



MVI71-GEC

PLC 5 Platform

Generic ASCII Ethernet
Communication Module

May 11, 2011

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MVI71-GEC User Manual

May 11, 2011

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ProSoft Technology[®] Product Documentation

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 on the enclosed CD-ROM in Adobe[®] Acrobat Reader file format (.PDFs). These product documentation files may also be freely downloaded from our web site: www.prosoft-technology.com

Important Installation Instructions

Power, Input, and Output (I/O) wiring must be in accordance with Class I, Division 2 wiring methods, Article 501-4 (b) of the National Electrical Code, NFPA 70 for installation in the U.S., or as specified in Section 18-1J2 of the Canadian Electrical Code for installations in Canada, and in accordance with the authority having jurisdiction. The following warnings must be heeded:

WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIV. 2;

WARNING - EXPLOSION HAZARD - WHEN IN HAZARDOUS LOCATIONS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES

WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.
THIS DEVICE SHALL BE POWERED BY CLASS 2 OUTPUTS ONLY.

MVI (Multi Vendor Interface) Modules

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'ÉQUIPEMENT, COUPER LE COURANT OU S'ASSURER QUE L'EMPLACEMENT EST DÉSIGNÉ NON DANGEREUX.

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.
- C** Suitable for use in Class I, division 2 Groups A, B, C and D Hazardous Locations or Non-Hazardous Locations.

ATEX Warnings and 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%. This device must be used only with ATEX certified backplanes.
- D** DO NOT OPEN WHEN ENERGIZED.

Warning: This module is not hot-swappable! Always remove power from the rack before inserting or removing this module, or damage may result to the module, the processor, or other connected devices.

Battery Life Advisory

The MVI46, MVI56, MVI56E, MVI69, and MVI71 modules use a rechargeable Lithium Vanadium Pentoxide battery to backup the real-time clock and CMOS. The battery should last for the life of the module. The module must be powered for approximately twenty hours before the battery becomes fully charged. After it is fully charged, the battery provides backup power for the CMOS setup and the real-time clock for approximately 21 days. When the battery is fully discharged, the module will revert to the default BIOS and clock settings.

Note: The battery is not user replaceable.

Markings

Electrical Ratings

- Backplane Current Load: 800 mA @ 5 Vdc
- Operating Temperature: 0°C to 60°C (32°F to 140°F)
- Storage Temperature: -40°C to 85°C (-40°F to 185°F)
- Shock: 30 g operational, 50 g non-operational; Vibration: 5 g from 10 Hz to 150 Hz
- Relative Humidity 5% to 95% (with no condensation)
- All phase conductor sizes must be at least 1.3 mm(squared) and all earth ground conductors must be at least 4mm(squared).

Label Markings

Agency Approvals and Certifications

Agency	Applicable Standards
ANSI / ISA	ISA 12.12.01 Class I Division 2, GPs A, B, C, D
CSA/cUL	C22.2 No. 213-1987
CSA CB Certified	IEC61010
ATEX	EN60079-0 Category 3, Zone 2 EN60079-15



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Guide to the MVI71-GEC User Manual

Function		Section to Read	Details
Introduction (Must Do)	→	Start Here (page 8)	This section introduces the customer to the module. Included are: package contents, system requirements, hardware installation, and basic configuration.
Diagnostic and Troubleshooting	→	Diagnostics and Troubleshooting (page 33)	This section describes Diagnostic and Troubleshooting procedures.
Reference Product Specifications	→	Reference (page 45) Product Specifications (page 46)	These sections contain general references associated with this product and its Specifications..
Support, Service, and Warranty Index	→	Support, Service and Warranty (page 77) Index	This section contains Support, Service and Warranty information. Index of chapters.

1 Start Here

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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 GEC and PLC devices to a power source and to the MVI71-GEC module's application port(s)

1.1 System Requirements

The MVI71-GEC module requires the following minimum hardware and software components:

- Rockwell Automation PLC processor, with compatible power supply and one free slot in the rack, for the MVI71-GEC module. The module requires 800mA of available power.
- The PLC Processor must provide for at least 64 words of BTR/BTW area, otherwise the module may not function correctly.
- Rockwell Automation RSLogix 5 programming software.
- Rockwell Automation RSLinx communication software
- Pentium® 100 MHz minimum. Pentium III 700 MHz (or better) recommended
- Supported operating systems:
 - Microsoft Windows XP
 - Microsoft Windows 2000
 - Microsoft Windows NT v4.0 with Service Pack 3 or greater
 - Microsoft Windows ME
 - Microsoft Windows 98
- 64 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)
- CD-ROM drive

1.2 Package Contents

The following components are included with your MVI71-GEC module, and are all required for installation and configuration.

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

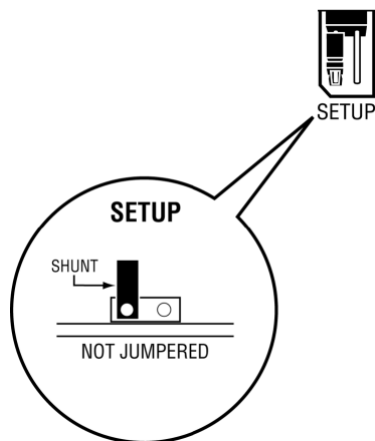
Qty.	Part Name	Part Number	Part Description
1	MVI71-GEC Module	MVI71-GEC	Generic ASCII Ethernet Communication Module
1	Cable	Cable #15, RS232 Null Modem	For RS232 Connection to the CFG Port
3	Cable	Cable #14, RJ45 to DB9 Male Adapter cable	For DB9 Connection to Module's Port
2	Adapter	1454-9F	Two Adapters, DB9 Female to Screw Terminal. For RS422 or RS485 Connections to Port 1 and 2 of the Module
1	ProSoft Solutions CD		Contains sample programs, utilities and documentation for the MVI71-GEC module.

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

1.3 Setting Jumpers

The Setup Jumper acts as "write protection" for the module's flash memory. In "write protected" mode, the Setup pins are not connected, and the module's firmware cannot be overwritten. Do not jumper the Setup pins together unless you are directed to do so by ProSoft Technical Support.

The following illustration shows the MVI71-GEC jumper configuration.



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.

1.4 Install the Module in the Rack

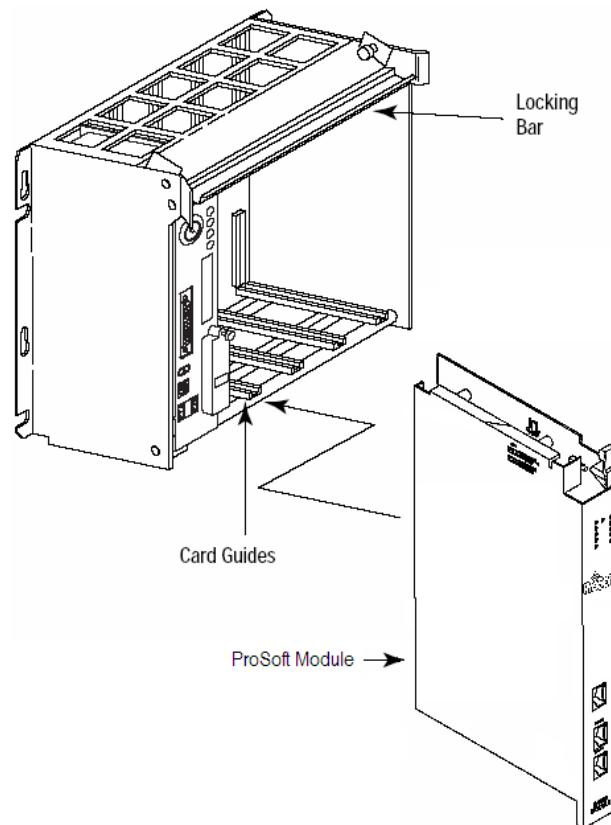
If you have not already installed and configured your PLC processor and power supply, please do so before installing the MVI71-GEC module. Refer to your Rockwell Automation product documentation for installation instructions.

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 jumpers, insert MVI71-GEC into the PLC™ chassis. Use the same technique recommended by Rockwell Automation to remove and install PLC modules.

Warning: This module is not hot-swappable! Always remove power from the rack before inserting or removing this module, or damage may result to the module, the processor, or other connected devices.

- 1 Turn power OFF.
- 2 Align the module with the top and bottom guides, and slide it into the rack until the module is firmly against the backplane connector.

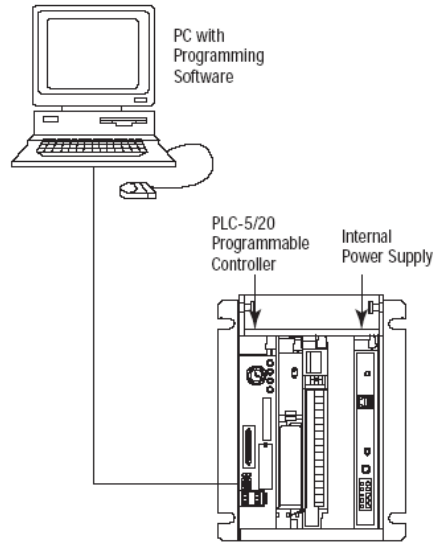


- 3 With a firm but steady push, snap the module into place.
- 4 Check that the holding clips on the top and bottom of the module are securely in the locking holes of the rack.
- 5 Make a note of the slot location. You will need to identify the slot in which the module is installed in order for the sample program to work correctly. Slot numbers are identified on the green circuit board (backplane) of the PLC rack.
- 6 Turn power ON.

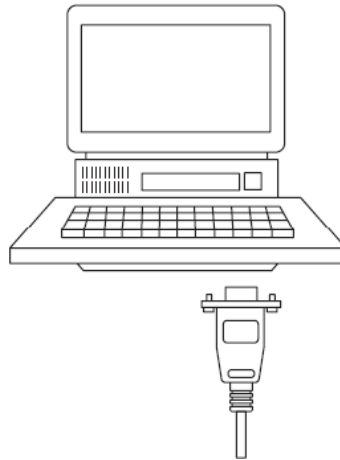
Note: If you insert the module improperly, the system may stop working, or may behave unpredictably.

1.5 Connect your PC to the Processor

- 1 Connect the right-angle connector end of the cable to your controller at the communications port.



- 2 Connect the straight connector end of the cable to the serial port on your computer.

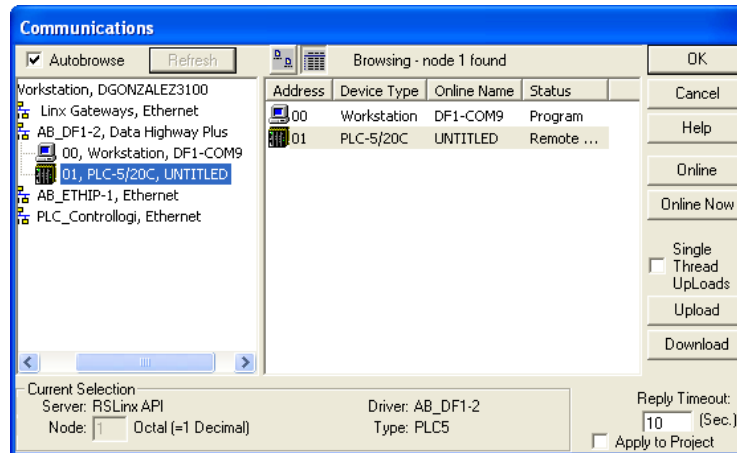


1.6 Download the Sample Program to the Processor

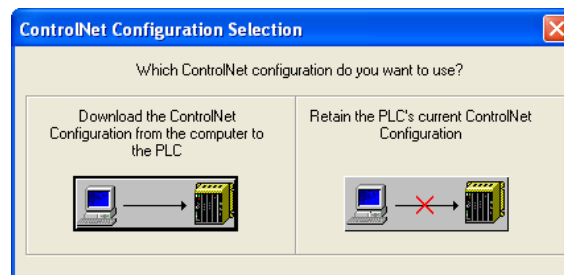
To download the sample program from RSLogix 5 to the PLC processor:

Note: The key switch on the front of the PLC processor must be in the REM position.

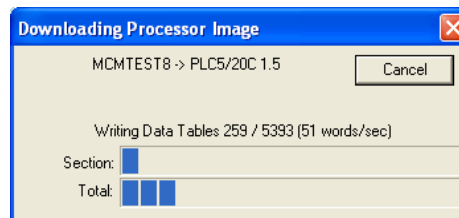
- 1 If you are not already online to the processor, open the Communications menu, and then choose Download. RSLogix will establish communication with the processor.



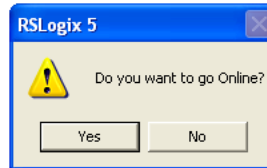
- 2 Click the Download button to transfer the sample program to the processor.
- 3 When prompted, choose Computer to PLC



- 4 RSLogix will compile the program and transfer it to the processor. This process may take a few minutes.



- 5 When the download is complete, RSLogix will open another confirmation dialog box. Click OK to switch the processor from Program mode to Run mode.

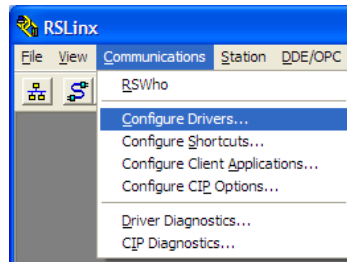


Note: If you receive an error message during these steps, refer to your RSLogix documentation to interpret and correct the error.

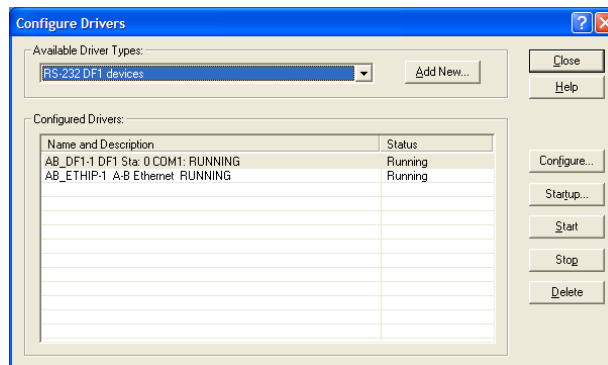
1.6.1 Configuring the RSLinx Driver for the PC COM Port

If RSLogix is unable to establish communication with the processor, follow these steps.

- 1 Open *RSLinx*.
- 2 Open the **COMMUNICATIONS** menu, and choose **CONFIGURE DRIVERS**.

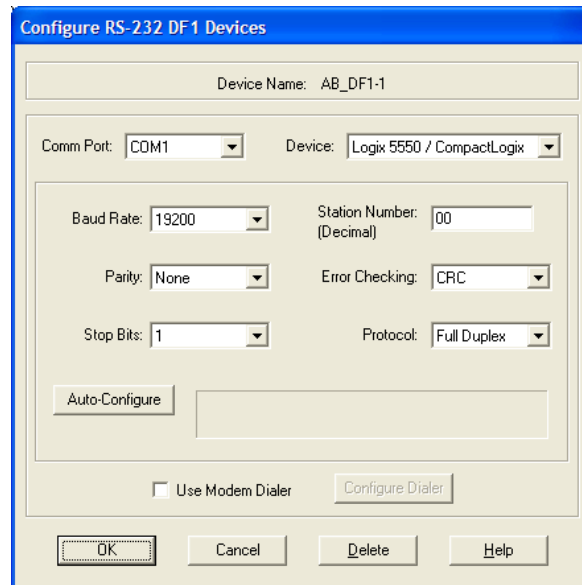


This action opens the *Configure Drivers* dialog box.



Note: If the list of configured drivers is blank, you must first choose and configure a driver from the *Available Driver Types* list. The recommended driver type to choose for serial communication with the processor is *RS-232 DF1 Devices*.

- Click to select the driver, and then click **CONFIGURE**. This action opens the *Configure RS-232 DF1 Devices* dialog box.



