ProSoft TECHNOLOGY

Where Automation Connects.

ILX56-MM

ControlLogix Platform

Message Manager for Industrial Communication

June 26, 2018

USER MANUAL

Your Feedback Please

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ILX56-MM User Manual
Rev 1.0.0

June 26, 2018

In an effort to conserve paper, ProSoft Technology no longer includes printed manuals with our product shipments. User Manuals, Datasheets, Sample Ladder Files, and Configuration Files are provided at our website: http://www.prosoft-technology.com

Important Safety Information

WARNING – EXPLOSION HAZARD – DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.
AVERTISSEMENT – RISQUE D'EXPLOSION – AVANT DE DÉCONNECTER L'EQUIPMENT, COUPER LE COURANT OU S'ASSURER QUE L'EMPLACEMENT EST DÉSIGNÉ NON DANGEREUX.

Markings

CSA/cUL	C22.2 No. 213-1987
CSA CB Certified	IEC61010

243333

Temp Code T5
0° C <= Ta <= 60° C

Warnings

North America Warnings

A Warning - Explosion Hazard - Substitution of components may impair suitability for Class I, Division 2.
B Warning - Explosion Hazard - When in Hazardous Locations, turn off power before replacing or rewiring modules.
Warning - Explosion Hazard - Do not disconnect equipment unless power has been switched off or the area is known to be nonhazardous.

Conditions of Safe Usage:

Power, Input, and Output (I/O) wiring must be in accordance with the authority having jurisdiction

A Warning - Explosion Hazard - When in hazardous locations, turn off power before replacing or wiring modules.
B Warning - Explosion Hazard - Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.
C These products are intended to be mounted in an IP54 enclosure. The devices shall provide external means to prevent the rated voltage being exceeded by transient disturbances of more than 40%.
D DO NOT OPEN WHEN ENERGIZED.

Electrical Ratings

- Backplane Current Load: 1000 mA @ 5 V DC
- Operating Temperature: 0 to 60°C (32 to 140°F)
- Storage Temperature: -40 to 80°C (-40 to 176°F)
- Shock: 30g Operational; 50g non-operational; Vibration: 5 g from 10 to 150 Hz
- Relative Humidity 5% to 95% (non-condensing)
- All phase conductor sizes must be at least 1.3 mm (squared) and all earth ground conductors must be at least 4mm (squared).

Battery Life Advisory

This module uses a Lithium Vanadium Pentoxide battery to backup the date/time settings of the real-time clock and the BIOS settings in CMOS. The battery recharges whenever the module is receiving power and should not need to be replaced for the life of the module. The module must be powered for approximately twenty hours before the battery becomes fully charged.

If the module is left in an unpowered state for approximately 21 or more days, the battery will be completely drained and the module BIOS, date, and time will revert to their default settings. Before you remove a module from its power source, ensure the battery is fully charged. You can tell the battery is fully charged when the Battery State (ERR) LED is OFF.

Note: The battery is not user-replaceable.

Contents

1 Start Here

In This Chapter

To get the most benefit from this User Manual, you should have the following skills:

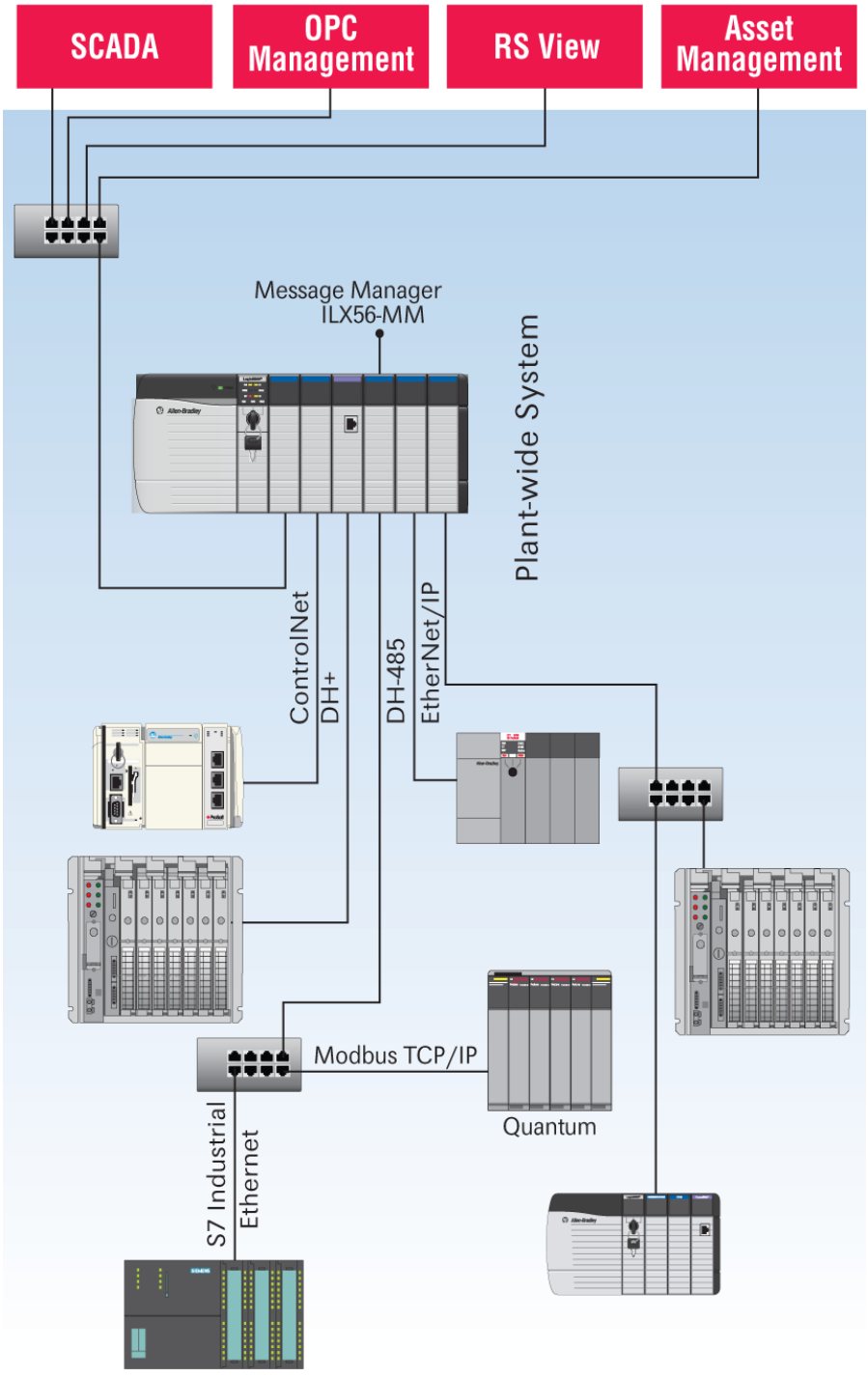
- **Rockwell Automation® RSLogix™ software**: launch the program, configure ladder logic, and transfer the ladder logic to the processor
- **Microsoft Windows:** install and launch programs, execute menu commands, navigate dialog boxes, and enter data
- **Hardware installation and wiring**: install the module and safely connect Message Manager and ControlLogix devices to a power source

Caution: You must be able to complete the application without exposing personnel or equipment to unsafe or inappropriate working conditions.

1.1 Overview

The ILX56-Message Manager is a communications interface that can be installed in a Rockwell Automation® ControlLogix® 1756 chassis to provide data transfer functionality between automation systems based on a diverse range of controllers and processors. Supported systems include:

- Rockwell Automation (RA) ControlLogix Programmable Automation Controller (PAC)
- RA CompactLogix™ (CPLX) PAC systems
- Allen-Bradley® (A-B) PLC5® systems
- A-B SLC™ systems
- A-B MicroLogix™ systems
- Siemens Step 7® systems with Industrial Ethernet communications
- Schneider Electric® Quantum™ PLC systems with Modbus TCP/IP communications
- Any devices that support Modbus TCP/IP Protocol


SCADA
OPC Management
RS View
Asset Management
Message Manager
ILX56-MM
Plant-wide System
ControlNet
DH+
DH-485
EtherNet/IP
Modbus TCP/IP
Quantum
S7 Industrial
Ethernet

1.2 Deployment Checklist

Before you begin configuring the module, consider the following questions. Your answers will help you determine the scope of your project and the configuration requirements for a successful deployment.

1 _____ Will the ILX56-MM require a static IP address for either or both Ethernet ports, or will it obtain IP address(es) from a DHCP Server? Obtain IP address information from your Network Administrator, and then record the IP Address settings in the following table:

Ethernet Ports	Port 1	Port 2
DHCP? (Yes/No)		
Static IP Address		
Subnet Mask		
Default Gateway		

2 _____ How many controllers and processors will be exchanging data in your application?

3 _____ What kinds of processors need to be linked for your application?

4 _____ What network protocols are used for the links?

5 _____ What types of user accounts do you need to create? Users (to modify configurations) or Administrators (to control configuration access)

6 _____ Which data transfers should happen on a regular timed-interval basis? Which transfers should happen only on data change or logic events?

7 _____ Do you need controllers or other communications modules installed in the same chassis as the ILX56-MM?

1.3 System Requirements

The ILX56-MM module requires the following minimum hardware and software components:

- Rockwell Automation® ControlLogix™ processor, with compatible power supply and one free slot in the rack for the ILX56-MM module. The module requires 1 Amp of available 5 VDC power
- Rockwell Automation RSLogix 5000 programming software version 16 or higher
- Rockwell Automation RSLinx communication software version 2.51 or higher
- Pentium® II 450 MHz minimum. Pentium III 733 MHz (or higher) recommended
- Supported operating systems:
  - Microsoft Windows 10
  - Microsoft Windows 7
  - Microsoft Windows Vista
  - Microsoft Windows XP Professional with Service Pack 1 or 2
  - Microsoft Windows 2000 Professional with Service Pack 1, 2, or 3
  - Microsoft Windows Server 2003
- Mozilla Firefox v60.0.1, or higher
- Google Chrome v67.0.3396.02, or higher
- Microsoft Internet Explorer version 7, or higher. Use 'Compatible View' mode.
- 128 Mbytes of RAM minimum, 256 Mbytes of RAM recommended

- 100 Mbytes of free hard disk space (or more based on application requirements)
- 256-color VGA graphics adapter, 800 x 600 minimum resolution (True Color 1024 × 768 recommended)

Note: The Hardware and Operating System requirements in this list are the minimum recommended to install and run software provided by ProSoft Technology. Other third party applications may have different minimum requirements. Refer to the documentation for any third party applications for system requirements.

1.4 Package Contents

The following components are included with your ILX56-MM module, and are all required for installation and configuration.

Important: Before beginning the installation, please verify that all of the following items are present.

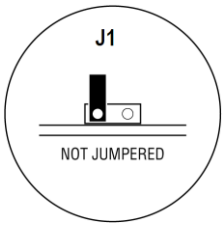
Qty.	Part Name	Part Number	Part Description
1	ILX56-MM Module	ILX56-MM	Message Manager for Industrial Communication

If any of these components are missing, please contact ProSoft Technology Support for replacement parts.

1.5 Setup Jumper

There is one **SETUP JUMPER** located on the back of the module, labeled **J1.** The Setup Jumper acts as "write protection" for the module's firmware. In "write protected" mode, the Setup pins are not connected, and the module's firmware cannot be overwritten.

The following illustration shows the ILX56-MM jumper configuration, with the Setup Jumper OFF.



If you need to update the firmware, apply the Setup jumper to both pins.

Note: If you are installing the module in a remote rack, you may prefer to leave the Setup pins jumpered. That way, you can update the module's firmware without requiring physical access to the module.

1.6 Install the Module in the Rack

If you have not already installed and configured your ControlLogix processor and power supply, please do so before installing the ILX56-MM module. Refer to your Rockwell Automation product documentation for installation instructions.

Warning: You must follow all safety instructions when installing this or any other electronic devices. Failure to follow safety procedures could result in damage to hardware or data, or even serious injury or death to personnel. Refer to the documentation for each device you plan to connect to verify that suitable safety procedures are in place before installing or servicing the device.

After you have checked the placement of the jumper, insert ILX56-MM into the ControlLogix chassis. Use the same technique recommended by Rockwell Automation to remove and install ControlLogix modules.

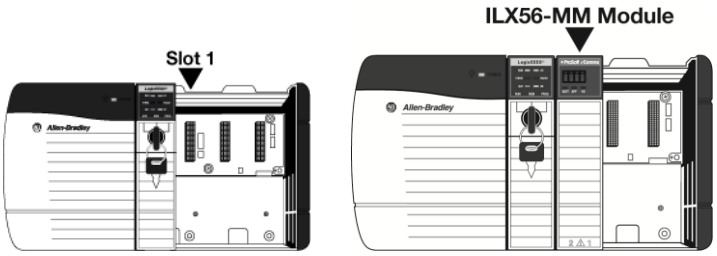
You can install or remove ControlLogix system components while chassis power is applied and the system is operating. However, please note the following warning.

Warning: When you insert or remove the module while backplane power is on, an electrical arc can occur. An electrical arc can cause personal injury or property damage by:

- sending an erroneous signal to your system's actuators causing unintended machine motion or loss of process control
- causing an explosion in a hazardous environment

Verify that power is removed or the area is non-hazardous before proceeding. Repeated electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance that can affect module operation.

1 Align the module with the top and bottom guides, and then slide it into the rack until the module is firmly against the backplane connector.



2 With a firm but steady push, snap the module into place.
3 Check that the holding clips on the top and bottom of the module are securely in the locking holes of the rack.
4 Turn power ON.

Note: If you insert the module improperly, the system may stop working, or may behave unpredictably.

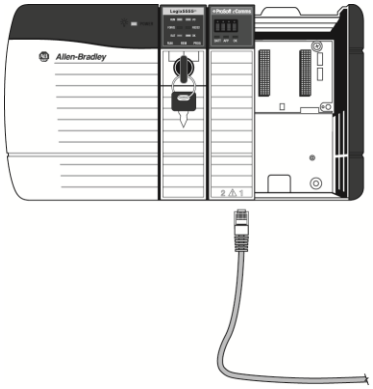
1.7 Connect to the Module's Web Page

If your network is configured to use IP addresses in the range 192.168.1.xxx, open Microsoft Internet Explorer (version 7, or higher), and connect to the following address:

http://192.168.1.254

If your network is configured to use a different IP range, follow these steps:

1. Disconnect your PC from the network
2. Connect the Ethernet cable between the Ethernet port on your PC and Port 1 on the module



3. Temporarily change the IP address and Subnet Mask on your PC to match the network configuration on the module:

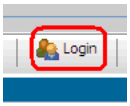
   IP address: 192.168.1.1
   Subnet mask: 255.255.255.0

Important: Make a note of your IP Address settings. You will need to restore these settings before you reconnect to the network.

4. Open Microsoft Internet Explorer (version 7, or higher) and connect to the following address:

   http://192.168.1.254

5. Click the **LOGIN** button at the bottom of the screen, and use the following username and password to login.



   Username: **admin**
   Password: **admin**

6. Click the **ADMINISTRATION** tab, and then the **NETWORK** tab. Configure the IP Address, Subnet Mask, and Default Gateway to work with your network.
7. Click the **SAVE** button to apply the updated settings.

8 Change the IP Address and Subnet Mask settings on your PC back to their original values, and then reconnect your PC to the network.
9 Connect to the module's web page again at the module's new IP address.

The following table describes the default Ethernet port configuration and login information.

Factory Default settings		
Ethernet Ports:	**Port 1**	**Port 2**
IP:	192.168.1.254.	DHCP
User Name:	admin	
Password:	admin	

Important: The User Name and Password are case-sensitive.

1.8 Logging In

You can view the status and configuration of the ILX56-MM module without logging in. However, to modify the module's configuration, or to perform maintenance tasks, you must log in.

The **LOGIN** and **LOGOUT** buttons are located in the status bar at the bottom of the module's web page.

To Log In

Click the **LOGIN** button on the status bar at the bottom of the page.

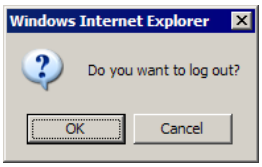
Note: Only one user can be logged into the module at a time.

To Log Out

Click the **LOGOUT** button on the status bar at the bottom of the page.

Note: When you close the browser, you are automatically logged out of the module.

If you attempt to log out of the module without saving changes that you have made, you are prompted to save or cancel the changes.



Click **OK** to save the changes. Click **CANCEL** to discard the changes without saving.

2 Administration

In This Chapter

The **ADMINISTRATION** page allows you to view or modify administration functions. The following table describes the tabs on the Administration page.

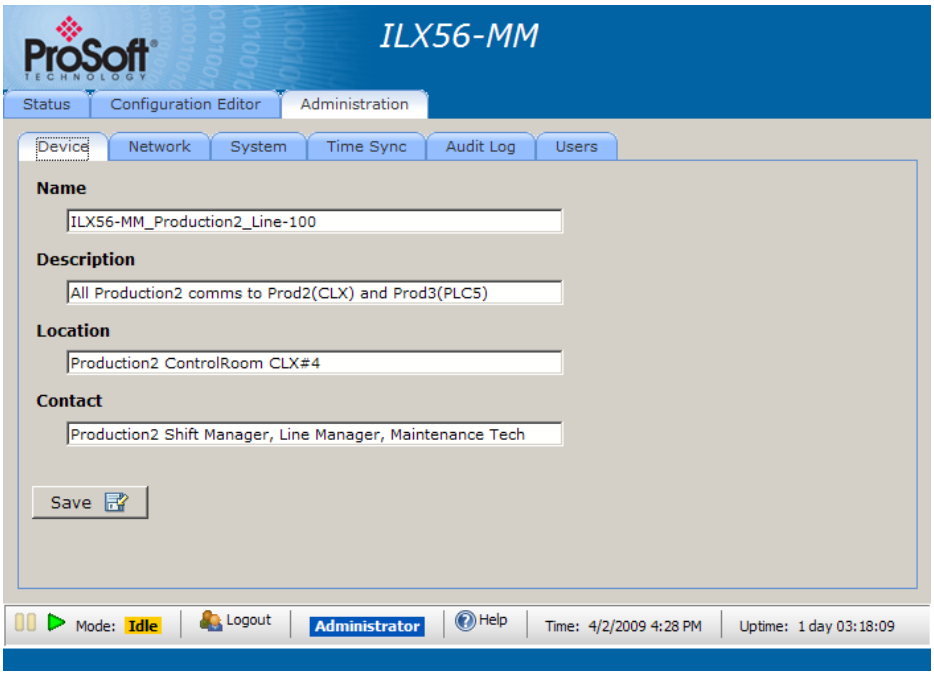
Tab	Function
Device	Configure device information.
Network	Configure the network ports.
System	Execute system functions.
Time Sync	Configure the time on the module Configure time synchronization for the controllers.
Audit Log	View the audit log. The audit log consists of system operational events that have occurred since the module was first started. For example, whenever the system mode is changed from run to idle or idle to run, this event will be in the log.
Users	Create and manage user accounts. You must be logged in with Administrator privilege to view this tab.

Note: You must be logged on as a user with Administrator privilege to modify the settings on this page.

See also Security (page 26).

2.1 Device Information

To open the **DEVICE INFORMATION** page, click the **ADMINISTRATION** tab, and then click the **DEVICE** tab.



The following table describes the fields on the **DEVICE INFORMATION** tab. The values you enter here are displayed on the Device Status (page 55).

Field	Description
Name	Name of the module.
Description	Description of the module.
Location	Location of the module.
Contact	The person responsible for the module.

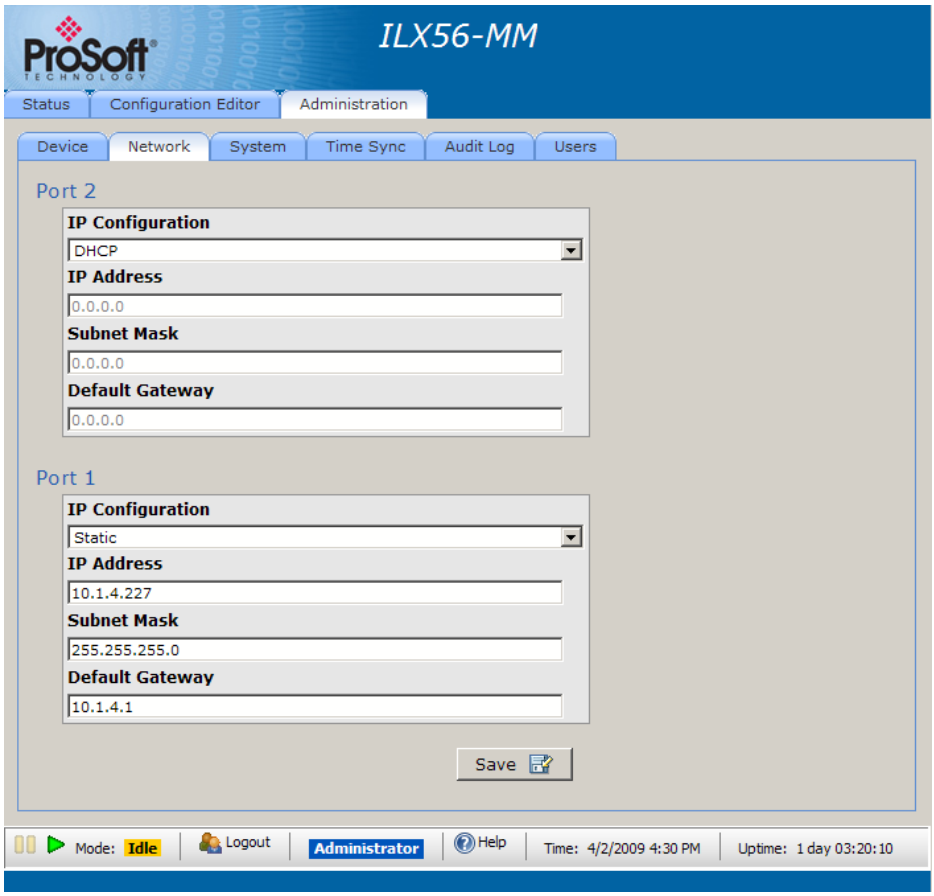
Click the **SAVE** button to save your changes.

Note: You must be logged on as a user with Administrator privilege to modify the settings on this page.

See also Administration (page 17).

2.2 Network Settings

To open the **NETWORK SETTINGS** page, click the **ADMINISTRATION** tab, and then click the **NETWORK** tab.

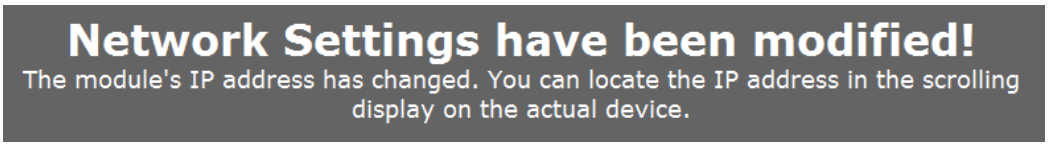


The module has two RJ45 Ethernet ports, located at the bottom of the front panel on the module. You can configure the following settings for each port.

