inRAx

MVI56-WA-EIP

ControlLogix Platform

High Speed Wireless EtherNet/IP
Communication Module

User Manual

May 28, 2008

ProSoft TECHNOLOGY

Please Read This Notice

Successful application of this module requires a reasonable working knowledge of the Rockwell Automation ControlLogix hardware, the MVI56-WA-EIP Module and the application in which the combination is to be used. For this reason, it is important that those responsible for implementation satisfy themselves that the combination will meet the needs of the application without exposing personnel or equipment to unsafe or inappropriate working conditions.

This manual is provided to assist the user. Every attempt has been made to ensure that the information provided is accurate and a true reflection of the product's installation requirements. In order to ensure a complete understanding of the operation of the product, the user should read all applicable Rockwell Automation documentation on the operation of the Rockwell Automation hardware.

Under no conditions will ProSoft Technology be responsible or liable for indirect or consequential damages resulting from the use or application of the product.

Information in this manual is subject to change without notice and does not represent a commitment on the part of ProSoft Technology Improvements and/or changes in this manual or the product may be made at any time. These changes will be made periodically to correct technical inaccuracies or typographical errors.

Important Installation Instructions: Radio Modules

The following Information and warnings pertaining to the radio module must be heeded:

A "THIS DEVICE CONTAINS A TRANSMITTER MODULE, FCC ID: SDZ-WA-1. PLEASE SEE FCC ID LABEL ON BACK OF DEVICE."

B "THIS DEVICE USES AN INTERNAL COMPACT FLASH RADIO MODULE AS THE PRIMARY RADIO COMPONENT. THE COMPACT FLASH RADIO MODULE DOES NOT HAVE AN FCC ID LABEL. THE COMPACT FLASH RADIO MODULE HAS NO USER SERVICABLE PARTS."

C "THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS: (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION."

D "THIS DEVICE AND ANY RADIO ACCESSORY SOLD BY PROSOFT MUST BE INSTALLED BY AN AUTHORIZED PROFESSIONAL INDUSTRIAL RADIO SYSTEM INTEGRATOR. FURTHER, ONLY RADIO ACCESSORIES SOLD BY PROSOFT AND SPECIFICALLY TESTED FOR USE WITH THIS DEVICE MAY BE USED WITH THIS DEVICE."

E "THE USER OF THIS EQUIPMENT CANNOT BE WITHIN 20 cm. FROM THE RADIATING ELEMENT DEVICE."

F "CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY THE PARTY RESOPNSIBLE FOR COMPLIANCE COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT."

Industry Canada Requirements:

A "THIS DEVICE HAS BEEN DESIGNED TO OPERATE WITH AN ANTENNA HAVING A MAXIMUM GAIN OF 24 dB. AN ANTENNA HAVING A HIGHER GAIN IS STRICTLY PROHIBITED PER REGULATIONS OF INDUSTRY CANADA. THE REQUIRED ANTENNA IMPEDANCE IS 50 OHMS."

B "TO REDUCE POTENTIAL RADIO INTERFERENCE TO OTHER USERS, THE ANTENNA TYPE AND ITS GAIN SHOULD BE CHOSEN SUCH THAT THE EQUIVALENT ISOTROPICALLY RADIATED POWER (EIRP) IS NOT MORE THAN THAT REQUIRED FOR SUCCESSFUL COMMUNICATION."

C "THE INSTALLER OF THIS RADIO EQUIPMENT MUST INSURE THAT THE ANTENNA IS LOCATED OR POINTED SUCH THAT IT DOES NOT EMIT RF FIELD IN EXCESS OF HEALTH CANADA LIMITS FOR THE GENERAL POPULATION; CONSULT SAFETY CODE 6, OBTAINABLE FROM HEALTH CANADA."

WARNING:

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Battery Life Advisory

All modules in the MVI series use a rechargeable Lithium Vanadium Pentoxide battery to backup the 512K SRAM memory, 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 it becomes fully charged. After it is fully charged, the battery provides backup power for the CMOS setup and configuration data, the real-time clock, and the 512K SRAM memory for approximately 21 days.

Before you remove a module from its power source, ensure that the battery within the module is fully charged. A fully charged battery will hold the BIOS settings (after being removed from its power source) for a limited number of days. When the battery is fully discharged, the module will revert to the default BIOS settings.

Note: The battery is not user replaceable.

Your Feedback Please

We always want you to feel that you made the right decision to use our products. If you have suggestions, comments, compliments or complaints about the product, documentation or support, please write or call us.

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MVI56-WA-EIP User Manual
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ProSoft® 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 and are available at no charge from our web site: http://www.prosoft-technology.com

Printed documentation is available for purchase. Contact ProSoft Technology for pricing and availability.

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Guide to the MVI56-WA-EIP User Manual

Function		Section to Read	Details
Introduction (Must Do)	→	Start Here (page 9)	This Section introduces the customer to the module. Included are: package contents, system requirements, hardware installation, and basic configuration.
Verify Communication, Diagnostic and Troubleshooting	→	Verifying Communication (page 42) Diagnostics and Troubleshooting (page 115)	This section describes how to verify communications with the network. Diagnostic and Troubleshooting procedures.
Reference Product Specifications Functional Overview Glossary	→	Reference (page 129) Functional Overview (page 57) Product Specifications (page 129)	These sections contain general references associated with this product, Specifications, and the Functional Overview.
Support, Service, and Warranty Index	→	Support, Service and Warranty (page 135)	This section contains Support, Service and Warranty information. Index of chapters.

1 Start Here

In This Chapter

Installing the MVI56-WA-EIP module requires a reasonable working knowledge of the Rockwell Automation hardware, the MVI56-WA-EIP Module and the application in which they will be used.

Caution: It is important that those responsible for implementation can complete the application without exposing personnel, or equipment, to unsafe or inappropriate working conditions. Safety, quality and experience are key factors in a successful installation.

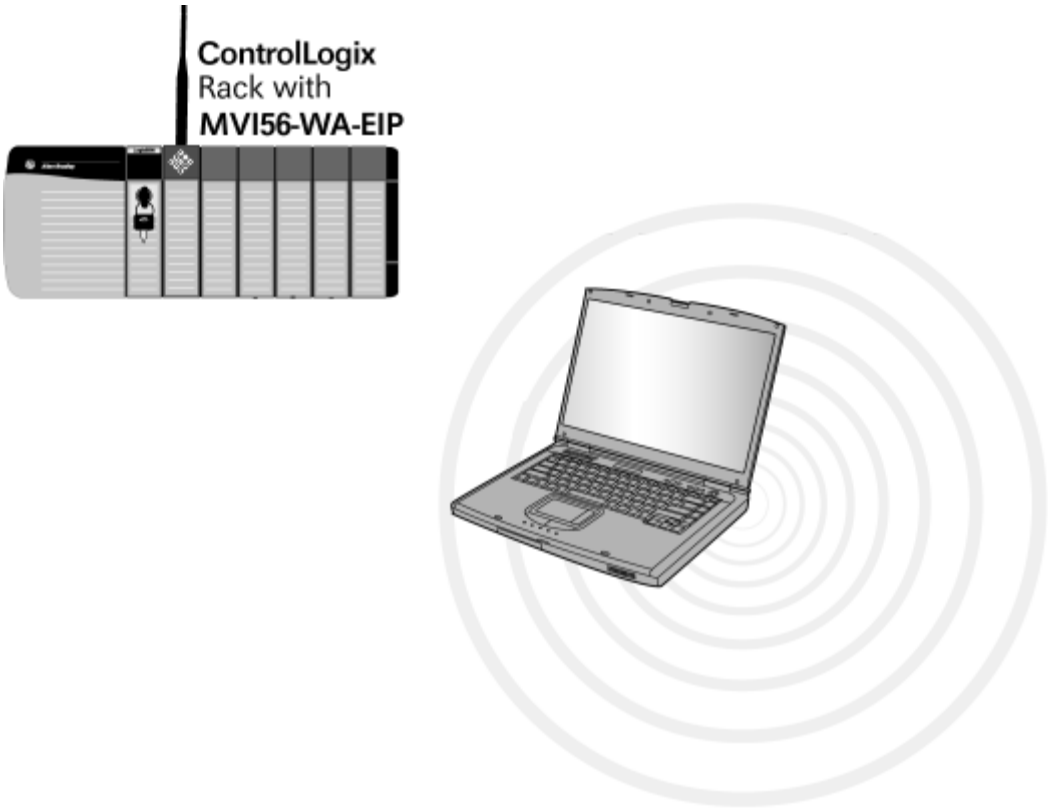
1.1 Introduction

The MVI56-WA-EIP module provides wireless ControlLogix bridge functionality. With the MVI56-WA-EIP module and a WiFi-equipped laptop or desktop PC, you can

- Program a local or remote processor with RSLogix
- Monitor and control a process with RSView SE or RSView 32
- Configure a ControlNet network with RSNetWorx for ControlNet
- Configure a DeviceNet network with RSNetWorx for DeviceNet

The MVI56-WA-EIP module can also route explicit messages as a server or as a client (unconnected only).

The following setup and configuration steps show how a set up a laptop or desktop PC with WiFi capability, so you can program a ControlLogix processor through a MVI56-WA-EIP module, as shown in the following illustration.



The MVI56-WA-EIP can also be used for other applications. Please refer to Supported Applications (page 57) for more examples.

1.2 System Requirements

The MVI56-WA-EIP module requires the following minimum hardware and software components:

- Rockwell Automation ControlLogix processor, with compatible power supply and one free slot in the rack, for the MVI56-WA-EIP module. The module requires 800mA of available power.
- Rockwell Automation RSLogix 5000 programming software
- Rockwell Automation RSLinx Classic version 2.51 or newer communication software
- Pentium® II 450 MHz minimum. Pentium III 733 MHz (or better) recommended
- Supported operating systems:
  - Microsoft Windows XP Professional with Service Pack 1 or 2
  - Microsoft Windows 2000 Professional with Service Pack 1, 2, or 3
  - Microsoft Windows Server 2003

- 128 Mbytes of RAM minimum, 256 Mbytes of RAM recommended
- 100 Mbytes of free hard disk space (or more based on application requirements)
- 256-color VGA graphics adapter, 800 x 600 minimum resolution (True Color 1024 × 768 recommended)
- CD-ROM drive
- 802.11b compatible wireless adapter.

Note: You can install the MVI56-WA-EIP module in a local or remote rack, in any available slot in the rack.

1.3 Package Contents

The following components are included with your MVI56-WA-EIP module, and are all required for installation and configuration.

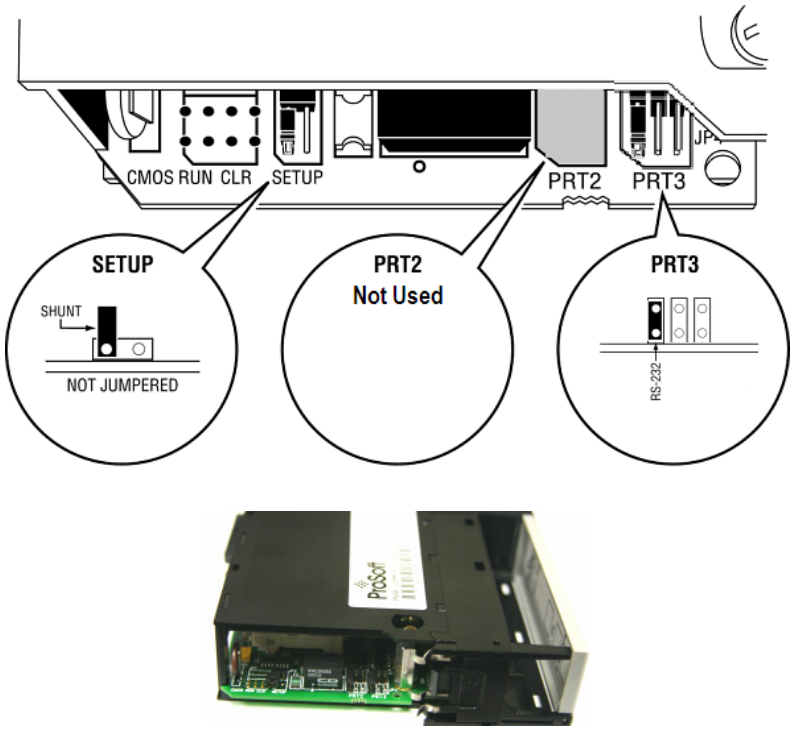
Important: Before beginning the installation, please verify that all of the following items are present.

Qty.	Part Name	Part Number	Part Description
1	MVI56-WA-EIP Module	MVI56-WA-EIP	High Speed Wireless EtherNet/IP Communication Module
1	Cable	Cable #15, RS232 Null Modem	For RS232 Connection to the CFG Port
1	Cable	RJ45 to DB9 Male Adapter	For DB9 Connection to Module's Port
1	Antenna	A2405S-OA	5dbi Omni Articulating Antenna
1	inRAx Solutions CD		Contains sample programs, utilities and documentation for the MVI56-WA-EIP module.

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

1.4 Verifying the Jumper Settings

1 Hold your module and look at the bottom. The following illustrations show what you should see. There are three jumpers located at the bottom of the module.



2 Do not change the position of the Setup jumper unless instructed to do so by ProSoft Technical Support.

Note: Refer to Wiring and Jumper Settings for specific wiring diagrams.

1.5 Install the Antenna

All antennas for radios communicating directly with each other should be mounted so they are within line-of-sight and have the same antenna polarity.

Antennas with a reverse polarity SMA connector can be mounted directly on the radio. Screw the antenna onto the antenna port connector until snug.

Antennas that do not have a reverse polarity SMA connector must be mounted separately and connected to the radio using a ProSoft RadioLinx adaptor cable. Because the antenna cable attenuates the RF signal, **use an antenna cable no longer than necessary to ensure optimum performance**.

Note: It is illegal to use any antenna that is not on the ProSoft Technology approved antennas list. Contact ProSoft Technology (page 3) with any questions or browse the antenna FAQ at http://www.prosoft-technology.com

1.6 Install the Module in the Rack

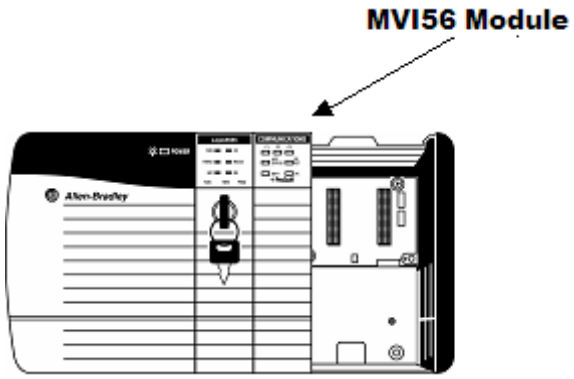
If you have not already installed and configured your ControlLogix processor and power supply, please do so before installing the MVI56-WA-EIP module. Refer to your Rockwell Automation product documentation for installation instructions.

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 MVI56-WA-EIP into the ControlLogixTM chassis. Use the same technique recommended by Rockwell Automation to remove and install ControlLogixTM modules.

Warning: When you insert or remove the module while backplane power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Verify that power is removed or the area is non-hazardous before proceeding. Repeated electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance that can affect module operation.

1. 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 ControlLogix rack.
6. Turn power ON.

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

Note: If you are installing MVI56-WA-EIP with other modules connected to the PCI bus, the peripheral modules will not have holding clips. Make sure all of the modules are aligned with their respective slots before you snap them into place.

1.7 Configuring the MVI56-WA-EIP Module

1.7.1 Connect your PC to the MVI56-WA-EIP debug menu

This step shows how to establish connection to the module debug menu to perform the following tasks:

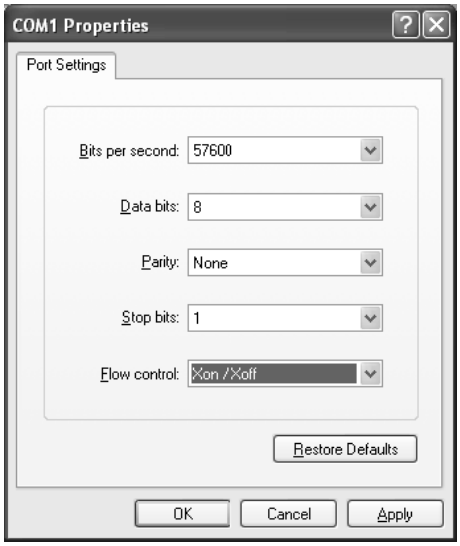
- Upload the configuration file from the MVI56-WA-EIP module to your computer
- Edit the configuration file to configure the MVI56-WA-EIP module.
- Download the configuration file from your computer to the MVI56-WA-EIP module
- Verify the MVI56-WA-EIP configuration parameters
- Monitor the MVI56-WA-EIP radio status information

To connect to the MVI56-WA-EIP debug menu:

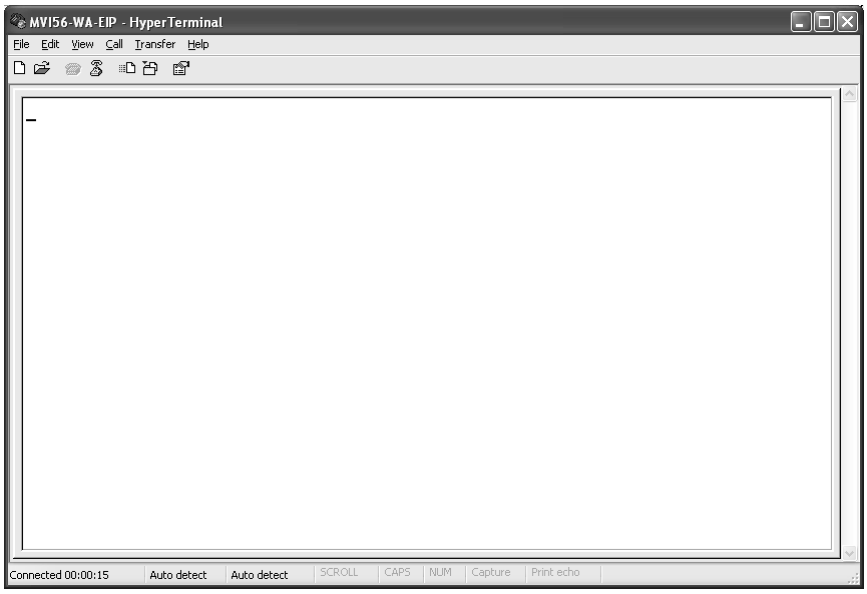
1. Connect the null-modem cable to the RJ45 to DB9 adapter (both provided with the MVI56-WA-EIP module). Connect the adapter to the configuration port of the MVI56-WA-EIP module and the null modem cable to an available COM port of your PC.
2. Run the HyperTerminal program at:
   All Programs - Accessories - Communications-HyperTerminal
3. Enter a name for the HyperTerminal connection then click OK

4 Select the COM port connected to your PC then click OK

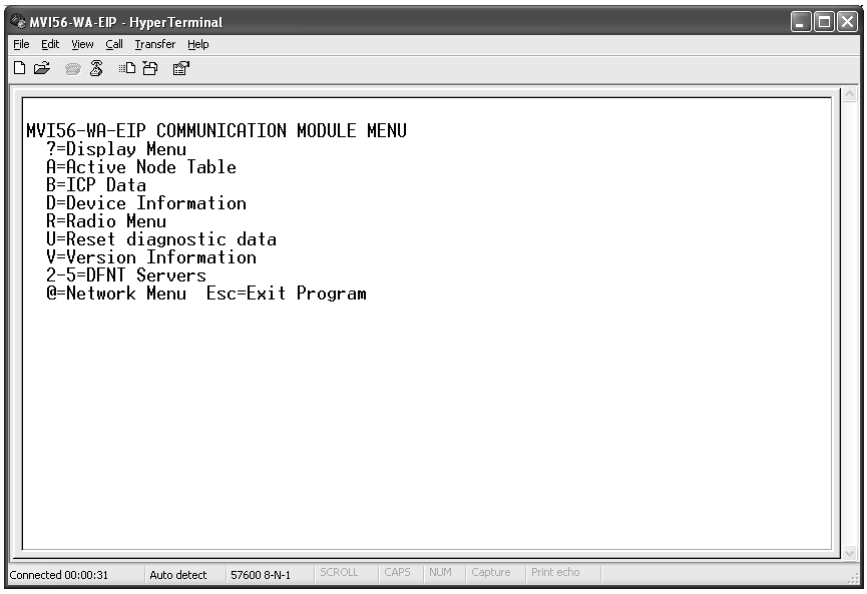
5 Configure the Port settings as indicated below then click OK.



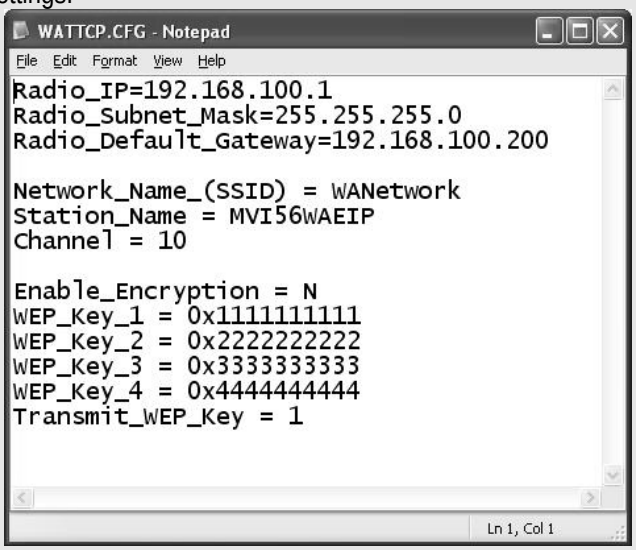
6 The HyperTerminal screen will be displayed as below. Press **[?]** to display the contents of the main menu.



7 The main menu options will be displayed as indicated below. The different options will be covered during this procedure.



Note: The MVI56-WA-EIP is shipped from ProSoft Technology with a configuration file that is preset with values that will work in many installations without modification. The following illustration shows the default settings.

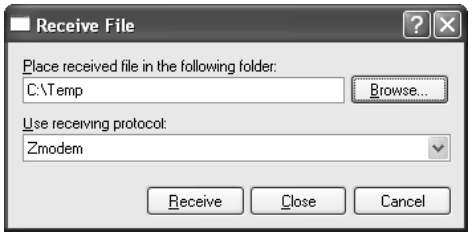


If these settings are correct for your network, you can skip the Upload, Edit and Download steps. Resume the setup at Connect the PC to the Wireless Network (page 24).

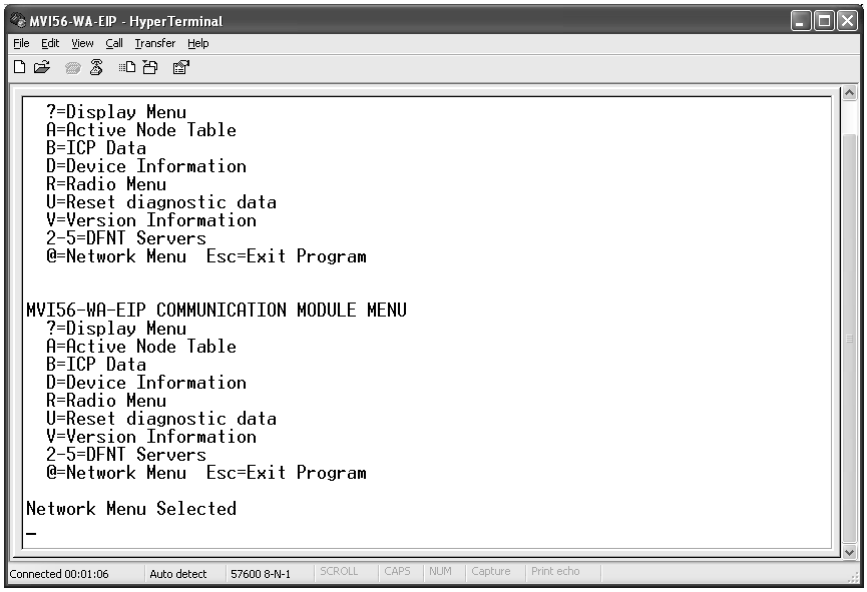
1.7.2 Upload the configuration file from the MVI56-WA-EIP

In order to configure the module, you must upload the configuration file from the MVI56-WA-EIP module to your PC.

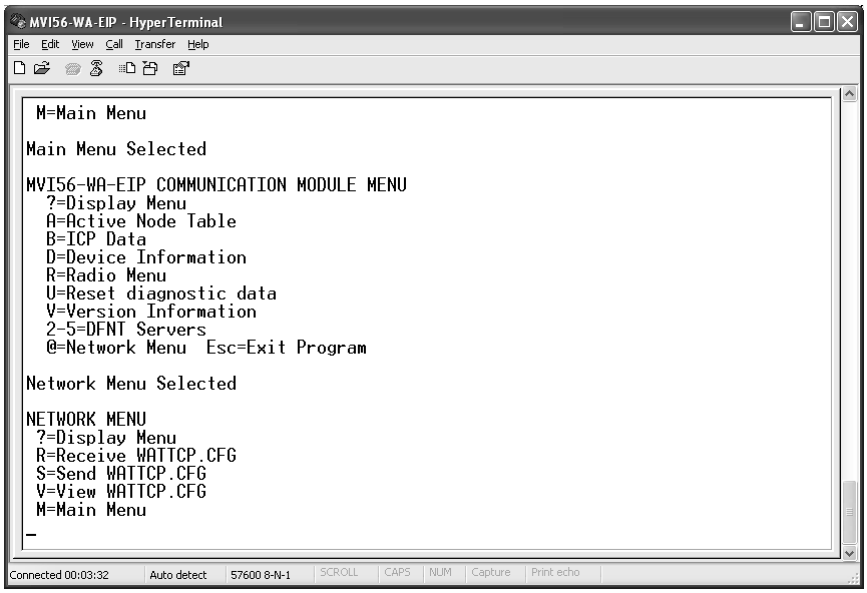
1. In HyperTerminal, open the Transfer menu, and then choose Transfer/Receive File...
2. Select the destination folder where the configuration file will be copied to. Select Zmodem as the protocol for file transfer. Click Close.



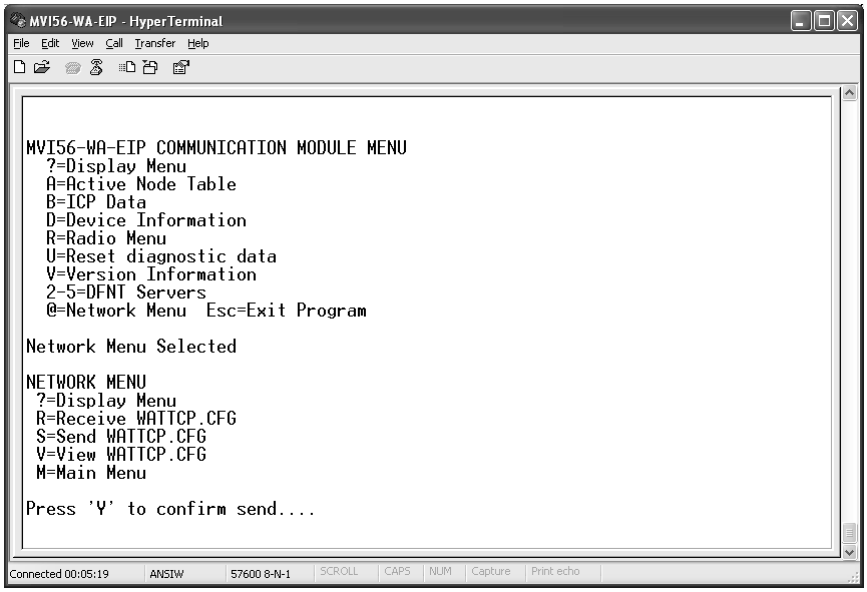
3 From the HyperTerminal main menu, press **[@]** to open the Network Menu.



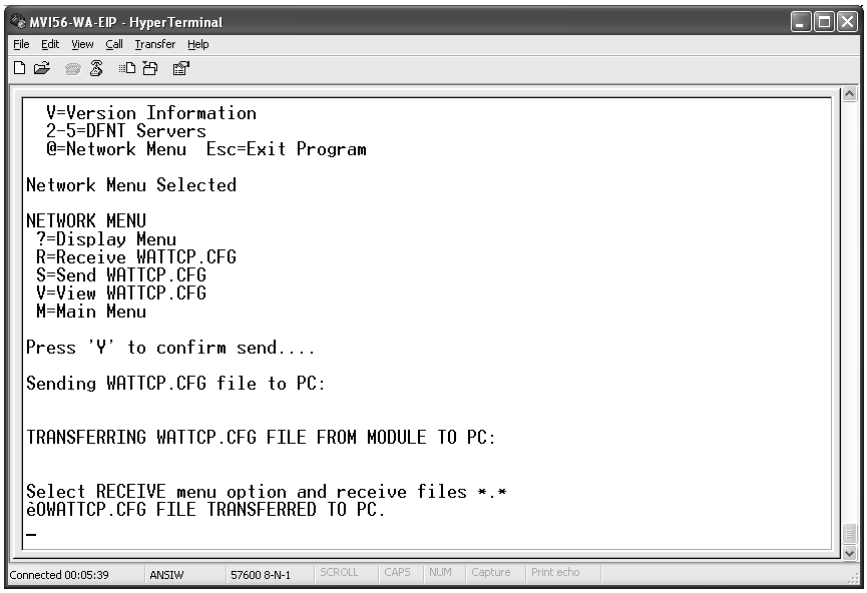
4 From the network menu, press **[S]** to send WATTCP.CFG)



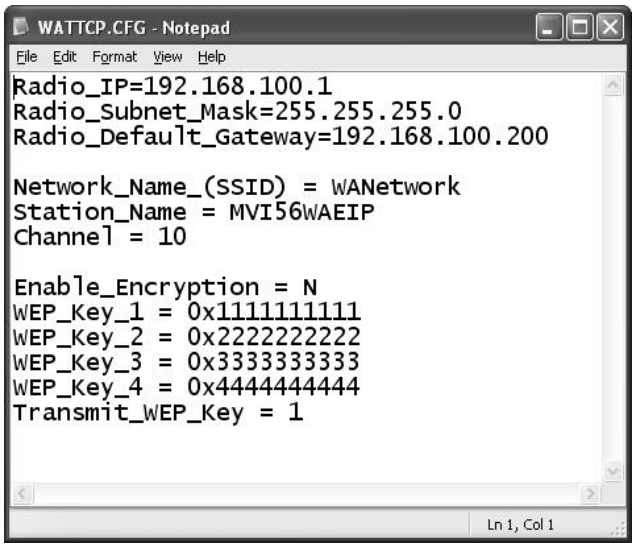
5 Press **[Y]** to confirm the send operation



6 When the confirmation message is displayed the upload operation is completed.



7 Use Windows Explorer to navigate to the destination folder. Use a text editor such as Notepad to open the WATTCP.CFG configuration file.



1.7.3 Edit the MVI56-WA-EIP configuration file

The configuration file contains the following parameters.

Radio_IP

Set the IP address of the MVI56-WA-EIP module. If you are also using RSLinx to setup Ethernet connections (for example with a 1756-ENET module) it is suggested to use a different network range for the wireless connection. For example, if using 192.168.0.xxx range for your Ethernet network, it is suggested to use a different network range, (such as 192.168.100.xxx) for the MVI56-WA-EIP module and other computers with wireless connection. Then you can set the Subnet Mask (see below) as 255.255.255.0 to guarantee that the network will be reserved only for the wireless devices. Default IP address is 192.168.100.1.

Radio_Subnet_Mask

Set the subnet mask for the wireless network. Default value is 255.255.255.0.

Radio_Default_Gateway

Set the optional default gateway for the wireless network. Default value is 192.168.100.200.

Network_Name_(SSID)

The SSID used when connecting to a wireless network used by an Access Point or Ad hoc station. Value can be alphanumeric string with a maximum of 32 ASCII characters that identifies the network associated to the MVI56-WA-EIP module. This procedure will later show how this name will be used to connect your PC to the MVI56-WA-EIP module. If using infrastructure mode you must use this same SSID name for the access point. Using the string ANY will cause the module to establish connection to any available access point (regardless of the configured Access Point SSID). Default value is WANetwork.

Station_Name

String used for module identification. Default value is MVI56WAEIP.

Channel

Channel number to be used by the network. The wireless adapter for your PC and (if used) the access point must also be configured for this channel. Channels 1 through 11 are available.

Note: The number of usable channels varies by country. Contact ProSoft Technology for country approval list.

Enable_Encryption

Set a value of Y to enable WEP encryption for data security. Default value is N.

WEP_Key_1, WEP_Key_2, WEP_Key_3, WEP_Key_4

Configure up to four WEP keys to be used for WEP data encryption. These parameters are only used by the module if the Enable_Encryption parameter is set to Y. You must set the same WEP encryption key on each device in the network in order to correctly decode data.

64-bit or 128-bit encryption is selected by the number of characters.

5-character ASCII key or 10-digit hexadecimal key for 64-bit encryption.

13-character ASCII key or 26-digit hexadecimal key for 128-bit encryption.

The key value is case-sensitive. Hexadecimal values must be preceded by "0x".

All wireless clients and access points should be configured with identical key values.

Note: Use only WEP Key 1 when communicating with an RLX-IH access point/repeater.

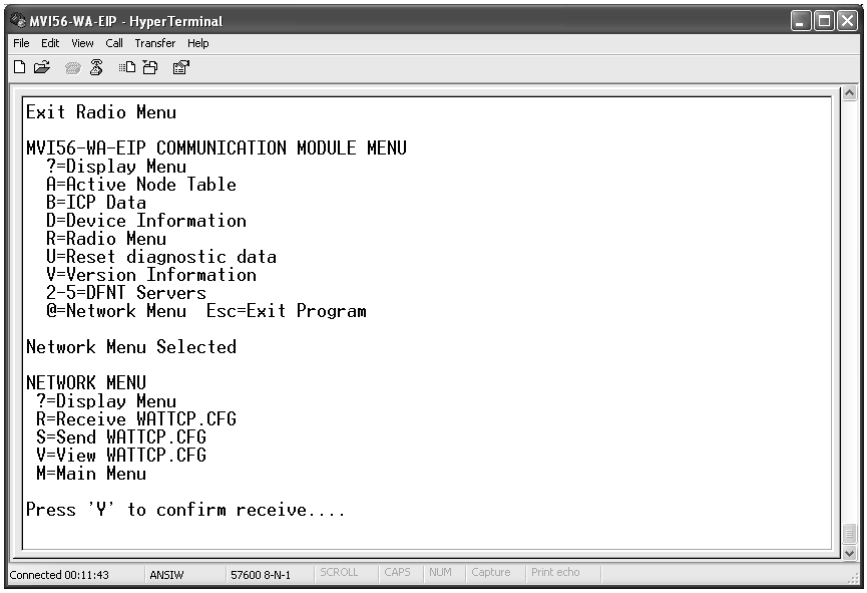
Transmit_WEP_Key

Selects which WEP key to use for encryption. For example, if this parameter is set as 1 then the module will use the WEP key configured for the WEP_Key_1 parameter.

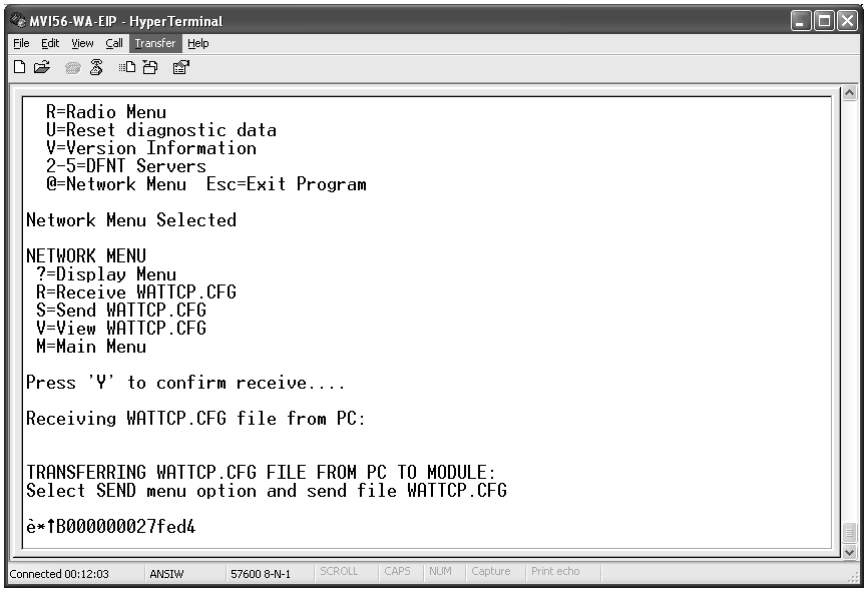
When you have finished editing the configuration file, save and close it. Do not change the file name (keep it as WATTCP.CFG)

1.7.4 Download the configuration file to the MVI56-WA-EIP

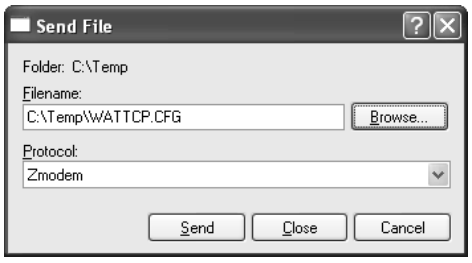
1 From the network menu, press **[R]** to receive WATTCP.CFG. When prompted to confirm, press **[Y]**.



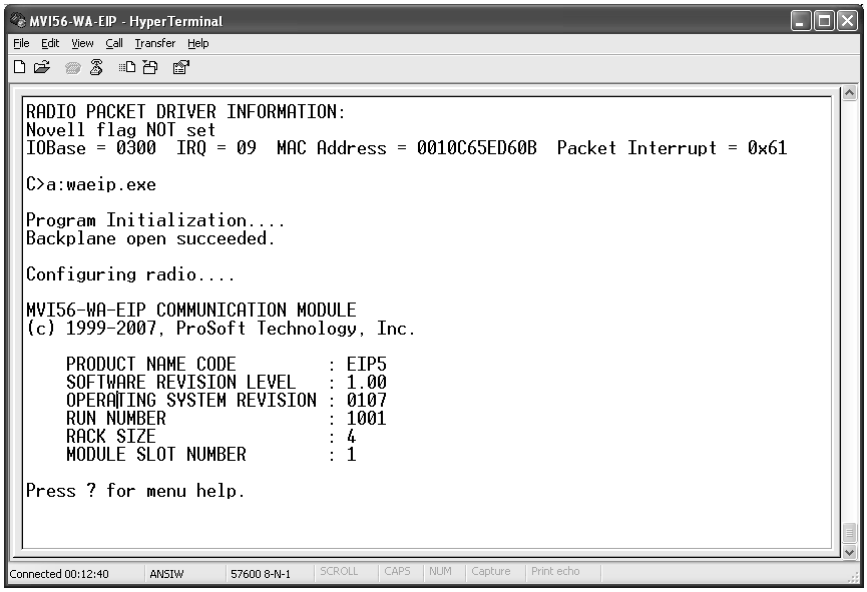
2 In HyperTerminal, open the Transfer menu, and then choose Transfer/Send File...



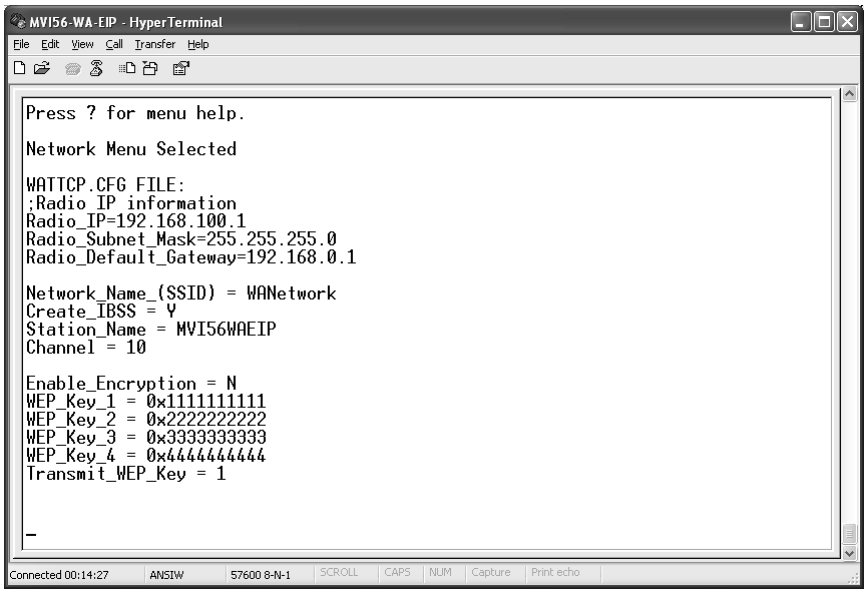
3 Browse the configuration file and select the Zmodem protocol. Click Send to store the configuration download.



4 After the download operation is completed the module automatically reboots to complete the initialization procedure with the update configuration parameters.