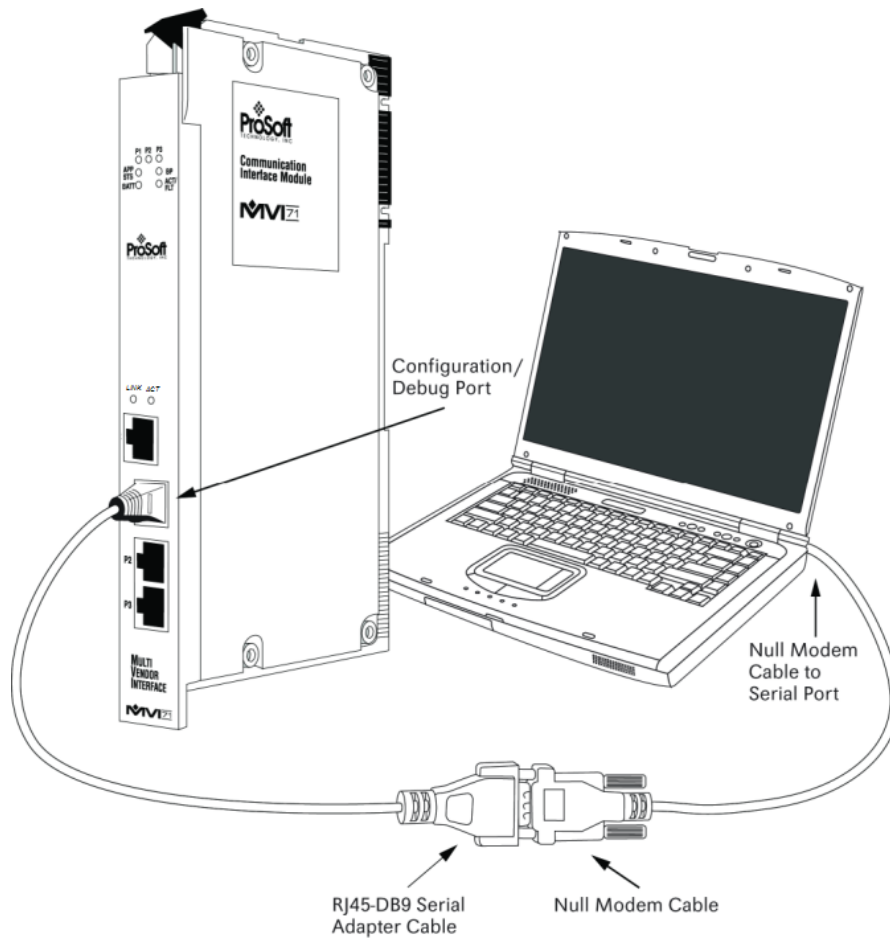
- Click the **AUTO-CONFIGURE** button. RSLinx will attempt to configure your serial port to work with the selected driver.
- When you see the message *Auto Configuration Successful*, click the **OK** button to dismiss the dialog box.

Note: If the auto-configuration procedure fails, verify that the cables are connected correctly between the processor and the serial port on your computer, and then try again. If you are still unable to auto-configure the port, refer to your RSLinx documentation for further troubleshooting steps.

1.7 Connect your PC to the Module

With the module securely mounted, connect your PC to the Configuration/Debug port using an RJ45-DB-9 Serial Adapter Cable and a Null Modem Cable.

- 1 Attach both cables as shown.
- 2 Insert the RJ45 cable connector into the Configuration/Debug port of the module.
- 3 Attach the other end to the serial port on your PC.



2 Module Configuration

In This Chapter

- ❖ Using ProSoft Configuration Builder.....22
- ❖ IP Address.....28

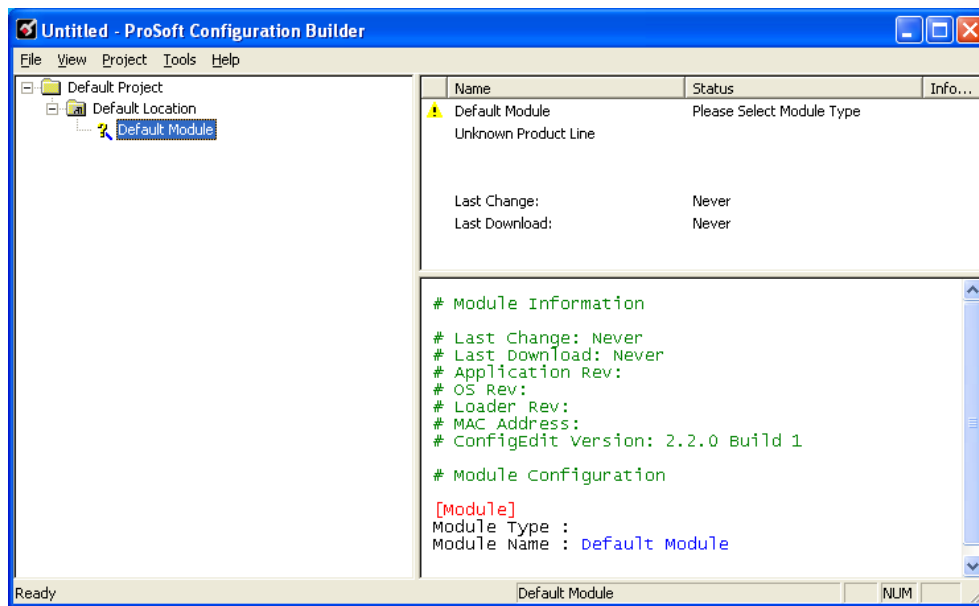
This section contains the setup procedure, data, and ladder logic for successful application of the MVI71-GEC module. Each step in the setup procedure is defined in order to simplify the use of the module.

2.1 Using ProSoft Configuration Builder

ProSoft Configuration Builder (PCB) provides a convenient way to manage module configuration files customized to meet your application needs. *PCB* is not only a powerful solution for new configuration files, but also allows you to import information from previously installed (known working) configurations to new projects.

2.1.1 Set Up the Project

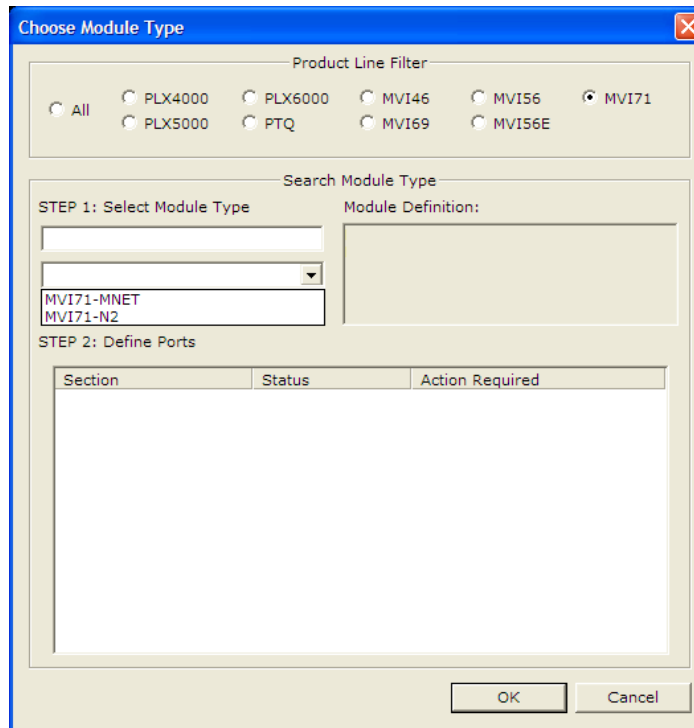
To begin, start ProSoft Configuration Builder. If you have used other Windows configuration tools before, you will find the screen layout familiar. ProSoft Configuration Builder's window consists of a tree view on the left, an information pane and a configuration pane on the right side of the window. When you first start ProSoft Configuration Builder, the tree view consists of folders for Default Project and Default Location, with a Default Module in the Default Location folder. The following illustration shows the ProSoft Configuration Builder window with a new project.



Your first task is to add the MVI71-GEC module to the project.

- 1 Use the mouse to select "Default Module" in the tree view, and then click the right mouse button to open a shortcut menu.

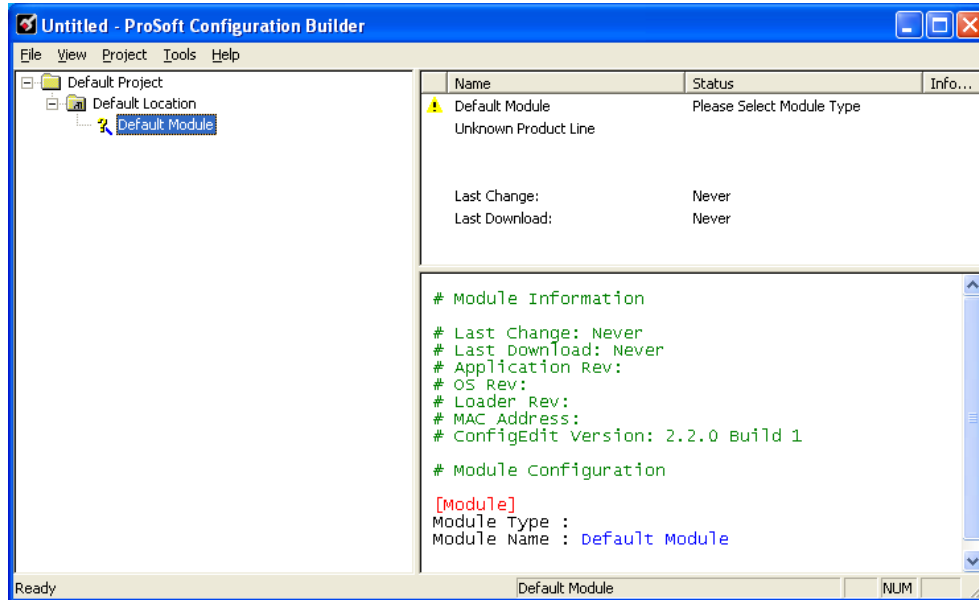
- 2 On the shortcut menu, choose "Choose Module Type". This action opens the Choose Module Type dialog box.



- 3 In the Product Line Filter area of the dialog box, select MVI71. In the Select Module Type dropdown list, select MVI71-GEC, and then click OK to save your settings and return to the ProSoft Configuration Builder window.
The next task is to set the module parameters.

2.1.2 Renaming PCB Objects

Notice that the contents of the information pane and the configuration pane changed when you added the module to the project.



At this time, you may wish to rename the *Default Project* and *Default Location* folders in the tree view.

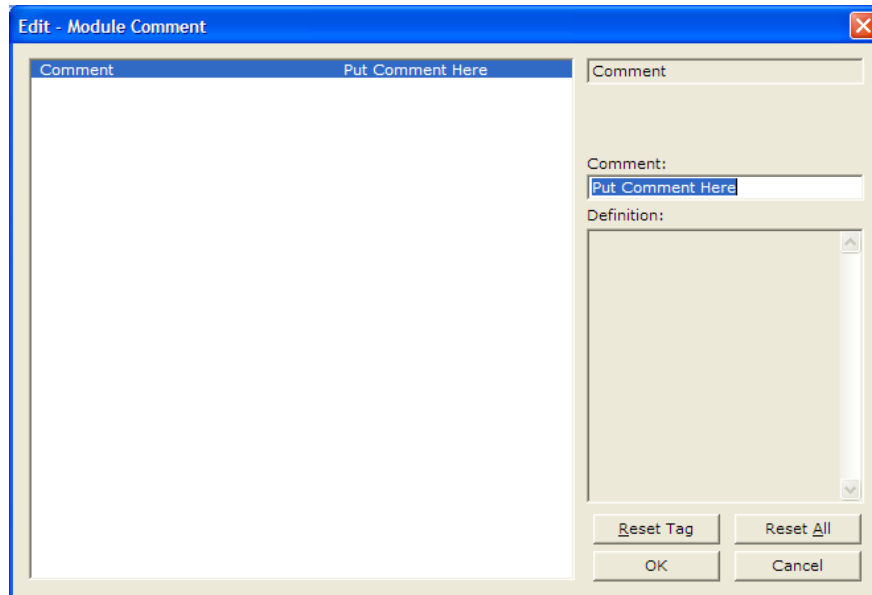
- 1 Select the object, and then click the right mouse button to open a shortcut menu. From the shortcut menu, choose **RENAME**.
- 2 Type the name to assign to the object.
- 3 Click *away* from the object to save the new name.

Configuring Module Parameters

- 1 Click the **[+]** sign next to the module icon to expand module information.
- 2 Click the **[+]** sign next to any  icon to view module information and configuration options.
- 3 Double-click any  icon to open an *Edit* dialog box.
- 4 To edit a parameter, select the parameter in the left pane and make your changes in the right pane.
- 5 Click **OK** to save your changes.

Creating Optional Comment Entries

- 1 Click the **[+]** to the left of the  **Comment** icon to expand the module comments.
- 2 Double-click the  **Module Comment** icon. The *Edit - Module Comment* dialog box appears.



- 3 Enter your comment and click **OK** to save your changes.

2.1.3 [Module]

This section of the file describes the database setup and module level parameters.

[Module]

Module Name: MVI71-GEC Communication Module DEFAULT

Module Name

0 to 80 characters

This parameter assigns a name to the module that can be viewed using the configuration/debug port. Use this parameter to identify the module and the configuration file.

2.1.4 [Server x]

You can configure up to five servers ([Server 0] through [Server 4]). The configuration section for each server contains the same set of parameters. You can configure the parameters for each server to meet the requirements of your application.

Enabled

Yes or No

This parameter determines if the server will be utilized by the module. If a value of "Yes" is entered, the server will be used. Any other value will disable the server.

Service Port Number

1 to 65535

This parameter sets the TCP/IP service port for this server. Each server can have its own unique service port or can share the same number with other servers.

Connection Timeout

0 or 5000 to 65535

This parameter specifies the number of milliseconds the server will permit the server to be inactive after a connection is made before closing the socket. This timeout period is reset on each read or write packet. If the parameter is set to 0, the connection will not timeout.

Connection Close Type

0, 1 or 2

This coded parameter defines the personality of the server after a connection is made. If the parameter is set to 0, the socket will only be closed when a request from the client is received or the connection timeout is exceeded. If a value of 1 is selected, the server will close the socket after it transmits a single message. If a value of 2 is selected, the server will close the socket after it receives a message.

Swap Rx Data Bytes

Yes or No

This parameter determines if the data received by the server will have the byte order of the data swapped. If the parameter is set to No, no byte swapping will occur. If the parameter is set to Yes, the odd byte will be swapped with the even byte in each word of data received.

Swap Tx Data Bytes

Yes or No

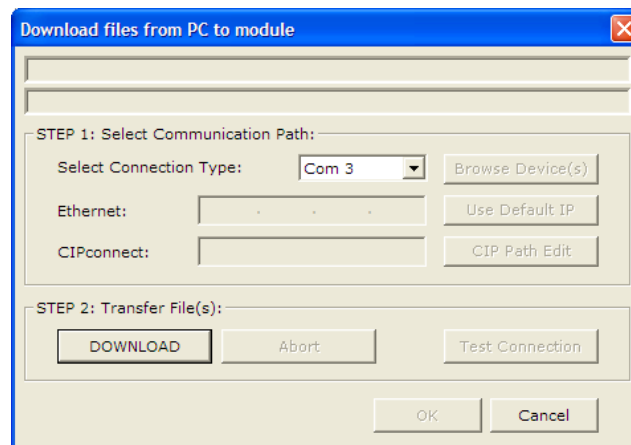
This parameter determines if the data to be transmitted by the module will have the byte order of the data swapped. If the parameter is set to No, no byte swapping will occur. If the parameter is set to Yes, the odd byte will be swapped with the even byte in each word of data received.

2.1.5 Downloading the Project to the Module Using a Serial COM Port

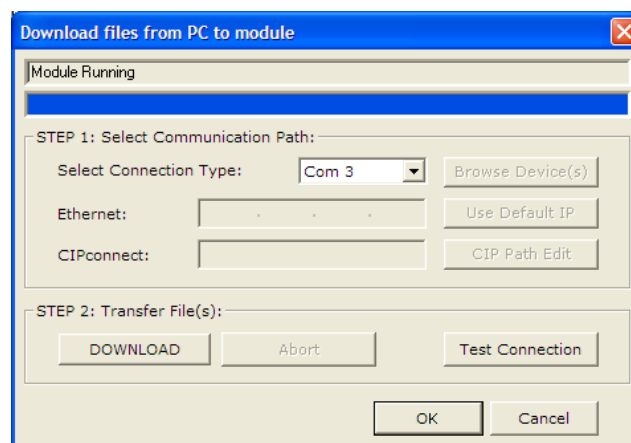
For the module to use the settings you configured, you must download (copy) the updated *Project* file from your PC to the module.