- Disabled
- Static IP Address
  - Subnet Mask
  - Default Gateway (optional)
- DHCP (auto-configured through a DHCP server)

Click the **SAVE** button to update these settings on the module.

When you save the network settings, the module will log you out.



Click the **RECONNECT** button, or press **[F5]** to reconnect to the module.

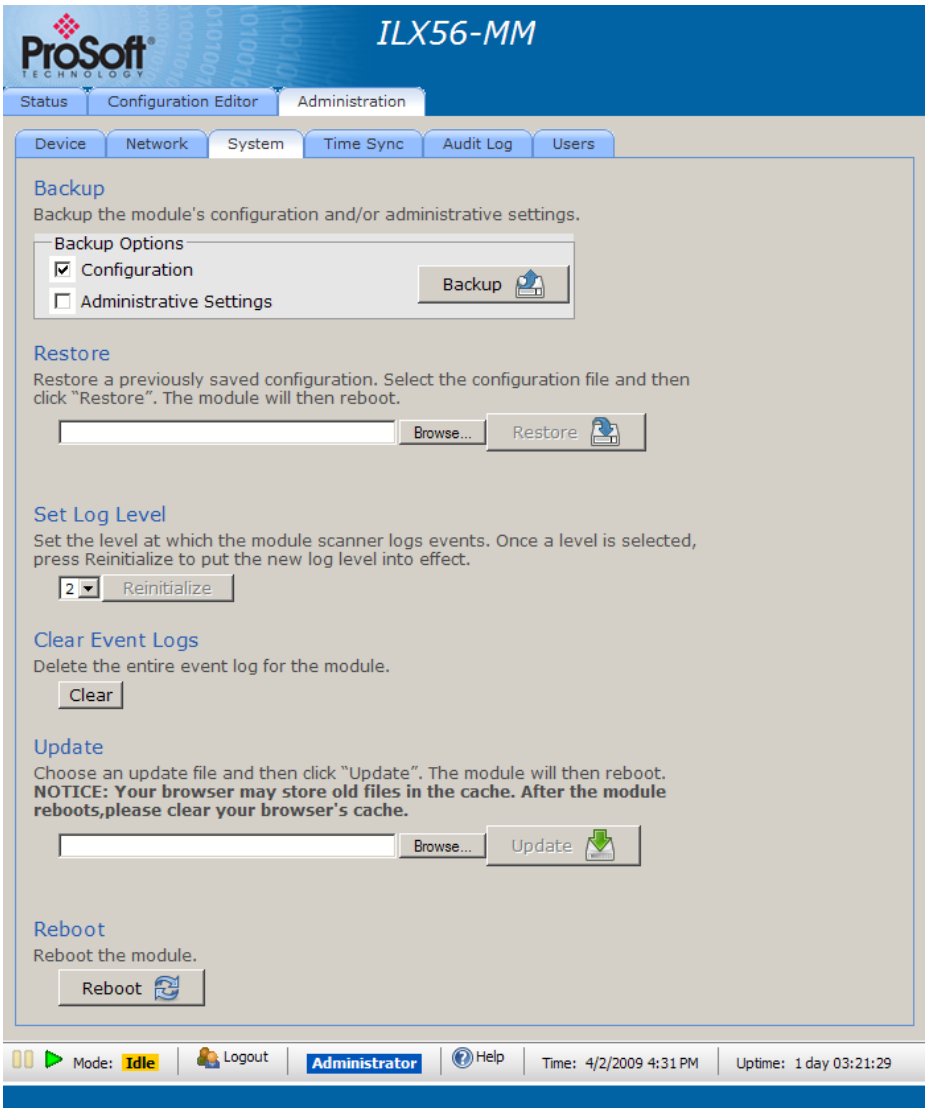
If you lose connection with the module, you can put the module in Setup Mode to temporarily set the network port settings back to the default Setup Jumper (page 12). This will allow you to connect to the module and correct the network settings.

Note: You must be logged on as a user with Administrator privilege to modify the settings on this page.

See also Administration (page 17).

2.3 System Functions

To open the **SYSTEM FUNCTIONS** page, click the **ADMINISTRATION** tab, and then click the **SYSTEM** tab.



System functions you can execute on the module include:

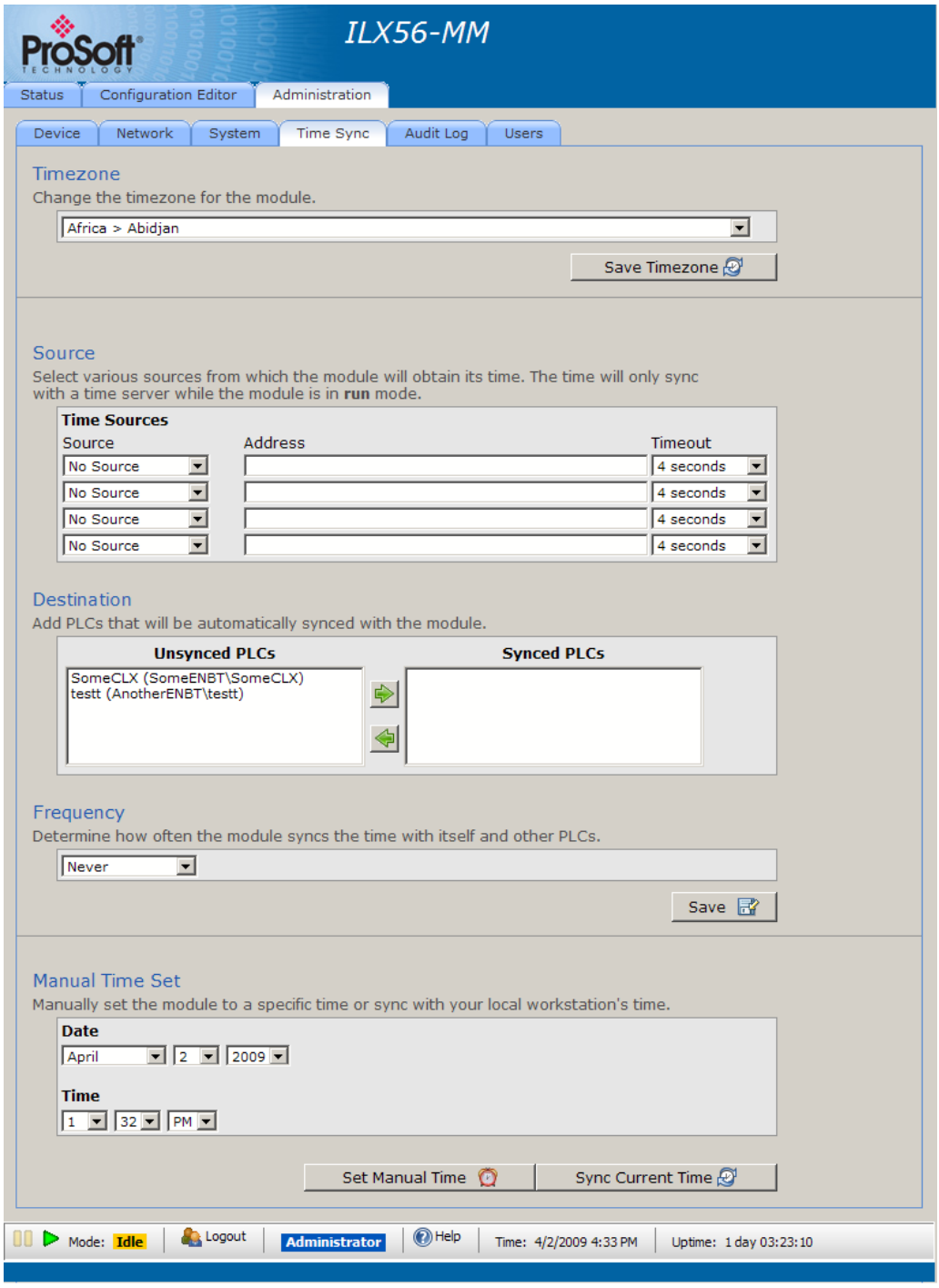
Function	Description
Backup	Choose which settings from the module you would like to backup by checking **CONFIGURATION** and/or **ADMINISTRATIVE SETTINGS**. Then click the **BACKUP** button to backup the current module configuration(s) to a file on your computer. **ADMINISTRATIVE SETTINGS** backs up all module configuration settings, including network settings, device name, and so on. **CONFIGURATION** backs up the only the information that pertains to the transfer of data. You can then use this backup file to configure another module with the same settings.
Restore	Click the **BROWSE** button to select a previously saved configuration file from your computer. Click the **RESTORE** button to restore the module to the state saved in the configuration file. The module is rebooted after the configuration is restored. You will be prompted to confirm the configuration restore and reboot.
Set Log Level	Set the log level at which the scanner module will record events. ▪ Level **1** logs errors only. This is the recommended setting for most applications. ▪ Levels **2** through **4** log informational events in increasing detail. Use these levels for troubleshooting and support. ▪ Level **0** logs only internal system errors. The scanner must be restarted before the new log level will take effect. Click the **REINITIALIZE** button to restart the scanner. You will be prompted to confirm the reinitialize.
Clear Event Logs	Clears the entire Event Log from the module. This cannot be undone.
Update	You can update the module's firmware from this page. *You should only update the firmware if you have been directed to do so by ProSoft Technical Support.* Click the **BROWSE** button to select the firmware file on your computer. Firmware files have the file extension "fwa". Click the **UPDATE** button to perform the update on the module. You will be prompted to confirm the update. **Important:** Do not cycle power or disconnect the Ethernet cable until the update is complete. **Important:** You must clear your browser's cache (Tools/Delete Browsing History/Temporary Internet Files) after rebooting the module to ensure the old pages have been cleared from your browser's memory.
Reboot	Click the **REBOOT** button to reboot the module. You will be prompted to confirm the reboot.

Note: You must be logged on as a user with Administrator privilege to modify the settings on this page.

See also Administration (page 17).

2.4 Time Sync

To open the **TIME SYNC** page, click the **ADMINISTRATION** tab, and then click the **TIME SYNC** tab.



The ILX56-MM module can acquire a time signal from an SNTP time server on the Internet, or from the ControlLogix processor in the same rack with the ILX56-MM.

The ILX56-MM can also set the time on ControlLogix, CompactLogix, and FlexLogix processors defined as Devices.

Note: The module will only obtain, and push, time while in **RUN** mode.

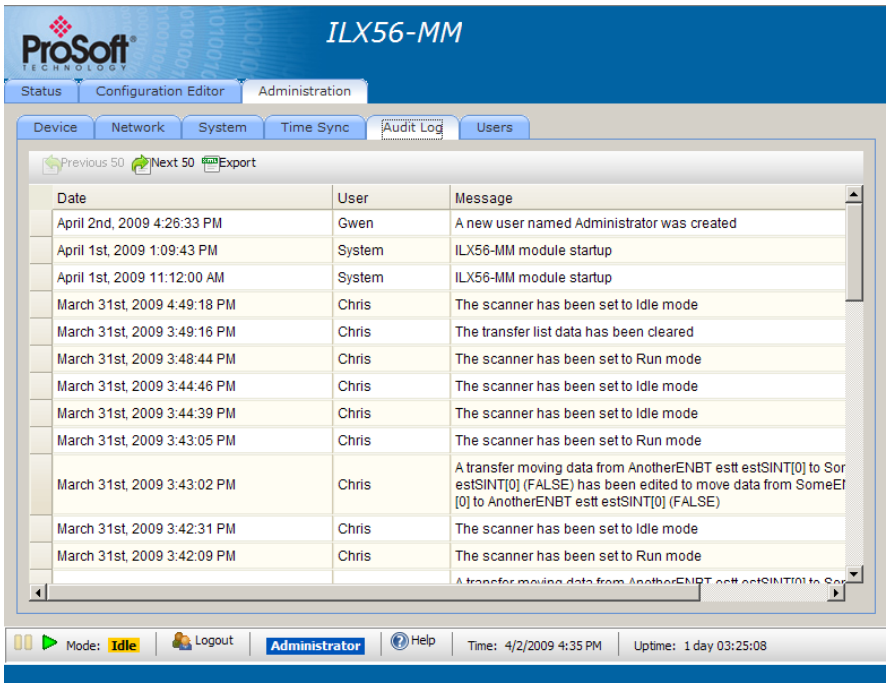
Field	Description
Timezone	Select the time zone for the module.
Source	The module can poll one or more sources for a time signal. **TIME SOURCES** specify the IP addresses for the time synchronization. The module will attempt to synchronize with each of these sources in the specified order until it is successful. **TIMEOUT** is the number of seconds the module will wait to receive the time signal from each source.
Destination	Select other devices that will be synchronized to the time on the module. The items on this list are derived from the devices you have defined in the Configuration Editor.
Frequency	Specify how often the module will receive and send time synchronization. A Time Sync cycle will be started when the module is switched to Run. Click the **SAVE** button to save your Time settings to the module.
Manual Time Set	Set the time and date, and then click the **SET MANUAL TIME** button. To synchronize the time and date on the module to the time and date on your local computer, click the **SYNC CURRENT TIME** button.

Note: You must be logged on as a user with Administrator privilege to modify the settings on this page.

See also Administration (page 17).

2.5 Audit Log

To open the **AUDIT LOG** page, click the **ADMINISTRATION** tab, and then click the **AUDIT LOG** tab.



The audit log is a chronological log of operational system events that have occurred since the module was first started. The audit log displays 50 records per page, in order from newest, at the top, to oldest, at the bottom.

The Audit Log records the following types of events:

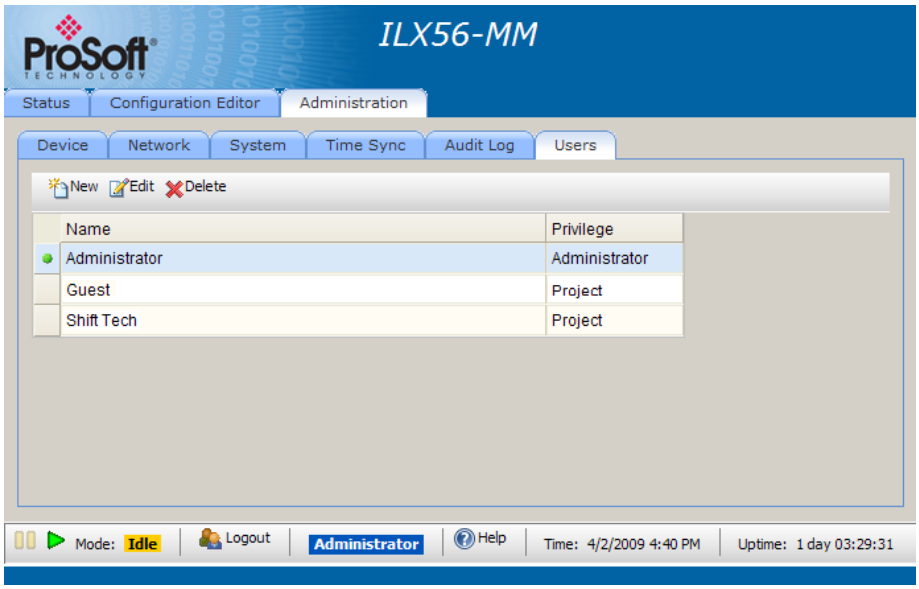
- Changing the module's operational mode
- Modifying the configuration
- Changing the event log level
- Reinitializing the module
- Backing up the configuration
- Restoring the configuration
- Updating the module
- Other less frequent system events

Operation	Description
Next 50	Click the **NEXT 50** button to view the 50 events that occurred prior to the current 50 events begin displayed.
Previous 50	Click the **PREVIOUS 50** button to view the 50 events that occurred after the current 50 events begin displayed.

See also Security (page 26), Setup Mode (page 54), Administration (page 17).

2.6 User Administration

To open the **USER ADMINISTRATION** page, click the **ADMINISTRATION** tab, then click the **USERS** tab.

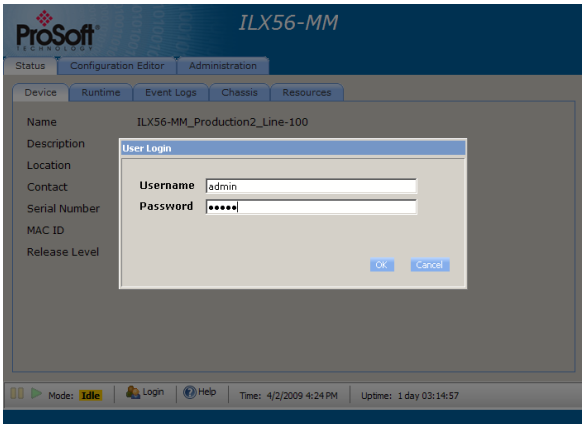


Note: You must be logged on as a user with Administrator privilege to modify the settings on this page.

2.6.1 Security

The ILX56-MM provides three levels of security:

- **GUEST:** No user login account is required.
- **PROJECT:** You must be logged in as a user with Project privilege
- **ADMINISTRATOR.** You must be logged in as a user with Administrator privilege.



Note: When you close the browser, you are automatically logged out. If you have problems logging in, double-check your username and password. The Login dialog will notify you if the username is not correct or the password is not correct. If you are sure you are using your correct username and password and you still cannot log in, see Cannot Log in (page 53).

The following table describes functions that require security privilege.

Location	Function	Privilege Required
Status Bar	Set Mode	Project
Configuration Editor	All Functions	Project
Administration	All Functions	Administrator
Administration/Users	This page cannot be viewed without Administrator privilege	Administrator

Note: Administrator privilege includes all Project privilege functions.

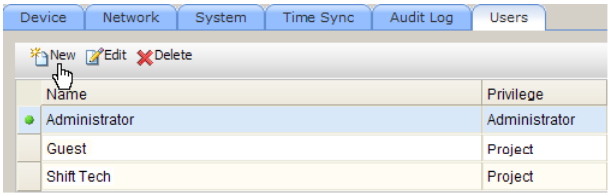
When you receive a new module, it comes configured with one default user who has Administrator privileges (full access to all module functions).

Username: `admin`
Password: `admin`

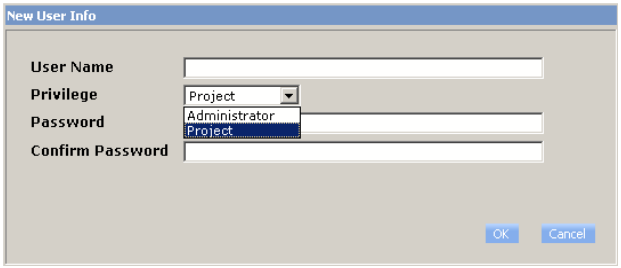
After configuring your user and administrator accounts, you should delete the default "admin" user for additional security.

If you forget your username and/or password you can reset the admin Setup Jumper (page 12). If you have deleted the default admin user, the default admin user will be restored with Administrator privilege.

2.6.2 Adding a New User

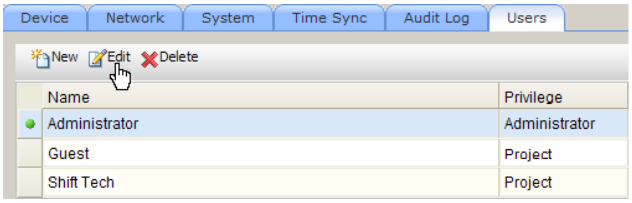


1 Click **NEW** to add a new user. This action opens the **NEW USER INFO** dialog box.

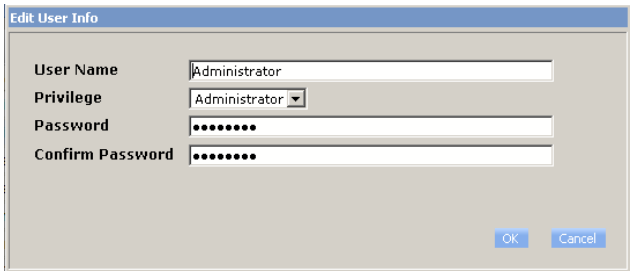


2 Enter the *User Name* for the user.
3 Select the desired *Privilege* for the user: Project or Administrator.
4 Enter a *Password* for the user.
5 Enter the password again in the *Confirm Password* field.
6 Click **OK** to add the new user.

2.6.3 Editing an Existing User



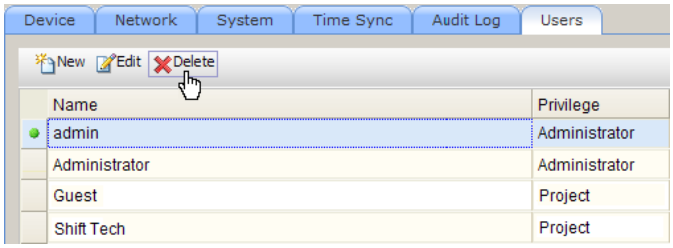
1 Select a user and click the **EDIT** button. This action opens the **EDIT USER INFO** dialog box



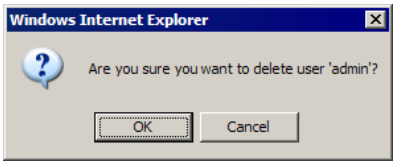
2 You can change the Username, Privilege, or Password.

If you change the password, you must also enter the new password in the *Confirm Password* edit box.

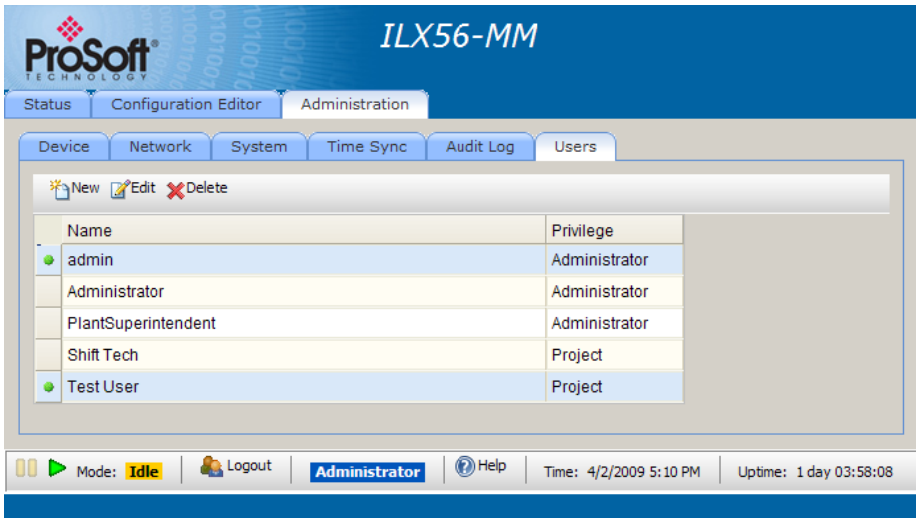
2.6.4 Deleting a User



1 Select a user and click **DELETE,** or press the **[DEL]** key to delete a user.
2 You will be prompted to confirm the deletion of the user.