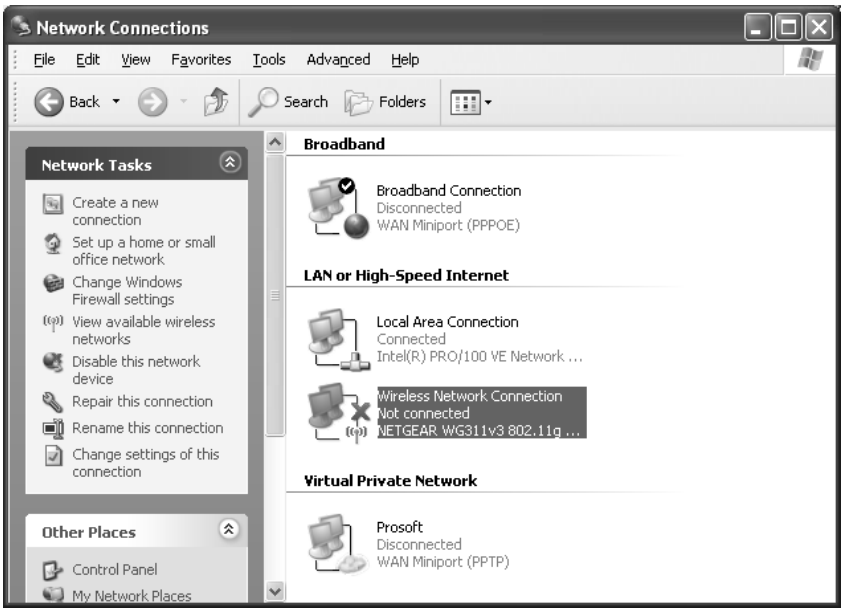
5 From the main menu, press **[@]** (Network Menu) and **[V]** (View WATTCP.CFG) to view the parameters that you have just configured.



1.8 Connect the PC to the Wireless Network

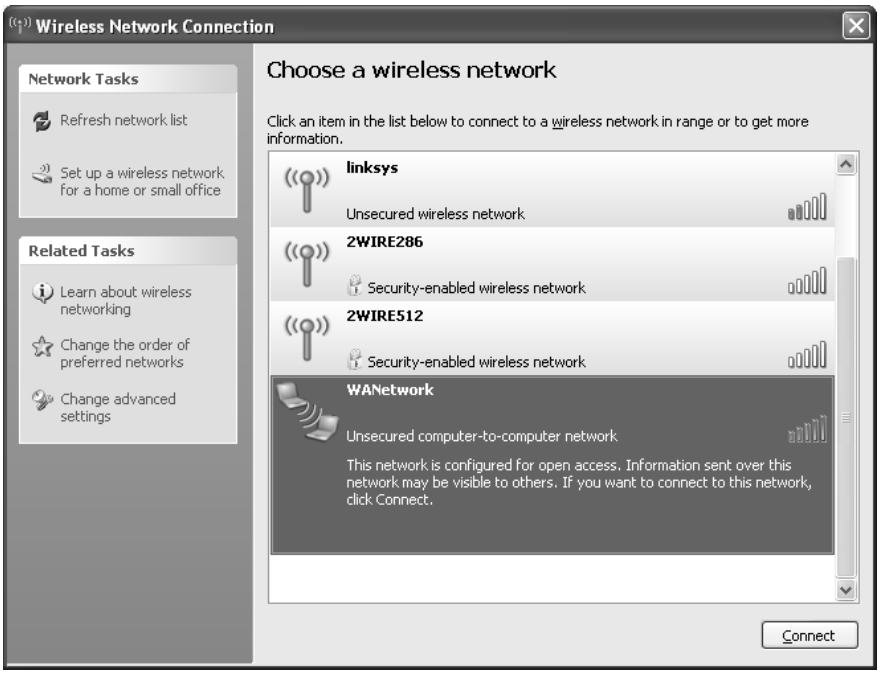
1 Click the Start button, choose Settings, and then choose Control Panel.
2 In the Control Panel, choose Network Connections.

3 Double-click to open the Wireless Connection

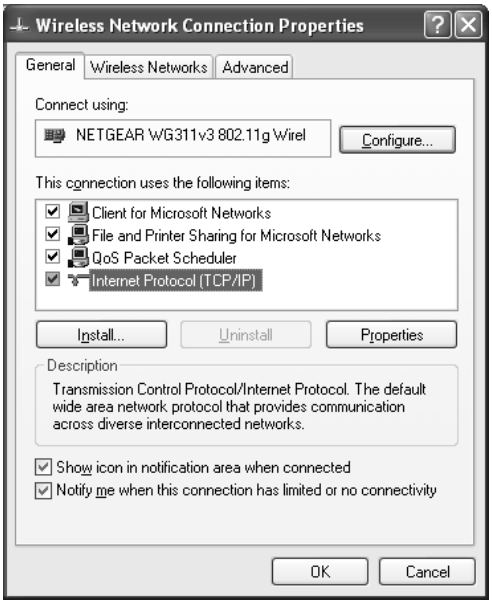


4 List the available wireless networks and you will be able to find the MVI56-WA-EIP network. The network will have the same name as the one previously configured through the **Network_Name_(SSID)** parameter in the WATTCP.CFG configuration file. This procedure uses the default SSID name WANetwork. Do not connect to the network yet.

5 Select Change Advanced Settings.



6 Select Internet Protocol (TCP/IP) and click Properties.



7 Select **Use the following IP address**. Enter the wireless IP address to be used by your PC. You must select a unique IP address in the same network previously configured in the WATTCP.CFG file. You should use a specific network for this wireless application only (different from other networks used by other RSLinx drivers). This sample procedure configures the module and the PC as:

- MVI56-WA-EIP Network Settings

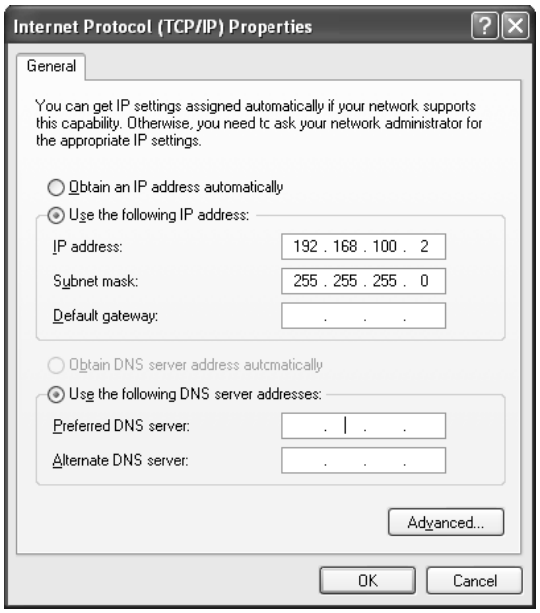
  IP: 192.168.100.1

  Netmask: 255.255.255.0
- PC Network Settings

  IP: 192.168.100.2

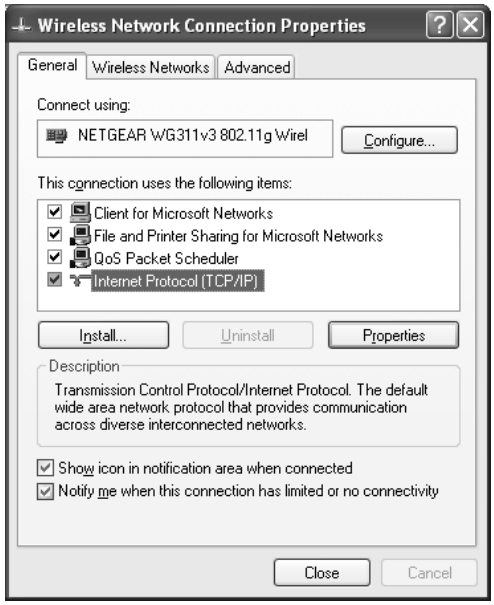
  Netmask: 255.255.255.0

This example uses the following configuration for the PC wireless adapter. After configuring the network settings click OK.

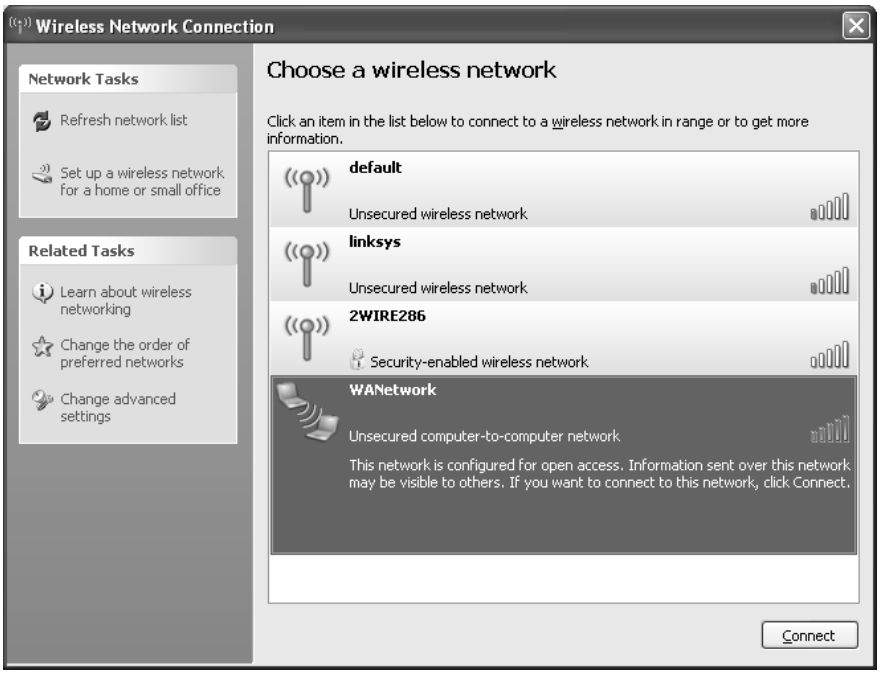


Note: failure to configure the IP and netmask settings correctly will prevent RSLinx from establishing communication with the MVI56-WA-EIP module.

8 Click Close.

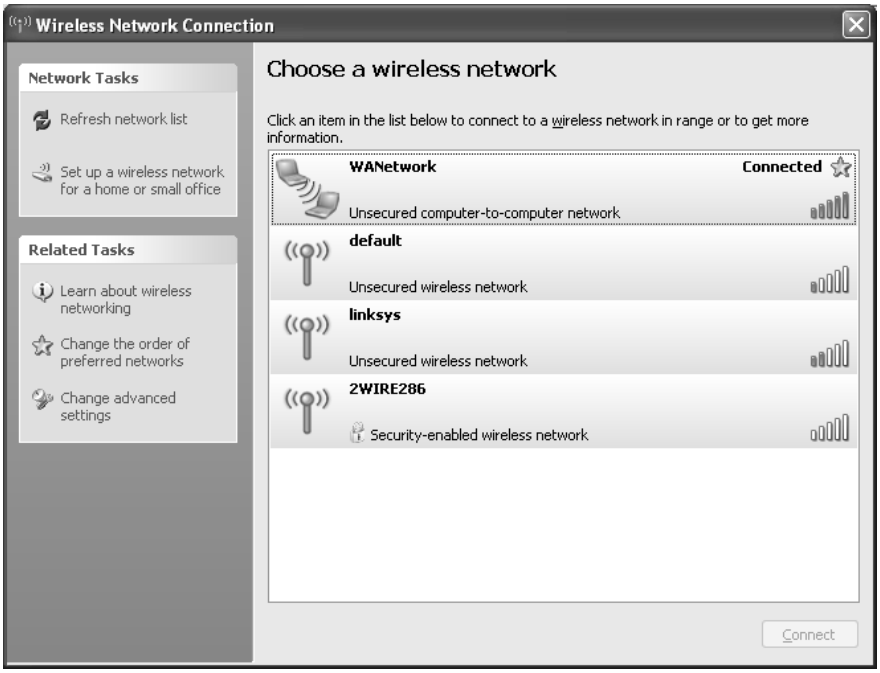


9 Select the MVI56-WA-EIP network (WANetwork for this example) and click Connect.



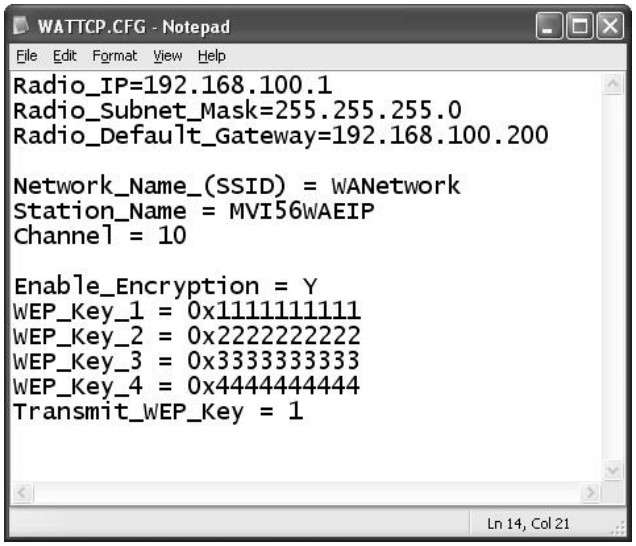
10 Click Connect Anyway (this example is not using WEP encryption)

Now the network status is indicated as Connected.

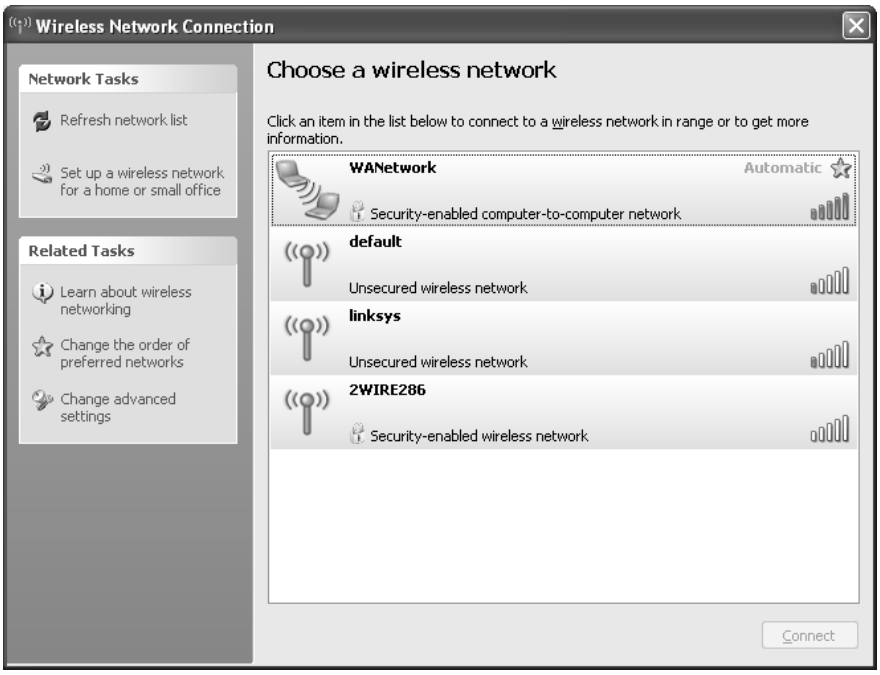


Note: WEP Encryption
If you are using WEP encryption, the Enable_Encryption parameter must be set tp Y in the WATTCP.CFG. This example uses 64-bit WEP encryption (10 hexadecimal digits).

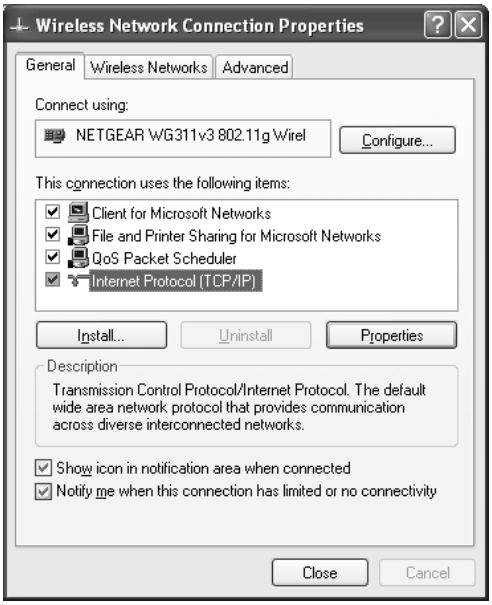
The configuration file in the following illustration shows that the module will be configured for WEP encryption, with the WEP key configured as 1111111111.



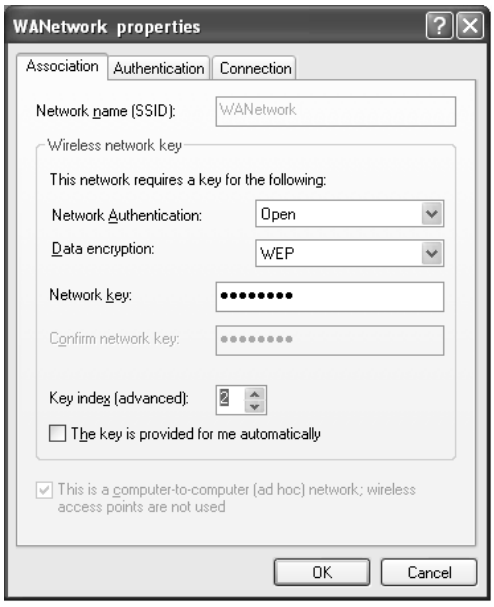
After downloading the previous configuration file to the module, the MVI56-WA-EIP network will be indicated as Security-enabled).



11 Click Change Advanced Settings to open the Wireless Network Connection Properties dialog box.

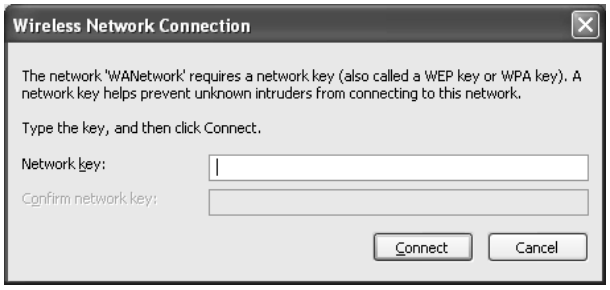


12 On the Wireless Networks tab, click the Properties button. This action opens the WANetwork Properties dialog box.

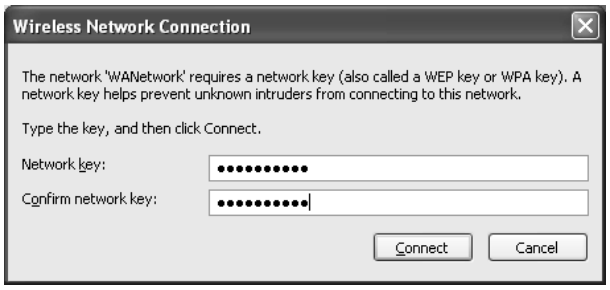


13 On the Associations tab, enter the same Network number (key index) you entered in the MVI56-WA-EIP configuration file parameter Transmit_Wep_Key. For this example, set the key index to 1.

14 After selecting the network and clicking the Connect button you will be prompted to enter the configured key.



15 For this example enter the 10 digits for the configured WEP key (1111111111) and click Connect. Do not type the "0x" if it is present.



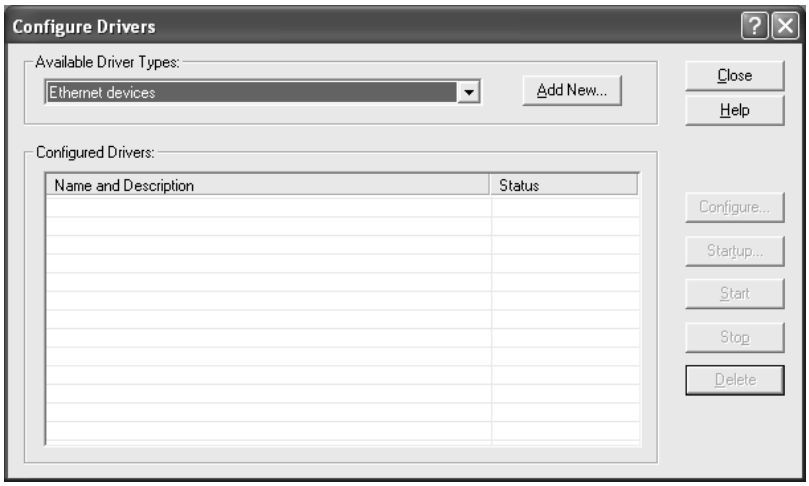
1.9 Set Up the RSLinx Driver

You can configure one of the following RSLinx drivers to access the MVI56-WA-EIP module:

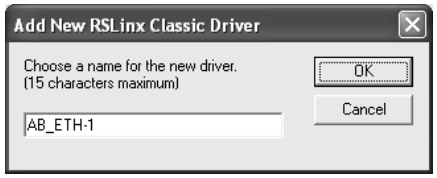
- Ethernet devices Driver (page 32)
- EtherNet/IP Driver (page 34)
- Remote Devices Via Linx Gateway Driver (page 38)

1.9.1 Configuring the Ethernet devices Driver

1. In RSLinx, open the Communications menu and then choose Configure Drivers. This action opens the Configure Drivers dialog box.
2. In the Configuration Drivers dialog box, select the Ethernet devices Driver from the dropdown list, and then click Add New



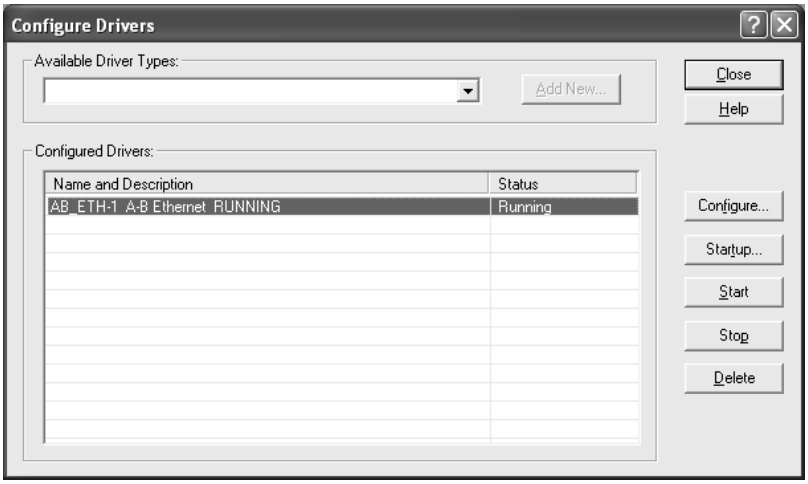
3. Enter the driver name as shown in the following illustration.



4. Enter the MVI56-WA-EIP module IP address that you have previously configured through the WATTCP configuration file. This procedure will assume that the module was configured with its default IP address (192.168.100.1) .

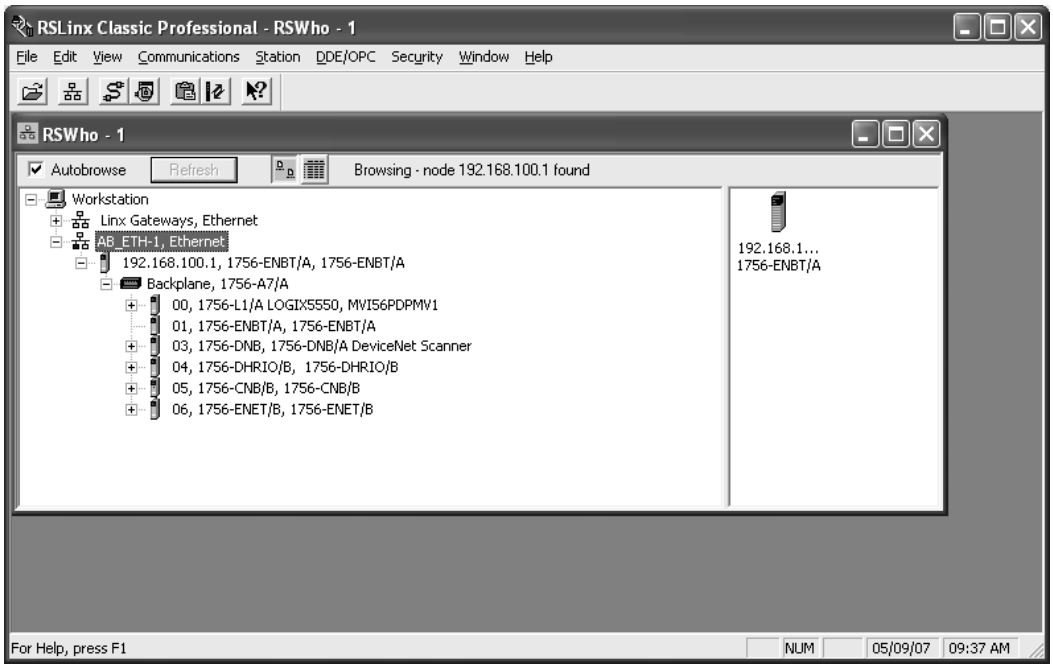
5 Click *Apply* to save your settings, and then click OK to close the Configure Driver dialog box.

The *Ethernet devices* driver will be running as shown in the following illustration.



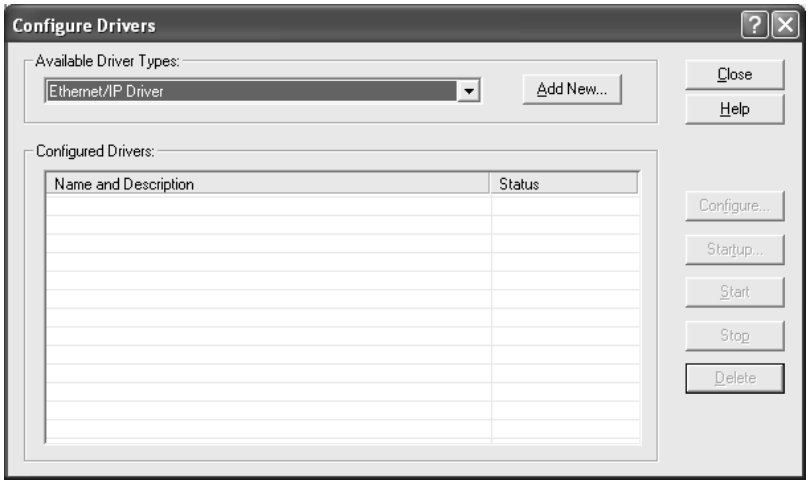
Refer to *RSWho* (*Communications* menu → *RSWho*) to monitor the MVI56-WA-EIP module and associated devices.

RSLinx recognizes the MVI56-WA-EIP as a 1756-ENBT/A module, as shown in the following illustration.

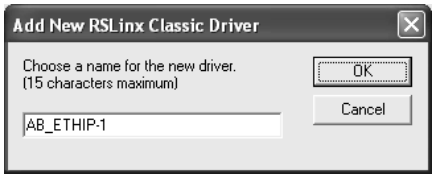


1.9.2 Configuring the EtherNet/IP Driver

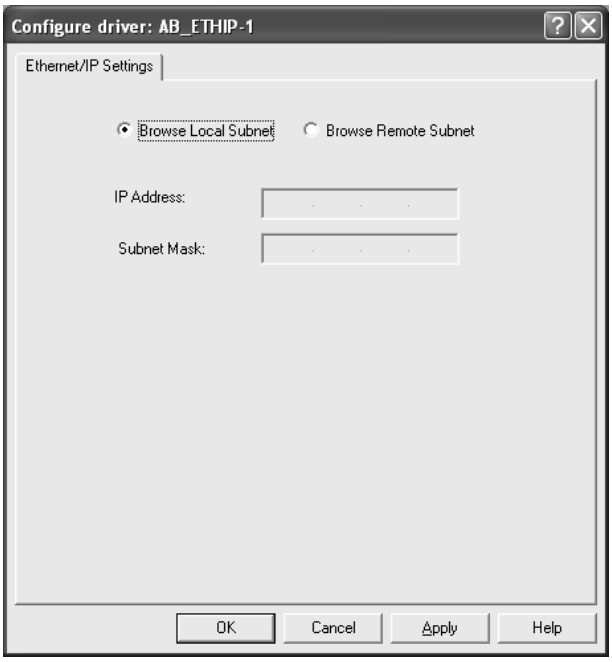
1. In RSLinx, open the Communications menu and then choose Configure Drivers… This action opens the Configure Drivers dialog box.
2. In the Configuration Drivers dialog box, select the *EtherNet/IP* Driver from the dropdown list, and then click Add New



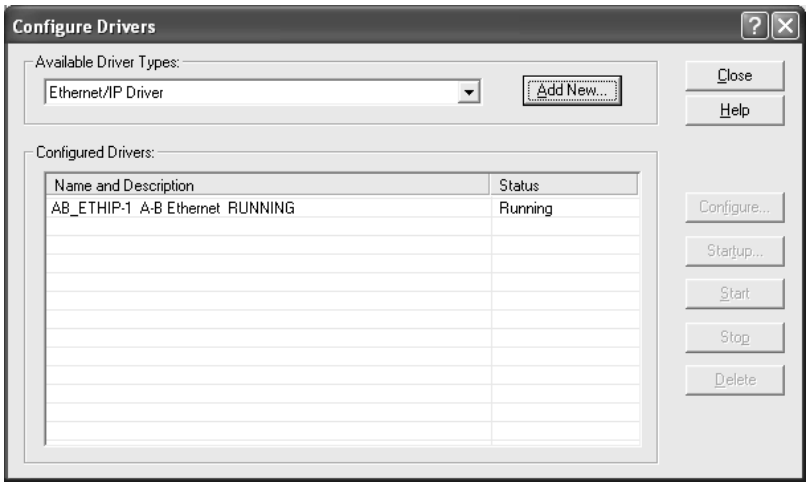
3 Enter the driver name as shown in the following illustration.



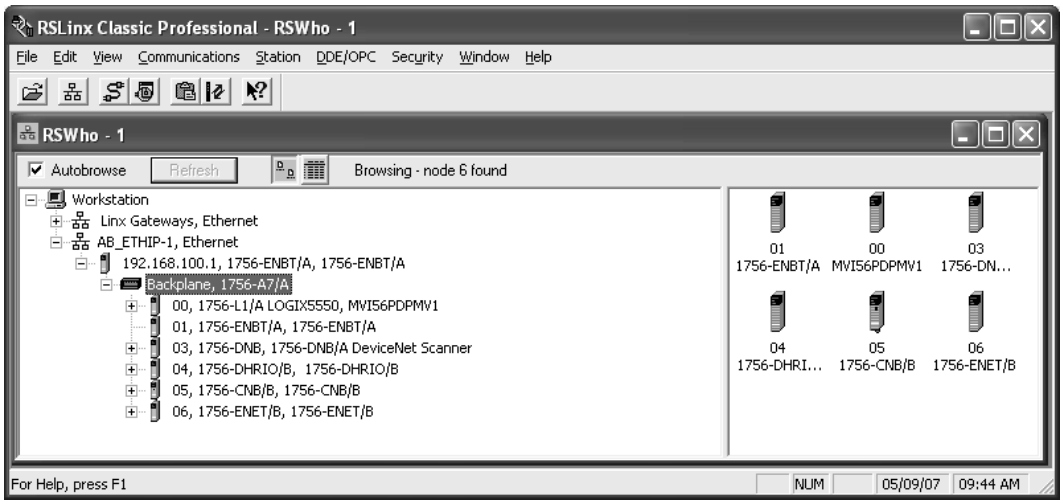
4 If the wired Ethernet network is disabled, configure the driver using the settings in the following window. Click OK to save your settings and close the Configure Driver dialog box.



The *Ethernet devices* driver will be running as shown in the following illustration.



Refer to *RSWho* (*Communications* menu → *RSWho*) to monitor the MVI56-WA-EIP module and associated devices.
RSLinx recognizes the MVI56-WA-EIP as a 1756-ENBT/A module, as shown in the following illustration.



EtherNet/IP Driver Troubleshooting Tip

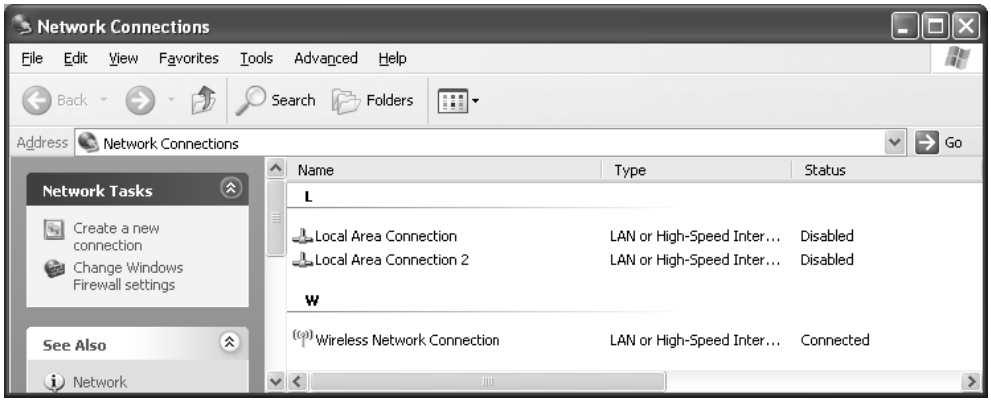
If you followed the previous steps and the module is still not displayed through RSWho, there may be a conflict with the wired Ethernet network that prevents RSLinx from finding the module through the wireless adapter.

One way to overcome this issue is to disable your wired Ethernet connections.

1 In Windows XP, click the Start button and then choose Settings → *Network Connections*.

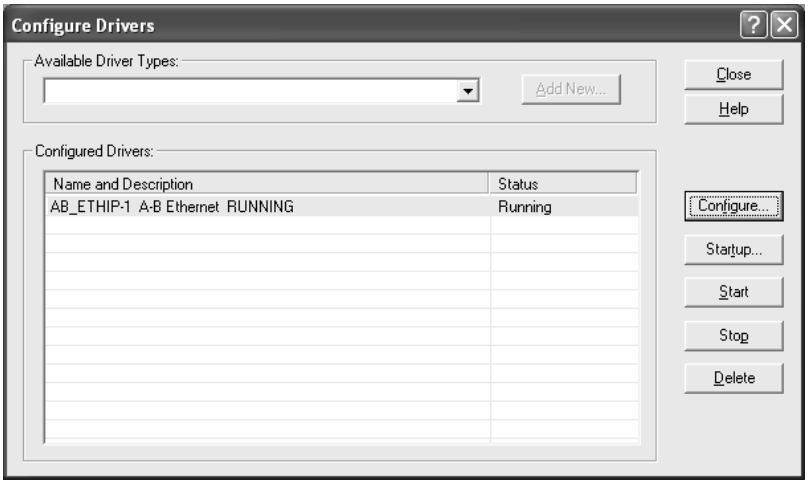
2 Select the Ethernet connection and click the right mouse button to open a shortcut menu.
3 On the shortcut menu, choose Disable. Repeat this step for any additional Ethernet connections.

Important: Do not disable the wireless connection.

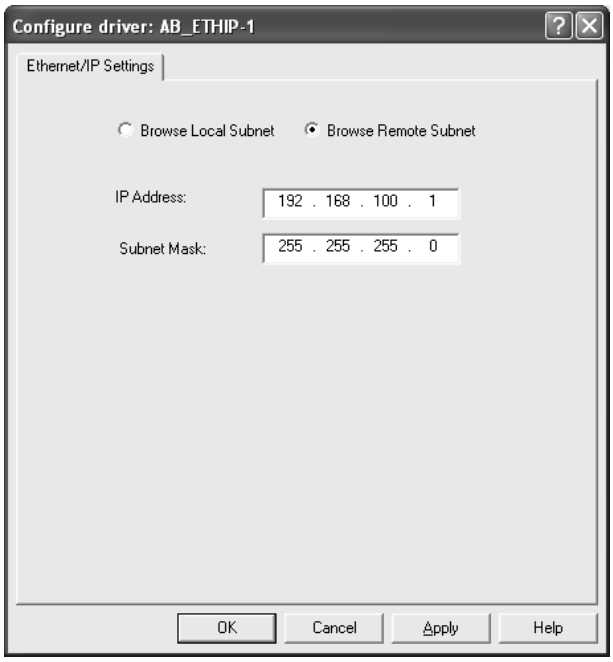


If your application requires the Ethernet connections to be enabled, you can alternatively configure the driver to look only for the MVI56-WA-EIP module.

1 In the driver configuration window, select the *EtherNet/IP* driver and then click Configure.

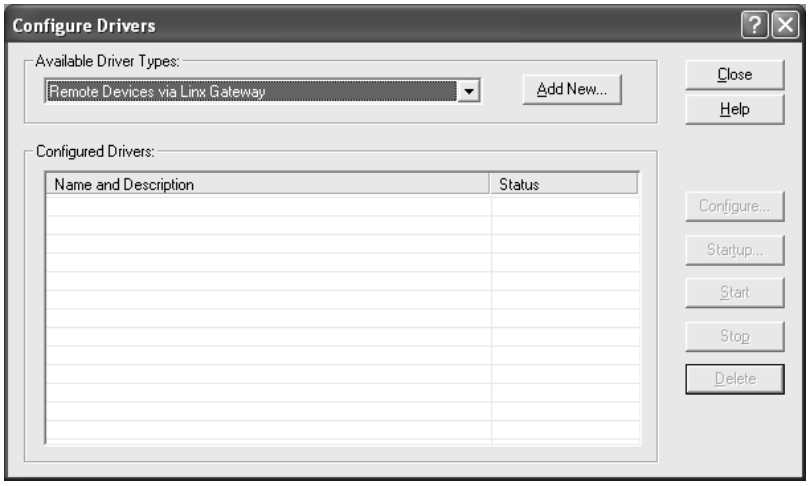


2 Select Browse Remote Subnet, and then enter the MVI56-WA-EIP IP address and subnet mask.

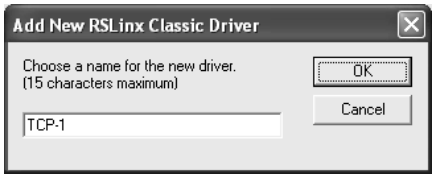


1.9.3 Configuring the Remote Devices Via Linx Gateway Driver

1 In RSLinx, open the Communications menu and then choose Configure Drivers… This action opens the Configure Drivers dialog box.
2 In the Configuration Drivers dialog box, select the *Remote Devices via Linx Gateway* Driver from the dropdown list, and then click Add New.

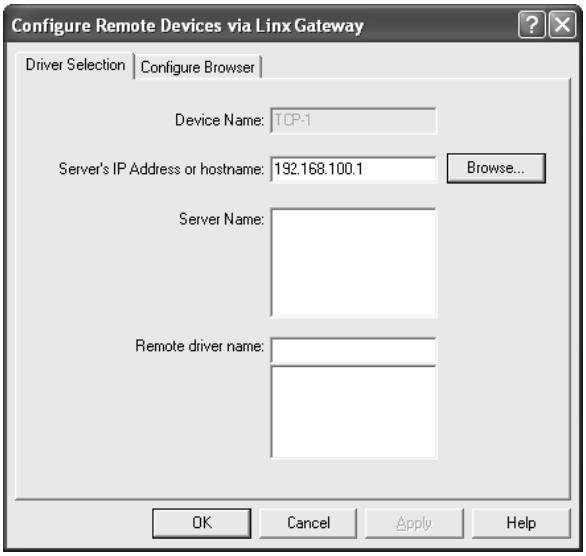


3 Enter the driver name as shown in the following illustration.

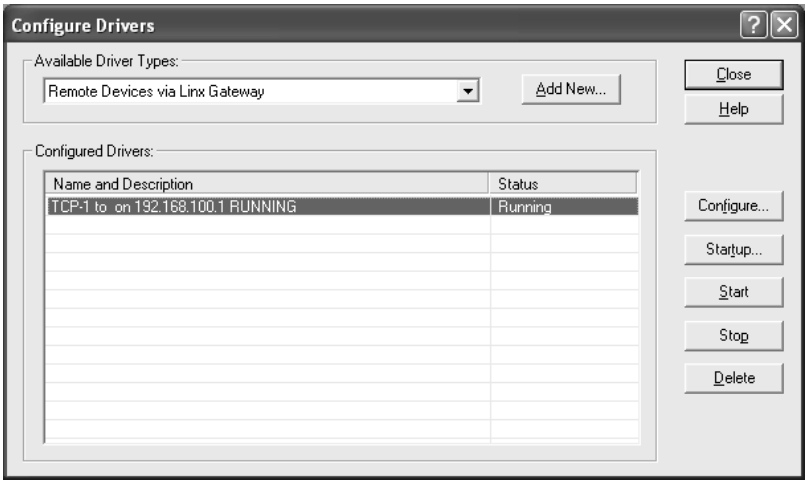


4 Enter the MVI56-WA-EIP module IP address that you have previously configured through the configuration file. This procedure will assume that the module was configured with its default IP address (192.168.100.1) .