To download the project file

- 1 In the tree view in *ProSoft Configuration Builder*, click once to select the module.
- 2 Right-click the module icon to open a shortcut menu. From the shortcut menu, choose **DOWNLOAD FROM PC TO DEVICE**. The program will scan your PC for a valid com port (this may take a few seconds). When *PCB* has found a valid COM port, the *Download* dialog box will open.



- 3 Choose the COM port to use from the dropdown list, and then click the **DOWNLOAD** button.
The module will perform a platform check to read and load its new settings. When the platform check is complete, the status bar in the *Download* dialog box will display the message *Module Running*.



2.2 IP Address

In addition to the GEC.CFG, the MVI71-GEC module requires a second configuration file that identifies its Ethernet configuration. Without this configuration file, the module will not communicate properly on the network.

This file contains the Ethernet address information to be used by the module and may be transferred to and from the module from the **Network** command available on the debug port of the module. Please consult your network administrator for the correct settings for your network before placing this or any other Ethernet TCP/IP device upon your network.

Important: If the field "my_ip" does not exist, or if the wattcp.cfg file is corrupted or does not exist, the module will not function.

To set the Module's IP Address

- 1 Locate the sample configuration files for your module on the ProSoft Solutions CD.
- 2 Copy the configuration files and ladder to a location on your PC's hard drive. We recommend C:\temp.
- 3 After you move the files, right-click on each of the files, choose Properties, and clear the READ ONLY check box.
- 4 Start Notepad.exe, or any other editor that can save plain text files.
- 5 Open the file WATTCP.CFG. The following example shows the contents of a typical WATTCP.CFG file.

```
# ProSoft Technology
# Default private class 3 address
my_ip=192.168.0.100

# Default class 3 network mask
netmask=255.255.255.0

# The gateway I wish to use
gateway=192.168.0.1,192.168.0.0,255.255.255.0
```

- 6 Edit the file, using the IP addresses supplied by your network administrator.

Important: The module does not support DHCP (Dynamic Host Configuration Protocol) for obtaining an IP address from a server. This module must have its own static IP address that does not duplicate the IP address of any other device on the Ethernet network.

- 7 Save the file as WATTCP.CFG. You must now transfer the file to the module. Refer to Transferring WATTCP.CFG to the module (page 43) for the correct procedure.

3 Ladder Logic

In This Chapter

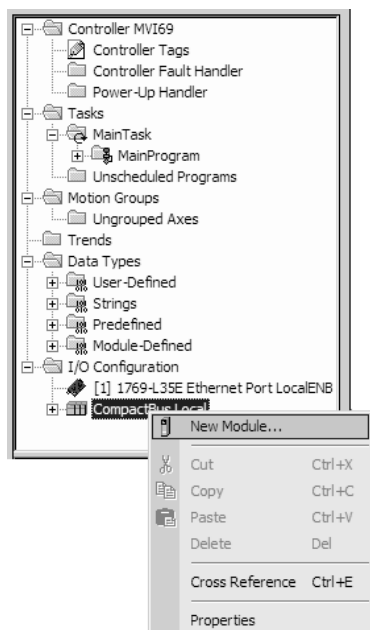
- ❖ Adding the Module to an Existing PLC5 Project 30
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Ladder logic is required for the MVI71-GEC module to work. Tasks that must be handled by the ladder logic are module data transfer, special block handling, and status data receipt. Additionally, a power-up handler may be needed to handle the initialization of the module's data and to clear any processor fault conditions.

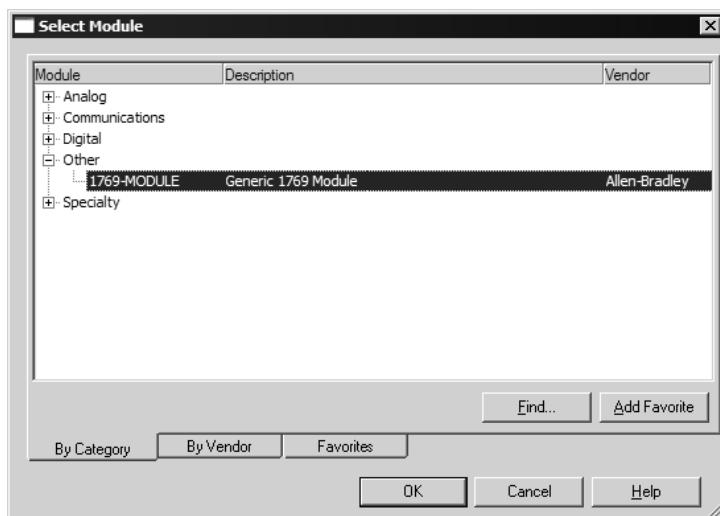
The sample ladder logic, on the *inRAX CD-ROM*, is extensively commented, to provide information on the purpose and function of each rung. For most applications, the sample ladder will work without modification.

3.1 Adding the Module to an Existing PLC5 Project

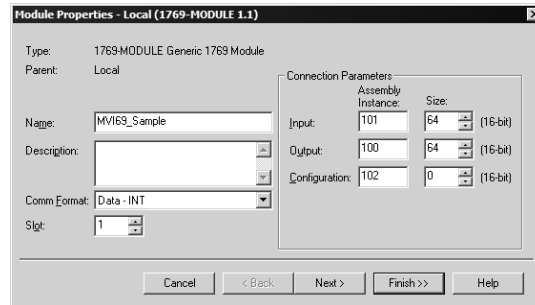
- 1 **Add the MVI71-GEC module to the project.** Right-click the mouse button on the I/O Configuration option in the Controller Organization window to display a pop-up menu. Select the New Module option from the I/O Configuration menu.



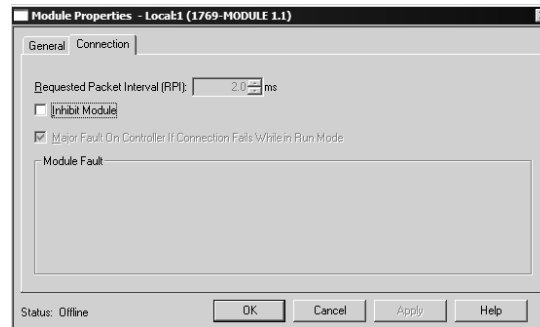
This action opens the following dialog box:



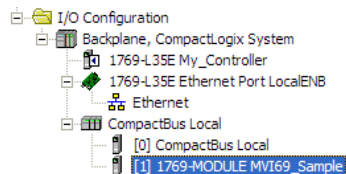
- 2 Select the 1769-Module (Generic 1769 Module) from the list and click OK.



- 3 Enter the Name, Description and Slot options for your application, using the values in the illustration above. You must select the **Comm Format** as **Data - INT** in the dialog box, otherwise the module will not communicate over the backplane of the CompactLogix rack.
Click **OK** to continue.



- 4 Select the Request Packet Interval value for scanning the I/O on the module. This value represents the minimum frequency the module will handle scheduled events. This value should not be set to less than 1 millisecond. Values between 1 and 10 milliseconds should work with most applications.
- 5 Save the module. Click OK to dismiss the dialog box. The Controller Organization window now displays the module's presence. The following illustration shows the Controller Organization window:



- 6 Copy the Controller Tags from the sample program.
- 7 Copy the User Defined Data Types from the sample program.
- 8 Copy the Ladder Rungs from the sample program.
- 9 Save and Download the new application to the controller and place the processor in run mode.

3.2 GECServerStat (Server Status Object)

The GECServerStat object stores the status information related to each server on the module. All messages are counted for both receive and transmit operations. The object also contains the CfgErrword member. The following table describes the structure of this object.

Name	Data Type	Description
Enabled	INT	Flag to indicate if server is enabled (1=Yes,0=No)
State	INT	Current state of server
IP	INT[2]	IP address of host connected to server
Port	INT	TCP port for host connected to server
Open	INT	Number of times server performed an open
Est	INT	Number of times connection established
Close	INT	Number of times socket closed
Rx	INT	Number of messages received
RxOverflow	INT	Number of receive buffer overflows
Tx	INT	Number of messages transmitted
TxOverflow	INT	Number of transmit buffer overflows
Timeout	INT	Number of socket timeout conditions
CfgErrword	INT	Configuration error word value for server

4 Diagnostics and Troubleshooting

In This Chapter

- ❖ LED Status Indicators.....34
- ❖ Using ProSoft Configuration Builder (PCB) for Diagnostics.....36
- ❖ Reading Status Data from the Module43

The module provides information on diagnostics and troubleshooting in the following forms:

- LED status indicators on the front of the module provide general information on the module's status.
- Status data contained in the module can be viewed through the Configuration/Debug port, using the troubleshooting and diagnostic capabilities of *ProSoft Configuration Builder (PCB)*.
- Status data values can be transferred from the module to processor memory and can be monitored there manually or by customer-created logic.

4.1 LED Status Indicators

The LEDs indicate the module's operating status as follows:

LED	Color	Status	Indication
CFG	Green	On	Data is being transferred between the module and a remote terminal using the Configuration/Debug port.
		Off	No data is being transferred on the Configuration/Debug port.
P1	Green	On	Port not used
		Off	Port not used
P2	Green	On	Port not used
		Off	Port not used
APP	Amber	Off	The MVI71-GEC is working normally.
		On	The MVI71-GEC module program has recognized a communication error.
BP ACT	Amber	On	The LED is on when the module is performing a write operation on the backplane.
		Off	The LED is off when the module is performing a read operation on the backplane. Under normal operation, the LED should blink rapidly on and off.
OK	Red/ Green	Off	The card is not receiving any power and is not securely plugged into the rack.
		Green	The module is operating normally.
		Red	The program has detected an error or is being configured. If the LED remains red for over 10 seconds, the program has probably halted. Remove the card from the rack and re-insert the card to restart the module's program.
BAT	Red	Off	The battery voltage is OK and functioning.
		On	The battery voltage is low or battery is not present. Allow battery to charge by keeping module plugged into rack for 24 hours. If BAT LED still does not go off, contact ProSoft Technology, as this is not a user serviceable item.

4.1.1 Ethernet LED Indicators

LED	State	Description
Data	OFF	No activity on the Ethernet port.
	GREEN Flash	The Ethernet port is actively transmitting or receiving data.
Link	OFF	No physical network connection is detected. No Ethernet communication is possible. Check wiring and cables.
	GREEN Solid	Physical network connection detected. This LED must be ON solid for Ethernet communication to be possible.

4.1.2 Clearing a Fault Condition

Typically, if the OK LED on the front of the module turns RED for more than ten seconds, a hardware problem has been detected in the module or the program has exited.

To clear the condition, follow these steps:

- 1 Turn off power to the rack.
- 2 Remove the card from the rack.
- 3 Verify that all jumpers are set correctly.
- 4 If the module requires a Compact Flash card, verify that the card is installed correctly.
- 5 Re-insert the card in the rack and turn the power back on.
- 6 Verify correct configuration data is being transferred to the module from the PLC controller.

If the module's OK LED does not turn GREEN, verify that the module is inserted completely into the rack. If this does not cure the problem, contact ProSoft Technology Technical Support.

4.1.3 Troubleshooting

Use the following troubleshooting steps if you encounter problems when the module is powered up. If these steps do not resolve your problem, please contact ProSoft Technology Technical Support.

Processor Errors

Problem description	Steps to take
Processor fault	Verify that the module is plugged into the slot that has been configured for the module in the I/O Configuration of RSLogix. Verify that the slot location in the rack has been configured correctly in the ladder logic.
Processor I/O LED flashes	This indicates a problem with backplane communications. A problem could exist between the processor and any installed I/O module, not just the MVI71-GEC. Verify that all modules in the rack are correctly configured in the ladder logic.

Module Errors

Problem description	Steps to take
BP ACT LED (not present on MVI56E modules) remains OFF or blinks slowly MVI56E modules with scrolling LED display: <i><Backplane Status></i> condition reads ERR	This indicates that backplane transfer operations are failing. Connect to the module's Configuration/Debug port to check this. To establish backplane communications, verify the following items: ▪ The processor is in RUN or REM RUN mode. ▪ The backplane driver is loaded in the module. ▪ The module is configured for read and write data block transfer. ▪ The ladder logic handles all read and write block situations. ▪ The module is properly configured in the processor I/O configuration and ladder logic.
OK LED remains RED	The program has halted or a critical error has occurred. Connect to the Configuration/Debug port to see if the module is running. If the program has halted, turn off power to the rack, remove the card from the rack and re-insert it, and then restore power to the rack.

4.2 Using ProSoft Configuration Builder (PCB) for Diagnostics

The *Configuration and Debug* menu for this module is arranged as a tree structure, with the *Main* menu at the top of the tree, and one or more sub-menus for each menu command. The first menu you see when you connect to the module is the *Main* menu.

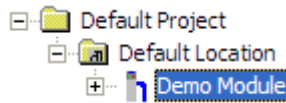
Because this is a text-based menu system, you enter commands by typing the [command letter] from your computer keyboard in the *Diagnostic* window in *ProSoft Configuration Builder (PCB)*. The module does not respond to mouse movements or clicks. The command executes as soon as you press the **[COMMAND LETTER]** — you do not need to press **[ENTER]**. When you type a **[COMMAND LETTER]**, a new screen will be displayed in your terminal application.

4.2.1 Using the Diagnostic Window in ProSoft Configuration Builder

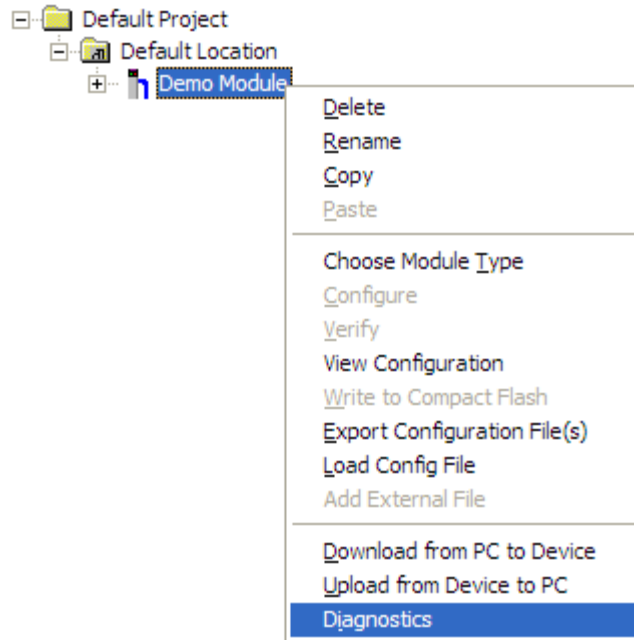
Tip: You can have a ProSoft Configuration Builder Diagnostics window open for more than one module at a time.

To connect to the module's Configuration/Debug serial port

- 1 Start *PCB*, and then select the module to test. Click the right mouse button to open a shortcut menu.

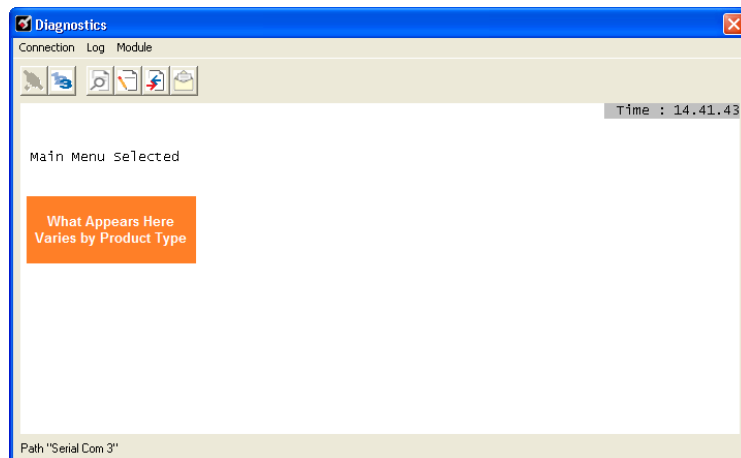


- 2 On the shortcut menu, choose **DIAGNOSTICS**.