3 To select multiple users for deletion, hold down the **[SHIFT]** or **[CTRL]** key while selecting users.



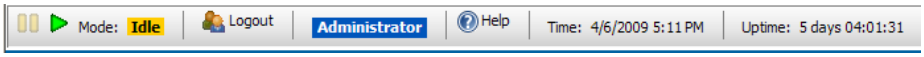
See also Security (page 26), Setup Mode (page 54), Administration (page 17).

2.7 Scanner Modes

The scanner mode controls the scanning of Triggers (page 48) and the transfer of data between Devices. The scanner can be in one of the following modes:

- In **STOP** mode, Triggers are not scanned and none of the Interfaces are active. The scanner only goes into Stop mode when a serious error has occurred. You cannot put the scanner into Stop mode yourself.
- In **IDLE** mode, Triggers are not scanned but the Interfaces are active. In Idle mode, you can configure the scanner using the Configuration Editor.
- In **RUN** mode, Triggers are scanned and the Interfaces are active. Data is actively transferred between controllers based on Trigger logic. You cannot configure the scanner while it is in Run mode.

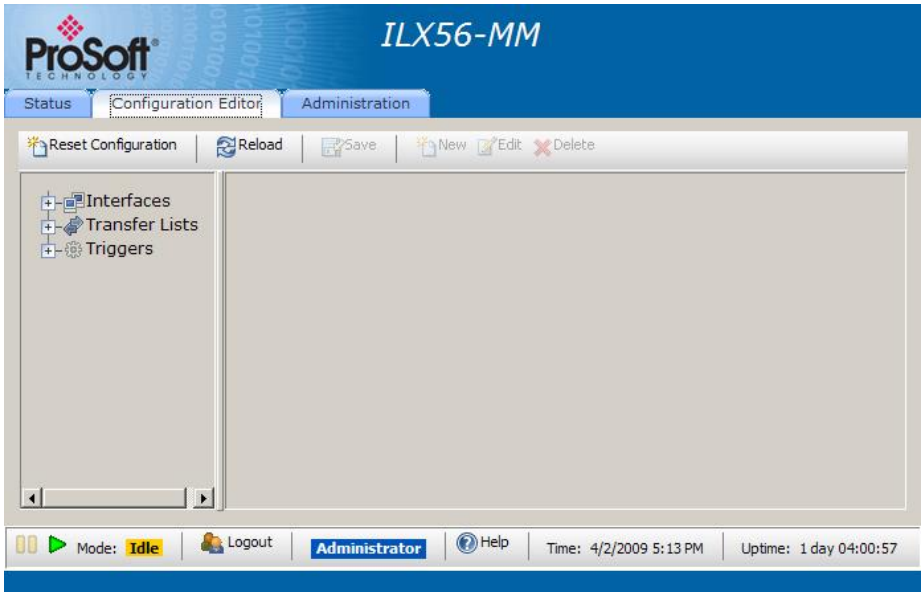
You must be logged into the module with Project or Administrator privilege to change the scanner mode. To change the scanner mode, click the **IDLE** or **RUN** buttons on the status bar at the bottom of the page. The following illustration shows the ILX56-MM in **IDLE** mode.



3 Configure the ILX56-MM module

In This Chapter

To open the Configuration Editor page, click the **CONFIGURATION EDITOR** tab.



Note: To modify the settings on this page, you must be logged on as a user with Administrator or Project privilege, and the scanner must be in **IDLE** Scanner Modes (page 29). If you are not logged in, or if the scanner is in **RUN** mode, you can view these settings, but you cannot change them.

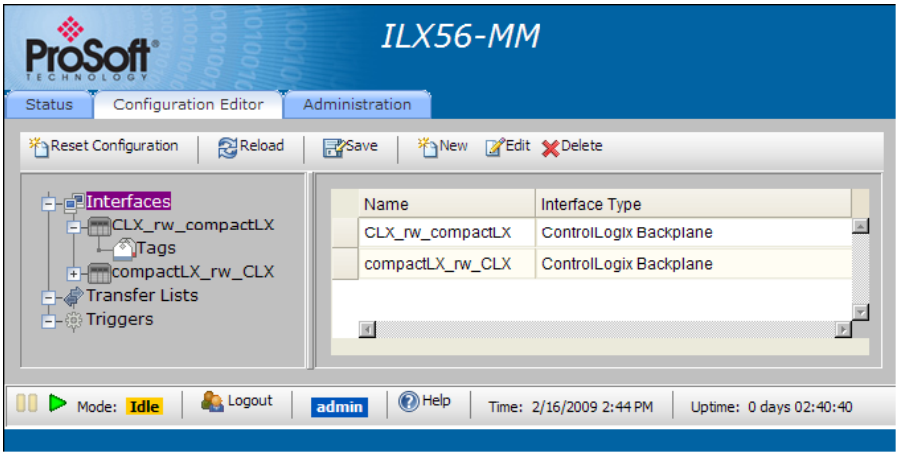
The *Configuration Editor* tab is divided into two panes.

- The left pane is a tree view of *Interfaces*, *Transfer Lists* and *Triggers*. Click the **[+]** icon next to each object to expand or collapse the tree view.
- The right pane shows the properties of objects you select in the tree view.

The following table describes the types of objects you can configure.

Name	Description
Interfaces	Physical objects located in slots in the ControlLogix rack, or physical objects connected to ports on the module.
Devices	Physical objects (bridges) linking a controller to one of the Interfaces. See Interfaces and Devices (page 33).
Tags	Individual data objects in the controllers that can be transferred to another controller. See Tags (page 41).
Triggers	Define when to transfer data from one Interface (programmable controller) to another. See Triggers (page 48).
Transfer lists	Define what data to transfer between Devices. See Transfer Lists (page 47).

3.1 Editing Configuration Objects



To use the *Configuration Editor*, expand the Tree View (left pane), and then select the object to edit.

- Click the **NEW** button on the toolbar to create a new object under the selected object.
- Click the **EDIT** button to view or modify the selected object. Or, you can double-click the selected object in the tree view.
- Click the **DELETE** button to delete the selected object. Or, select an object and then press the **[DEL]** key to Delete (permanently remove) the object.

3.2 Interfaces and Devices

You can configure the module to send and receive tag data to/from controllers in the local ControlLogix rack, connected remotely through a bridge, or via one of the Ethernet ports on the module. Interfaces are used to configure controllers or bridges in the local ControlLogix rack. Devices are used to configure bridges and controllers that are remotely connected through bridges in the local rack or one of the Ethernet ports on the module.

Data transferred to or from a PLC 5®, SLC™, or MicroLogix™ may be transferred via one of the supported bridges or one of the Ethernet ports on the module. Data transferred to or from a, or ControlLogix® Programmable Automation Controller (PAC) can be transferred directly to/from a controller in the ControlLogix rack or to/from a remote ControlLogix PAC via one of the supported bridges or one of the Ethernet ports on the module.

Data transferred to or from a Siemens Step 7 (S7) PLC or Schneider Electric Quantum PLC must be done through one of the Ethernet ports of the module.

Use the Configuration Editor to create, modify, or delete Interfaces and Devices. Select the *Interfaces* node in the Configuration Editor tree. The content pane will display a table containing all of the Interfaces.

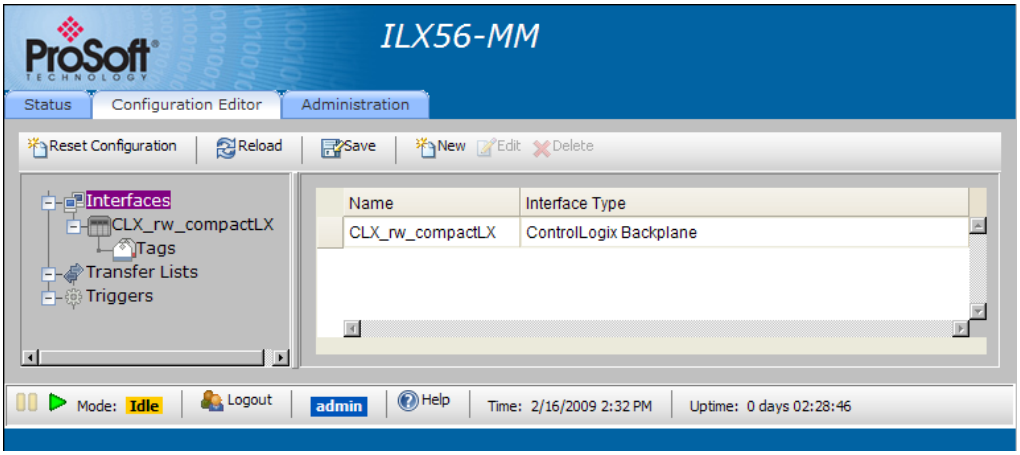
- Click **NEW** to create a new Interface.
- Click **EDIT** to edit the selected Interface.
- Click **DELETE** or press the **[DEL]** key to delete the selected Interface.

You can also edit an Interface by double clicking on the Interface in the Configuration Editor tree or in the content pane.

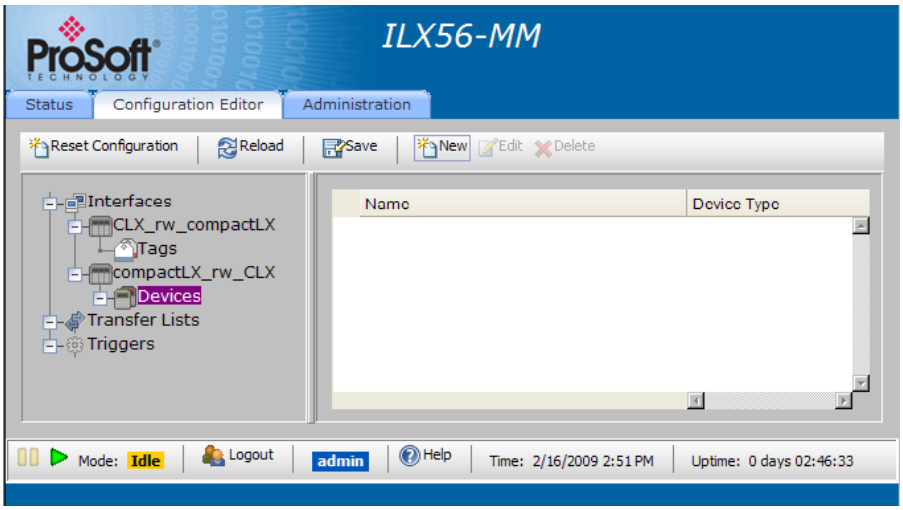
3.2.1 Allen-Bradley PLCs

An Allen-Bradley (AB) PLC can be defined as an *Interface* or as a *Device*.

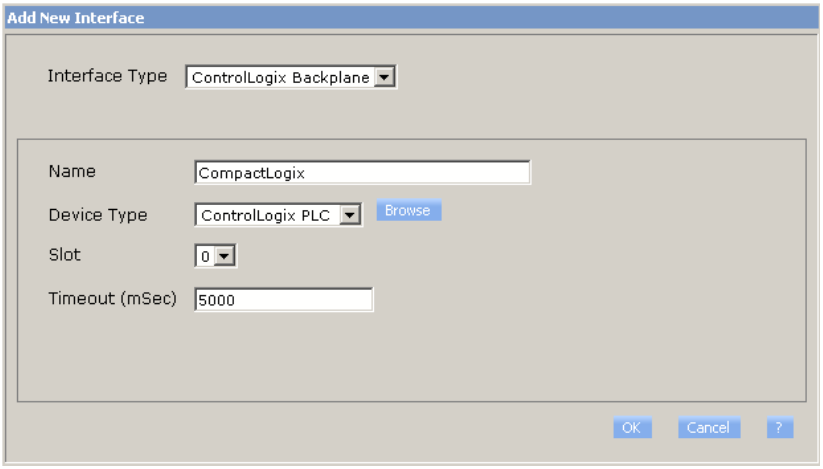
- A Device defined as an Interface (controller) will contain a *Tags* node under it in the *Configuration Editor* tree. The *Tags* node contains all the tags referenced for that controller.



- A Device defined as a Bridge will contain a Devices node under it in the *Configuration Editor* tree.



Each Interface and Device has a unique *Name*, a *Timeout*, and addressing information.



- The *Timeout* specifies the timeout value in milliseconds to be used in communicating with the device.
- The addressing information contains information to address the device on the network or in the rack where the device is located.

Depending on the *Interface Type* and *Device Type*, other parameters may also be available. The following table describes the addressing parameters for each interface/device type.

Parameter	Description
Interfaces	Addressing is specified as a slot number.
ControlNet bridge	Addressing is specified as a node number.
DHRIO bridge	Addressing is specified as a channel and node number.
DH485 bridge	Addressing is specified as a channel and node number.

Bridges (ControlLogix Backplane)

Devices are configured under a bridge interface in the local rack. Select the **DEVICES** node in the Configuration Editor tree. The content pane will display a table containing all of the Devices defined for that bridge.

The ILX56-MM supports the following bridges:

- EtherNet/IP Bridge (page 35)
- DHRIO Bridge (page 35)
- DH485 Bridge (page 37)
- ControlNet Bridge (page 36)™

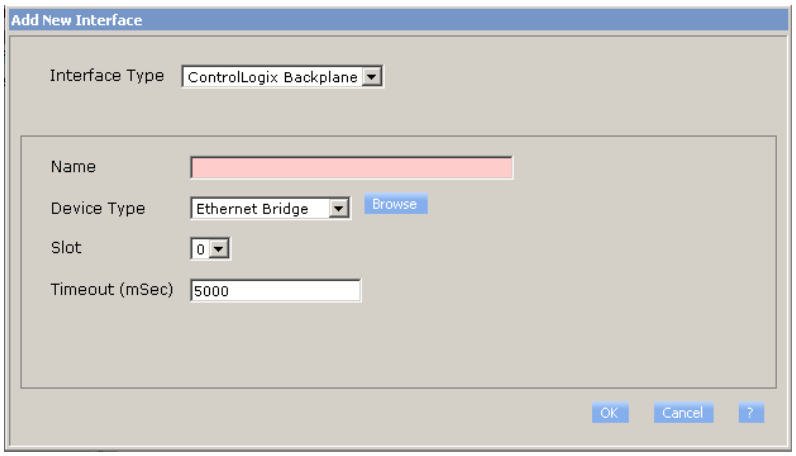
EtherNet/IP Bridge

A 1756 EtherNet/IP bridge in the local rack can be connected directly to a PLC 5, SLC, or MicroLogix.

An EtherNet/IP bridge can also be connected to another EtherNet/IP bridge or CompactLogix PAC in a remote rack.

An EtherNet/IP bridge in a remote rack can be connected to a ControlLogix PAC in that rack or an EtherNet/IP bridge, ControlNet bridge, DHRIO bridge, or DH485 bridge in that remote rack.

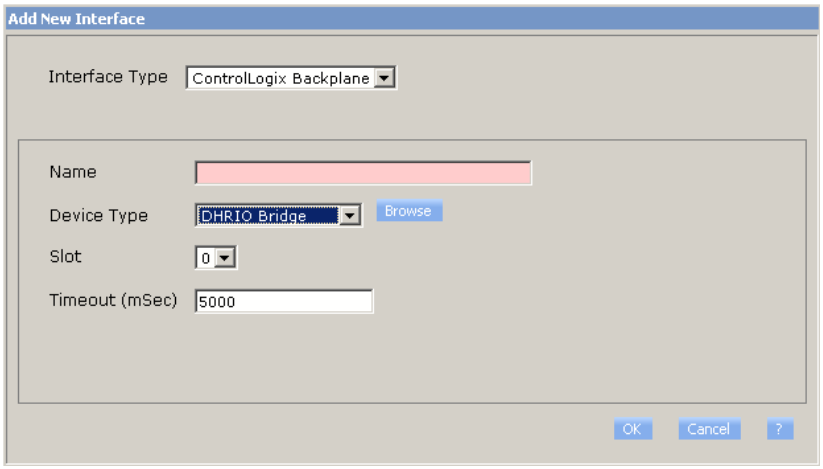
An EtherNet/IP bridge rack can be connected to a CompactLogix PAC.



DHRIO Bridge

A DHRIO bridge in the local rack can be connected directly to a PLC 5 or SLC, or, connected to another DHRIO bridge in a remote ControlLogix rack.

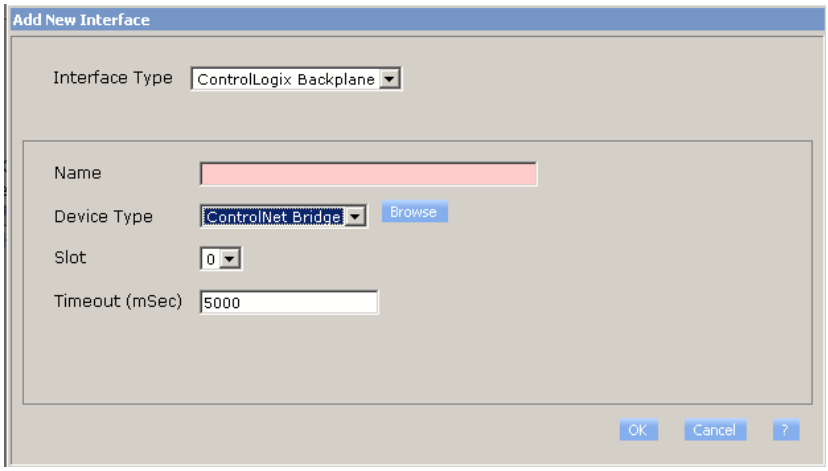
A DHRIO bridge in a remote rack can be connected to a ControlLogix PAC in that rack or an EtherNet/IP bridge, ControlNet bridge, DHRIO bridge, or DH485 bridge in that remote rack.



ControlNet Bridge

A ControlNet bridge in the local rack can be connected directly to a PLC 5 or, connected to another ControlNet bridge in a remote ControlLogix rack.

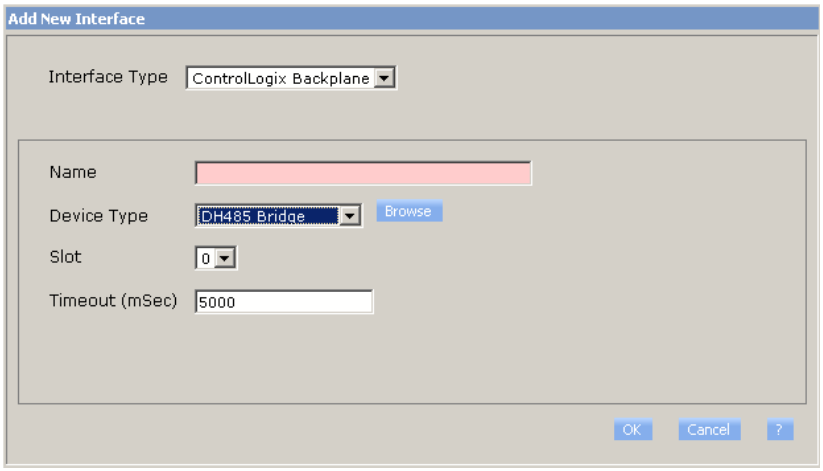
A ControlNet bridge in a remote rack can be connected to a ControlLogix PLC in that rack or an EtherNet/IP bridge, ControlNet bridge, DHRIO bridge, or DH485 bridge in that remote rack.



DH485 Bridge

A DH485 bridge in the local rack can be connected directly to an SLC, MicroLogix, or ControlLogix PAC, or, connected to another DH485 bridge in a remote ControlLogix rack.

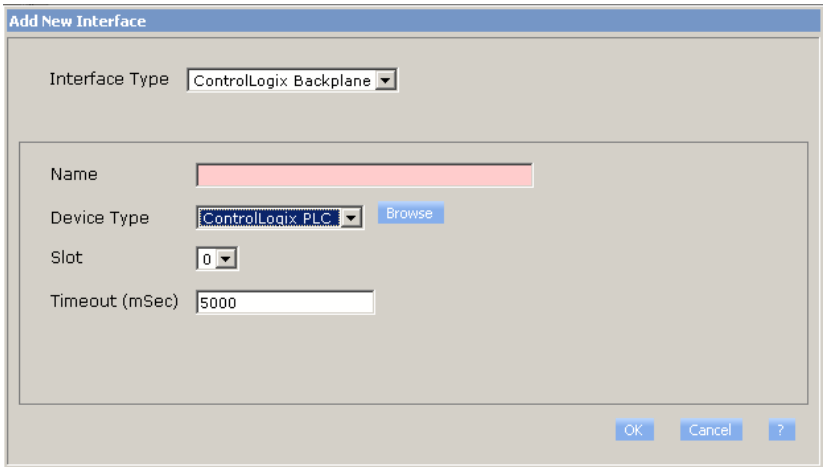
A DH485 bridge in a remote rack can be connected to a ControlLogix PAC in that rack or an EtherNet/IP bridge, ControlNet bridge, DHRIO bridge, or DH485 bridge in that remote rack.



ControlLogix PLC

A ControlLogix PAC in the local rack can be connected through a bridge module to a PLC 5, SLC, MicroLogix, or ControlLogix PAC, or, connected to another ControlLogix PAC in a remote ControlLogix rack.

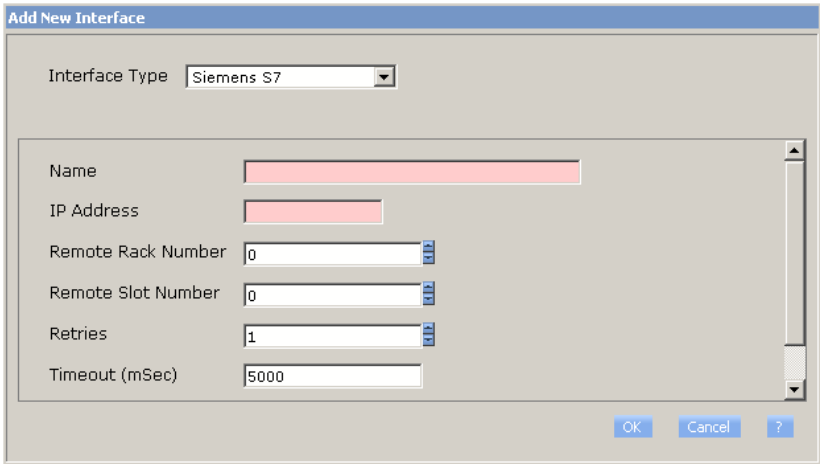
A ControlLogix PAC in a remote rack can be connected to a ControlLogix PAC in that rack or an EtherNet/IP bridge, ControlNet bridge, DHRIO bridge, or DH485 bridge in that remote rack.



3.2.2 Siemens Step 7 (S7) PLCs

An Interface defined as a Siemens S7 will contain a Tags node under it in the Configuration Editor tree. The Tags node contains all the Tags referenced for that controller.

Each Interface has a unique *Name*, *IP address*, *Remote Rack Number*, *Remote Slot Number*, *Retries*, and *Timeout*.