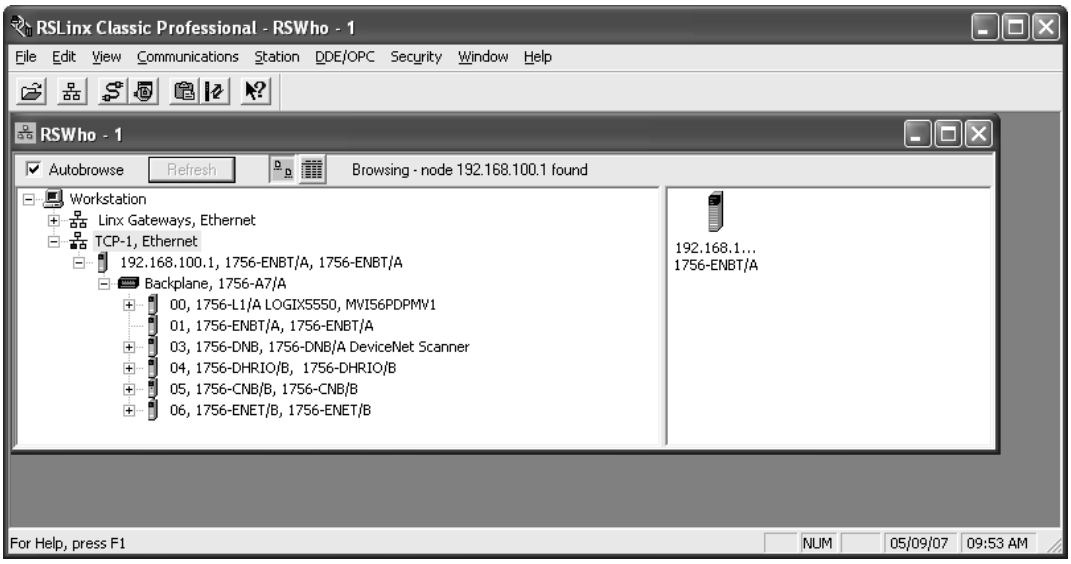
5 Click *Apply* to save your settings, and then click OK to close the Configure Driver dialog box.



The *Remote Devices via Linx Gateway* driver will be running as shown in the following illustration.



Refer to *RSWho* (*Communications-RSWho*) to monitor the MVI56-WA-EIP module and associated devices.
RSLinx recognizes the MVI56-WA-EIP as a 1756-ENBT/A module, as shown in the following illustration.



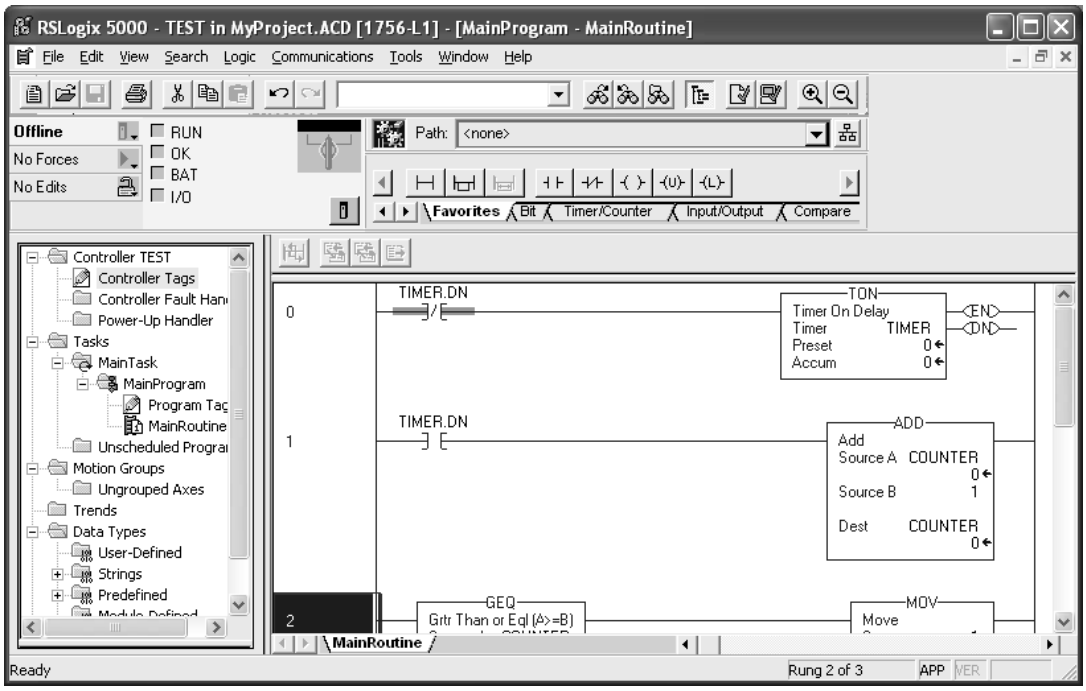
Troubleshooting Tips

If at this point RSWho does not display the MVI56-WA-EIP (regardless of the RSLinx driver) please check the following items:

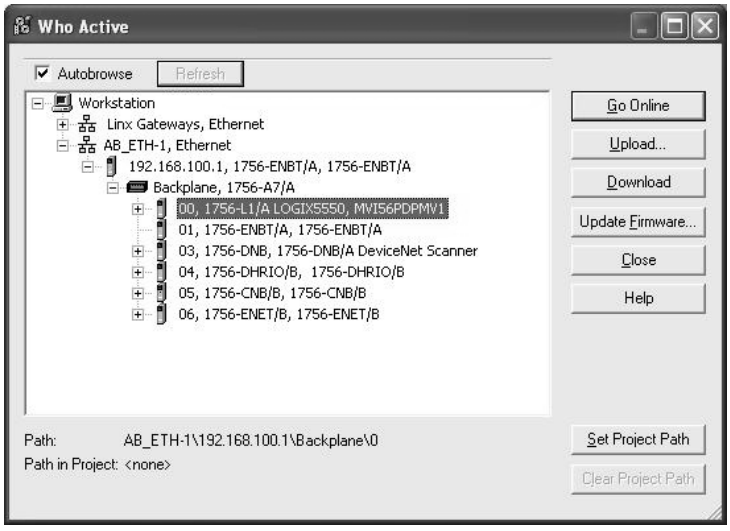
- Make sure that the IP address (and subnet mask settings) of the desktop or laptop wireless adapter was set in the same network as the IP address of the MVI56-WA-EIP. Refer to Connect the PC to the Wireless Network (page 24) to set up the IP address of your desktop or laptop wireless adapter.
- Verify that you are using RSLinx Classic version 2.51 or later.
- If you have configured the MVI56-WA-EIP module to use WEP encryption make sure that the desktop or laptop wireless adapter was also configured for WEP encryption (with the same WEP key value). Refer to Enable_Encryption (page 21) to set up WEP encryption.

1.10 Use RSLogix5000 to access the ControlLogix through the MVI56-WA-EIP

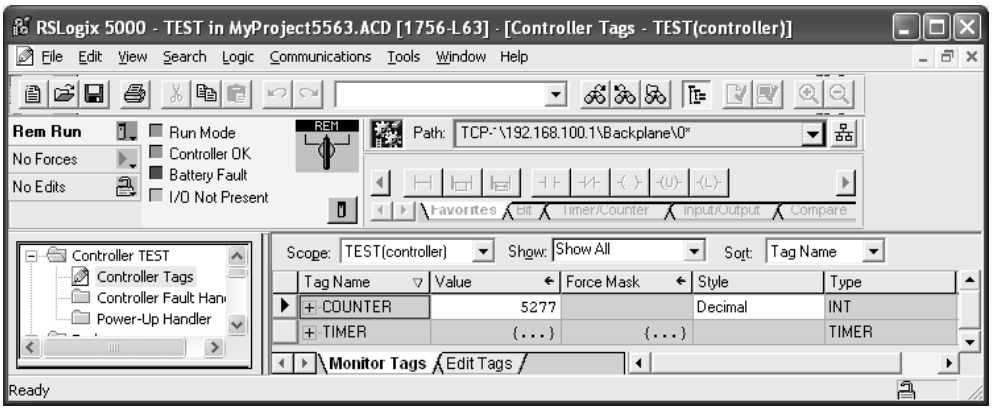
1 In RSLogix5000, open the Communications menu, and then choose RSWho.



2 Locate the configured driver and select the ControlLogix processor. Click Download to transfer the ladder to the processor through the MVI56-WA-EIP module.

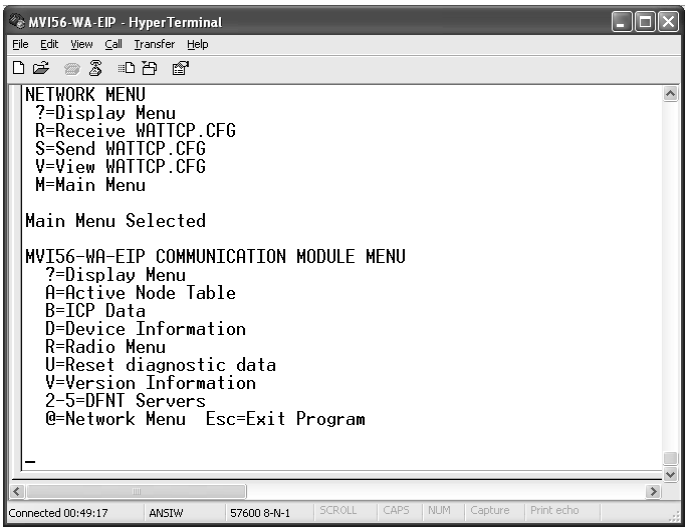


You can perform other general tasks (Download/Upload/Go Online, and so on) in the same way as using a 1756-ENET module.

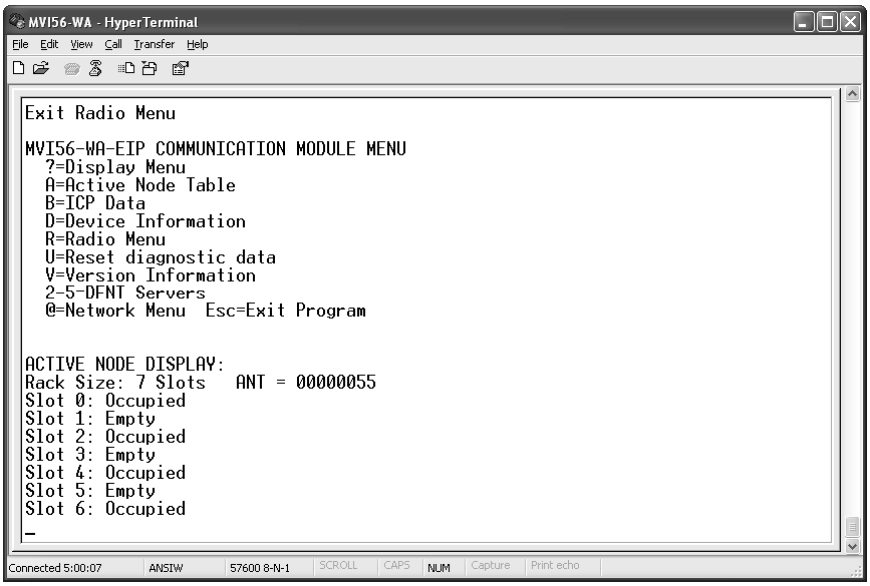


1.11 Verify Status Information

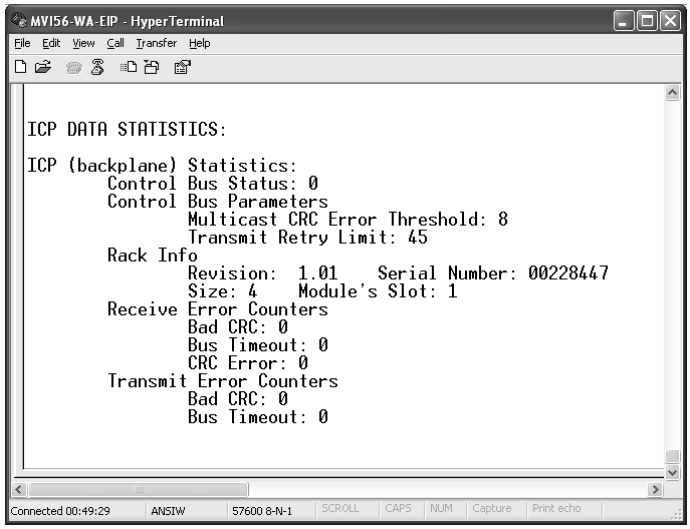
You can use the debug menu to verify the MVI56-WA-EIP status information.



Press **[A]** for rack occupation information. You can check which slots are occupied in the rack. The ANT register is a bitmap word (hexadecimal value) that also indicates which slots are occupied (bit x=1 means slot x is occupied).



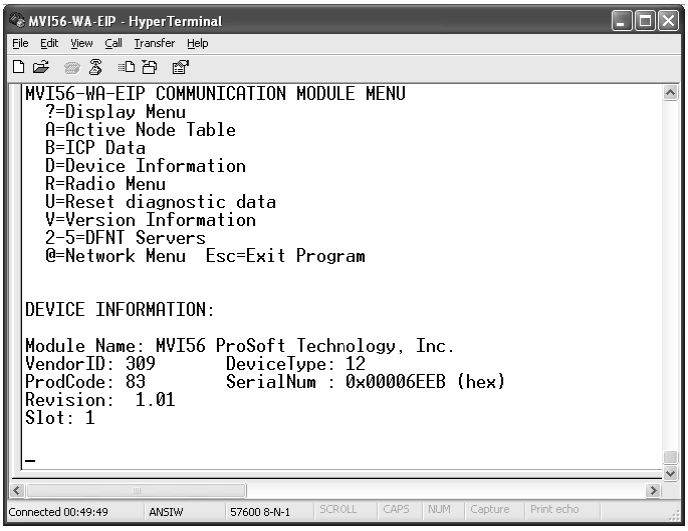
From the main menu, press **[B]** for the ICP status information. This information is obtained by the module through the backplane:



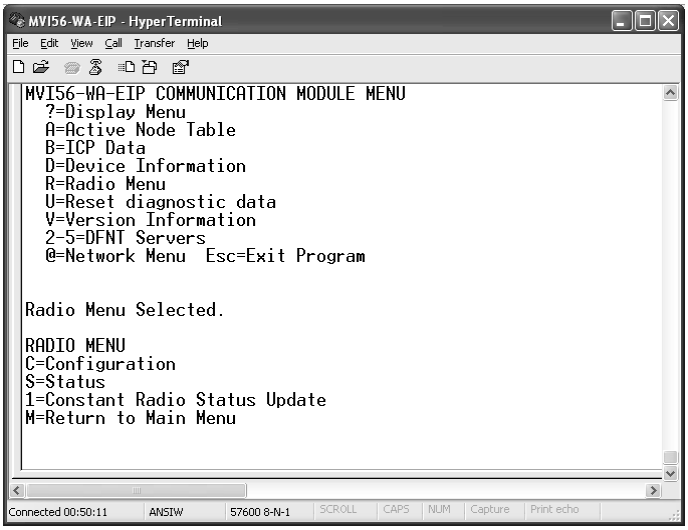
The following registers are available:

- **Control Bus Station** - indicates an error if value is different than 0. Refer to Rockwell documentation for further information on specific error codes.
- **Multicast CRC Error Threshold** - displays the threshold for entering a fault state due to multicast CRC errors.
- **Transmit Retry Limit** - The number of times a frame is retried if a transmission error occurs.

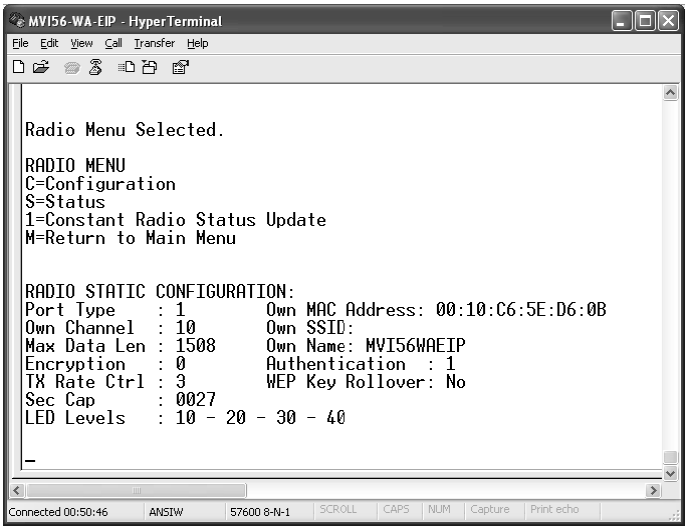
- **Rack information** - provides general information concerning: module revision and serial number, rack size and slot where the module is located.
- **Receive Error Counters (Bad CRC)** - number of bad CRC errors that occurred on received backplane frames.
- **Receive Error Counters (Bus Timeout)** - number of receive time-outs
- **Receive Error Counters (CRC Error)** - number of multicast receive CRC errors
- **Transmit Error Counters (Bad CRC)** - number of bad CRC errors that occurred on transmitted frames.
- **Transmit Error Counters (Bus Timeout)** - number of transmitted bus time-outs.
- To view device information, press **[D]**. This menu provides general device information as indicated below:



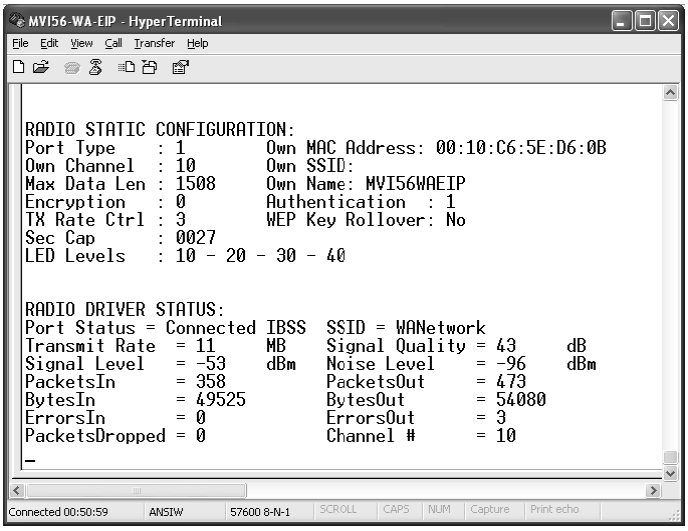
From the main menu, press **[R]** key to open the Radio menu.



Press **[C]** key for the radio configuration settings.



Press **[S]** key for the status information data



The following status registers can be monitored through the radio status menu:

Port Status

This register will typically indicate one of the following values:

- **Connected IBSS**

  If this status is continuously indicated then the module is connected to another station in ad-hoc mode.

- **Connected IBSS/Searching**

  If the ports status continuously alternates between Connected IBSS and Searching it typically means that either the module has just powered up or the module lost communication to another station (connected through ad-hoc mode). For the later condition the Connected IBSS status would be displayed for approximately 10 seconds and Searching status would be displayed for approximately 1 second.

- **Connected ESS**

  The module is connected to an access point (infrastructure mode).

- **Out of Range**

  The module lost connection to the previously connected access point. When in the out of range mode it will only search for another access point.

Transmit Rate

The transmit rate used for data communication. The module implements auto fallback transmit rate, so the module automatically calculates the rate to be used based on the signal quality level. There are four rates supported (1Mbps, 2Mbps, 5.5Mbps and 11Mbps).

Signal Quality, Signal Level, Noise Level

These registers can be used to determine the quality of the radio communication. The signal quality level will be the difference between the signal level and noise level.

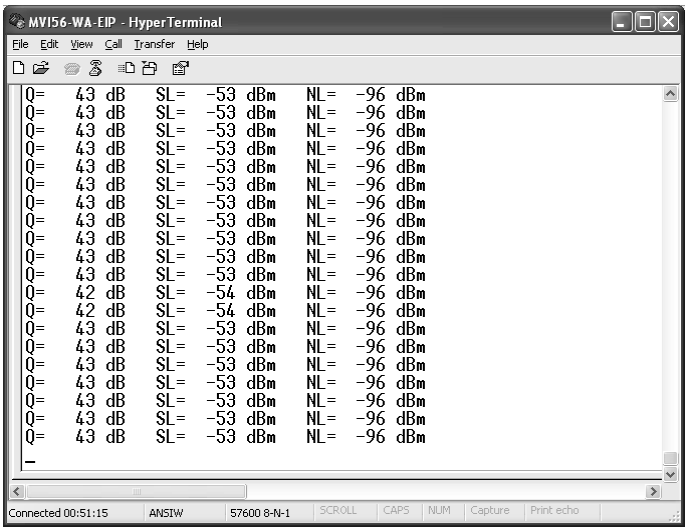
Packets In/Out, Bytes In/Out, Errors In/Out, Packets Dropped

These status registers allow the troubleshooting of the radio network by checking if the radio is receiving or sending data. If the module is not connected then the Packets In, Bytes In registers will not change.

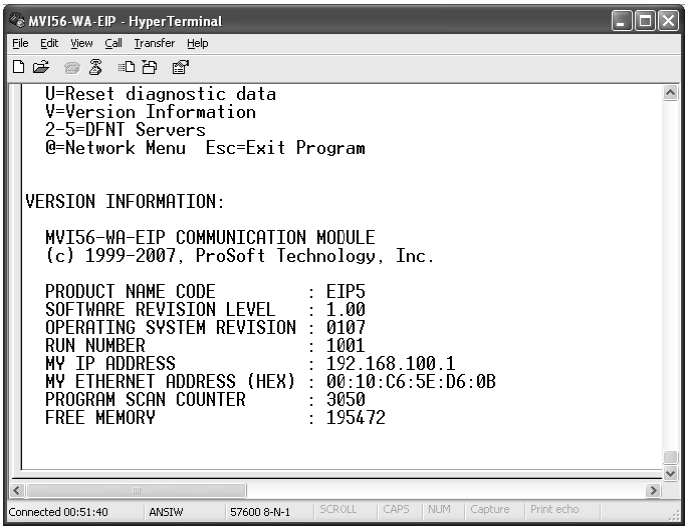
Channel

Check the channel number used by the radio to receive and transmit data. This should match the value configured in the configuration file.

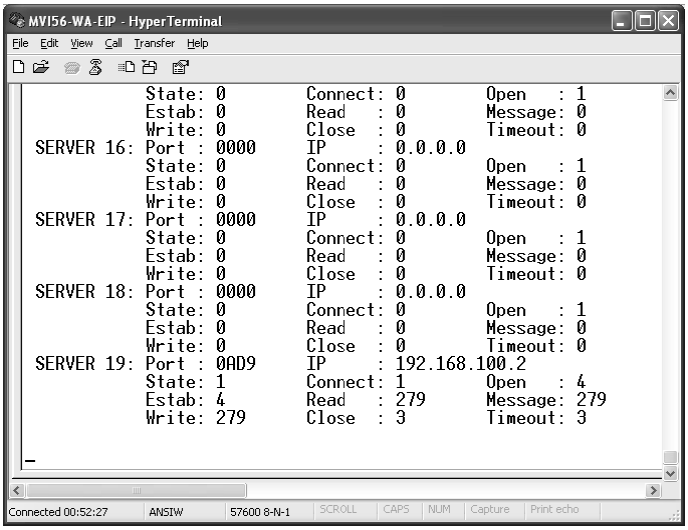
From the radio menu, press **[1]** for continuous update of the radio Noise Level (NL), Signal Level (SL) and Quality (Q):



From the main menu, press **[V]** to view the MVI56-WA-EIP version information.



Press keys **[2], [3], [4]** or **[5]** to view EtherNet/IP server status information. The first server to be connected will be server 19. It will display relevant information such as the remote computer IP address connected to the module. The module accepts up to 20 simultaneous connections.



2 Ad-hoc & Infrastructure Mode Overview

In This Chapter

The MVI56-WA-EIP module can be used in ad-hoc or infrastructure networks.

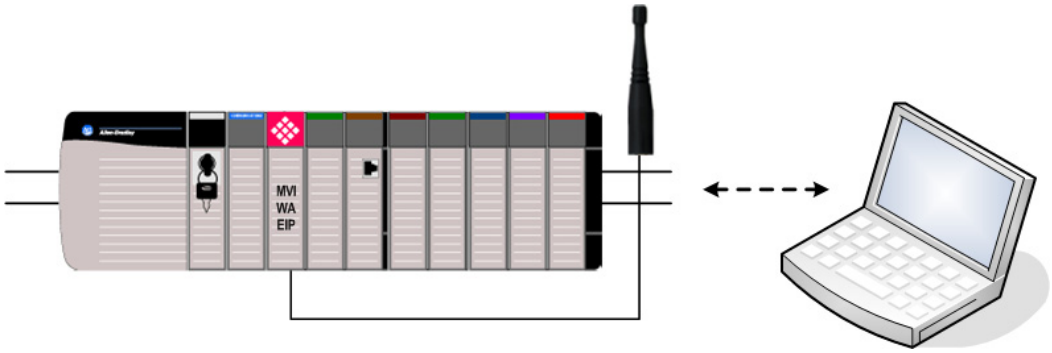
Stations in an ad-hoc network communicate directly with each other and thus must be within direct communication range.

Infrastructure networks are distinguished by the use of an access point for all communications. Any message sent between two stations must take two hops.

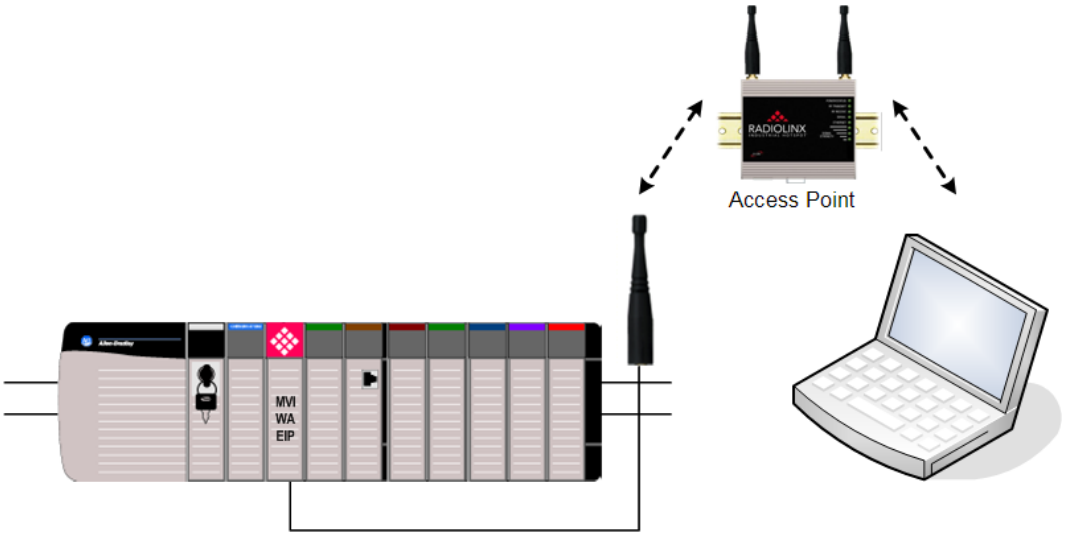
1. First, the source station transfers the frame to the access point.
2. Second, the access point transfers the frame to the destination station.

Therefore, in an infrastructure mode, all stations are required to be within reach of the access point.

2.1 Ad hoc Network



2.2 Infrastructure Network



It is out of the scope of this document to present detailed information about ad-hoc and infrastructure networks. Please refer the 802.11 specification document for further information.

The module may connect to an access point (infrastructure mode) in one of the following scenarios:

- After power up, if an access point with same SSID is found.
- After infrastructure or ad-hoc communication is lost, if an access point with same SSID is found.

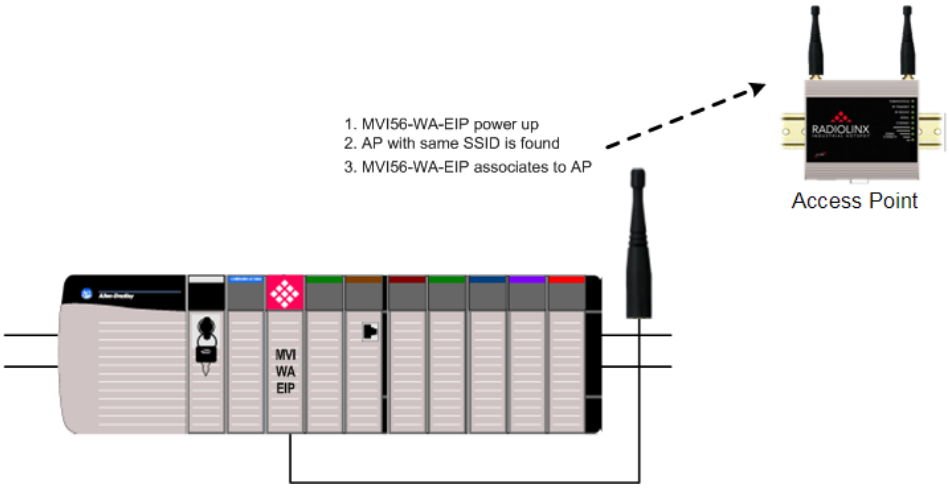
The module may connect to a station (ad-hoc mode) in one of the following scenarios:

- After power up, if an access point with same SSID is not found and an ad-hoc station is found with same SSID
- After ad-hoc communication is lost, if an ad-hoc station with same SSID is found.

Therefore the selection between ad-hoc and infrastructure mode is performed during module operation (there is no configuration parameter to select either mode). The following topics describe some scenarios that will help you understand how the module implements ad-hoc and infrastructure connections.

2.3 SCENARIO 1: AP Found after Power Up

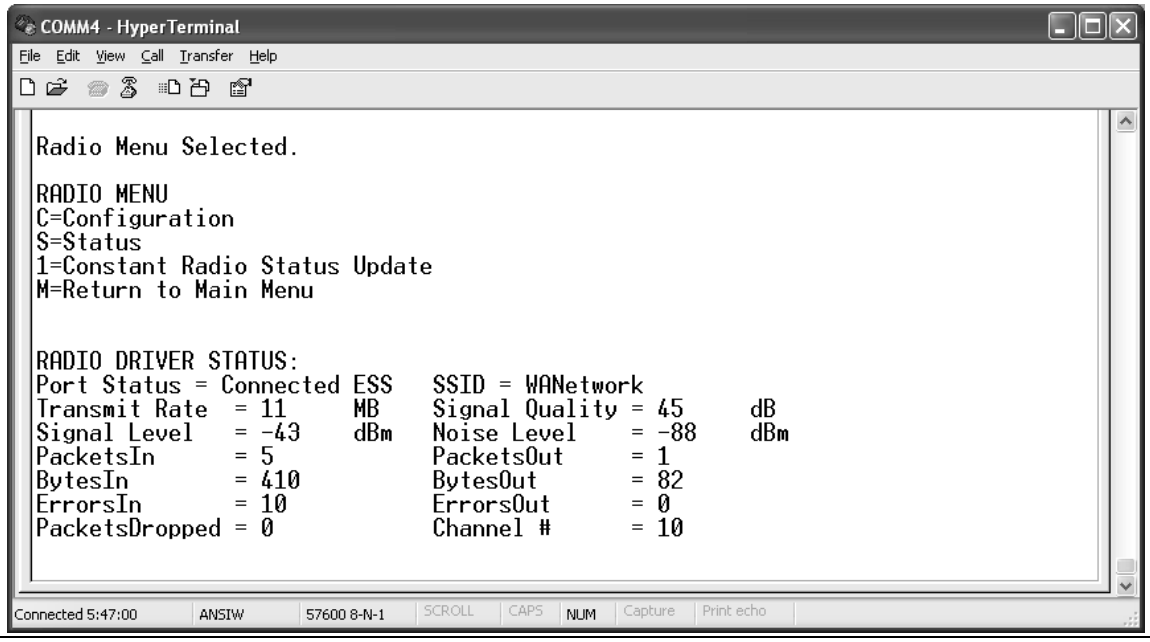
Upon power up, the module initially searches for an access point within range with same SSID value. If an access point with same SSID is found then the module associates to the AP in infrastructure mode. Then the module will communicate to any other stations associated to the same access point.



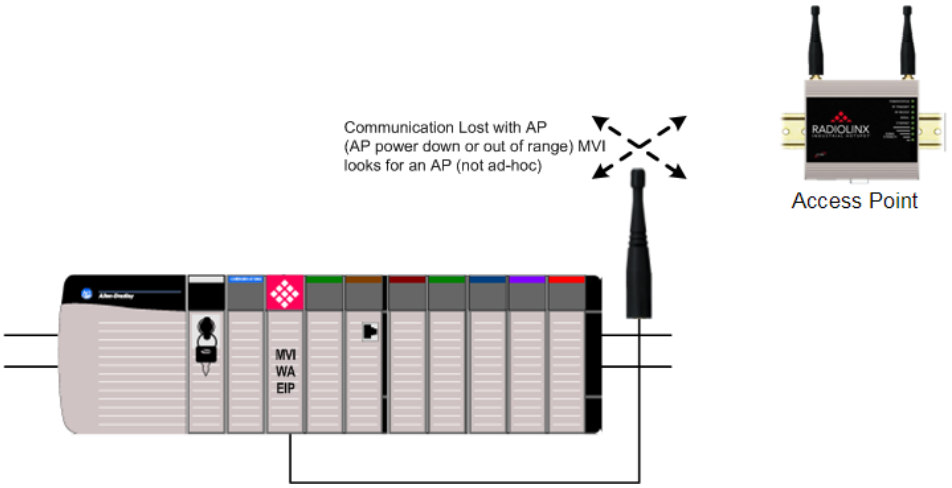
In order to find out if the module is connected in infrastructure or ad-hoc mode, refer to the port status information on the module's debug menu. From the main menu press **[R]** for the Radio Menu, and then press **[S]** for Status.

If the module successfully finds an Access Point with the same SSID, the port status register will show Connected ESS:

2.3.1 Access Point Found (Port Status = Connected ESS)

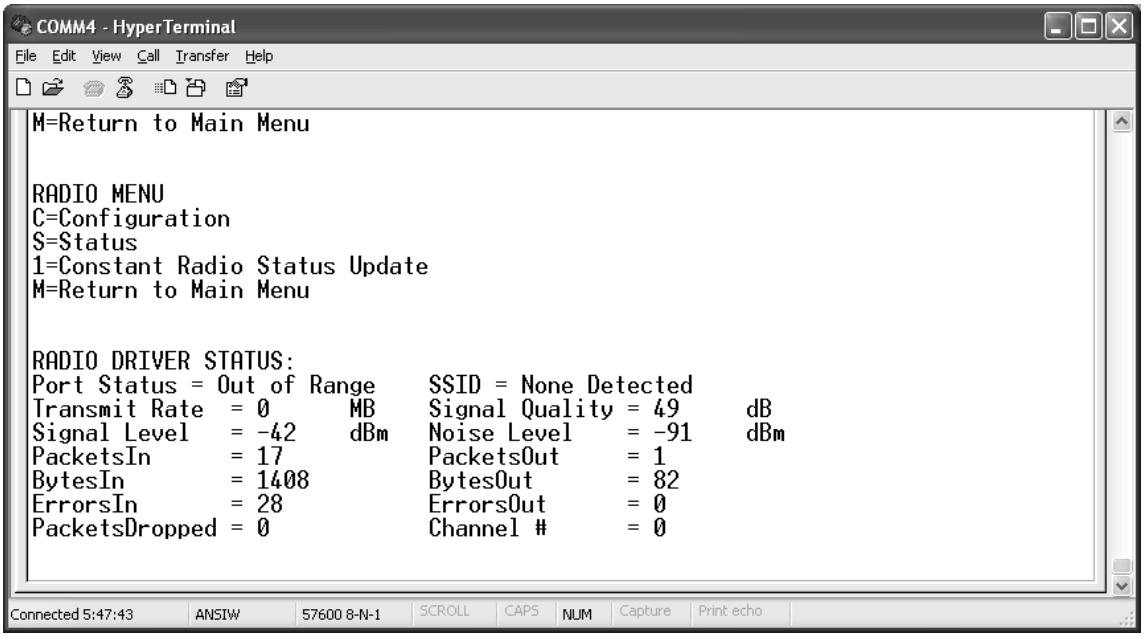


If communication to the AP is lost the module will try to associate to an access point with the same SSID. The module will not attempt to connect to another station in ad-hoc mode. The module must reboot to establish communication in ad-hoc mode after the communication is lost in infrastructure mode.



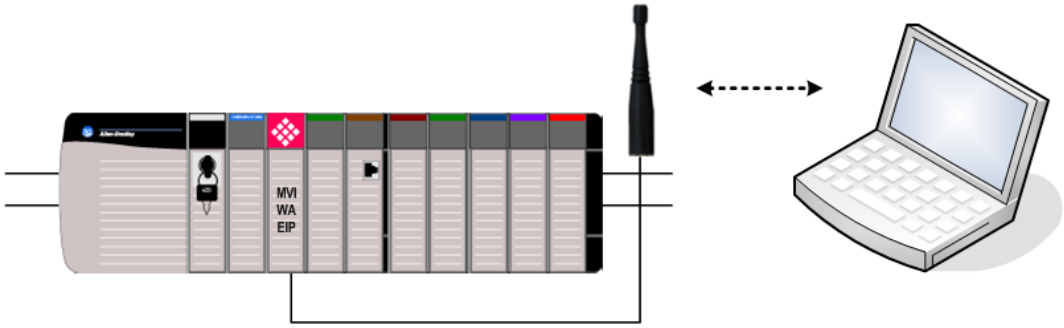
If communication is lost in infrastructure mode, the port status will indicate "out of range".

2.3.2 Communication Lost With Access Point (Port Status = Out of Range)



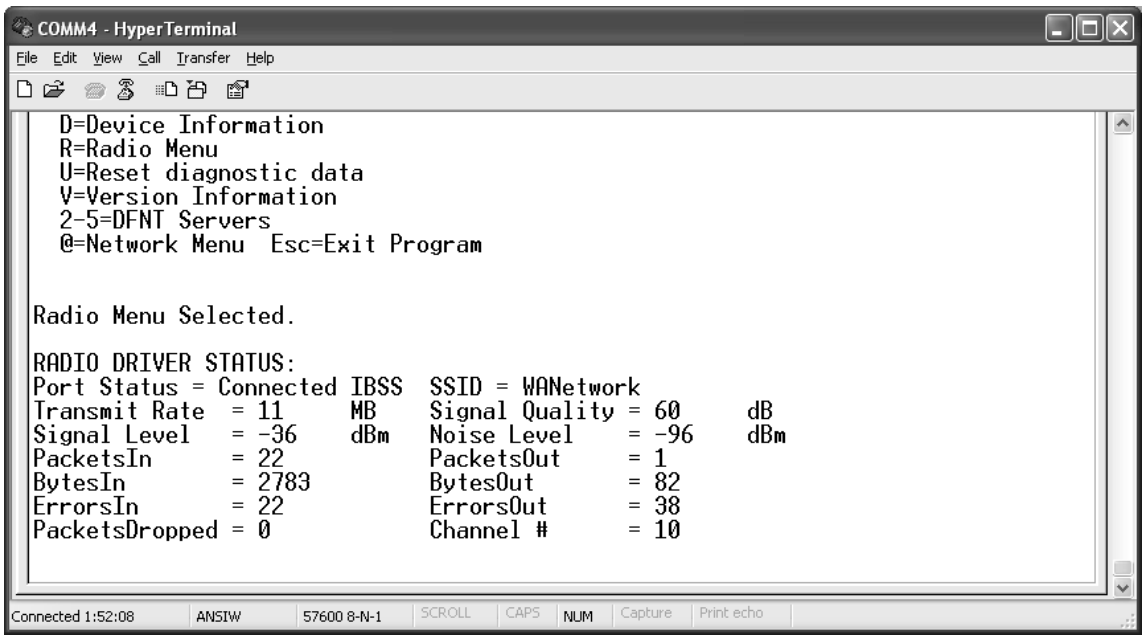
2.4 SCENARIO 2: AP Not Found after Power Up (Ad-hoc Station Found)

Upon power up, the module initially searches for an access point within range with the same SSID value. If an access point with the same SSID is not found, the module will attempt to connect to other stations with the same SSID in ad-hoc mode. If a station is found within range, the module will be connected in ad-hoc mode.

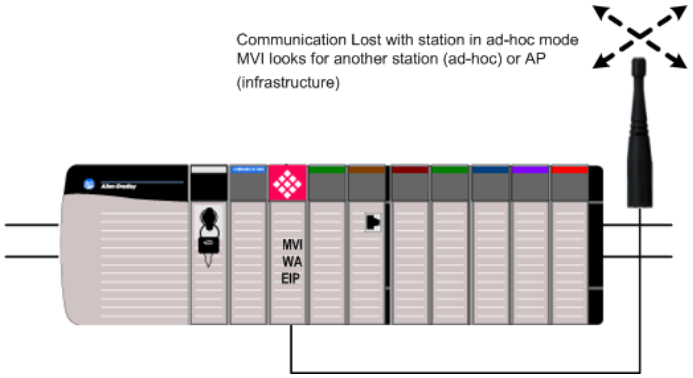


If the module is connected in ad-hoc mode, the ports status will indicate "Connected IBSS" continuously and with a valid Signal Quality (greater than 0dB).