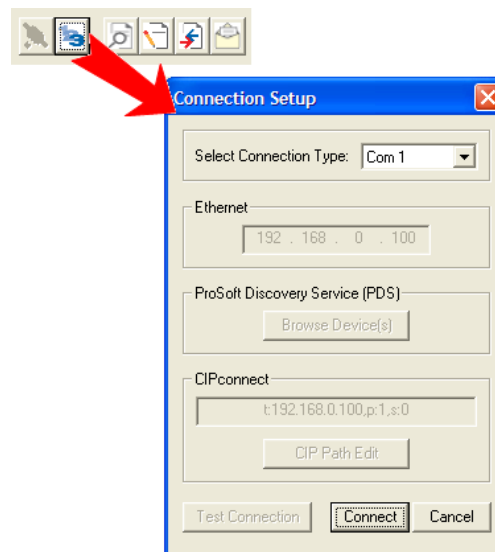
This action opens the *Diagnostics* dialog box.

- 3 Press **[?]** to open the *Main* menu.



If there is no response from the module, follow these steps:

- 1 Click to configure the connection. On the *Connection Setup* dialog box, select a valid com port or other connection type supported by the module.



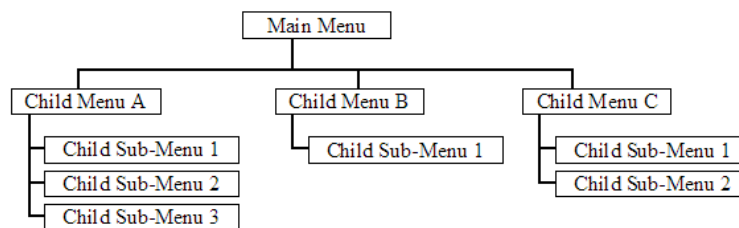
- 2 Verify that the null modem cable is connected properly between your computer's serial port and the module. A regular serial cable will not work.
- 3 On computers with more than one serial port, verify that your communication program is connected to the same port that is connected to the module.

If you are still not able to establish a connection, contact ProSoft Technology for assistance.

4.2.2 Navigation

All of the submenus for this module contain commands to redisplay the menu or return to the previous menu. You can always return from a submenu to the next higher menu by pressing **[M]** on your keyboard.

The organization of the menu structure is represented in simplified form in the following illustration:



The remainder of this section shows the menus available for this module, and briefly discusses the commands available to you.

Keystrokes

The keyboard commands on these menus are usually not case sensitive. You can enter most commands in lowercase or uppercase letters.

The menus use a few special characters (**?**, **-**, **+**, **@**) that must be entered exactly as shown. Some of these characters will require you to use the **SHIFT**, **CTRL**, or **ALT** keys to enter them correctly. For example, on US English keyboards, enter the **?** command as **SHIFT** and **/**.

Also, take care to distinguish the different uses for uppercase letter "eye" (**I**), lowercase letter "el" (**L**), and the number one (**1**). Likewise, uppercase letter "oh" (**O**) and the number zero (**0**) are not interchangeable. Although these characters look alike on the screen, they perform different actions on the module and may not be used interchangeably.

4.2.3 Main Menu

When you first connect to the module from your computer, your terminal screen will be blank. To activate the main menu, press the **[?]** key on your computer's keyboard. If the module is connected properly, the following menu will appear.

```
MVI-GEC COMMUNICATION MODULE MENU
?=Display Menu
B=Block Transfer Statistics
C=Module Configuration
R=Transfer Configuration from PC to MVI Unit
S=Transfer Configuration from MVI Unit to PC
U=Reset diagnostic data
V=Version Information
W=Warm Boot Module
Status: 1=Server 0, 2=Server 1, 3=Server 2, 4=Server 3, 5=Server 4
         E=Client 0, F=Client 1, G=Client 2, H=Client 3, I=Client 4
Cfg    : 6=Server 0, 7=Server 1, 8=Server 2, 9=Server 3, 0=Server 4
@=Network Menu      Esc=Exit Program
```

Caution: Some of the commands available to you from this menu are designed for advanced debugging and system testing only, and can cause the module to stop communicating with the processor or with other devices, resulting in potential data loss or other communication failures. Use these commands only if you fully understand their potential effects, or if you are specifically directed to do so by ProSoft Technology Technical Support Engineers.

There may be some special command keys that are not listed on the menu but that may activate additional diagnostic or debugging features. If you need these functions, you will be advised how to use them by Technical Support. Please be careful when pressing keys so that you do not accidentally execute an unwanted command.

Redisplaying the Menu

Press **[?]** to display the current menu. Use this command when you are looking at a screen of data, and want to view the menu choices available to you.

Viewing Block Transfer Statistics

Press **[B]** to view the Block Transfer Statistics screen.

Use this command to display the configuration and statistics of the backplane data transfer operations between the module and the processor. The information on this screen can help determine if there are communication problems between the processor and the module.

Tip: Repeat this command at one-second intervals to determine the number of blocks transferred each second.

Viewing Module Configuration

Press **[C]** to view the *Module Configuration* screen.

Use this command to display the current configuration and statistics for the module.

Transferring the Configuration File from the PC to the Module

On the Diagnostics Menu this is referred to as *Receive Module Configuration*.

Press **[R]** to receive (download) the configuration file from your PC to the module and store the file on the module's Compact Flash Card (Personality Module) or Flash RAM.

Press **[Y]** to confirm the file transfer, and then follow the instructions on the terminal screen to complete the file transfer process.

After the file has been successfully downloaded, the module will restart the program and load the new configuration information. Review the new configuration using menu commands **[6]** and **[0]** to verify that the module is configured correctly.

Transferring the Configuration File from The Module to the PC

On the Diagnostics Menu this is referred to as *Send Module Configuration*.

Press **[S]** to send (upload) the configuration file from the module to your PC.

Press **[Y]** to confirm the file transfer, and then follow the instructions on the terminal screen to complete the file transfer process.

After the file has been successfully uploaded, you can open and edit the file to change the module's configuration.

Resetting Diagnostic Data

Press **[U]** to reset the status counters for the Client and/or server(s) in the module.

Viewing Version Information

Press **[V]** to view version information for the module.

Use this command to view the current version of the software for the module, as well as other important values. You may be asked to provide this information when calling for technical support on the product.

Values at the bottom of the display are important in determining module operation. The *Program Scan Counter* value is incremented each time a module's program cycle is complete.

Tip: Repeat this command at one-second intervals to determine the frequency of program execution.

Warm Booting the Module

Press **[W]** from the *Main* menu to warm boot (restart) the module.

This command will cause the program to exit and reload, refreshing configuration parameters that must be set on program initialization. Only use this command if you must force the module to reboot.

Viewing Server Communication Status (Servers 0 to 4)

Use commands **[1]** **[2]** **[3]** **[4]** or **[5]** to view the communication status and statistics of the specified server. This information can be useful when troubleshooting communication problems.

```
SERVER 0 (Port 15000):
Enabled           : YES
State            : 1
IP of Connected Host : C0000039
Port of Connected Host : 1504
Open Count       : 1
Establish Count   : 1
Close Count      : 0
Receive Message Count : 125
Receive Busy State : 0
Receive Message Length : 0
Receive Overflow Count : 0
Transmit Message Count : 125
Transmit Busy State : 0
Transmit Message Length : 0
Transmit Overflow Count : 0
Timeout Error Count : 0
Configuration Error Word : 0x0000
```

Viewing Client Communication Status (Clients 10 to 14)

Use commands **[E]** **[F]** **[G]** **[H]** or **[I]** to view the communication status and statistics of the specified client. This information can be useful when troubleshooting communication problems.

```
CLIENT 0:
Connected State   : 0
State            : -1
IP of Connected Host : 
Port of Connected Host : 
Receive Message Count : 0
Receive Busy State : 0
Receive Message Length : 0
Receive Overflow Count : 0
Receive Swap Type : NO
Transmit Message Count : 0
Transmit Busy State : 0
Transmit Message Length : 0
Transmit Overflow Count : 0
Transmit Swap Type : NO
```

Viewing Server Configuration (Servers 0 to 4)

Use commands [6] [7] [8] [9] or [0] to view the configuration of the specified server.

```
SERVER 0 (Enabled = YES)
Service Port           : 15000
Maximum Buffer Size    : 4096
Connection Timeout     : 0
Close Type             : 0
```

Opening the Network Menu

Press [0] to open the *Network* menu.

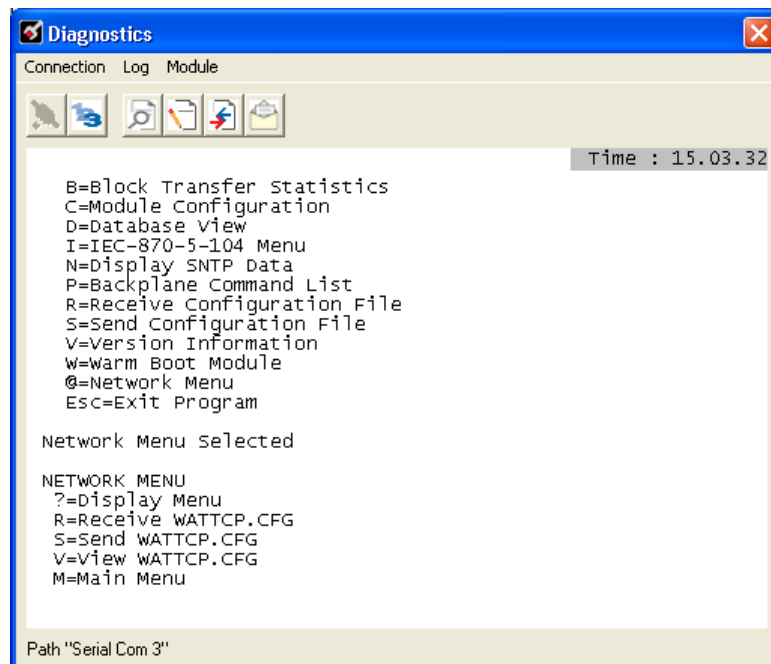
The *Network* menu allows you to send, receive and view the WATTCP.CFG file that contains the IP, gateway and other network specification information. For more information about this submenu, see Network Menu (page 42).

Exiting the Program

Press [ESC] to restart the module and force all drivers to be loaded. The module will use the configuration stored in the module's flash memory to configure the module.

4.2.4 Network Menu

From the *IEC-870-5-104 Server* menu press [0] to display the *IEC-870-5-104 Network* menu screen. The *Network* menu allows you to send, receive, and view the WATTCP.CFG file that contains the IP and module addresses, and other network information.



Transferring WATTCP.CFG to the Module

Press **[R]** to transfer a new WATTCP.CFG file from the PC to the module. Use this command to change the network configuration for the module (for example, the module's IP address).

Press **[Y]** to confirm the file transfer, and then follow the instructions on the terminal screen to complete the file transfer process.

Transferring WATTCP.CFG to the PC

Press **[S]** to transfer the WATTCP.CFG file from the module to your PC.

Press **[Y]** to confirm the file transfer, and then follow the instructions on the terminal screen to complete the file transfer process.

After the file has been successfully transferred, you can open and edit the file to change the module's network configuration.

Viewing the WATTCP.CFG File on the module

Press **[V]** to view the module's WATTCP.CFG file. Use this command to confirm the module's current network settings.

```
WATTCP.CFG FILE:
# ProLinx Communication Gateways, Inc.
# Default private class 3 address
my_ip=192.168.0.75
# Default class 3 network mask
netmask=255.255.255.0
# name server 1 up to 9 may be included
# nameserver=xxx.xxx.xxx.xxx
# name server 2
# nameserver=xxx.xxx.xxx.xxx
# The gateway I wish to use
gateway=192.168.0.1
# some networks (class 2) require all three parameters
# gateway.network.subnetmask
# gateway 192.168.0.1,192.168.0.0,255.255.255.0
# The name of my network
# domainslist="mynetwork.name"
```

Returning to the Main Menu

Press **[M]** to return to the *Main* menu.

4.3 Reading Status Data from the Module

The MVI71-GEC module returns a status data set to the PLC processor in each read block. This data is transferred to the PLC processor continuously with each read block.

The Configuration/Debug port provides the following functionality:

- Full view of the module's configuration data
- View of the module's status data
- Version Information
- Control over the module (warm boot and cold boot)
- Facility to upload and download the module's configuration file

5 Reference

In This Chapter

- ❖ Product Specifications 46
- ❖ Functional Overview 48
- ❖ Cable Connections 66
- ❖ MVI71-GEC Status Data Area 70
- ❖ MVI71-GEC Configuration Data 74

5.1 Product Specifications

The MVI71 Generic ASCII Ethernet Interface module is designed to allow PLC processors to interface easily with ASCII devices using the TCP/IP protocol. Compatible devices may be either ASCII instruments with built-in Ethernet or Ethernet connection via a thin server to the existing ASCII device.

Five servers and Clients are present on the module permitting both the reception and transmission of data between the Rockwell Automation processor and attached devices.

The MVI71-GEC module is a powerful communication interface for PLC processors. Developed under license from Rockwell Automation, the module incorporates proprietary backplane technology that enables powerful data access between the module and the PLC processor.

5.1.1 General Specifications

- Single Slot - 1771 backplane compatible
- The module is recognized as an Input/Output module and has access to processor memory for data transfer between processor and module
- Ladder Logic is used for data transfer between module and processor.
Sample ladder file included.

5.1.2 Hardware Specifications

Specification	Description
Form Factor	Single Slot 1771 chassis compatible BTR/BTW data transfer Local or remote rack
Backplane current load	800 mA @ 5 V
Operating temperature	32 to 140°F (0°C to 60°C)
Storage temperature	-40°F to 185°F (-40°C to 85°C)
Shock	30g operational 50g non-operational
Vibration	5 g from 10150 Hz
Relative Humidity	5% to 95%, RH with no condensation
LED Indicators	Module status Backplane transfer status Application status Serial activity and error LED status
Configuration Serial Port (CFG)	DB-9M PC compatible RS-232 Hardware handshaking
Ethernet Port (Ethernet modules)	RJ45 Connector Link and activity LED indicators Electrical Isolation 1500 V rms at 50 Hz to 60 Hz for 60 s, applied as specified in section 5.3.2 of IEC 60950: 1991 Ethernet Broadcast Storm Resiliency = less than or equal to 5000 [ARP] frames-per-second and less than or equal to 5 minutes duration

5.1.3 Functional Specifications

- Five Servers and Clients to receive and/or transmit data
- 10/100 Base-T Ethernet-compatible interface
- Configurable parameters
 - Service port number
 - Connection timeout
 - Close type
- Simple ladder logic operation
- Setup and monitoring through RS-Logix 5 software and user-constructed configuration file (GEC.CFG)
- PLC backplane interface via I/O access
- Each Server monitors
 - State
 - IP and port number of connected Client
 - Error codes
- Each Client monitors
 - State
 - IP and port number of connected Server
 - Message related parameters
- ASCII character strings up to 2048 characters in length supported
- Full hardware handshaking control, providing radio, modem, and multi-drop support
- User-definable module memory usage, supporting the storage and transfer of up to 4000 bytes to/from the control processor
- Module error and status conditions returned to processor for diagnostic purposes
 - Module status
 - Port error status word (bit mapped)
 - Port receive state
 - Port receive character count
 - Port receive block count
 - Port transmit state
 - Port transmit character count
 - Port transmit block count

5.2 Functional Overview

5.2.1 General Concepts

The following discussion explains several concepts that are important for understanding module operation.