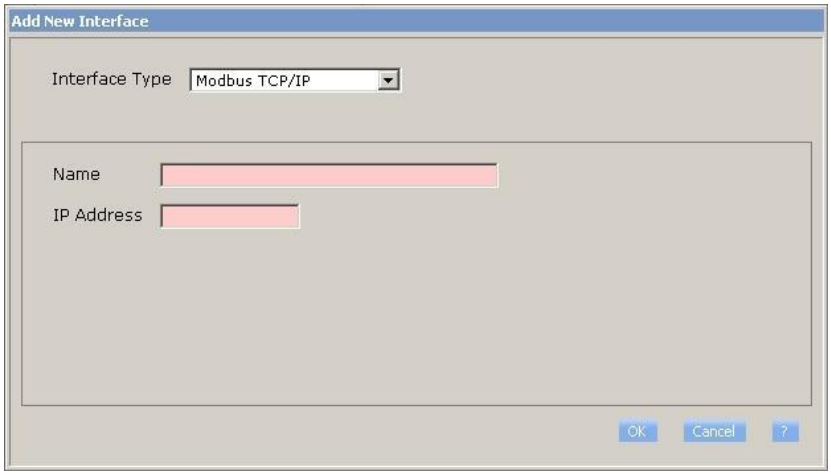


The *Timeout* specifies the timeout value in milliseconds to be used in communicating with the device.

The addressing information: *IP address*, *Remote Rack Number*, and *Remote Slot Number* contains information to address the device on the S7 Industrial Ethernet network.

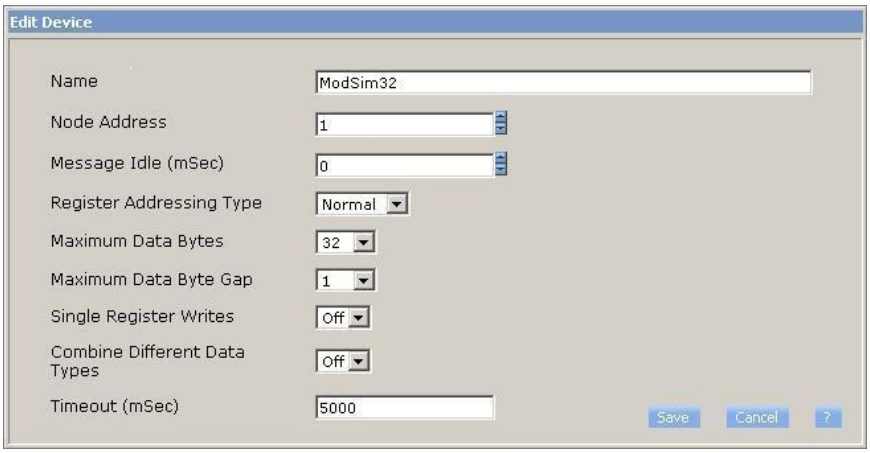
3.2.3 Modbus TCP/IP (Schneider Electric Quantum PLCs)

An Interface defined as Modbus TCP/IP will contain a Devices node under it in the Configuration Editor tree.



Each Devices node will contain a Tags node in the Configuration Editor tree. The Tags node contains all the Tags referenced for that controller.

Each Interface has a unique Name, IP Address and Timeout. The Timeout specifies the timeout value in milliseconds to be used in communicating with the device.



Each Device has the following unique parameters.

Parameter	Description
Node Address	The Modbus Node Address of the slave device to connect to the module. If you are connecting to a Quantum PLC via a bridge, enter the Modbus node address of the device connect to the module. If you are directly connecting to a Quantum PLC, set this to 0.
Message Idle Time	The idle time between messages in milliseconds. Range is 0 to 50.
Register Addressing Type	The type of addressing used to access Long Integers and Floating Point data, where: Normal — Longs/Floats occupy two 16-bit registers. Register order is normal. Modicon — Longs/Floats occupy two 16-bit registers. Register addressing order is WORD reversed. 32-bit — Longs/Floats occupy one 32-bit register.
Maximum Data Bytes	The maximum number of register or coil data bytes contained in a single MODBUS message body. Valid options are 4, 32, 64, 128, 192, and 244. If an array tag is larger than this value, multiple messages may be used to complete the data access.

<table>
<tr><th>Parameter</th><th>Description</th></tr>
<tr><td>Maximum Data Byte Gap</td><td>The byte gap allowed in the reading of the register or coil data block. Valid options are:
<table>
<tr><td>0</td><td>No gaps are allowed in the reg/coil data block. Only sequential contiguous reg/coil read requests may be combined in a request message. For example, sequential reads of Status Bits 10001 and 10003 will result in two read request messages.</td></tr>
<tr><td>1</td><td>Scattered Coil (0x0000) and Status Bit (1x0000) read requests with up to a 1 byte (8 bit) gap may be combined in a single request message. For example, sequential reads of 10001 and 10003 will result in a single request message with 10002 being discarded. Scattered sequential Holding (4x0000) and Input (3x0000) register accesses must be contained or exactly adjacent.</td></tr>
<tr><td>8</td><td>Scattered sequential reg/coil read requests that have up to an 8 byte gap may be combined in the same read request message.</td></tr>
<tr><td>16</td><td>Scattered sequential reg/coil read requests that have up to a 16 byte gap may be combined in the same read request message.</td></tr>
<tr><td>32</td><td>Scattered sequential reg/coil read requests that have up to a 32 byte gap may be combined in the same read request message.</td></tr>
<tr><td>64</td><td>Scattered sequential reg/coil read requests that have up to a 64 byte gap may be combined in the same read request message.</td></tr>
<tr><td>128</td><td>Scattered sequential reg/coil read requests that have up to a 128 byte gap may be combined in the same read request message.</td></tr>
</table></td></tr>
<tr><td>Single Register Writes</td><td>Determines if multiple or single register writes will occur. If this option is "ON", 16-bit register writes will be executed one at a time, 32-bit writes will be executed one at a time, and coil writes will be executed one at a time. Array writes will require multiple messages to complete.</td></tr>
<tr><td>Timeout</td><td>The timeout value in milliseconds to be used in communicating with the device.</td></tr>
</table>

You must be logged on as a user with Project or Administrator privilege to modify the module data transfer configuration.

See also Configuration Editor, Tags (page 41).

3.3 Tags

Tags refer to individual data objects in the controllers that can be transferred to another controller.

Tags can be created and deleted, but cannot be modified. In the Configuration Editor tree, each controller contains a node named Tags. When you select the Tags node under any controller, in the content pane a table is displayed containing all of the Tags currently defined for that controller. The read/write status of a tag is shown in the last column as a "Read Only" check box. If the Read Only check box is selected, you cannot use this tag as as a destination in a transfer list.

When the Tags node is selected, you can add or delete Tags from the controller. Click **NEW** to create a new Tag. Click the Delete button to delete the selected Tag.

- For ControlLogix PACs, the actual Tags in the controller are enumerated. From this enumeration, the user can select which tags to reference in the module. See also New Tag dialog box (ControlLogix/CompactLogix/Flex Logix).
- For PLC 5, MicroLogix and SLC processors, Tags are created to access various indexes in the controller files (PLC 5, MicroLogix and SLC). See also New Tag dialog box (PLC 5, MicroLogix and SLC).
- For Siemens S7 and Schneider Electric Quantum PLCs, the tag references must be entered by the user. Automated enumeration is not supported. See also New Tag dialog box (Siemens S7) and New Tag dialog box (Schneider Electric Quantum PLCs).

You must be logged on as a user with Project or Administrator privilege to modify the module's data transfer configuration.

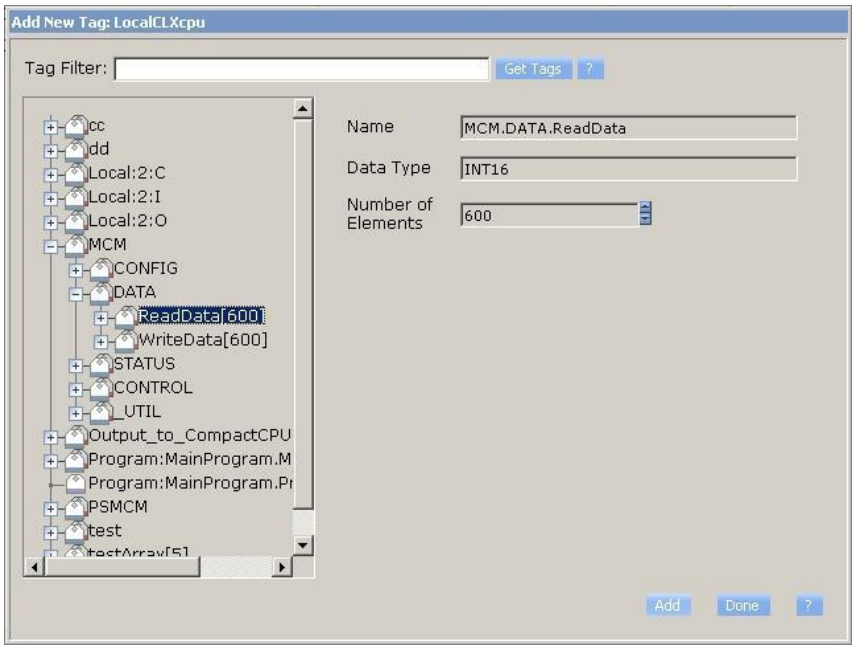
See also Configuration Editor.

3.3.1 Internal Diagnostic Tags

This option allows you to set up transfer lists and these can now be transferred to other interface devices using other diagnostics tags used in transfer lists. For additional information for how to use these tags, see Transferring Internal Diagnostic Tags.

3.3.2 ControlLogix, CompactLogix, FlexLogix

You can use the ControlLogix, CompactLogix and FlexLogix **NEW TAG** dialog box to add references of Tags to the module's configuration. To open the **NEW TAG** dialog box, you select the **TAGS** node under a ControlLogix, CompactLogix or FlexLogix controller in the *Configuration Editor* tree and then click the **NEW** button on the toolbar.



When the dialog first comes up, no Tags are displayed in the Tag tree. At the top of the dialog is an edit box named Tag Filter. Enter a filter for the Tags and click the **GET TAGS** button or press the **[ENTER]** key. All Tags that match the specified filter will be loaded into the tag tree. Or, to get all Tags, leave the Tag Filter empty and click the **GET TAGS** button or press the **[ENTER]** key. See also Tag Filters (page 72).

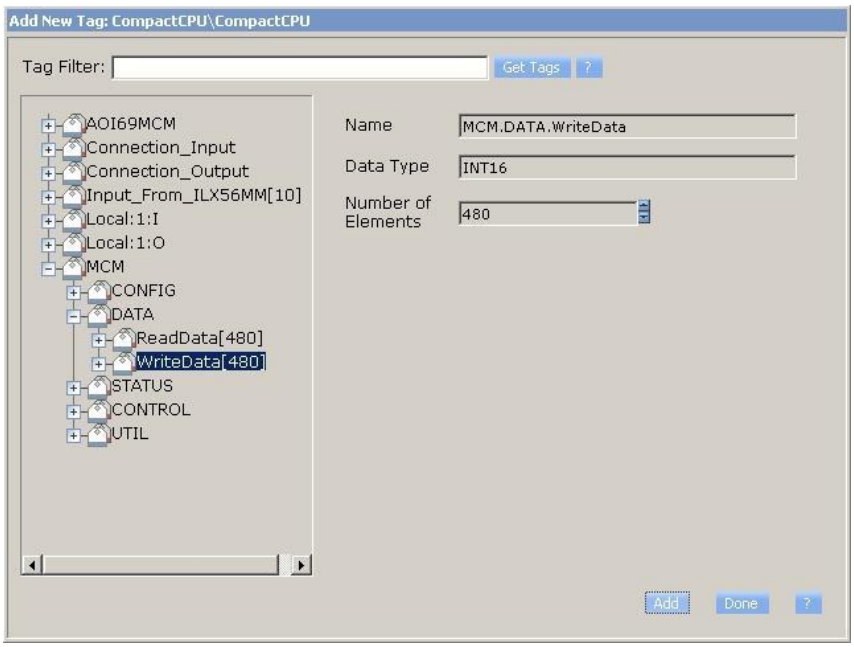
After the Tags matching the filter are loaded into the Tag tree, select a Tag. The Name, Data Type, and Number of Elements associated with the Tag are displayed on the right hand side of the *New Tag* dialog box. You cannot modify any of the Tag values. Click the **ADD** button to add the Tag reference to the module's configuration.

Click **DONE** to close the *New Tag* dialog box.

See also Tags (page 41).

3.3.3 PLC5, MicroLogix, and SLC

You can use the PLC5, MicroLogix and SLC *New Tag* dialog box to add Tags from a PLC 5, MicroLogix or SLC controller to the module's configuration. To open the PLC5, MicroLogix and SLC *New Tag* dialog box, you select the Tags node under a PLC5, MicroLogix or SLC controller in the *Configuration Editor* tree and then click the **NEW** button on the toolbar.



When the dialog box first comes up, the location tree is loaded with Tag locations within the controller. For a PLC5, MicroLogix or SLC, these are file references.

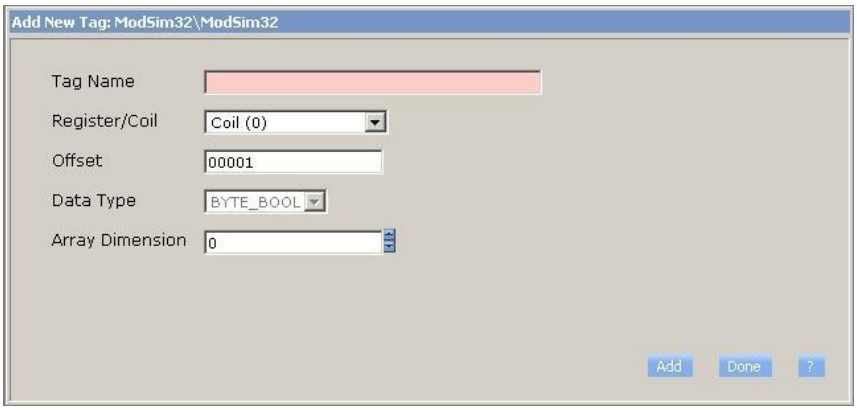
Select a Tag location in the location tree. The File Address, Data Type and Name, associated with the Tag are displayed on the right hand side of the **NEW TAG** dialog box. You can modify the name of the tag to a Tag name that is meaningful to you. You can modify the number of elements to specify how many data items at this location will be associated with this tag. When number of elements is greater than 1 this Tag will be handled as an array. Click the **ADD** button to add the Tag to module's configuration.

Click **DONE** to close the PLC5, MicroLogix and SLC **NEW TAG** dialog box.

See also Tags (page 41).

3.3.4 Schneider Electric Quantum PLCs

Use the Modbus TCP/IP *New Tag* dialog box to add Tags from a Schneider Electric Quantum PLC (Unity or Concept) controller to the module's configuration. To open the *Modbus TCP/IP New Tag* dialog box, you select the Tags node under a Schneider Electric Quantum PLC controller in the *Configuration Editor* tree and then click the **NEW** button on the toolbar.



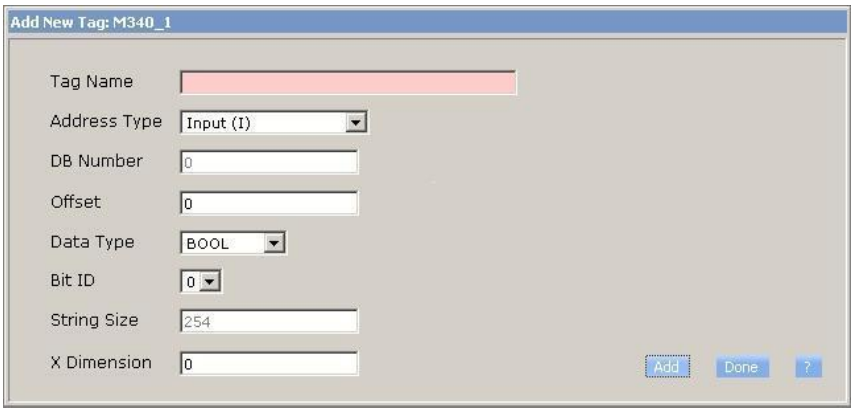
The dialog box allows the user to enter the following parameters.

Parameter	Description
Tag Name	The desired name of the tag and is completely at the discretion of the user. It is suggested that it resemble the tag as it is labeled in the Schneider Electric Quantum controller.
Register/Coil	The desired area of the state RAM to be accessed. The four areas are Coils (0x0000), Input Status bits (1x0000), Input register (3x0000), and Holding Register (4x0000). Each area designation is followed by the most significant digit of the Concept (direct) address, shown in parenthesis.
Offset	The desired offset, within the state RAM, of the data to be accessed. This, coupled with the register/coil selection, will determine the complete address of the data to be accessed. For example, selecting Holding Register with an offset of 00180 would produce a final address of 400180.
Data Type	The desired format for accessing the data. Register/coil types of coil and input bit can only be accessed as byte_bools. Registers may be accessed as one of the following: ▪ Int16 - 16-bit Signed Integers ▪ Int32 - 32-bit Signed Long Integers ▪ Uint16 - 16-bit Unsigned Integers ▪ Uint32 - 32-bit Unsigned Long Integers ▪ Float32 - 32-bit Floating Point
Number of Elements	The number of elements to be accessed. This allows for array transfers.

See also Tags (page 41).

3.3.5 Siemens S7

Use the Siemens S7 *New Tag* dialog box to add Tags from a Siemens S7 controller to the module's configuration. To open the Siemens S7 *New Tag* dialog box, you select the Tags node under a Siemens S7 controller in the *Configuration Editor* tree and then click the **NEW** button on the toolbar.



The dialog box allows the user to enter the following parameter.

Parameter	Description
Tag Name	The desired name of the tag and is completely at the discretion of the user. It is suggested that it resemble the tag as it is labeled in the Siemens S7 controller.
Address Type	The type of memory to be accessed: Input, Output, Peripheral Input, Flag Bit, Timers, Counters, or Data Blocks.
Input	The memory that contains the last scan of the input modules. The S7 notation (IEC) for this area is "I". This memory is read-only for module access.
Output	The memory that contains the desired output values to be written to the output modules at the end of the next scan cycle. The S7 notation (IEC) for this area is "Q". This memory is read only for module access.
Peripheral Input	The actual physical hardware of the input modules. The S7 notation (IEC) for this area is "PI". This area is read only for module access.
Flag Bit	The memory that is intended to store interim results calculated in the program of the PLC. The S7 notation (IEC) for this area is "M". This memory is read/write for module access.
Timers	The memory that contains the accumulators for the timers in the S7 PLC. The S7 notation (IEC) for the timers is "T". This memory is read only for module access and the format is in BCD. The number represents the number of milliseconds that the timer has been active with a maximum value of 3999.
Counters	The memory that contains the accumulators for the counters in the S7. The S7 notation (IEC) for the counters is "C". This memory is read only for module access and the format is in BCD. The number represents the accumulated value of the counter since the counter has been active with a maximum value of 999.

<table>
<tr><th>Parameter</th><th>Description</th></tr>
<tr><td>Data Blocks</td><td>The memory that contains information for the program of the S7 PLC. They may contain the following data types: BOOL, BYTE, WORD, DWORD, INT, DINT, REAL, S5TIME, DATE, TIME, TIME_OF_DAY, CHAR, DATE_AND_TIME, STRING, or ARRAY. Descriptions of these data types should be available in the S7 PLC or Step 7 Programming Software documentation. This memory is read/write for module access.</td></tr>
<tr><td>DB Number</td><td>The number of the desired Data Block to access. This field is only valid if the Address Type selected is Data Blocks (DB).</td></tr>
<tr><td>Offset</td><td>The desired offset/number of the associated Address Type element. The following is a description of this field’s meaning for each address type:<table><tr><td>Input, Peripheral Input & Output</td><td>Enter the slot number of the desired I/O module.</td></tr><tr><td>Flag Bit</td><td>Enter the byte offset within the Flag Bit memory of the desired location.</td></tr><tr><td>Timers & Counters</td><td>Enter the number of the desired timer or counter.</td></tr><tr><td>Data Blocks</td><td>Enter the number of the desired data block.</td></tr></table></td></tr>
<tr><td>Bit ID</td><td>The desired bit number within the data element.</td></tr>
<tr><td>Data Type</td><td>The desired format for accessing the data. This field depends on the selected Address Type. Certain Address Types have limited access and particular Data Types will be grayed out if not applicable to the selected Address Type.</td></tr>
<tr><td>String Size</td><td>The size of the string to be accessed. Enter the exact size of the string as it is defined in the S7 PLC. This is only applicable to an Address Type of STRING.</td></tr>
</table>

Click **DONE** to close the Siemens S7 *New Tag* dialog box. Click the **SAVE** button to save the new tag configuration data.

See also Tags (page 41).

3.4 Transfer Lists

A **TRANSFER LIST** is a list of Transfers that specify what data is to be transferred between the programmable controllers.

A Transfer List contains a unique name for the Transfer List, a set of Transfers, and an *On Transfer Error* option. The *On Transfer Error* specifies how the scanner will handle a transfer. *On Transfer Error* includes the following error options:

Parameter	Description
Abort	Abort Transfer List on any Transfer error.
Continue	Abort the Transfer that generated the error, but continue Transfer List execution.
Retry (default)	Retry the Transfer that generated the error until it succeeds.

A Transfer specifies a Source and a Destination and includes a Sequence Number, Wait indicator, and a Transfer on Change indicator.

The Source specifies the Tag to read the data from or a numeric or string literal constant. The Destination specifies the Tag where the data will be transferred to. The Sequence Number determines the order of execution of the Transfers. The Wait indicator, if turned on, specifies that the Transfer List will wait for all previous transfers to complete before starting this transfer. The Transfer on Change indicator, if turned on, indicates that the transfer will occur whenever the source data changes. If the Transfer on Change option is selected, the source data has not changed since the last Transfer List execution, and the source data is less than 10 seconds old, the Transfer destination tag will not be written. This optimization can improve performance when writing to slow networks.

When specifying a string constant in the Source, the string constant must begin and end with a single quote and cannot contain a single quote or double quote as part of the string to be transferred.

3.4.1 Data Conversion During Transfers

When the data type of a Source is different from the data type of the Destination, the Source is converted to the data type of the Base Data Type Conversion Rules (page 74).

When you are transferring data from one array to another, the dimensions of the arrays must match in total number of elements. The members are all type-converted, if required, according to the Base Data Type Conversion Rules. PLC 5, SLC and MicroLogix Tags that specify Number of Elements greater than 1 are treated as array.

If the Source and Destination are Structures (UDTs), the Source and Destination structure members are matched by name. If a Source member does not exist in the Destination, the Source member is ignored. If a Destination member does not exist in the Source, the transfer is not allowed. The Base Data Type Conversion Rules apply to the matched members, so, if "PartCount" is a numeric Source member and a string Destination member, a number to string conversion is applied during the transfer. Member array dimension total element counts must match exactly.

3.4.2 Editing Transfer Lists

Transfer Lists can be created, modified, and deleted in the Configuration Editor. Select the Transfer Lists node in the Configuration Editor tree. The content pane will display a table containing all of the Transfer Lists. Click **NEW** to create a new Transfer List. Click **EDIT** to edit the selected Transfer List. Click **DELETE** to delete the selected Transfer List. You can also edit a Transfer List by double clicking on the Transfer List in the Configuration Editor tree or in the content pane.

