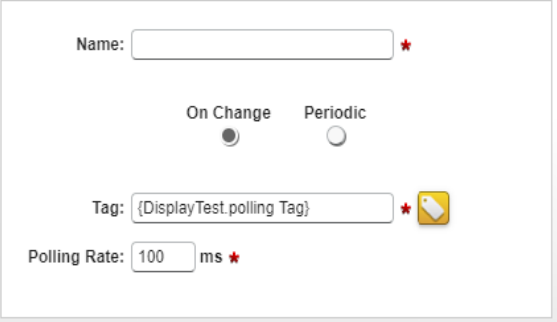

3. From the Available Tags list, select the following:
   - **Device/Tag**. To select a device from which you wish to copy tags, click the device. A selected device turns blue. Tags available for copying from the selected device appear in the associated **Tag** list. To move a tag to the **Copy Tags** list, select a tag, select a source or destination cell in the list, and click the now active **Select** button:

     The tag moves to the selected location in the Copy Tags list. You can also copy a tag from the Available Tags table to the selected tag in the Copy Tags table by double-clicking it.
   - **Copy Tags**. The tags selected to copy from one device location to another are listed in the **Source** and **Destination** columns in the Copy Tags work area. The following buttons can be used to add and delete rows in the tag map, and to edit the list of tags. To select an individual tag in a column, click the tag entry. Selected tags turn blue. To edit the list:
     - *Add* icon. To add a tag row to the Copy Tags work area in the Tag Map Editor dialog, click the following icon:

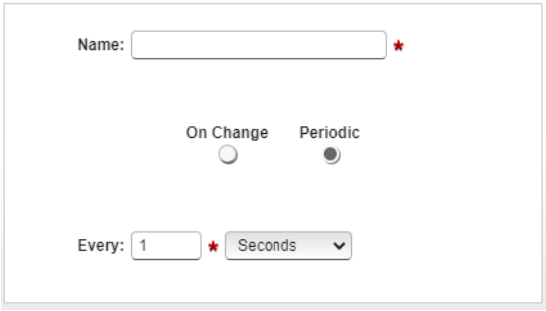
     - *Delete* icon. To delete a tag row (with or without tags in the row), in the Tag Map Editor dialog from the Copy Tags work area, click the following icon:

     - Once you have your source and destination tag list set up, enter the following data to complete tag map setup:

- **Name**. Enter the tag map name (must be unique). Specify when to copy the tags:
  - *On Change*. Copy tags from source to destination when the specified tag changes value:




  - *Tag*. Specify the tag that triggers the copy by clicking the Tag icon and selecting a tag from the list that appears.
  - *Polling Rate*. Specify how often to look at a tag in a controller for a tag value change since the last time the value was checked. Range is 10 milliseconds to 1000 milliseconds. Default value is 100 ms.
  - *Periodic*. Copy tags from source to destination periodically as specified.
  - *Every n time period at time t.* Specify to copy the tags at a specified time period of milliseconds, seconds (default), minutes, hours, or days. If you choose **Days**, the copy will happen every day at the time of day specified.




Example: If you define a period of 1 second, and the operation takes 100 milliseconds, then the next operation begins in 900 milliseconds. If you define a period of 1 second, and the copy takes 1020 milliseconds, the software executes the next copy in the least time possible, which is immediately after finishing the first copy. Your tag copy will then run continuously.

| NOTE | If the Copy Tags action references a tag or tags that are no longer defined, the software provides a Clean Up button to allow you to remove the listed Tag Not Found tags:<br>The tags are listed as "**$_DeviceUnknown. $_ TagNotFound**". |
|---|---|

4. **Activate** icon. Tag maps are inactive when first created. To activate the tag map, return to the Tag Maps window and click the following icon on the window:

| NOTE | If you try to activate a tag map that references a deleted tag in either the source or destination map, the software warns you there is a tag that no longer exists. You cannot activate the tag map until the deleted tag issue is addressed. You also cannot activate a System Tag Map. |
|---|---|

- **Submit**. Saves entered data on Gateway and exits.
- **Cancel**. Exits without saving changes on Gateway.

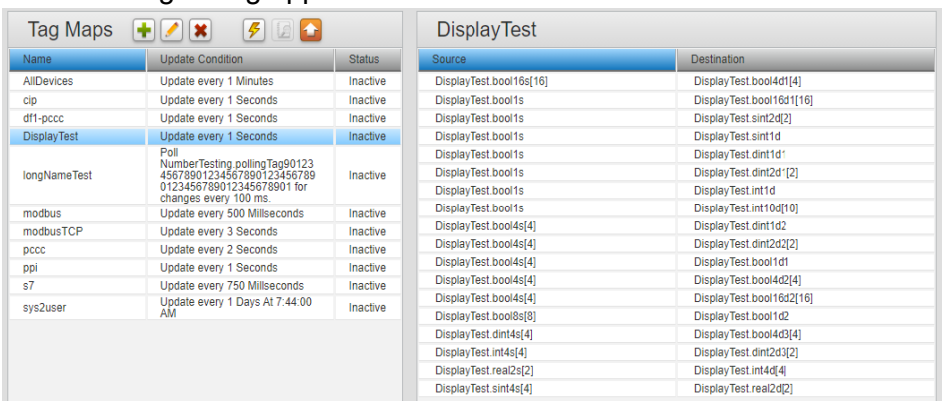
### 3.4.2 Modifying Tag Maps

You may modify a tag map. The tag map has to be made INACTIVE before you can modify it. When you reactivate the tag map, ALL of the tag maps will be restarted.

To modify a tag map:

1. Click the Tag Maps icon:

The following dialog appears:




2. Click the following Tag Maps dialog icon:

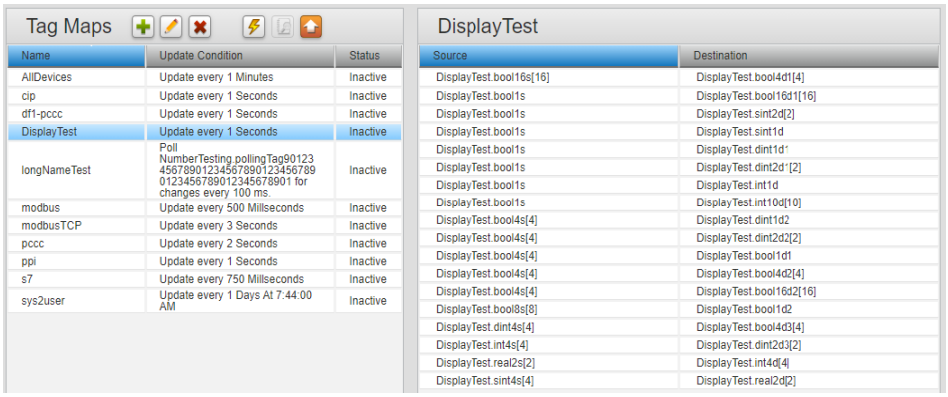
3. Make your modifications to the tag maps:
   See Adding Tag Maps
4. Confirm the modification(s):
   - **Submit.** Saves the changes to the tag map and exits.
   - **Cancel.** Exits without saving changes to the tag pairs.

### 3.4.3 Deleting Tag Maps

To delete a tag map:

1. Click the Tag Maps icon:

The following dialog appears:




2. Select a Tag Map to be deleted. Only inactive maps can be deleted.

3. Click the Delete icon:
   A confirmation dialog appears:

4. Confirm the deletion:
   - **Yes**. Deletes the selected tag map and exits.
   - **No**. Exits without deleting the selected tag map.

### 3.4.4 Exporting Tag Maps

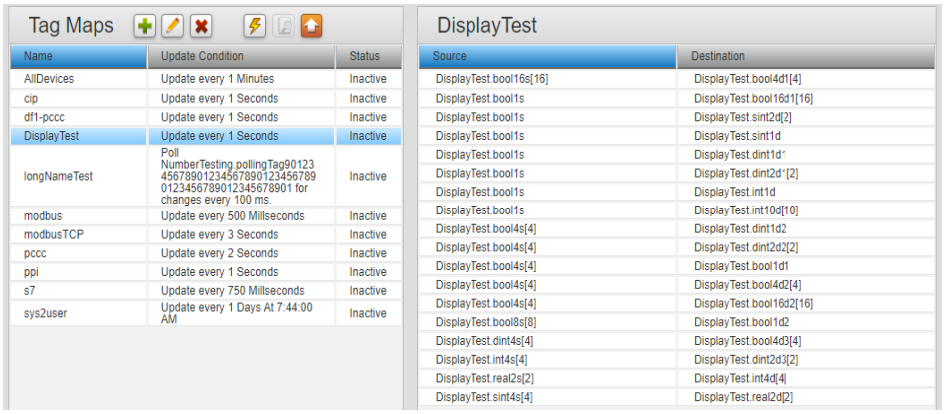
You may export a tag map as a compressed .csv file as follows:
Row one of the exported .csv is Tag Map Properties. All fields are enclosed in single quotation marks. If the Tag Map is “Periodic”, then the first row contains:

- Map Name, 'Periodic', 'Periodic Interval', 'Units', 'Use TimeOfDay', 'TimeOfDay'
  If the unit used for the scheduling period is less than one day, the last two fields are empty.
- If the Tag Map is 'OnChange', then the first row contains:
  - Map Name, 'OnChange', 'OnChange Tag', 'Polling Rate', 'ms'
- Subsequent rows contain source and destination tag pair mappings, with the source tag first, and the destination tag second:
  - 'srcDeviceName.TagName', 'TagAddress', 'DataType',
  - 'destDevice.TagName', 'TagAddress', 'DataType'

To export a tag map:

1. Click the Tag Maps icon:

   The following dialog appears:

2. Select a tag map to export, and click the following Tag Maps Export icon.

   The User Interface prompts you that it is downloading the export file.

Depending on the browser, browser settings, and computer operating system, you may be prompted to choose your download location, or the exportation source and destination tag pair mappings, with the source tag first, and the destination tag second:ted file is downloaded to the Downloads directory (or other, designated folder).

### 3.4.5 Activating Tag Maps

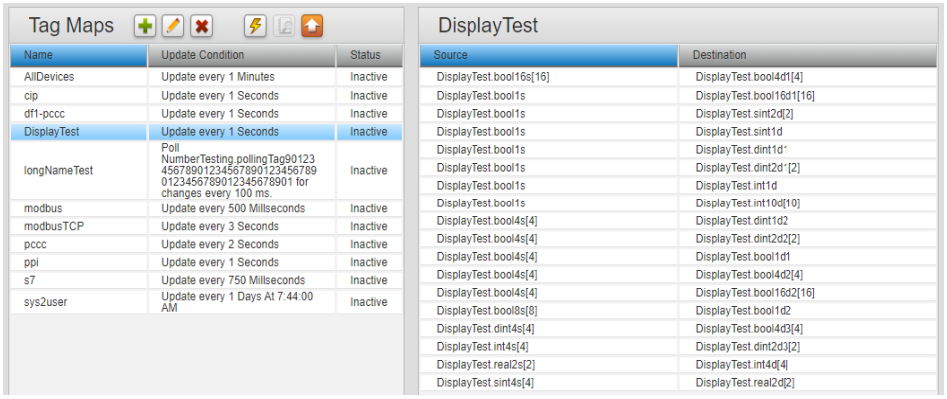
This topic explains how to activate a tag map.

To activate a tag map:

| NOTE | Tag maps are inactive when first created. When you activate the tag map, ALL currently active tag maps in your list are restarted. |
|---|---|

1. Click the Tag Maps icon:

The following window appears:




2. To activate the tag map, click the following icon:

3. To deactivate the tag map, click the icon again.

| NOTE | If you try to activate a tag map that references a deleted tag in either the source or destination map, the software warns you that tag(s) no longer exist. You cannot activate the tag map until the deleted tag issue is addressed. |
|---|---|

### 3.4.6 Viewing Live Tag Maps

Use this option to view live tag data values on source and destination tags in a tag map.

For source tags, the tag value is displayed after being read from the source device and after any word or byte swapping has been performed. For destination tags, the tag value is displayed after any byte or word swapping has been performed. The data is shown in the type format (for example, INT, REAL, STRING). The tag values showing in the source and destination lists are refreshed as they change, which depends on the copying rate. You may also choose to view the data in Hexadecimal format. Tags that have not been read or written use the following characters: --- (three dashes) to show no values at present.

| | |
|---|---|
| ***NOTE*** | When configured for ModbusTCP, the Siemens S7-1200 and S7-1500 PLCs store tag values with the least significant word first, whereas the Gateway requires tag values to have the most significant word first. Other Modbus devices may also store values with the least significant word first. To ensure that the Gateway operates on the correct values, the Word Swap check box must be checked on all tags configured in the Gateway for these devices. Because the Gateway swaps source tags before displaying their values in the Live Tag Viewer, source tag values will appear correctly. Destination tags are displayed after the Gateway performs the swap (in preparation to write it to the device with the required least significant word first). Thus, these tags will appear in word-swapped order under the Destination column of the Live Tag Viewer. For example, a DINT tag with hex value 0x12345678 (decimal value 305419896) will be displayed as 0x56781234 if the “Display as Hex” checkbox is checked or as the decimal value 1450709556 if the checkbox is unchecked. Note that these tags *are* copied correctly; this is strictly a presentation issue for the destination tags in the Live Tag Viewer.<br>For more information, see S7-1200 and S7-1500 Modbus Tag Values Appear in Word-swapped Order in Live Tag Viewer |

| | |
|---|---|
| ***NOTE*** | Tag maps are inactive when first created. When you activate the tag map, ALL currently active tag maps in your list are restarted. |

If source and destination tags do not reference the same amount of memory space, then the number of array entries is limited to only the smallest.

Example 1:

dev. BOOL[8] => dev. BOOL[3] (OR dev. BOOL[3] => dev. BOOL[8]) would be displayed as:

| Source | Destination |
|---|---|
| dev. BOOL[0] | dev. BOOL[0] |
| dev. BOOL[1] | dev. BOOL[1] |
| dev. BOOL[2] | dev. BOOL[2] |

If the data types do not match, the display of tag array entries and their values include blank rows to keep corresponding source and destination values aligned. EXAMPLE 2
dev. INT[8] => dev. REAL[2] would be displayed as:

| Source | Destination |
|---|---|
| dev. INT[0] | dev. REAL[0] |
| dev. INT[1] | ---- |
| dev. INT[2] | dev. REAL[1] |
| dev. INT[3] | ---- |

If tags cannot be read or written because the device and/or tag configuration is incorrect or the device is offline, the Live Tags view shows **{ERR}**:

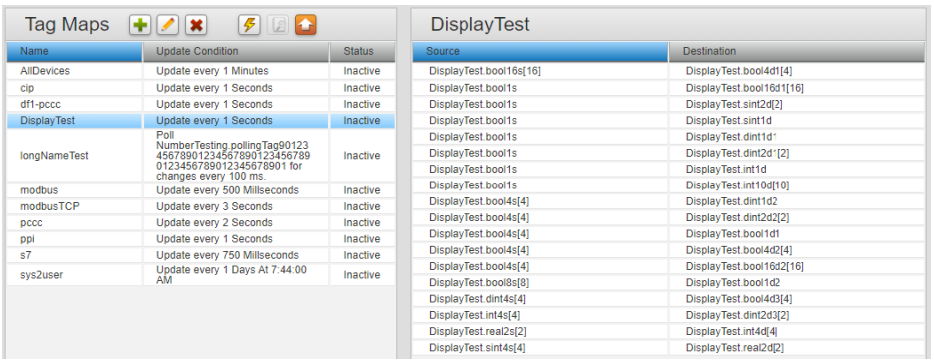
If the source tag cannot be read, both source and destination values show as {ERR}. If the destination tag cannot be written, only the destination value will be shown as {ERR}.
The format of the value display is dependent on the state of the hex display check box, and the data type of the value. The following table lists formats for each condition:

| | Hex display unchecked | Hex display checked |
|---|---|---|
| Integer types | decimal | hex |
| Real | decimal | IEEE 754 hex |
| String | ASCII | ASCII |
| Boolean | decimal/binary | hex |

To view the values:

1. Click the Tag Maps icon:

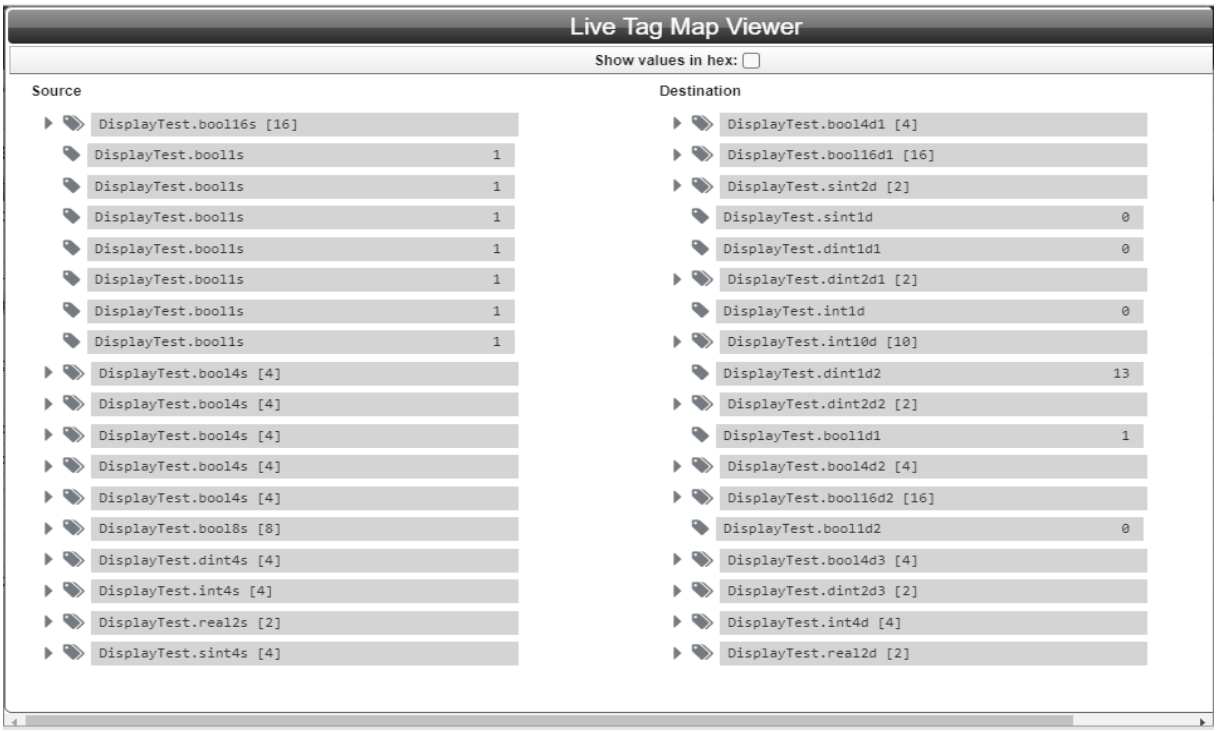
The following dialog appears:



2. Select a tag map that is active, and click the following icon:

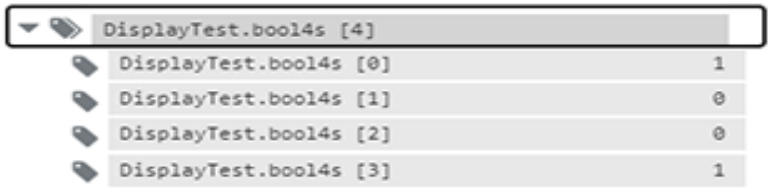
   The Live Tag Maps dialog appears. The data being copied between Source and Destination PLCs is constantly displayed.