2.4.1 Ad-hoc station Found (Port Status = Connected IBSS)

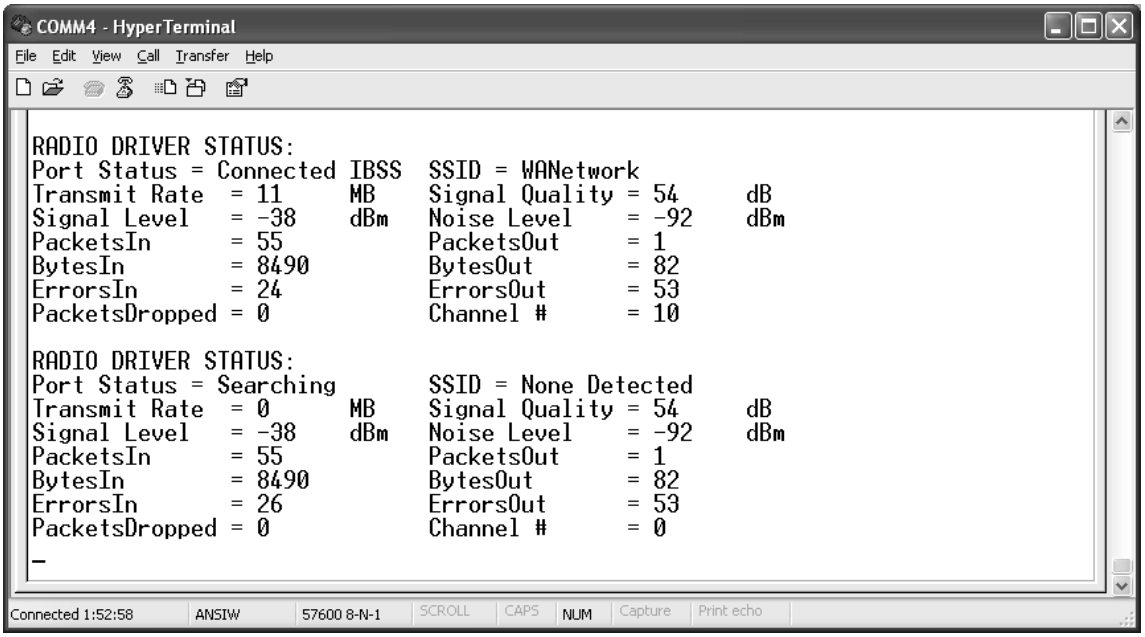


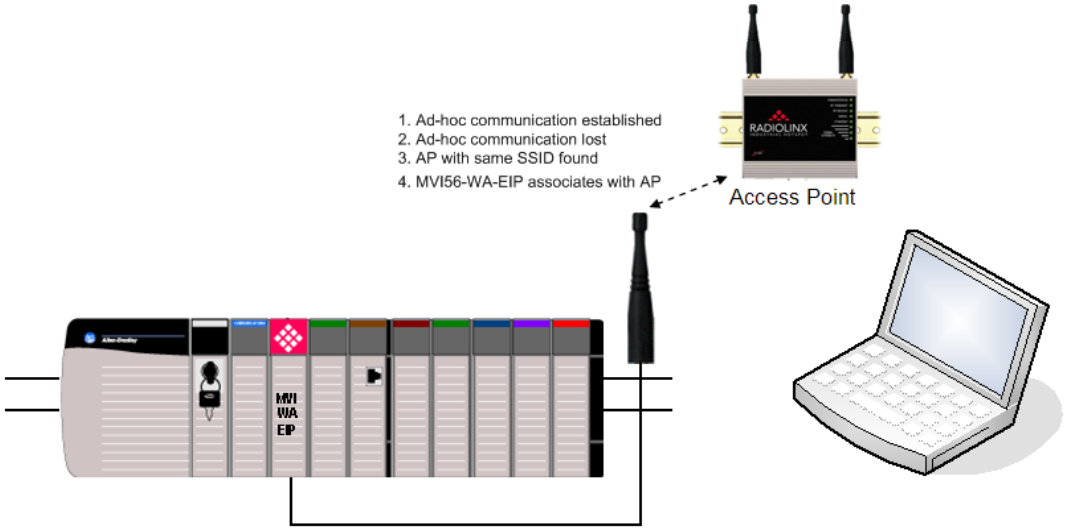
If the communication to any other stations is lost (ad-hoc) the module will search for other stations with same SSID (ad-hoc) or an access point with same SSID (infrastructure). Therefore, if the communication in ad-hoc is lost the module can still connect in infrastructure mode. However, if the communication is lost in infrastructure mode it will no longer connect in ad-hoc mode (as indicated in previous scenario).



The port status will switch between Connected IBSS (SSID=WANetwork) and Searching (SSID = None Detected) indicating that the module will be searching for other stations. The LEDs will also reflect this state. Refer to RF Signal Level LEDs (page 126) for more information on interpreting the LEDs.

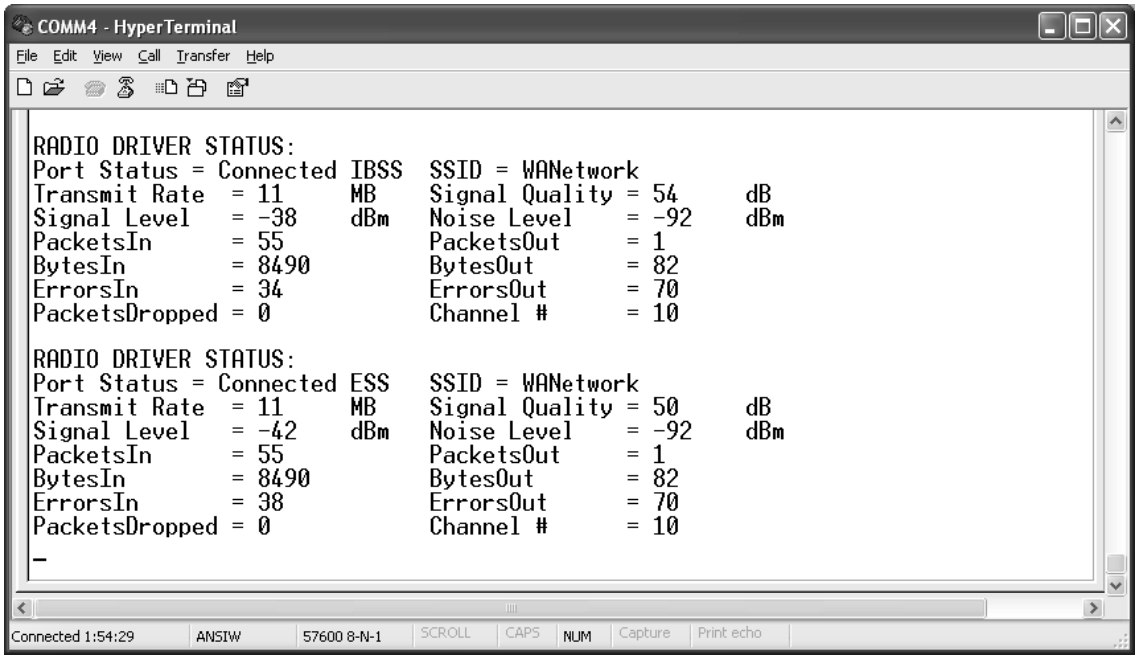
2.4.2 No ad-hoc communication: MVI56-WA-EIP looks for ad-hoc station or AP (Port Status = Connected IBSS/Searching)





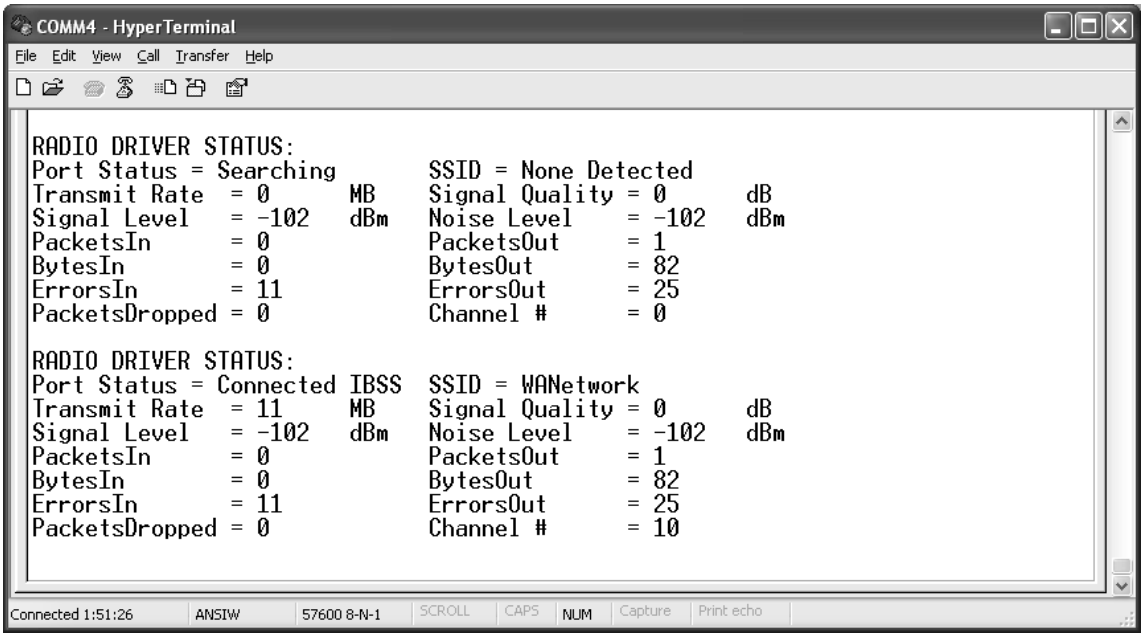
After the module communicates with the access point, the port status will then change from Connected IBSS/Searching to Connected ESS:

2.4.3 Port Status = Connected ESS



2.5 SCENARIO 3: No stations found after Power Up (ad-hoc or AP)

The module might power up but not find any access point or ad-hoc stations with the same SSID. The module will continue searching for other stations (ad-hoc or AP) until a connection is established. The port status will switch between Connected IBSS and Searching with a signal quality level of 0dB until a connection is established.



3 Supported Applications

In This Chapter

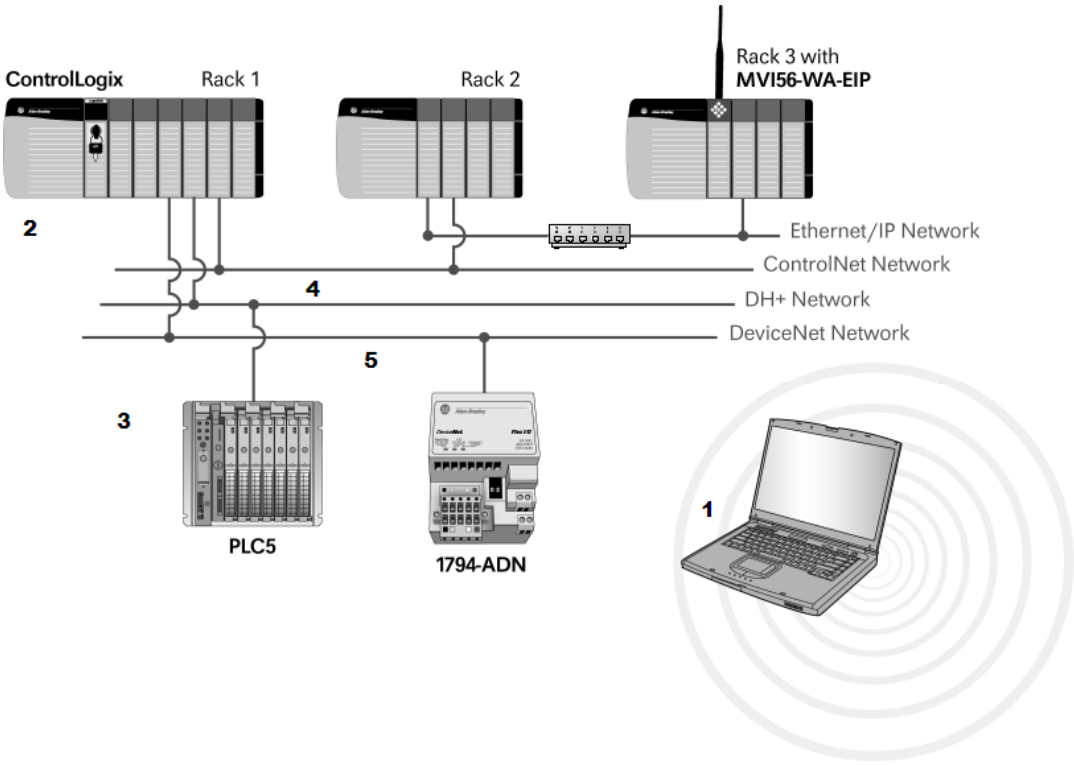
The previous setup procedure created a basic application where the MVI56-WA-EIP module would allow a laptop with WiFi capability to wirelessly program a ControlLogix processor in the same rack. This section will illustrate other applications you can perform with the MVI56-WA-EIP module.

The following topics show how to perform different tasks through the MVI56-WA-EIP module. These tasks assume that you have followed the previous setup steps listed in this document to have the module configured and connected to the laptop.

3.1 Bridging Capability

The MVI56-WA-EIP module can bridge different processors through different networks. The module allows the bridging through ControlNet, EtherNet/IP, DH+ and DeviceNet networks.

To illustrate the bridging capability, refer to the sample network diagram below:

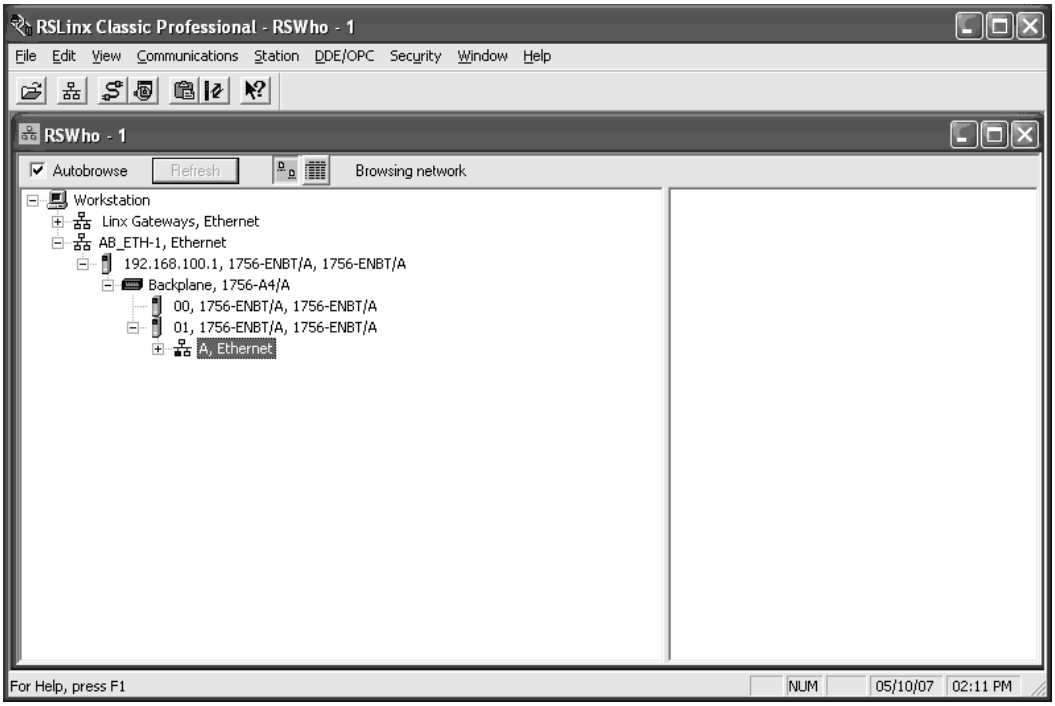


For this sample network the MVI56-WA-IP module allows wireless access to the laptop to perform the following tasks:

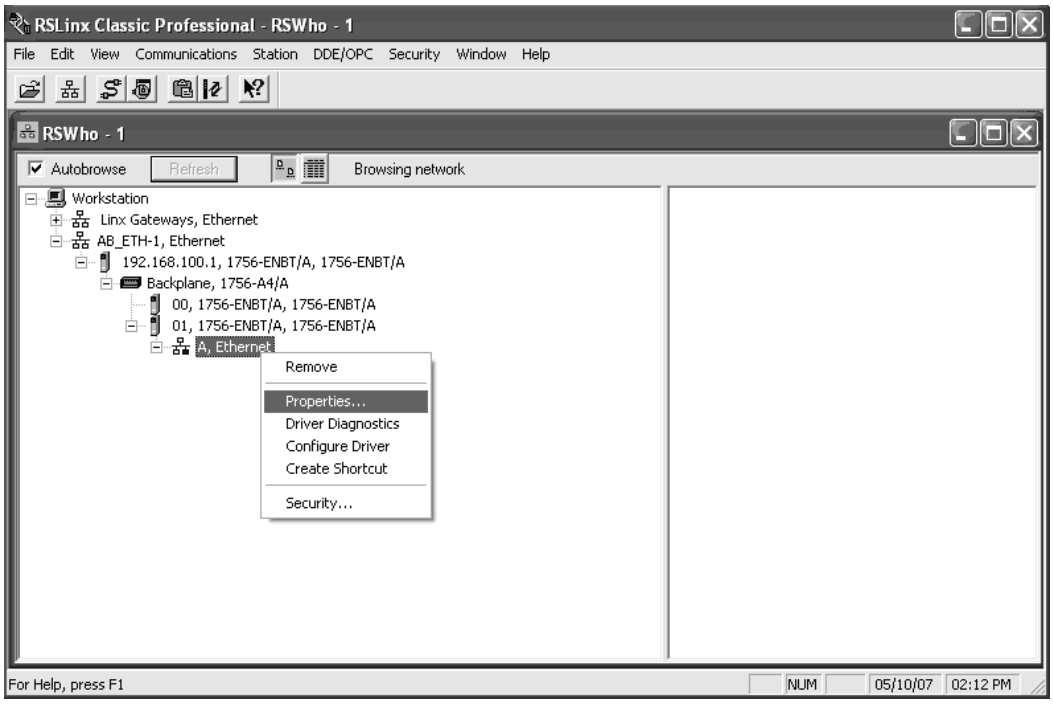
1 Monitor the entire network with RSLinx
2 Program the ControlLogix processor with RSLogix5000
3 Program the PLC5 processor on the DH+ network with RSLogix5
4 Configure the ControlNet network through RSNetWorx for ControlNet
5 Configure the DeviceNet network through RSNetWorx for Devicenet

3.1.1 Monitor the Entire Network with RSLinx

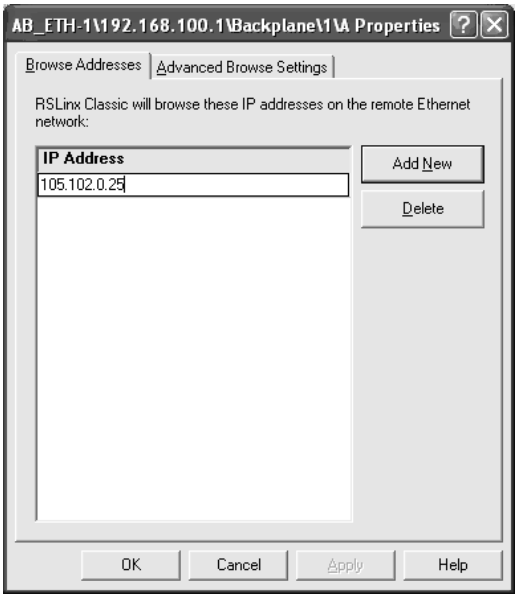
You can use RSlinx Who functionality to scan different networks/racks bridged through the MVI56-WA-EIP.



Similarly when scanning an EtherNet/IP module through a 1656-ENBT module you need to define the addresses to be browsed under an EtherNet/IP node. Right-click on the Ethernet icon and choose Properties.

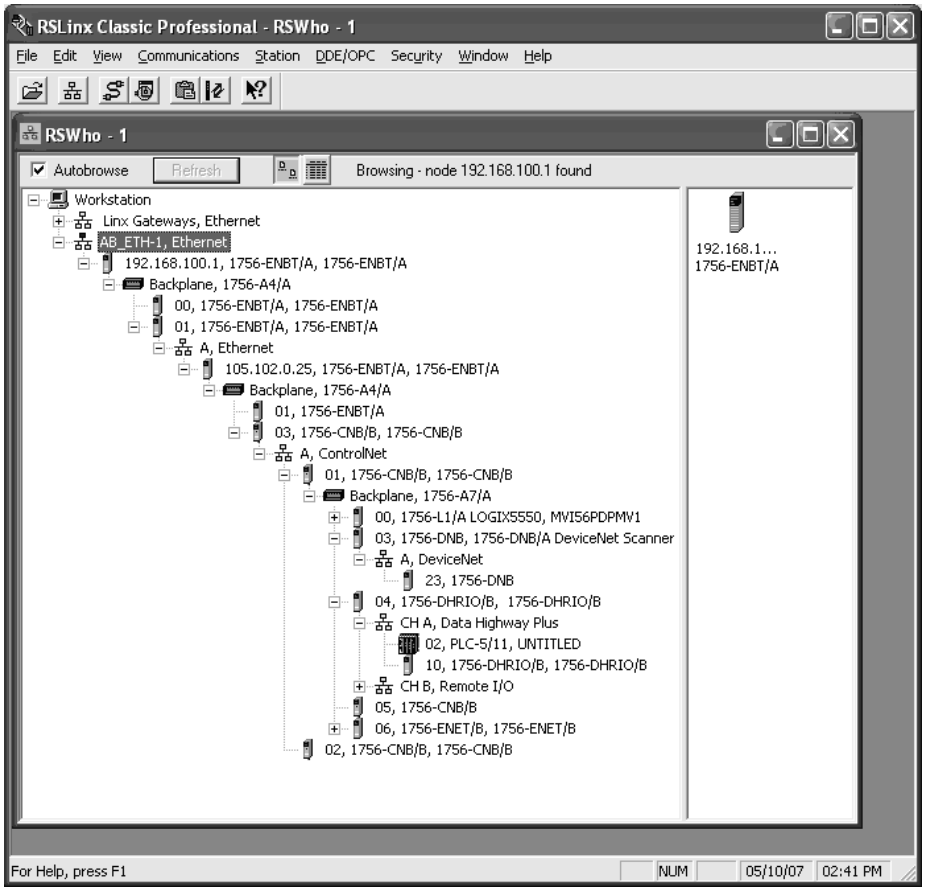


Enter the IP address of the 1756-ENBT on the EtherNet/IP network. Click Apply to save your settings, and then click OK to close the dialog box.



Now you can observe all the nodes connected on the sample network through the MVI56-WA-EIP module. The module provides access to nodes on EtherNet/IP, ControlNet, DeviceNet and DH+ networks as indicated in the following example.

Note: If the modules under the EtherNet/IP network are not displayed, delete the Ethernet icon to force a refresh.



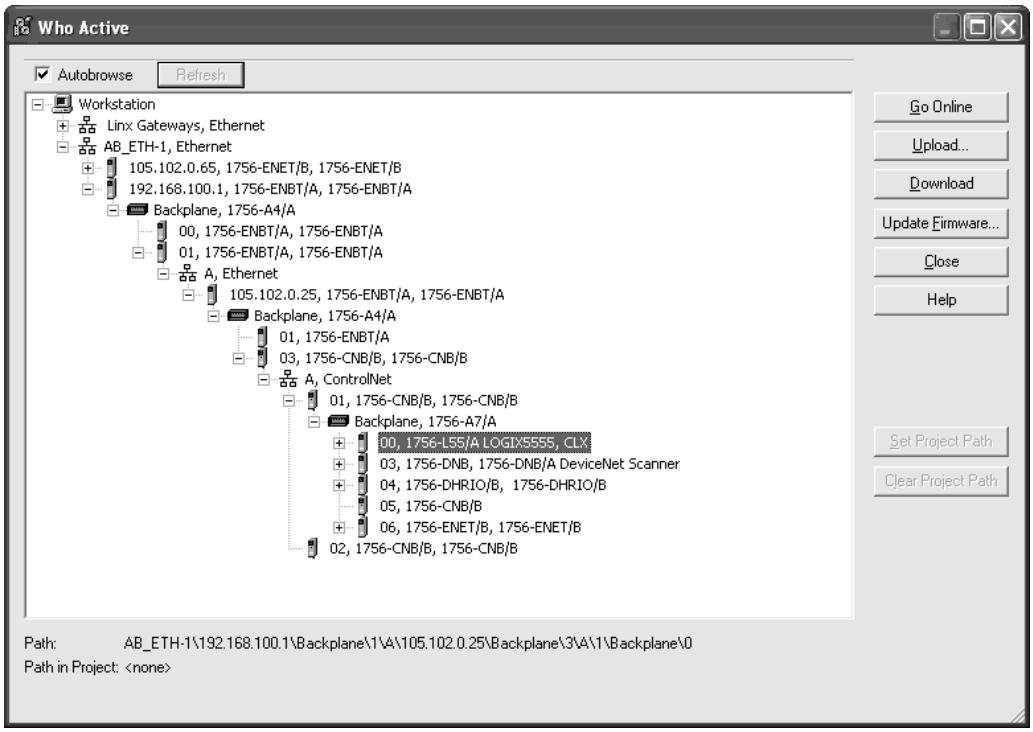
3.1.2 Program the ControlLogix processor with RSLogix5000

The MVI56-WA-EIP module allows a laptop with WiFi capability to program a ControlLogix processor in local or remote rack. For remote rack applications the bridging functionality allows access through ControlNet, EtherNet/IP, DH+ and DeviceNet networks.

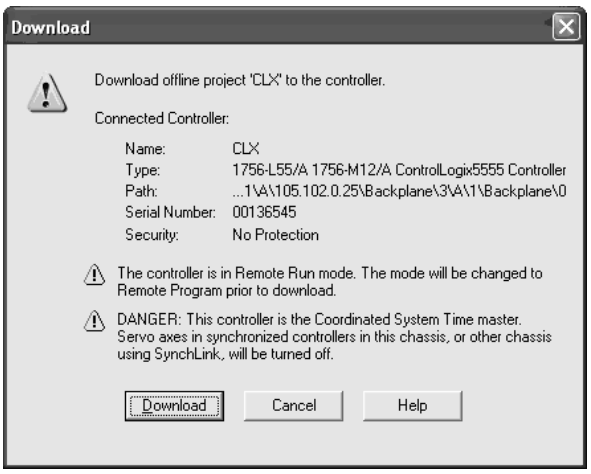
For the sample network, the MVI56-WA-EIP module bridges the messages through ControlNet and EtherNet/IP networks to access the ControlLogix processor on rack 1.

1 In RSLogix5000, open the Communications menu, and then choose Who Active.

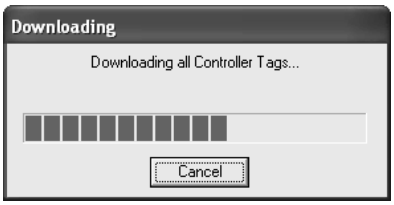
2 Select the ControlLogix processor through the MVI56-WA-EIP module as follows. Note that the MVI56-WA-EIP module is recognized as a 1756-ENBT/A module (192.168.100.1).



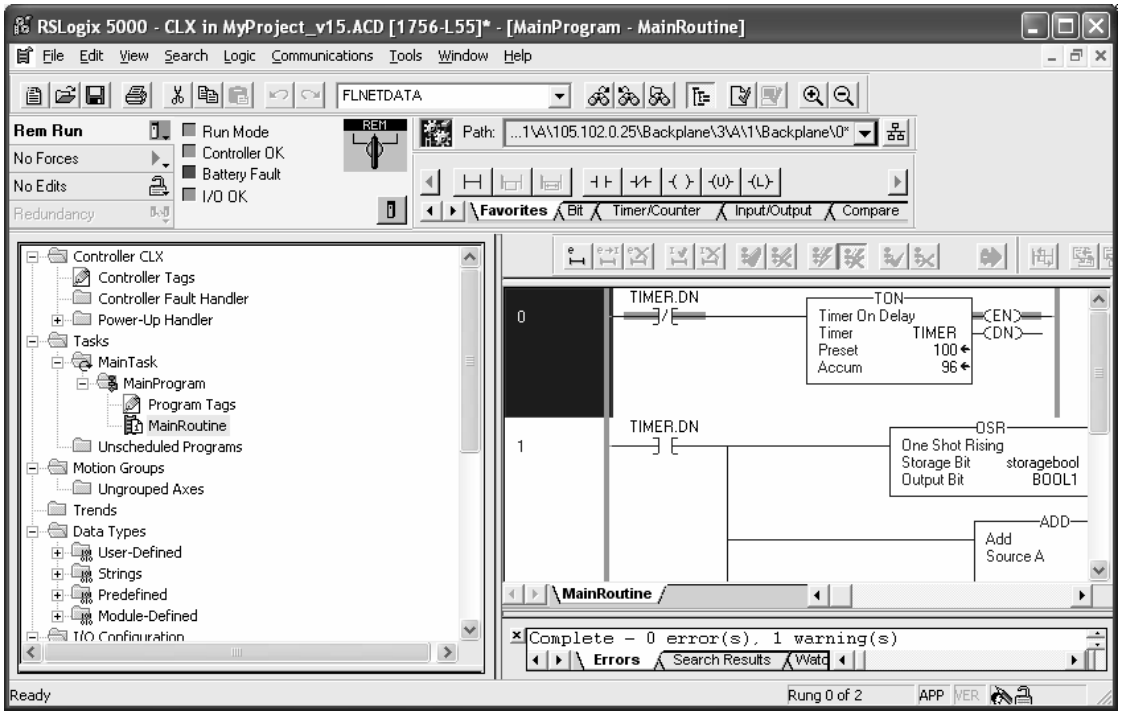
3 You can now select different operations such as Download, Upload or Go Online, similarly as using a 1756-ENBT module. For example you could select to download the offline project as follows:



The download operation will be in progress.



You could also select to Go Online with the processor as follows:



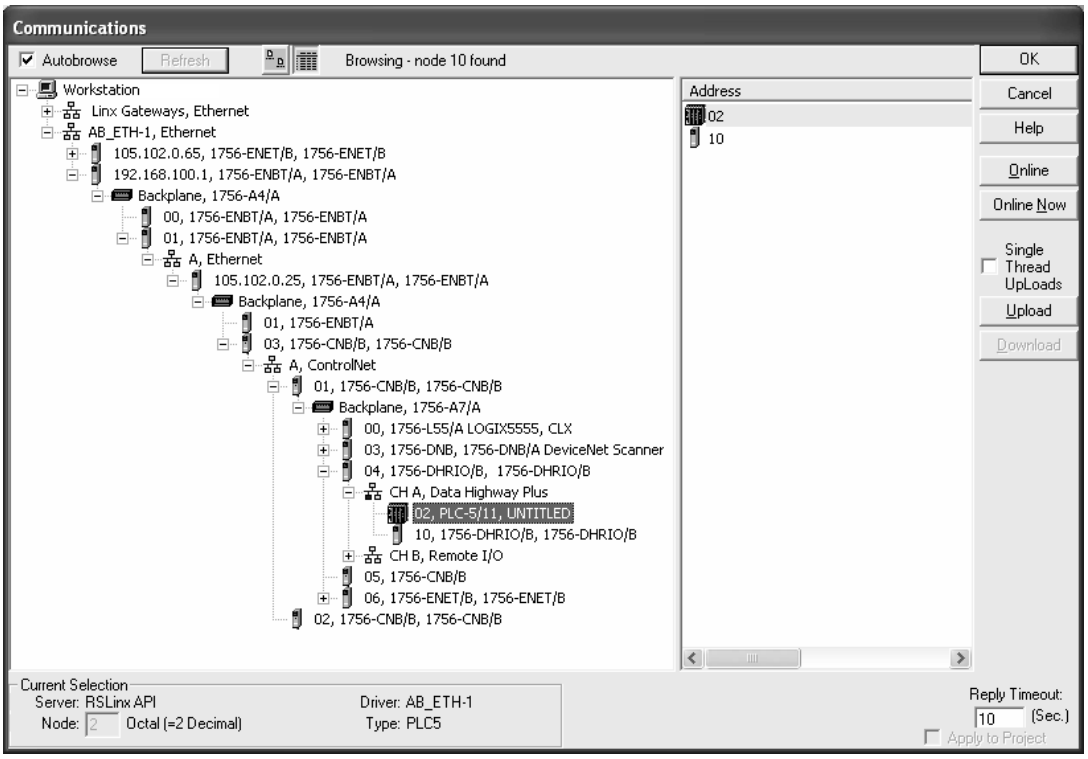
3.1.3 Program the PLC5 processor in the DH+ network with RSLogix5

The MVI56-WA-EIP module allows access to different processors such as MicroLogix, CompactLogix, ControlLogix, SLC, PLC, FlexIO that are accessible through ControlNet, EtherNet/IP or DH+ networks.

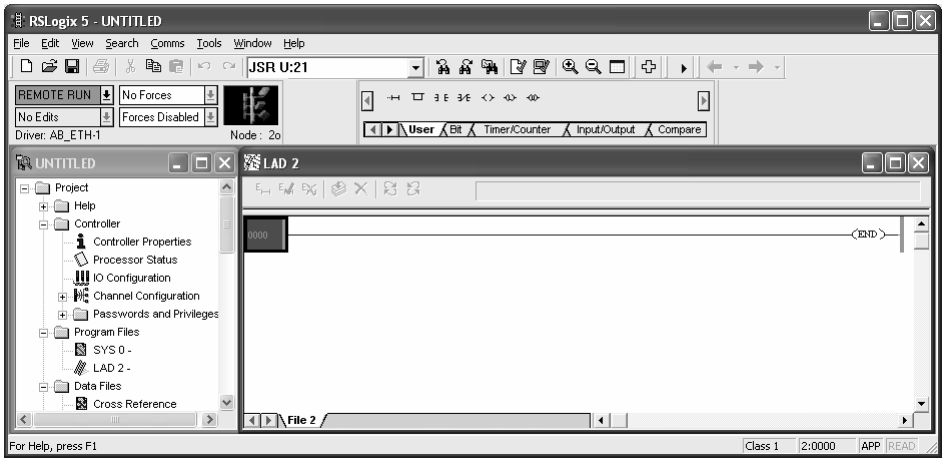
For the sample network, the MVI56-WA-EIP module allows access to the PLC5 on the DH+ network. Therefore, for this example, the MVI56-WA-EIP bridges the messages through the ControlNet, EtherNet/IP and DH+ networks to reach the PLC5 processor.

1 In RSLogix5, open the Comms menu, and then choose System Coms

2 Select the PLC5 processor that is accessible through the MVI56-WA-EIP module. Note that the MVI56-WA-EIP module is recognized as a 1756-ENBT/A module (192.168.100.1) module.



3 You can now select different options to edit the PLC5 ladder program. The following example shows the Online option. After you select Online, you can perform online edits to the PLC5 processor through the MVI56-WA-EIP module.

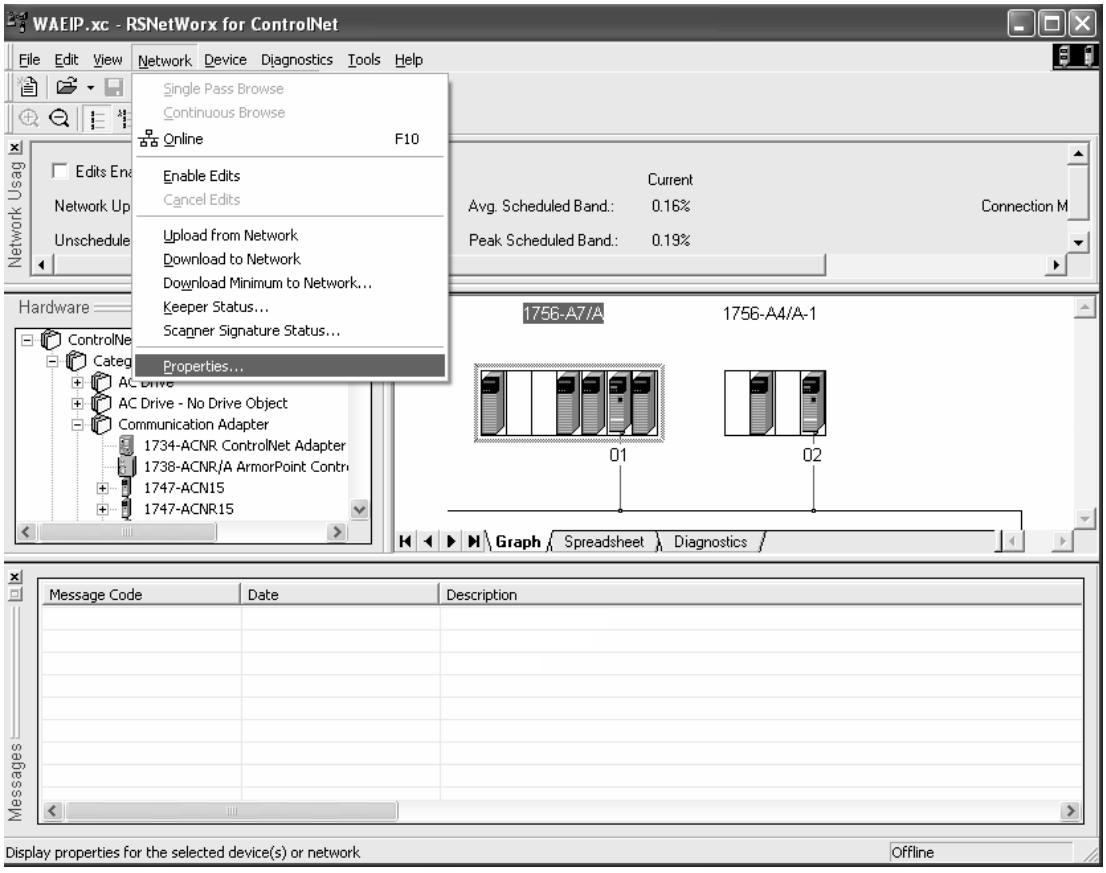


3.1.4 Configure the ControlNet network through RSNetWorx for ControlNet

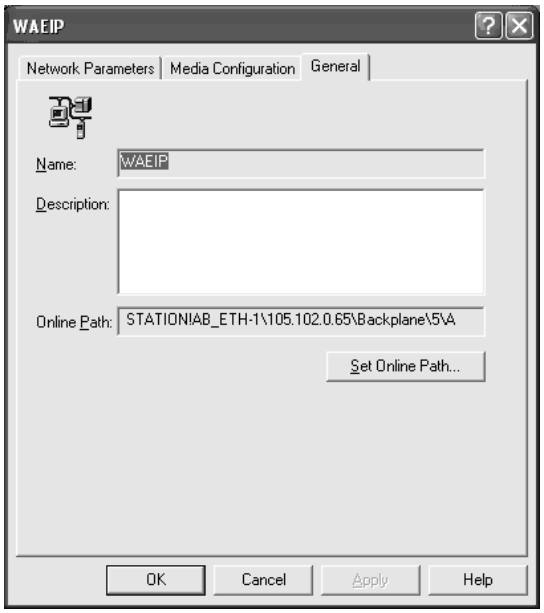
The network path available through the MVI56-WA-EIP module can also be used to configure the ControlNet network with RSNetWorx for ControlNet.

Still considering the sample network, we can demonstrate how to change the NUT time in RSNetWorx and then reschedule the ControlNet network through the online path available through the MVI56-WA-EIP module.

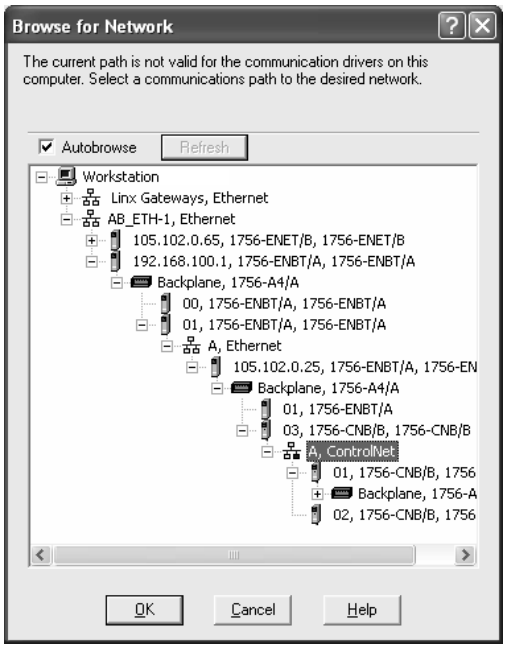
1 In RSNetWorx for ControlNet, open the Network menu, and then choose Properties.



2 In the General tab of the Network Properties (WAEIP) dialog box, click Online Path to configure the online path.

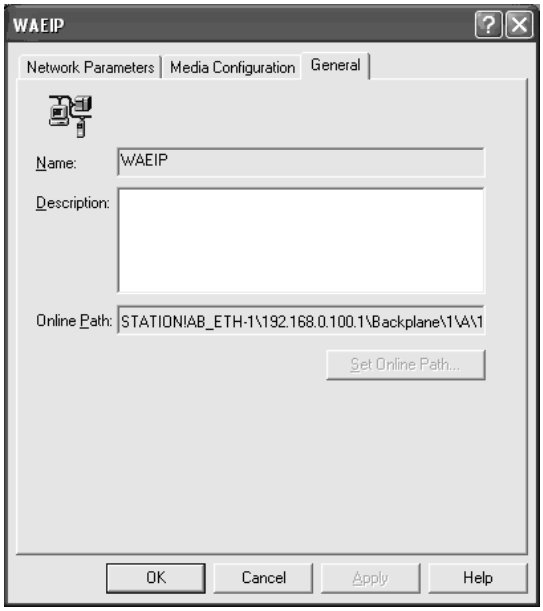


3 Select the ControlNet network icon that is available through the MVI56-WA-EIP module. Note that the MVI56-WA-EIP module is displayed as a 1756-ENBT/A module (IP = 192.168.100.1). Click OK to save your settings and close the dialog box.