3.4.3 Execution of Transfer Lists

The Transfers in the Transfer List are executed in the order specified by the Sequence Number. When you select a Transfer List, the toolbar buttons allow you to move the Transfers up or down in the order of execution. If you select a Transfer and then click the **NEW** button, the new Transfer will be added BEFORE the selected Transfer. If you add a new Transfer while no Transfers are selected, the new Transfer will be added to the end of the list.

3.5 Triggers

Triggers define when the data is transferred from one programmable controller to another. A Trigger contains the following attributes.

<table>
<tr><th>Parameter</th><th>Description</th></tr>
<tr><td>Name</td><td>The Name that uniquely identifies the Trigger.</td></tr>
<tr><td>Type</td><td>Specifies how the Trigger fires. This value is fixed and cannot be modified.</td></tr>
<tr><td>Scan Period</td><td>The rate at which the Trigger will be evaluated.</td></tr>
<tr><td>Condition</td><td>The Condition under which the Trigger will fire. Condition can be any of the following.
<table>
<tr><th>Parameter</th><th>Description</th></tr>
<tr><td>ALWAYS</td><td>Always fires.</td></tr>
<tr><td>NEVER</td><td>Never fires.</td></tr>
<tr><td>CHANGE</td><td>Fires on change of state.</td></tr>
<tr><td>LT</td><td>Fires when Compare Value 1 < Compare Value 2.</td></tr>
<tr><td>LTE</td><td>Fires when Compare Value 1 <= Compare Value 2.</td></tr>
<tr><td>GT</td><td>Fires when Compare Value 1 > Compare Value 2.</td></tr>
<tr><td>GTE</td><td>Fires when Compare Value 1 >= Compare Value 2.</td></tr>
<tr><td>EQ</td><td>Fires when Compare Value 1 = Compare Value 2.</td></tr>
<tr><td>NEQ</td><td>Fires when Compare Value 1 <> Compare Value 2.</td></tr>
<tr><td>BAND (Bitwise AND)</td><td>Fires when Compare Value 1 bitwise ANDed with Compare Value 2 is non zero.</td></tr>
<tr><td>ELT, ELTE, EGT, EGTE, EEQ, ENEQ, EBAND</td><td>These conditions are the same as the conditions above, except that these conditions are edge trigger conditions. They only fire once when the condition evaluates to true. The trigger will fire again once, when the condition evaluates to false and then changes again to true.</td></tr>
</table>
</td></tr>
</table>

Parameter	Description
Tolerance	Optional comparison Tolerance value (numeric constant). ▪ Ignored for ALWAYS, NEVER, CHANGE, BAND, and EBAND conditions. ▪ Used as hysteresis value for LT, LTE, GT, GTE, ELT, ELTE, EGT, and EGTE conditions. ▪ Used as range for EQ, NEQ, EEQ, and ENEQ conditions.

3.5.1 Hysteresis Example

- Compare Value 1 = Tag1
- Condition = EGT
- Compare Value 2 = 212.0
- Tolerance = 12.0
- Trigger fires once when Tag1 > 212.0.
- Trigger arms when Tag1 <= (212.0-12.0).
- Trigger fires again once when Tag1 > 212.0.

3.5.2 Range Example

- Compare Value 1 = Tag1
- Condition = EQ
- Compare Value 2 = 212.0
- Tolerance = 2.0
- Trigger fires when 210.0 <= Tag1 <= 214.0

3.5.3 Trigger Scanning

Triggers are evaluated by the scanner at the rate specified by the Scan Period attribute. If the Trigger Condition evaluates to TRUE (nonzero), the Trigger is fired and any associated Transfer Lists are executed.

If multiple Transfer Lists are specified, they are executed simultaneously. After a Trigger fires, it is disabled until all of the specified Transfer Lists are completed. It is possible for multiple Triggers to simultaneously fire a single Transfer List.

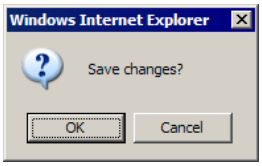
If an asynchronous Trigger attempts to fire a currently executing Transfer List, the Transfer List will be marked as pending and restarted as soon as it completes. The associated Trigger will be disabled until the pending Transfer Lists start and complete.

If an error occurs while reading the Trigger Compare Value 1, or Compare Value 2 tags, the error will be placed in the active error list, the error will be logged, and the Trigger will be disabled for a period (usually 5 seconds, to prevent excessive error logging). If or when a retry of the failed Compare Value 1 / Compare Value 2 read succeeds, the active error will be cleared, but the log entry will remain.

3.6 Saving the Configuration

When you have completed making changes to the data transfer configuration, click the **SAVE** button to save the configuration changes and load them into the scanner.

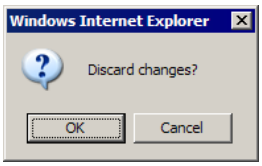
You will be prompted to confirm the save of the data transfer configuration.



3.7 Reloading the Configuration

Click the **RELOAD** button to discard changes you have made to the data transfer configuration.

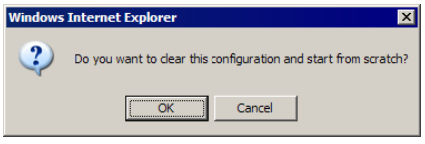
This will reload the last saved configuration. You will be prompted to confirm the reload of the data transfer configuration.



3.8 Resetting the Configuration

Click the **RESET** button to erase the entire data transfer configuration and start over.

You will be prompted to confirm the erase of the data transfer configuration.



4 Verify Communication

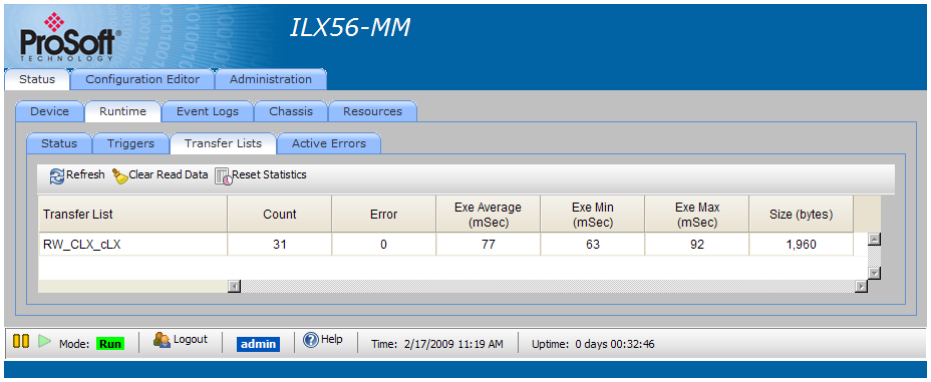
In This Chapter

There are several ways to verify that the ILX56-MM module is communicating with the processor and the network:

- View Data Transfer Viewing Data Transfer Statistics in the ILX56-MM Module (page 51)
- View Trigger Viewing Trigger Statistics in the ILX56-MM Module (page 52)
- View the tags in the Viewing Controller Tags (page 52).

4.1 Viewing Data Transfer Statistics in the ILX56-MM Module

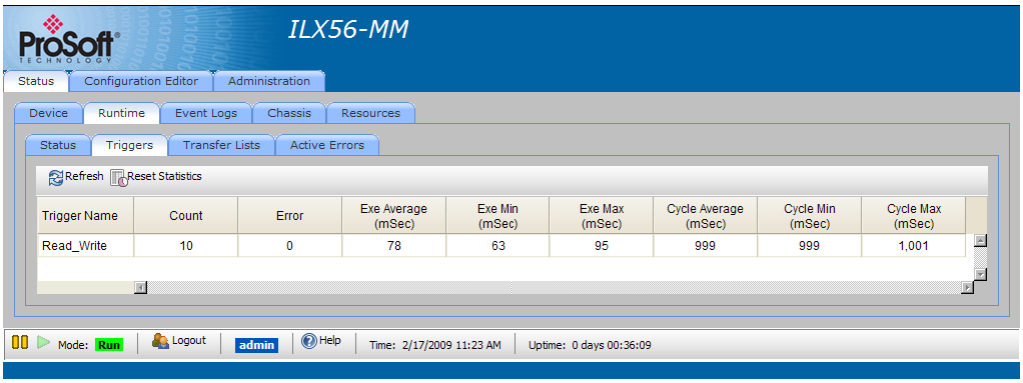
Log in to the ILX56-MM module's web page, click the **STATUS** tab, the **RUNTIME** tab, and then the **TRANSFER LISTS** tab.



If the ILX56-MM module is communicating, these values will be populated. Click the **REFRESH** button and observe that the **COUNT** field increments once per second.

4.2 Viewing Trigger Statistics in the ILX56-MM Module

Log into the ILX56-MM module's web page, click the **STATUS** tab, the **RUNTIME** tab, and then the **TRIGGERS** tab.



If the ILX56-MM module is communicating, these values will be populated. Click the **REFRESH** button and observe that the **COUNT** field increments once per second.

4.3 Viewing Controller Tags

If the ILX56-MM module is communicating successfully on the network, you should be able to see the tag values changing in the programming software for each processor.

If the data transfer is taking place correctly, you should be able to locate and monitor the tags, data files, or memory addresses in the processor that correspond to the tags you configured in the ILX56-MM.

5 Diagnostics and Troubleshooting

In This Chapter

5.1 Cannot Log in

There are times when you will be unable to log in to the module. This occurs when another user is logged in to the module or when you are logged in to the module from another browser. You must wait until the other user logs out before you can log in to the module.

When you close the browser, the Configuration Tool will automatically log you out. However, if the browser crashes or locks up, it will be unable to automatically log you out. In this scenario, a 10-minute timer keeps the user logged in. After the 10-minute period elapses, the user login will be released and you can log in again. If your browser crashes or locks up, you can immediately release the local login by starting the Configuration Tool with the following URL:

```
http://xx.xx.xx.xx/index.php?resetLocalLogin
```

(replace the xx.xx.xx.xx with your local IP or DNS name)

If a user is logged in to the module and leaves the Configuration Tool active, no other users will be able to log in. This can become an issue if the user leaves the workplace with the Configuration Tool in this state. To work around this issue, try one of the following suggestions.

1. Reboot the module
2. Disconnect the cables from the Ethernet port(s) and wait for 10 minutes. After that period, the logged in user will be released.

See also Security (page 26).

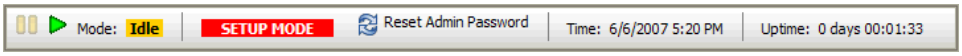
5.2 Setup Mode

Setup Mode temporarily sets the module's network port settings to their default values. Setup Mode also allows you to reset the default **ADMIN** password.

To go into Setup Mode, you must remove the module from the ControlLogix rack. Install the Setup Mode jumper on the back of the Setup Jumper (page 12). Then plug the module back into the ControlLogix rack. The module is now in Setup Mode until you remove the Setup Mode jumper.

When in Setup Mode, the module's network port settings are temporarily set to their default values. Port 1 is set to a static IP address of 192.168.1.254. Port 2 is set up to get its IP from a DHCP server.

When you start the configuration tool while the module is in Setup Mode, a red SETUP MODE indicator is displayed on the status bar at the bottom of the page.



User login is disabled in this mode and all Administrator functions are available to the user.

To reset the default "admin" password, click the **RESET ADMIN PASSWORD** button on the status bar. This action restores the default admin user and password, and assigns Administrator privilege.

To reset the network port settings, go to the Network Settings (page 19).

When you have finished resetting the network port settings and/or the default admin password,

1. Close your web browser.
2. Remove the module from the ControlLogix rack.
3. Remove the Setup Mode jumper.
4. Reinstall the module in the ControlLogix rack.

5.3 Status

To view Status information for the module, click the **STATUS** tab. Status information can be viewed without logging in to the module.

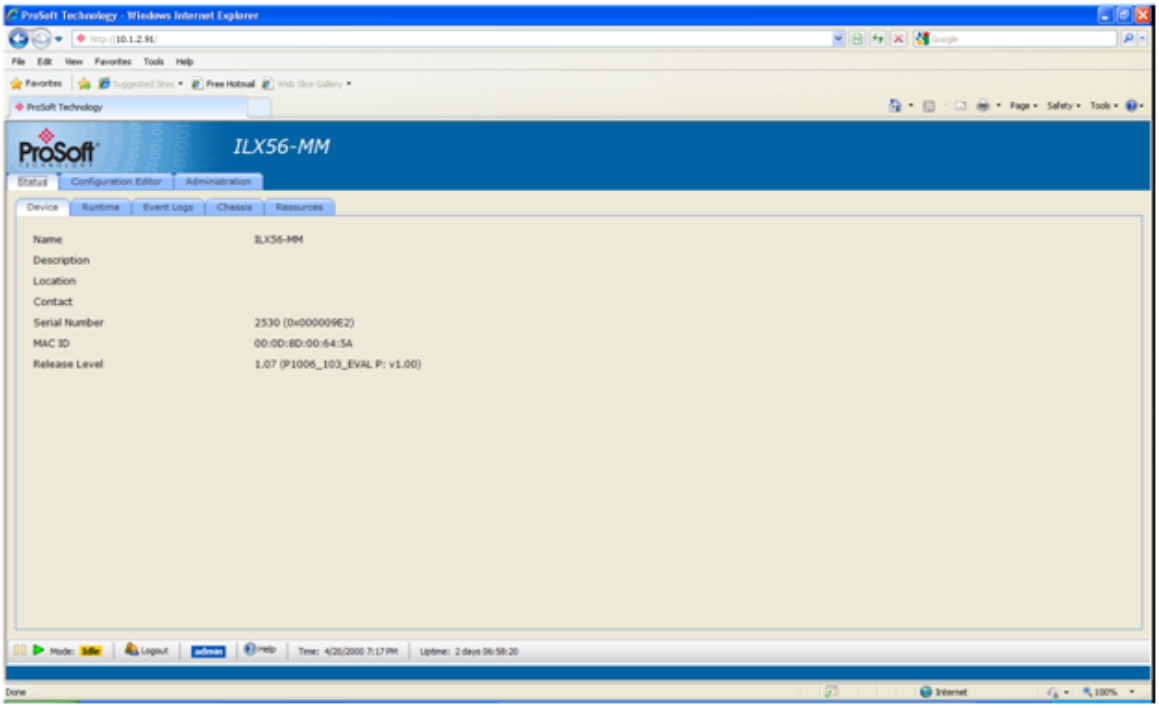
See also Device Status (page 55), Runtime Status (page 56), Event Logs (page 64), Chassis Status (page 65), and Resource Status (page 66).

5.3.1 Device Status

To open the **DEVICE STATUS** page, click the **STATUS** tab, and then click the **DEVICE** tab. The Device Status page allows you to view the current device information. The device information includes the following.

Parameter	Description
Name	Name of the module.
Description	Description of the module.
Location	Location of the module.
Contact	The person responsible for the module.
Serial Number	The serial number of the module.
MAC ID	The MAC ID of the module.
Release Level	The release level of the module.

The device information can be modified on the Administration/Device page.



See also Status (page 54).

5.3.2 Runtime Status

To view *Runtime Status* information for the module, click the **STATUS** tab, then click the **RUNTIME** tab.

The **DOWNLOAD CROSS REFERENCE** button will generate an Excel cross reference report of all of the active tags, triggers, and transfer lists being used in the configuration.

The file generated will be an XLS file (Excel 2000-2003). If you attempt to open this file with Excel 2007 you will receive an alert telling you the *file is of a different format*. If this occurs, click **YES** to *Do you want to open this file*?

The *Runtime Interfaces Status* page contains a table that shows all of the Interfaces that are defined in the scanner along with information about each Interface. The information about each Interface is included the following topics.

Runtime General Status

To open the *Runtime General Status* page, click the **STATUS** tab, and then click the **RUNTIME** tab, then click the **STATUS** tab.

The *Runtime General Status* page will show you the current scanner mode, the time that the scanner has been in the current mode, the number of errors active in the scanner, and the number of errors logged by the scanner.

To update the status while viewing the *Runtime General Status* page, click the **REFRESH** button.

See also Status (page 54), and Runtime Status (page 56).

Runtime Interface Status

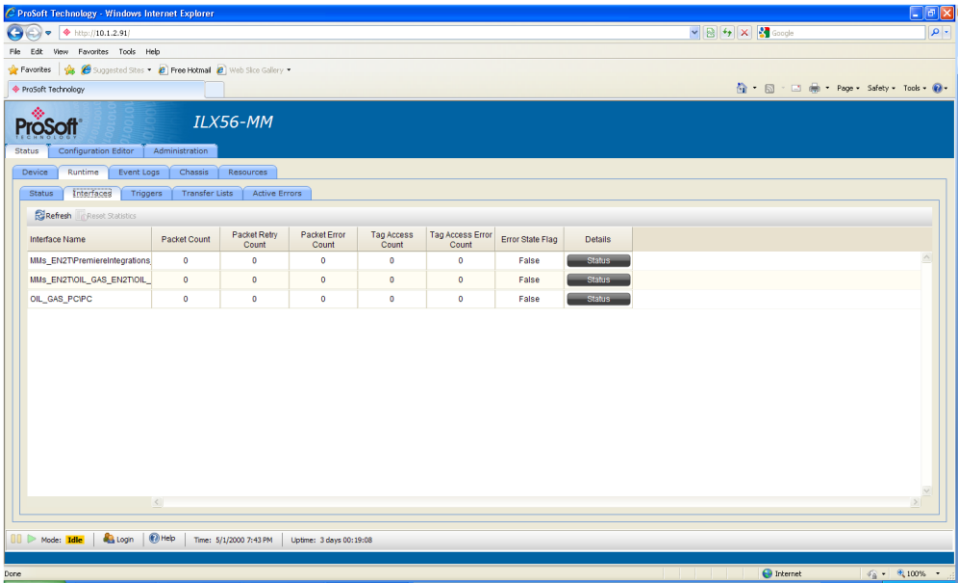
To open the *Runtime Interface Status* page, click the **STATUS** tab, then click the **RUNTIME** tab, then click the **INTERFACE** tab.

The *Runtime Interface Status* page contains a table that shows all of the Interfaces that are defined in the scanner along with information about each Interface. The information about each Interface includes the following.

Parameter	Description
Count	Indicates the number of times the Interface has fired.
Packet Retry Count	Indicates the number of times a packet send was re-sent to the controller.
Packet Error Count	Indicates the number of times an error occurred sending a packet to the controller.
Tag Access Count	the total number of times that the tags in the controller have been accessed (read or write).
Tag Access Error Count	The total number of errors that have occurred in while reading or writing tags in the controller.
Error State Flag	the current error number occurring in the driver or device. This gets cleared when their is no error.
Details	A string that describes the last error that occurred in the driver or device. This does NOT get cleared when the error goes away.

To update the status while viewing the *Runtime Interface Status* page, click the **REFRESH** button.

To reset all of the runtime statistics while viewing the *Runtime Interface Status* page, click the **RESET STATISTICS** button.



Runtime Triggers Status

To open the *Runtime Triggers Status* page, click the **STATUS** tab, then click the **RUNTIME** tab, then click the **TRIGGERS** tab.

The *Runtime Triggers Status* page contains a table that shows all of the Triggers that are defined in the scanner along with information about each Trigger. The information about each Trigger includes the following.

Parameter	Description
Count	Indicates the number of times the Trigger has fired.
Error	Indicates the number of Trigger evaluation I/O errors.

Execution (Exe) Statistics are recorded only when the trigger fires. This is the time from Trigger Condition evaluation start to when the last triggered transfer list is complete.

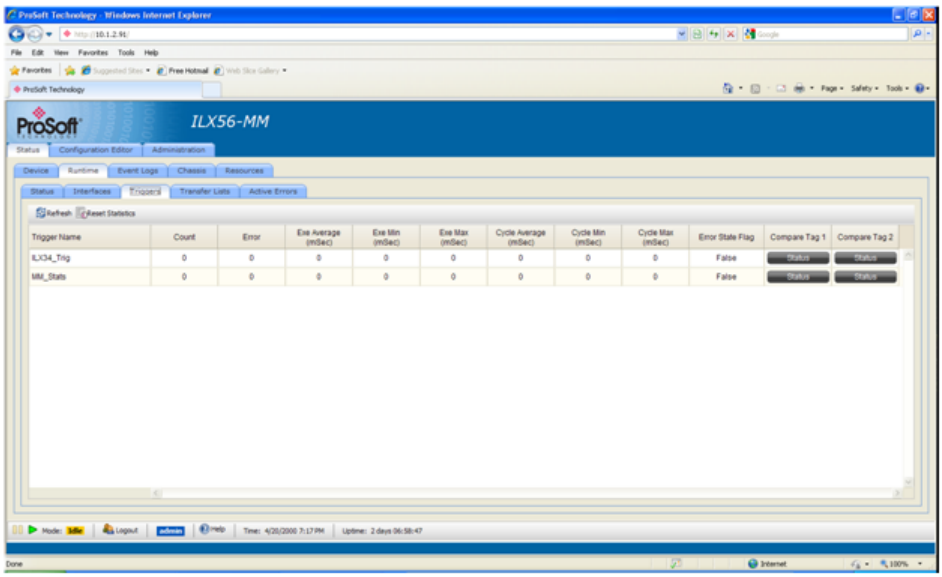
Parameter	Description
Exe Average	Average in milliseconds of the last 16 Trigger execution times.
Exe Min	Minimum Trigger execution time in milliseconds.
Exe Max	Maximum Trigger execution time in milliseconds.

Cycle statistics monitor the time between trigger condition evaluations. If the trigger condition evaluation does not fire the trigger, the Cycle Time should be close to the Trigger Poll Period. If the trigger fires, the Cycle Time may increase because Trigger Condition evaluation is disabled during transfer list execution.

Parameter	Description
Cycle Average	Average in milliseconds of the last 16 Trigger cycle times.
Cycle Min	Minimum Trigger cycle time in milliseconds.
Cycle Max	Maximum Trigger cycle time in milliseconds.
Error State Flag	This is set on the first encountered error and cleared on the next successful Transfer List completion.
Compare Tag 1	Provides detailed status information such as Error Count, Recent Error, and Error History.
Compare Tag 2	Provides detailed status information such as Error Count, Recent Error, and Error History.

To update the status while viewing the *Runtime Triggers Status* page, click the **REFRESH** button.

To reset all of the runtime statistics while viewing the *Runtime Trigger Status* page, click the **RESET STATISTICS** button.



See also Status (page 54), and Runtime Status (page 56).