   The values are sampled at one-second intervals.



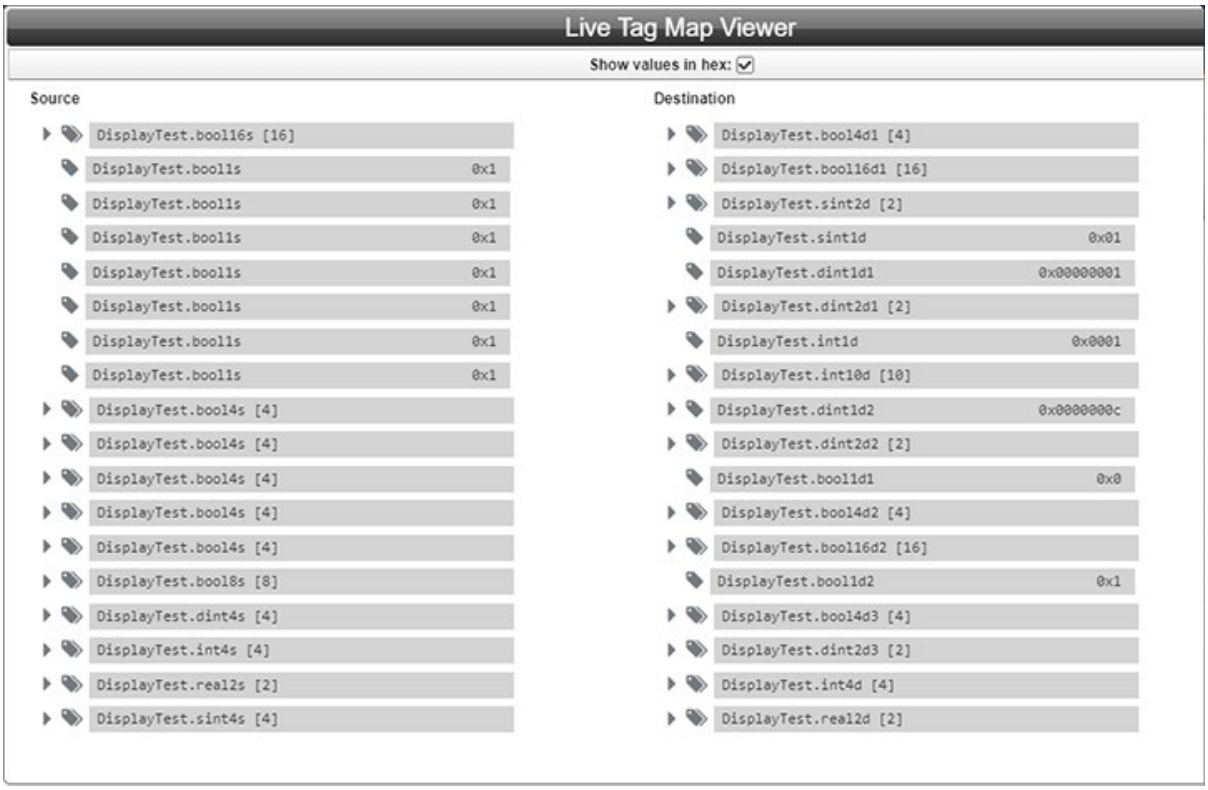

3. To view array values, click on the arrow associated with the array.

   The values appear on an indented, drop-down list in the column:




4. To hide the values, click the arrow again.

   - **Show values in hex**. To view the values in hexadecimal format, select this option:




- **Polling Tag Value**. Shows the current polling tag value when the tag map trigger is set to **On Change**. Shows the value when the tag can be read and displays {ERR} if the tag cannot be read. If no value has been read, or the tag is not yet initialized, shows three dashes (**---**). If the tag value is too long to fit into the column, the tag value is truncated. (An ellipsis is used to indicate the truncated value.) Hover over the field to show the full tag name and its value. If the polling tag is a numeric type, the value appears in decimal format when the **Show values in Hex** checkbox is unchecked; in hexadecimal value when the checkbox is checked:

5. To close, click **X** on far right of window.

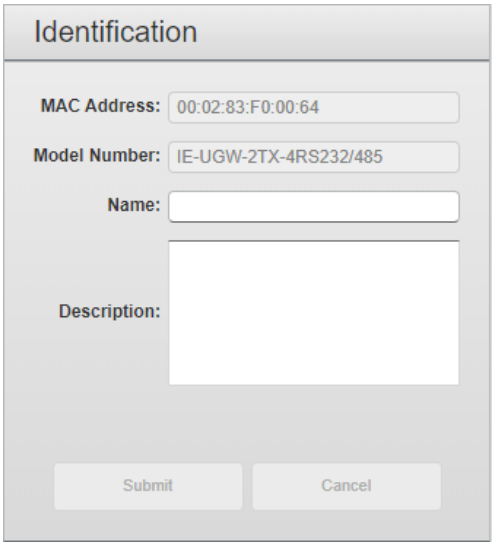
## Section 3.5 Identifying the Industrial Gateway

This information uniquely identifies the Gateway. The information includes the module's MAC address, the model ID, a name, and a description.

To access the option:

1. Click the Identification icon:

The Gateway Identification dialog appears:




2. View or specify the following settings:
   - **MAC Address**. Not editable. The MAC address is a 12-digit hexadecimal string that can be also be obtained from the Industrial Gateway label.
   - **Model Number**. Not editable. Lists the model number of your Gateway. This is also the catalog number.
   - **Name**. Text name that uniquely identifies your Gateway. 63 characters maximum. Allowable characters are a to z, A to Z, 0 to 9, dash, underscore, and comma. May not use spaces, percent sign, caret, semi-colon, back slash, double quote, single quote, back quote, angle brackets, braces, and ampersand. Example: **Weidmuller1**. The name is displayed as the tab name in the browser window.
   - **Description**. Text description for location and comment information. Example: **Master Gateway for Testing.**
3. When finished making changes to the Gateway Identification, click either of the following to exit:
   - **Submit**. Saves changes.
   - **Cancel**. Resets any modified fields on the dialog.

## Section 3.6 Configuring Network Settings for the Industrial Gateway

The Gateway Network Settings are used to set up the network parameters.

| NOTE | When assigning IP addresses across the system, (ETH1) DO NOT overlap with IP addresses used elsewhere. |
|---|---|

| NOTE | Keep the following in mind: the gateway and DNS addresses are only necessary if using NTP; otherwise, only address and subnet mask needed are. |
|---|---|

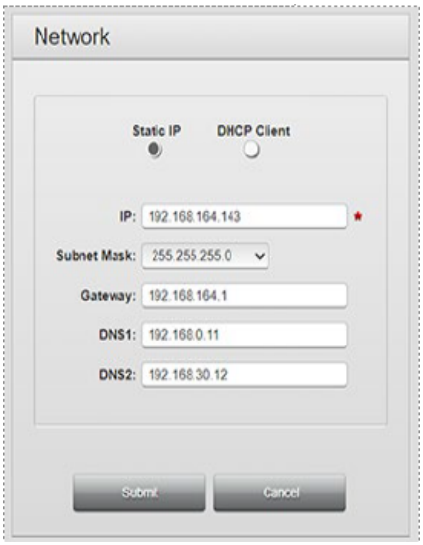
The Gateway Ethernet ports, PORT1 and PORT2, provide an interface between a network and the Gateway and access to the Gateway User Interface from the network. Both ports communicate at 10/100 Mbytes per second over an Ethernet connection. Each Gateway is assigned a unique MAC address. Both Ethernet ports are assigned a single IP address. The MAC address is listed on the label on your Gateway. During setup, you can configure the Ethernet connection as a DHCP client or with a static IP address.

Configure the Gateway using an Ethernet cable to make a connection between either Ethernet port on the Gateway front panel and a PC. Before you can communicate with the Gateway, a power supply needs to be wired into the PWR terminal strip on the Gateway front panel and plugged into an outlet in a controller cabinet or other power source. Once power is applied to the Gateway, the Gateway starts up and shows the default 192.168.1.100 address that is the initial starting IP address for the device displayed on the OLED display, along with troubleshooting information.

To configure network settings:

1. Click the Network icon:

The Network Setup window appears:

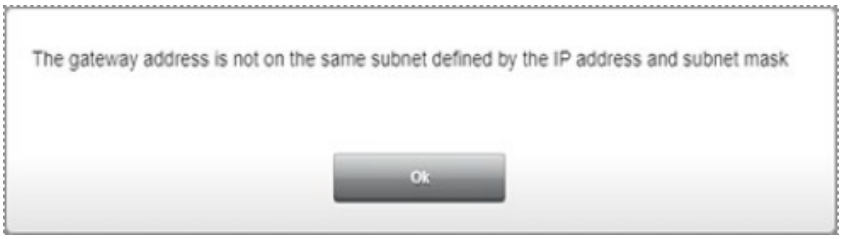



2. View or specify the following options:
   - ***Connection type***. Identifies whether to use static or dynamic address configuration for the network connection:
     - *Static IP*. Default option. Static means that an IP address is entered manually and does not change until you change it.
       - ❖ IP. Select a valid Static IP address in the Network. Enter the Industrial Gateway IP Address. The default address the Gateway ships with is **192.168.1.100**. During installation, you will likely change this address to an IP address that works in your network.
       - ❖ Subnet Mask. Enter subnet mask address. This value is typically **255.255.255.0**.
       - ❖ Gateway. Default when shipped is **192.168.1.1**. If needed, enter Gateway address suitable for your network.
       - ❖ DNS1. Default when shipped is 8.8.8.8. Enter the primary DNS value.
       - ❖ DNS2. Lists a secondary DNS value. For the Gateway, this value may be set to a different value. If the primary connection fails, the secondary is available.

| NOTE | If an NTP timer server is configured, The Gateway must have access to the Internet and a gateway and at least one DNS server must be configured. This does NOT apply if the Gateway is on the same subnet as the server. If the server is specified with an IP address (rather than a name), no DNS addresses are necessary. |
|---|---|

- *DHCP Client*. If you have a DHCP Server installed and configured on the network, select this option to allow the Gateway to get an ETH1 IP address from the designated DHCP server for a designated lease period when the Gateway starts up.

- **Submit**. Saves data on Gateway and exits. If you enter a gateway address that is not on the same subnet as the IP address and subnet mask, you will see the following error




- **Cancel**. Exits without saving data from Gateway.

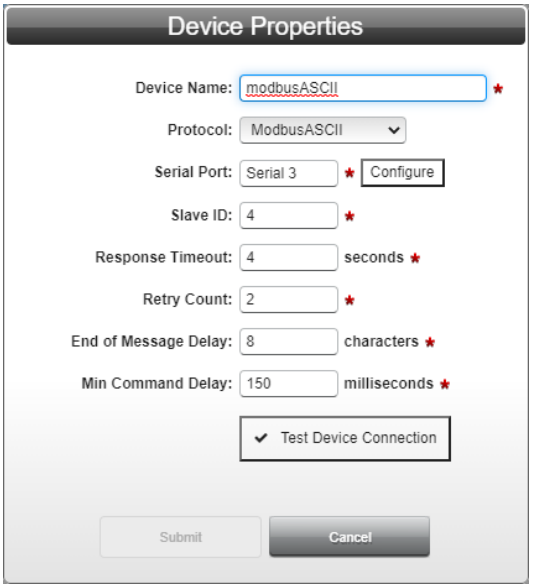
## Section 3.7 Configuring Serial Communications Setup

A Gateway provides RS-232/RS-485 serial communications via two or four serial ports (Serial 1 and Serial 2, Serial 3, and Serial 4). Serial Ports 3 and 4 pertain only to the IE-UGW- 2TX-4RS232/485 model. You may connect the Gateway via these ports to external programmable logic controllers (PLCs) or other devices. You can configure each available serial port for either an RS-232 or RS-485 connection as part of adding a device to the Gateway. See Adding Devices, earlier in this chapter.

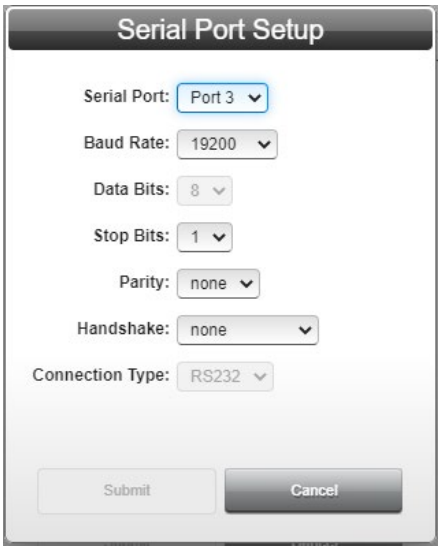
If the protocol is changed for a previously configured serial port, the serial port reverts to an unconfigured state (no port selected). The field remains bordered in red until you reconfigure the port.

To configure serial ports for the Gateway:

1. From the Devices window, select the PLC for which you wish to configure a serial port:




2. Select the **Configure** button.
The Serial Port Setup dialog appears:




3. View or specify the following Communications Settings options for the selected serial port (**3**):
   - **Port**. Selected. You can change this port if other serial ports are still available.
   - **Baud Rate**. Specifies the speed at which the serial port sends data. Rates are **1200** through **115200**. Select the desired rate from the dropdown menu for the port.
   - **Data Bits**. Specifies word length. Lengths are **7** or **8** bits. If you can specify the value (the dropdown is not grayed out), select the desired length from the dropdown menu.

- **Stop Bits**. Specifies number of stop bits to use. Numbers are **1** or **2**. Select the desired number from the dropdown menu.
- **Parity**. Specifies parity to use. Options are **none**, **odd**, or **even**. Select the desired option from the dropdown menu.
- **Handshake**. Defines whether or not to use handshaking, and. the handshaking type. Options are **none**, **RTS/CTS**, **X-ON/X-OFF**. Select the desired option from the dropdown menu.
- **Connection Type**. Defines whether to use the Gateway's RS-232 or RS-485 serial communication.
- **Submit**. Saves the entered connection data on Industrial Gateway. The software prompts you that the data settings were successfully modified. Click **OK**.
- **Cancel**. Exits without saving data from Industrial Gateway.

## Section 3.8 Configuring Time Setup for the Industrial Gateway

The Gateway tracks date and time, and uses the data to timestamp Gateway operations, such as log entries. You specify that Gateway time and date is either set manually (default selection) or via the NTP, using either a local or remote Network Time Protocol (NTP) server. If you are connecting to a remote server over the Internet, you must configure a gateway address and at least one DNS address or you must configure the Gateway to use DHCP.

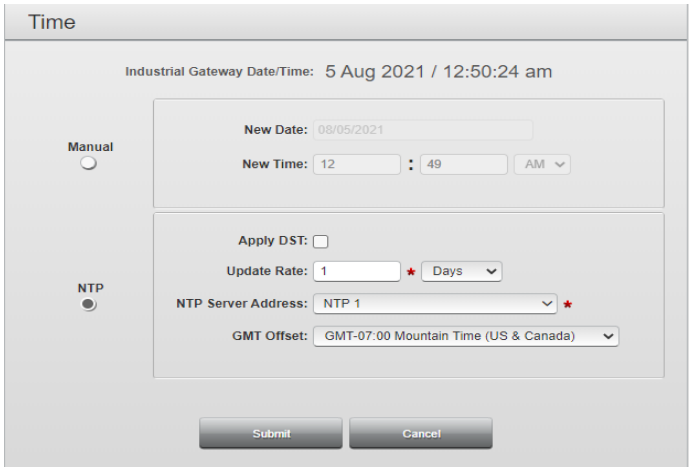
| NOTE | An operating system anomaly exists which does not allow for Date/ Time settings beyond January 19, 2038 3:14:07 AM GMT. |
|---|---|

To configure Industrial Gateway time and date settings:

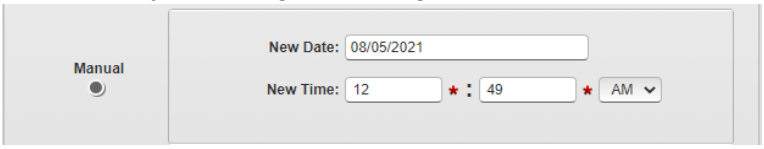
1. Click the Time icon:

The Time Setup window appears.

(Default window shows current Gateway date and time information):

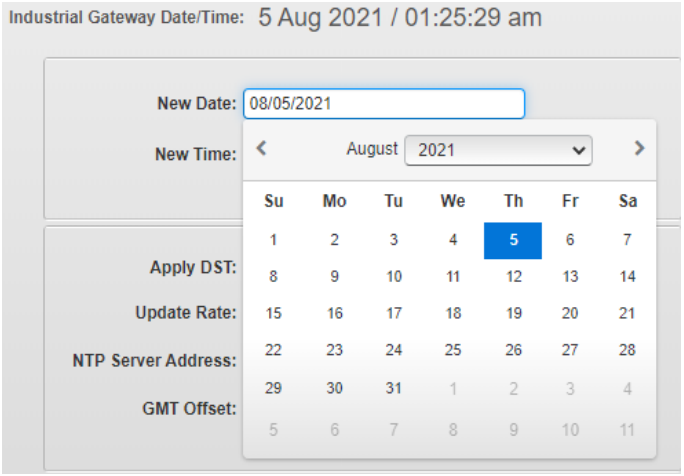


2. View or specify the following options:
   - **Industrial Gateway Date/Time**. Shows current time and date on the Gateway as configured using either **Manual** or **NTP**.



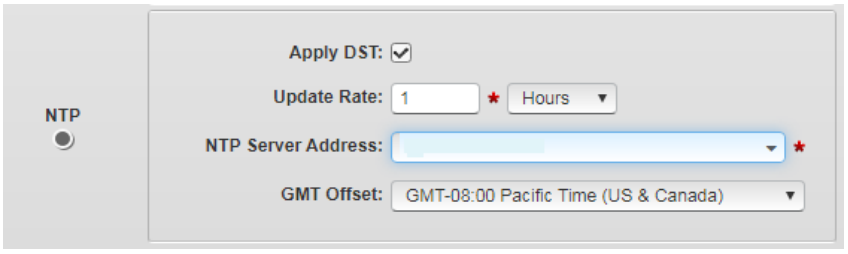

   - **Manual**.

     Select the current date from the the calendar.
     Specify the current time in hours, minutes, and AM or PM.
     This is commonly based on the Gateway's physical location.
     - *New Date.* Shows field containing current date on Gateway. The field is not directly editable. To make changes, select the date from the calendar. The calendar closes only after you select a date:




     - *New Time*. Shows current time on Gateway as read from the PC. This field is not directly editable. The hour and minute fields are directly editable. To adjust the time, enter the new time in the fields provided and use the up and down arrows to select AM or PM.