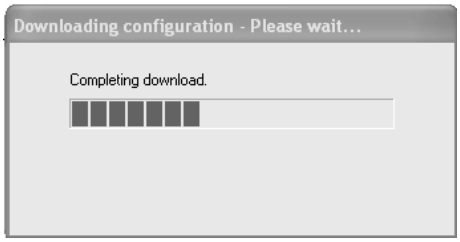


Note: if the EtherNet/IP nodes you have previously configured for browsing through RSLinx are not displayed, close RSLinx and RSNetWorx and then run these programs again to force a display refresh.

Now the online path available through the MVI56-WA-EIP module will be used as the path for all online communications by RSNetWorx for ControlNet.



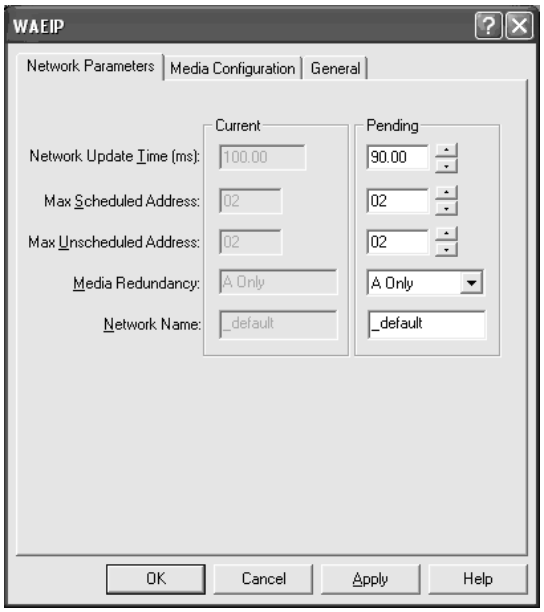
4 Click OK to close the dialog box, and, when prompted, download the configuration through the MVI56-WA-EIP module.



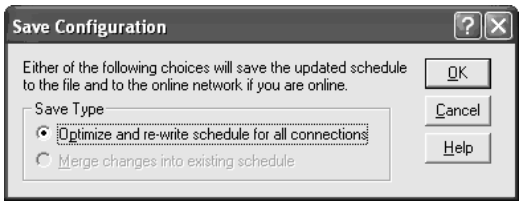
5 In RSNetWorx for ControlNet, open the Network menu, and then choose Properties. This action opens the Network Properties (WAEIP) dialog box.

6 In the Network-Properties dialog box, click the Network Parameters tab, and then change the NUT time. The following illustration shows an example of changes that could be performed to a specific RSNetWorx project.

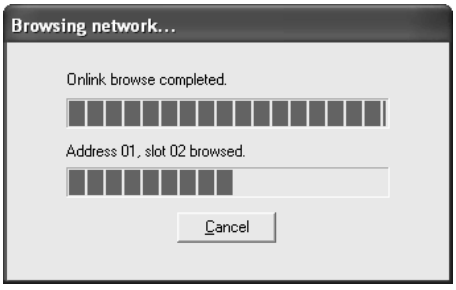
7 Click OK to save your settings and close the dialog box.



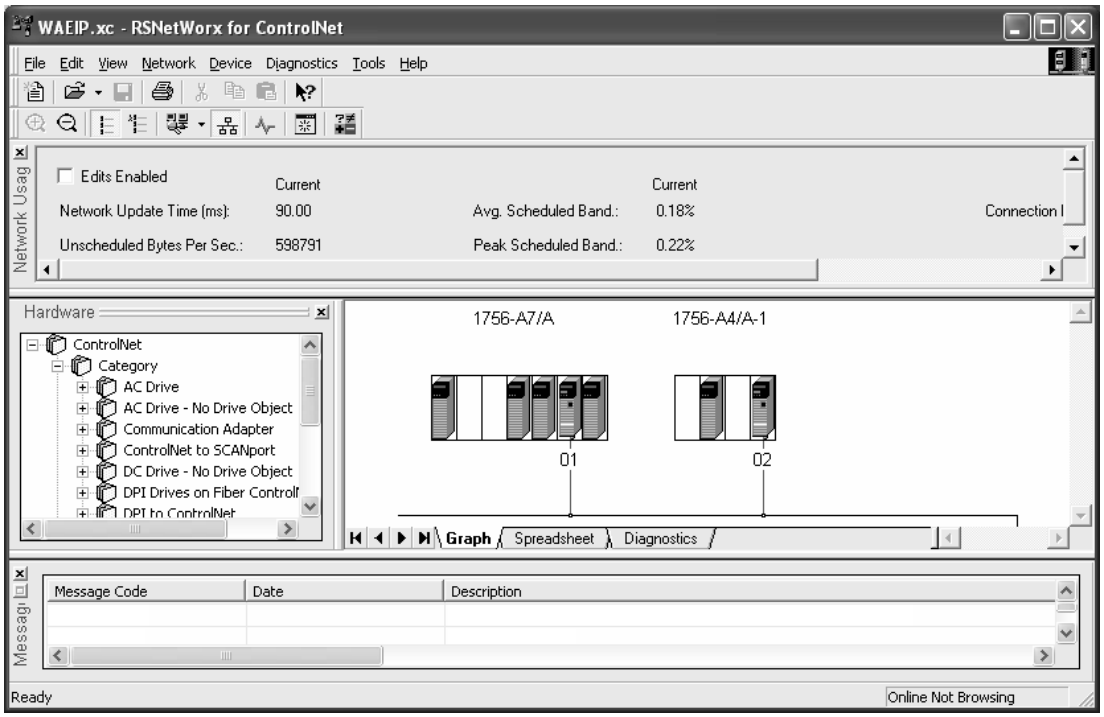
8 Save your project (with Edits Enabled selected). Select Optimize and re-write schedule for all connections, as indicated below, to reschedule your ControlNet network through online path available through the MVI56-WA-EIP module



The RSNetWorx will be rescheduling and downloading the new configuration to the ControlNet network through the MVI56WA-EIP module.



After the network is rescheduled you can also monitor the network through the online path available through the MVI56-WA-EIP module.



Note: In a ControlNet project, you can configure the slot where the module is is located with a 1756-ENBT/A communication module.

3.1.5 Configure the DeviceNet network through RSNetWorx for Devicenet

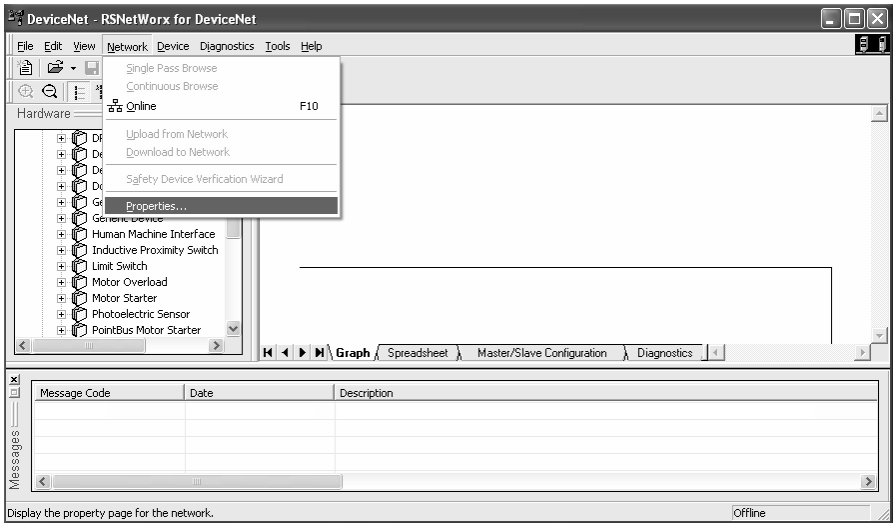
The network path available through the MVI56-WA-EIP module can also be used to configure the DeviceNet network with RSNetWorx for DeviceNet.

For the sample network, it will be demonstrated how to perform the following tasks through the online path available through the MVI56-WA-EIP module.

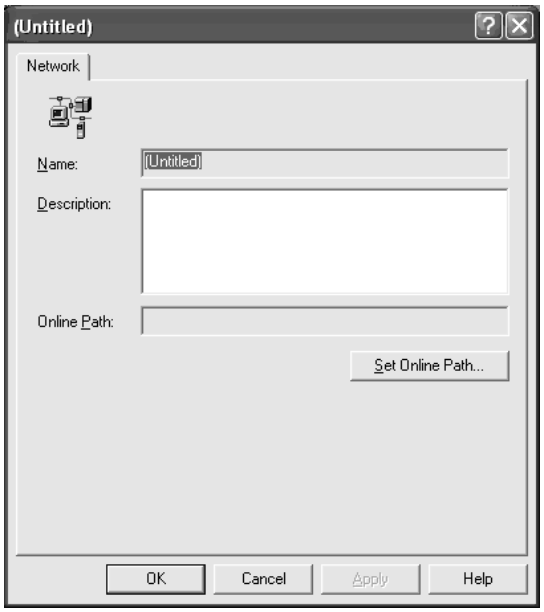
- Upload the DeviceNet configuration
- Execute a transaction to a DeviceNet node

To Configure the DeviceNet network through RSNetWorx for Devicenet

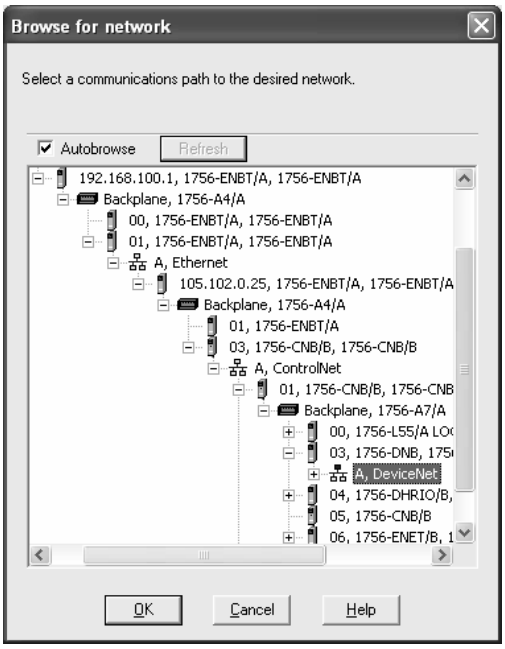
1 In RSNetWorx for DeviceNet, open the Network menu, and then choose Properties.



2 In the Network Properties dialog box, click Online Path… to configure the online path.

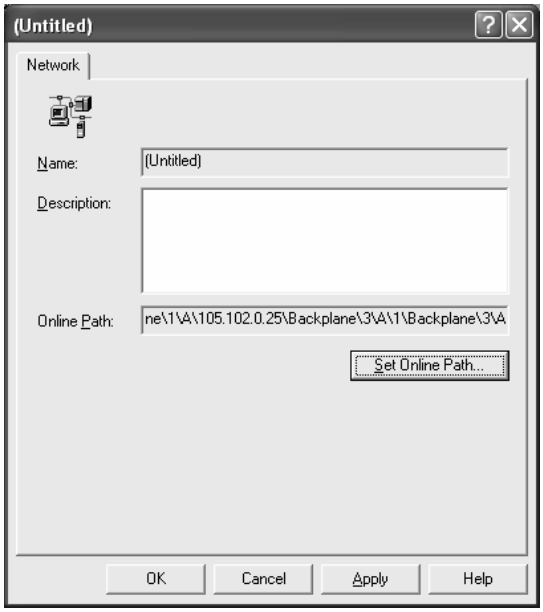


3 Select the DeviceNet network that is available through the MVI56-WA-EIP module. Please note that the MVI56-WA-EIP module is displayed as a 1756-ENBT/A module (IP=192.168.100.1). Select OK to confirm.

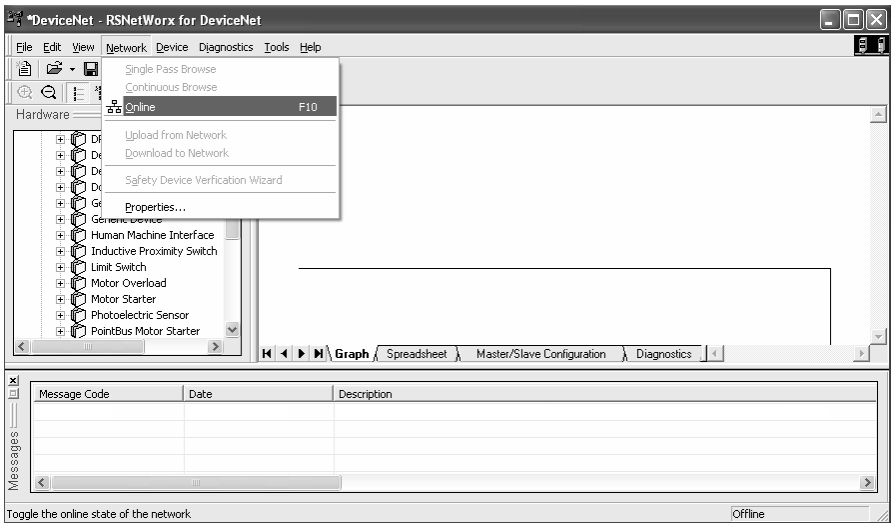


Note: if the EtherNet/IP nodes previously configured for browsing through RSLinx are not displayed, close RSLinx and RSNetWorx and run these programs again to force a display refresh.

The Online Path now indicates the path available through the MVI56-WA-EIP module.

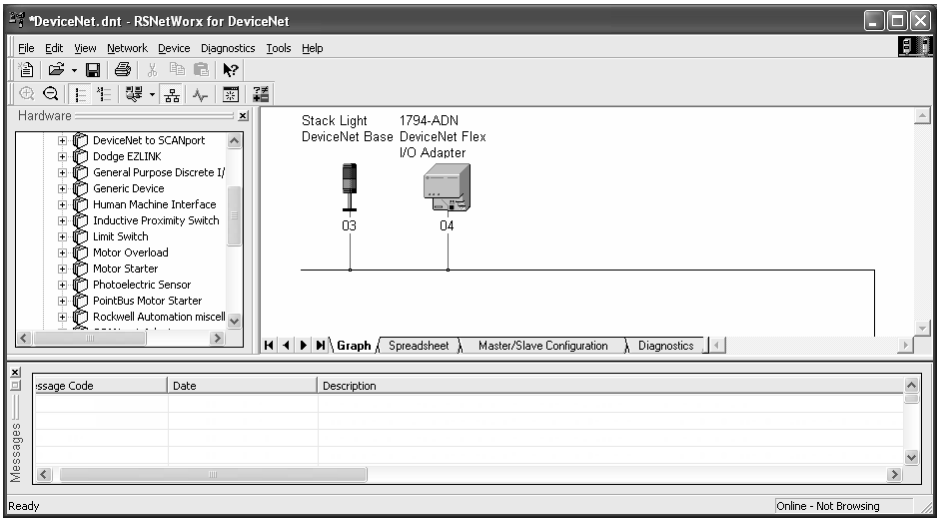


4 In RSNetWorx for DeviceNet, open the Network menu, and then choose Online.



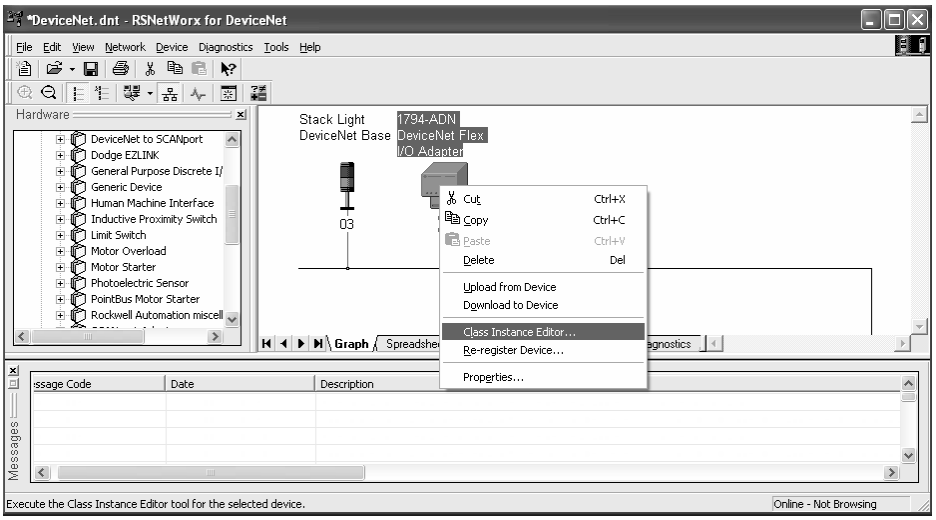
RSNetWorx will browse the DeviceNet network and upload the current network configuration.

The connected devices will be displayed on the Graph tab

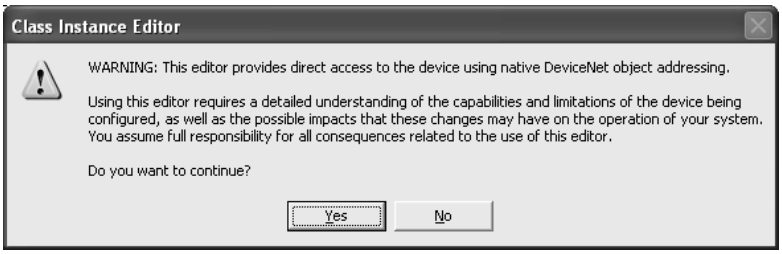


Now you can perform different tasks similarly as using a 1756-ENBT module. For example, you could request a transaction from a specific node DeviceNet node.

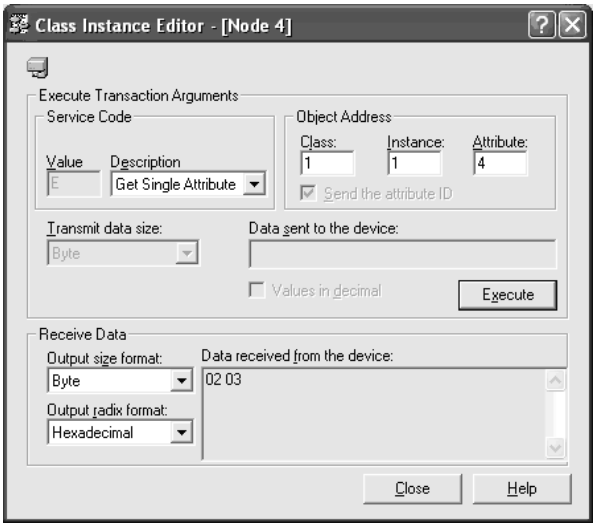
5 Right-click on a specific node to run the Class Instance Editor:



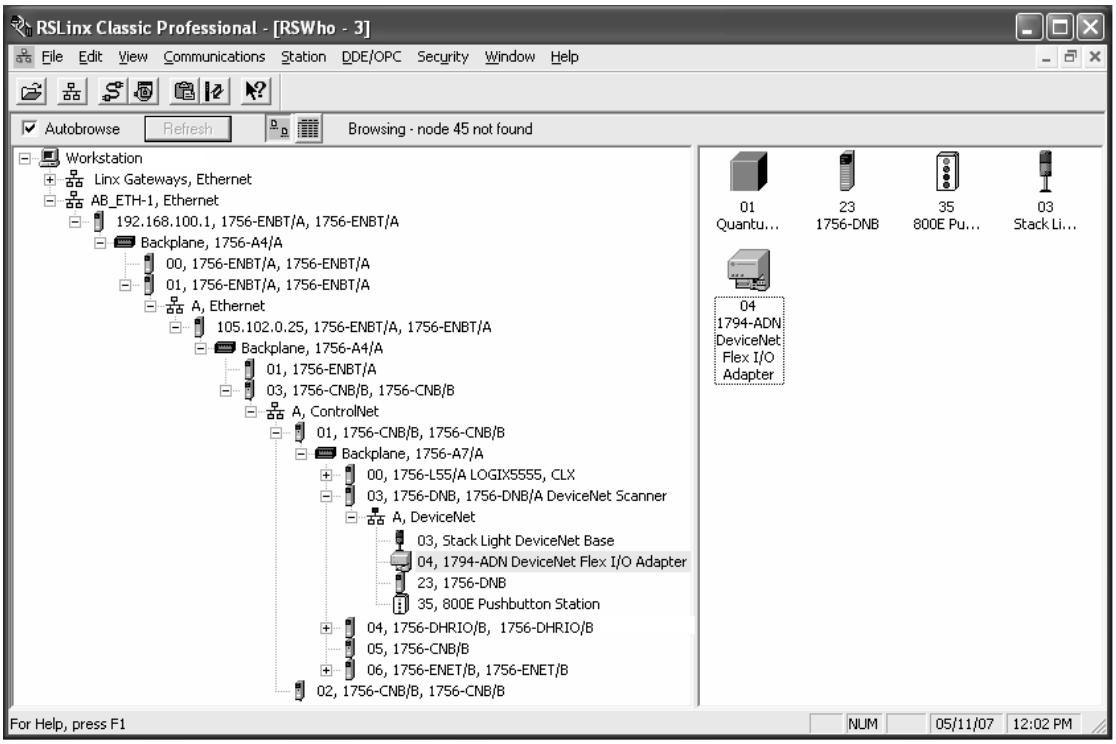
6 Click Yes to confirm.



For this example you could execute a Get Single Attribute transaction to retrieve the version number of that specific node:



Note: The different nodes connected to the DeviceNet can also be monitored through RSLinx RSWho as follows:



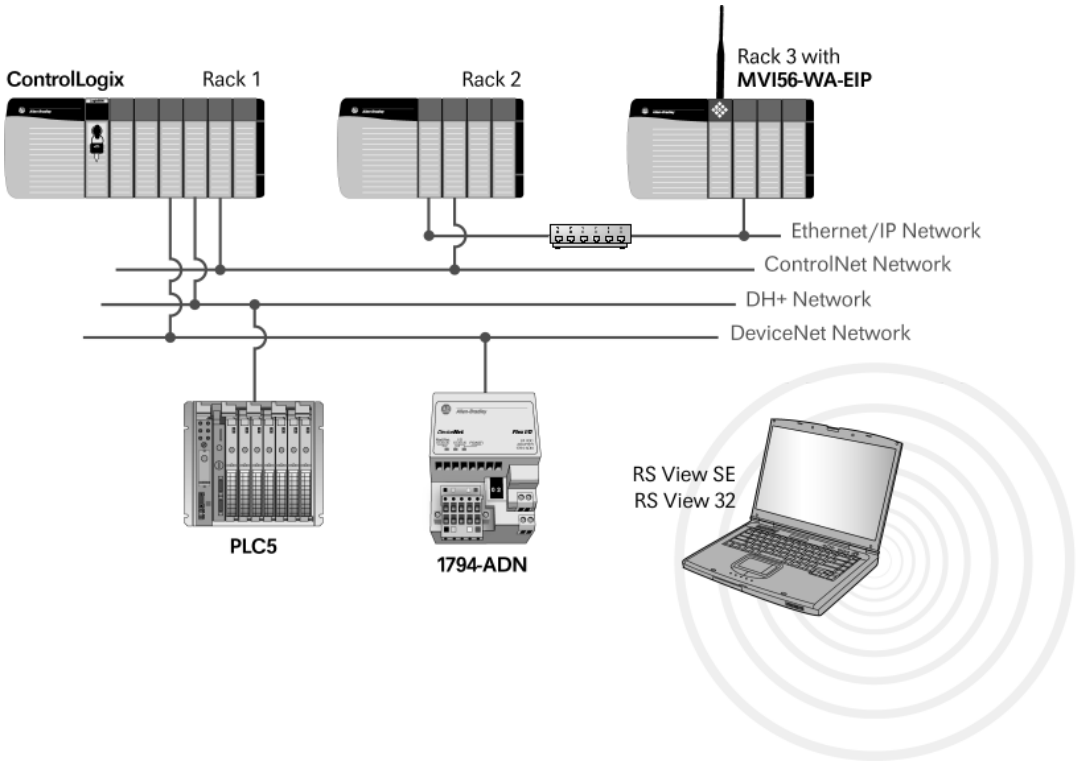
3.2 RSView Support

The online path available through the MVI56-WA-EIP module allows the monitoring and controlling of processes through RSView. The module supports:

- RSView SE (RSLinx Enterprise and RSLinx Classic DDE/OPC Topic)
- RSView32 (RSLinx Classic DDE/OPC Topic)

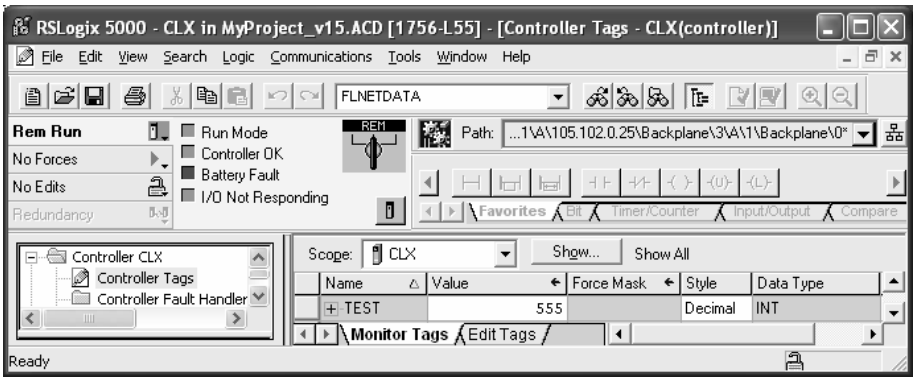
The bridging capability covered in the previous section allows RSView access to different devices and processors through ControlNet, EtherNet/IP or DH+ networks. Therefore, the MVI56-WA-EIP module can be located in a local or remote rack.

To illustrate the RSView support, refer to the sample network diagram below:



This section will show how to use RSView SE to access a ControlLogix controller (rack 1) tag with the online path available through the MVI56-WA-EIP module.

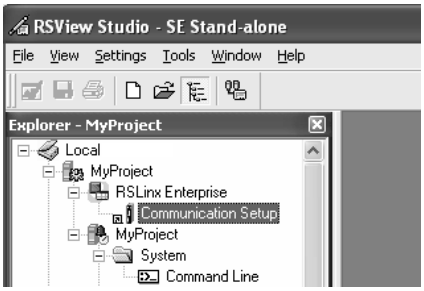
The ControlLogix controller tag to be monitored through RSView SE is shown in the following illustration.



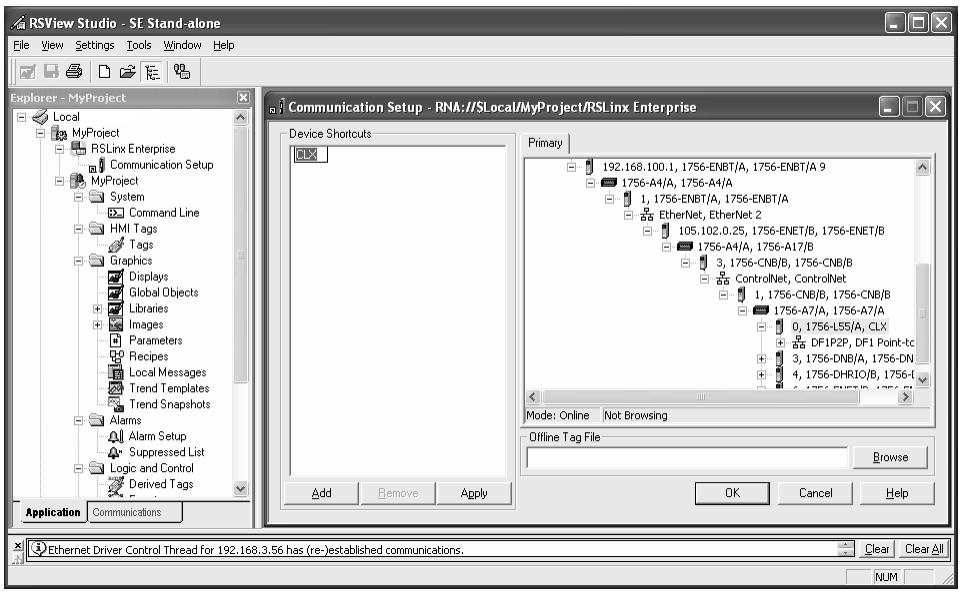
3.2.1 RSView SE (RSlinx Enterprise Data Server)

1 Double-click on the project name and select New Data Server-RSLinx Enterprise Data Server. Then configure the server name and click OK to confirm.

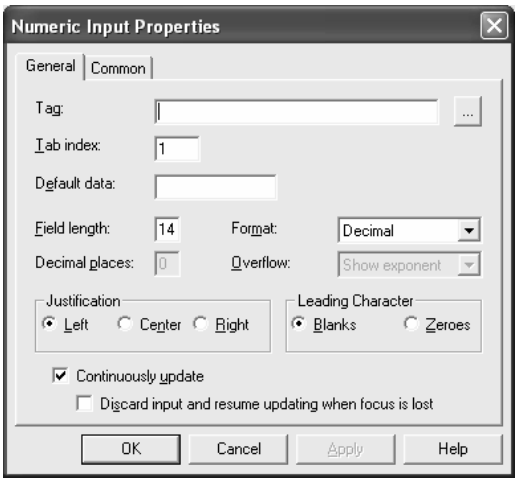
2 Double-click on RSLinx Enterprise-Communication Setup.



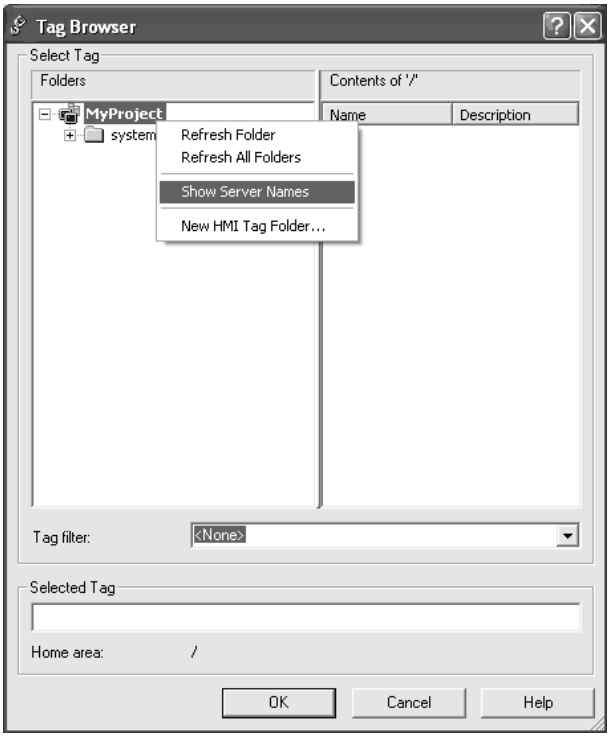
3 In RSLinx Enterprise, browse the ControlLogix processor through the path provided by the MVI56-WA-EIP module. Note that the MVI56-WA-EIP module is displayed as a 1756-ENBT/A module. Click OK to confirm the new shortcut.



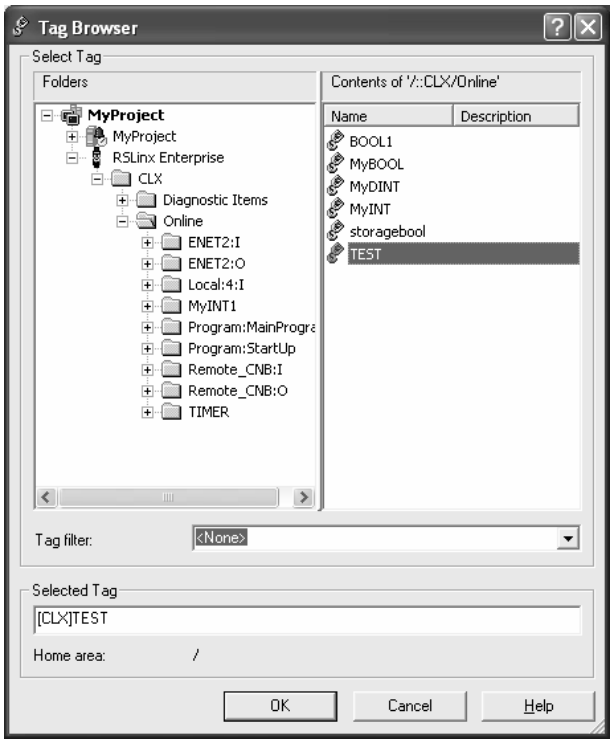
4 Create a Graphic Display and insert a numeric input.
5 On the Numeric Input Properties dialog box, click the "..." button to select the tag.



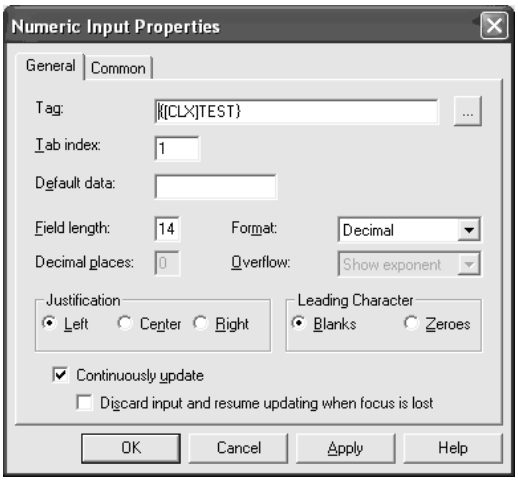
6 Right-click on the project name and choose Show Server Names.



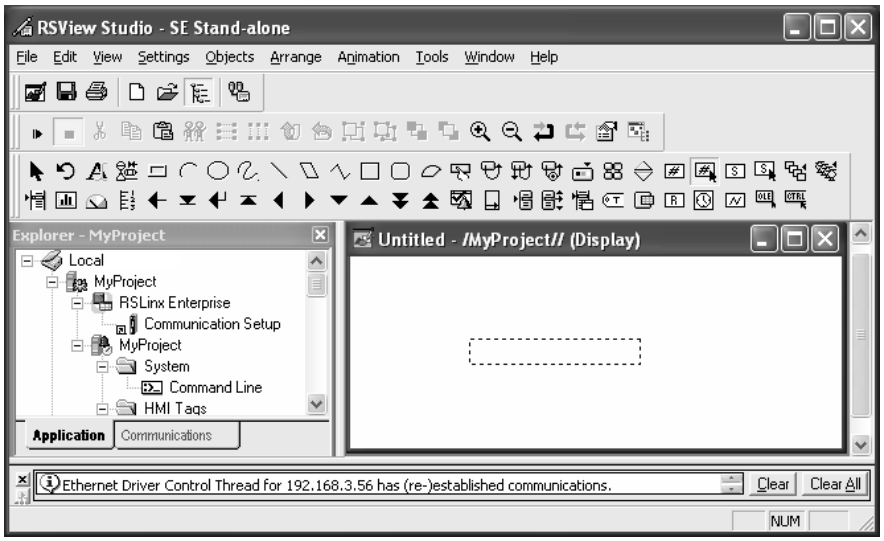
7 Browse through the online controller tags that are available through the server and select the tag to be monitored.



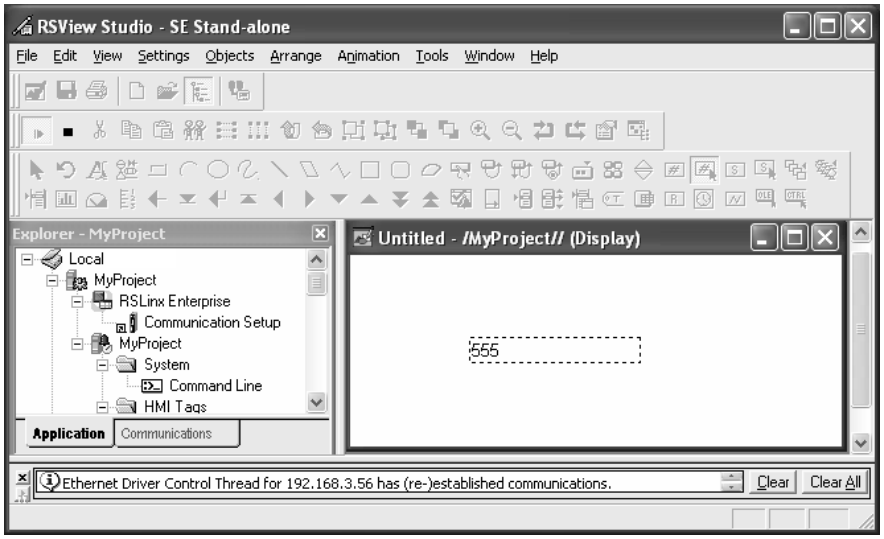
8 Check the tag and confirm the properties window.



9 Select Test Display to update the numeric input tag.



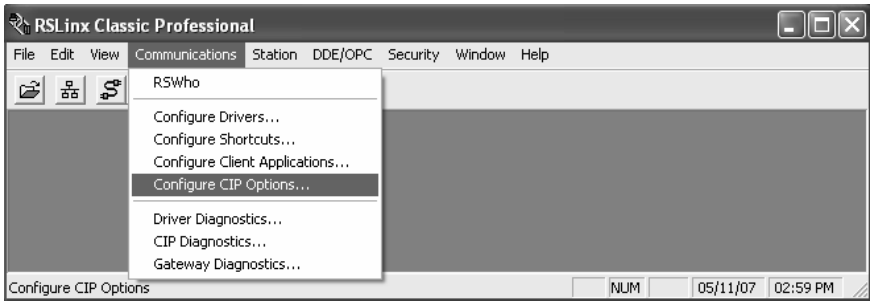
The numeric display tag will be updated from the ControlLogix processor through the path provided by the MVI56-WA-EIP module.



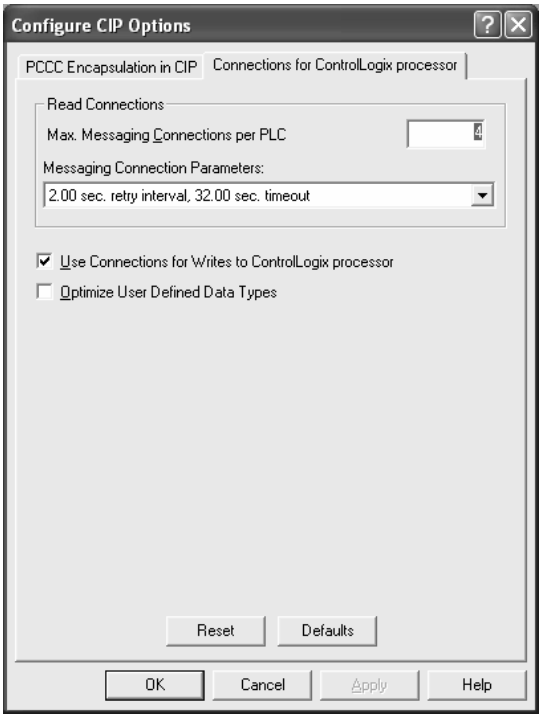
3.2.2 RSView SE (OPC Data Server)

Note: the following RSLinx Classic configuration step is also required when using RSView32.

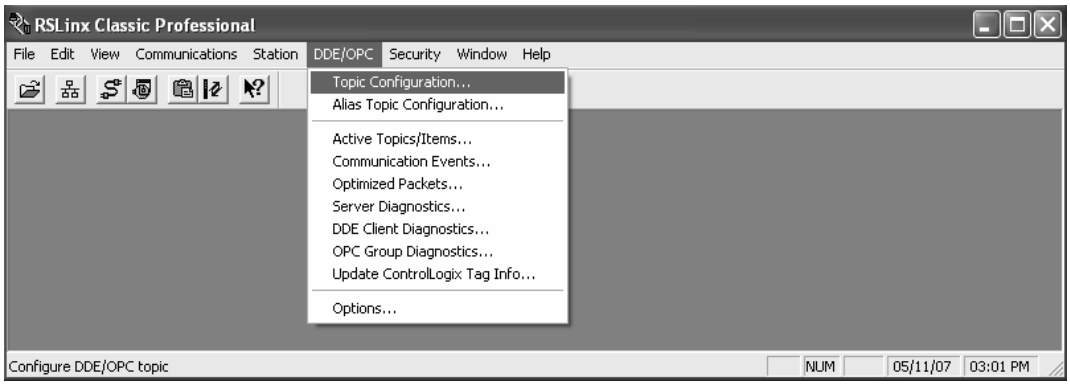
1 In RSLinx Classic, open the Communications menu, and then choose Configure CIP Options



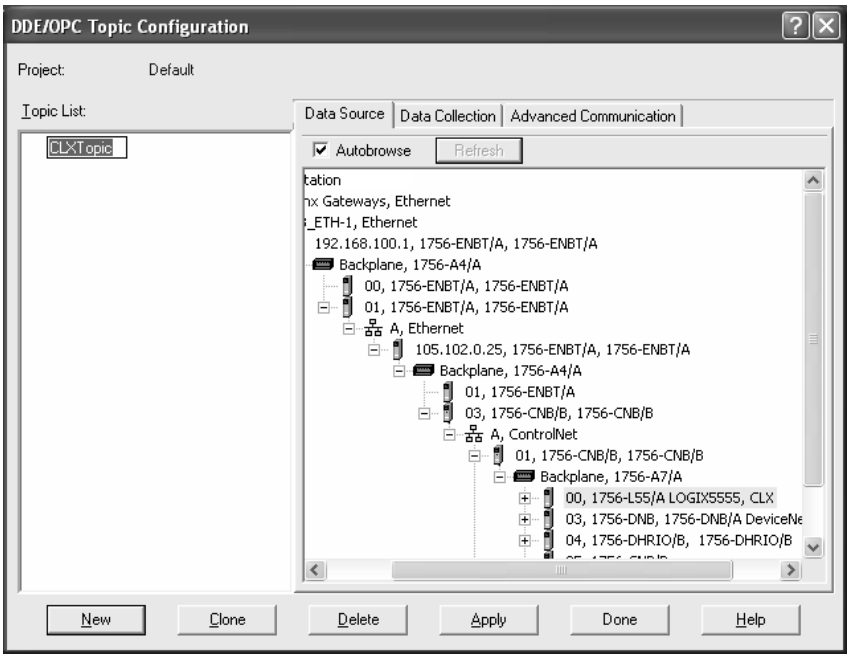
2 Select (check) Use Connections for Writes to the ControlLogix processor. Click OK to save your settings and close the dialog box.