Runtime Transfer Lists Status

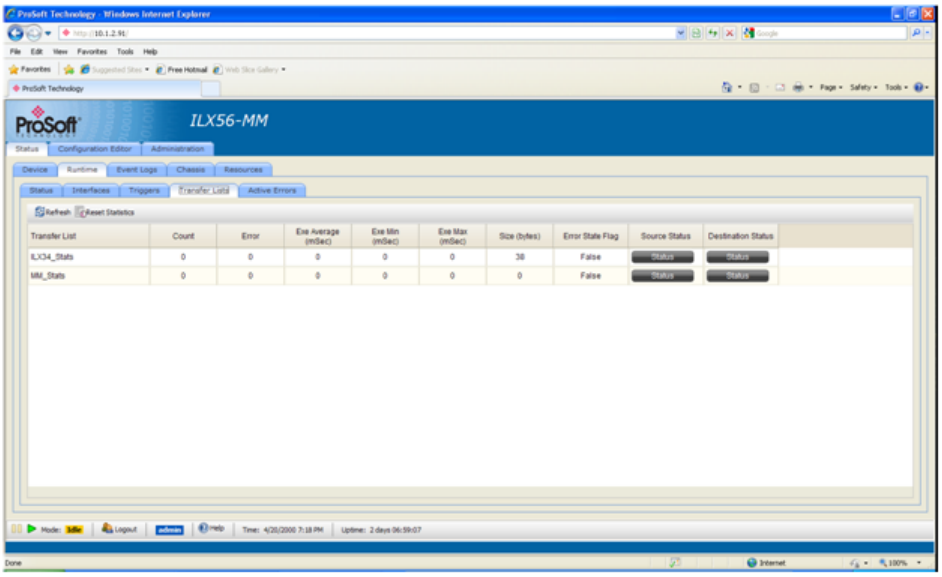
To open the *Runtime Transfer Lists Status* page, click the **STATUS** tab, then click the **RUNTIME** tab, then click the **TRANSFER LISTS** tab.

The *Runtime Transfer Lists Status* page contains a table that shows all of the Transfer Lists that are defined in the scanner, along with information about each Transfer List. The information about each Transfer List includes the following.

Parameter	Description
Count	Indicates the number of times the Transfer List has completed.
Error	Indicates the number of Transfer List I/O errors.
Exe Average	Average in milliseconds of the last 16 Transfer List execution times.
Exe Min	Minimum Transfer List execution time in milliseconds.
Exe Max	Maximum Transfer List execution time in milliseconds.
Size	The size of the transfer in bytes.
Error State Flag	This is set on the first encountered error and cleared on the next successful Transfer List completion.
Source Status	Provides detailed status information such as Current Error, Recent Error, Error History.
Destination Server	Provides detailed status information such as Current Error, Recent Error, Error History.

To update the status while viewing the *Runtime Transfer Lists Status* page, click the **REFRESH** button.

To reset all of the runtime statistics while viewing the *Runtime Transfer Lists Status* page, click the **RESET STATISTICS** button.



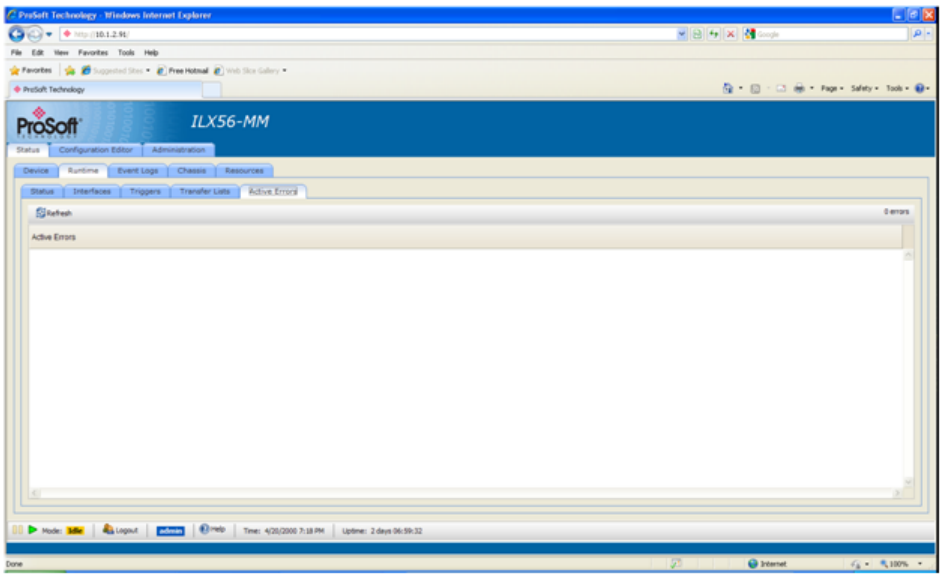
See also Status (page 54), and Runtime Status (page 56).

Runtime Active Errors Status

To open the *Runtime Active Errors Status* page, click the **STATUS** tab, then click the **RUNTIME** tab, then click the **ACTIVE ERRORS** tab.

The *Runtime Active Errors Status* page contains a table that shows all of the errors that are currently active in the scanner.

To update the status while viewing the *Runtime Active Errors Status* page, click the **REFRESH** button.



See also Status (page 54), and Runtime Status (page 56).

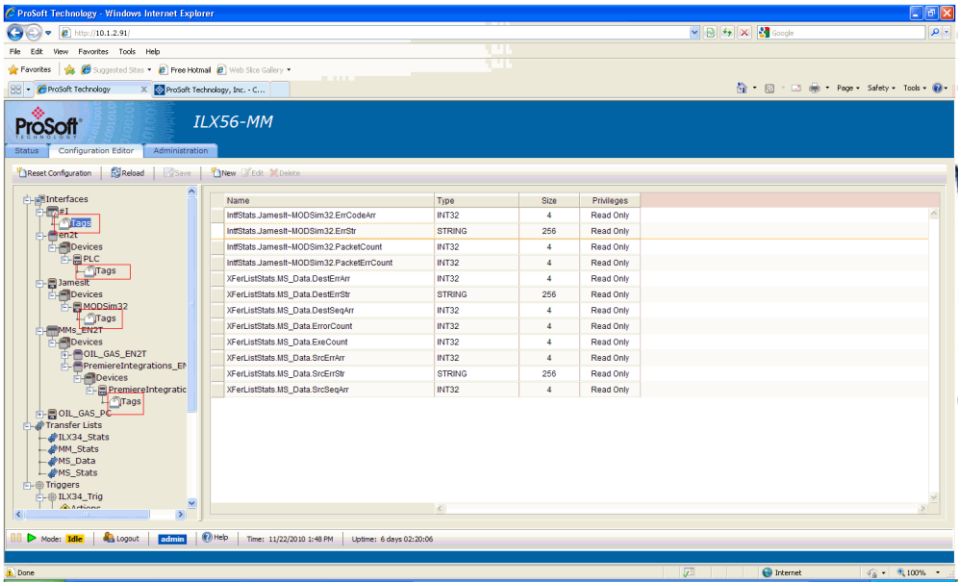
Tranferring Diagnostic Information from MM to Network Interface Devices

Internal Tags (#I) provide runtime status data. Every user defined Trigger, Transfer List, Interface, and Device will have predefined internal Interface status tags. The statistics will be available in data structures which may be transferred to a suitable UDT in a single transfer. The statistics will also be available as individual values for transfer to controllers that do not support UDTs.

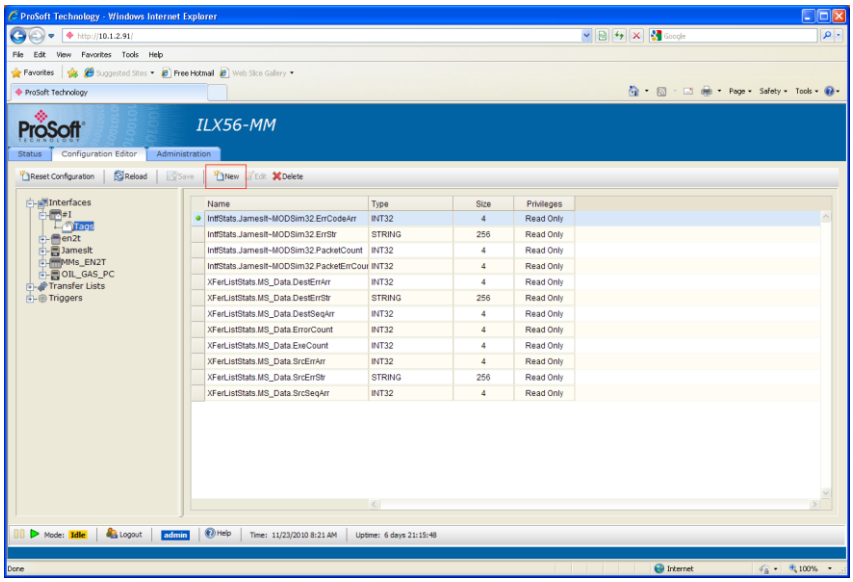
You can use the *New Tag* dialog box for Internal Tags, ControlLogix, CompactLogix and FlexLogix to add references of tags to the module's configuration.

To open the New Tag dialog box:

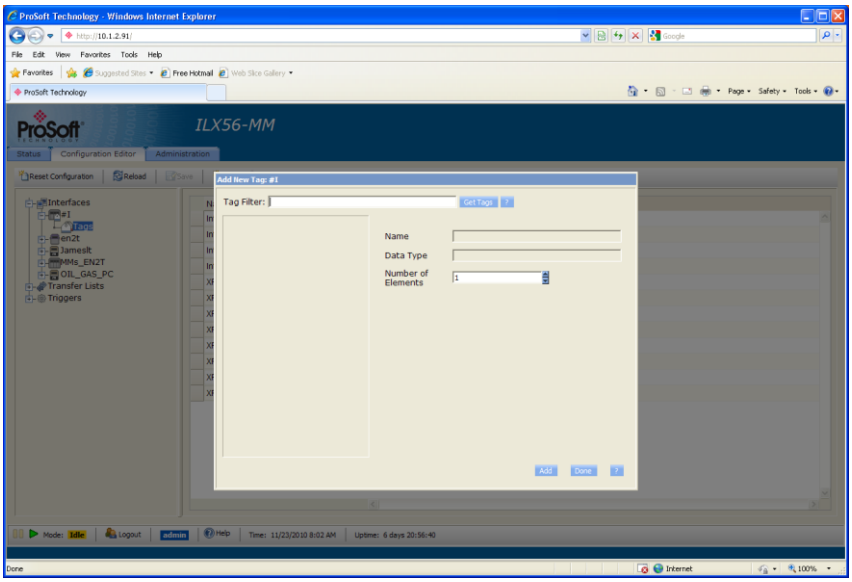
1 Select the Tags node under the desired Interface in the *Configuration Editor* tree.



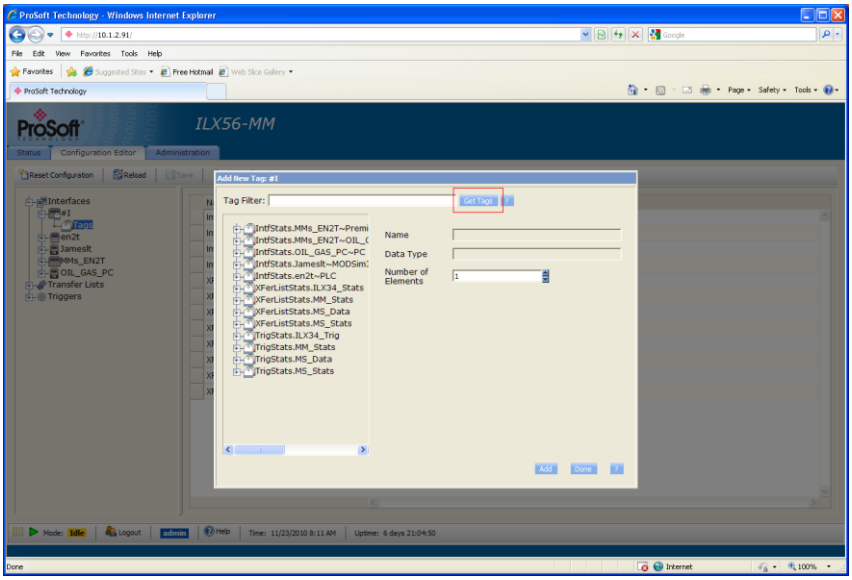
2 Press the **NEW** button on the toolbar.



3 When the dialog box first comes up, no Tags are displayed in the Tag tree. At the top of the dialog box is an edit box named *Tag Filter*. Enter a filter for the Tags.

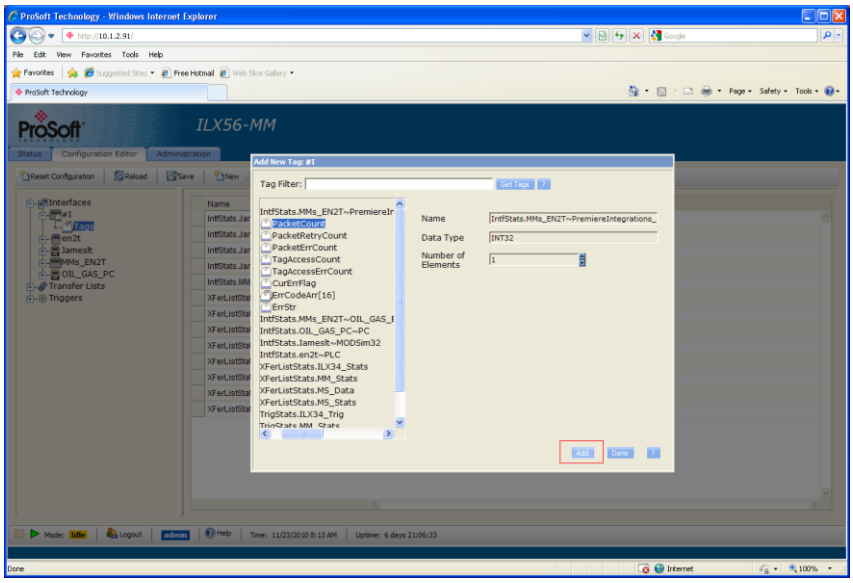


4 Press the **GET TAGS** button.

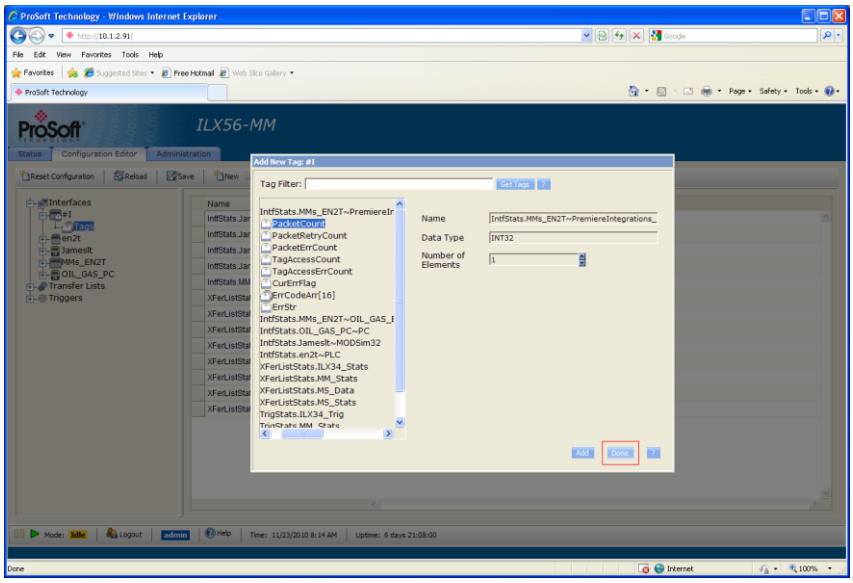


5 All Tags that match the specified filter will be loaded into the tag tree. Or, to get all Tags, leave the Tag Filter empty and press the **GET TAGS** button. After the Tags which match the filter are loaded into the Tag tree, select a Tag. The Name, Data Type, and Number of Elements associated with the Tag are displayed on the right hand side of the *New Tag* dialog box. You cannot modify any of the Tag values.

6 Press the **ADD** button to add the Tag reference to the module's configuration. You can also double click on a Tag to directly add the tag reference to the module's configuration without pressing the **ADD** button.



7 Press the **DONE** button to close the *New Tag* dialog box.



5.3.3 Event Logs

The Event Logs page shows you recent events that have been logged by the scanner. To open the Event Logs page, click the **STATUS** tab, then click the **EVENT LOGS** tab.

The Event Log will display events that have been logged starting with the most recent event. Each event has level associated with it. A level of "1" means the event is an error, while levels 2" through "4" are information events of decreasing importance. The scanner will log events based on the Log Level set on the Administration/System page. A level of 0 is reserved for internal system errors. The module will not run with a level 0 error posted.

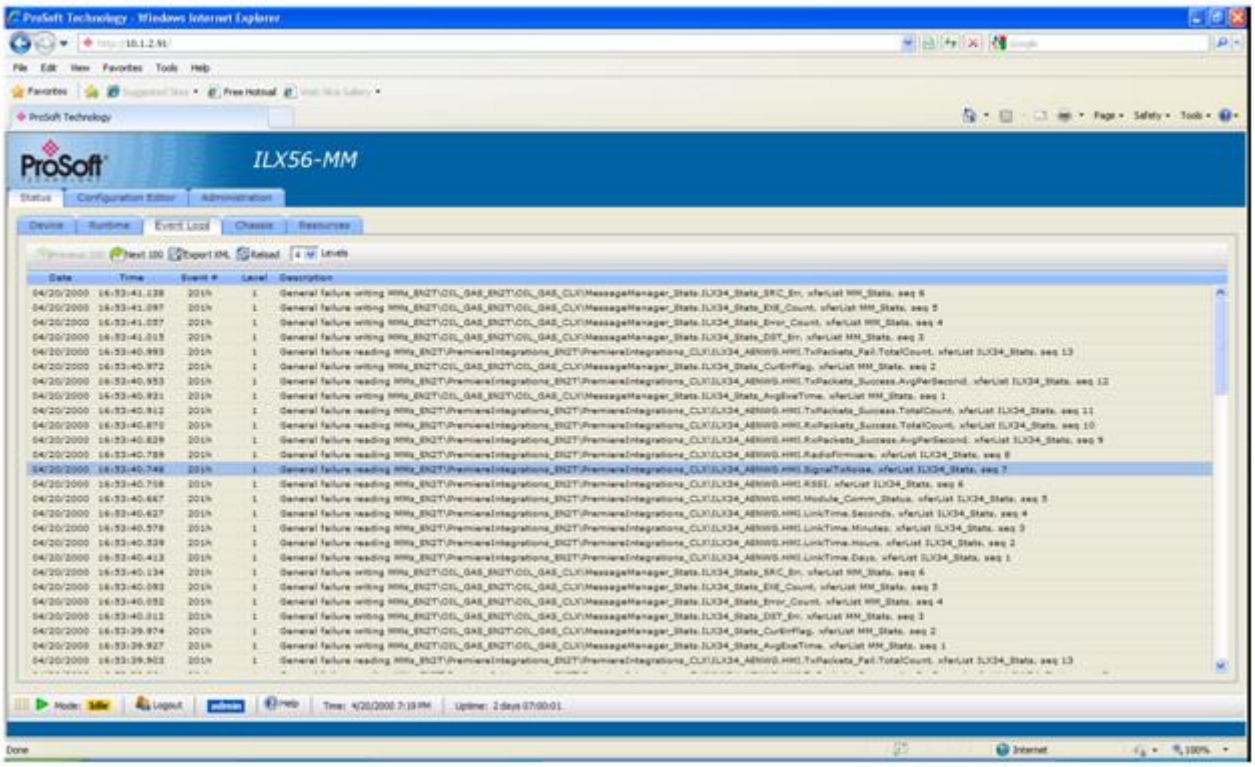
The Event Log will display the most recent 100 of these events. To display the next 100 events, click the **NEXT 100** button. You can continue pressing the **NEXT 100** button until you have reached the last set of events. After pressing the Next 100 button, you can view the previous set of 100 events by pressing the **PREVIOUS 100** button.

To retrieve the latest event logs, click the Reload button.

You can filter which events are displayed by setting the **LEVEL.** When the *Level* is set, only events of the specified level or lower are displayed. The **LEVEL** can never be set greater than the Log Level at which the scanner is recording events.

You can export the ordered list of events to an XML file by pressing the **EXPORT XML** button.

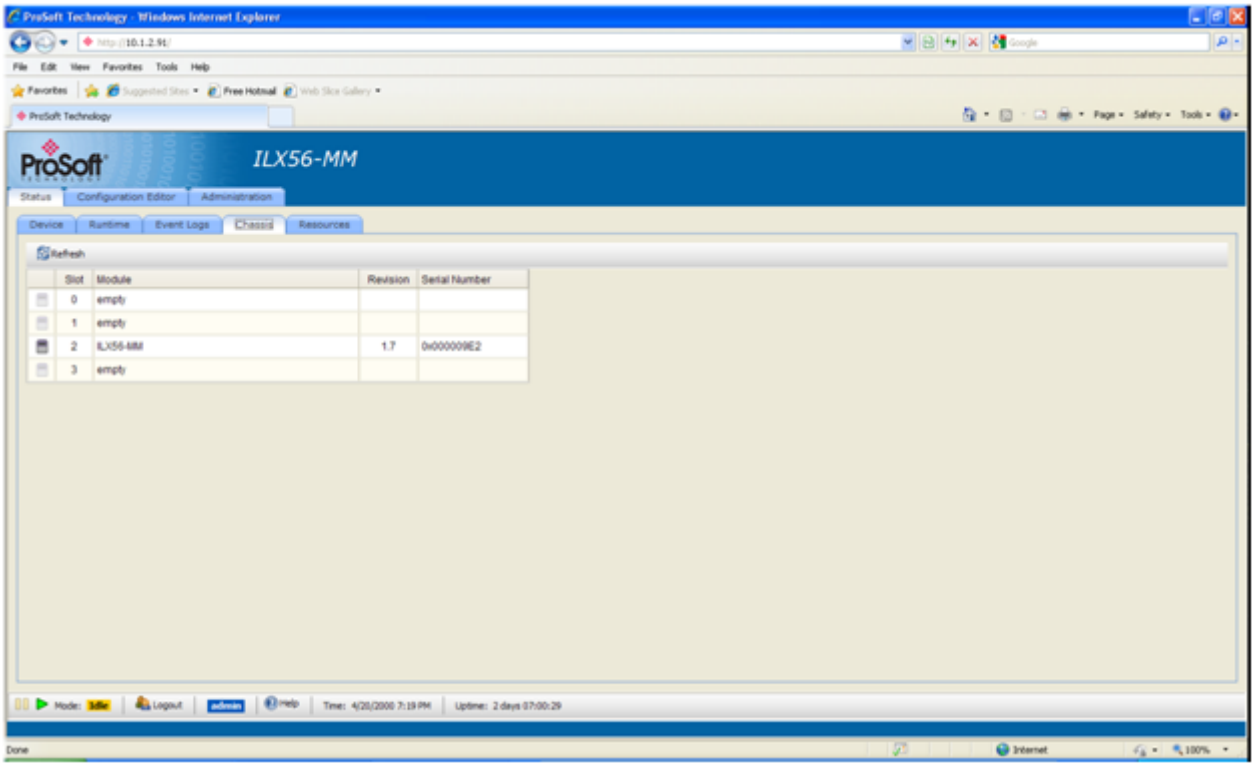
When examining the Event Log, if you switch to another page and then switch back to the Event Log, the Event Log will continue to display the events that were loaded when the Event Log was first opened. This will allow you to examine the Event Log while switching back and forth between pages without having the log reloaded.