   - **NTP**. Allows Gateway to synchronize its time using a Network Time Protocol (NTP) server. Settings are grayed out until the checkbox is selected.
     The field is editable:



- *Apply DST*. Applies a Daylight Savings Time adjustment to the Gateway only for the NTP option.
- *Update Rate n time*. Defines how often the Gateway updates its date and time using the NTP server. Specify an integer for a count, and select from **Hours**, **Days**, **Weeks** or **Months** for a unit in the time field. At each specified time interval, the Gateway attempts to get the time:
  - ❖ If it cannot get the time from the server, it repeats the time update attempt every fifteen seconds as long as the Gateway is active.
  - ❖ If you turn off NTP updating, the Gateway stops trying to update the time using this method.
  - ❖ If you turn NTP updating back on, the Gateway returns to trying to update the time every fifteen seconds.
- *NTP Server Address*. Lists Internet locations of servers that provide network time synchronization. The address is also directly editable. You can supply the IP address of any NTP server either external or internal. Select a server location that describes the continent on which the Gateway is located. Example: **north-america.pool.ntp.org**
- *GMT Offset*. Lists time zone information. Select the time zone in which the Industrial Gateway is located. Example: **GMT-07.00 Mountain Time (US & Canada)**

- **Submit**. Saves new selections on Industrial Gateway.
- **Cancel**. Reverts any changes on the window. If you try to exit the window without saving your changes, the software asks you to confirm the exit without saving changes.

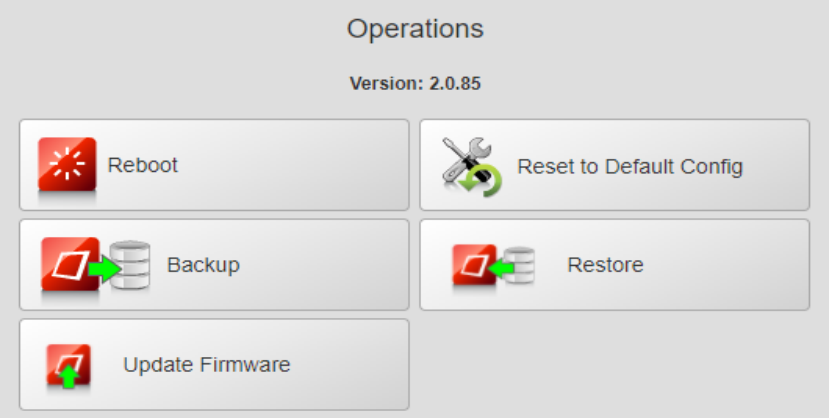
## Section 3.9 Configuring Industrial Gateway Operations

You can reboot, backup, upgrade firmware, reset the Gateway to factory default settings, restore data and upgrade protocols*.

To access the options:

1. Click the Operations icon:

2. The Industrial Gateway Operations dialog appears (with the current firmware version running on the Gateway):




3. From the dialog, select the appropriate function:
   - Rebooting the Gateway
   - Backing Up Gateway Data
   - Updating Firmware
   - Resetting the Gateway to Default Configuration
   - Restoring Gateway Data
   - Upgrading Protocols*

| NOTE | *The current firmware does not support the option to upgrade protocols. The referenced information is included only for the purpose of potential, future updates. |
|---|---|

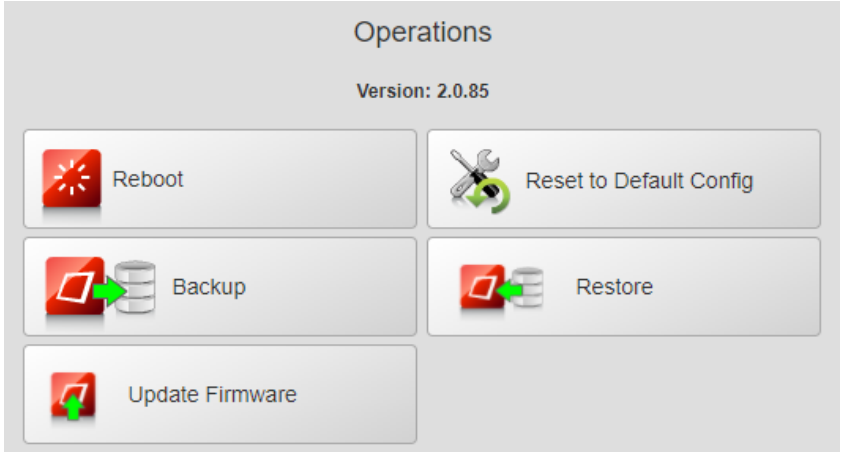
### 3.9.1 Rebooting the Industrial Gateway

Restarts the Gateway. Rebooting is one of the first steps to take if your Gateway does not function correctly for any reason. The reboot usually starts your Industrial Gateway up with all services restored and running properly.

To reboot the Gateway:

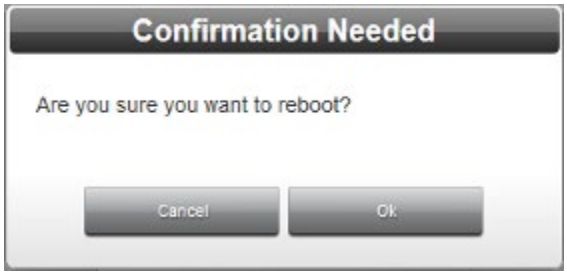
1. Click the Operations icon:

The following dialog appears:



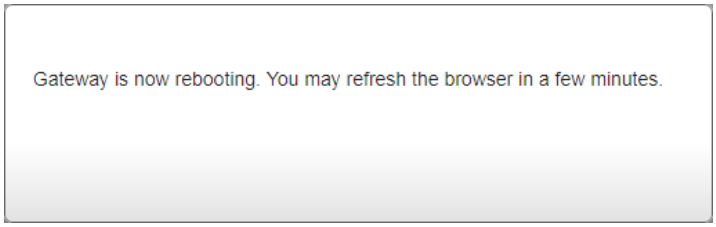
2. Click **Reboot**:

3. The following dialog appears:




4. Confirm the reboot:
   - **Ok**. Reboots the Gateway and exits the Gateway user login.
   - **Cancel**. Exits without rebooting the Gateway.

   The software reboots the Gateway:




5. Once the Gateway has fully rebooted, reload your web browser and log back in to your Serial Communications Gateway.

### 3.9.2 Backing Up Industrial Gateway Data

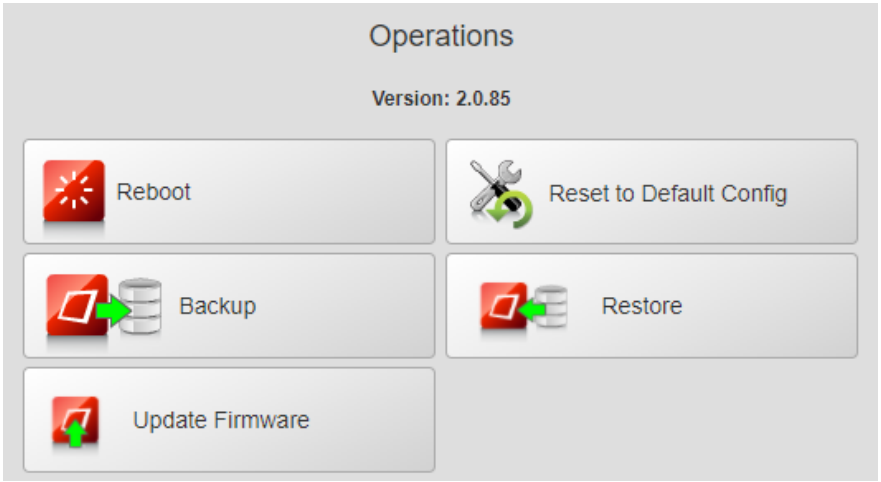
It is recommended that you regularly make a copy of all the data on your Gateway on a separate device, such as a personal computer or other storage device. To back up your data:

| NOTE | Backing up a very large database may take some time. Please wait until the backup completes before moving onto your next task. |
|---|---|

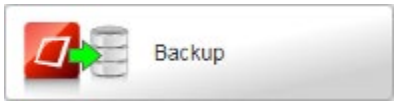
| NOTE | IP addresses and Passwords are not saved as a part of the backup configuration file. |
|---|---|

1. Click the Operations icon:

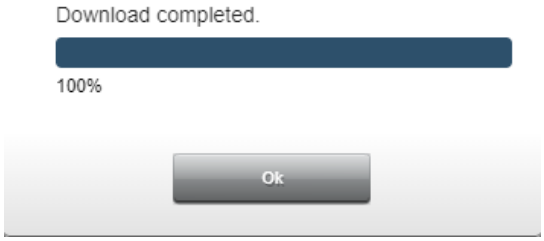
The following dialog appears:




2. From the dialog, click **Backup**:




The User Interface prompts you that it is building and downloading the backup file.




3. Click **OK**.
4. Depending on the browser, browser settings, and computer operating system, you may be prompted to choose your download location, or the exported file is downloaded to the Downloads directory (or other, designated folder).

### 3.9.3 Updating Firmware

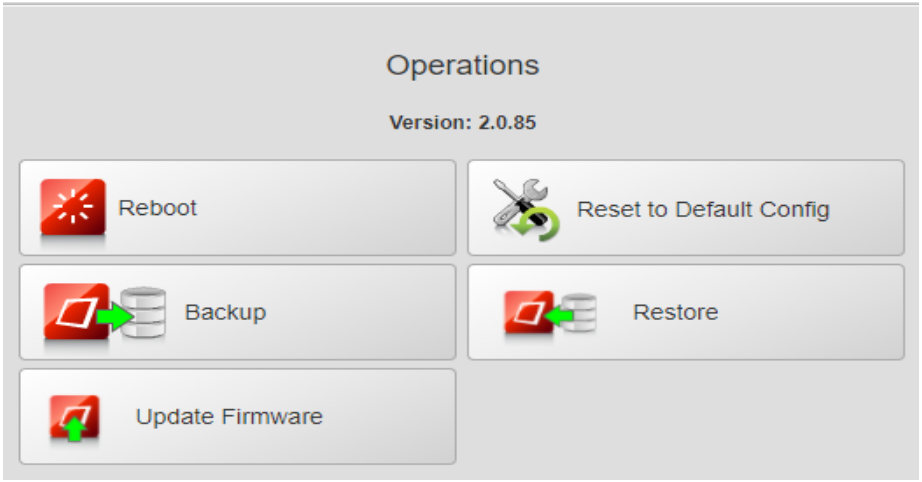
Replaces firmware on the selected Gateway. The firmware is the software that runs the Gateway. Replacing firmware does not change, replace, or delete your data or settings on the Industrial Gateway.

| NOTE | You cannot reverse a firmware update once it has been installed or re-install an earlier version. Before updating your Industrial Gateway Gateway, back up your existing database files. This provides a safety feature so that your data remains intact, and can be restored if you encounter problems with the upgrade. To back up your files, see Backing Gateway Data. |
|---|---|

To update firmware:

1. Click the Operations icon:

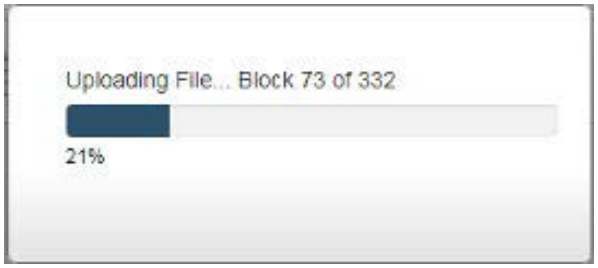
The following window appears:



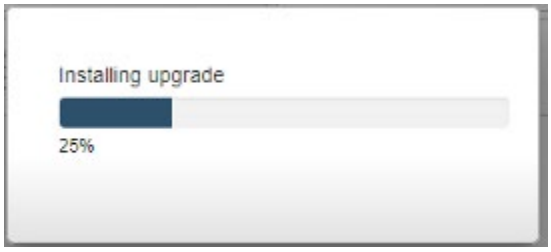

2. Click **Upgrade Firmware**:

An updating and a firmware update file selection dialog appear:

3. Navigate to the directory in which your firmware file is located. This directory can be on a personal computer drive or a network server. Select the correct file.
Example: ***name_n.nn.tar.gz*** where n.nn is the version.
The software loads the selected firmware onto the Gateway:



4. The software also prompts you about progress as it is installing the update:




The software prompts you when the update is completed and reboots the Gateway.

5. After the Gateway reboots, and before logging back onto the Gateway, clear the Internet browser's cache. Then log back onto your Gateway. Once logged in, check that the right version of the software is installed (listed on Operations window).

### 3.9.4 Resetting the Industrial Gateway to Default Configuration

Resetting a Gateway to its factory default configuration using the software removes all user-entered data that is on the Gateway. It does not affect the Protocol level of the device. If a device has been upgraded, a reset does not downgrade the level.

The Gateway reset to default returns the Gateway to its factory configuration settings as follows:

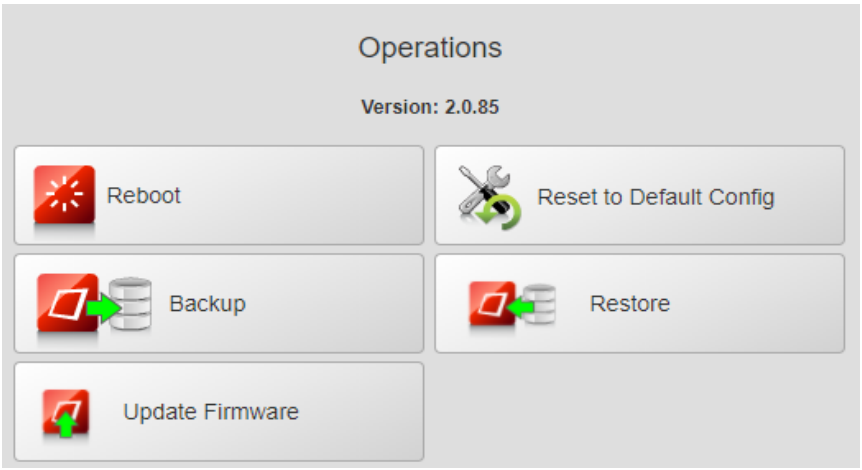
- The default device network configuration, including address set to Static IP address of 192.168.1.100.
- All serial ports are set to 19200, 8/1/None/RS-232.
- Time is configured as **Manual**, DST unchecked, NTP update rate set to 1 Day.
- Security is set to no MAC addresses entered, Blacklist selected, Enabled deselected; Ping allowed.
- Login password is set to default value (**Detmold**). User name (**admin**) is not editable.
- All Devices, Tag Maps, and Traces are removed, with the exception of $System device and its tags, and the $User device. Any tags added to the$User device are removed.
- User-configured Identification information is cleared.
- All trace file and logs are cleared, except for the Reboot log.

If the reset to default fails, the Gateway will be in an error condition. If this happens, call Technical Services for further help.

To reset the Gateway to factory default settings using software:

1. Click the Operations icon:

The following dialog appears:




2. Click **Reset to Default Config**:

The following dialog appears:

3. Confirm the reset:
   - **Yes**. Restores the factory default settings and exits.
   - **No**. Exits without restoring the factory default settings.

   The software prompts you when the reset is done and reboots the Gateway.

| NOTE | You may also choose to reset the Gateway using the Reset switch on the Gateway front panel. Resetting the Gateway using the Reset switch provides two options. You can:<br>• Reboot the system, maintaining its current configuration. To do so, insert a paper clip into the Reset switch on the Gateway and press gently and briefly, for less than 15 seconds. While pressing the button during the first 15 seconds, the display reads **Reboot, hold to Factory reset *xx* sec**. The *xx* is a countdown starting from 15. Once the Gateway starts to reboot, it restarts all processes, and checks database integrity. If the database is missing or corrupt, a new default database is created. This allows you to log-in and restore a back-up.<br>• Reset to factory defaults. Insert the paper clip and press gently for more than 15 seconds. For the first 15 seconds, the display reads **For Defaults Hold *xx*** sec. After 15 seconds, the display reads **Factory reset**. Once the Gateway starts to reboot, it restarts all processes, and checks database integrity. If the database is missing or corrupt, a new default database is created. This allows you to log-in and restore a back-up. |
|---|---|

| NOTE | The Gateway may become unresponsive if you double click the switch. You will need to cycle power.<br>The Gateway reboots, restarts all processes, and checks database integrity. If the database is missing or corrupt, a new default database is created. This allows you to log-in and restore a back-up. |
|---|---|

### 3.9.5 Restoring Gateway Data

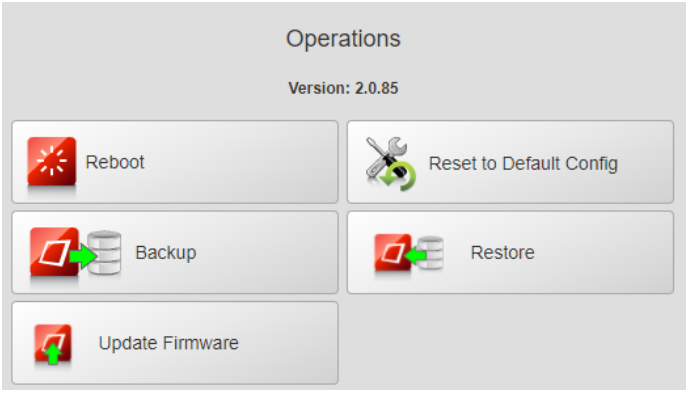
Restores a previous data backup on the Gateway. In order to restore to a Gateway, you must have a previous data backup file. See Backing Up Gateway Data.

| NOTE | During a Gateway restore operation, there is no change to the network configuration or to the administrator password. You also cannot restore the Gateway from a non-Gateway, or related device. |
|---|---|

To restore a data backup:

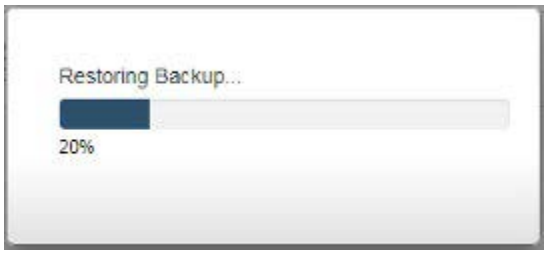
1. Click the Operations icon:

The following dialog appears:




2. From the dialog, click **Restore:**

3. A file selection dialog appears. If necessary, navigate to the directory in which your backup files are located. This directory can be on a personal computer drive or a network server.
4. Select the correct file.
5. Click **Open**. The software informs you that it is restoring the backup on the Gateway:




The software informs you when the software backup restoration is complete and informs you that it is rebooting the Gateway:

6. Wait a few minutes, then refresh your Gateway browser, and, if necessary, log back in.

### 3.9.6 Upgrading Protocols

Allows you to access to additional protocols via an upgrade.