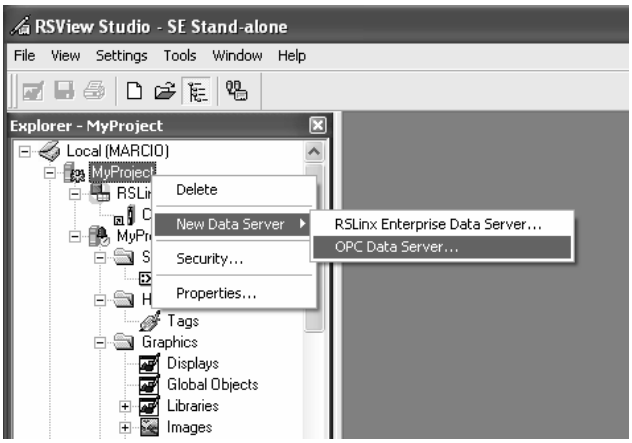
3 In RSLinx Classic, open the DDE/OPC Menu, and then choose Topic Configuration…



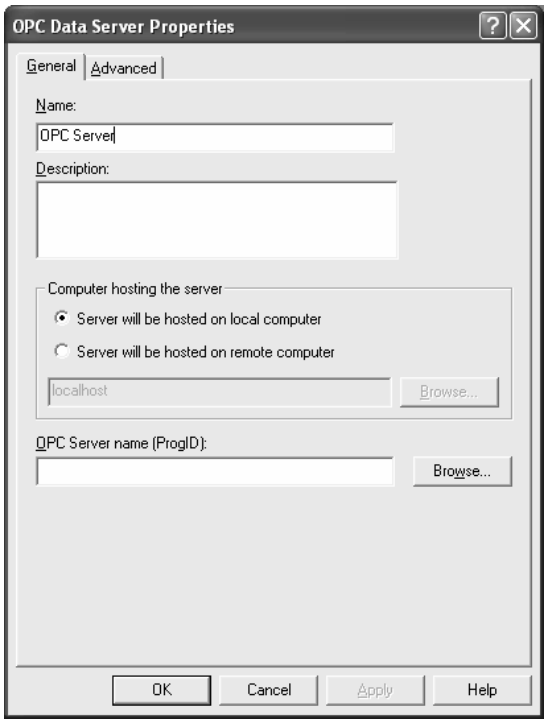
4 Browse the path available through the MVI56-WA-EIP module to select the ControlLogix processor. Note that the MVI56-WA-EIP module is displayed as the 1756-ENBT/A module. Create the OPC topic and select Apply/Done.



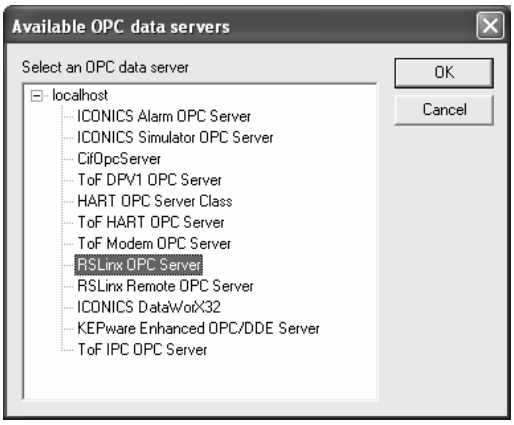
5 In RSView SE, right-click on the project name and select New Data Server-OPC Data Server.



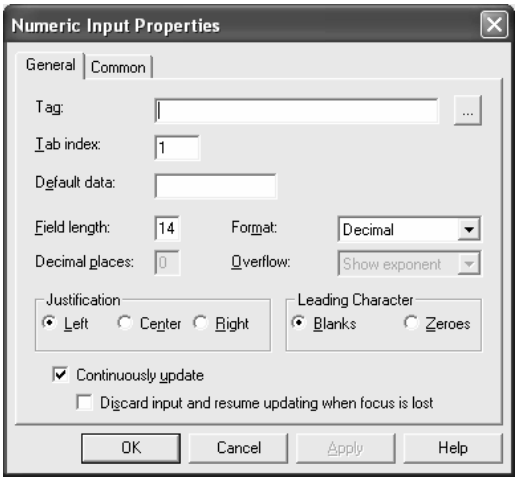
6 Enter the server name and click Browse to select the OPC Server Name:



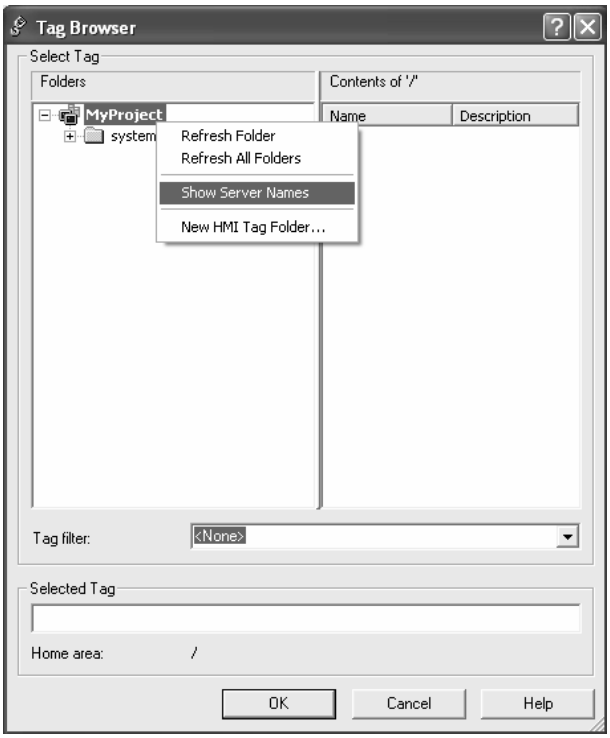
7 Select RSLinx OPC Server. Click OK to save your settings and close OPC Data Server Properties dialog box.



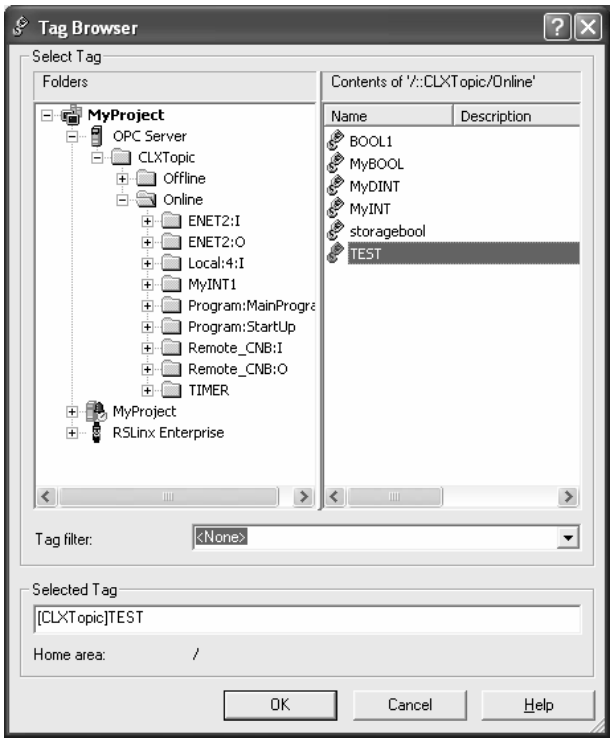
8 Create a Graphic Display and insert a numeric input.
9 On the Numeric Input Properties dialog box, click the "..." button to select the tag.



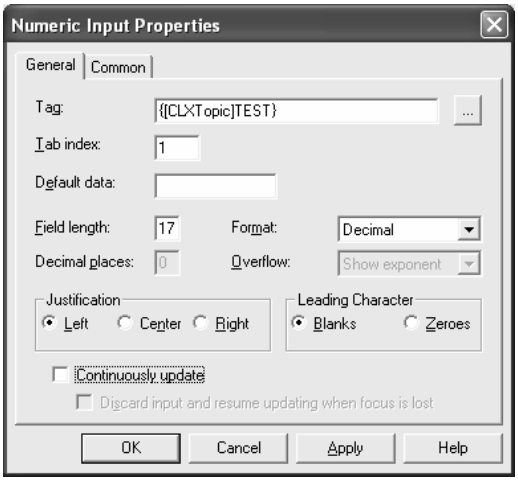
10 Right-click on the project name and choose Show Server Names…



11 Select the controller tag to be used through the OPC topic that was created with the path available through the MVI56-WA-EIP module.

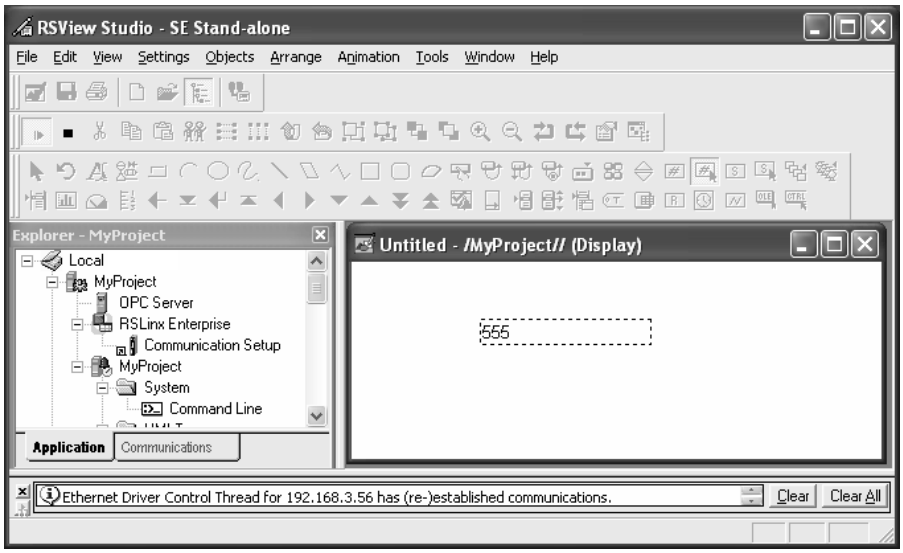


12 Click OK to save the numeric input properties and close the dialog box.



13 Select Test Display to update the numeric input tag.

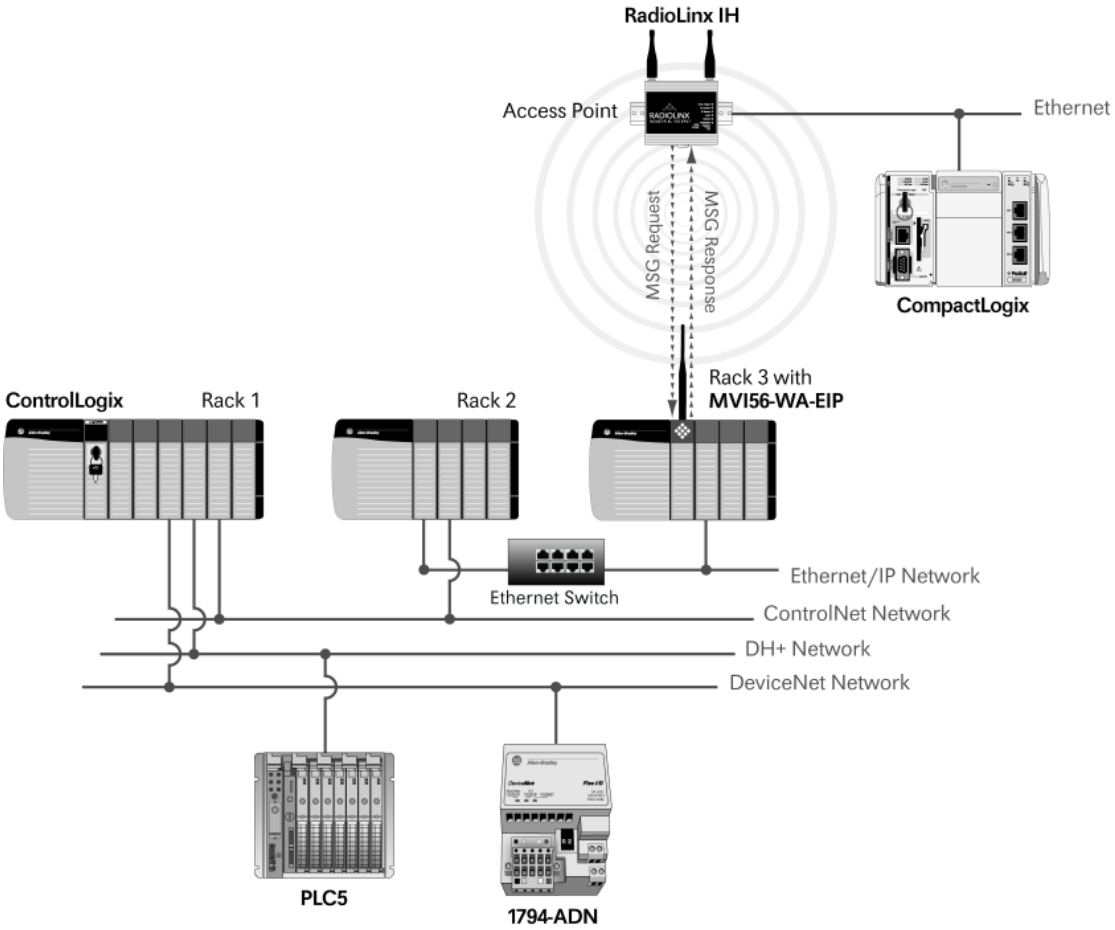
The numeric display tag will be updated from the ControlLogix processor through the path provided by the MVI56-WA-EIP module.



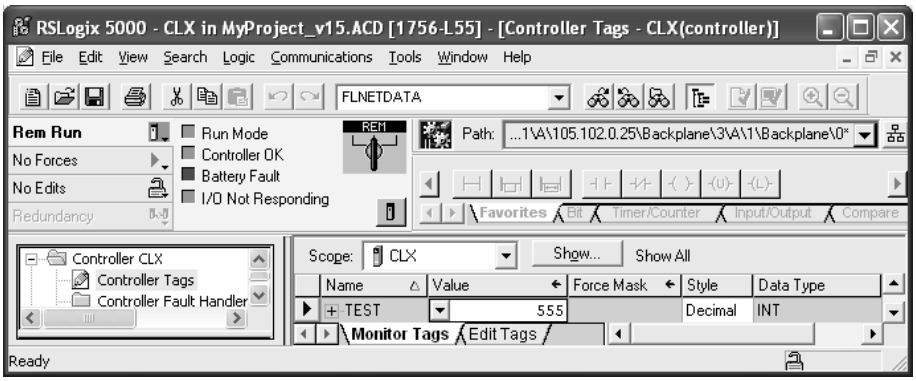
3.3 Explicit Messaging as a Server

The MVI56-WA-EIP supports explicit messaging as a server. The module can receive an explicit wireless message request from a remote processor wirelessly, and will route that message to a processor through EtherNet/IP, ControlNet and DH+ networks.

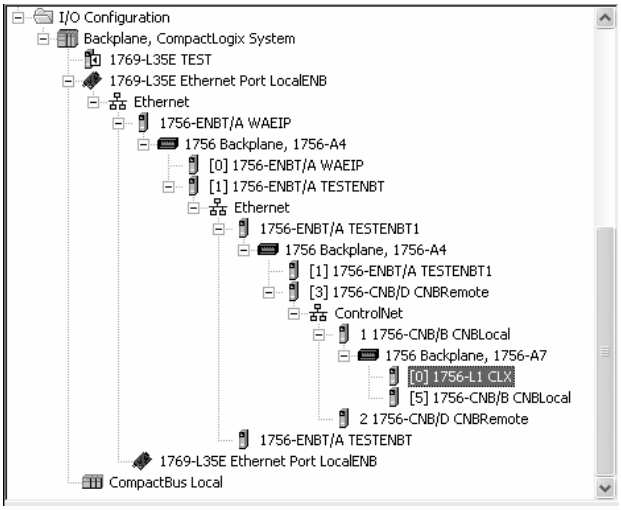
To illustrate this functionality it will be considered the same network from the previous sections. For this application, a remote CompactLogix processor will send an explicit message request to the ControlLogix processor through the MVI56-WA-EIP module.



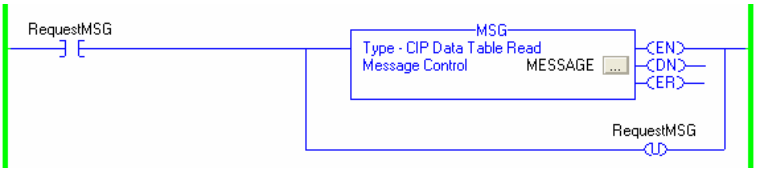
For this example the CompactLogix processor will read the following controller tag from the ControlLogix processor:



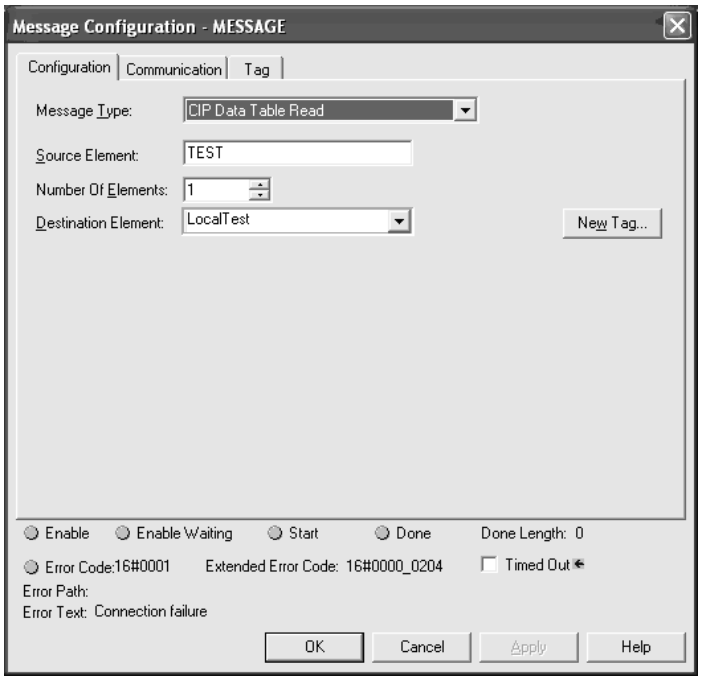
1 In the RSLogix5000 project for the CompactLogix processor, configure the offline I/O network. It will set up the path from the MVI56-WA-EIP module to the ControlLogix processor. The MVI56-WA-EIP module will be selected as a 1756-ENBT/A module as indicated below. Alternatively, you can manually setup the path while configuring the MSG instruction.



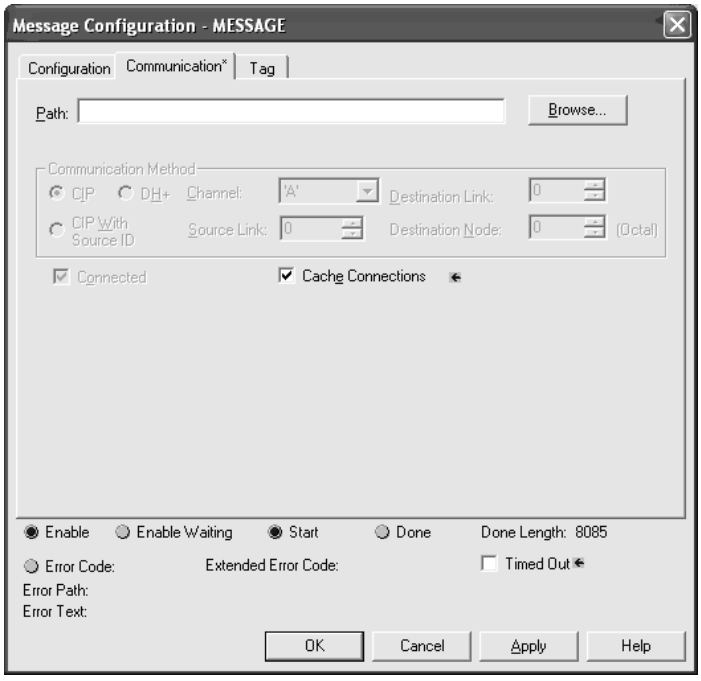
2 Build the MSG instruction for the explicit message to be sent to the ControlLogix processor.



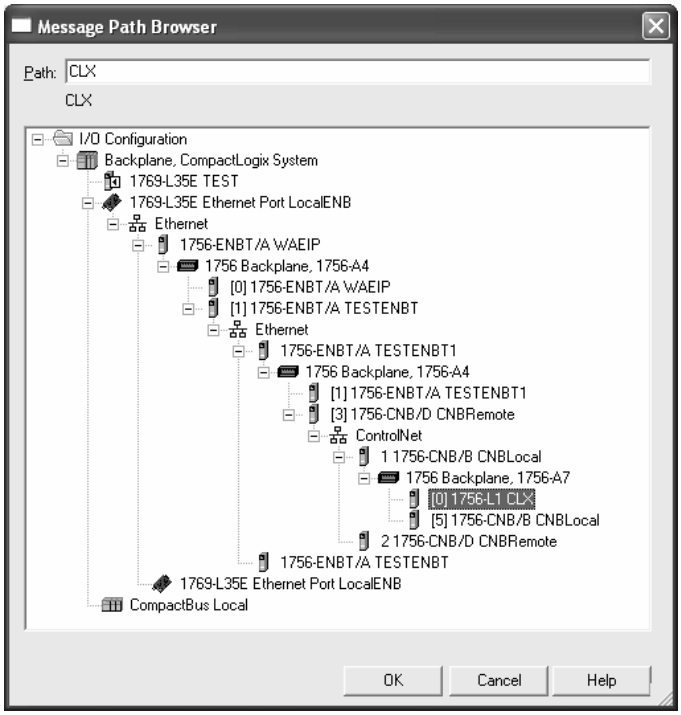
3 Configure the MSG instruction using the settings in the following illustration.



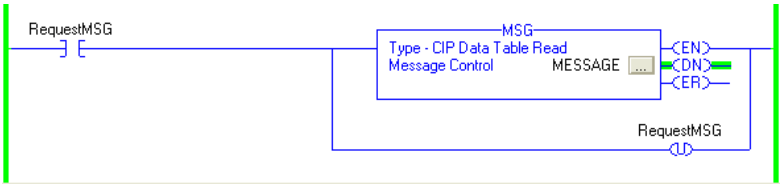
On the Communication tab, click Browse to choose the ControlLogix processor that was configured offline.



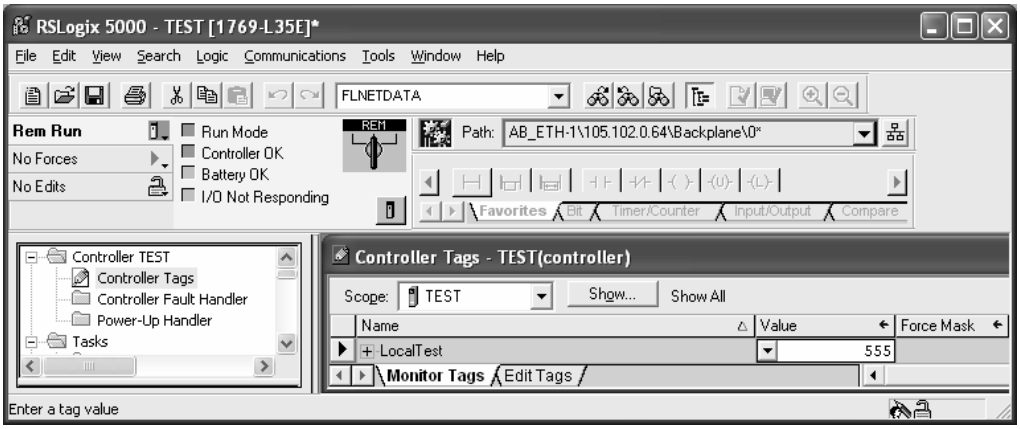
Select the ControlLogix processor. You could also have entered the path to the ControlLogix processor without browsing to the processor.



4 Trigger the MSG instruction. If the message was correctly configured, the .DN but should be set and the controller tag updated.



The following window indicates that the CompactLogix has read the ControlLogix processor tag with Explicit messaging through the MVI56-WA-EIP module .



Note: the MVI56-WA-EIP module does not support explicit messaging as a client (it cannot send a message request from the ControlLogix processor to the CompactLogix processor)

3.4 Explicit Messaging as a Client

Note: Support for Explicit Messaging for Unconnected Clients is available only on modules with firmware version 1.22.000 or later.

3.4.1 Overview

The MVI56-WA-EIP module supports the routing of explicit unconnected client messages to remote processor or devices. The module act as bridge to route explicit unconnected messages received over the backplane to remote wireless devices.

3.4.2 Functional Specification

The following table describes the functional specification of the MVI56-WA-EIP client feature:

Item	Description
Supported Client Message Type	Explicit Unconnected
Maximum number of simultaneous client associations	10
Maximum number of simultaneous messages per association	1
Maximum number of simultaneous messages through the backplane	8
Connection timeout period after inactivity	10 seconds

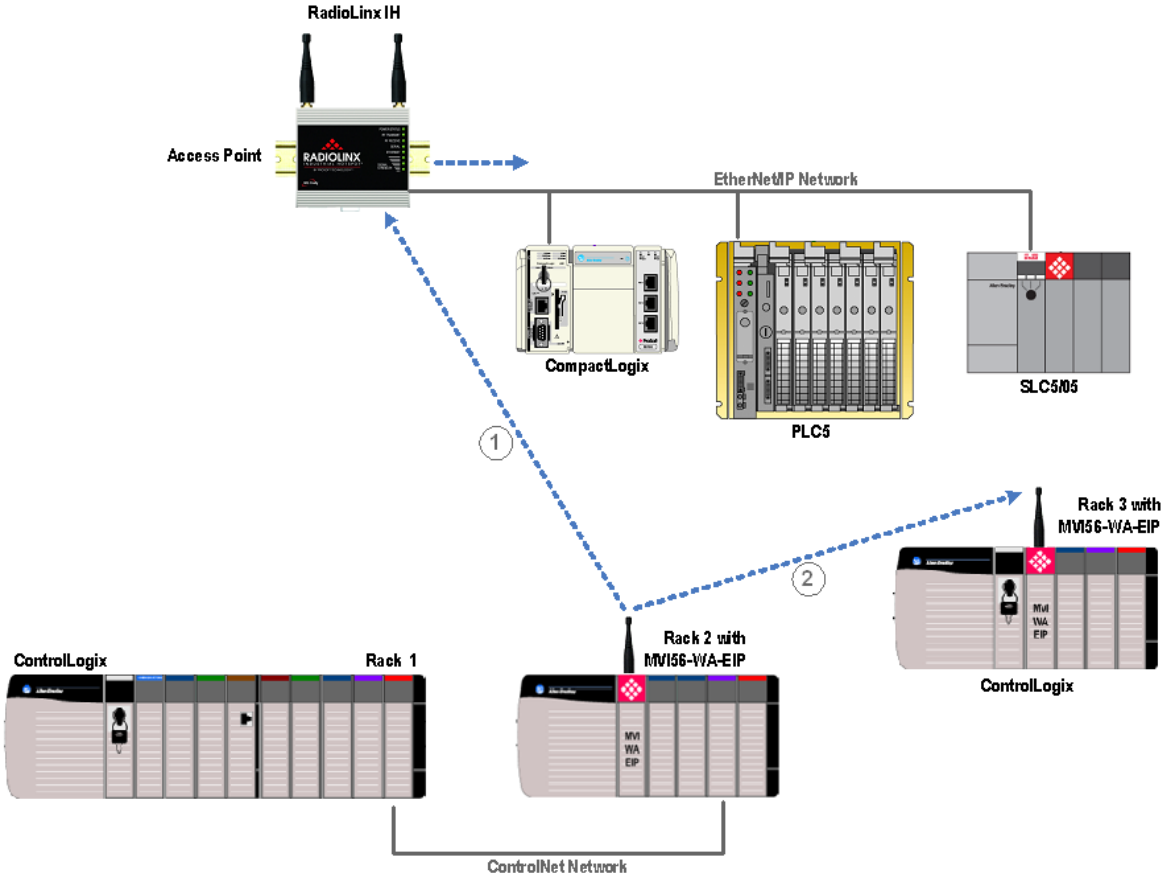
The module supports only explicit unconnected messages.

When the module receives a message to be routed to a remote device, it will initially create a socket association to route the message to the server. The module can associate simultaneously with 10 servers. The module can handle up to 8 simultaneous messages at a time for all associated servers and each association can handle one message at a time. Ladder logic must therefore guarantee that:

1. No more than 8 messages are being simultaneously handled with all associated servers
2. No more than one message is being simultaneously handled with a specific associated server.

Sample Application

The following illustration shows a sample application to illustrate the MVI56-WA-EIP client functionality.



For this example, the MVI56-WA-EIP module in rack 2 routes the messages received from the ControlLogix processor in rack 1 to remote devices. This sample illustrates that the MVI56-WA-EIP module can be the located in a local or remote rack relative to where the originating ControlLogix processor is located.

In this example the module routes the messages for two different applications:

1 The module routes the messages to processors connected through wired Ethernet (supporting Ethernet/IP protocol). The routing is possible through infrastructure mode where the access point routes the wireless messages into the Ethernet network. For this example, the module routes the messages to three processors

- CompactLogix
- PLC5
- SLC 5/05

2 The module routes the messages to a remote ControlLogix processor through the MVI56-WA-EIP in rack 3. It illustrates that the client feature also allows the exchange of data between remote ControlLogix processors either in infrastructure or ad-hoc mode.

3.4.3 Module Setup

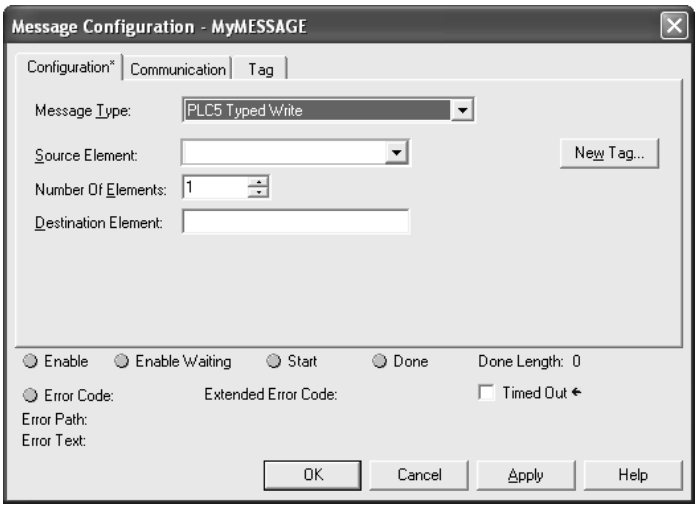
This feature requires the module to be configured through RSLogix5000. Refer to Module Configuration (page 98) for the information on how to setup the module. The available sample ladder logic also contains the required module setup.

MSG Setup

1 In your ladder logic, include a MSG instruction triggered by a specific condition, as shown in the following illustration

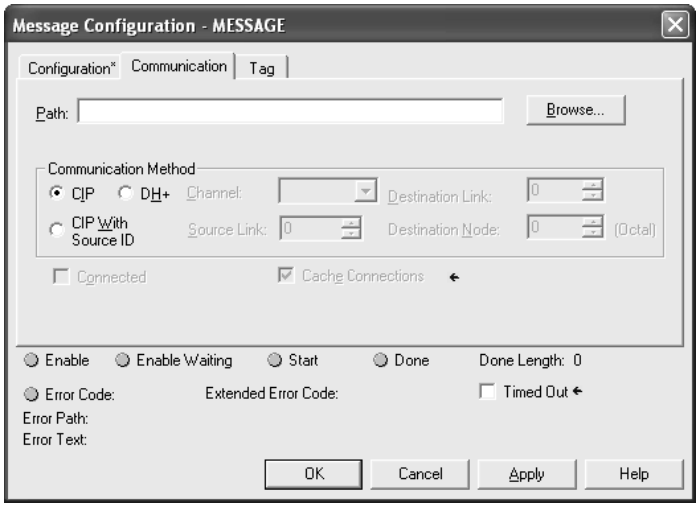
2 Click the MSG setup button to configure the message tag.
3 Select the one of the supported message types:

- PLC2 Unprotected Read
- PLC2 Unprotected Write
- PLC5 Typed Read
- PLC5 Typed Write
- PLC5 Word Range Read
- PLC5 Word Range Write
- SLC Typed Read
- SLC Typed Write
- CIP Generic



Complete the other fields of the message setup. Refer to the documentation of the remote device for the maximum supported message length.

Important: The module supports only explicit unconnected messages. For the MSG instruction, the Connected checkbox on the Communication tab must be cleared, as shown in the following illustration.

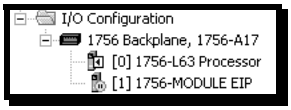


Some message types such as *Block Transfer Read/Write* and *CIP Data Table Read/Write* are connected (the checkbox is selected) and therefore are not supported for client operation. Because the module does not support implicit messaging, the module cannot route data from remote I/O devices directly to a ControlLogix processor. The module can only route explicit unconnected messages between processors or devices that support Ethernet/IP.

Setting Up the Route Path

In order to route a message through the client interface of the module, you must define a proper path.

1 The first part of the path must be the module as named in the rack through RSLogix. In the following examples, the module is named EIP through RSLogix (I/O Configuration section).



Note: Each parameter in the path must be separated by a comma to delineate the fields.

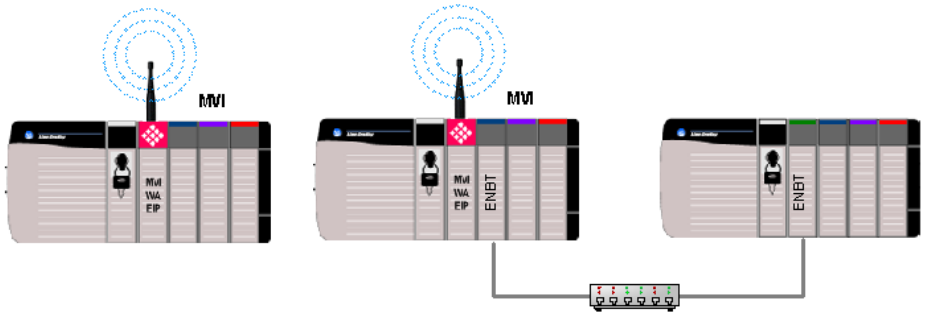
2 The next parameter must be the port in the module to route the outgoing message. For the wireless (radio) interface of the MVI56-WA-EIP module, this is port 2. Therefore, the path should always start as in the following example:

EIP,2.

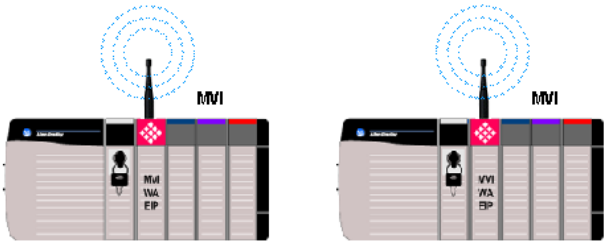
3 The next parameter is the IP address to reach. This is entered in standard dotted notation. For example, to get the identity object for a 1756-ENBT module with IP address 192.168.8.104, the following path would be used in the message:

EIP,2,192.168.8.104.
In order to reach a processor in this rack, the path must include the backplane port (1) for the 1756-ENBT module, and the slot number for the controller. To reach the processor in the remote rack in slot 0 for the example above, use the following path:
EIP,2,192.168.8.104,1,0.

This technique can be used to form many complex routes. For example to reach a processor in slot 0 of a remote rack the following route could be used: EIP,2,192.168.8.52,1,3,2,192.168.8.105,1,0. The diagram below displays the network configuration for this path:



For the following example, the messages are sent from the ControlLogix processor out to the MVI56-WA-EIP module to another MVI56-WA-EIP module (IP address = 192.168.8.53) to a ControlLogix processor.



CLX MSG -> WA-EIP -> WA-EIP -> CLX
PATH: EIP,2,192.168.8.53,1,0

Monitoring the Client Status

You can monitor the client status data either through ladder logic or through the debug menu.

- For information on how to monitor the client status through ladder logic please refer to Using Sample Ladder Logic (page 97).
- For information on how to monitor the client status through the debug menu please refer to Using the Configuration/Debug Port (page 117).

Note: Under rare circumstances, the module may be required to re-initialize its internal radio hardware. The re-initialization period takes approximately 5 seconds. During this time the module does not route any wireless messages. During this period all received messages will be lost, therefore the ladder should contain logic to re-send the MSG upon error. Regular wireless message routing is resumed after the re-initialization period.

4 Using Sample Ladder Logic (Optional)

In This Chapter

Note: In order to use this optional feature make sure that your ControlLogix processor is using the following firmware version according to the processor type:
ControlLogix 1756-L1: use firmware 13.34 or later
ControlLogix 1756-L55: use firmware 15.1 or later
ControlLogix 1756-L61,1756-L62 and 1756-L63: use firmware 13.44 or later
Using older firmware versions might cause issues during the execution of the MSG instructions that are used by the sample ladder logic. If necessary contact Rockwell Automation

The module supports messaging for applications that require MVI56-WA-EIP status information to be reported to the ControlLogix processor.

The module does not require ladder logic to establish communication between the ControlLogix processor and the PC. Also, the module does not have to be configured in the I/O configuration section for regular operation. The sample ladder logic should only be used if status information is required to be reported to the ControlLogix processor.

The sample ladder logic allows the ControlLogix processor to perform the following tasks:

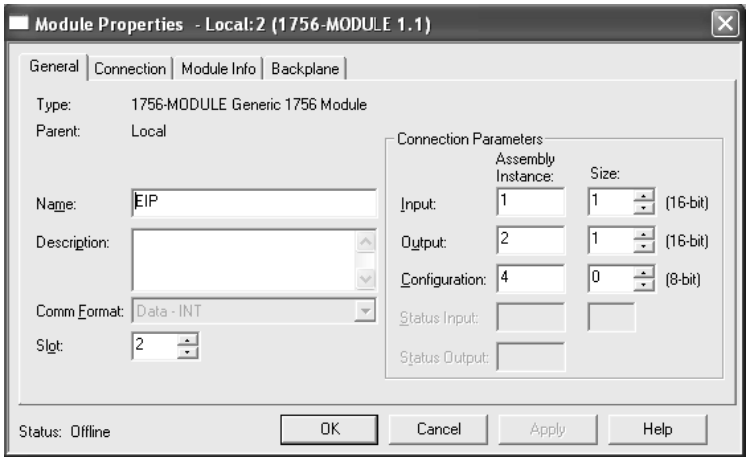
- Retrieve MVI56-WA-EIP radio configuration
- Retrieve MVI56-WA-EIP radio status information
- Retrieve MVI56-WA-EIP EtherNet/IP server status information
- Request a reboot of the MVI56-WA-EIP module

Tip: You can find the sample ladder logic on the ProSoft Solutions CD-ROM. You can also find the latest version of the sample ladder logic on the ProSoft Technology web site at http://www.prosoft-technology.com/downloads.