See also Status (page 54).

5.3.4 Chassis Status

The **CHASSIS STATUS** page shows you what modules are currently installed in the local ControlLogix rack. To open the Chassis Status page, click the **STATUS** tab, then click the **CHASSIS** tab.



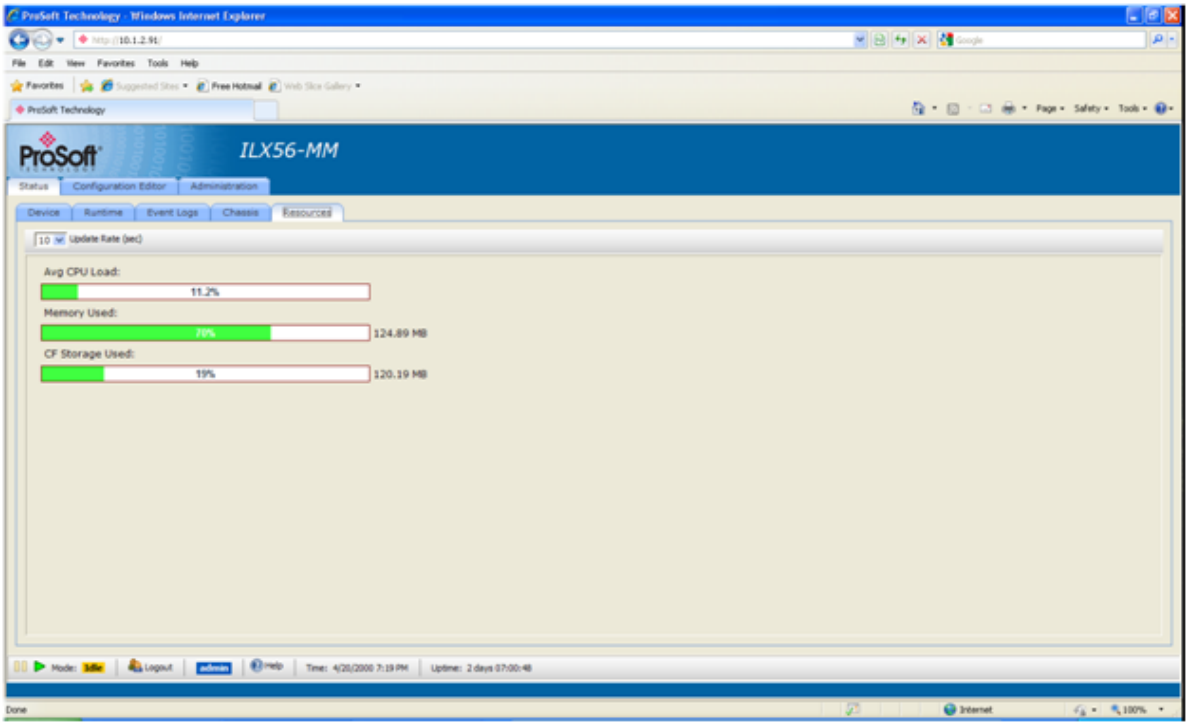
See also Status (page 54).

5.3.5 Resource Status

The **RESOURCE STATUS** page shows you the current resource usage on the module. To open the Resource Status page, click the **STATUS** tab, then click the **RESOURCE** tab.

The Resource Status usage includes the Average (Avg) CPU Load, the Memory Used, and the Compact Flash Storage Used.

The **UPDATE RATE** specifies the time in seconds at which the Resource Status is updated. You may select an update rate of 5, 10, 15 or 20 seconds.



See also Status (page 54).

6 Reference

In This Chapter

6.1 Product Specifications

The ILX56-MM ("Message Manager for Industrial Communication") allows Rockwell Automation ControlLogix I/O compatible processors to interface easily with other MM protocol compatible devices.

6.1.1 Functional Overview

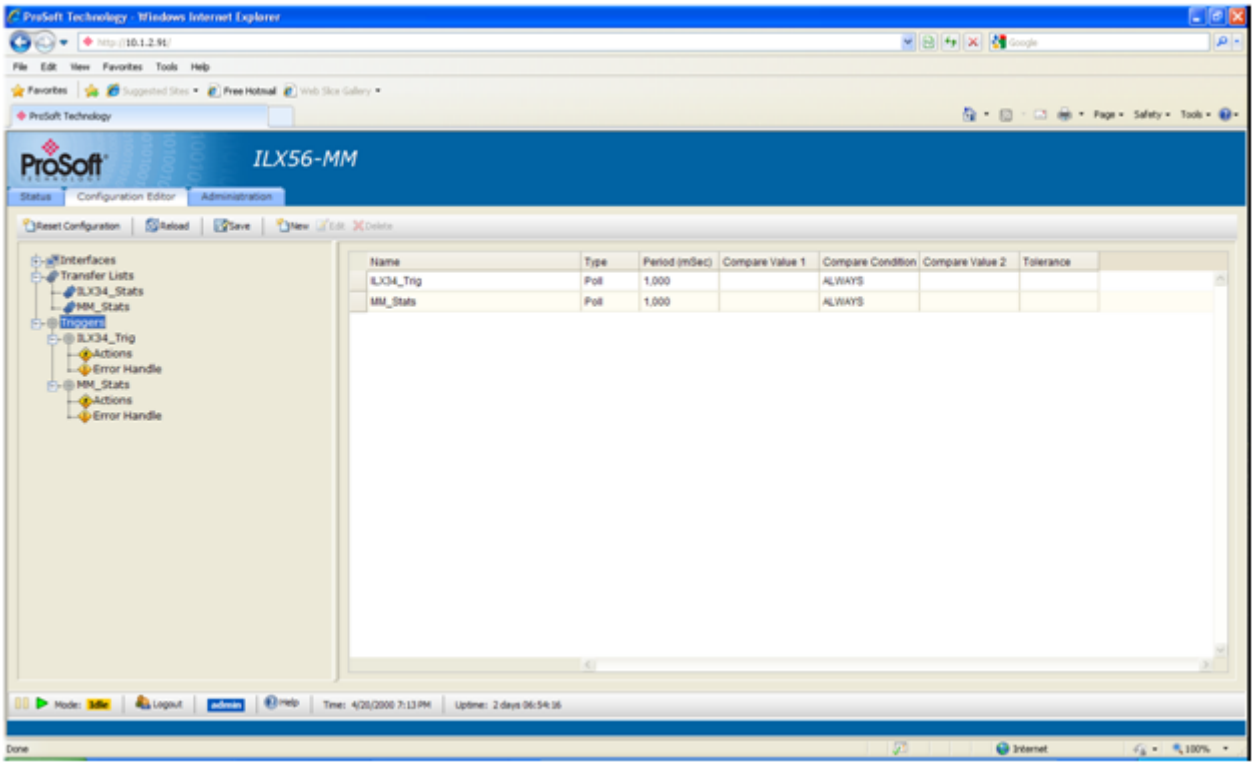
The primary means of transmitting data transfer messages between diverse systems is through the two Ethernet ports on the module. All data transferred to and from Siemens or Schneider Electric systems must be done via one of these Ethernet ports. Data may also be transferred between different RA systems using the EtherNet/IP protocol common among RA processors.

The ILX56-MM can transfer data directly across the backplane to and from a ControlLogix PAC installed in the same chassis. This ability to communicate across the ControlLogix backplane means that the ILX56-MM can also take advantage of the "bridging" capability of certain RA communications modules and protocols.

6.1.2 Triggers

Triggers allow you to control message execution in the ILX56-MM by linking to a logical event or the change of value of a monitored tag or tags. A Trigger may be linked to one or more Transfer Lists. When the trigger conditions are true, the associated Transfer List or Lists will execute the configured data transfer commands.

Triggers allows end-users a measure of logic control over message execution. If existing process variable tags or existing conditional tags are used as trigger tags, normal process execution will trigger message transfers with no additional control logic needed. There are two types of triggers consisting of ILX34_Trig, and MM_Stats. Both types include Actions and Error Handle as seen in the following screen.



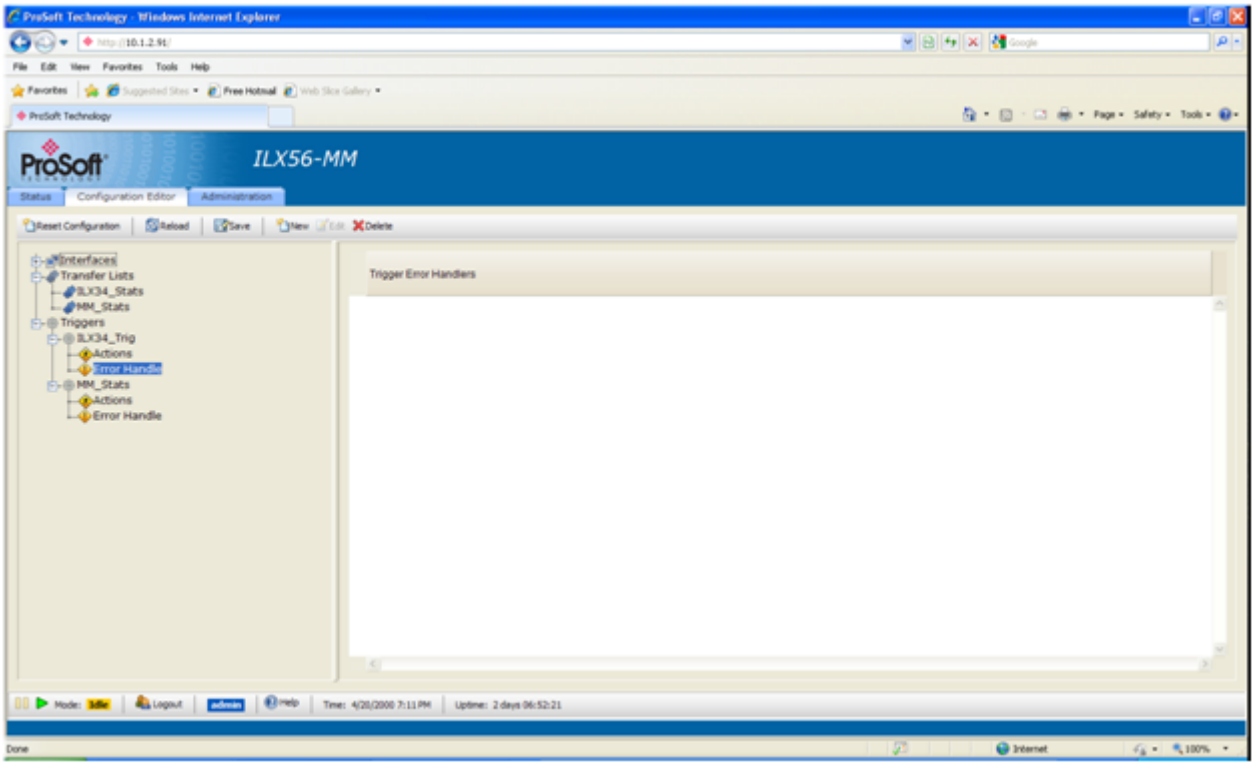
NOTE: You must be logged on as a user with Project privilege to modify the module's data transfer configuration.

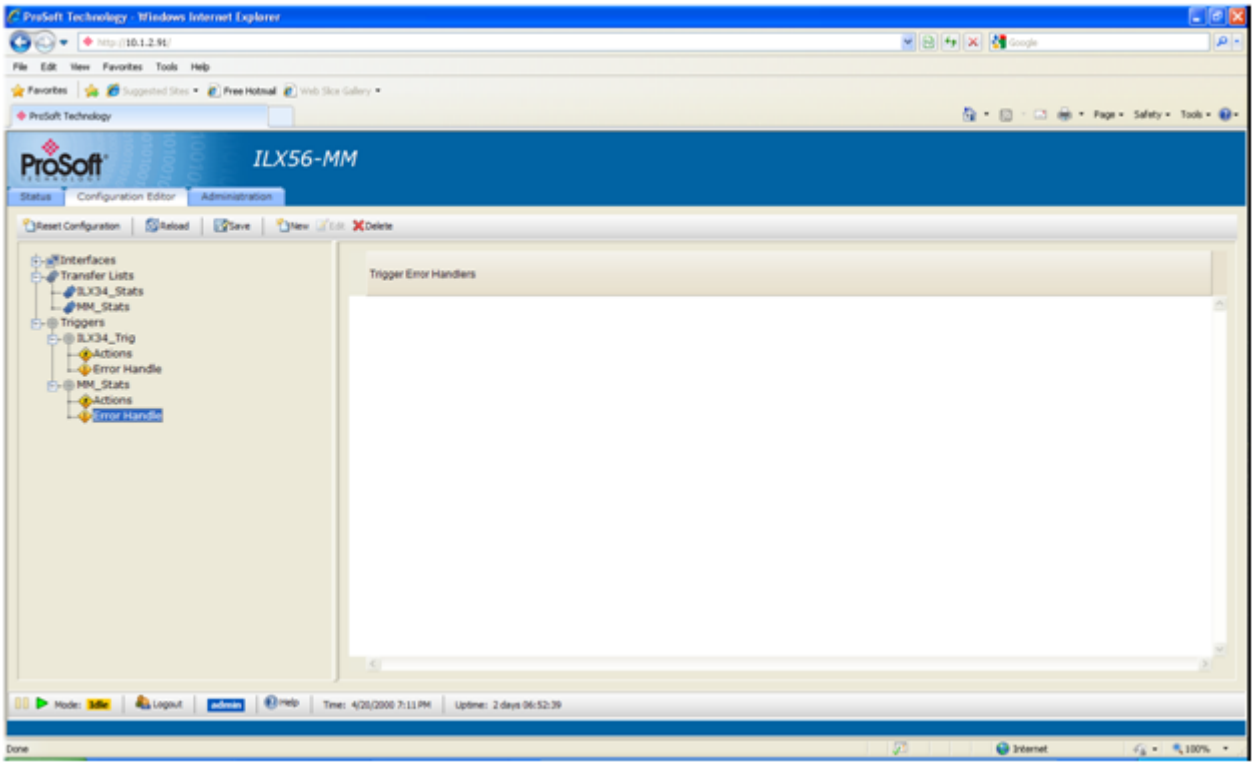
Actions

Actions specify an optional Transfer List to execute when the Trigger is fired.

Error Handle ILX56-MM

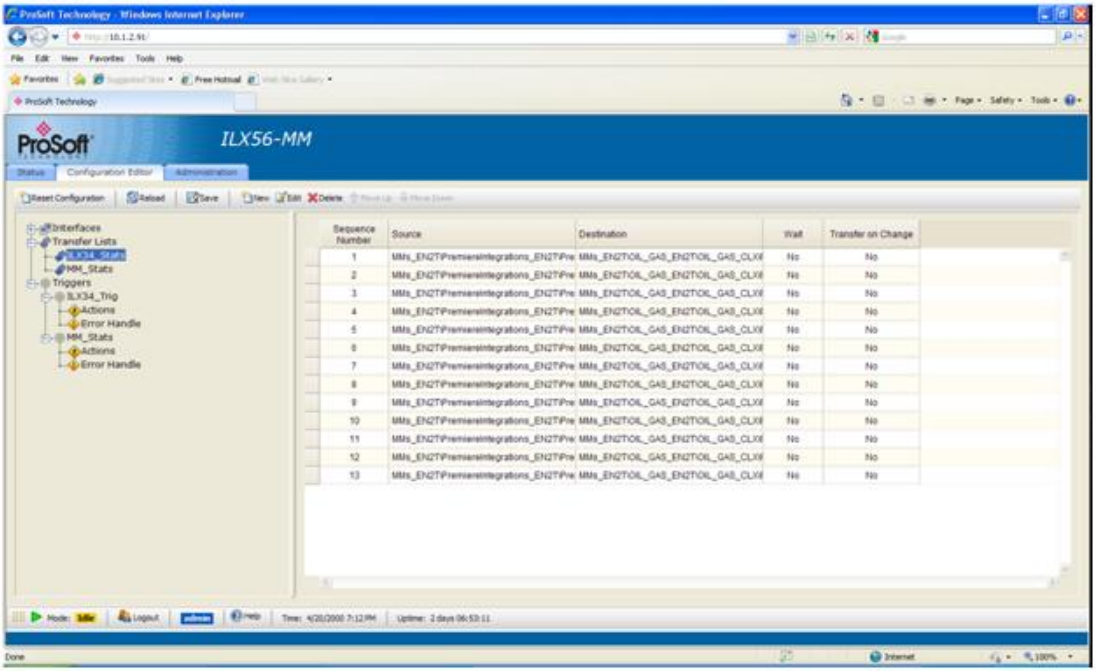
Error Handle specifies an optional Transfer List to execute when the Trigger enters and exits the Error State. The Trigger Error State will be initiated by any contained Tag Access or transfer failure. The Error State will be cleared on a successful trigger completion. The specified Error Handle Transfer List can also be executed with a separate Periodic Trigger to refresh the data if desired/required.

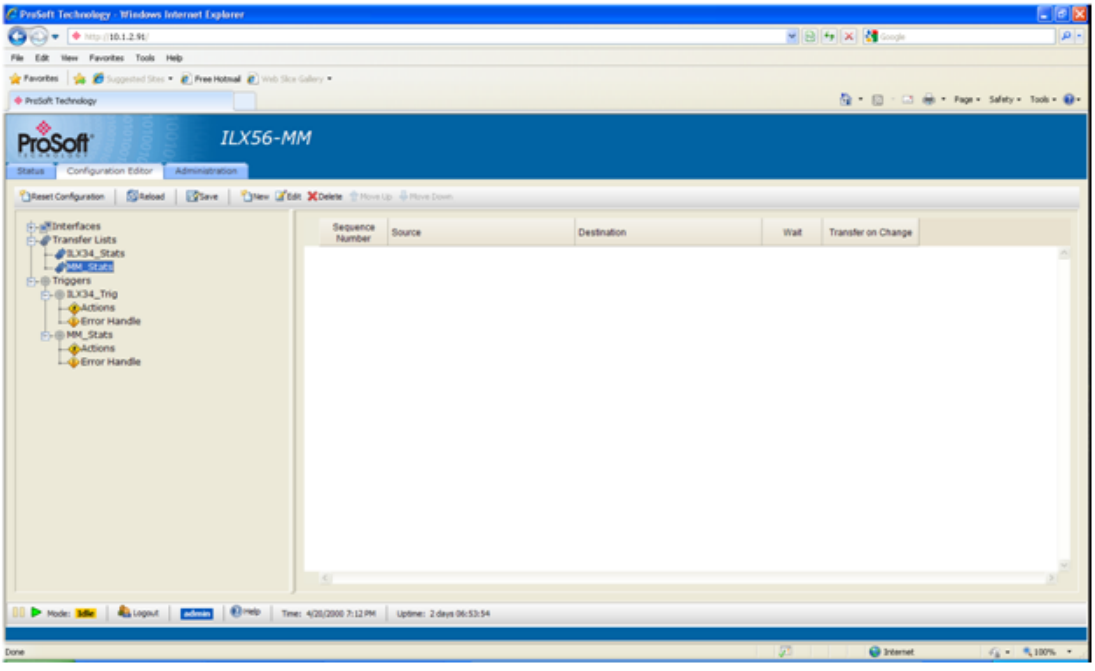

ProSoft Technology - Windows Internet Explorer
ProSoft
ILX56-MM
Status
Configuration Editor
Administration
Reset Configuration
Reload
Save
New
Delete
Interfaces
Transfer Lists
ILX34_Stats
MM_Stats
Triggers
ILX34_Trig
Actions
Error Handle
MM_Stats
Actions
Error Handle
Trigger Error Handlers
Logout
admin
Help


ProSoft Technology - Windows Internet Explorer
ProSoft
ILX56-MM
Status
Configuration Editor
Administration
Reset Configuration
Reload
Save
New
Delete
Interfaces
Transfer Lists
ILX34_Stats
MM_Stats
Triggers
ILX34_Trig
Actions
Error Handle
MM_Stats
Actions
Error Handle
Trigger Error Handlers
Logout
admin
Help

6.1.3 Transfer Lists

A Transfer List will contain one or more message commands. Each command in the list will specify all the information needed to complete one data transfer transaction, in much the same way as a MSG instruction in RA ladder logic would contain all the information for one message. Multiple Transfer Lists may be created to help you better organize your communications tasks by allowing related messages to be grouped together. This also allows groups of messages to be controlled by changes of data tag values, called *Triggers* or *trigger events*.





6.1.4 Data Transfer

Data transfer messages are created and controlled in the ILX56-MM using Transfer Lists and Triggers. Transfer Lists determine what values are to be transferred through the Message Manager between programmable controllers on the various networks. For the most part, this messaging happens automatically, based on the message configurations contained in the Transfer Lists.

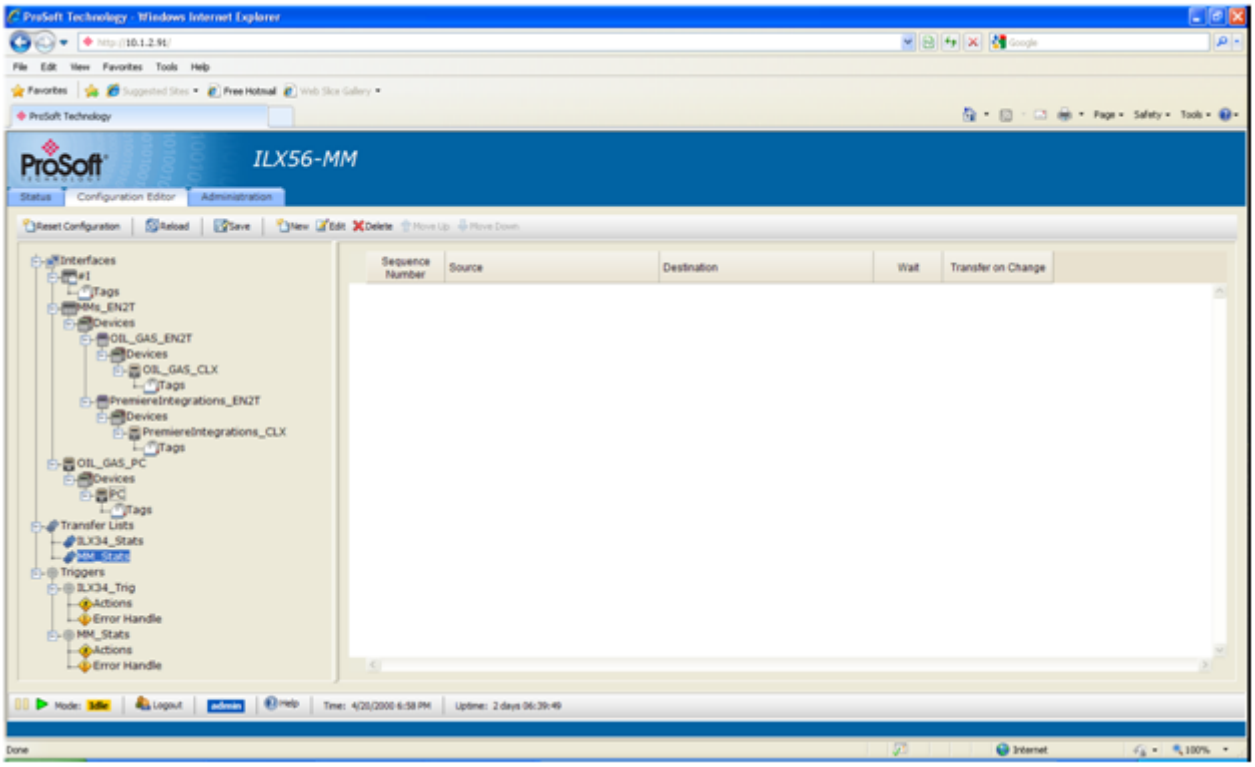
The Message Manager transfers data to and from ControlLogix PACs by using their Controller Tag database. Controller Tags are individual data objects or object arrays in the ControlLogix processor memory database. Tags must be created in the RSLogix5000 project and downloaded to the ControlLogix PAC before they may be used in a Message Manager Transfer List.