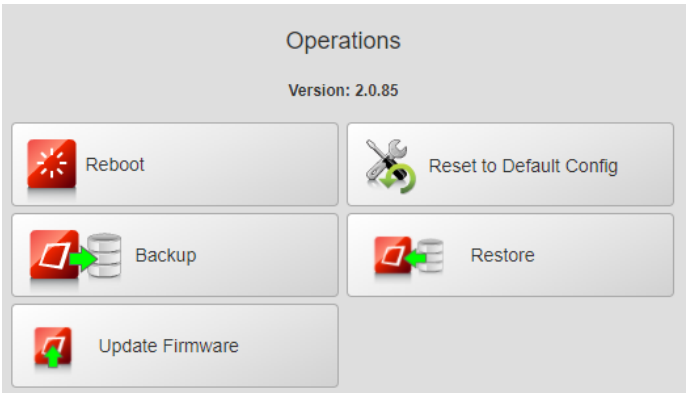
While the current firmware does not support this feature, with future updates, it may be possible to access additional protocols through the purchase of an upgrade key.

| NOTE | Before upgrading the Industrial Gateway, be sure to back up your existing database files. This provides a safety feature so that your data remains intact and can be restored if you encounter problems with the protocol upgrade. To back up your files, see Backing Up Your Serial Communications Gateway Data. If at any point you need to do a factory reset of the Gateway, your upgrade is retained. |
|---|---|

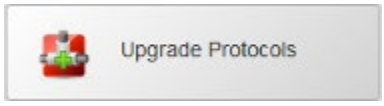
To upgrade protocols after a successful firmware update, see Firmware Update, and proceed with the following steps:

1. Click the Operations icon:

   The following dialog appears:

2. Click **Upgrade Protocols**:

3. An upgrading selection dialog appears. To complete the upgrade, copy the 52-digit upgrade key into the **Upgrade Key** field.
4. Click **Submit**. The software prompts you when the upgrade is completed and reboots the Gateway.
5. After the Gateway reboots, and before logging back onto the Gateway clear the Internet browser's cache. Then log back onto the Gateway. Once logged in, check that the right version of the software is visible under Operations.

## Section 3.10 Configuring Security Setup for the Industrial Gateway

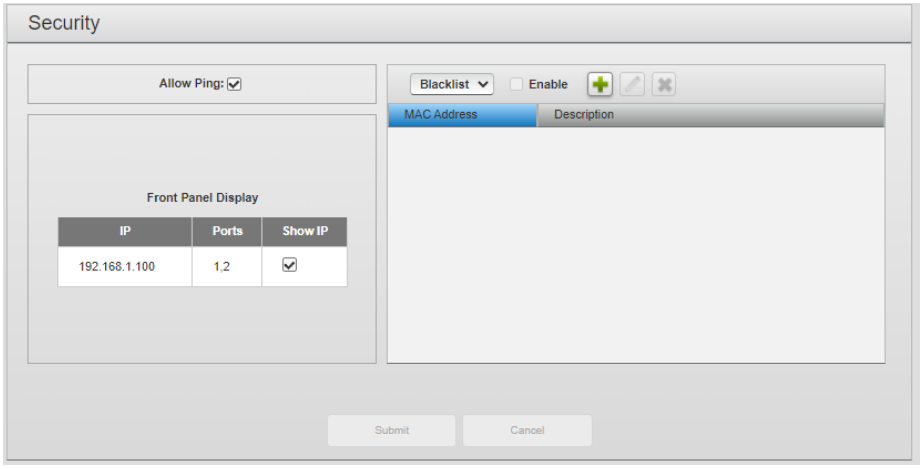
The Gateway provides security features that allow you to control network access to the Gateway.

| NOTE | Please keep the following in mind: |
|---|---|
| | • The MAC address that you enter in the security settings is a 12-digit hexadecimal string that can be obtained from blacklist registries on the Internet or from your security or network administrator. If you have internal computers you wish to exclude, run a command shell and type **ipconfig/all** (Windows) and **ifconfig** (Mac). The MAC address for your computer is listed.<br>• If you whitelist a MAC address, the same firewall settings apply as for a blacklist address.<br>• When you enter a MAC address into the Whitelist, ONLY the personal computer or device with that MAC address will be able to access the Gateway. No other devices can access it. If you have checked the **Allow Ping** checkbox, only the MAC address from the Whitelist will be allowed to ping the Gateway.<br>• If you blacklist a MAC address, all traffic from that address is blocked, regardless of how safe that traffic may be. Even if you select **Allow Ping**, blacklisted MAC addresses are prevented from pinging the Gateway. |

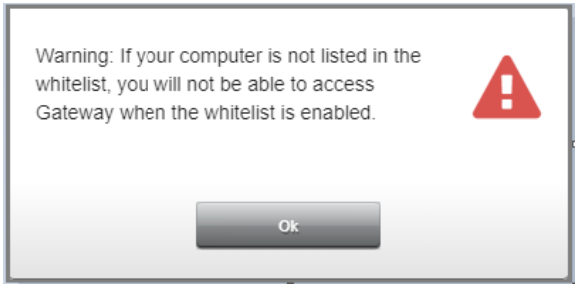
To configure security for the Industrial Gateway:

1. Click the Security icon:

The Security Setup window appears:



2. View or specify the following Security Setup options for each Gateway:
   - *Security Options*: Select one of the security options from the dropdown menu. Only one of these options is implemented:
   - Blacklist. Enter a known, untrusted MAC address. Blacklisting an address allows the Gateway to reject any attempt to connect to the Gateway from this address. When selected, the Blacklist dialog appears.
   - Whitelist. Enter a known, trusted MAC address that allows the Gateway to validate legitimate connections to it. When selected, the Whitelist dialog appears. A wrong MAC address entered here
   - requires a reset to factory defaults from the Gateway front panel to re-establish the connection, so use with caution and double check your own MAC address before you enter it.




   - **Enable** checkbox. Turns on the acceptance or rejection of the address(es), listed in the table, depending on whether **Whitelist** or **Blacklist** option is selected.
   - **Allow Ping**. Defines whether or not the Industrial Gateway can be pinged across a network. By default, pinging is permitted.
   - **Front Panel Display**. Shows you the IP address, port numbers, and the **Show IP** option. You can turn off the **Show IP** option so that the IP address for the Gateway is not visible in the OLED display on the front of the Gateway. See Viewing OLED Interface Information.Determines security settings for the Industrial Gateway:
   - **Submit**. Saves data on Gateway and exits.
   - **Cancel**. Exits without saving data from Gateway.

3. View or specify the following options:

| Icon | Function | Access |
|---|---|---|
| | Add a MAC Address: | Adding MAC Addresses |
| | Modify a MAC Address: | Modifying MAC Addresses |
| | Delete a MAC Address: | Deleting MAC Addresses |

### 3.10.1 Adding MAC Addresses

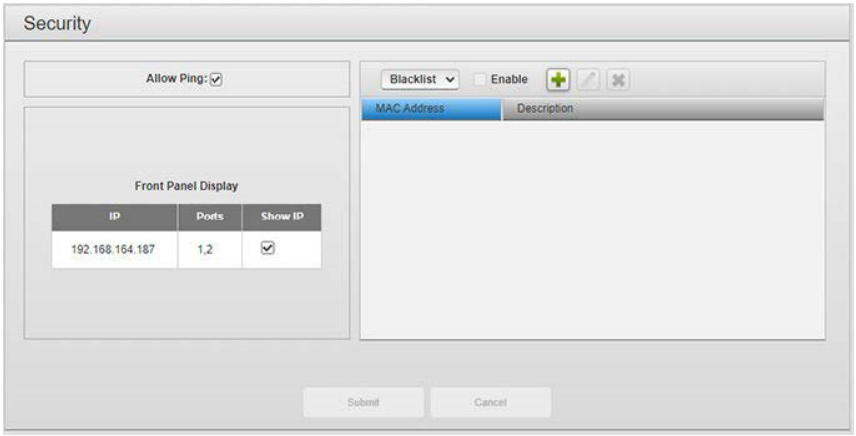
| NOTE | Please keep the following in mind:<br>• The MAC address that you enter in the security settings is a 12-digit hexadecimal string that can be obtained from blacklist registries on the Internet or from your security or network administrator. If you have internal computers you wish to exclude, run a command shell and type **ipconfig/all** (Windows) and **ifconfig** (Mac). The MAC address for your computer is listed.<br>• If you whitelist a MAC address, the same firewall settings apply as for a blacklist address.<br>• When you enter a MAC address into the Whitelist, ONLY the personal computer or device with that MAC address will be able to access the Gateway. No other devices can access it. If you have checked the **Allow Ping** checkbox, only the MAC address from the Whitelist will be allowed to ping the Gateway.<br>• If you blacklist a MAC address, all traffic from that address is blocked, regardless of how safe that traffic may be. Even if you select **Allow Ping**, blacklisted MAC addresses are prevented from pinging the Gateway. |
|---|---|

Enter the MAC addresses you wish to whitelist or blacklist. You may only whitelist or blacklist a series MAC addresses.

To add a blacklisting:

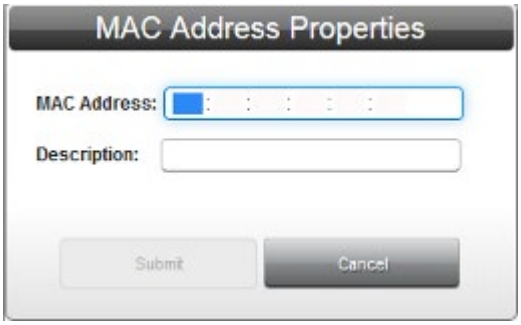
1. Click the Security icon:

   The Security window appears:

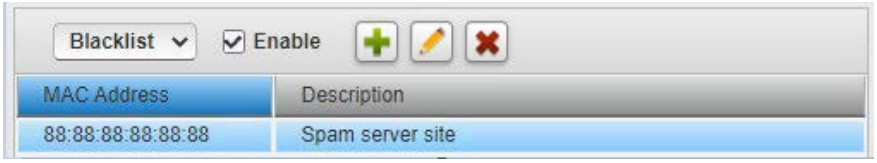
   
   

2. Select the **Blacklist** or **Whitelist** option.
3. To add the MAC address, click the following icon:

The MAC Address Properties dialog appears:




4. View or specify the following options:
   - **MAC Address**. Enter MAC address. Example: **88:88:88:88:88:88**
   - **Description**. Enter description. Example: **Spam server site.**
   - **Submit**. Saves the new MAC address in the list:

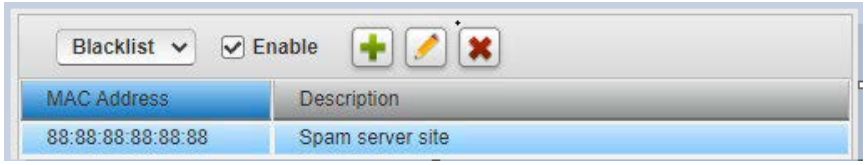



   - **Cancel**. Exits without saving changes in the list.
   - **Enable**. You must select this option to turn on the selected blacklist or whitelist capabiliy.
5. When finished making changes, click either of the following to exit:
   - **Submit.** The selected capability for the added MAC address(es) is enabled by selecting the **Enable** option. Gateway and exits.
   - **Cancel.** Cancels the enabling of the capability and remains in the window.

### 3.10.2 Modifying MAC Addresses

To modify MAC Address information:

1. Access the Security Setup window:
   See Configuring Security Setup for the Industrial Gateway.
   The Security Setup window appears:




2. If changing between whitelisting or blacklisting, select the desired blacklist or whitelist option in the Security Setup window.
3. Select a MAC address from the list and click the following icon:

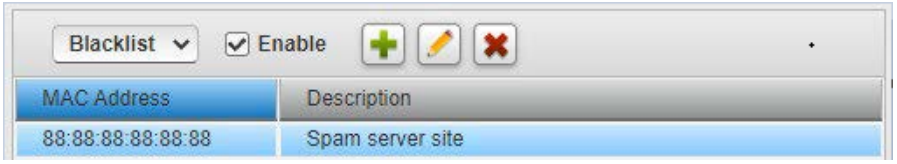
4. The MAC Address Properties dialog appears. Change information in the listed fields:
   See Adding MAC Addresses.
5. When finished making changes, click either of the following:
   - **Submit**. Saves changes on the Gateway and exits.
   - **Cancel**. Exits without saving changes on Gateway.

### 3.10.3 Deleting MAC Addresses

To delete a blacklisting:

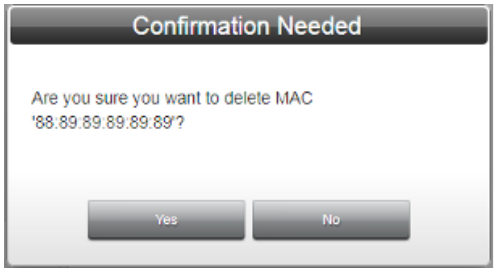
1. Click the Security icon:

   The Security Setup window appears:

2. If necessary, select the **Blacklist** option in the Security Setup dialog.
3. Select a MAC address from the list.
4. Click the Delete icon:

   A confirmation dialog appears:

5. Confirm the deletion:
   - **Yes**. Deletes the selected MAC address from the Gateway and returns to the window.
   - **No**. Returns to the window without deleting the selected MAC address from the Gateway.

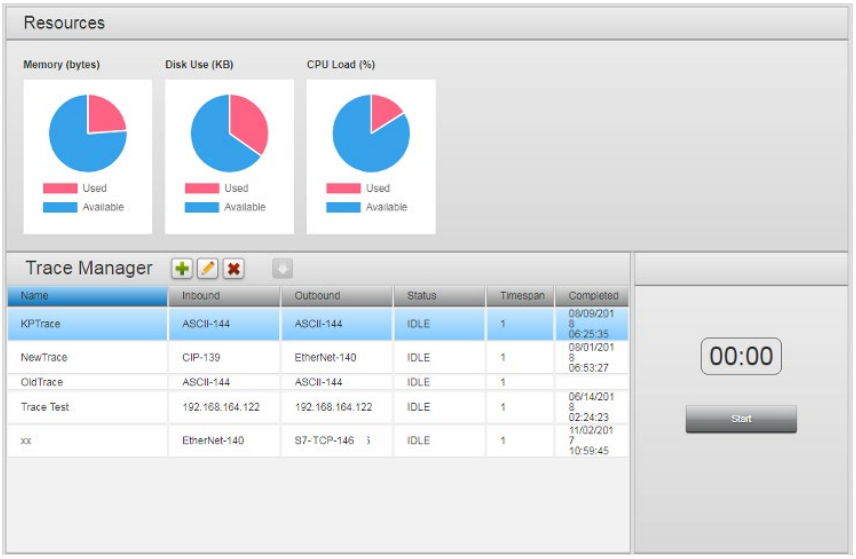
## Section 3.11 Viewing Diagnostics, Storage, and Trace Information

Use the provided options to manage diagnostics tasks:

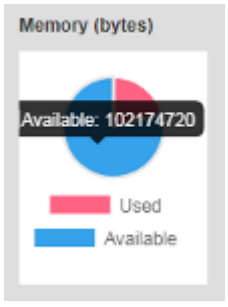
- Monitor Gateway's resource use.
- Trace traffic network to, and from, the Gateway to a specific, connected device.

1. Click the Diagnostics icon:

The following dialog appears:




2. View the following options:
   - **Resources**. Graphically shows available memory, disk use, and central processing unit (CPU) load:
     - **Memory (bytes)**. To view available and used memory in kilobytes, mouse over the blue or red portion of the chart:




     - **Disk Use (KB).** To view available and used flash in kilobytes, mouse over the blue or red portion of the chart.

- **CPU Load %**. To view available and used CPU load in percentages, mouse over the blue or red portion of the chart. The CPU Load pie chart may show a percentage greater than 100%. This occurs because the percentage shows not just actual usage, but the amount of backed-up work waiting on the CPU.

- **Trace Manager**. Use to trace data for network debugging purposes. Data includes the name of the trace and a timestamp. See Tracing Data.

## Section 3.12 Tracing Data

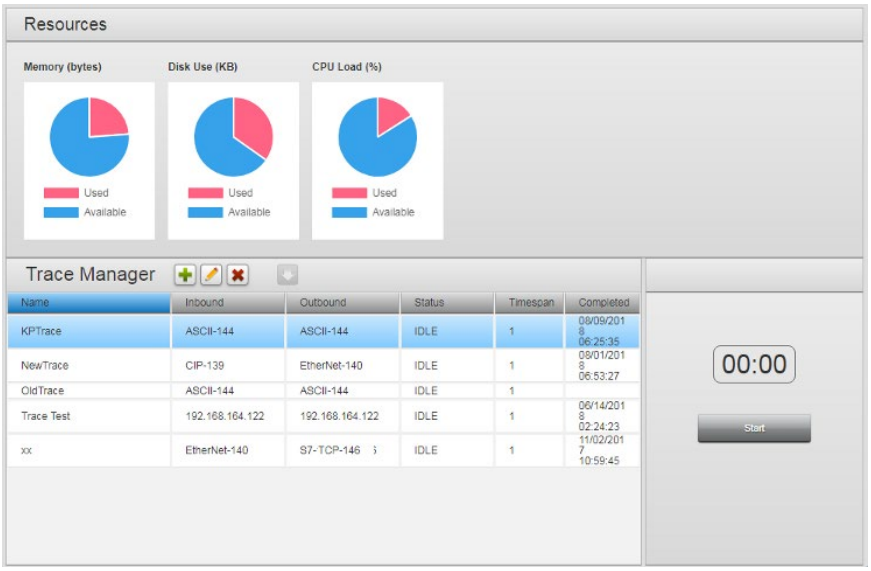
Capture network data for debugging purposes. Define which inbound and outbound devices to monitor from devices configured on the Gateway, and how long you wish to monitor the data traffic. Ethernet data is captured as a .pcap file, viewable by the external WireShark program. Serial data is captured as an ASCII file, viewable in a text editor. This option is provided for engineering and support personnel familiar with serial data transmission:

- If you specify the same device for both inbound and outbound tracing, a single trace is launched and saved.
- If you specify different inbound and outbound devices, two traces are launched and saved.

To add a data trace:

1. Click the Diagnostics icon:

The following dialog appears:



2. In the Trace Manager work area, view or specify the following options:

| Icon | Function | Access |
|---|---|---|
| | Add a data trace: | Adding Data Traces |
| | Modify a data trace: | Modifying Data Traces |
| | Delete a data trace: | Deleting Data Traces |
| | Download a data trace: | Downloading Data Traces |

- **Submit**. Saves changes on Industrial Gateway and exits.
- **Cancel**. Exits without saving changes on Industrial Gateway.

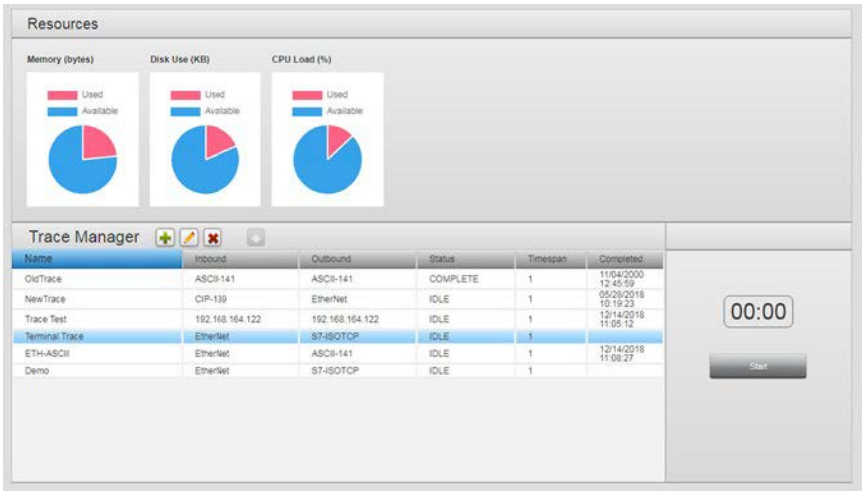
### 3.12.1 Adding Data Traces Data

To help with troubleshooting, the software allows you to capture network traffic to, and from, the Gateway and user-specified, connected devices. An inbound and an outbound device by name can be specified. The inbound and outbound device can be the same. The length of time to trace the network traffic can also be specified. A maximum of up to 3 minutes is allowable. For more information about how data tracing works, see About Data Traces.