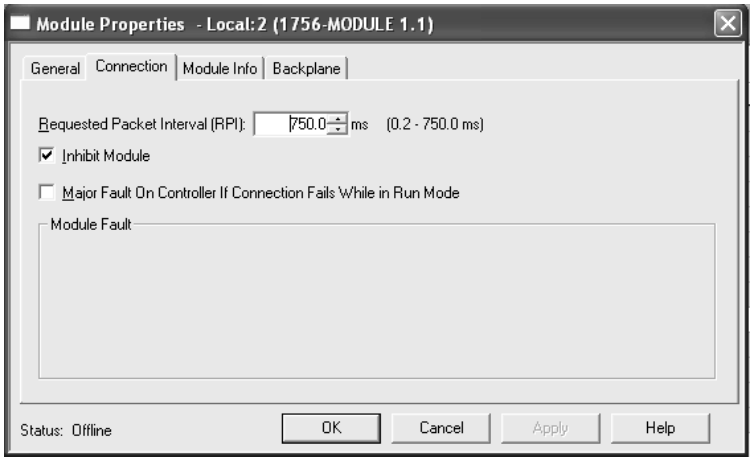
4.1 Module Configuration

The MVI56-WA-EIP module is identified in the rack as the 1756-MODULE generic profile with the general settings and connection settings configured as below:

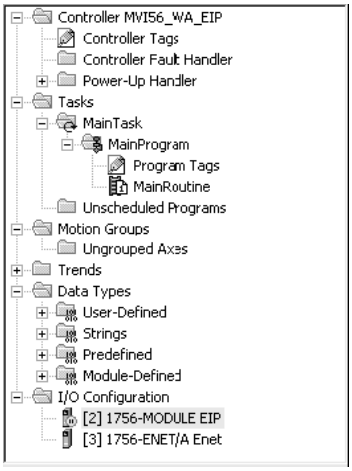
Module Properties: General tab



Module Properties: Connection tab



The round yellow icon will be displayed over the module while RSLogix is online.

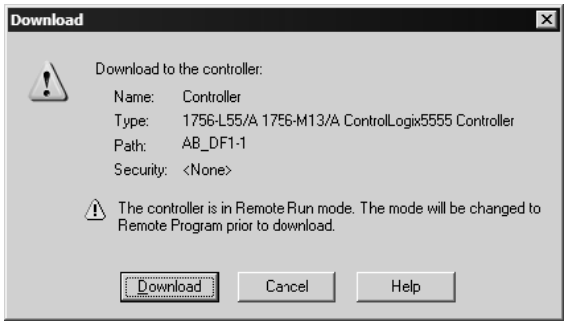


4.1.1 Download the Sample Program to the Processor (Optional)

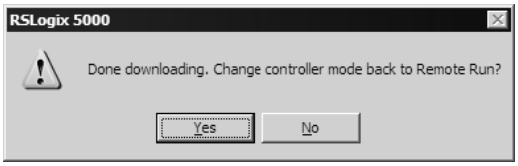
To download the sample program from RSLogix 5000 to the ControlLogix processor:

Note: The key switch on the front of the ControlLogix module 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. When communication is established, RSLogix will open a confirmation dialog box. Click the Download button to transfer the sample program to the processor.



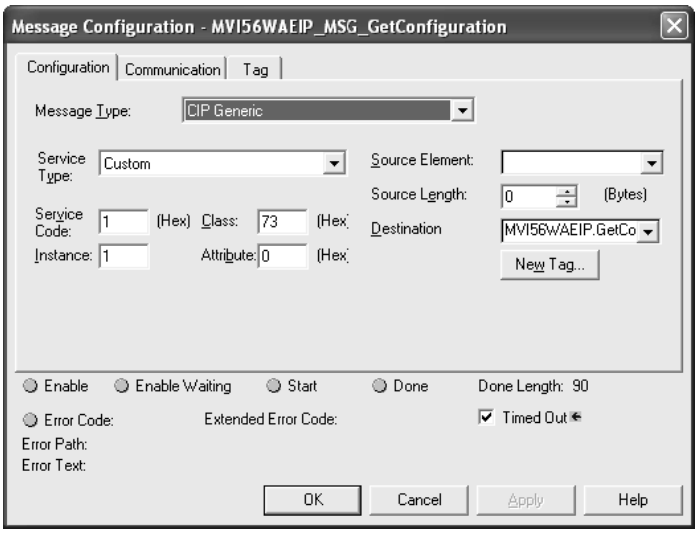
3. RSLogix will compile the program and transfer it to the processor. This process may take a few minutes.
4. When the download is complete, RSLogix will open another confirmation dialog box. Click OK to switch the processor from Program mode to Run mode.

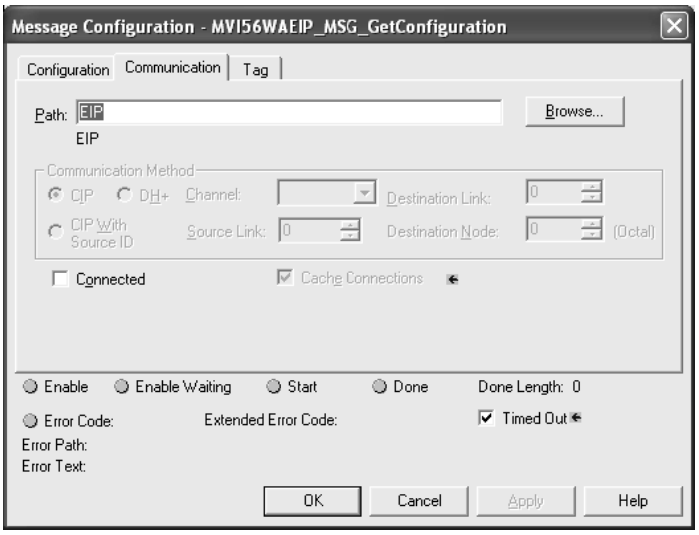


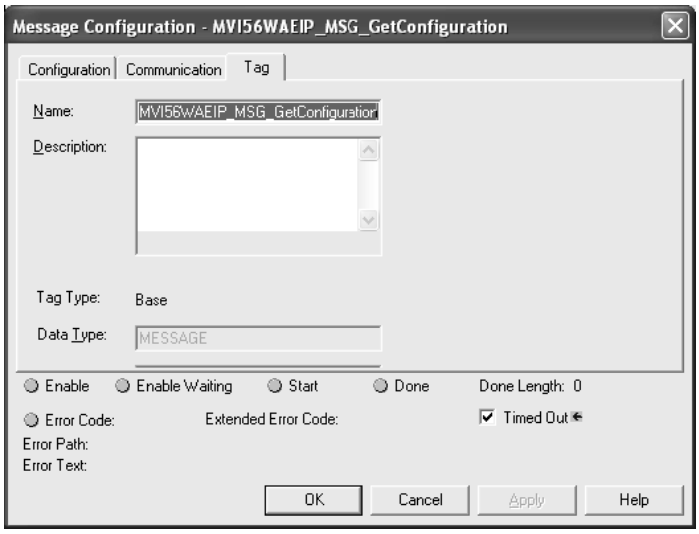
Note: If you receive an error message during these steps, refer to your RSLogix documentation to interpret and correct the error.

4.2 Retrieve MVI56-WA-EIP Radio Configuration

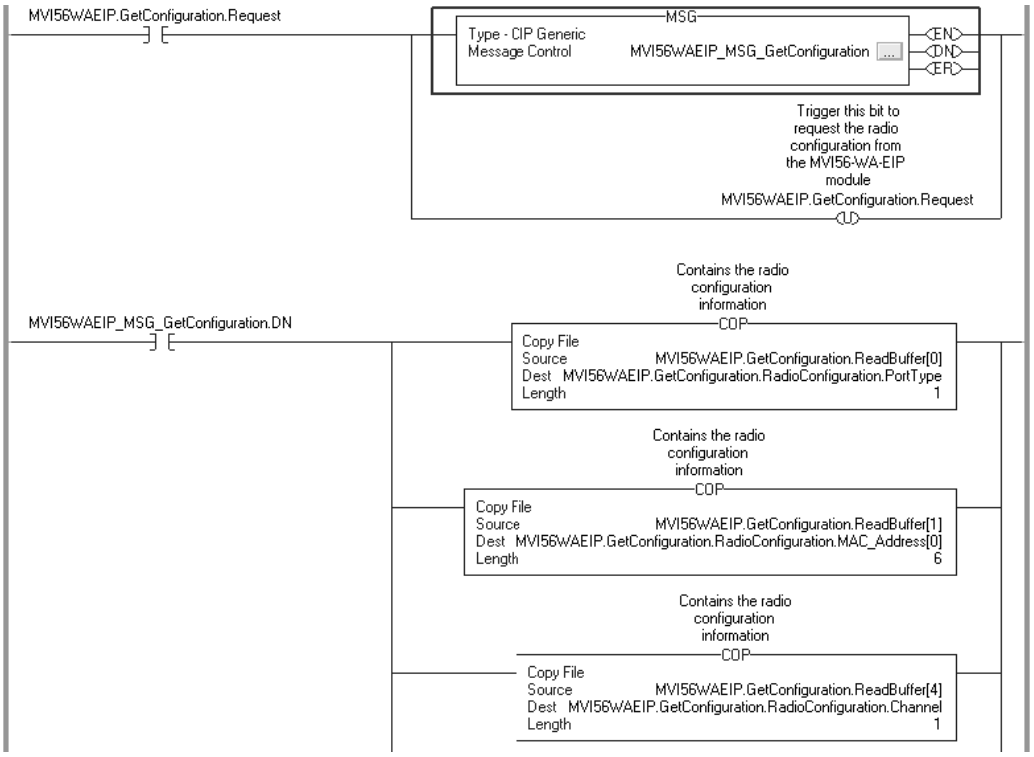
The message instruction used to retrieve MVI56-WA-EIP configuration data is configured with the following parameters:







The following illustration shows the ladder required to request the configuration information from the module:



In order to retrieve configuration information perform the following:

1 Set the MVI56WAEIP.GetConfiguration.Request bit to 1

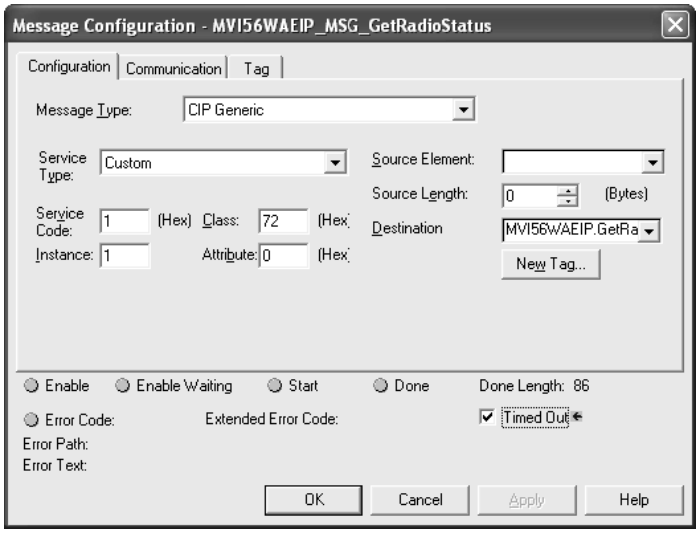
2 Refer to the MVI56WAEIP.GetConfiguration.RadioConfiguration data structure

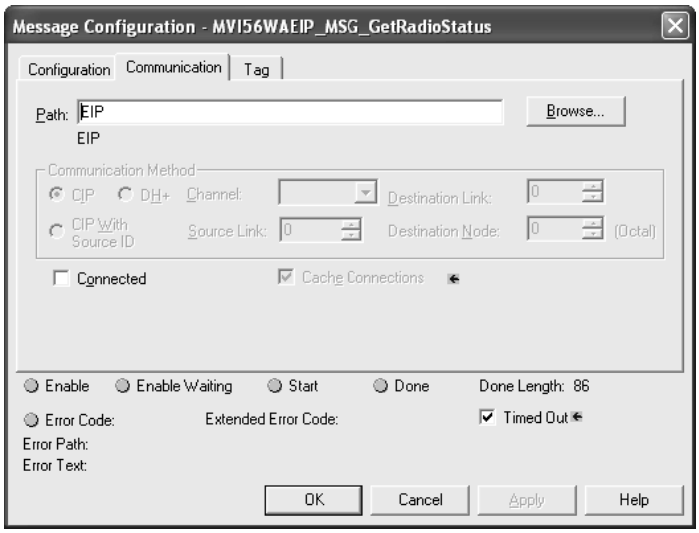
MVI56WAEIP	{...}	{...}		MVI56WAEIP_ModuleDefinition
MVI56WAEIP.GetConfiguration	{...}	{...}		MVI56WAEIP_GetConfiguration
MVI56WAEIP.GetConfiguration.Request	0		Decimal	BOOL
MVI56WAEIP.GetConfiguration.RadioConfiguration	{...}	{...}		MVI56WAEIP_RadioConfiguration
MVI56WAEIP.GetConfiguration.RadioConfiguration.PortType	1		Decimal	INT
MVI56WAEIP.GetConfiguration.RadioConfiguration.MAC_Address	{...}	{...}	Hex	SINT[6]
MVI56WAEIP.GetConfiguration.RadioConfiguration.MAC_Address[0]	16#00		Hex	SINT
MVI56WAEIP.GetConfiguration.RadioConfiguration.MAC_Address[1]	16#10		Hex	SINT
MVI56WAEIP.GetConfiguration.RadioConfiguration.MAC_Address[2]	16#c6		Hex	SINT
MVI56WAEIP.GetConfiguration.RadioConfiguration.MAC_Address[3]	16#47		Hex	SINT
MVI56WAEIP.GetConfiguration.RadioConfiguration.MAC_Address[4]	16#8c		Hex	SINT
MVI56WAEIP.GetConfiguration.RadioConfiguration.MAC_Address[5]	16#54		Hex	SINT
MVI56WAEIP.GetConfiguration.RadioConfiguration.Channel	10		Decimal	INT
MVI56WAEIP.GetConfiguration.RadioConfiguration.Reserved	{...}	{...}	ASCII	SINT[34]
MVI56WAEIP.GetConfiguration.RadioConfiguration.MaximumDataLength	1508		Decimal	INT
MVI56WAEIP.GetConfiguration.RadioConfiguration.OwnName	{...}	{...}	ASCII	SINT[34]
MVI56WAEIP.GetConfiguration.RadioConfiguration.Encryption	0		Decimal	INT
MVI56WAEIP.GetConfiguration.RadioConfiguration.Authentication	1		Decimal	INT
MVI56WAEIP.GetConfiguration.RadioConfiguration.TxRate	3		Decimal	INT
MVI56WAEIP.GetConfiguration.RadioConfiguration.RandomizeTxWep	0		Decimal	INT
MVI56WAEIP.GetConfiguration.RadioConfiguration.SecurityCap	16#0027		Hex	INT
MVI56WAEIP.GetConfiguration.ReadBuffer	{...}	{...}	Decimal	INT[250]
MVI56WAEIP.GetRadioStatus	{...}	{...}		MVI56WAEIP_GetRadioStatus
MVI56WAEIP.GetEIPServerStatus	{...}	{...}		MVI56WAEIP_GetEIPServerStatus

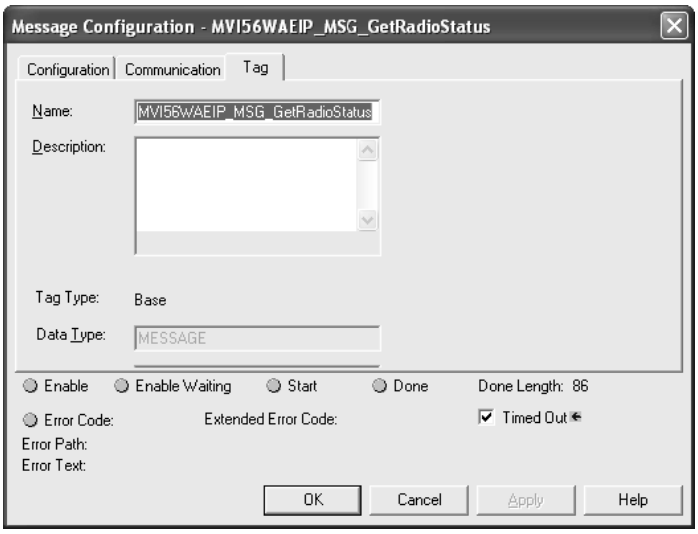
Parameter	Observation
Port Type	Fixed 1 (BSS operation)
MAC_Address	Module MAC address
Channel	Channel parameter value
Reserved	Not Used
Maximum Data Length	Maximum number of data bytes in receive and transmit frames
Own Name	Station_Name parameter value
Encryption	Enable_Encryption parameter value (0=No, 1=Yes)
Authentication	Fixed 1 (Open System)
TxRate	Fixed 3 (Autofallback High between 1Mbps, 2Mbps, 5.5Mbps, 11Mbps)
RandomizeTxWEP	Fixed 0 (functionality not supported for MVI56-WA-EIP)
Security Cap	Fixed 27hex (for ProSoft internal reference)

4.3 Retrieve MVI56-WA-EIP Radio Status

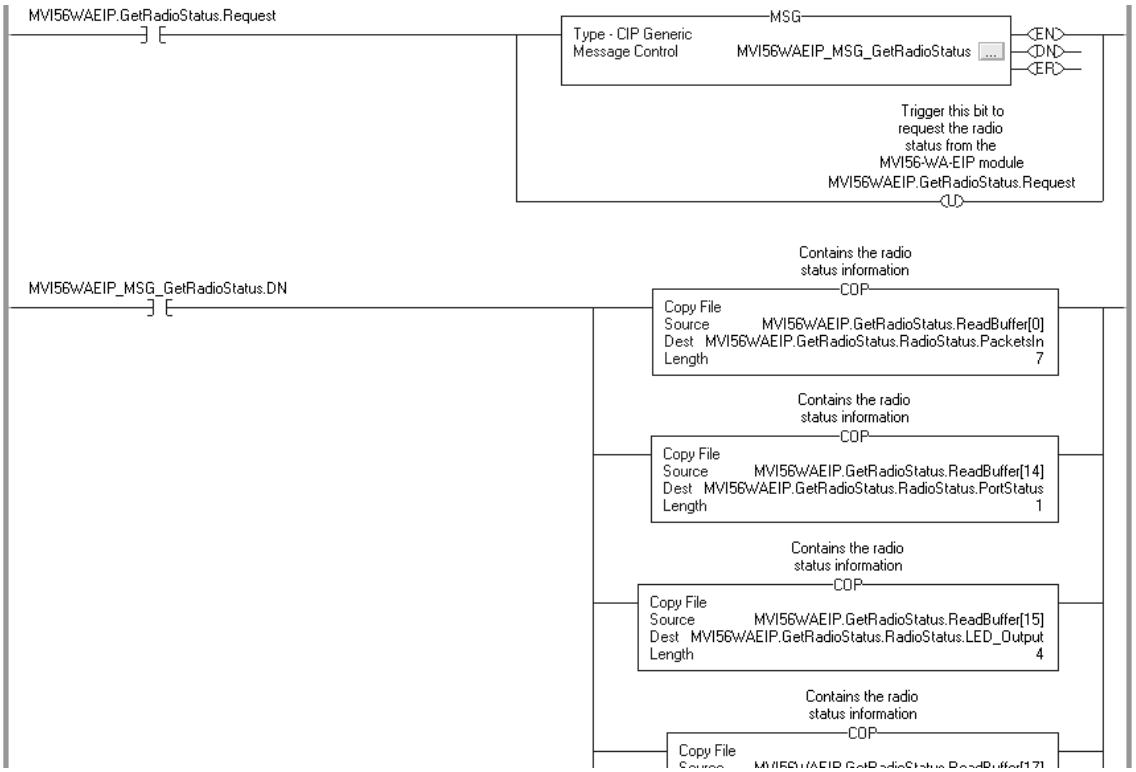
The message instruction used to retrieve MVI56-WA-EIP radio status information is configured with the following parameters:







The following illustration is a ladder example to retrieve radio status information:



In order to retrieve configuration information perform the following:

1. Set the MVI56WAEIP.GetRadioStatus.Request bit to 1
2. Refer to the MVI56WAEIP.GetRadioStatus.RadioStatus data structure

MVI56WAEIP	{...}	{...}		MVI56WAEIP_ModuleDefinition
MVI56WAEIP.GetConfiguration	{...}	{...}		MVI56WAEIP_GetConfiguration
MVI56WAEIP.GetRadioStatus	{...}	{...}		MVI56WAEIP_GetRadioStatus
MVI56WAEIP.GetRadioStatus.Request	0		Decimal	BOOL
MVI56WAEIP.GetRadioStatus.RadioStatus	{...}	{...}		MVI56WAEIP_RadioStatus
MVI56WAEIP.GetRadioStatus.RadioStatus.PacketsIn	25424		Decimal	DINT
MVI56WAEIP.GetRadioStatus.RadioStatus.PacketsOut	35497		Decimal	DINT
MVI56WAEIP.GetRadioStatus.RadioStatus.BytesIn	6371112		Decimal	DINT
MVI56WAEIP.GetRadioStatus.RadioStatus.BytesOut	7709391		Decimal	DINT
MVI56WAEIP.GetRadioStatus.RadioStatus.ErrorsIn	1501		Decimal	DINT
MVI56WAEIP.GetRadioStatus.RadioStatus.ErrorsOut	319		Decimal	DINT
MVI56WAEIP.GetRadioStatus.RadioStatus.PacketsDropped	20		Decimal	DINT
MVI56WAEIP.GetRadioStatus.RadioStatus.PortStatus	3		Decimal	INT
MVI56WAEIP.GetRadioStatus.RadioStatus.LED_Output	63		Decimal	SINT
MVI56WAEIP.GetRadioStatus.RadioStatus.Signal_LED	15		Decimal	SINT
MVI56WAEIP.GetRadioStatus.RadioStatus.Link_LED	32		Decimal	SINT
MVI56WAEIP.GetRadioStatus.RadioStatus.Data_LED	16		Decimal	SINT
MVI56WAEIP.GetRadioStatus.RadioStatus.SSID	{...}	{...}	Decimal	SINT[34]
MVI56WAEIP.GetRadioStatus.RadioStatus.TxRate	11		Decimal	INT
MVI56WAEIP.GetRadioStatus.RadioStatus.CommQuality	54		Decimal	INT
MVI56WAEIP.GetRadioStatus.RadioStatus.SignalLevel	-40		Decimal	INT
MVI56WAEIP.GetRadioStatus.RadioStatus.NoiseLevel	-94		Decimal	INT
MVI56WAEIP.GetRadioStatus.RadioStatus.ChannelNumber	10		Decimal	INT
MVI56WAEIP.GetRadioStatus.RadioStatus.LED_0	10		Decimal	INT
MVI56WAEIP.GetRadioStatus.RadioStatus.LED_1	20		Decimal	INT
MVI56WAEIP.GetRadioStatus.RadioStatus.LED_2	30		Decimal	INT
MVI56WAEIP.GetRadioStatus.RadioStatus.LED_3	40		Decimal	INT

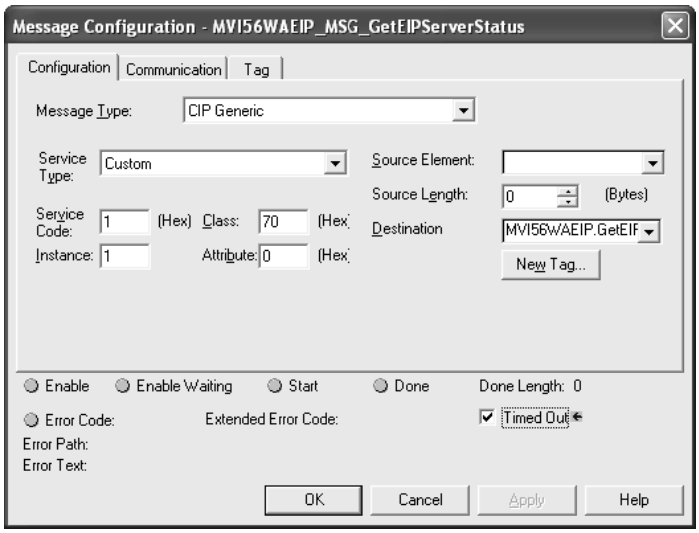
Parameter	Observation
Packets In	The total number of MSDUs, with a unicast MAC address as the Destination Address, received successfully. +plus+ The total number of MSDUs, with a multicast MAC address (including the broadcast MAC address) as the Destination Address, received successfully.
Packets Out	The total number of MSDUs, of which the Destination Address is a unicast MAC address, transmitted successfully. This implies having received an acknowledgment to all associated MPDUs. +Plus+ The total number of MSDUs, of which the Destination Address is a multicast MAC address (including the broadcast MAC address), transmitted successfully. When operating as a STA in an ESS, and these frames are directed to the AP, this implies having received an acknowledgment to all associated MPDUs.
Bytes In	The total number of octets received successfully as part of unicast MSDUs (PacketsIn). These octets include MAC Header and Frame Body of all associated fragments. +Plus+ The total number of octets received successfully as part of multicast (incl. broadcast) MSDUs (PacketsIn). These octets include MAC Header and Frame Body of all associated fragments.

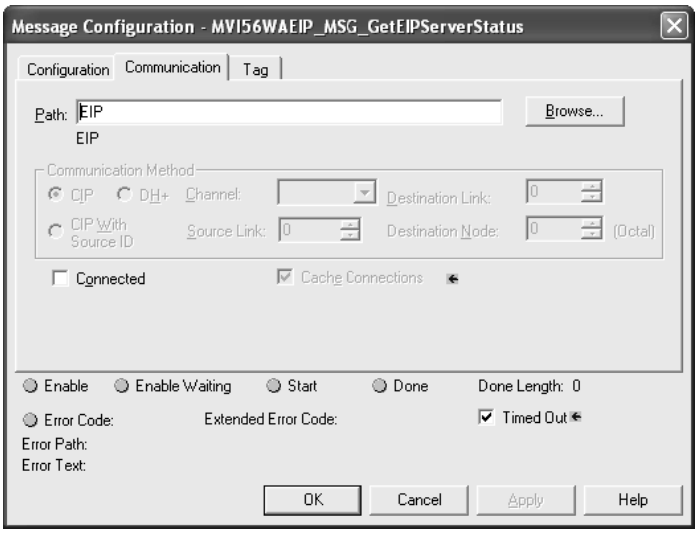
Parameter	Observation
Bytes Out	The total number of octets transmitted successfully as part of successfully transmitted unicast MSDUs (PacketsOut). These octets include MAC Header and Frame Body of all associated fragments. +Plus+ The total number of octets transmitted successfully as part of successfully transmitted multicast (incl. broadcast) MSDUs (PacketsOut). These octets include MAC Header and Frame Body of all associated fragments.
Errors In	Number of MPDUs, considered to be destined for this station (Address1 matches), received with an FCS error. Note: This does not include things received with an incorrect CRC in the PLCP header. These are not considered MPDUs. +Plus+ The number of received MPDUs, with the WEP subfield in the Frame Control field set to one, that were discarded because it should not have been encrypted or due to the receiving station not implementing the privacy option.
Errors Out	Number of times a MSDU is not transmitted successfully because the retry limit (either the ShortRetryLimit or the LongRetryLimit) is reached, due to no acknowledgment or CTS received. +Plus+ The number of transmit requests that were discarded to free up buffer space on the NIC. Transmit queued too long on one of the transmit queues, due to many retries and defers, or otherwise not being able to transmit (e.g. scanning). Transmit queued too long on the Power-Save queue (STA in IBSS: destination STA does not respond to ATIM; AP: STA does not Poll or wake up in time). +Plus+ The number of transmit requests that were discarded because of wrong Source Address (Source Address OwnMACAddress). This only applies to a STA with a BSS Port.
Packets Dropped	The number of received Message Protocol Data Units that were discarded because of lack of buffer space on the NIC.
Port Status	The following codes are available: 1 = Disabled 2 = Searching for connection 3 = Connected IBSS (ad-hoc) 4 = Connected ESS (Infrastructure) 5 = Out of range ESS (Infrastructure) Note: switching between 3 and 2 indicates that module is reporting IBSS but not connected to any station.
LED_Output	This value is the sum of SIGNAL_LED, LINK_LED, DATA_LED values.
Signal_LED	Bit 0 = LED 0 is ON Bit 1 = LED 1 is ON Bit 2 = LED 2 is ON Bit 3 = LED 3 is ON
Link_LED	0 = not connected/searching (RF LINK LED = OFF) 20hex = connected IBSS/connected ESS/Out of Range ESS (RF Link LED = ON)

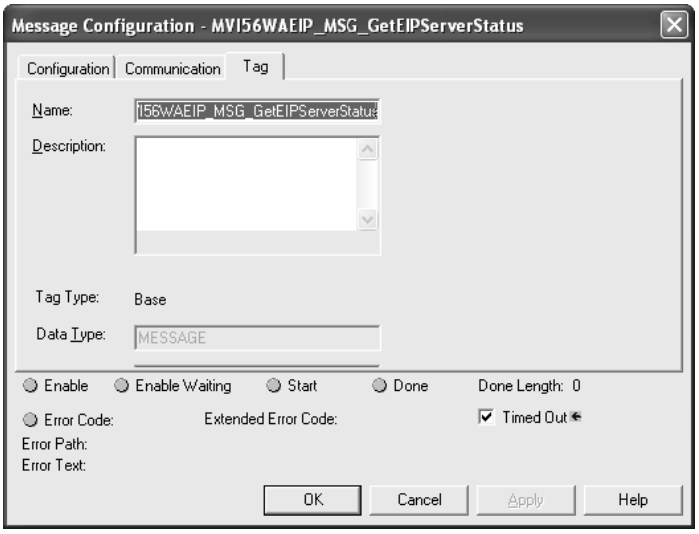
Parameter	Observation
Data_LED	0 = no data (RF DATA LED = OFF) 10hex = data transmitted or data received (RF DATA LED = ON)
SSID	SSID name
TxRate	Transmit rate (1Mbps, 2Mbps, 5.5 (6)Mbps or 11Mbps)
CommQuality	Quality level (dB)
SignalLevel	Signal Level (dBm)
NoiseLevel	Noise Level (dBm)
ChannelNumber	Channel number used
LED_0	Quality signal that will assert signal level LED 0
LED_1	Quality signal that will assert signal level LED 1
LED_2	Quality signal that will assert signal level LED 2
LED_3	Quality signal that will assert signal level LED 3

4.4 Retrieve MVI56-WA-EIP EtherNet/IP Server Status Information

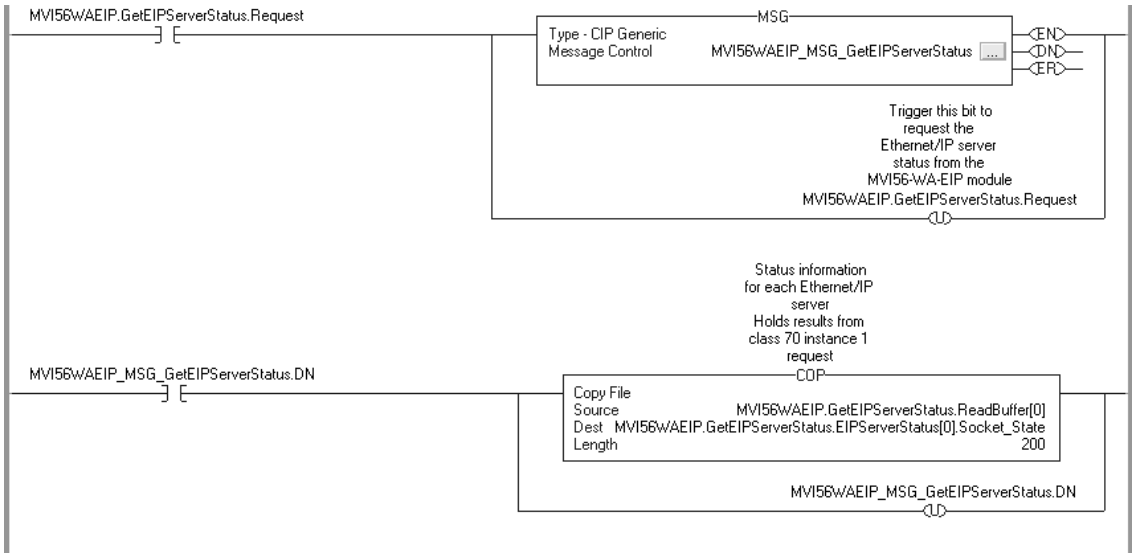
The message instruction used to retrieve MVI56-WA-EIP EtherNet/IP server status information is configured with the following parameters:




Message Configuration - MVI56WAEIP_MSG_GetEIPServerStatus
Configuration
Communication
Tag
Path: EIP
EIP
Browse...
Communication Method
CIP
DH+
Channel:
Destination Link:
CIP With Source ID
Source Link:
Destination Node:
(Octal)
Connected
Cache Connections
Enable
Enable Waiting
Start
Done
Done Length: 0
Error Code:
Extended Error Code:
Timed Out
Error Path:
Error Text:
OK
Cancel
Apply
Help


Message Configuration - MVI56WAEIP_MSG_GetEIPServerStatus
Configuration
Communication
Tag
Name:
Description:
Tag Type:
Base
Data Type:
MESSAGE
Enable
Enable Waiting
Start
Done
Done Length: 0
Error Code:
Extended Error Code:
Timed Out
Error Path:
Error Text:
OK
Cancel
Apply
Help

The following illustration is a ladder example to retrieve EtherNet/IP status information:



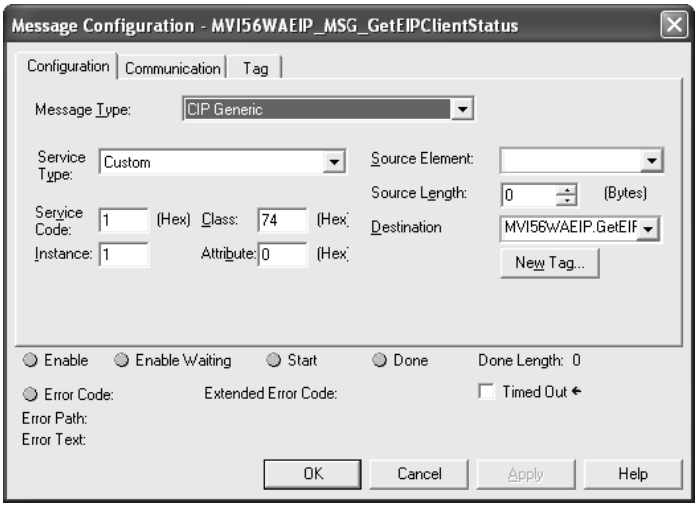
1. Set the MVI56WAEIP.GetEIPServerStatus.Request bit to 1
2. Refer to the MVI56WAEIP.GetEIPServerStatus.EIPServerStatus data structure. The first connected server will be server 19 (second 18, etc..).

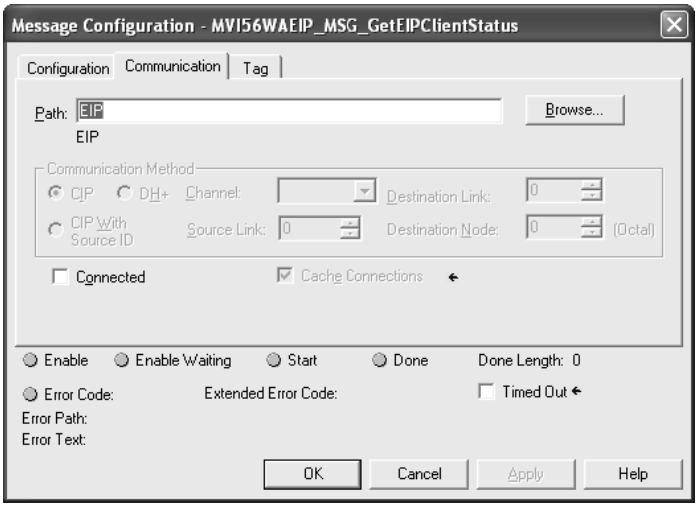
MVI56WAEIP.GetEIPServerStatus.Request	0		Decimal	BOOL
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus	{...}	{...}		MVI56WAEIP_EIPServerStatus[20]
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[0]	{...}	{...}		MVI56WAEIP_EIPServerStatus
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[1]	{...}	{...}		MVI56WAEIP_EIPServerStatus
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[2]	{...}	{...}		MVI56WAEIP_EIPServerStatus
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[3]	{...}	{...}		MVI56WAEIP_EIPServerStatus
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[4]	{...}	{...}		MVI56WAEIP_EIPServerStatus
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[5]	{...}	{...}		MVI56WAEIP_EIPServerStatus
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[6]	{...}	{...}		MVI56WAEIP_EIPServerStatus
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[7]	{...}	{...}		MVI56WAEIP_EIPServerStatus
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[8]	{...}	{...}		MVI56WAEIP_EIPServerStatus
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[9]	{...}	{...}		MVI56WAEIP_EIPServerStatus
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[10]	{...}	{...}		MVI56WAEIP_EIPServerStatus
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[11]	{...}	{...}		MVI56WAEIP_EIPServerStatus
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[12]	{...}	{...}		MVI56WAEIP_EIPServerStatus
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[13]	{...}	{...}		MVI56WAEIP_EIPServerStatus
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[14]	{...}	{...}		MVI56WAEIP_EIPServerStatus
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[15]	{...}	{...}		MVI56WAEIP_EIPServerStatus
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[16]	{...}	{...}		MVI56WAEIP_EIPServerStatus
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[17]	{...}	{...}		MVI56WAEIP_EIPServerStatus
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[18]	{...}	{...}		MVI56WAEIP_EIPServerStatus
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[19]	{...}	{...}		MVI56WAEIP_EIPServerStatus
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[19].Socket_State	1		Decimal	INT
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[19].Connect_State	2		Decimal	INT
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[19].Open_Count	13		Decimal	INT
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[19].Establish_Count	13		Decimal	INT
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[19].Close_Count	6		Decimal	INT
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[19].Read_Count	30074		Decimal	INT
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[19].Message_Count	30074		Decimal	INT
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[19].Write_Count	30074		Decimal	INT
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[19].Timeout_Count	11		Decimal	INT
MVI56WAEIP.GetEIPServerStatus.EIPServerStatus[19].Reserved	0		Decimal	INT

4.5 Retrieve MVI56-WA-EIP EtherNet/IP Client Status Information

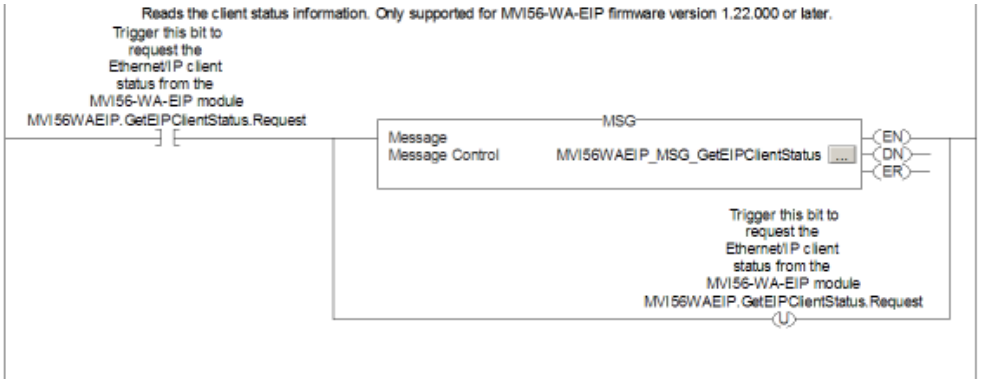
Note: Status for Unconnected Clients is available only on modules with firmware version 1.22.000 or later.