Module Power Up

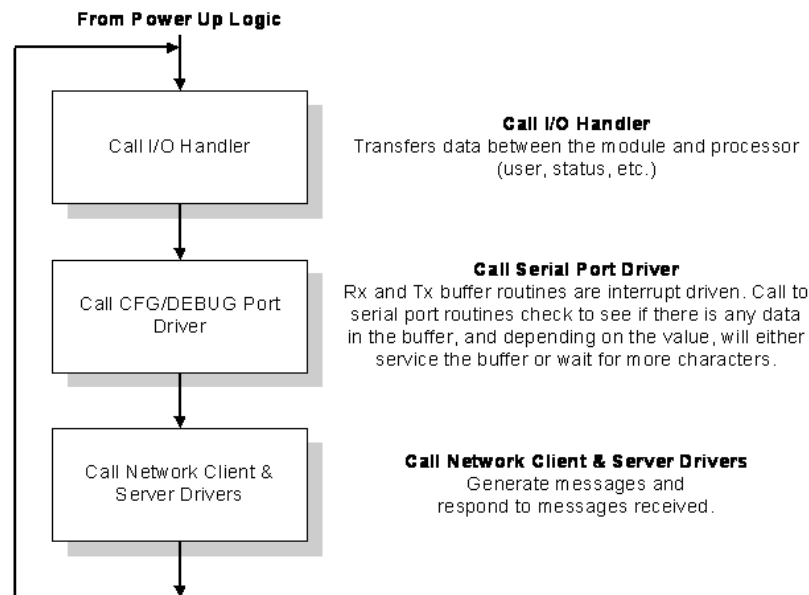
On power up the module begins performing the following logical functions:

- 1 Initialize hardware components
 - Initialize PLC backplane driver
 - Test and clear all RAM
 - Initialize the serial communication ports
- 2 Read configuration for module from GEC.CFG file on Compact Flash Disk
- 3 Initialize servers
- 4 Set up the serial communication interface for the debug/configuration port

After the module has received the configuration, the module will begin receiving and transmitting messages with devices on the Ethernet network.

Main Logic Loop

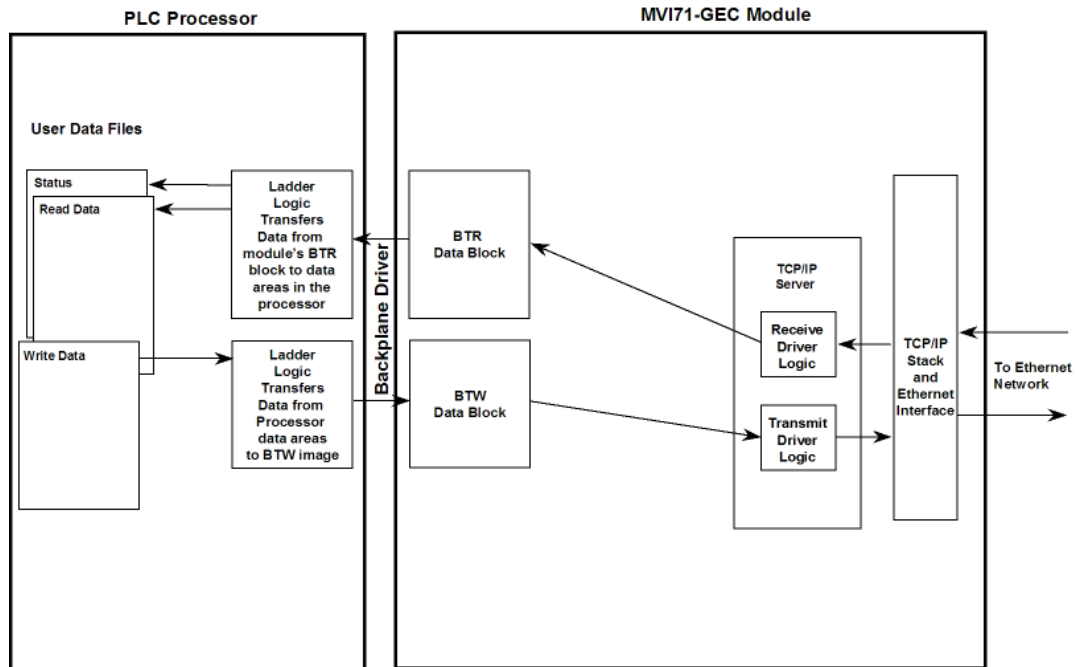
Upon completing the power-up configuration process, the module enters an infinite loop that performs the functions shown in the following diagram.



Block Transfer Backplane Data Transfer

The MVI71-GEC module communicates directly over the PLC backplane. Data is paged between the module and the PLC processor across the backplane using BTR and BTW operations. Data is transferred from the module to the processor using the BTR blocks, and data is transferred from the processor to the module using BTW blocks.

The following illustration shows the data transfer method used to move data between the PLC processor, the MVI71-GEC module, and the Ethernet network.



All data transferred between the module and the processor over the backplane is through the BTR and BTW blocks. Ladder logic must be written in the PLC processor to interface the block data with user data files.

Normal Data Transfer

Normal data transfer includes the transferring of data received or to be transmitted on the servers and the status data. These data are transferred through read (BTR) and write (BTW) blocks. Refer to **Module Configuration** for a description of the ladder logic required to perform the data movement within the PLC processor. The structure and function of each block is discussed in the following topics.

Read Block

These blocks of data transfer information from the module to the PLC processor. When data is received on one of the servers, a data block is built. The structure of this block type is shown in the following table.

	Word Offset	Description
	0	Block Sequence Number (Bumped each scan by module)
Received Data	1	Server Number for data received. If the word contains a value of -1 or -2, no receive data is present and the block contains status data. If the word contains a value from 0 to 4, the block contains data from one of the servers in the module.
	2	Number of characters (0 to 110) in receive block (3 to 57). If the receive data in the module is larger than 110 bytes, multiple blocks will be transferred. Any block with a value of -1 in this field represents the first or continuation block and the block contains 110 bytes of data. The last block of data will contain a positive number in this field that represents the number of characters in the last block.
	3 to 57	110 bytes of data received for specified server.
	58	Server 0 State
	59	Server 1 State
	60	Server 2 State
	61	Server 3 State
	62	Server 4 State
	63	Number of characters processed from last write block.

Word Offset 0 contains an index value used to signal to the PLC processor that a new block is ready for processing. The ladder logic must recognize a change in this value and process the data encapsulated. If data is available for a server, a block containing data received is passed to the processor.

Word Offset 1 contains the server index (0 to 4) that is sending the data to the processor.

Word Offset 2 contains a value that determines the number of characters (or bytes) in the data area of the block. If the server receives a message longer than 110 bytes, it must send the received message in multiple blocks to the processor. In this case, the byte count field of the block will be set to -1 for each block where more than 110 characters are being sent by the server. Each block with a byte count field of -1 contains 110 bytes of data. The data set is located in the block starting at word offset 3. When the last block of data to send by the server is less than or equal to 110 bytes, the byte count field will be set to a number from 1 to 110. This signifies to the processor that this is the last block. The ladder logic must handle data received on each server enabled in the module.

If no data is available, the module will page one of the two status data images to the processor. If word 1 of the BTR block is set to -1, the data for the first three servers, the product and block transfer data is sent in the block. The format of this block is as follows:

Object in GSCInStat	Block Offset Start	Description
Seq Number	0	Sequence number for this block.
Server Index	1	For this status data block, this word is set to a value of -1.
PassCnt	2	Program cycle counter
Product	3	Product name as ASCII string
Rev	5	Revision level as ASCII string
OP	7	Operating system level as ASCII string
Run	9	Run number as ASCII string
BlkErrs.Read	11	Number of blocks transferred from module to processor
BlkErrs.Write	12	Number of blocks transferred from processor to module
BlkErrs.Parse	13	Number of blocks parsed by module
BlkErrs.Err	14	Number of block errors in module
Server[0].Enabled	15	This flag defines if the server is utilized. A value of 0 indicates the server is not used. Any other value indicates the server is used.
Server[0].State	16	This flag defines the current state of the server.
Server[0].IP	17	This double-word value contains the IP address of the client connected to the server.
Server[0].Port	19	This word value contains the port address for the client connected to the server.
Server[0].Open	20	This status value contains the total number of times the server performed an open operation.
Server[0].Established	21	This status value contains the total number of times a connection was established on the socket.
Server[0].Closed	22	This status value contains the total number of times a close operation was performed on the socket.
Server[0].RxCount	23	This status value contains the total number of messages received by the server.
Server[0].RxOverflow	24	This status value contains the total number of messages received that exceed the specified buffer size for the server.
Server[0].TxCount	25	This status value contains the total number of messages transmitted by the server.
Server[0].TxOverflow	26	This status value contains the total number of transmit messages that exceeded the specified maximum buffer size for the server.
Server[0].Timeout	27	This status value contains the total number of times a connection timeout occurred on the socket.
Server[0].CfgErrWord	28	This bit mapped word defines the configuration errors for the server.
Server[1].Enabled	29	This flag defines if the server is utilized. A value of 0 indicates the server is not used. Any other value indicates the server is used.
Server[1].State	30	This flag defines the current state of the server.
Server[1].IP	31	This double-word value contains the IP address of the client connected to the server.

Object in GSCInStat	Block Offset Start	Description
Server[1].Port	33	This word value contains the port address for the client connected to the server.
Server[1].Open	34	This status value contains the total number of times the server performed an open operation.
Server[1].Established	35	This status value contains the total number of times a connection was established on the socket.
Server[1].Closed	36	This status value contains the total number of times a close operation was performed on the socket.
Server[1].RxCount	37	This status value contains the total number of messages received by the server.
Server[1].RxOverflow	38	This status value contains the total number of messages received that exceed the specified buffer size for the server.
Server[1].TxCount	39	This status value contains the total number of messages transmitted by the server.
Server[1].TxOverflow	40	This status value contains the total number of transmit messages that exceeded the specified maximum buffer size for the server.
Server[1].Timeout	41	This status value contains the total number of times a connection timeout occurred on the socket.
Server[1].CfgErrWord	42	This bit mapped word defines the configuration errors for the server.
Server[2].Enabled	43	This flag defines if the server is utilized. A value of 0 indicates the server is not used. Any other value indicates the server is used.
Server[2].State	44	This flag defines the current state of the server.
Server[2].IP	45	This double-word value contains the IP address of the client connected to the server.
Server[2].Port	47	This word value contains the port address for the client connected to the server.
Server[2].Open	48	This status value contains the total number of times the server performed an open operation.
Server[2].Established	49	This status value contains the total number of times a connection was established on the socket.
Server[2].Closed	50	This status value contains the total number of times a close operation was performed on the socket.
Server[2].RxCount	51	This status value contains the total number of messages received by the server.
Server[2].RxOverflow	52	This status value contains the total number of messages received that exceed the specified buffer size for the server.
Server[2].TxCount	53	This status value contains the total number of messages transmitted by the server.
Server[2].TxOverflow	54	This status value contains the total number of transmit messages that exceeded the specified maximum buffer size for the server.
Server[2].Timeout	55	This status value contains the total number of times a connection timeout occurred on the socket.

Object in GSCInStat	Block Offset Start	Description
Server[2].CfgErrWord	56	This bit mapped word defines the configuration errors for the server.
Reserved	57 to 62	This data area is reserved for future use.
Last Write Count	63	This word contains the number of characters written on server from last BTR block.

If the word 1 of the BTR block is set to -2, the data for the last two servers is passed to the processor. The format of this block is as follows:

Object in GSCInStat	Block Offset Start	Description
Seq Number	0	Sequence number for this block.
Server Index	1	For this status data block, this word is set to a value of -2.
PassCnt	2	Program cycle counter
Product	3	Product name as ASCII string
Rev	5	Revision level as ASCII string
OP	7	Operating system level as ASCII string
Run	9	Run number as ASCII string
BlkErrs.Read	11	Number of blocks transferred from module to processor
BlkErrs.Write	12	Number of blocks transferred from processor to module
BlkErrs.Parse	13	Number of blocks parsed by module
BlkErrs.Err	14	Number of block errors in module
Server[3].Enabled	15	This flag defines if the server is utilized. A value of 0 indicates the server is not used. Any other value indicates the server is used.
Server[3].State	16	This flag defines the current state of the server.
Server[3].IP	17	This double-word value contains the IP address of the client connected to the server.
Server[3].Port	19	This word value contains the port address for the client connected to the server.
Server[3].Open	20	This status value contains the total number of times the server performed an open operation.
Server[3].Established	21	This status value contains the total number of times a connection was established on the socket.
Server[3].Closed	22	This status value contains the total number of times a close operation was performed on the socket.
Server[3].RxCount	23	This status value contains the total number of messages received by the server.
Server[3].RxOverflow	24	This status value contains the total number of messages received that exceed the specified buffer size for the server.
Server[3].TxCount	25	This status value contains the total number of messages transmitted by the server.
Server[3].TxOverflow	26	This status value contains the total number of transmit messages that exceeded the specified maximum buffer size for the server.

Object in GSCInStat	Block Offset Start	Description
Server[3].Timeout	27	This status value contains the total number of times a connection timeout occurred on the socket.
Server[3].CfgErrWord	28	This bit mapped word defines the configuration errors for the server.
Server[4].Enabled	29	This flag defines if the server is utilized. A value of 0 indicates the server is not used. Any other value indicates the server is used.
Server[4].State	30	This flag defines the current state of the server.
Server[4].IP	31	This double-word value contains the IP address of the client connected to the server.
Server[4].Port	33	This word value contains the port address for the client connected to the server.
Server[4].Open	34	This status value contains the total number of times the server performed an open operation.
Server[4].Established	35	This status value contains the total number of times a connection was established on the socket.
Server[4].Closed	36	This status value contains the total number of times a close operation was performed on the socket.
Server[4].RxCount	37	This status value contains the total number of messages received by the server.
Server[4].RxOverflow	38	This status value contains the total number of messages received that exceed the specified buffer size for the server.
Server[4].TxCount	39	This status value contains the total number of messages transmitted by the server.
Server[4].TxOverflow	40	This status value contains the total number of transmit messages that exceeded the specified maximum buffer size for the server.
Server[4].Timeout	41	This status value contains the total number of times a connection timeout occurred on the socket.
Server[4].CfgErrWord	42	This bit mapped word defines the configuration errors for the server.
Reserved	43 to 62	This data area is reserved for future use.
Last Write Count	63	This word contains the number of characters written on server from last BTR block.

If word 1 of the Input Image block is set to -3, the data for the first three clients is passed to the processor. The format of this block is as follows:

Parameter	Block Offset Start	Description
Seq Number	0	Sequence number for this block.
Server Index	1	For this status data block, this word is set to a value of -3.
PassCnt	2	Program cycle counter
Product	3	Product name as ASCII string
Rev	5	Revision level as ASCII string

Parameter	Block Offset Start	Description
OP	7	Operating system level as ASCII string
Run	9	Run number as ASCII string
BlkErrs.Read	11	Number of blocks transferred from module to processor
BlkErrs.Write	12	Number of blocks transferred from processor to module
BlkErrs.Parse	13	Number of blocks parsed by module
BlkErrs.Err	14	Number of block errors in module
Client[0].Connected	15	This flag defines if the client is utilized and connected to a server. A value of 0 indicates the client is not connected and can be utilized for a connection. Any other value indicates the client is connected and being used.
Client[0].State	16	This flag defines the current state of the client.
Client[0].IP	17 & 18	This double-word value contains the IP address of the server connected to the client.
Client[0].Port	19	This word value contains the port address for the server connected to the client.
Client[0].RxCount	20	This status value contains the total number of messages received by the client.
Client[0].RxOverflow	21	This status value contains the total number of messages received that exceed the specified buffer size for the client.
Client[0].TxCount	22	This status value contains the total number of messages transmitted by the client.
Client[0].TxOverflow	23	This status value contains the total number of transmit messages that exceeded the specified maximum buffer size for the client.
Client[0].spare	24	Reserved for future use
Client[1].Connected	25	This flag defines if the client is utilized and connected to a server. A value of 0 indicates the client is not connected and can be utilized for a connection. Any other value indicates the client is connected and being used.
Client[1].State	26	This flag defines the current state of the client.
Client[1].IP	27 & 28	This double-word value contains the IP address of the server connected to the client.
Client[1].Port	29	This word value contains the port address for the server connected to the client.
Client[1].RxCount	30	This status value contains the total number of messages received by the client.
Client[1].RxOverflow	31	This status value contains the total number of messages received that exceed the specified buffer size for the client.
Client[1].TxCount	32	This status value contains the total number of messages transmitted by the client.
Client[1].TxOverflow	33	This status value contains the total number of transmit messages that exceeded the specified maximum buffer size for the client.
Client[1].spare	34	Reserved for future use

Parameter	Block Offset Start	Description
Client[2].Connected	35	This flag defines if the client is utilized and connected to a server. A value of 0 indicates the client is not connected and can be utilized for a connection. Any other value indicates the client is connected and being used.
Client[2].State	36	This flag defines the current state of the client.
Client[2].IP	37 & 38	This double-word value contains the IP address of the server connected to the client.
Client[2].Port	39	This word value contains the port address for the server connected to the client.
Client[2].RxCount	40	This status value contains the total number of messages received by the client.
Client[2].RxOverflow	41	This status value contains the total number of messages received that exceed the specified buffer size for the client.
Client[2].TxCount	42	This status value contains the total number of messages transmitted by the client.
Client[2].TxOverflow	43	This status value contains the total number of transmit messages that exceeded the specified maximum buffer size for the client.
Client[2].spare	44	Reserved for future use
Reserved	45 to 57	This data area is reserved for future use.
Server States	58 to 62	State of each of the five servers.
Last Write Count	63	This word contains the number of characters written on server from last BTR block.