To add a data trace:

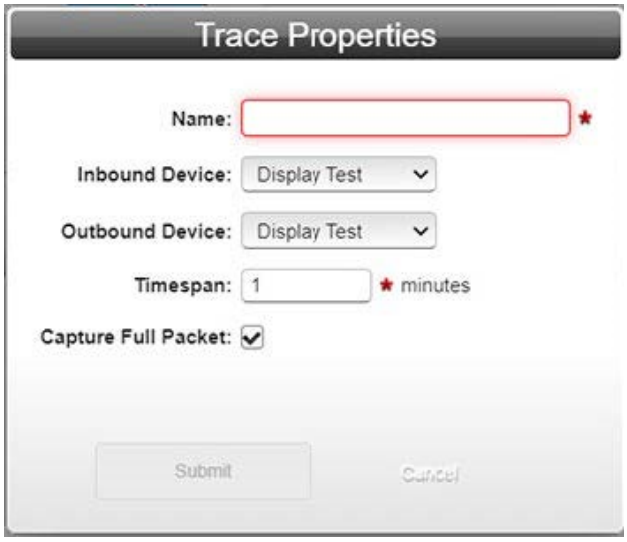
1. Click the Diagnostics icon:

The following window appears:




2. Click the following Trace Manager icon (all buttons are disabled if no device(s) have been configured):

The Trace Properties dialog appears:




3. From the Trace Properties dialog, view or specify the following options:
   - **Name**. Enter name of trace. Example: **NewTrace**
   - **Inbound**. Specify inbound data source (PLC to Gateway). Click to select device name.
   - **Outbound**. Specify outbound data source (Gateway to PLC). Click to select device name.
   - **Timespan.** Enter length of time trace is to run, in minutes. Example: **1**. Range is 1 to 3 minutes.3.
   - **Capture Full Packet**. Captures data for full packets (65535 bytes). Only available for Ethernet traces. If deselected, short packets are captured (96 bytes).

| NOTE | Full packet captures are recommended for the best analysis. If you are sending captures to Technical Support, full packet captures are required. |
|---|---|

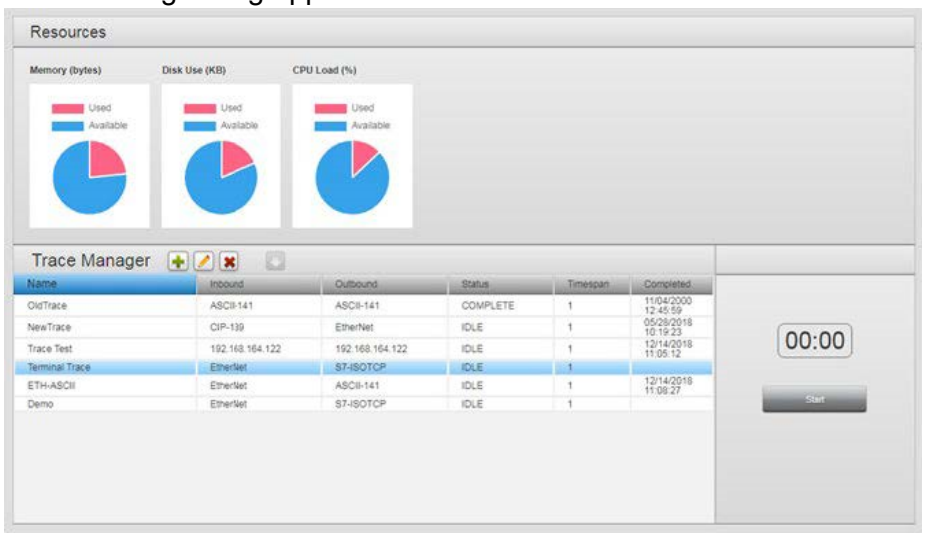
   - **Submit**. Saves changes on Gateway and exits.
   - **Cancel**. Exits without saving changes on Gateway.
4. When you submit your selections, the new trace setup appears in the Trace Manager:
   - To start a selected trace, click **Start**.
   - To download trace data, see Downloading Data Traces.

### 3.12.2 Modifying Data Traces

To modify a data trace:

1. Click the Diagnostics icon:

   The following dialog appears:

2. Select a data trace from the list.
3. Click the following Trace Manager icon:

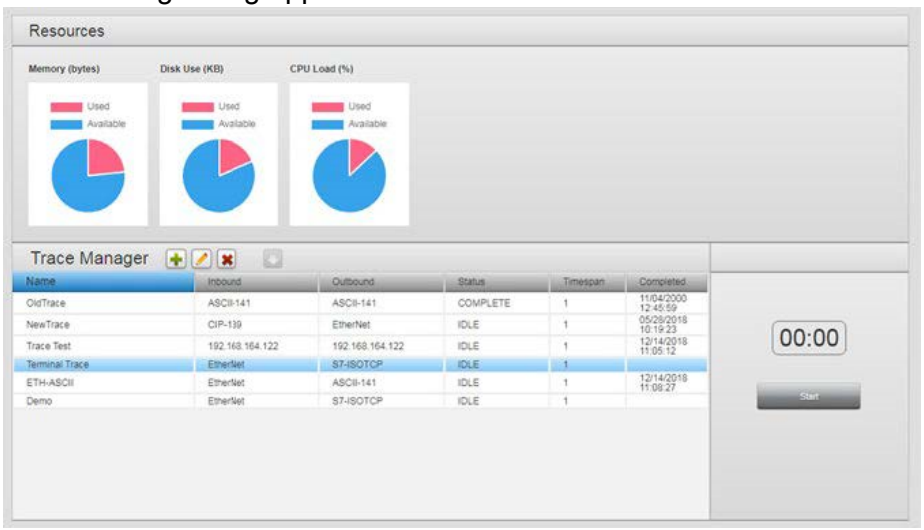
4. The Trace Properties dialog appears. Change information in the listed fields:
   See Adding Data Traces.
5. When finished making changes, click either of the following to exit:
   - **Submit**. Saves changes to the Gateway and exits.
   - **Cancel**. Exits without saving changes to the Gateway.

### 3.12.3 Deleting Data Traces

To delete a data trace:

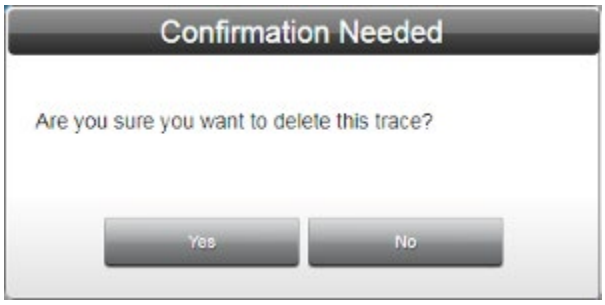
1. Click the Diagnostics icon:

The following dialog appears:




2. Select a data trace from the list.
3. Click the following Trace Manager icon:

A confirmation dialog appears:




4. Confirm the deletion:
   - **Yes**. Deletes the selected data trace from the Gateway.
   - **No**. Does not delete the selected data trace from the Gateway.

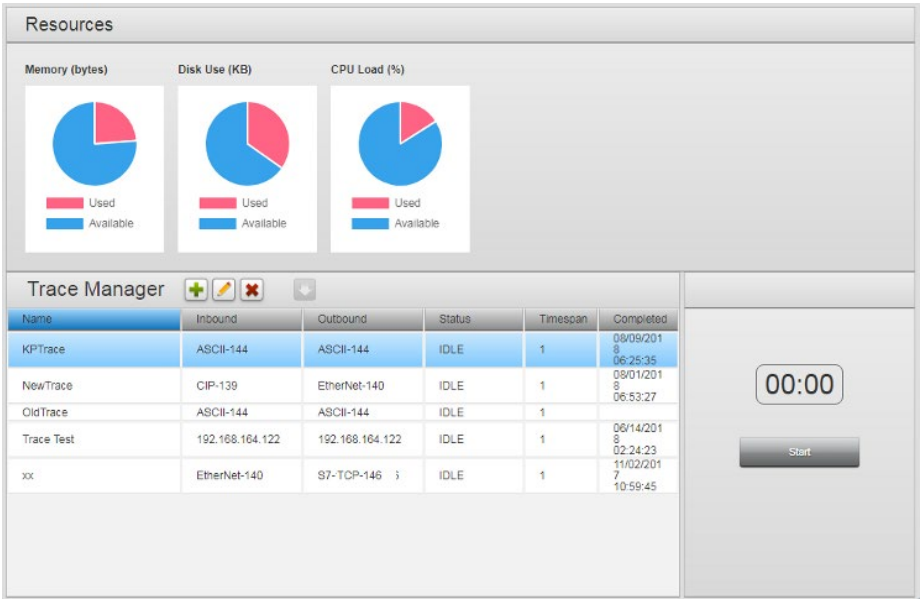
### 3.12.4 Downloading Data Traces

Download a data trace to your personal computer or other storage location. Download is enabled only when the selected trace in the table has a **COMPLETE** status.

To download a data trace:

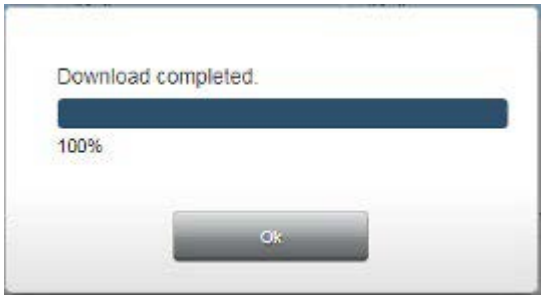
1. Click the Diagnostics icon:

The following dialog appears:




2. Select a data trace that has a **COMPLETE** status from the list.
3. Click the following icon:

The software prompts when the download is complete:




4. Click **Ok**.

   Depending on the browser, browser settings, and computer operation system, you may be prompted to choose your download location, or the exported file is downloaded to the Downloads directory (or other, designated folder).

### 3.12.5 Viewing Downloaded Trace Data

To view data captured by a trace, you must first record a trace, then download the data to your personal computer for viewing with Wireshark, or text editing software.

To download the trace data for viewing:

1. Click the Diagnostics icon:

2. Record a trace, and then then download the data from the Trace Manager to your personal computer (see Downloading Data Traces).

   Ethernet (.pcap) files can be viewed using Wireshark or similar third-party software. Serial files can be viewed with any text editor.

## Section 3.13 Changing Password

The Gateway allows you to change password access for the user interface. To guard against unauthorized access to settings and log information, access is restricted by password. Passwords must use a minimum of 8 characters; a maximum of 63.

1. Click the following icon:

   The Change Password dialog appears:

2. View or specify the following options:
   - **Current.** Enter the password you used to log onto the software.
   - **Password**. Enter the new password.
   - **Confirm**. Re-enter the new password for confirmation.
   - **Submit**. Saves the new password on the module.
   - **Cancel**. Cancels saving the new password on the module.

## Section 3.14 Viewing System Logs Information

The system logs contain a record of the events that occur as the Gateway runs. The logged information includes user interface connections, device connections, time updates, periodic system health reports, process level errors and reboots. Error information that is generated at the protocol level is logged with the maximum information available to help diagnose issues. An engineering log rolls over when the log reaches 3 Mbyte in size. The Gateway stores up to a maximum of 3 system logs, plus the current system log. You can export logs up to one thousand (1000) lines.

To view System Log information:

1. Click the Logs icons on Home page:

2. View the following options:
   - **Viewing Error Log Data**. Lists errors that have occurred on the Gateway.
   - **Viewing Engineering Log Data**. Lists engineering events such as changes to Gateway processes that have occurred.
   - **Viewing Reboot Log Information**. Lists data on Gateway reboots, including date and time and reason for reboot.

## Section 3.15 Viewing Error Log Data

Shows current Gateway error details. These are a subset of engineering log listings.

If the log contains more than one page of data, you can navigate through the pages using the provided buttons. These allow individual page, next or previous, and end or beginning of file selection. You can also enter a number in the **Page** field to go directly to a page in the log file.

To view error logs:

1. Click the Logs icon:

The Errors Log dialog appears:

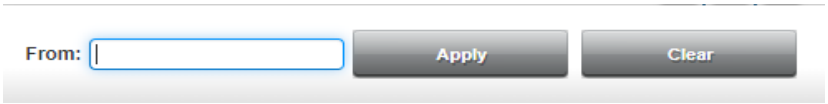
2. View the following options.
   - **Date**. Lists time and date stamp associated with the error as *MM/DD/YYYY HH/MM/SS* where *MM* is month, *DD* is day, *YYYY* is year, *HH* is hours, *MM* is minutes, and *SS* is seconds.

- **Module**. Lists firmware module associated with message.
- **Description**. Lists error description.

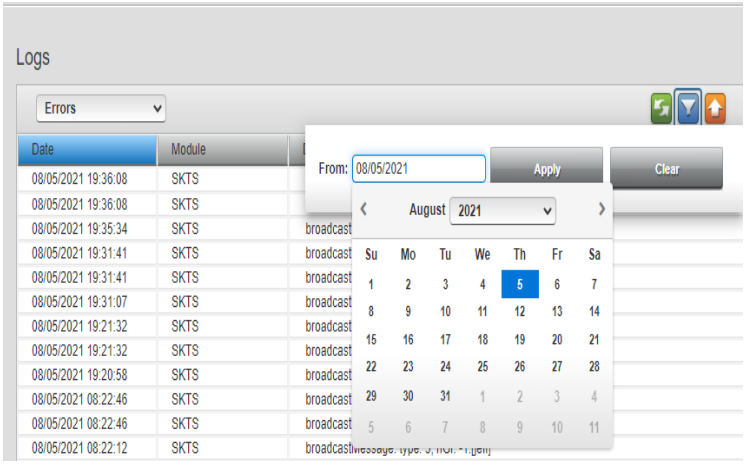
3. To refresh the snapshot of report information you are viewing, click the following icon:

4. Filtering allows you to view entries from a starting date. To filter error log entries, click the following icon:

5. The Filter dialog appears. View or specify the following options:



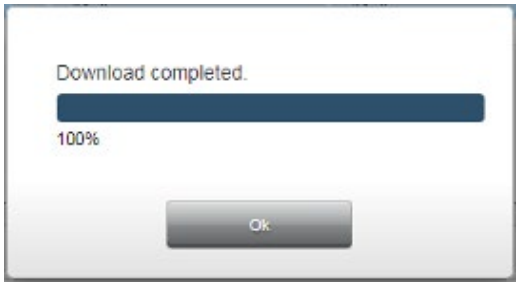

- **From**. Defines a starting date. Enter a new date in the field provided or select a date from the calendar.
  To make changes, click the field to drop down a calendar:



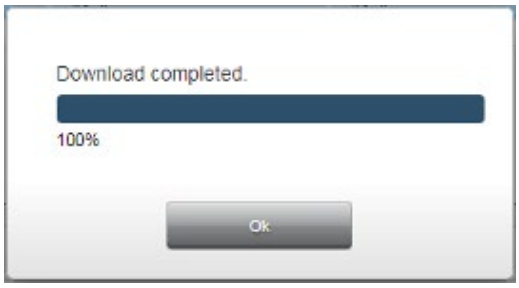

- **Apply**. Applies filtering selections and updates the table display.
- **Clear**. Cancels filtering selections (and/or closes dialog).

6. To export and download the error data to a storage device, click the following icon:

The software prompts you when the download is complete:



The software prompts you when the download is complete:




7. Click **OK**.
   Depending on the browser, browser settings, and computer operation system, you may be prompted to choose your download location, or the exported file is downloaded to the Downloads directory (or other, designated folder).

## Section 3.16 Viewing Engineering Log Data

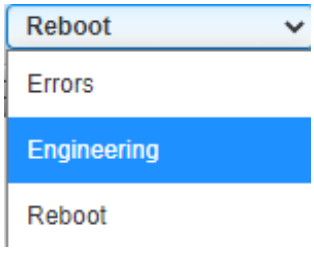
Shows current Gateway engineering log details. This log is an overall look at Gateway operations including detail about Gateway processes.
You can navigate through the pages using the provided buttons. These allow individual page, next or previous, and end or beginning of file selection. You can also enter a number in the Page field to go directly to a page in the log file.

To view the Engineering log:

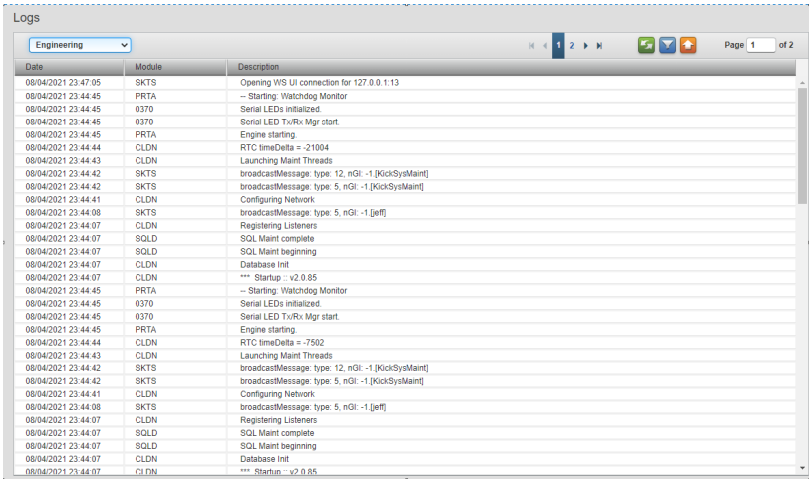
1. Click the Logs icon:

   The Errors Log appears:

2. From the drop down list, select **Engineering**.



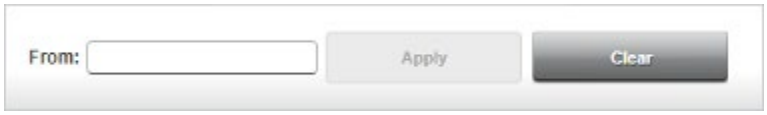
The following updated list appears:



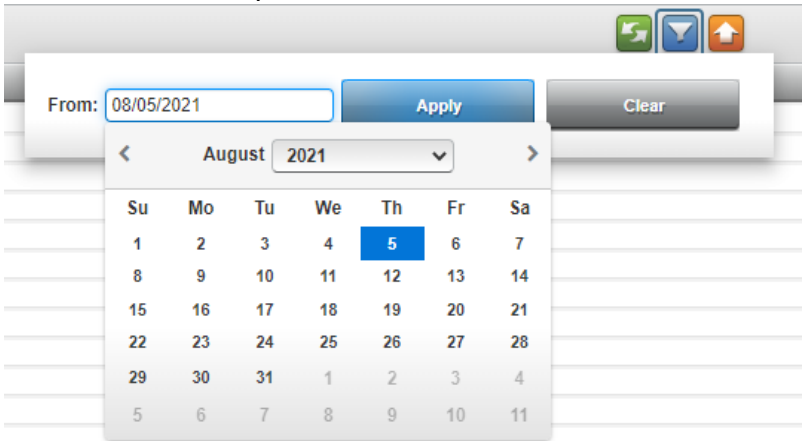

3. View the following options.
   - **Date**. Lists time and date stamp associated with the engineering entry as *MM/DD/YYYY HH/MM/SS* where *MM* month, *DD* is day, *YYYY* is year, *HH* is hours, *MM* is minutes, and *SS* is seconds.
   - **Module**. Lists firmware module associated with message.
   - **Description**. Lists engineering message with description.
4. To refresh the information you are viewing, click the following icon:

5. Filtering allows you to view entries from a starting date. To filter engineering log entries, click the following icon:

6. The Filter dialog appears. View or specify the following options:

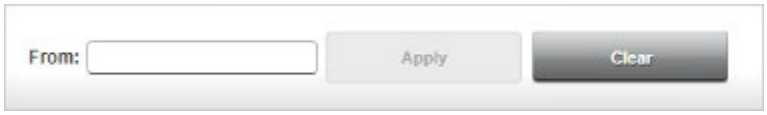
   - **From**. Defines a starting date. Enter a new date in the field provided or select a date from the calendar. To make changes, click the field to drop down a calendar:

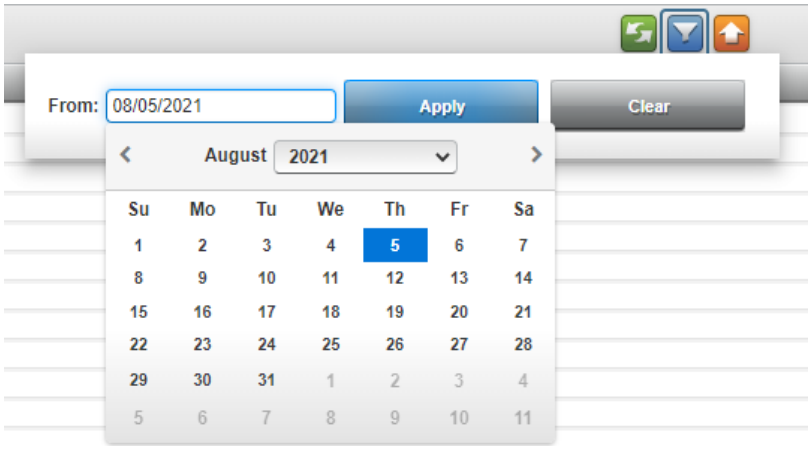
4. To refresh the information you are viewing, click the following icon:

5. Filtering allows you to view entries from a starting date. To filter engineering log entries, click the following icon:

6. The Filter dialog appears. View or specify the following options:



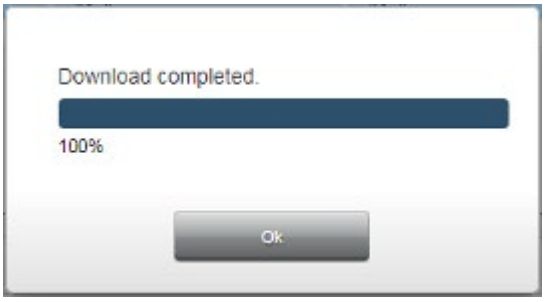

- **From**. Defines a starting date. Enter a new date in the field provided or select a date from the calendar.
  To make changes, click the field to drop down a calendar:




- **Apply**. Applies filtering selections and updates the table display.
- **Clear**. Cancels filtering selections and closes dialog.

7. To export and download the engineering entry data to a storage device click the following icon:

The software prompts you when the download is complete:




8. Click **Ok**.

Depending on the browser, browser settings, and computer operation system, you may be prompted to choose your download location, or the exported file is downloaded to the Downloads directory (or other, designated folder).

## Section 3.17 Viewing the Reboot Log

Lists messages logged during a reboot of the Gateway with the exception of a reboot caused by a power failure. When the Gateway experiences a power failure, it restarts once it has power again. During the restart, database integrity is also checked.

You can navigate through these pages using the provided buttons. These allow individual page, next or previous, and end or beginning of file selection. You can also enter a number in the **Page** field to go directly to a page in the log file.

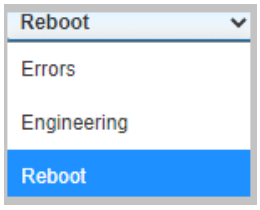
To view the Reboot log:

1. Click the Logs icon:

   The Errors Log appears:

2. From the dropdown menu, select **Reboot**:

3. A list of messages triggered during each Gateway reboot appears. If no reboots have occurred, the fields are blank as shown:

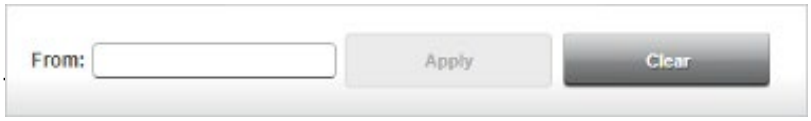
   

4. View the following options.
   - **Date**. Lists time and date stamp associated with the reboot entry as *MM/DD/YYYY HH/MM/SS* where *MM* is month, *DD* is day, *YYYY* is year, *HH* is hours, *MM* is minutes, and *SS* is seconds.
   - **Module**. Identifies the RBOOT module.
   - **Description**. Lists reboot entry description.

The ***refresh*** icon is disabled for the Reboot log as entries only get added to the log during a reboot:

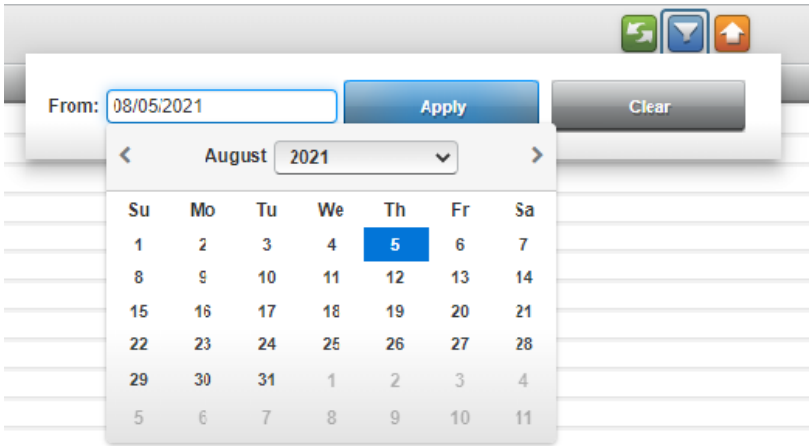
5. Filtering allows you to view entries from a starting date. To filter reboot log entries, click the following icon:

6. The Filter dialog appears. View or specify the following options:




7. **From.** Defines a starting date. Enter a new date in the field provided or select a date from the calendar.

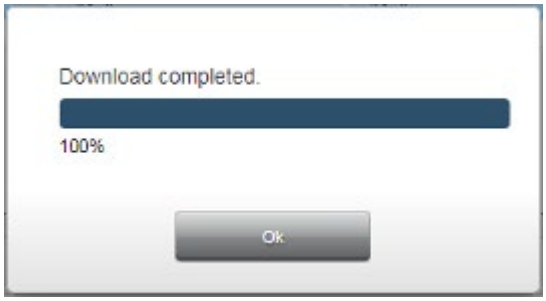
   To make changes, click the field to drop down a calendar:




   - **Apply**. Applies filtering selections and updates the table display.
   - **Clear**. Cancels filtering selections and closes dialog.

8. To export and download the reboot data to a storage device, click the following icon:

   The software prompts you when the download is complete:




9. Click **OK**.

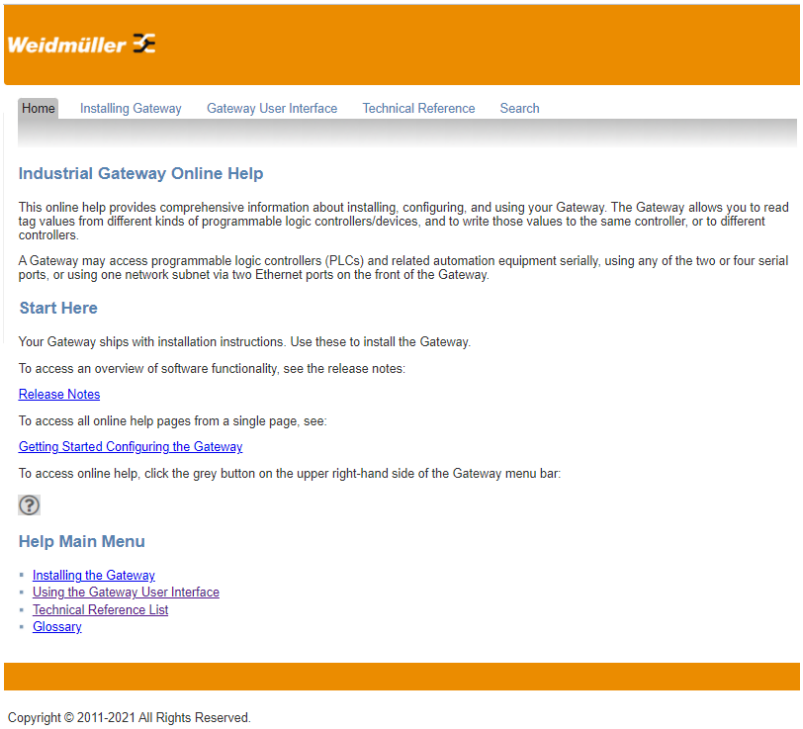
   Depending on the browser, browser settings, and computer operation system, you may be prompted to choose your download location, or the exported file is downloaded to the Downloads directory (or other, designated folder).

## Section 3.19 Viewing Help Information

To view help information:

1. From the Gateway configuration work area, click the following icon on the menu bar:

   The following help window appears:

   This window only appears if you clicked the Help icon on the main GUI window. If you click the Help icon on other windows, context-sensitive help appears for the window.

2. Either navigate to the topic of interest using the provided links, or search for a term using the search capability:
   - For context-sensitive help, select the help icon from the window that is currently displayed.
   - For a software table of contents, see Using the Industrial Gateway User Interface.

# Chapter 4
# Technical Reference

The technical reference contains reference material that provides greater detail about some of the Industrial Gateway functions than you find in the general body of the documentation.

## Section 4.1 Industrial Gateway Messages

The following list contains messages you may encounter when setting up and using your Industrial Gateways. Messages are listed in the Error logs. User messages may be logged in one of the logs, or appear only on an Industrial Gateway software dialog. An Error Code List is provided for messages that return an error code. See Error Code List.

| Message | Possible Cause | Fix |
|---|---|---|
| Address is missing offset. Format is: '*tagName[offset]*' | Tags configured as part of an Array must have the Offset to define the first tag in the array. If “Is Array” is checked the Offset must be configured. | Add the Offset to the Tag address or uncheck the “Is Array” box if the Tag is not part of an Array. |
| An error occurred during download process | This message appears if the connection loss occurs during an export or backup operation. The reasons may be:<br>• Power was interrupted during the download.<br>• The network connection to the Gateway was broken during the download.<br>• The unit has a failure that requires repair. | • Confirm the power source is adequate and stable.<br>• Confirm the network connection is stable. Whenever possible connect directly to the Gateway rather than across a network.<br>• Contact Technical Support (if all other items are ruled out). |
| Are you sure you want to delete MAC *‘xx:xx:xx:xx:xx:xx”*? | If you select **Yes,** the table row is deleted. If the deletion leaves the table empty, which means that the Blacklist/Whitelist controls revert to their default status. | If you wish to keep Blacklist/ Whitelist settings at default, with the drop listing set to Blacklist, and the Enable checkbox unchecked, no further action is needed. |

| Message | Possible Cause | Fix |
|---|---|---|
| Are you sure you want to delete this *item name*? | To delete the selected item, confirm the deletion. Items include devices, tags, traces, and tag maps. | |
| Are you sure you want to reboot? | The Gateway will be rebooted if you choose to continue. | |
| Are you sure you want to reset Gateway's configuration back to defaults? | When you reset the Gateway to its default configuration, all data you have added is deleted, and the Industrial Gateway is restored to its factory configuration. | |
| Are you sure you wish to remove the last address in Whitelist mode? This will result in a reset to Blacklist mode. | You can choose to add another MAC address row, or to return to default Blacklist mode. In either case, the Enabled check box will be unchecked, so neither blacklisting nor whitelisting will be in effect. | |
| Blank spaces are not allowed. | Remove blank spaces. | Remove blank spaces. |
| Cannot perform device connection test.<br>The following active tag maps use tags on the device:<br>*active_tag_map_list*<br>These tag maps must be deactivated before the connection test can be run. | Deactivate the tag maps and re-run your test. | |
| Changing the protocol on this device will result in all of its tags being deleted. Do you wish to continue? | Before continuing, be sure that deleting all tags on your PLC is what you wish to do. | |

| Message | Possible Cause | Fix |
|---|---|---|
| Connection Lost! | • Power to the Gateway was interrupted.<br>• The network connection was interrupted.<br>• The Network IP Address was changed. | • Confirm a stable power source is connected to the Gateway.<br>• Confirm the network connection between the Gateway and PC. If possible, connect directly to the Gateway (rather than going through a network).<br>• Change the address used to access the Gateway in the web browser's address bar.<br>• Confirm the PC's subnet mask matches the current subnet mask of the Gateway. |
| Connection re-established | The user interface tries to re-establish the connection, with a series of informative messages letting you know what is happening. This message lets you know that the GUI was able to re-connect to the Gateway. | No further action required. |
| Continuing will deactivate the following tag maps:<br>*active_tag_map_list.*<br>Do you wish to proceed? | If a device has tags in one or more active tag maps and you modify the device by changing the protocol to another protocol in the same family or by changing any other property other than the device name, the tag map(s) will be deactivated if you continue. | |
| Could not create Trace package. | A Data Trace that is older than 10 days was selected start, or the file was deleted or corrupt. | This message most often occurs when there is no trace file. This can happen if it is older than 10 days and has been removed,<br>In that case, the solution is to re-run the trace.<br>This can also happen when there's no traffic to be recorded, so there's no file created during the trace. This will occur if the device(s) selected as inbound and outbound devices have no tags in an active tag map. If the devices have tags in an inactive tag map, the solution is to activate at least one tag map that copies one or more tags on the device(s) selected as incoming or outgoing. |

| Message | Possible Cause | Fix |
|---|---|---|
| Current password is incorrect | The entered password is compared to the current password (case sensitive). You see this message if they do not match. | Re-enter the correct password. |
| Destination *tagName* is missing a source. | You will need to fix incomplete tag pairs. | |
| *device name* already exists. | You are trying to enter a name for a device that already exists on the Gateway. | Use a different name.<br>NOTE: Case is insignificant. 'mydevice' is the same as 'MyDevice'. |
| Downgrading to an earlier version is not allowed. | An older firmware version than what is currently in the Gateway was used as a firmware update. | Confirm the current version of firmware and use a newer version (higher in number) to do the firmware update. |
| Duplicate tag names are not allowed. The following tag names already exist:<br>*tag_list*<br>These tags will be stripped from the import list. Do you wish to continue? | Remove the duplicates or allow them to be stripped from the file. If you select **Yes**, and all tags are stripped from the file, you see a status message **Nothing to Import**. If only some of the tags are removed, you see a status message **Tags were successfully imported**.<br>NOTE: Case is insignificant. 'mytag' is the same as 'MyTag'. | |
| Duplicate tag names are not allowed. The following tag names are duplicated within the import file:<br>*tag_list*<br>To fix this problem, open the file in a text editor and delete the duplicate tags. | NOTE: Case is insignificant. 'mytag' is the same as 'MyTag'. | |
| Each IP address octet must be between 0 and 255 | Check your IP address and enter the correct value. Valid characters are 0-9 and period (.) | |
| Error: 'Downgrade not supported' during upgrade. Gateway is still running. | An older firmware version than what is currently in the Gateway was used as a firmware update. | Confirm the current version of firmware and use a firmware version that is newer (higher rev) to perform the update. |

| Message | Possible Cause | Fix |
|---|---|---|
| Insufficient disk space to perform the update. | Not enough memory space is available to load the new firmware file. | Follow these steps:<br>• Export the Tags from all of the configured Devices.<br>• Delete the Tags.<br>• Upgrade the firmware.<br>• Import the Tags back into the appropriate devices.<br>• Go to the Tag Map configuration page and re-associate the Tags with the appropriate Tag Maps. |
| File ""filename.tar.gz" is not a Gateway file. | The incorrect product type firmware file was selected to upgrade the Gateway's firmware. | Locate and use a firmware upgrade file for a Gateway. |
| Gateway is Already at this Upgrade Level | The upgrade file selected for the upgrade matches the firmware version installed in the Gateway. | No further action needed. |
| Gateway is now rebooting. You may refresh the browser and log back in after a few minutes. | Refresh the browser. However, if you have just changed the Gateway's IP address and submitted the change you will need to log back in. | |
| Invalid characters: *invalid_character_list* | Do not use these characters as part of a text entry. Invalid characters are listed in the message. | |
| Invalid IP address. | An invalid IP Address format was entered. Address must have four octets, 0-9 and period, 1-3 digits, and 0-255 value. Re-enter a data that is valid. | Enter a valid IPv4 Address. |
| Invalid MAC Address | An invalid MAC Address format was entered. Address must have six octets entered as two-digit hexa- decimal values, separated by either dashes or colons. You cannot mix dashes and colons in a single address. | Locate the correct MAC Address of the device you are adding to the Black or White list and enter it using the correct format . |
| Invalid Polling Tag | Replace the polling tag. | |
| Invalid upgrade key | The upgrade key entered is not valid. | Confirm the key entered is what was sent for the upgrade. If it matches, contact Technical Support at Weidmuller, Inc. |
| *MAC_address* already exists. | You cannot enter a duplicate address. | |

| Message | Possible Cause | Fix |
|---|---|---|
| Maximum length of *limit* characters has been exceeded | You have entered/pasted too many characters in the field. Reduce the number of characters to at or below the maximum (63 characters for text inputs, 200 for a text area). Invalid characters are & < > ` \ { } ^ " % ; ' . | |
| Must be between 1 and *upper_bound* | Allowed periodic range values must be between 1 and the listed upper range for the period. Valid ranges are: 1-1000 milliseconds, 1-60 seconds or minutes, 1-24 hours, 1 days. | |
| Must be between *lower_bound* and *upper_bound*. | Enter a value within the specified range. | |
| Name already exists. | Either delete the existing tag, device, tag map and trace or change the name. | |
| *name* cannot begin with **$** | The **$** is reserved. Only Gateway system device names start with this symbol. (**$** is a reserved symbol used as a prefix for Gateway System variables). | |
| New password cannot be default_password (Detmold) | Enter a different password. Do not lose track of the password. The only way to recover from a lost password is to do a factory reset. | |
| New password cannot be the same as the old password | You cannot use previously used passords. | |
| New Password is same as current password | Change the password. Do not lose track of the password. The only way to recover from a lost password is to do a factory reset. | |
| Password and Confirmation do not match. | Ensure the entries in both fields match exactly. | |
| Password must be at least eight characters | You entered a password with fewer than eight characters. | |
| No tags are selected for copying. | A tag map must have at least one source/destination tag pair. You will need to add a tag pair before you can save the tag map. | |
| Nothing to import. | The Tag file that was selected for import does not contain any data. | Edit the Tag file with the correct format and usable data. |