6.1.5 Bridging

Bridging refers to the ability of some processors and communications modules to directly pass data transfer messages from one network protocol to devices on a different network using a different network protocol and return the requested data from the responding device back the requesting device. Bridges supported by the Message Manager include the 1756 EtherNet/IP bridges, the 1756 ControlNet bridges, the 1756 DH485 bridge, and the 1756 DHRIO bridge.

6.1.6 Configuration Editor

A web browser-based Configuration Editor allows you to easily connect to and configure the module. Just enter the IP or DNS name of the module in the browser address box to bring up the configuration web pages.



6.2 Tag Filters

Character	Filter Meaning
0 to 9, a to z, A to Z, :, /, _	The character in the tag name or user defined type member name must match the character exactly. **Example:** ab_c will match only a tag named ab_c.
?	Any single character in the tag name or user defined type member name will match this character. **Example:** ab?de will match any tags that start with ab, followed by a single character, followed by de. abcde and abbde would both match this filter. abccde would not match this filter.
*	Any number of characters in the tag name or user defined type member name will match this character. **Examples:** *.* will match any tags that are tags of user defined type or any tags that contain a '.' in the tag name. abc* will match any tags that start with abc. **Note:** The '*' wildcard is only matched within a tag name or user defined type member name. Thus, abc*abc will only match tags that begin with abc and end with abc. abc*abc will not match tags that start with abc and have a structure member that ends with abc.
.	A character in the tag name must match the '." character exactly, or the tag must be of user defined type and the following characters must be found in a member of the user defined type. **Examples:** Program:MainProgram.myTag will only match a tag in the Logix MainProgram named myTag. myStruct.abc will only match the member named abc of the tag named myStruct of user defined type. **Note:** If a '." character begins the Tag Filter or '." characters are adjacent to each other or directly adjacent to an array index, the '.' are assumed to be separated by wildcard searches. **Examples:** .abc* will match any tag of user defined type that has a member that begins with the characters abc or any tag with a name that contains .abc. This is the equivalent of *.abc*. ..abc* will match any tag of user defined type that has a member of user defined type that has a member that begins with abc or any tag of user defined type whose name contains a '.' and has a member that begins with abc. This is the equivalent of *.*.abc*. .[ ] will match any tag of user defined type that has a member that is an array. This is the equivalent of *.*[*].
[followed by]	Indicates a selection of one or more elements from a tag that is an array. **Examples:** array1[0] will match the element 0 of the tag named array1 that is an array. array1[4-6] will match elements 4, 5, and 6 of the tag named array1 that is an array. marray1[1,2,1-3] will match elements 1, 2, and 3 where the 1st dimension is 1, and the 2nd dimension is 2 of the tag named marray1 that is a 3 dimensional array. marray1[*,1-2] will match elements 1 and 2 of all the 1st dimensions of the tag named marray1 that is a 2 dimensional array. [ ] will match any tag that is an array. This is the equivalent of [*].

6.3 Base Data Type Conversion Rules

6.3.1 Boolean

Source	Conversion
BOOL	Direct Assignment.
INT8, UINT8, CHAR, BYTE, INT16, UINT16, WORD, INT32, UINT32, DWORD, INT64, UINT64, or QWORD	If the source data value is zero, the destination data value will be set to zero. If the source data value is nonzero, the destination data value will be set to one.
FLOAT32 or FLOAT64	The source value is rounded to the nearest INT64 value and the above INT64 to BOOL conversion rule applied.
STRING	The string is converted to INT64 and moved according to the above INT64 to BOOL conversion rule. If the string could not be converted to INT64 (invalid chars, overflow, and so on), a conversion error will result

6.3.2 INT8, UINT8, CHAR, or BYTE

Source	Conversion
BOOL	The source value of zero or one is assigned to the destination.
INT8, UINT8, CHAR, or BYTE	Direct assignment. If source is unsigned (UINT8, CHAR, or BYTE) and dest is signed (INT8) a value change may result (255 to -1 for example). If source is signed and dest is unsigned a value change may result (-2 to 254 for example).
INT16, UINT16, WORD, INT32, UINT32, DWORD, INT64, UINT64, or QWORD	The most significant source data byte(s) are discarded (possible data loss). The least significant source data byte is copied to the destination.
FLOAT32 or FLOAT64	The source value is rounded to the nearest INT64 value and the above INT64 to 8 bit INT conversion rule applied. If the rounded source value will not fit in an INT64 a conversion error will result.
STRING	The string is converted to INT64 and moved according to the above INT64 to 8 bit INT conversion rule. If the string could not be converted to INT64 (invalid chars, overflow, and so on) a conversion error will result.

6.3.3 INT16, UINT16, or WORD

Source	Conversion
BOOL	The source value of zero or one is assigned to the destination.
INT8, UINT8, CHAR, or BYTE	The source data value is assigned to the destination (sign extend where appropriate).
INT16, UINT16, or WORD	The source value is copied directly to the destination possibly resulting in a signed/unsigned value change (-1 to 65535 or 65535 to -1 for example).
INT32, UINT32, DWORD, INT64, UINT64, or QWORD	The most significant source data WORD(s) are discarded (possible data loss). The least significant source data WORD is copied directly to the destination.
FLOAT32 or FLOAT64	The source value is rounded to the nearest INT64 value and the above INT64 to 16 bit INT conversion rule applied. If the rounded source value will not fit in an INT64 a conversion error will result.

Source	Conversion
STRING	The string is converted to INT64 and moved according to the above INT64 to 16 bit INT conversion rule. If the string could not be converted to INT64 (invalid chars, overflow, and so on) a conversion error will result.

6.3.4 INT32, UINT32, or DWORD

Source	Conversion
BOOL	The source value of zero or one is assigned to the destination.
INT8, UINT8, CHAR, BYTE, INT16, UINT16, or WORD	The source data value is assigned to the destination (sign extend where appropriate).
INT32, UINT32, or DWORD	The source value is copied directly to the destination possibly resulting in a signed/unsigned value change.
INT64, UINT64, or QWORD	The most significant source data DWORD(s) are discarded (possible data loss). The least significant source data DWORD is copied directly to the destination.
FLOAT32 or FLOAT64	The source value is rounded to the nearest INT64 value and the above INT64 to 32 bit INT conversion rule applied. If the rounded source value will not fit in an INT64 a conversion error will result.
STRING	The string is converted to INT64 and moved according to the above INT64 to 32 bit INT conversion rule. If the string could not be converted to INT64 (invalid chars, overflow, and so on) a conversion error will result.

6.3.5 INT64, UINT64, or QWORD

Source	Conversion
BOOL	The source value of zero or one is assigned to the destination.
INT8, UINT8, CHAR, BYTE, INT16, UINT16, WORD, INT32, UINT32, or DWORD	The source data value is assigned to the destination (sign extend where appropriate).
INT64, UINT64, or QWORD	The source value is copied directly to the destination possibly resulting in a signed/unsigned value change.
FLOAT32 or FLOAT64	The source value is rounded to the nearest INT64 value and the above INT64 to 64 bit INT conversion rule applied. If the rounded source value will not fit in an INT64 a conversion error will result.
STRING	The string is converted to INT64 and moved according to the above INT64 to 64 bit INT conversion rule. If the string could not be converted to INT64 (invalid chars, overflow, and so on) a conversion error will result.

6.3.6 Float32

Source	Conversion
BOOL	The source value of zero or one is assigned to the destination.
INT8, UINT8, CHAR, BYTE, INT16, UINT16, WORD, INT32, UINT32, DWORD, INT64, UINT64, or QWORD	The source data value is assigned to the destination possibly resulting in a loss of precision.
FLOAT32	Direct Assignment.
FLOAT64	If source val < -3.4e38 or source val > 3.4e38 a conversion overflow error will result. Otherwise, the source value will be assigned to the destination with a loss of precision.
STRING	The string (with possible exponent) is converted to FLOAT32. If the string could not be converted to a FLOAT32 (invalid chars, overflow, and so on) a conversion error will result.

6.3.7 Float64

Source	Conversion
BOOL	The source value of zero or one is assigned to the destination.
INT8, UINT8, CHAR, BYTE, INT16, UINT16, WORD, INT32, UINT32, DWORD, INT64, UINT64, or QWORD	The source data value is assigned to the destination possibly resulting in a loss of precision.
FLOAT32	The source data value is assigned to the destination.
FLOAT64	Direct assignment.
STRING	The string (with possible exponent) is converted to FLOAT64. If the string could not be converted to a FLOAT64 (invalid chars, overflow, and so on) a conversion error will result.

6.3.8 String

Source	Conversion
BOOL	The source value of zero or one is converted to ASCII and copied to the destination. If the destination string is too small, a conversion error will result.
INT8, UINT8, CHAR, BYTE, INT16, UINT16, WORD, INT32, UINT32, DWORD, INT64, UINT64, or QWORD	The source data value is converted to INT64 (according to the above INT to INT64 conversion rules), converted to ASCII, and copied to the destination. If the destination string is too small, a conversion error will result.
FLOAT32 or FLOAT64	The source data value is converted to shortest possible string (with possible exponent) and copied to the destination. If the destination string is too small, a conversion error will result.
STRING	If the source string is too long to fit in the destination string data buffer, the string will be truncated.

6.4 Errors

The module includes tools for detecting and analyzing errors and events that have occurred during the transfer of data between controllers. The Active Error List displays all errors that have occurred in the module, and have not yet been cleared. The Event Log displays the last 2000 errors and events that have occurred in the module. The errors and events in the Event Log are displayed starting with the most recent errors/events.

When an error occurs in the module, the error is logged to the event log and displayed in the Active Error List. When a warning or informational event occurs in the module, the event is logged to the Event Log.

Module errors and events are grouped in the following categories.

- Level 0 Permanent Level 0: Permanent Errors (page 77)
- Level 1 Clearable Level 1: Clearable Errors (page 77)
- Level 2 Level 2: Warnings (page 78)
- Level 3 Informational Level 3: Informational Events (page 78)
- Level 4 Verbose Informational Level 4 Verbose Informational Events (page 78)

6.4.1 Level 0: Permanent Errors

These errors are reserved for serious conditions, such as configuration load Failure or internal system errors. Permanent errors are logged in the Event Log and displayed in the Active Error List. Permanent errors will not be cleared from the Active Error List until the configuration file is reloaded or the scanner mode is changed from Stop or Idle mode to Run mode.

6.4.2 Level 1: Clearable Errors

Clearable errors are logged in the Event Log. They remain in the Active Error List for 20 seconds, until the condition that caused the error is cleared (such as a successful transfer after a retry), or until the scanner mode is changed from Stop or Idle mode to Run mode.

Clearable errors include Trigger evaluation errors, Transfer List execution errors, Time Sync source errors, and Time Sync destination errors.

- Trigger evaluation errors include data read errors, data write errors and evaluation overflow errors. If a Trigger evaluation error occurs, the Trigger will be disabled for 5 seconds and then retried during a subsequent scan of the Trigger.
- Transfer List execution errors include: data read errors, data write errors and data conversion errors. Transfer Lists can be configured with the following error handling options.

Parameter	Description
Abort	Abort Transfer List on any Transfer error.
Continue	Abort the Transfer that generated the error, but continue Transfer List execution.
Retry (default)	Retry the Transfer that generated the error until it succeeds.

Time Sync errors do not receive any special handling. The specified Time Sync source or destination will be retried during the next scheduled Time Sync period.

6.4.3 Level 2: Warnings

Events at this level are serious warnings in the scanner that should be investigated to determine their cause. These events are logged to the Event Log, but do not appear in the Active Error List. An example of a Level 2 Warning is "Configuration Server Client Connection Terminated Unexpectedly".

6.4.4 Level 3: Informational Events

Events at this level are significant events that have occurred in the scanner. These events are logged to the Event Log, but do not appear in the Active Error List. Three examples of Level 3 Informational Events are:

- "Scanner Startup/Shutdown"
- "Scanner Mode Change Requests"
- "Service Thread Start/Stop"

6.4.5 Level 4 Verbose Informational Events

Events at this level are less significant events that have occurred in the scanner. These events are logged to the Event Log, but do not appear in the Active Error List. An example of a Level 4 Verbose Informational Event is "Configuration Server Client Connection Established/Terminated Normally".

See also Event Logs (page 64), Active Errors, and Set Log Level.

6.4.6 Operation of Transfer Status

When an error occurs:

- The Error Code will be transferred to the desired destination tag selected to contain the "Transfer Error Code".
- The Error Count will be incremented and transferred to its desired destination tag.
- When the condition that caused the error is corrected, and the transfer completes successfully, an error code of zero will be transferred to the destination tag selected for the :Transfer Error Code", and the previous error code will be overwritten.
- If the condition is not cleared prior to another transfer attempt and the error reoccurs, the error code will once again be transferred and the error count will be incremented and transferred.
- If the latest error detected is different from the previous error, the new error code will overwrite the previous error code.
    - Occurrences of errors will be influenced by the selected "On Transfer Technique" for a particular transfer list.
    - If the "Retry" technique is selected, the transfer causing the error will be repeated until the transfer is successful. Subsequent transfers in the transfer list will not be executed and any errors in them will not be annunciated.
    - If the "Continue" technique is selected, then each transfer in the transfer list will be attempted and any errors will be annunciated.
    - If the "Abort" technique is selected, the transfer that generated the error will be annunciated but the remainder of the transfer list will not be executed.

Error messages have the following general format:

ErrorCodeString ContextString

Where:

- ErrorCodeString = Text string derived directly from an error code. For example, scanner error code 804h = “timeout”.
- ContextString = Context description. For example, if an error occurs while reading trigger compare tag #1:
- ContextString = “reading cmpVal 1 (TagPath), trig TrigName”, where:
- TagPath = Configuration defined device path and tag name, EnetBridge\PLC5\N7:1 for example.
- TriggerName = Configuration defined trigger name.

Error codes in the 1h-1FFh range are generic driver errors. Codes in the 201h-7FFh are driver specific errors (more than one driver may have an error 201h). Codes in the 801h-1FFFh are scanner errors. Errors not specifically listed in this document will likely require engineering intervention to determine the cause (internal error, program bug, or unexpected/rare communications error).

General Driver Errors (code followed by ErrorCodeString)

Error Code	Description
001h	General (internal) error.
002h	Unsupported functionality.
003h	Out of memory.
004h	Timeout error.
005h	Bad parameter.
006h	Access denied (probably instance not opened).
007h	Required device missing (or not responding).
008h	Aborted by user.
009h	Tag not readable. (attempt to read write-only tag)
00Ah	Tag not writable. (attempt to write read-only tag)
00Bh	Incompatible access
00Ch	Not found
00Dh	Format invalid
00Eh	Overflow
00Fh	Underflow
010h	Open (file) error
011h	Read error
012h	Write error
013h	Busy
01Dh	Bad tag name format
022h	Scanner/driver library API version mismatch
024h	Tag data conversion error

CONTROLOGIX Backplane/CONTROLLOGIX EtherNet/IP Driver Errors

Error Code	Description
201h	General (unrecognized) BP error
202h	BP bad parameter
203h	BP reopen error
204h	BP no device error (target device missing)
205h	BP invalid access
206h	BP function has timed out (target device not responding)
207h	BP message is too large
208h	BP IO is not configured properly
209h	BP unable to allocate memory
20Ah	BP function not supported
20Bh	BP object is already registered
20Ch	BP object handle is not valid
20Dh	BP no data (reply returned with missing data field)
20Eh	BP invalid function/state
20Fh	BP device is busy - retry function (controller to busy to respond, normal during controller program download)
210h	BP failed because already initialized
211h	BP failed because not initialized
212h	BP data overflow
213h	BP data underflow
214h	BP inconsistent data error
215h	BP version mismatch
216h	BP object empty
217h	BP invalid Tag name specified (attempt to access invalid tag)
218h	BP insufficient packet space for response data
219h	BP request was invalid (generic request rejected error)
21Ah	BP data type request/response mismatch
21Bh	BP general unconnected message error
21Ch	BP destination unknown, class unsupported, instance undefined, or structure element undefined
21Dh	BP access past the end of data object
21Eh	BP PCCC error(generic unspecified PCCC error)
280h	PLC has no tags
365h, 374h, 375h, 376h, 377h, 378h, 379h, 384h,	Bad register address (permutations of invalid uLGX, PLC5, SLC500 register address, N7:1 does not exist for example)

Modbus Master TCP Driver Errors

Error Code	Description
201h	Invalid Modbus function code
201h to 2FFh	Reserved for raw Modbus error response (lower 8 bits)
202h	Invalid Modbus register or coil
203h	Invalid Modbus data value
204h	Unrecoverable Modbus failure
205h	Modbus ACK
206h	Modbus busy
207h	Modbus NAK
208h	Modbus memory parity failure
209h to 2FFh	Device-specific error or unknown error
301h	General (unexpected) error
302h	General transmit or receive mismatch error
303h	Transmit timeout
304h	Receive timeout
305h	Receive buffer overflow
306h	Serial framing error (parity mismatch, and so on)
307h	TCP open socket error
308h	Modbus connection error
309h	TCP connection timeout
30Ah	TCP socket transmit error
30Bh	TCP socket receive error
30Ch	Bad IP address

Step7 Driver Errors

Error Code	Description
201h	S7L open device
202h	S7L init adapter
203h	S7L function not found
204h	S7L bad parameter
205h	S7L invalid device number
206h	S7L invalid PLC number
207h	S7L out of memory
208h	S7L device already open
209h	S7L device not open
20Ah	S7L function unsupported
20Bh	S7L adapter not initialized
20Ch	S7L out of connections
20Dh	S7L device unsupported

Error Code	Description
20Eh	S7L hardware not found
20Fh	S7L read parameter
210h	S7L write parameter
211h	S7L bad config
212h	S7L dynamic dll load
213h	PLC unconnected
214h	S7L connection closed
215h	S7L bad PLC memory
216h	S7L wrong state
217h	S7L wrong mode
218h	S7L no data
219h	S7L invalid PLC block size
21Ah	S7L bad block number
21Bh	S7L unknown PLC
21Ch	S7L hardware
21Dh	S7L object access
21Eh	S7L disconnect requested
21Fh	PLC not found
220h	S7L data overflow
221h	S7L read device info
222h	S7L invalid device
223h	S7L adapter not found
224h	S7L driver not found
225h	S7L adapter removed
226h	S7L modem removed
227h	S7L no direct PLC
228h	S7L duplicate address
229h	S7L no device
22Ah	S7L general
240h	Dev IpAddr required
241h	Tag Address required
242h	Tag Address format
243h	Tag S7Type required
244h	Tag S7Type format
245h	Too many configured PLCs

Scanner Errors

Error Code	Description
801h	General (internal) error
802h	Unsupported functionality
803h	Out of memory
804h	Timeout error
805h	Bad parameter
806h	Access denied (probably instance not opened)
807h	Aborted by user
808h	Tag not readable
809h	Tag not writable
850h	Comparison failure
851h	Comparison overflow
852h	Tag data conversion error
853h	Tag data conversion overflow

As you can see, the actual transfer mechanism in the ILX56-MM is far removed from the messaging layer. Therefore, many of the errors pertain to the scanner, driver, and Application Programming Interface (API).

If the error count value is not cleared, then the count will rollover to zero when it reaches the decimal value of 65535 and must be incremented again.

The "Transfer Error Count" will NOT necessarily correlate with the error counts shown on the "Status-Runtime-Transfer Lists" page.

If status data transfer fails, it will be logged into the event log.

6.4.7 Commonly Posted Context Strings

- “reading cmpVal 1 (TagPath), trig TrigName”
  TagPath = Full path to tag (EnetBridge\PLC5\N7:1 for example).
  TrigName = Configured trigger name.
- “reading cmpVal 2 (TagPath), trig TrigName”
  TagPath = Full path to tag (EnetBridge\PLC5\N7:1 for example).
  TrigName = Configured trigger name.
- "evaluating compare values, trigger TrigName"
  TrigName = Configured trigger name.

Note: This is normally associated with data compare errors (850h or 851h).

- “xferlist TransferListName, seq SequenceNumber”
  TransferListName = Configured transfer list name.
  SequenceNumber = Configured transfer list sequence number.

Note: This is normally associated with data conversion errors (852h or 853h).

- “reading TagPath, xferList TransferListName, seq SequenceNumber”
  TagPath = Full path to tag (EnetBridge\PLC5\N7:1 for example).
  TransferListName = Configured transfer list name.
  SequenceNumber = Configured transfer list sequence number.

Note: This is posted as a result of a transfer source read error.

- “writing TagPath, xferList TransferListName, seq SequenceNumber”
  TagPath = Full path to tag (EnetBridge\PLC5\N7:1 for example).
  TransferListName = Configured transfer list name.
  SequenceNumber = Configured transfer list sequence number.

Note: This is posted as a result of a transfer destination write error.

6.4.8 Clearing the Error Counts

The transfer status error counts may be cleared collectively in two ways:

1. The unit is rebooted.
2. A Clear **TRANSFER STATUS DATA** button will be provided on the "Status-Runtime-Transfer Lists" page as shown below.

7 Support, Service & Warranty

In This Chapter

7.1 Contacting Technical Support

ProSoft Technology, Inc. is committed to providing the most efficient and effective support possible. Before calling, please gather the following information to assist in expediting this process:

1 Product Version Number
2 System architecture
3 Network details

If the issue is hardware related, we will also need information regarding:

1 Module configuration and associated ladder files, if any
2 Module operation and any unusual behavior
3 Configuration/Debug status information
4 LED patterns
5 Details about the serial, Ethernet or Fieldbus devices interfaced to the module, if any.

Note: *For technical support calls within the United States, ProSoft's 24/7 after-hours phone support is available for urgent plant-down issues. Detailed contact information for all our worldwide locations is available on the following page.*

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7.2 Warranty Information

For complete details regarding ProSoft Technology's TERMS & CONDITIONS OF SALE, WARRANTY, SUPPORT, SERVICE AND RETURN MATERIAL AUTHORIZATION INSTRUCTIONS, please see the documents at:
www.prosoft-technology/legal

Documentation is subject to change without notice.

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