If word 1 of the Input Image block is set to -4, the data for the last two clients is passed to the processor. The format of this block is as follows:

Parameter	Block Offset Start	Description
Seq Number	0	Sequence number for this block.
Server Index	1	For this status data block, this word is set to a value of -4.
PassCnt	2	Program cycle counter
Product	3	Product name as ASCII string
Rev	5	Revision level as ASCII string
OP	7	Operating system level as ASCII string
Run	9	Run number as ASCII string
BlkErrs.Read	11	Number of blocks transferred from module to processor
BlkErrs.Write	12	Number of blocks transferred from processor to module
BlkErrs.Parse	13	Number of blocks parsed by module
BlkErrs.Err	14	Number of block errors in module
Client[3].Connected	15	This flag defines if the client is utilized and connected to a server. A value of 0 indicates the client is not connected and can be utilized for a connection. Any other value indicates the client is connected and being used.
Client[3].State	16	This flag defines the current state of the client.

Parameter	Block Offset Start	Description
Client[3].IP	17 & 18	This double-word value contains the IP address of the server connected to the client.
Client[3].Port	19	This word value contains the port address for the server connected to the client.
Client[3].RxCount	20	This status value contains the total number of messages received by the client.
Client[3].RxOverflow	21	This status value contains the total number of messages received that exceed the specified buffer size for the client.
Client[3].TxCount	22	This status value contains the total number of messages transmitted by the client.
Client[3].TxOverflow	23	This status value contains the total number of transmit messages that exceeded the specified maximum buffer size for the client.
Client[3].spare	24	Reserved for future use
Client[4].Connected	25	This flag defines if the client is utilized and connected to a server. A value of 0 indicates the client is not connected and can be utilized for a connection. Any other value indicates the client is connected and being used.
Client[4].State	26	This flag defines the current state of the client.
Client[4].IP	27 & 28	This double-word value contains the IP address of the server connected to the client.
Client[4].Port	29	This word value contains the port address for the server connected to the client.
Client[4].RxCount	30	This status value contains the total number of messages received by the client.
Client[4].RxOverflow	31	This status value contains the total number of messages received that exceed the specified buffer size for the client.
Client[4].TxCount	32	This status value contains the total number of messages transmitted by the client.
Client[4].TxOverflow	33	This status value contains the total number of transmit messages that exceeded the specified maximum buffer size for the client.
Client[4].spare	34	Reserved for future use
Reserved	35 to 57	This data area is reserved for future use.
Server States	58 to 62	State of each of the five servers.
Last Write Count	63	This word contains the number of characters written on server from last BTR block.

Write Block

These blocks of data transfer information from the PLC processor to the module. The structure of the BTW blocks used to transfer this data is shown in the following table.

	Word Offset	Description
	0	Block Sequence Number (Read block number as set by module)
Transmit Data	1	Server Number for data to transmit. If the word contains a value of -1, no transmit data is present. If the word contains a value from 0 to maximum number of servers -1, the block contains data to send to the specified server in the module..
	2	Number of characters to transmit to server. Each block can transmit up to 118 bytes of data. If this word contains a value of -1, the block contains 118 bytes of data and more blocks of data are to follow. When the module received the last block containing a positive value representing the number of bytes in the block, the server will transmit the data to the client.
	3 to 61	118 bytes of data to transmit on specified server.
	62	Server Control Word
	63	Module Control Word

In Word Offset 0 the Block Sequence Number is the value set by the module received on the last read block transfer through the BTR on the module. The ladder logic should copy this value from word 0 of the BTR image to word 0 of BTW image in the ladder logic. This is the last operation performed when constructing the write block. The module's program will trigger the process write block function when a new value is recognized in word 0 of the BTW image.

Word 1 of the block defines the server index that should receive the message. If the word is set to a value of -1, there is no data in the message. A value of 0 to 4 will cause the enclosed message to be sent to the server if the message length is set to a value other than zero and the server has an open connection. Word 2 of the block defines the length of data in the block. Up to 118 bytes of data can be sent in each block starting at word offset 3 in the block. If the message to be sent to a server is longer than 118 bytes, multiple blocks are required. As long as more than 118 bytes are required to send, the message length field should be set to a value of -1 and 118 bytes of data should be placed in the block. When 118 or fewer bytes remain to be sent, the message length field should be set to that value and the remaining data placed in the block. The server will accept messages up to a length of 8192 bytes. If a message longer than 8192 bytes is sent to a server, a transmit overflow error will be recorded and the message will be sent when 8192 bytes are received. The remaining part of the message will be sent as it is received.

The last two words of the image control the server or the module. The server control word (word offset 62) controls the server. The following table lists the values recognized by the module:

Word Offset	Code	Definition
62	0	No operation to perform
	1	Close socket after transmit operation
	2	Abort socket after transmit operation

If a value of 0 is present in the field, no action is taken by the server. If a value of 1 is present in the field, the server will close the socket after it transmits the message contained in the block. If a value of 2 is present, the server will send the message contained in the block and then force the connection closed by sending a reset message to the client.

Word 63 is utilized to control the module. Two commands are recognized by the module as displayed in the following table.

Word Offset	Code	Definition
63	0	No operation to perform
	-1	Warm boot module
	-2	Cold boot module
	-30	Close server 0
	-31	Close server 1
	-32	Close server 2
	-33	Close server 3
	-34	Close server 4

The module performs the action specified in the command control word.

Handling Multiple Blocks

An important concept to understand about the MVI71-GEC module is how multiple blocks are handled.

The buffer size supports 4096 bytes, but the module can only send 110 bytes at each scan to the processor. For example, if a device sends a message that contains 550 bytes to the module, it will break it down to five blocks of 110 bytes. The first four blocks will set the number of characters parameter to -1, indicating that each block is part of the same message. The last block will have the number of characters parameter set to 110, indicating that there are no more blocks from that message.

The same holds true for writing data from the processor to the module, in which case you can write 118 bytes each time to the module. The module buffers all the data until it receives a block that has the number of characters parameter set to ≥ 0 . In this case, it sends all data to the client connected to that server.

The ladder logic should handle multiple blocks. The main example ladder logic is very simple and will only handle up to 110 bytes since it does not check the status of the number of characters parameter. Refer to the Reference chapter for an example of ladder logic that handles messages containing multiple blocks.

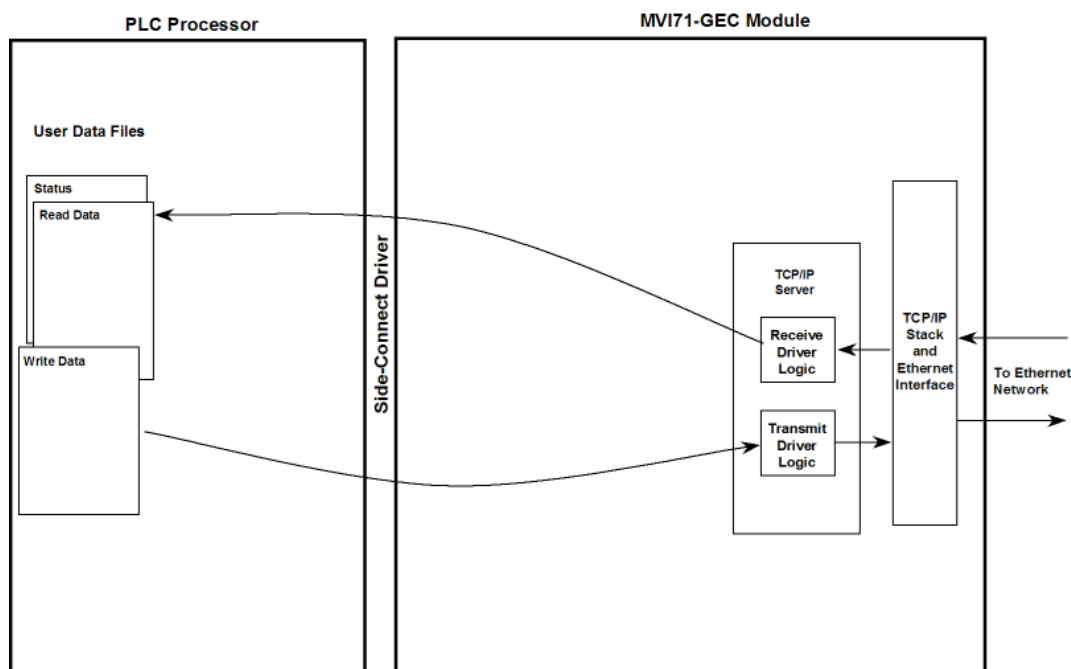
Important: You should be aware that messages are usually broken down into smaller frames by the IP layer in a specific LAN or WAN according to the Maximum Transmit Unit (MTU) of the network.

For example, a message that contains 2000 bytes can be broken down into two messages by the IP layer in the network (after it is sent to the module). The same issue is applied when a client sends data to the server; although a client sends a single message to the module, it could be broken down into smaller fragments before it gets to the module. In this case, the module would interpret it as two different messages.

It is the application layer's responsibility to define when a message is finished. Therefore, you should consider using some kind of control that allows the ladder to identify different messages as part of a single message. This could be accomplished by using a specific character at the end of each message or by using a fixed length for each message.

Side-Connect Backplane Data Transfer

The side-connect interface is the simplest method to implement the module. Minimal ladder logic is required for the interface because the driver handles data movement between the module and the processor automatically. Additionally, this interface is much faster than the block transfer interface. The data flow associated with this interface is shown in the following diagram:



The value found in the SC_DATA.TXT file on the module determines the starting file number for the side-connect interface. The following table lists the files required for the side-connect interface:

File Number	Example	Size	Description
Cfg File	N10	250	Data transferred from the processor to the module
Cfg File+1	N11	250	Data transferred from the module to the processor

The first file is used by the module to read data placed in the file by the processor. The second file places received data from the network into the processor. It is very important that these files be defined to prevent the processor from faulting.

These files have fixed formats that are discussed below. Data received by the servers on the modules is passed to the read data file. The format of this file is shown in the following table.

	Word Offset	Description
	0	Server Number for data received. If the word contains a value of -1, no receive data is present. If the word contains a value from 0 to 4, the block contains data from one of the servers in the module.
Received Data	1	Number of characters (0 to 200) in receive block (2 to 101). If the receive data in the module is larger than 200 bytes, multiple blocks will be transferred. Any block with a value of -1 in this field represents the first or continuation block and the block contains 200 bytes of data. The last block of data will contain a positive number in this field that represents the number of characters in the last block.
	2 to 101	200 bytes of data received for specified server.
Module Status	102 to 184	This data area contains the status data block. Each block transferred to the processor contains this set of information.
	185 to 247	Spare data area for future use.
	248	Number of characters processed from last write block.
	249	Block Sequence Number (Bumped each scan by module)

Word 249 is used as a sequence number for the block of data presented to the processor. When this number changes, the processor should read the new block of data. Word 248 of the block informs the PLC processor of the number of bytes processed from the last write block. Word 0 of the block informs the processor the source of the data. If the word is set to a value of -1, the block does not contain any received data and only the status data (words 102 to 184) is significant in the block. If the word contains a value of 0 to 4, this value represents the server that received the message. Ladder logic should be written to handle each enabled server in the module and to process the data received. Word 1 of the image contains a byte count of the number of characters in the received message that begins at word 2.

After the processor has processed the read block, it should prepare a write block for the module. The format of this block (built in the write file) is shown in the following table.

	Word Offset	Description
	0	Block Sequence Number (Read block number as set by module)
Transmit Data	1	Server Number for data to transmit. If the word contains a value of -1, no transmit data is present. If the word contains a value from 0 to max number of servers -1, the block contains data to send to the specified server in the module..
	2	Number of characters to transmit to server. Each block can transmit up to 400 bytes of data. If this word contains a value of -1, the block contains 400 bytes of data and more blocks of data are to follow. When the module received the last block containing a positive value representing the number of bytes in the block, the server will transmit the data to the client.
	3 to 202	Data to transmit on specified server.
	203 to 245	Reserved for future use
	246	Server Control Word
	247	Module Control Word

Words 246 and 247 control the server and module as discussed in the previous section. If data is to be transmitted to a server, word 1 should be set to the appropriate server index value. If a value of -1 is placed in the word, no transmit data will be processed by the module (null transmit block). The number of bytes in the message to transmit must be placed in word 2 and the data placed in the block starting at word 3. After the block is constructed, the ladder logic should copy the last block sequence number received in the last read block into word 0 of the write block. This will trigger the module to process the new write data block and to construct a new read block.

Network Data Transfer

In order for data to be transferred between the module and another device, a TCP/IP connection must be made between a client and a server on the module. The MVI71-GEC module contains five servers that listen on the user assigned service ports waiting for a connection. When a client devices wishes to send data to the module, it must open a TCP/IP connection to the module. After the connection is established, either device can send and receive data. When either device is finished with the connection, the connection must be closed. This operation can be initiated from either end device.

The MVI71-GEC module servers are configured to handle their TCP/IP session independently. The user parameter Connection Timeout is utilized to determine the amount of time a connection can remain idle before the server will close the connection. If the parameter is set to 0, the server will not perform the timeout logic and the socket will never be closed by the server on an idle condition. If this feature is utilized, it can prevent connections that may be lost and were not properly closed. For example, if the link between the client and the server is lost (broken connection), the server will attempt to gently close the connection after the timeout expires. When no response is received from the client, the server will abort the connection and set up to accept a new connection. If the connection timeout feature was not utilized in the situation above, the server will not be available until the TCP/IP stack closes the socket.

Each server on the module is assigned its own server port number. This does not mean that two or more servers cannot share the same port number. In fact this might be desirable in some instances. It is up to the ladder logic to keep track of each message and to insure that a request/response transaction is associated with the correct connection. Information to keep track of each connection is passed in each input image. The status data set provides the IP address and TCP port address for the connection on each server. Each message transferred between the module and the processor has a server index word. This word associates the message with a server, which is associated with a connection to a specific IP address and TCP port address. Therefore, each connection is specified to the processor by the server index. The following illustration shows a snapshot of the modules status data:

Server	Status Data	Description of Server
Server 0	IP of Host (192.168.0.100) Port of Host (1243) State = 1	This server is connected (State=1) to IP address 192.168.0.100 on TCP port 1243.
Server 1	IP of Host (192.168.0.100) Port of Host (1244) State = 1	This server is connected (State=1) to IP address 192.168.0.100 on TCP port 1244.
Server 2	IP of Host (192.168.0.101) Port of Host (56443) State = 1	This server is connected (State=1) to IP address 192.168.0.101 on TCP port 56443.
Server 3	IP of Host (192.168.0.102) Port of Host (7943) State = 1	This server is connected (State=1) to IP address 192.168.0.102 on TCP port 7943.
Server 4	IP of Host (0.0.0.0) Port of Host (0) State = 0	This server is not connected (State not equal to 1) and is waiting for a connection.

Ladder logic can send messages to the clients connected to servers 0 to 3. Messages sent to server 4 will not be sent from the module because there is no connection active on that server.

Each server has a state value in the status data area. This value is utilized by the ladder logic to determine if a connection is present on server. The following table defines the state status values used by each server:

State Value	Definition
-1	Server is initializing and is being set up to listen.
0	The server is waiting for a client to establish a connection.
1	The server has established a connection with a client and can send or receive data.
1000	The server has initiated a close operation on the connection.
1001	The server is waiting for the close on the connection to complete.
1002	The server is issuing an abort (reset) on the connection. The socket is forced closed.
3000	The client is issuing the ARP command request and waiting for the response.
3001	The client has received the ARP response and has opened the socket.

Ladder logic should only direct messages to servers that have a state status value of 1. The module will ignore all messages sent to servers with any other state value.