| Message | Possible Cause | Fix |
|---|---|---|
| Only one user at a time may be connected to Gateway.<br>Another user is currently logged in and will be logged off after 30 minutes of inactivity. | You will have to wait until the user logs off or contact the user to log out so you can log on. | If another user has logged onto a Gateway, and you try to log on, you see this message. |
| Reconnecting... | The user interface tries to re-establish the connection, with a series of informative messages letting you know what is happening. | |
| Reset completed. IP address has been changed to 192.168.1.100. Gateway is now rebooting. You may refresh the browser in a few minutes. | Refresh your browser and log back in. | |
| Session has expired due to inactivity. | If you log in, but do not interact with the user interface for 30 minutes, the system logs you out. | Log back in. |
| Source *deviceName.tagName* is missing a destination. | You will need to repair or remove incomplete tag pairs. | |
| Source *tagName* is missing a destination. Destination *tagName* is missing a source. | You will need to repair or remove incomplete tag pairs. | |
| Tag names cannot start with a dollar sign or contain commas or periods. The following tags have invalid names:<br>*tag_list*<br>These tags will be stripped from the import list. Do you wish to continue? | You see this message because you tried to enter a tag name that begins with the symbol. Either fix the tag name or accept that the incorrect tags will be removed from the file. | |
| Tags were successfully imported. | No further action needed. | |
| Tag [Map] *name* already exists. | Use a different name for the tag or tag map to avoid duplicating a name that has already been configured in the device. | |

| Message | Possible Cause | Fix |
|---|---|---|
| The array length for the following tags is invalid:<br>Tag_list<br>These tags will be stripped from the import list. Do you wish to continue? | Fix the array lengths before continuing. | |
| The following lines are missing a tag name:<br>*line_number_list*<br>These tags will be stripped from the import list. Do you wish to continue? | You will need to either to fix the missing name or accept the stripped line. | |
| The following lines contain invalid characters:<br>*row_num1*:<br>*invalid_chars_list*<br>*row_num2*:<br>*invalid_chars_list*<br>…<br>*row_numn*:<br>*invalid_chars_list* They will not be imported. Do you wish to continue? | Either fix the rows by removing invalid characters or accept that rows with invalid characters will not be imported. | |
| The following lines did not have six columns defined:<br>row_num1:<br>tag_name_or_blank<br>row_num2:<br>tag_name_or_blank<br>…<br>row_numn:<br>tag_name_or_blank<br>Do you wish to continue?<br>These tags will be stripped from the import list. Do you wish to continue? | You will have to modify your import file to match the required number of columns or accept that the additional tag columns will be stripped.<br>If all tags in the file have only four columns, the file will be interpreted as having been exported from a 1.0 Gateway. | A message will ask you to confirm whether you wish to convert this file to a compatible file for your device. To convert, select **Yes**. To cancel the conversion, click **No**. Two columns with a value of zero (0) are added to the file. |

| Message | Possible Cause | Fix |
|---|---|---|
| The following tags have a data type that is not supported by the protocol of the current device. *tag_list* These tags will be stripped from the import list. Do you wish to continue? | You will have to modify your import file to remove these tags or accept that the unsupported tags will be stripped from the file. | |
| The following tags have a missing data type. *tag_list* These tags will be stripped from the import list. Do you wish to continue? | You will have to modify your import file to remove these tags or accept that the tags with a missing datatype will be stripped from the file. | |
| The following tags have a name or address longer than 63 characters or a description longer than 200 characters: *Tag_list* These tags will be stripped from the import list. Do you wish to continue? | Reduce the name or address to below the specified limit. | |
| The gateway address is not on the same subnet as defined by the IP address and subnet mask. Do you wish to save this configuration? | If the Static IP radio button is selected, a gateway address is provided, and (WAN_IP & SUBNET_IP != GATEWAY_IP & SUBNET_IP), this message appears. | |
| There are incomplete tag pairs: *missing_tag_message_list* | Complete the tag pairs before submitting the map. Each pair must have a source and destination tag. The error message lists all the missing pairs, in order of appearance in the table. | |
| There was an error contacting the NTP time server. Make another selection or click Submit to try again. | Either select a different server option, enter the IP address or name of an NTP server, or click Submit to see if you can now contact the server. | |

| Message | Possible Cause | Fix |
|---|---|---|
| The selected .csv file appears to be formatted for an earlier version. Importing will uncheck all Word Swap and Byte Swap check boxes.<br>Do you wish to proceed? | If you choose to proceed, two columns with the value '0' (indicating 'no swap' will be added to the file before importing. | |
| The selected Tag Map cannot be activated. It references a tag that does not exist. | Check your tag map and fix the missing tag issue before trying to activate the tag map. | |
| This change will invalidate one or more pairs in the following tag maps.<br>Changing this data type would create one or more tag pairs with both a string and non-string tag. To change the data type of this tag, you must first delete any tag pairs that include it.<br>The following tag maps use this tag:<br>*tag_map_list*. | You see this message if the data type of a tag of type STRING that is currently used in a tag map as a source or destination is changed to a non-string type, or if the data type of a tag of a non-string type that is currently used in a tag map as a source or destination is changed to STRING (whether the tag maps are active or not). | |
| This change will invalidate one or more pairs in the following tag maps.<br>You will not be able to activate these tag maps until the invalid pairs are removed or reconfigured.<br>*tag_map_list*<br>Do you wish to proceed? | If you go ahead and delete the device, all existing tags for the device are deleted, and no longer displayed in the Tags table. In tag map(s) containing the tags, the tags are listed as **$_DeviceUnknown<.$_Tag NotFound**<br>Affected tag maps are also deactivated. | |
| TSAP must be:<br>{*hex*}{*hex*}.{*hex*}{*hex*} | Re-enter the value using the required format. | |

| Message | Possible Cause | Fix |
|---|---|---|
| Unable to connect to Gateway | The connection between the web browser and the Gateway could not be established. | • Confirm you are entering the correct IP Address.<br>• Confirm the Gateway has finished booting up (can take two or three minutes).<br>• Confirm that you have an Ethernet path between the PC and the Gateway.<br>• Confirm you are using a compatible web browser and version. Google Chrome™ browser, Mozilla Firefox™, Safari®, and Microsoft Edge® browsers are supported by Gateway. Using Chrome is highly recommended. If needed, download and install on your personal computer from https://www.google.com/chrome/ |
| Unable to reconnect to Gateway | The connection to the Gateway was lost and the reason has not been resolved. | • Diagnose the reason the PC is not able to connect to the Gateway and resolve the issue:<br>- Check that the Gateway is powered up.<br>- Check the network connection between the PC and Gateway.<br>- Confirm the correct IP Address is in the web browser's address bar. |
| Value must be between *lower_bound* and *upper_bound*. | Allowed integer number input values are: 0-9: 1-2 digits, Range=1-12 Minutes: 2 digits, Range=00-59. Dropdown menu values are: AM, PM. Allowed real numbers are 0-9 plus or minus numbers or e/E, after the decimal point. No characters are allowed. | Value must be between *lower_bound* and *upper_bound*. |

| Message | Possible Cause | Fix |
|---|---|---|
| Warning: If your computer is not listed in the whitelist, you will not be able to access Gateway when the whitelist is enabled. | When creating a whitelist, you must enter the MAC address for the computer you use to access the Gateway. Failing to enter your own computer MAC address means that you won't be able to access the Gateway as soon as you enable the whitelist. | |
| You cannot copy between STRING and non-STRING data types. The following tag-pairs must be corrected: *tag pair list* | Change the tag copy to reflect an allowed copy type. | |
| You entered an incorrect password. | You see this message when you make a mistake trying to log onto the Gateway. The software will only allow you to try to log on again after a brief wait. | |
| You have *xxx* tag-pairing(s) that reference missing tags. The tag-pairings for these will be stripped from the list. Do you want to continue? | Note which tag(s) are missing and either remove or replace them with valid entries. You must fix the tag issues before you can save the tag map. | |

## Section 4.2 Concepts

The following list contains further information about concepts that you may encounter when setting up and using your Industrial Gateways.

| Concept | Information |
|---|---|
| **CPU** | Central Processing Unit. Carries out the instructions provided by a computer program. Normally these are basic logical, input/output, and arithmetical operations that form the basis of most software operations on a computer. |
| **DoS** | Denial of Service. A common attack involving overwhelming a server with invalid requests. |
| **Domain Name Server (DNS)** | This is the value that is associated with the Domain Name Server that your system interacts with on the Internet. Domain name servers convert text names that are easy to remember (google.com, weidmuller.com) to IP address values. |
| **Dynamic Host Configuration Protocol (DHCP)** | A type of network configuration for host devices that dynamically provides IP, gateway, and routing address for devices that are connected to that network. |
| **DHCP Client** | Dynamic Host Configuration Protocol Client. When you connect a new device such as a computer, or a Industrial Gateway to a network that has a DHCP Server set up, the client device gets its IP address and other configuration information such as default gateway and domain name from a group of IP addresses maintained by the DHCP server for a defined time period. |
| **Gateway Address** | A gateway address is the default address of your network or web site. This is usually the next address in line when connecting to the Internet from a local area network and is usually the address assigned to a router or a firewall. Communications traffic goes out and comes in through the gateway. |
| **GPL** | GNU Public License. A license offered by the Free Software Foundation that covers licensing and distribution of free software. |
| **HTTP/HTTPS** | Hypertext Transfer Protocol. Communication protocols that access the world-wide web. HTTP protocol is not secure. HTTPS is secure. The S designation means that the transfer protocol is combined with the Secure Socket Layer/Transport Security Layer (SSL/TLS) protocol to provide secure communication for transactions such as payments across the Internet. |

| Concept | Information |
|---|---|
| **Internet Protocol (IP) Address** | An IP address is a unique number that every device that connects to the Internet must have. Devices include personal computers, printers, removable hard drives, routers such as the Industrial Gateway, hardware firewalls, cell phones, and modems. The addresses are assigned by your system administrator or by the protocol that is running on your device. The connection method you choose defines how that address is assigned. |
| **Local Area Network (LAN)** | A local area network (LAN) is a network that is normally made of devices such as personal computers that are located near to each other, such as in the same office building or plant. |
| **LED** | Light-emitting diode. Photons emitted from a semi-conductor provide indicator signals for electronic devices and various forms of lighting. An LED can emit light photons in different colors, including red, green, and purple, and different frequencies (visible, infrared, and ultraviolet). |
| **MAC** | Media Access Control address. A unique set of numbers assigned to a network interface card and stored in the read-only memory. A MAC address may also be called the Ethernet hardware address or the physical address of a device. |
| **Modbus** | An industry standard protocol for communicating with IO devices. This protocol usually uses serial communication as the physical layer. |
| **OLED** | Organic Light-Emitting Diode. A light-emitting diode containing thin flexible sheets of an organic electroluminescent material, used mainly in digital display screens. |
| **PLC** | Programmable logic controller. A digital computer used to automate industrial processes such as controlling electrical turbine operation, assembly lines, and manufacturing machinery. The controllers are frequently ruggedized to withstand difficult operating environments. |
| **PHY** | Physical layer that connects to a media access control address. |
| **Static IP Address** | A permanent IP address assigned to a computer by the network administrator or a domain name server. |
| **Transmission Control Protocol, Internet Protocol (TCP/IP)** | Transmission Control Protocol, Internet Protocol. A group of communications protocols used to communicate between computers on the Internet or other networks. Also called The Internet protocol suite. The  suite sends Copy Triggers data across the Internet in packets. |

## 4.3 About Copy Triggers

There is no user control over order of copy operations. However, all tags on a source device are read before any are written to the destination device.

| NOTE | If you use an array tag as a polling tag, be aware that the copy will only be triggered when the element at index 0 changes. Changes to other elements will not initiate a copy operation. |
|---|---|

There are three types of triggers for the tag copy operation:

**A Periodic Schedule**. A copy action is executed periodically, with the period ranging from 1 millisecond to 1 day.

- If the copy operation takes less than the period, the next copy operation begins as soon as the period expires, starting from the initiation of the previous copy operation. For example, if a period of one second is specified and the Tag Map cycle takes 100 ms, then the next cycle starts 900 ms after the completion of the copy operation.
- If the copy operation takes longer than the period, the copy operation completes as soon as possible and the next copy operation begins immediately. In this case, the tag map copy operation runs continuously.

**The Time of Day Schedule**. A copy action is executed at a specific time each day.

**On Change**. A copy action is executed when a specific tag changes value. This is determined by polling the tag. Polling restrictions are:

- Polling of the trigger tag does not occur while a copy operation is in progress. If the polling tag value changes while a copy operation is underway, the change is detected, and the next copy operation begins immediately after the current operation is complete.
- The Gateway software supports polling rates from 10 ms to 1000 ms.

## 4.4 About Bit Copying Operations

The software allows for copies between bit (BOOL) and other numeric types. Example: You may copy 16 BOOLs to be copied to an INT or vice versa. The copy from source to destination is treated as a byte copy operation; that is, both source and destination buffers are interpreted as contiguous arrays of untyped bytes. No type conversion is performed. The destination is initially set to all zeros. The following rules also apply:

- If source and destination are the same size, the entire source array of bytes are copied to the destination.
- If the source is smaller than the destination, all bytes of the source are copied to the destination with the remainder of the destination being set to zero. Bytes are transferred to the low order portion of the destination.
- If the destination is smaller than the source, the low order portion of the bytes from the source is copied to the destination

The following table contains examples of allowed copies from a source data tag of one data type to a destination of a different type:

| Source | Destination |
|---|---|
| INT[1] | BOOL[16] |
| BOOL[16] | INT[1] |
| SINT[4] | DINT[1] |
| DINT[1] | SINT[4] |
| REAL[1] | SINT[4] |
| SINT[4] | REAL[1] |
| INT[2] | DINT[1] |
| DINT[1] | INT[2] |
| REAL[1] | INT[2] |
| INT[2] | REAL[1] |
| DINT[1] | BOOL[32] |
| BOOL[32] | DINT[1] |

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Because no type conversion is performed, the value of the destination tag after a copy may not be what you expect. The following table assumes the same endianness for source and destination with no byte or word swapping:

| Source Type | Source Value(s) | Destination Type | Destination Value | Notes |
|---|---|---|---|---|
| **Single tag to single tag copies** | | | | |
| **Source and destination are the same size** | | | | |
| INT | -1 (0xFFFF) | USHORT | 65535 (0xFFFF) | |
| USHORT | 65535 (0xFFFF) | INT | -1 (0xFFFF) | |
| REAL | 3.14159 (0x40490fd0) | DINT | 1078530000 (0x40490fd0) | |
| DINT | 1078530000 (0x40490fd0) | REAL | 3.14159 (0x40490fd0) | |
| **Source is smaller than destination (source is copied to the low order portion of the destination)** | | | | |
| SINT | 13 (0x0D) | INT | 13 (0x*000*D) | High-order portion of destination is unaffected (may not be zero) |
| SHORT | 14440 (0x3868) | REAL | 2.0235E-41 (0x*00003*868) | High-order portion of destination is unaffected (may not be zero) |
| **Source is larger than destination ( the low order portion of the source is copied to the destination)** | | | | |
| INT | 46 (0x2E) | BOOL | 0 (0x0) | Last (lowest order) binary digit of source is 0 |
| REAL | 2.71828 (0x402df84d) | SINT | 77 (0x4D) | |
| **Array to array copies** | | | | |
| **Source and destination elements are the same size** | | | | |
| INT[3] | -2, 15, 38 (0xFFFE, 0x000F, 0x26) | USHORT[2] | 65534, 15 (0xFFFE, 0x000F) | Last element of source is not copied to destination |
| USHORT[2] | 65534, 15 (0xFFFE, 0x000F) | INT[3] | -2, 15 (0xFFFE, 0x000F) | Last element of destination is unaffected |
| REAL[2] | 101.125, 48.875 (0x42ca4000, 0x42438000) | DINT[3] | 1120550912, 1111719936 (0x42ca4000, 0x42438000) | Last element of destination is unaffected |
| DINT[3] | 1120550912, 1111719936 (0x42ca4000, 0x42438000) | REAL[2] | 101.125, 48.875 (0x42ca4000, 0x42438000) | Last element of source is not copied to destination |
| **Source elements are smaller than destination elements (multiple source elements are copied to each destination element)** | | | | |
| BOOL[8] | 0, 1, 1, 1, 1, 0, 0, 1 (0x9E) | SINT[2] | 158 (0x9e) | Last element of destination is unaffected |
| SINT[4] | 123, 60, 77, -124 (0x7B, 0x3C, 0x4D, 0x84) | UDINT[2] | 2067549572 (0x7b3c4d84) | Last element of destination is unaffected |
| **Source elements are larger than destination elements (each source element occupies multiple destination elements)** | | | | |
| DINT[2] | 3558942464, 3575719680 (0xD4212700, 0xD5212700) | INT[3] | 9984, 54305, 9984 (0x2700, 0xd421, 0x2700) | Only low order bits of the second source element are copied to the destination |
| REAL[2] | 15.0, 25.25 (0x41700000, 0x41ca0000) | BOOL[8] | 0, 0, 0, 0, 0, 0, 0, 0, (0x00) | Only low order bits of the first source element are copied to the destination |

- Single tag-to-array copies and array-to-single tag copies follow the same rules as array-to-array copies. The single tag is interpreted as an array of one element.

## Section 4.5 Array Length Limits

The Gateway supports user-defined array lengths. The minimum length is one; the maximum depends on the packet size for the protocol. In practice, this means the maximum is dictated by the combination of data type and protocol, but it may never exceed 500. Each array element must be the same data type, and the elements must be contiguous in controller memory. The firmware will enforce valid ranges by not allowing invalid ranges to be submitted, and by displaying the allowable Array Length for the data type. The length attribute specifies the number of elements to be read or written when a tag is configured as an array. For instance, a tag configured on the Gateway may refer to a device tag at address INT[1000], of which four elements are of interest, starting at offset 68. In this example, the tag address field would be entered on the Gateway as INT[67] (array elements use zero-based addressing) and the length field would be specified as 4.

Specifying an offset that would result in an operation that surpasses the controller-defined length of the array results in truncation of the element transfer or an undefined behavior depending on the type of device/protocol in use.

The following table provides array length limit ranges for protocols supported on the Gateway.

| Data Type | EIP-PCCC, DF1-PCCC | Ethernet/IP | DF1-CIP | Modbus | S7Comm, PPI | DirectNET, CCM, HostLink |
|---|---|---|---|---|---|---|
| SINT | N/A | 1-460 | 1-216 | N/A | 1-100 | N/A |
| INT/(U)SHORT | 1-120 | 1-230 | 1-108 | 1-500 | 1-100 | 1-500 |
| DINT/UDINT | 1-60 | 1-115 | 1-54 | 1-500 | 1-100 | 1-500 |
| REAL | 1-60 | 1-115 | 1-54 | 1-500 | 1-100 | 1-500 |
| BOOL | 1-60 | 1-115 | 1-54 | 1-500 | 1-100 | 1-500 |
| STRING | N/A | 1-4 | 1-4 | N/A | N/A | N/A |

## Section 4.6 S7-1200 and S7-1500 Modbus Tag Values Appear in Word-swapped Order in Live Tag Viewer

For all protocols except Modbus, the architectural ordering of words for values stored on the device is specified by the protocol. Some values require more than one word of storage space (Examples: DINTs or REALs). Depending on the protocol, these values may be stored with the most significant word in the lower of the word addresses OR with the least significant word in the lower of the word addresses. For example, if a protocol specifies that the least significant word is stored before the most significant word, a numeric value of 0x12345678 would be stored as follows:

- Lower address: 0×5678
- Higher address: 0×1234

However, the Modbus protocol specification does not require a particular word ordering for values that require more than one word of storage space. As a result, some devices store the most significant word first and others store the least significant word first.

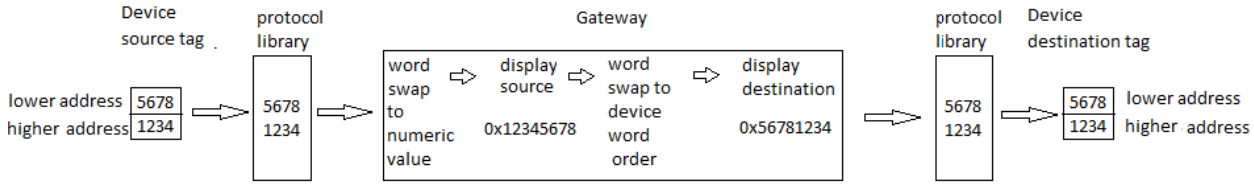
The Gateway expects tag values to have the most significant word first. If the device stores the least significant word first, the Gateway will receive the value in word-swapped order (with respect to the actual numeric value). In this case, the Live Tag Viewer will display the values in word-swapped order. So for a numeric value of 0x12345678, the Live Tag Viewer would display 0x56781234.

To correct this, the user must check the Word Swap check box for all tags configured for the device. This will ensure that the Gateway will do the word-swapping when it receives a source value, thus converting the value to the format the Gateway requires. It will also ensure that the Gateway will do the necessary word-swapping before it sends a destination value to be written to the device tag in the order the device requires.

For such devices, the Live Tag Viewer will display the correct numeric value of the source tags because it does the word swapping before displaying and processing the tag. However, the Gateway does the word-swaps for destination tags so the least significant word is first and displays it in the Live Tag Viewer after this swap. This means that the Live Tag Viewer will display the destination values in word-swapped order.

| NOTE | Note that these tags are copied correctly; this is strictly a presentation issue for the destination tags in the Live Tag Viewer. |
|---|---|

For example, consider a tag copy from a Siemens S7-1200 running ModbusTCP to a Siemens S7-1500 running ModbusTCP. Both of these PLCs store the least significant word first so they are not in the format the Gateway needs. In this case, if the user has correctly checked the Word Swap check box for both tags, and a source tag with a numeric value of 0x12345678 is read from the S7-1200, the Gateway will swap the words as soon as it receives the value from the protocol library and the Live Tag Viewer will display the source tag's value correctly as 0x12345678. It then does the word-swap before sending it to be written to the destination device. This means it will display the destination's tag value as 0x56781234 (storage order rather than correct numeric value) in the Live Tag viewer; however, the tag is correctly copied to the S7-1500.




## Section 4.7 About Read/Write Tag Errors

Read/Write tag errors are treated as follows:

- If an error occurs while reading from a device, the tag value is marked as *unrecorded* for purposes of data presentation.
- If an error occurs while writing to a device, the tag value is marked as *unrecorded*. The marking of a tag as *recorded* is only assigned when a valid read or write has successfully been made for the specific tag.
- Tags marked *unrecorded* remain so until a subsequent tag transaction for this tag completes successfully.

- The *unrecorded* status of a tag is passed to the software user interface, which displays “{ERR}” for such tags. An entry is also made to the error log.
- If copying for a tag map is triggered by a change in the value of a polled tag and that polling tag cannot be read, no attempt is made to read either source or destination tags. If the polling tag does not change value very often, it may be some time before the source and destination tags are processed. In either case, the software provides this information to the software user interface, which displays a triple dash for source and destination values instead of “{ERR}.” This differentiates between not yet having attempted to read or write a tag and encountering an error when a read or write is attempted. The current polling tag value is provided to the software user interface using the same three values.

## Section 4.8 About Data Traces

You may run data traces for both Ethernet and serial devices. The serial option is provided for engineering and support personnel familiar with serial data transmission. If you define an INPUT and OUTPUT trace for a single device, then only one trace will run. If you define trace profiles between two separate PLCs, using two separate serial ports, the software runs two separate trace logs for inbound and outbound traffic.

You may navigate away from the Diagnostics dialog while a trace is running. If you navigate away from the dialog, the Gateway software provides a menu bar user notification when data capture is complete. No notification is provided on the Diagnostics window.

You can stop a trace at any time. If you do so, the trace is marked as **Aborted**. If you reset to factory defaults, all trace logs are deleted.

The software automatically removes trace logs that are more than 10 days old.

## Section 4.9 About Gateway File Exports

The following tables explain how Gateway names and identifies files that are exported by default. You can supply a different name when you save the file:

| File Type | Default File Name |
|---|---|
| Device Export File | Format:<br>• A time stamp of the form *yyyymmdd_hhmmss_* (the hour is given in 24-hour time).<br>• The unit name followed by an underscore if one is configured on the Identification page or just an underscore if there is no unit name.<br>• The constant string “Device_.<br>• The device name (for $System or $User, the dollar sign is replaced by a dash; spaces in the names are replaced by an underscore), followed by the extension “.zip”. |

| File Type | Default File Name |
|---|---|
| Tag Export File | Format:<br>• The constant string “TAGS_”.<br>• The device name, followed by the extension “.csv”. |
| Tag Map Export File | Format:<br>• A time stamp of the form *yyyymmdd_hhmmss_* (the hour is given in 24-hour time).<br>• The unit name followed by an underscore if one is configured on the Identification page or just an underscore if there is no unit name.<br>• The constant string “TagMaps.zip”. |
| Logs Export File | Format:<br>• The unit name followed by an underscore if one is configured on the Identification page or “Gateway_” if there is no unit name.<br>• The log type (either “ERROR_” or “ENG_”.<br>• A time stamp of the form *yyyymmdd_hhmmss_* (the hour is given in 24-hour time, followed by the extension “.zip”. |
| Backup File | Format:<br>• A time stamp of the form *yyyymmdd_hhmmss_* (the hour is given in 24-hour time).<br>• The unit name followed by an underscore if one is configured on the Identification page or just an underscore if there is no unit name.<br>• The constant string “backup.zip”. |
| Trace Download File | Format:<br>• A time stamp of the form *yyyymmdd_hhmmss_* (the hour is given in 24-hour time).<br>• The unit name followed by an underscore if one is configured on the Identification page or just an underscore if there is no unit name.<br>• The constant string “backup.zip”. |
| Diagnostics File | Format:<br>• A time stamp of the form *yyyymmdd_hhmmss-* (the hour is given in 24-hour time).<br>• The unit’s 12-digit MAC address (without separators) followed by a dash.<br>• The constant string “snapshot.zip”. |

## Section 4.10 About Testing Device Connections

The following information is provided to help you configure and troubleshoot serial protocol operation on your Gateway system.

The tables contain information about each serial protocol and an ordered list of the settings that are attempted when you select the **Test Device Connection** button. This testing does NOT perform exhaustive parameter tests. Only the settings listed are attempted. Lines containing a list of settings for a given parameter are applied in the given order, from left to right. The final parameter of the entire parameter list for the given protocol is the one that will be incremented most often during the operation. In general, the baud rate remains consistent while checksum, where applicable, and word-size parameters (parity and stop bits) are changed more often. Once all combinations listed for the given serial protocol have been exhausted, the **Test Device Connection** option reports the result.

### 4.10.1 Protocols

| |
|---|
| **DF1-CIP** |
| User setting first and then... |
| Baud Rate: 19200, 38400, 9600 |
| Parity: None, Even, Odd |
| Checksum: BCC, CRC |
| Stop Bits: 1 |
| **DF1-PCCC** |
| User setting first and then... |
| Baud Rate: 19200, 38400, 9600 |
| Parity: None, Even, Odd |
| Checksum: BCC, CRC |
| Stop Bits: 1 |
| **ModbusRTU** |
| User setting first and then... |
| Baud Rate: 9600, 19200, 38400 |
| Parity: None, Even, Odd |
| Stop Bits: 1 |
| Word size: 8, 7 |
| **ModbusASCII** |
| User setting first and then... |
| Baud Rate: 9600, 19200, 38400 |
| Parity: None, Even, Odd |
| Stop Bits: 1 |
| Word size: 8, 7 |
| **DirectNet/CCM/Hostlink** |
| User setting only |
| **PPI** |
| User setting first and then... |
| Baud Rate: 9600, 19200, 38400 |
| Parity: None, Even, Odd |
| Stop Bits: 1 |

## Section 4.11 Configuring Tag Data Types

When configuring tags (or 'named data') on the Industrial Gateway to associate them with the tags defined on connected programmable logic controllers (PLCs), you must make sure that the:

- Data type in Gateway's tag properties form for the tag is the same as the data type of the corresponding tag on the PLC.
- The address of the tag in the PLC and the address in the tag properties form for the tag must match.

The following rules apply to tag definition:

- Tag names cannot begin with $. This character is reserved for system definitions that you may not change. If you try to create a tag with a $ in front of it, the name is not accepted.
- The tag name cannot match an existing tag configured for the same device. If you try to enter a tag name that already exists for the current device, the software will inform you that a tag with that name already exists.

## Section 4.12 Protocol Attribute List

Lists the values for each individual protocol by attribute.
Protocols supported are:

| **Serial DF1-CIP** | |
|---|---|
| Slot Number | (0-32) |
| Checksum | CRC or BCC |
| ACK Timeout | (1-255) x 20 ms |
| NAK Retries | (0-10) |
| ENQ Retries | (0-50) |
| **Serial DF1-PCCC** | |
| Checksum | CRC or BCC |
| ACK Timeout | (1-255) x 20 ms |
| NAK Retries | (0-10) |
| ENQ Retries | (0-50) |
| **Serial Modbus RTU** | |
| Slave ID | Integer (1-247) |
| Response Timeout | (1-5) seconds |
| Retry Count | Integer (0-3) |
| End of Message Delay | (1-32) characters |
| Min Command Delay | (100-1000) milliseconds |

| **Serial Modbus ASCII** | |
|---|---|
| Slave ID | Integer (1-247) |
| Response Timeout | (1-5) seconds |
| Retry Count | Integer (0-3) |
| End of Message Delay | (1-32) characters |
| Min Command Delay | (100-1000) milliseconds |
| **EtherNet/IP** | |
| TCP Port | Integer (1-65535) |
| IP Address | IP-V4 |
| Slot Number | (0-16) |
| **EtherNet/IP-PCCC** | |
| TCP Port | Integer (1-65535) |
| IP Address | IP-V4 |
| **ModbusTCP** | |
| Slave ID | Integer (1- 247) |
| TCP Port | Integer (1-65535) |
| IP Address | IP-V4 |

| **S7Comm** | |
|---|---|
| PLC Type | S7200, S7300, S71200, S71500 |
| Keep Alive | Integer (1-99) seconds |
| TCP Port | Integer (1-65535) |
| IP Address | IP-V4 |
| TSAP | Applies to S7200 only. (Preconfigured options are “4D.57”, “10.00”, “11.00”, but you may specify other values |
| **PPI** | |
| Node Address | Integer (0-16), Default: 2 |
| **DirectNET/CCM/HostLink** | |
| Station Address | Integer (1-90) |
| Timeout | Short, Medium or Long |
| Retries | Normal or Short |
| Response Delay | (0-500) milliseconds |

## Section 4.13 System Tags List

System tags are read-only tags that provide information about lower-level communications on the Gateway. Tags with a # are generated on request. Other tags are refreshed on a one-minute interval. You may not add or delete system tags.

A $System tag is considered to be in use if it is a source tag in any tag map in the backup file.

| Tag | Description | Data Type |
|---|---|---|
| #DATETIME | Current date and time | STRING |
| #HEARTBEAT | Constant Value of 1 | DINT |
| #RANDOM | System-generated random number | DINT |
| serialNumber | Gateway Serial Number | STRING |
| Switch_Group1_IP | Switch Group 1 IP address | STRING |
| Switch_Group2_IP | Switch Group 2 IP address | STRING |
| Unit_Name | System Unit Name | STRING |

## Section 4.14 Types Endianness of Types

Devices may represent byte ordering of types which may not have a compatible representation on a target device. The Gateway supports optional tag level markup to provide for an endianness transformation as shown in the table below. Byte and word swapping are performed for source tags as soon as they are read, and for destination tags just before they are written. In addition to native types such as WORDs and DWORDs, STRINGS (array of characters) are also byte/word swappable.

Declaring that a tag value should be BYTE and/or WORD-swapped allows you to control swapping at the tag level, instead of at the device level, for all protocols.

You may combine BYTE_SWAP and WORD_SWAP to form the following options:

| Bit Field | Action |
|---|---|
| NO_TRANSFORM | Straight copy |
| BYTE_SWAP | Swap 2 bytes within each word |
| WORD_SWAP | Swap 2 words within each double word |
| BYTE_SWAP and WORD_SWAP combined | Combine swapping 2 bytes within each word with swapping 2 words within each double word |
| **BYTE_SWAP** is defined as interchanging the two bytes of every word. | |
| Source Destination<br>0x12345678 0x34127856 | |
| **WORD_SWAP** is defined as interchanging the two words out of every double word. | |
| Source Destination<br>0x12345678 0x56781234 | |
| **BYTE_SWAP and WORD_SWAP** may be used at the same time. | |
| Source Destination<br>0x12345678 0×78563412 | |

## Section 4.15 Viewing Supported Data Types

This table lists each tag data type supported by the Gateway. Not all types are available for every device because each protocol supports a subset of these data types:

| Data Type | Description |
|---|---|
| BOOL | 1 bit (1 byte as a unit of storage) |
| SINT | 1-byte integer |
| INT | 2-byte integer |
| SHORT (SIGNED 16 BIT) | 2-byte integer |
| USHORT (UNSIGNED 16 BIT) | 2-byte unsigned integer |
| DINT (SIGNED 32 BIT) | 4-byte integer |
| UDINT (UNSIGNED 32-BIT) | 4-byte unsigned integer |
| REAL | 4-byte IEEE float |
| STRING | ARRAY of bytes |

### 4.15.1 Viewing Data Types Supported by Protocols

Individual protocols support a set of data types. When you select a protocol, the data types are restricted to those supported by the selected protocol. This table lists each protocol and shows you the supported data types for that protocol.

| Protocol | DF1-CIP | DF1-PCC | Modbus RTU | Modbus ASCII | EtherNet/IP | EtherNet/IP-PCCC | Modbus TCP | S7Comm | PPI | DirectNET/CCM/HostLink |
|---|---|---|---|---|---|---|---|---|---|---|
| SINT | Yes | | | | Yes | | | Yes | Yes | |
| INT | Yes | Yes | | | Yes | Yes | | Yes | Yes | |
| DINT | Yes | Yes | | | Yes | Yes | | Yes | Yes | |
| REAL | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| BOOL | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | |
| STRING | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| SIGNED 16-BIT (SHORT) | | | Yes | Yes | | | Yes | | | Yes |
| UNSIGNED 16-BIT (USHORT) | | | Yes | Yes | | | Yes | | | Yes |
| SIGNED 32-BIT (DINT) | | | Yes | Yes | | | Yes | | | Yes |
| UNSIGNED 32-BIT (UDINT) | | | Yes | Yes | | | Yes | | | Yes |

## Section 4.16 Viewing DirectNET Addressing

Consult the user reference manual titled "DirectNET Reference Manual" from Automation Direct (Manual Number: DA-DNET-M). In addition, manual(s) for the specific programmable controllers (PLCs) that are involved should be consulted to obtain the V memory address cross references for the starting offsets and memory ranges for the particular data types being accessed.

The Gateway handles the details of the DirectNET communications described in the "DirectNET Host Communications Programs" portion(s) of the manual. In a few situations, such as when access to required memory types via V memory is not supported or V memory access isn't supported at all, understanding the format and encoding of the DirectNET/CCM/HostLINK request header will prove beneficial. Variable memory/system data in these situations may still be accessed using the supported "DirectNet Reference Address" style of gateway tag addressing.

Gateway tag address notation for DirectNET/CCM/TI HostLINK may be denoted in either of two supported formats. There is the most commonly used V memory addressing format with octal address values (V0 - V177777). This address notation supports access to most of the data types of DirectLOGIC products. Cross reference information is available in the previously mentioned documents.

For other situations and PLCs, there is the "DirectNet Reference Address" style, consisting of, in order, one or two HEX ASCII values for the DirectNET "Data Type"/GE "CCM Memory Type", a colon and finally the hexadecimal DirectNET Reference Address. Consult the DA-DNET-M manual appendix "Data Types and Memory Map" for the pertinent DirectLOGIC device for more details on what values to use for the "Data Type" and "DirectNET Reference Address".

Diagnostic Status Words are available for diagnosing errors that occur during data transfers. These are not accessible via V memory. They must be accessed by using the "DirectNet Reference Address" style of tag address. Consult available documentation for the given PLC as some may only support reads/ writes of the entire collection of diagnostic words at a time or may ignore the beginning address/offset.

The DirectNET Reference Address for these Diagnostic Status Words is 39:0000, where 39 is the hexadecimal value for the ASCII code that represents the number 9 (HEX ASCII) and the offset zero in hexadecimal being the start of that data type's memory range.

## Section 4.17 Troubleshooting Gateway Power Supplies

The Gateway uses a power supply for powering the Gateway.

Use the following information to help you troubleshoot Gateway power-up problems:

- If you use a power supply that fails to supply steady power, on startup, the Gateway may behave erratically. You may see intermittent Gateway reboots, flickering LEDs, or the LEDs may not illuminate at all.
- If you have improperly wired the connector, the Gateway either will not power up, or if you significantly exceed the input limit, you will observe a puff of smoke.

## Section 4.18 Troubleshooting Gateway Startup

If you encounter difficulties when starting up your Gateway, check the following:

- Check the wiring and test the output from the power supply. The output should be 24 volts.
- If the Gateway does not show a P1 address in the LED display on the front of the Gateway, connect the P1 cable to the network and reboot again. If the problem persists, contact technical support.
- When a power failure occurs, the Gateway reboots once power is available again. All processes restart, and the software checks the database integrity. If the database is missing or corrupt, a new default database is created. This allows the user to log-in and restore a back-up.

For more information on this topic, see Resetting the Gateway to Default Configuration.

## Section 4.19 Troubleshooting Serial Ports

When setting up serial ports, if you are configuring the port as RS-232, the software actively prevents you from adding more than one device to a particular port. RS-485 configuration allows multiple devices to share a port. The messages you see are dependent on the error condition.

Related technical descriptions can be found at:

- Technical Reference Definitions
- Gateway Messages

## Section 4.20 Troubleshooting Gateway User Interface Communication Ports

The Gateway User Interface (running on a personal computer) uses TCP port 443 to communicate to the Gateway. If traffic is blocked on this port, the Gateway User Interface will not open up on your personal computer.

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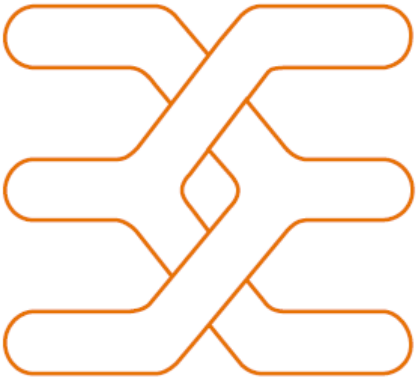

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