When the ladder logic sends a message to a server, it can request that the socket be closed after the message is sent. The server control word in the output image is used for this purpose. Place a value of 1 in this register to gently close the connection after the message is sent. If a value of 2 is placed in the register, the server will abort the connection to force the socket closed (send a message with the Reset Flag set to the client). Most applications will have the client close the socket.

5.3 Cable Connections

The MVI71-GEC module has the following functional communication connections installed:

- One Ethernet port (RJ45 connector)
- One RS-232 Configuration/Debug port (RJ45 connector)

5.3.1 Ethernet Connection

The MVI71-GEC module has an RJ45 port located on the front of the module, labeled *Ethernet*, for use with the TCP/IP network. The module is connected to the Ethernet network using an Ethernet cable between the module's Ethernet port and an Ethernet switch or hub.

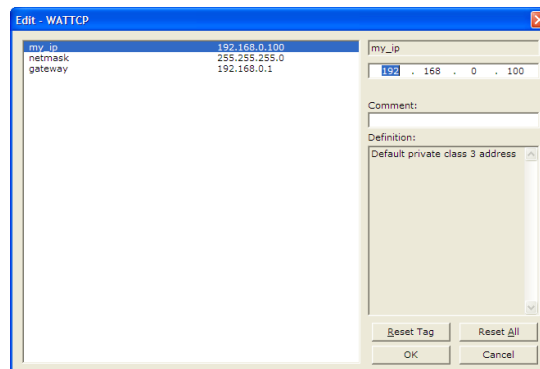
Note: Depending on hardware configuration, you may see more than one RJ45 port on the module. The Ethernet port is labeled *Ethernet*.

Warning: The MVI71-GEC module is NOT compatible with Power Over Ethernet (IEEE802.3af / IEEE802.3at) networks. Do NOT connect the module to Ethernet devices, hubs, switches or networks that supply AC or DC power over the Ethernet cable. Failure to observe this precaution may result in damage to hardware, or injury to personnel.

Important: The module requires a static (fixed) IP address that is not shared with any other device on the Ethernet network. Obtain a list of suitable IP addresses from your network administrator BEFORE configuring the Ethernet port on this module.

Ethernet Port Configuration - wattcp.cfg

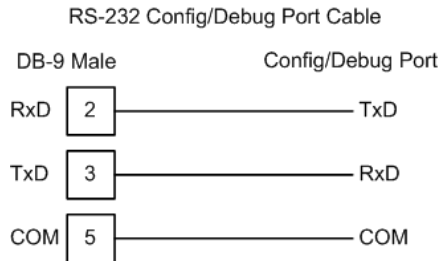
The wattcp.cfg file must be set up properly in order to use a TCP/IP network connection. You can view the current network configuration in *ProSoft Configuration Builder (PCB)*, as shown:



You may also view the network configuration using a PC serial port connection and an ASCII terminal program (like Windows HyperTerminal) by selecting **[@]** (Network Menu) and **[V]** (View) options when connected to the Debug port. For more information on serial port access, see the chapter on Diagnostics and Troubleshooting (page 33).

5.3.2 RS-232 Configuration/Debug Port

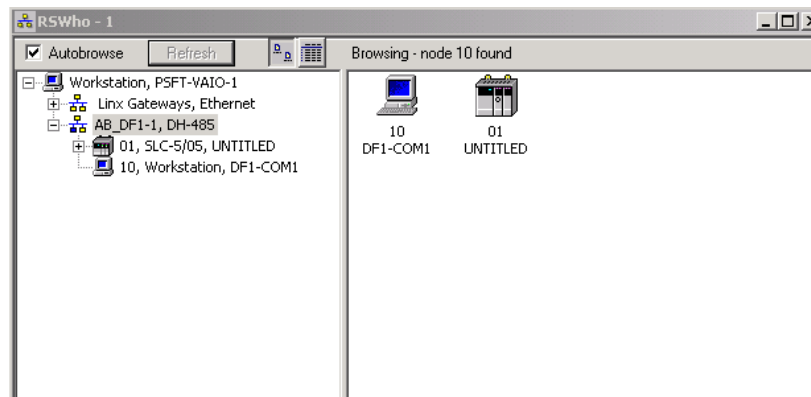
This port is physically an RJ45 connection. An RJ45 to DB-9 adapter cable is included with the module. This port permits a PC-based terminal emulation program to view configuration and status data in the module and to control the module. The cable pinout for communications on this port is shown in the following diagram.



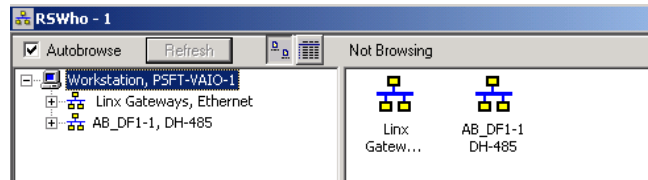
Disabling the RSLinx Driver for the Com Port on the PC

The communication port driver in *RSLinx* can occasionally prevent other applications from using the PC's COM port. If you are not able to connect to the module's configuration/debug port using *ProSoft Configuration Builder (PCB)*, *HyperTerminal* or another terminal emulator, follow these steps to disable the *RSLinx* driver.

- 1 Open *RSLinx* and go to **COMMUNICATIONS > RSWHO**.
- 2 Make sure that you are not actively browsing using the driver that you wish to stop. The following shows an actively browsed network.



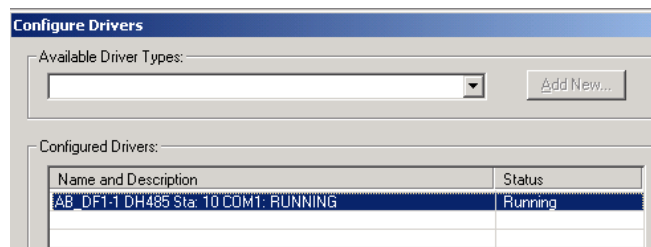
- 3 Notice how the DF1 driver is opened, and the driver is looking for a processor on node 1. If the network is being browsed, then you will not be able to stop this driver. To stop the driver your *RSWho* screen should look like this:



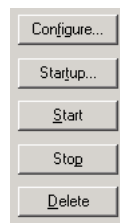
Branches are displayed or hidden by clicking on the  or the  icons.



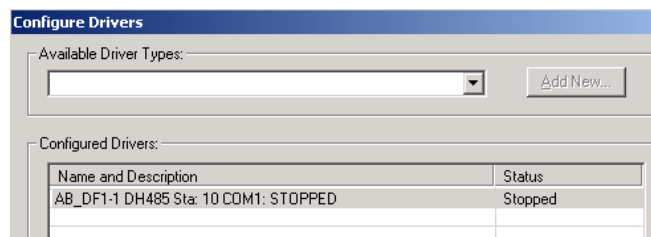
- 4 When you have verified that the driver is not being browsed, go to **COMMUNICATIONS > CONFIGURE DRIVERS**. You may see something like this:



If you see the status as running, you will not be able to use this com port for anything other than communication to the processor. To stop the driver press the **STOP** button on the side of the window:



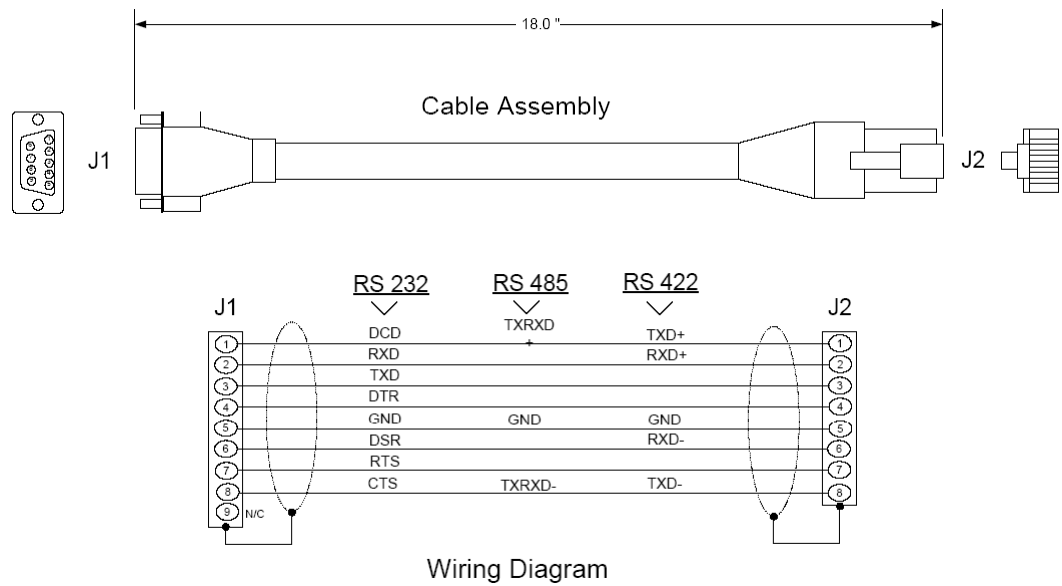
- 5 After you have stopped the driver you will see the following.



- 6 You may now use the com port to connect to the debug port of the module.

Note: You may need to shut down and restart your PC before it will allow you to stop the driver (usually only on *Windows NT* machines). If you have followed all of the above steps, and it will not stop the driver, then make sure you do not have *RSLogix* open. If *RSLogix* is not open, and you still cannot stop the driver, then reboot your PC.

5.3.3 DB9 to RJ45 Adaptor (Cable 14)



5.4 MVI71-GEC Status Data Area

This section contains a listing of the data contained in the MVI71-GEC status data object.

Object In GSCInStat	Block Offset Start	Description
PassCnt	102	Program cycle counter
Product	103	Product name as ASCII string
Rev	105	Revision level as ASCII string
OP	107	Operating system level as ASCII string
Run	109	Run number as ASCII string
BlkErrs.Read	111	Number of blocks transferred from module to processor
BlkErrs.Write	112	Number of blocks transferred from processor to module
BlkErrs.Parse	113	Number of blocks parsed by module
BlkErrs.Err	114	Number of block errors in module
Server[0].Enabled	115	This flag defines if the server is utilized. Y indicates that the server is enabled. N indicates that the server is disabled as ASCII string.
Server[0].State	116	This flag defines the current state of the server.
Server[0].IP	117	This double-word value contains the IP address of the client connected to the server.
Server[0].Port	119	This word value contains the port address for the client connected to the server.
Server[0].Open	120	This status value contains the total number of times the server performed an open operation.
Server[0].Established	121	This status value contains the total number of times a connection was established on the socket.
Server[0].Closed	122	This status value contains the total number of times a close operation was performed on the socket.
Server[0].RxCount	123	This status value contains the total number of messages received by the server.
Server[0].RxOverflow	124	This status value contains the total number of messages received that exceed the specified buffer size for the server.
Server[0].TxCount	125	This status value contains the total number of messages transmitted by the server.
Server[0].TxOverflow	126	This status value contains the total number of transmit messages that exceeded the specified maximum buffer size for the server.
Server[0].Timeout	127	This status value contains the total number of times a connection timeout occurred on the socket.
Server[0].CfgErrWord	128	This bit mapped word defines the configuration errors for the server.
Server[1].Enabled	129	This flag defines if the server is utilized. Y indicates that the server is enabled. N indicates that the server is disabled as ASCII string.
Server[1].State	130	This flag defines the current state of the server.

Object In GSCInStat	Block Offset Start	Description
Server[1].IP	131	This double-word value contains the IP address of the client connected to the server.
Server[1].Port	133	This word value contains the port address for the client connected to the server.
Server[1].Open	134	This status value contains the total number of times the server performed an open operation.
Server[1].Established	135	This status value contains the total number of times a connection was established on the socket.
Server[1].Closed	136	This status value contains the total number of times a close operation was performed on the socket.
Server[1].RxCount	137	This status value contains the total number of messages received by the server.
Server[1].RxOverflow	138	This status value contains the total number of messages received that exceed the specified buffer size for the server.
Server[1].TxCount	139	This status value contains the total number of messages transmitted by the server.
Server[1].TxOverflow	140	This status value contains the total number of transmit messages that exceeded the specified maximum buffer size for the server.
Server[1].Timeout	141	This status value contains the total number of times a connection timeout occurred on the socket.
Server[1].CfgErrWord	142	This bit mapped word defines the configuration errors for the server.
Server[2].Enabled	143	This flag defines if the server is utilized. Y indicates that the server is enabled. N indicates that the server is disabled as ASCII string.
Server[2].State	144	This flag defines the current state of the server.
Server[2].IP	145	This double-word value contains the IP address of the client connected to the server.
Server[2].Port	147	This word value contains the port address for the client connected to the server.
Server[2].Open	148	This status value contains the total number of times the server performed an open operation.
Server[2].Established	149	This status value contains the total number of times a connection was established on the socket.
Server[2].Closed	150	This status value contains the total number of times a close operation was performed on the socket.
Server[2].RxCount	151	This status value contains the total number of messages received by the server.
Server[2].RxOverflow	152	This status value contains the total number of messages received that exceed the specified buffer size for the server.
Server[2].TxCount	153	This status value contains the total number of messages transmitted by the server.
Server[2].TxOverflow	154	This status value contains the total number of transmit messages that exceeded the specified maximum buffer size for the server.

Object In GSCInStat	Block Offset Start	Description
Server[2].Timeout	155	This status value contains the total number of times a connection timeout occurred on the socket.
Server[2].CfgErrWord	156	This bit mapped word defines the configuration errors for the server.
Server[3].Enabled	157	This flag defines if the server is utilized. Y indicates that the server is enabled. N indicates that the server is disabled as ASCII string.
Server[3].State	158	This flag defines the current state of the server.
Server[3].IP	159	This double-word value contains the IP address of the client connected to the server.
Server[3].Port	161	This word value contains the port address for the client connected to the server.
Server[3].Open	162	This status value contains the total number of times the server performed an open operation.
Server[3].Established	163	This status value contains the total number of times a connection was established on the socket.
Server[3].Closed	164	This status value contains the total number of times a close operation was performed on the socket.
Server[3].RxCount	165	This status value contains the total number of messages received by the server.
Server[3].RxOverflow	166	This status value contains the total number of messages received that exceed the specified buffer size for the server.
Server[3].TxCount	167	This status value contains the total number of messages transmitted by the server.
Server[3].TxOverflow	168	This status value contains the total number of transmit messages that exceeded the specified maximum buffer size for the server.
Server[3].Timeout	169	This status value contains the total number of times a connection timeout occurred on the socket.
Server[3].CfgErrWord	170	This bit mapped word defines the configuration errors for the server.
Server[4].Enabled	171	This flag defines if the server is utilized. Y indicates that the server is enabled. N indicates that the server is disabled as ASCII string.
Server[4].State	172	This flag defines the current state of the server.
Server[4].IP	173	This double-word value contains the IP address of the client connected to the server.
Server[4].Port	175	This word value contains the port address for the client connected to the server.
Server[4].Open	176	This status value contains the total number of times the server performed an open operation.
Server[4].Established	177	This status value contains the total number of times a connection was established on the socket.
Server[4].Closed	178	This status value contains the total number of times a close operation was performed on the socket.

Object In GSCInStat	Block Offset Start	Description
Server[4].RxCount	179	This status value contains the total number of messages received by the server.
Server[4].RxOverflow	180	This status value contains the total number of messages received that exceed the specified buffer size for the server.
Server[4].TxCount	181	This status value contains the total number of messages transmitted by the server.
Server[4].TxOverflow	182	This status value contains the total number of transmit messages that exceeded the specified maximum buffer size for the server.
Server[4].Timeout	183	This status value contains the total number of times a connection timeout occurred on the socket.
Server[4].CfgErrWord	184	This bit mapped word defines the configuration errors for the server.

5.5 MVI71-GEC Configuration Data

This section contains a listing of the parameters and their definitions for the MVI71-GEC module configuration file definition.

5.5.1 MVI71-GEC Server Communication Module Configuration

[Section]/Item	Value	Range	Description
[MODULE]			Module parameter definitions
Module Name:		0 to 80 characters	This parameter assigns a name to the module that can be viewed using the configuration/debug port. Use this parameter to identify the module and the configuration file.
[Section]/Item	Value	Range	Description
[Server 0]			Server definitions
Enabled:		Yes or No	This parameter determines if the server will be utilized by the module. If a value of "Yes" is entered, the server will be used. Any other value will disable the server.
Service Port Number:		1 to 65535	This parameter sets the TCP/IP service port for this server. Each server can have its own unique service port or can share the same number with other servers.
Connection Timeout:		0 or 5000 to 65535	This parameter specifies the number of milliseconds the server will permit the server to be inactive after a connection is made before closing the socket. This timeout period is reset on each read or write packet. If the parameter is set to 0, the connection will not timeout.
Connection Close Type:		0, 1 or 2	This coded parameter defines the personality of the server after a connection is made. If the parameter is set to 0, the socket will only be closed when a request from the client is received or the connection timeout is exceeded. If a value of 1 is selected, the server will close the socket after it transmits a single message. If a value of 2 is selected, the server will close the socket after it receives a message.
Swap Rx Data Bytes:		Yes or No	This parameter is determines if the data received by the server will have the byte order of the data swapped. If the parameter is set to No, no byte swapping will occur. If the parameter is set to Yes, the odd byte will be swapped with the even byte in each word of data received.
Swap Tx Data Bytes:		Yes or No	This parameter is determines if the data to be transmitted by the server will have the byte order of the data swapped. If the parameter is set to No, no byte swapping will occur. If the parameter is set to Yes, the odd byte will be swapped with the even byte in each word of data received.

Note: Add other [Server n] sections for each server to be utilized.

[Section]/Item	Value	Range	Description
[Server n]			Server definitions
Enabled:		Yes or No	This parameter determines if the server will be utilized by the module. If a value of "Yes" is entered, the server will be used. Any other value will disable the server.
Service Port Number:		1 to 65535	This parameter sets the TCP/IP service port for this server. Each server can have its own unique service port or can share the same number with other servers.
Connection Timeout:		0 or 5000 to 65535	This parameter specifies the number of milliseconds the server will permit the server to be inactive after a connection is made before closing the socket. This timeout period is reset on each read or write packet. If the parameter is set to 0, the connection will not timeout.
Connection Close Type:		0, 1 or 2	This coded parameter defines the personality of the server after a connection is made. If the parameter is set to 0, the socket will only be closed when a request from the client is received or the connection timeout is exceeded. If a value of 1 is selected, the server will close the socket after it transmits a single message. If a value of 2 is selected, the server will close the socket after it receives a message.
Swap Rx Data Bytes:		Yes or No	This parameter is determines if the data received by the server will have the byte order of the data swapped. If the parameter is set to No, no byte swapping will occur. If the parameter is set to Yes, the odd byte will be swapped with the even byte in each word of data received.
Swap Tx Data Bytes:		Yes or No	This parameter is determines if the data to be transmitted by the server will have the byte order of the data swapped. If the parameter is set to No, no byte swapping will occur. If the parameter is set to Yes, the odd byte will be swapped with the even byte in each word of data received.

6 Support, Service & Warranty

In This Chapter

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- ❖ Return Material Authorization (RMA) Policies and Conditions..... 79
- ❖ LIMITED WARRANTY 81

Contacting Technical Support

ProSoft Technology, Inc. (ProSoft) 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, an after-hours answering system allows 24-hour/7-days-a-week pager access to one of our qualified Technical and/or Application Support Engineers. Detailed contact information for all our worldwide locations is available on the following page.

Internet	Web Site: www.prosoft-technology.com/support E-mail address: support@prosoft-technology.com
Asia Pacific (location in Malaysia)	Tel: +603.7724.2080, E-mail: asiapc@prosoft-technology.com Languages spoken include: Chinese, English
Asia Pacific (location in China)	Tel: +86.21.5187.7337 x888, E-mail: asiapc@prosoft-technology.com Languages spoken include: Chinese, English
Europe (location in Toulouse, France)	Tel: +33 (0) 5.34.36.87.20, E-mail: support.EMEA@prosoft-technology.com Languages spoken include: French, English
Europe (location in Dubai, UAE)	Tel: +971-4-214-6911, E-mail: mea@prosoft-technology.com Languages spoken include: English, Hindi
North America (location in California)	Tel: +1.661.716.5100, E-mail: support@prosoft-technology.com Languages spoken include: English, Spanish
Latin America (Oficina Regional)	Tel: +1-281-2989109, E-Mail: latinam@prosoft-technology.com Languages spoken include: Spanish, English
Latin America (location in Puebla, Mexico)	Tel: +52-222-3-99-6565, E-mail: soporte@prosoft-technology.com Languages spoken include: Spanish
Brasil (location in Sao Paulo)	Tel: +55-11-5083-3776, E-mail: brasil@prosoft-technology.com Languages spoken include: Portuguese, English

6.1 Return Material Authorization (RMA) Policies and Conditions

The following Return Material Authorization (RMA) Policies and Conditions (collectively, "RMA Policies") apply to any returned product. These RMA Policies are subject to change by ProSoft Technology, Inc., without notice. For warranty information, see Limited Warranty (page 81). In the event of any inconsistency between the RMA Policies and the Warranty, the Warranty shall govern.

6.1.1 Returning Any Product

- a) In order to return a Product for repair, exchange, or otherwise, the Customer must obtain a Return Material Authorization (RMA) number from ProSoft Technology and comply with ProSoft Technology shipping instructions.
- b) In the event that the Customer experiences a problem with the Product for any reason, Customer should contact ProSoft Technical Support at one of the telephone numbers listed above (page 77). A Technical Support Engineer will request that you perform several tests in an attempt to isolate the problem. If after completing these tests, the Product is found to be the source of the problem, we will issue an RMA.
- c) All returned Products must be shipped freight prepaid, in the original shipping container or equivalent, to the location specified by ProSoft Technology, and be accompanied by proof of purchase and receipt date. The RMA number is to be prominently marked on the outside of the shipping box. Customer agrees to insure the Product or assume the risk of loss or damage in transit. Products shipped to ProSoft Technology using a shipment method other than that specified by ProSoft Technology, or shipped without an RMA number will be returned to the Customer, freight collect. Contact ProSoft Technical Support for further information.
- d) A 10% restocking fee applies to all warranty credit returns, whereby a Customer has an application change, ordered too many, does not need, etc. Returns for credit require that all accessory parts included in the original box (i.e.; antennas, cables) be returned. Failure to return these items will result in a deduction from the total credit due for each missing item.

6.1.2 Returning Units Under Warranty

A Technical Support Engineer must approve the return of Product under ProSoft Technology's Warranty:

- a) A replacement module will be shipped and invoiced. A purchase order will be required.
- b) Credit for a product under warranty will be issued upon receipt of authorized product by ProSoft Technology at designated location referenced on the Return Material Authorization
 - i. If a defect is found and is determined to be customer generated, or if the defect is otherwise not covered by ProSoft Technology's warranty, there will be no credit given. Customer will be contacted and can request module be returned at their expense;
 - ii. If defect is customer generated and is repairable, customer can authorize ProSoft Technology to repair the unit by providing a purchase order for 30% of the current list price plus freight charges, duties and taxes as applicable.

6.1.3 Returning Units Out of Warranty

- a) Customer sends unit in for evaluation to location specified by ProSoft Technology, freight prepaid.
- b) If no defect is found, Customer will be charged the equivalent of \$100 USD, plus freight charges, duties and taxes as applicable. A new purchase order will be required.
- c) If unit is repaired, charge to Customer will be 30% of current list price (USD) plus freight charges, duties and taxes as applicable. A new purchase order will be required or authorization to use the purchase order submitted for evaluation fee.

The following is a list of non-repairable units:

ScanPort Adapters

- 1500 - All
- 1550 - Can be repaired only if defect is the power supply
- 1560 - Can be repaired only if defect is the power supply

inRAx Modules

- 3150 - All
- 3170 - All
- 3250
- 3300
- 3350
- 3600 - All
- 3700
- 3750
- 3800-MNET

ProLinux Standalone Gateways

- 4xxx - All (No hardware available to do repairs)

6.2 LIMITED WARRANTY

This Limited Warranty ("Warranty") governs all sales of hardware, software, and other products (collectively, "Product") manufactured and/or offered for sale by ProSoft Technology, Incorporated (ProSoft), and all related services provided by ProSoft, including maintenance, repair, warranty exchange, and service programs (collectively, "Services"). By purchasing or using the Product or Services, the individual or entity purchasing or using the Product or Services ("Customer") agrees to all of the terms and provisions (collectively, the "Terms") of this Limited Warranty. All sales of software or other intellectual property are, in addition, subject to any license agreement accompanying such software or other intellectual property.

6.2.1 What Is Covered By This Warranty

- a) *Warranty On New Products:* ProSoft warrants, to the original purchaser, that the Product that is the subject of the sale will (1) conform to and perform in accordance with published specifications prepared, approved and issued by ProSoft, and (2) will be free from defects in material or workmanship; provided these warranties only cover Product that is sold as new. This Warranty expires three (3) years from the date of shipment for Product purchased **on or after** January 1st, 2008, or one (1) year from the date of shipment for Product purchased **before** January 1st, 2008 (the "Warranty Period"). If the Customer discovers within the Warranty Period a failure of the Product to conform to specifications, or a defect in material or workmanship of the Product, the Customer must promptly notify ProSoft by fax, email or telephone. In no event may that notification be received by ProSoft later than 39 months from date of original shipment. Within a reasonable time after notification, ProSoft will correct any failure of the Product to conform to specifications or any defect in material or workmanship of the Product, with either new or remanufactured replacement parts. ProSoft reserves the right, and at its sole discretion, may replace unrepairable units with new or remanufactured equipment. All replacement units will be covered under warranty for the 3 year period commencing from the date of original equipment purchase, not the date of shipment of the replacement unit. Such repair, including both parts and labor, will be performed at ProSoft's expense. All warranty service will be performed at service centers designated by ProSoft.
- b) *Warranty On Services:* Materials and labor performed by ProSoft to repair a verified malfunction or defect are warranted in the terms specified above for new Product, provided said warranty will be for the period remaining on the original new equipment warranty or, if the original warranty is no longer in effect, for a period of 90 days from the date of repair.

6.2.2 What Is Not Covered By This Warranty

- a) ProSoft makes no representation or warranty, expressed or implied, that the operation of software purchased from ProSoft will be uninterrupted or error free or that the functions contained in the software will meet or satisfy the purchaser's intended use or requirements; the Customer assumes complete responsibility for decisions made or actions taken based on information obtained using ProSoft software.
- b) This Warranty does not cover the failure of the Product to perform specified functions, or any other non-conformance, defects, losses or damages caused by or attributable to any of the following: (i) shipping; (ii) improper installation or other failure of Customer to adhere to ProSoft's specifications or instructions; (iii) unauthorized repair or maintenance; (iv) attachments, equipment, options, parts, software, or user-created programming (including, but not limited to, programs developed with any IEC 61131-3, "C" or any variant of "C" programming languages) not furnished by ProSoft; (v) use of the Product for purposes other than those for which it was designed; (vi) any other abuse, misapplication, neglect or misuse by the Customer; (vii) accident, improper testing or causes external to the Product such as, but not limited to, exposure to extremes of temperature or humidity, power failure or power surges; or (viii) disasters such as fire, flood, earthquake, wind and lightning.
- c) The information in this Agreement is subject to change without notice. ProSoft shall not be liable for technical or editorial errors or omissions made herein; nor for incidental or consequential damages resulting from the furnishing, performance or use of this material. The user guide included with your original product purchase from ProSoft contains information protected by copyright. No part of the guide may be duplicated or reproduced in any form without prior written consent from ProSoft.

6.2.3 Disclaimer Regarding High Risk Activities

Product manufactured or supplied by ProSoft is not fault tolerant and is not designed, manufactured or intended for use in hazardous environments requiring fail-safe performance including and without limitation: the operation of nuclear facilities, aircraft navigation or communication systems, air traffic control, direct life support machines or weapons systems in which the failure of the product could lead directly or indirectly to death, personal injury or severe physical or environmental damage (collectively, "high risk activities"). ProSoft specifically disclaims any express or implied warranty of fitness for high risk activities.

6.2.4 Intellectual Property Indemnity

Buyer shall indemnify and hold harmless ProSoft and its employees from and against all liabilities, losses, claims, costs and expenses (including attorney's fees and expenses) related to any claim, investigation, litigation or proceeding (whether or not ProSoft is a party) which arises or is alleged to arise from Buyer's acts or omissions under these Terms or in any way with respect to the Products. Without limiting the foregoing, Buyer (at its own expense) shall indemnify and hold harmless ProSoft and defend or settle any action brought against such Companies to the extent based on a claim that any Product made to Buyer specifications infringed intellectual property rights of another party. ProSoft makes no warranty that the product is or will be delivered free of any person's claiming of patent, trademark, or similar infringement. The Buyer assumes all risks (including the risk of suit) that the product or any use of the product will infringe existing or subsequently issued patents, trademarks, or copyrights.

- a) Any documentation included with Product purchased from ProSoft is protected by copyright and may not be duplicated or reproduced in any form without prior written consent from ProSoft.
- b) ProSoft's technical specifications and documentation that are included with the Product are subject to editing and modification without notice.
- c) Transfer of title shall not operate to convey to Customer any right to make, or have made, any Product supplied by ProSoft.
- d) Customer is granted no right or license to use any software or other intellectual property in any manner or for any purpose not expressly permitted by any license agreement accompanying such software or other intellectual property.
- e) Customer agrees that it shall not, and shall not authorize others to, copy software provided by ProSoft (except as expressly permitted in any license agreement accompanying such software); transfer software to a third party separately from the Product; modify, alter, translate, decode, decompile, disassemble, reverse-engineer or otherwise attempt to derive the source code of the software or create derivative works based on the software; export the software or underlying technology in contravention of applicable US and international export laws and regulations; or use the software other than as authorized in connection with use of Product.
- f) **Additional Restrictions Relating To Software And Other Intellectual Property**

In addition to compliance with the Terms of this Warranty, Customers purchasing software or other intellectual property shall comply with any license agreement accompanying such software or other intellectual property. Failure to do so may void this Warranty with respect to such software and/or other intellectual property.

6.2.5 Disclaimer of all Other Warranties

The Warranty set forth in What Is Covered By This Warranty (page 81) are in lieu of all other warranties, express or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose.

6.2.6 Limitation of Remedies **

In no event will ProSoft or its Dealer be liable for any special, incidental or consequential damages based on breach of warranty, breach of contract, negligence, strict tort or any other legal theory. Damages that ProSoft or its Dealer will not be responsible for include, but are not limited to: Loss of profits; loss of savings or revenue; loss of use of the product or any associated equipment; loss of data; cost of capital; cost of any substitute equipment, facilities, or services; downtime; the claims of third parties including, customers of the Purchaser; and, injury to property.

** Some areas do not allow time limitations on an implied warranty, or allow the exclusion or limitation of incidental or consequential damages. In such areas, the above limitations may not apply. This Warranty gives you specific legal rights, and you may also have other rights which vary from place to place.

6.2.7 Time Limit for Bringing Suit

Any action for breach of warranty must be commenced within 39 months following shipment of the Product.

6.2.8 No Other Warranties

Unless modified in writing and signed by both parties, this Warranty is understood to be the complete and exclusive agreement between the parties, suspending all oral or written prior agreements and all other communications between the parties relating to the subject matter of this Warranty, including statements made by salesperson. No employee of ProSoft or any other party is authorized to make any warranty in addition to those made in this Warranty. The Customer is warned, therefore, to check this Warranty carefully to see that it correctly reflects those terms that are important to the Customer.

6.2.9 Allocation of Risks

This Warranty allocates the risk of product failure between ProSoft and the Customer. This allocation is recognized by both parties and is reflected in the price of the goods. The Customer acknowledges that it has read this Warranty, understands it, and is bound by its Terms.

6.2.10 Controlling Law and Severability

This Warranty shall be governed by and construed in accordance with the laws of the United States and the domestic laws of the State of California, without reference to its conflicts of law provisions. If for any reason a court of competent jurisdiction finds any provisions of this Warranty, or a portion thereof, to be unenforceable, that provision shall be enforced to the maximum extent permissible and the remainder of this Warranty shall remain in full force and effect. Any cause of action with respect to the Product or Services must be instituted in a court of competent jurisdiction in the State of California.

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