The message instruction used to retrieve MVI56-WA-EIP EtherNet/IP client status information is configured with the following parameters:

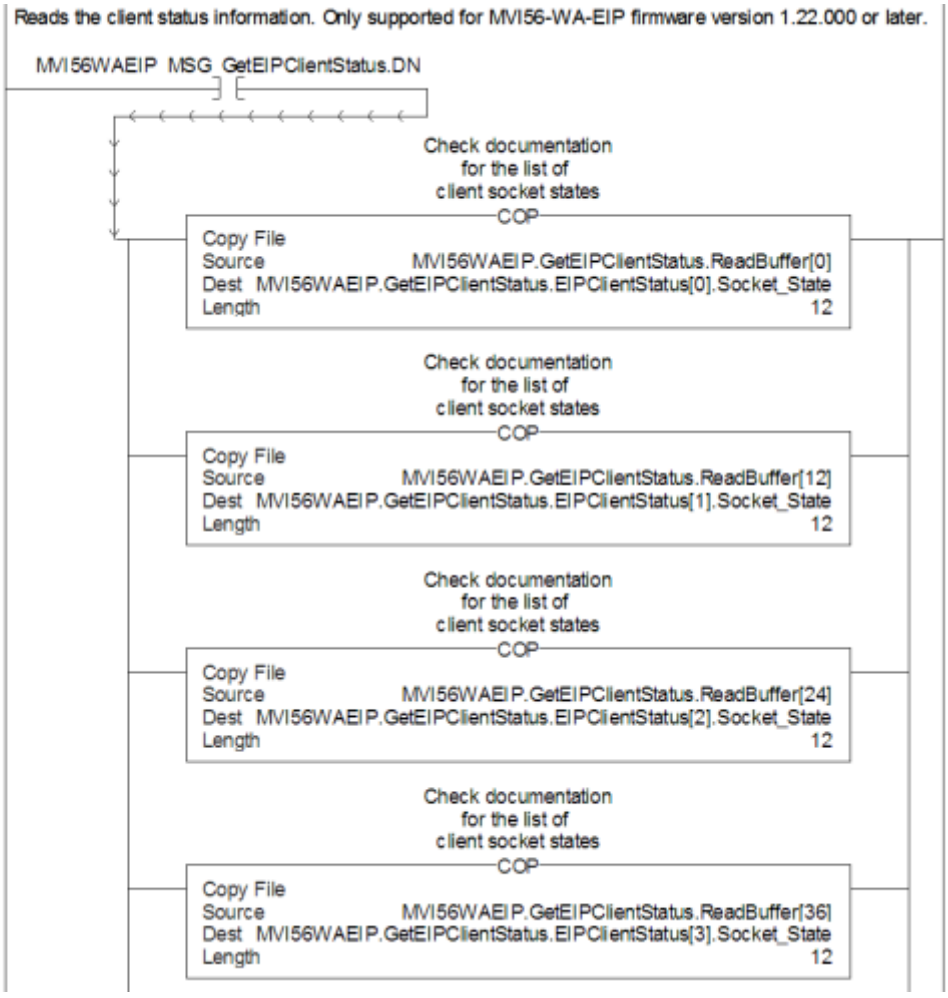


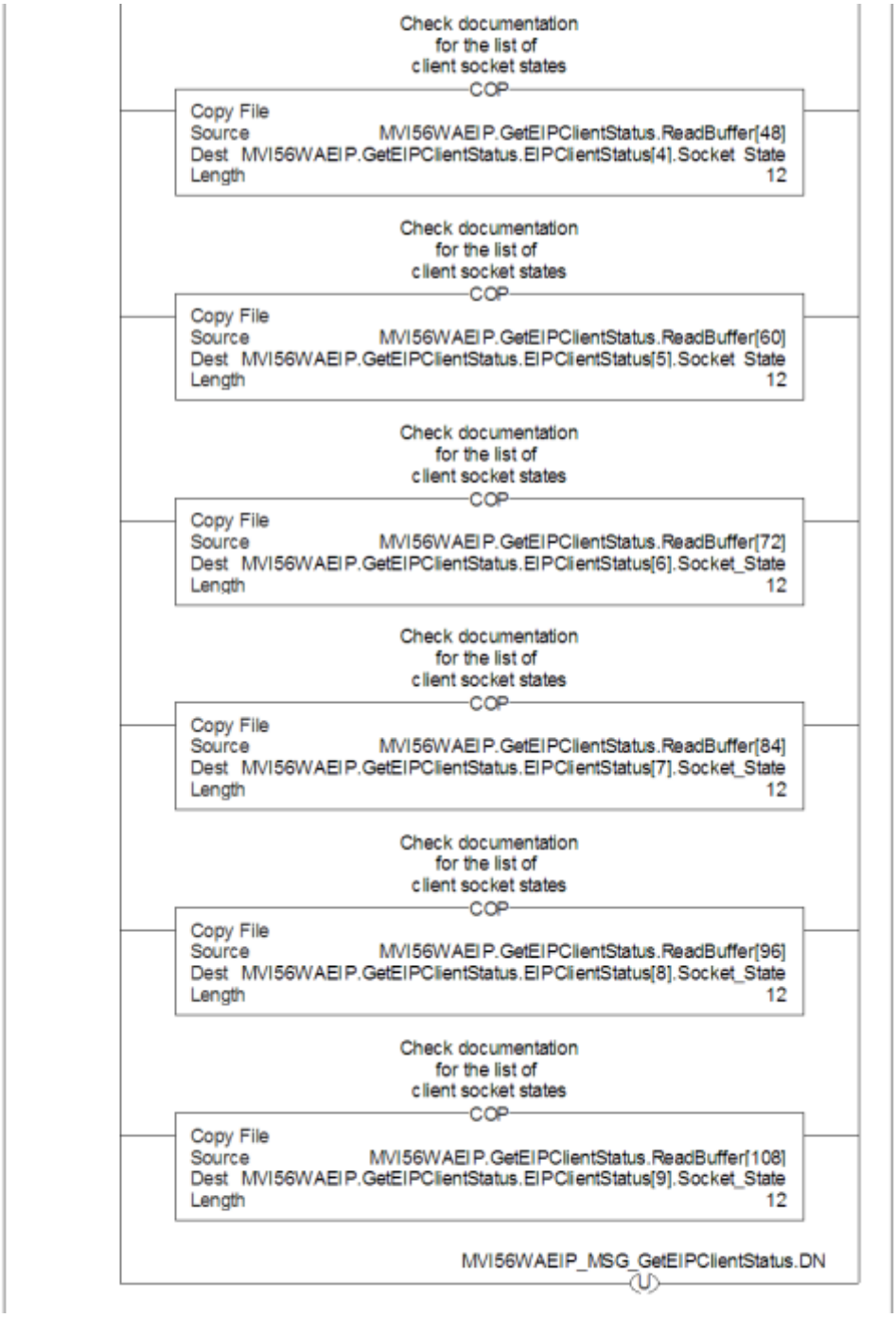


The following illustration is a ladder example to retrieve EtherNet/IP status information:



The following rung reads the client status information received in the MSG instruction into the controller tags.

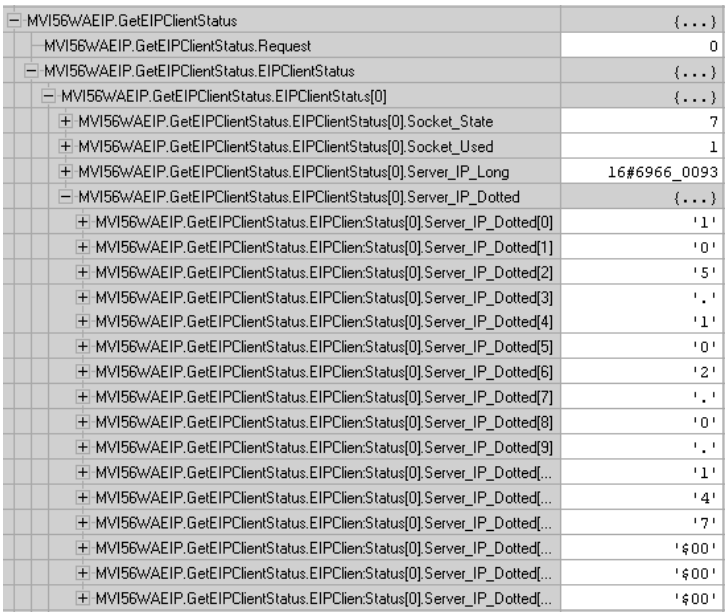




To retrieve client status information from the module, follow these steps:

1. Set the MVI56WAEIP.GetEIPClientStatus.Request bit to 1
2. Refer to the MVI56WAEIP.GetEIPClientStatus.EIPClientStatus data structure for all 10 clients.

The following xample shows that client 0 is associated and exchanging messages with a remote processor with an IP address of 105.102.0.147.



The *socket_state register* can assume one of the following values:

State	Definition
-20	Waiting for request (not used)
-1	Setting up client socket
2000	Performing ARP request
2001	Opening socket to server
0	Waiting for socket to establish
1	Registering the Session
2	Receiving register session response
5	Build EtherNet/IP message and send out
6	Receiving response
7	Idle, waiting for next message or timeout on socket
100	Force socket closed immediately
1000	Close socket with timeout of 2 seconds
1001	Waiting for close
1002	Set up socket to abort
1003	Socket abort with 1 second timeout
1004	Waiting for socket to finish with abort

The *Socket_Used register* can assume the following values:

Value	Definition
0	Client not connected
1	Client connected
2	Client busy

The IP address of the remote associated server can be monitored in long format (Server_IP_Long) or dotted format (Server_IP_Dotted).

5 Diagnostics and Troubleshooting

In This Chapter

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

- Status data values are transferred from the module to the processor.
- Data contained in the module can be viewed through the Configuration/Debug port attached to a terminal emulator.
- LED status indicators on the front of the module provide information on the module's status.

5.1 The Configuration/Debug Menu

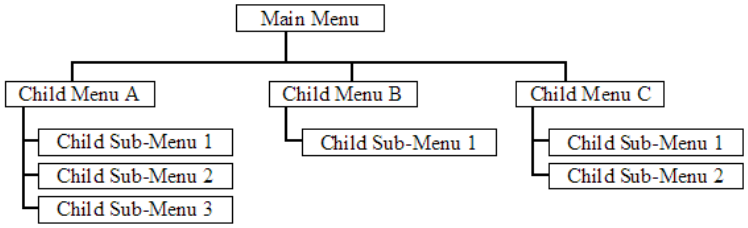
The Configuration and Debug menu for this module is arranged as a tree structure, with the Main Menu at the top of the tree, and one or more sub-menus for each menu command. The first menu you see when you connect to the module is the Main menu.

Because this is a text-based menu system, you enter commands by typing the command letter from your computer keyboard in the terminal application (for example, HyperTerminal). 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.

5.1.1 Navigation

All of the sub-menus for this module contain commands to redisplay the menu or return to the previous menu. You can always return from a sub-menu 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 you the menus available for this module, and briefly discusses the commands available to you.

5.1.2 Keystrokes

The keyboard commands on these menus are almost always non-case sensitive. You can enter most commands in lower case or capital 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][/]**.

Also, take care to distinguish capital letter **[I]** from lower case letter **[l]** (L) and number **[1]**; likewise for capital letter **[O]** and number **[0]**. Although these characters look nearly the same on the screen, they perform different actions on the module.

5.2 Required Hardware

You can connect directly from your computer's serial port to the serial port on the module to view configuration information, perform maintenance, and send (upload) or receive (download) configuration files.

ProSoft Technology recommends the following minimum hardware to connect your computer to the module:

- 80486 based processor (Pentium preferred)
- 1 megabyte of memory
- At least one UART hardware-based serial communications port available. USB-based virtual UART systems (USB to serial port adapters) often do not function reliably, especially during binary file transfers, such as when uploading/downloading configuration files or module firmware upgrades.
- A null modem serial cable.

5.3 Required Software

In order to send and receive data over the serial port (COM port) on your computer to the module, you must use a communication program (terminal emulator).

A simple communication program called HyperTerminal is pre-installed with recent versions of Microsoft Windows operating systems. If you are connecting from a machine running DOS, you must obtain and install a compatible communication program. The following table lists communication programs that have been tested by ProSoft Technology.

DOS	ProComm, as well as several other terminal emulation programs
Windows 3.1	Terminal
Windows 95/98	HyperTerminal
Windows NT/2000/XP	HyperTerminal

The module uses the Zmodem file transfer protocol to send (upload) and receive (download) configuration files from your module. If you use a communication program that is not on the list above, please be sure that it supports Zmodem file transfers.

5.4 Using the Configuration/Debug Port

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

1. Connect your computer to the module's port using a null modem cable.
2. Start the communication program on your computer and configure the communication parameters with the following settings:

Baud Rate	57,600
Parity	None
Data Bits	8
Stop Bits	1
Software Handshaking	None

3. Open the connection. When you are connected, press the **[?]** key on your keyboard. If the system is set up properly, you will see a menu with the module name followed by a list of letters and the commands associated with them.

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

1. 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.
2. Verify that RSLinx is not controlling the COM port. Refer to Disabling the RSLinx Driver for the Com Port on the PC.
3. Verify that your communication software is using the correct settings for baud rate, parity and handshaking.
4. 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, you can contact ProSoft Technology Technical Support for further assistance.

5.4.1 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 on your terminal screen:

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 failures. Only use these commands if you are specifically directed to do so by ProSoft Technology Technical Support staff. Some of these command keys are not listed on the menu, but are active nevertheless. Please be careful when pressing keys so that you do not accidentally execute an unwanted command.

```
MVI56-WA-EIP COMMUNICATION MODULE MENU
  ?=Display Menu
  A=Active Node Table
  B=ICP Data
  C=Connection Manager Data
  D=Device Information
  R=Radio Menu
  U=Reset diagnostic data
  V=Version Information
  0-1=Unconnected Clients
  2-5=DFNT Servers
  @=Network Menu
  Esc=Exit Program and Reboot Module
```

Note: The menu selections for Unconnected Clients are available only on modules with firmware version 1.22.000 or later.

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 Active Nodes

Press **[A]** to view rack occupation information. You can check which slots are occupied in the rack. The ANT register is a bitmap word that also indicates which slots are occupied (bit x=1 means slot x is occupied).

```
ACTIVE NODE DISPLAY:
Rack Size: 7 Slots   ANT = 00000055
Slot 0: Occupied
Slot 1: Empty
Slot 2: Occupied
Slot 3: Empty
Slot 4: Occupied
Slot 5: Empty
Slot 6: Occupied
```

Viewing Backplane (ICP) Information

From the main menu, press **[B]** for the ICP status information. This information is obtained by the module through the backplane:

```
ICP DATA STATISTICS:

ICP (backplane) Statistics:
        Control Bus Status: 0
        Control Bus Parameters
                Multicast CRC Error Threshold: 8
                Transmit Retry Limit: 45
        Rack Info
                Revision:  1.01    Serial Number: 00228447
                Size: 4    Module's Slot: 1
        Receive Error Counters
                Bad CRC: 0
                Bus Timeout: 0
                CRC Error: 0
        Transmit Error Counters
                Bad CRC: 0
                Bus Timeout: 0
```

The following registers are available:

Control Bus Station - indicates an error if value is different than 0. Refer to Rockwell documentation for further information on specific error codes.

Multicast CRC Error Threshold - displays the threshold for entering a fault state due to multicast CRC errors.

Transmit Retry Limit - The number of times a frame is retried if a transmission error occurs.

Rack information - provides general information concerning: module revision and serial number, rack size and slot where the module is located.

Receive Error Counters (Bad CRC) - number of bad CRC errors that occurred on received backplane frames.

Receive Error Counters (Bus Timeout) - number of receive time-outs

Receive Error Counters (CRC Error) - number of multicast receive CRC errors

Transmit Error Counters (Bad CRC) - number of bad CRC errors that occurred on transmitted frames.

Transmit Error Counters (Bus Timeout) - number of transmitted bus time-outs.

Viewing Device Information

From the main menu, press [D] to view Device information. This menu provides general device information as indicated below:

```
DEVICE INFORMATION:

Module Name: MVI56 ProSoft Technology, Inc.
VendorID: 309       DeviceType: 12
ProdCode: 83        SerialNum : 0x00006EEB (hex)
Revision:  1.01
Slot: 1
```

Opening the Radio Menu

Press **[R]** to open the Radio menu. Use this command to view configuration and status for the module's onboard radio.

Resetting diagnostic data

Press **[U]** to reset the status counters for the client and/or servers in the module.

Viewing Version Information

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

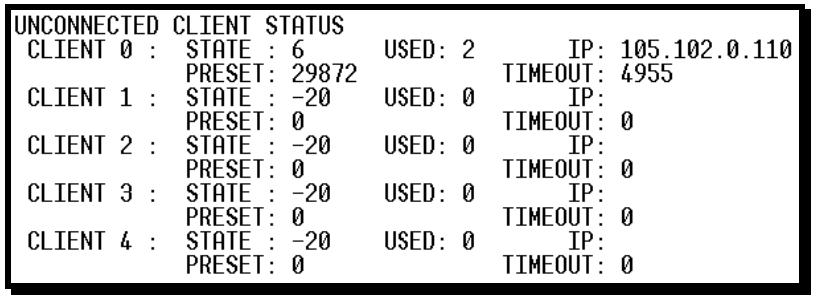
Use this command to view the current version of the software for the module, as well as other important values. You may be asked to provide this information when calling for technical support on the product.

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.

Viewing Unconnected Client Status

Press **[0]** or **[1]** to view status of clients 0 through 4, or 5 through 9, respectively.



Note: The menu selections for Unconnected Clients are available only on modules with firmware version 1.22.000 or later.

The *STATE* code can assume one of the following values:

State	Definition
-20	Waiting for request (not used)
-1	Setting up client socket
2000	Performing ARP request
2001	Opening socket to server
0	Waiting for socket to establish
1	Registering the Session
2	Receiving register session response

State	Definition
5	Build EtherNet/IP message and send out
6	Receiving response
7	Idle, waiting for next message or timeout on socket
100	Force socket closed immediately
1000	Close socket with timeout of 2 seconds
1001	Waiting for close
1002	Set up socket to abort
1003	Socket abort with 1 second timeout
1004	Waiting for socket to finish with abort

The *USED* value can assume the following values:

Value	Definition
0	Client not connected
1	Client connected
2	Client busy

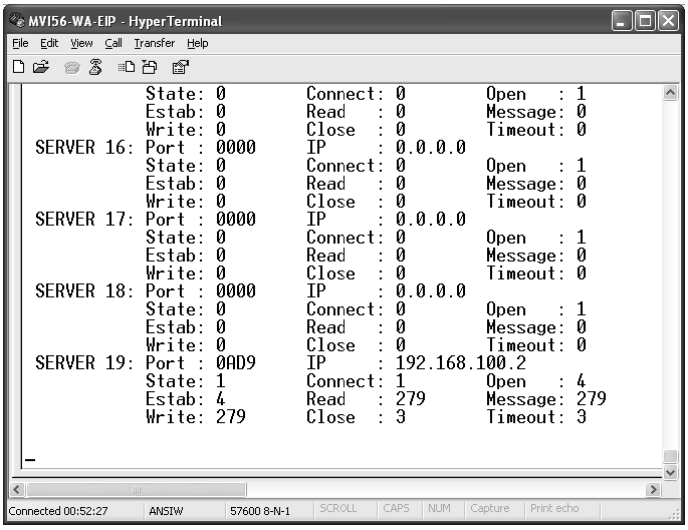
The IP value shows the IP address of the connected remote server device

The *TIMEOUT* value initializes with a value of 10000 (ms) when the client routes the message. When the message is routed this counter will decrement until a new message is received for routing. If no further messages are received and the counter reaches the value of 0 then the socket association with the remote device will be terminated. Therefore this counter value reflects the timeout period of 10 seconds used by the module to terminate the socket association if the module no longer receives a message for that same remote server.

The *PRESET* value shows the timeout value associated to the specific message. This information is available only for debugging purposes because the value is not actually used by the module as a timeout period.

Opening the DFNT Server Menu

Press keys **[2], [3], [4]** or **[5]** to view EtherNet/IP server status information. The first server to be connected will be server 19. It will display relevant information such as the remote computer IP address connected to the module. The module accepts up to 20 simultaneous connections.



Opening the Network Menu

Press **[@]** 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. You can find more information about the commands on this menu in the Network Menu (page 124) section.

Exiting the 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 failures. Only use these commands if you are specifically directed to do so by ProSoft Technology Technical Support staff. Some of these command keys are not listed on the menu, but are active nevertheless. Please be careful when pressing keys so that you do not accidentally execute an unwanted command.

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 ROM to configure the module.

5.4.2 Radio Menu

Press **[R]** to open the Radio menu. Use this command to view configuration and status for the module's onboard radio.

```
RADIO MENU
C=Configuration
S=Status
1=Constant Radio Status Update
M=Return to Main Menu
```

Viewing Radio Configuration

Press **[C]** to view radio configuration. Use this command to view the port type, channel, data length and other radio configuration settings.

```
RADIO STATIC CONFIGURATION:
Port Type    : 1        Own MAC Address: 00:10:C6:47:79:68
Own Channel  : 10       Own SSID:
Max Data Len : 1508     Own Name: New
Encryption   : 0        Authentication  : 1
TX Rate Ctrl : 3        WEP Key Rollover: No
LED Levels   : 20 - 25 - 30 - 35
```

Viewing Radio Status

Press **[S]** to view the current operational status of the radio. Use this command to view connection and signal status, packets and bytes transferred, signal quality and errors.

```
RADIO DRIVER STATUS:
Port Status = Connected IBSS  SSID = NetworkWA
Transmit Rate  = 11     MB    Signal Quality = 83     dB
Signal Level   = -19    dBm   Noise Level    = -102   dBm
PacketsIn      = 12082        PacketsOut     = 23737
BytesIn        = 1932496      BytesOut       = 3796798
ErrorsIn       = 1            ErrorsOut      = 559
PacketsDropped = 0            Channel #      = 10
```

Continuously Monitoring Radio Status

Press **[1]** to monitor radio status continuously. Use this command to view the signal strength and noise level for the radio in real time.

```
Radio Monitor Enabled.  Press any key to exit.
Q=   48 dB   SL=  -46 dBm   NL=  -94 dBm
Q=   48 dB   SL=  -46 dBm   NL=  -94 dBm
Q=   49 dB   SL=  -46 dBm   NL=  -95 dBm
Q=   50 dB   SL=  -45 dBm   NL=  -95 dBm
Q=   50 dB   SL=  -45 dBm   NL=  -95 dBm
Q=   49 dB   SL=  -46 dBm   NL=  -95 dBm
Q=   49 dB   SL=  -46 dBm   NL=  -95 dBm
Q=   49 dB   SL=  -46 dBm   NL=  -95 dBm
```

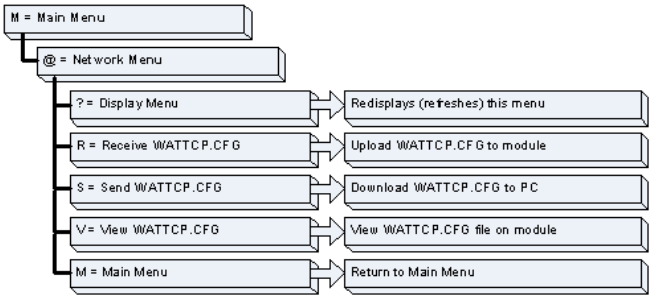
Important: When in continuous radio monitor mode, program execution will slow down. Only use this tool during a trouble-shooting session. Before disconnecting from the Config/Debug port, please be sure to press a key to disable the radio status monitor. This action will allow the module to resume its normal operating mode.

Returning to the Main Menu

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

5.4.3 Network Menu

The network menu allows you to send, receive and view the WATTCP.CFG file that contains the IP and gateway addresses, and other network specification 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

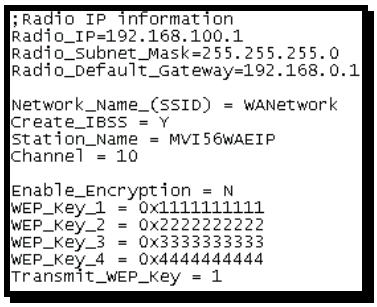
Press **[S]** to transfer the WATTCP.CFG file from the module to your PC.

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.



Returning to the Main Menu

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

5.5 LED Status Indicators

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

ProSoft Module	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	Not Used		
P2	Not Used		
APP	Not Used		
BP ACT	Not Used		
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.

If the APP, BP ACT and OK LEDs blink at a rate of every one-second, this indicates a serious problem with the module. Call ProSoft Technology support to arrange for repairs.

5.5.1 RF LEDs

If the RF Signal Level LEDs are continuously asserted these will indicate the current quality level signal while the module is connected in either ad-hoc or infrastructure mode:

LED 0: 10dB or greater

LED 1: 20dB or greater

LED 2: 30dB or greater

LED 3: 40dB or greater

If the RF Signal Level LEDs are asserted for approximately 10 seconds and off for approximately 1 seconds it means that the module lost communication with the previously connected ad-hoc remote station (the asserted LEDs indicate the last measured quality level before disconnection).

If the RF Signal Level LEDs are off it means that either:

1. The module was initialized and has not established connection to any station

   or

2. The module was disconnected from a previously connected Access Point.

RF Link: (Green) asserted continuously if module is:

- Connected ad-hoc
- Connected Infrastructure (ESS)
- Out of range Infrastructure (ESS)

If the RF Link LED is asserted for approximately 10 seconds and off for approximately 1 seconds it means that either:

1. The module was initialized and have not connected to any stations
2. The module lost communication with the previously connected ad-hoc remote station.

RF Data: (Green) Asserted when data is received or transmitted to the module

5.5.2 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 the configuration data being transferred to the module from the ControlLogix processor.

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 Support.

5.5.3 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.

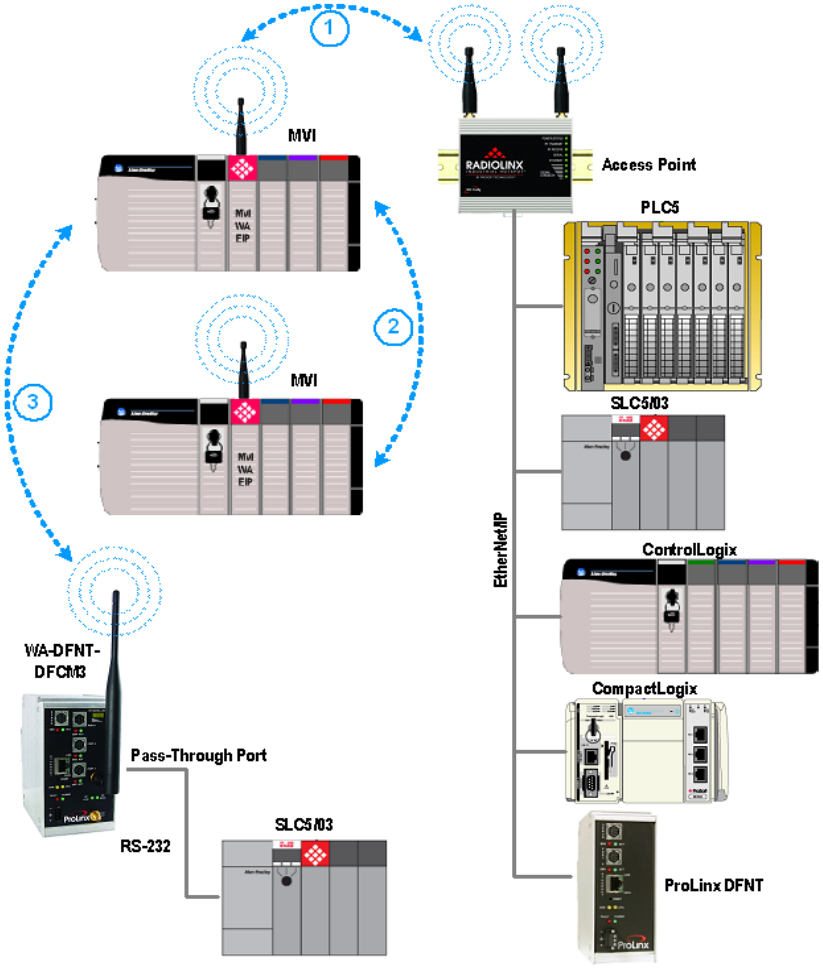
Problem Description	Steps to take
Processor I/O LED flashes	This indicates there is a problem with backplane communications. Verify that all modules in the rack are configured in the processor.
OK LED remains red	The program has halted or a critical error has occurred. Connect to the Configuration/Debug port to see if the module is running. If the program has halted, remove the card from the rack and re-insert the card in the rack.

6 Reference

In This Chapter

6.1 Product Specifications

The In-Chassis High Speed Wireless EtherNet/IP Communication Module creates a powerful wireless connection between your PC or Laptop and a remote ControlLogix processor. The bridging functionality allows access to other processors in other racks through different networks, using RSLinx, RSLogix, RSView or RSNetWorx. The module emulates similar 1756-ENBT Ethernet module features when used with PC (RSLinx) to processor communications.

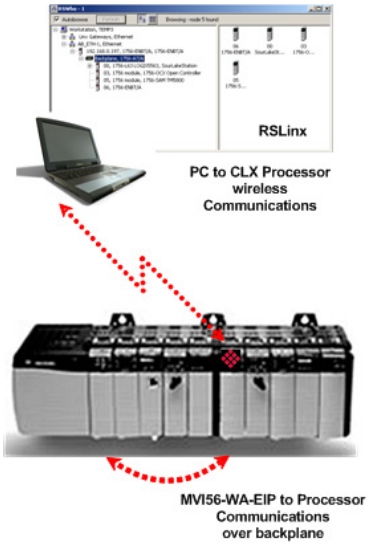


6.1.1 Features and Benefits

Wireless EIP communications extend and enhance ProSoft Technology's range of wireless products. The MVI56-WA-EIP allows PC to ControlLogix processor communications using an 802.11 wireless network. The module acts as a server to RSLinx based connected services bridged between a ControlLogix processor and PC running RSLinx.

MVI56-WA-EIP is capable of supporting up to 10 distinct clients, explicit, unconnected messaging only. Thre are 20 types of read/write message capabilities, including CIP, SLC and PLC5.

The module allows for multiple programs including RSLogix 5000 to communicate simultaneously to the processor. The 802.11 wireless networks can be set up for PC to Wireless Router (infrastructure) or PC to PC (Ad hoc) modes of communications.



6.1.2 General Specifications

- Single Slot - 1756 backplane compatible
- PC to processor communication (RSLinx version 2.51 or newer)
- The module is recognized as a 1756-ENBT/A Communication Module
- Configuration data obtained from configuration text file downloaded to module. Sample configuration file included
- Reside in Local or Remote chassis and function as a bridge to a ControlLogix processor
- Supports ad-hoc or infrastructure modes.
- Supports up to 20 simultaneous connections.

6.1.3 Hardware Specifications

Specification	Description
Backplane Current Load	800 mA @ 5 V DC; 3mA @ 24V DC
Operating Temperature	0 to 60°C (32 to 140°F)
Storage Temperature	-40 to 85°C (-40 to 185°F)
Shock:	30g Operational
	50g non-operational
	Vibration: 5 g from 10 to 150 Hz
Relative Humidity	5% to 95% (non-condensing)
LED Indicators:	RF Signal Level
	RF Data Status
	RF Link Status
	Serial Activity
Debug/Configuration port (CFG)	
CFG Port (CFG)	RJ45 (DB-9M with supplied cable)
	RS-232 only
Shipped with Unit	RJ45 to DB-9M cables for each port
	6-foot RS-232 configuration cable
	5dbi Omni Articulating Antenna

6.1.4 Functional Specifications

- PC to PLC communications
- RSView (RSView 32 and RSView SE) are supported
- PLC to PLC communications is supported for explicit messaging as a server
- Program different processors in different racks with the bridging functionality

General Radio Specifications

Specification	Value
Frequency	2.4 GHz band (2400 to 2483.5 MHz)*
Wireless medium	DSSS - Direct Sequence Spread Spectrum (802.11b)
Output power	32 mW (15 dBm)
Channel data rates	11, 5.5, 2, 1 Mbps
Channels - user selectable	1 through 11* **
Receive Sensitivity	-83 @ 11 Mbps
	-86 @ 5.5 Mbps
	-89 @ 2 Mbps
	-92 @ 1 Mbps
Security	WEP 64/128 Encryption
Antenna Ports	Two RP-SMA connectors, automatic antenna diversity
Bit Error Rate (BER)	Better than 10^{-5}

* Varies with country regulation
** Some European countries such as France allow fewer channels

6.2 Frequently Asked Questions

Can I use the MVI56-WA-EIP with any RSLinx version?

No. Only RSLinx Classic version 2.51 or newer is supported.

Can I configure the RSLinx driver EtherNet/IP to locate the MVI56-WA-EIP module?

Yes. You can set up RSLinx with EtherNet/IP, Ethernet devices or Remote Device via Linx Gateway devices.

Is it possible to establish simultaneous connections between the MVI56-WA-EIP module and different computers?

Yes. A maximum of 20 connections are supported.

Why I cannot establish communication to the module through Hyperterminal?

Make sure that you are using the null-modem cable supplied with the module. Also verify if the COM port you are using is not being accessed by other applications. Finally, verify if the communication parameters are correct according to the configuration procedure presented in this User Manual.

I reconfigured the channel number but after the configuration download is completed the MVI56-WA-EIP module communicates through the previous channel used before the module was reconfigured.

Before downloading the new configuration file to the module the PC or laptop must be disconnected from the current MVI56-WA-EIP network. Only after the configuration download is completed that you should reconnect the PC or laptop to the MVI56-WA-EIP wireless network. In order to recover you also disconnect your PC or laptop of the MVI56-WA-EIP network and reconnect the module.

Why is RSLinx unable to locate the MVI56-WA-EIP through RSWho even after successfully connecting the module to the Windows wireless adapter?

Check the following items:

1. Check the IP address and netmask configured for your PC wireless adapter. Make sure that the PC wireless IP address will be in the same network that you configured for the MVI56-WA-EIP module. Refer to Connect the PC to the Wireless Network (page 24) in this User Manual for further information about how to configure the IP address for the wireless adapter of your PC.
2. Check if the Ethernet and Wireless IP addresses configured for your PC are located on different networks.
3. Check the RSLinx version. Only RSLinx Classic version 2.51 or later is supported.
4. Using RSLinx Classic v2.51.
5. In the Wireless Network Connection window, disconnect from the MVI56-WA-EIP network and connect again. Check if RSLinx (RSWho) can locate the module.

6 Right-click the Wireless Network Connection icon in the Windows system tray and choose Repair. After the repair operation is completed check if RSLinx (RSWho) can locate the module.
7 If the laptop is located at a considerable distance from the MVI56-WA-EIP the signal might not be strong enough to establish communication through EtherNet/IP. The actual distance might depend on several items (obstacles, environment, etc..). At certain ranges it might be possible to connect to the module through the Windows Wireless Network Connection menu but not through RSLinx.

How can I use the module in ad-hoc mode?

Make sure that the module is configured with a unique SSID name that is not being used by any access points in the area. Then your computer can connect to the module in ad-hoc mode. In Hyperterminal, open the Radio Menu (page 120) (Status) and check the Port Status parameter, which should be set as Connected IBSS during infrastructure mode. You can identify that the network type is ad-hoc by the specific ad-hoc icon used in the network list in the Wireless Network Connection window.

How can I use the module in infrastructure mode?

Configure the module and the access point with the same SSID. Make sure that the MVI56-WA-EIP wireless network is not configured as "automatic" in your Wireless Network Connection window (to avoid connecting the module with your PC in ad-hoc mode before the configuration procedure of the MVI56-WA-EIP and the access point is completed). When the module finds the access point it will be connected in infrastructure mode. In Hyperterminal, open the Radio Menu (page 120) (Status) and check the Port Status parameter that should be set as Connected ESS during infrastructure mode. You can identify that the network type is ad-hoc by the specific ad-hoc icon used in the network list in the Wireless Network Connection window.

After the module is connected in infrastructure mode it will no longer connect to any stations in ad-hoc mode. If the access point connection is lost the module will keep trying to connect to an access point with the same SSID but will no longer connect in ad-hoc mode.

7 Support, Service & Warranty

In This Chapter

Be sure and read the full Warranty that can be found on our web site at www.prosoft-technology.com for details and other terms and conditions. The content in this summary is subject to change without notice. The content is current at date of publication.

ProSoft Technology, Inc. strives to provide meaningful support to its customers. Should any questions or problems arise, please feel free to contact us at:

Internet	Web Site: http://www.prosoft-technology.com/support
	E-mail address: support@prosoft-technology.com

Those of us at ProSoft Technology, Inc. want to provide the best and quickest support possible, so before calling please have the following information available. You may wish to fax this information to us prior to calling.

1 Product Version Number
2 System architecture
3 Network details

In the case of hardware, we will also need the following information:

1 Module configuration and contents of file
2 Module Operation
3 Configuration/Debug status information
4 LED patterns
5 Information about the processor and user data files as viewed through the development software and LED patterns on the processor
6 Details about the networked devices interfaced, if any

For technical support calls within the United States, an after-hours answering system allows pager access to one of our qualified technical and/or application support engineers at any time to answer your questions.

7.1 How to Contact Us: Sales and Support

All ProSoft Technology Products are backed with full technical support. Contact our worldwide Technical Support team and Customer Service representatives directly by phone or email:

USA / Latin America (excluding Brasil) (Office in California)

+1(661) 716-5100
+1(661) 716-5101 (Fax)
1675 Chester Avenue, 4th Floor
Bakersfield, California 93301
U.S.A.
+1.661.716.5100, support@prosoft-technology.com
Languages spoken include: English, Spanish

Asia Pacific Sales (office in Malaysia)

+603.7724.2080
+603.7724.2090 (Fax)
C210, Damansara Intan,
1 Jalan SS20/27, 47400 Petaling Jaya
Selangor, Malaysia
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Languages spoken include: Chinese, Japanese, English

Asia Pacific Support (office in China)

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Languages spoken include: Chinese, English

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France
+33 (0) 5.34.36.87.20. support.emea@prosoft-technology.com
Languages spoken include: French, English

Brasil (office in Sao Paulo)

+55-11-5084-5178
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Rua Vergueiro, 2949 - sala 182 - Edifício Vergueiro Work Center
Vila Mariana - São Paulo
Cep: 04101-300 - Brasil
+55-11-5084-5178, eduardo@prosoft-technology.com
Languages spoken include: Portuguese, English

7.2 Return Material Authorization (RMA) Policies and Conditions

The following RMA Policies and Conditions apply to any returned product. These RMA Policies are subject to change by ProSoft without notice. For warranty information, see Section C below entitled "Limited Warranty". In the event of any inconsistency between the RMA Policies and the Warranty, the Warranty shall govern.

7.2.1 All Product Returns

1 In order to return a Product for repair, exchange or otherwise, the Customer must obtain a Returned Material Authorization (RMA) number from ProSoft and comply with ProSoft shipping instructions.
2 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 in Section A. A Technical Support Engineer will request several tests in an attempt to isolate the problem. If after these tests are completed, the Product is found to be the source of the problem, ProSoft will issue an RMA.
3 All returned Products must be shipped freight prepaid, in the original shipping container or equivalent, to the location specified by ProSoft, and be accompanied by proof of purchase. 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 without an RMA number will be returned to the Customer, freight collect. Contact ProSoft Technical Support for further information.
4 Out of warranty returns are not allowed on RadioLinx accessories such as antennas, cables, and brackets.

The following policy applies for Non-Warranty Credit Returns:

A 10% Restocking Fee if Factory Seal is *not* broken
B 20% Restocking Fee if Factory Seal is broken

ProSoft retains the right, in its absolute and sole discretion, to reject any non-warranty returns for credit if the return is not requested within three (3) months after shipment of the Product to Customer, if the Customer fails to comply with ProSoft's shipping instructions, or if the Customer fails to return the Product to ProSoft within six (6) months after Product was originally shipped.

7.3 Procedures for Return of Units Under Warranty

1 A Technical Support Engineer must pre-approve all product returns.
2 Module is repaired or replaced after a Return Material Authorization Number is entered and a replacement order is generated.
3 Credit for the warranted item is issued within 10 business days after receipt of product and evaluation of the defect has been performed by ProSoft. The credit will only be issued provided the product is returned with a valid Return Material Authorization Number and in accordance with ProSoft's shipping instructions.

a) If no defect is found, a credit is issued.

b) If a defect is found and is determined to be customer generated or if the defect is otherwise not covered by ProSoft's Warranty, or if the module is not repairable, a credit is not issued and payment of the replacement module is due.

7.4 Procedures for Return of Units Out of Warranty

1 Customer sends unit in for evaluation.

2 If no defect is found, Customer will be charged the equivalent of US $100 plus shipping, duties and taxes that may apply. A new Purchase Order will be required for this evaluation fee.

If the unit is repaired the charge to the Customer will be 30%* of the list price plus any shipping, duties and taxes that may apply. A new Purchase Order will be required for a product repair.

3 For an immediate exchange, a new module may be purchased and sent to Customer while repair work is being performed. Credit for purchase of the new module will be issued when the new module is returned in accordance with ProSoft's shipping instructions and subject to ProSoft's policy on non-warranty returns. This is in addition to charges for repair of the old module and any associated charges to Customer.

4 If, upon contacting ProSoft Customer Service, the Customer is informed that unit is believed to be unrepairable, the Customer may choose to send unit in for evaluation to determine if the repair can be made. Customer will pay shipping, duties and taxes that may apply. If unit cannot be repaired, the Customer may purchase a new unit.

7.4.1 Un-repairable Units

- 3150-All
- 3750
- 3600-All
- 3700
- 3170-All
- 3250
- 1560 can be repaired, if defect is the power supply
- 1550 can be repaired, if defect is the power supply
- 3350
- 3300
- 1500-All

*** 30% of list price is an estimated repair cost only. The actual cost of repairs will be determined when the module is received by ProSoft and evaluated for needed repairs.**

7.4.2 Purchasing Warranty Extension

As detailed below in ProSoft's Warranty, the standard Warranty Period is one year (or in the case of RadioLinx modules, three years) from the date of delivery. The Warranty Period may be extended for an additional charge, as follows:

- Additional 1 year = 10% of list price
- Additional 2 years = 20% of list price
- Additional 3 years = 30% of list price

7.5 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, 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.

7.5.1 What Is Covered By This Warranty

A *Warranty On New Products*: ProSoft warrants, to the original purchaser only, 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 one year (or in the case of RadioLinx modules, three years) from the date of shipment (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 15 months (or in the case of RadioLinx modules, 39 months) from the date of delivery. 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 used replacement parts. 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. If ProSoft is unable to repair the Product to conform to this Warranty after a reasonable number of attempts, ProSoft will provide, at its option, one of the following: a replacement product, a full refund of the purchase price or a credit in the amount of the purchase price. All replaced product and parts become the property of ProSoft. These remedies are the Customer's only remedies for breach of warranty.

B *Warranty On Services*: Material and labor used by ProSoft to repair a verified malfunction or defect are warranted on 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.

C The Warranty Period for RadioLinx accessories (such as antennas, cables, brackets, etc.) are the same as for RadioLinx modules, that is, three years from the date of shipment.

7.5.2 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 With the exception of RadioLinx accessories referenced in paragraph 1(c) this Warranty does not cover any product, components, or parts not manufactured by ProSoft.

C This Warranty also 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 programming languages, or "C") 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 outside of the limits indicated on the product specifications; or (viii) disasters such as fire, flood, earthquake, wind or lightning.

D 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 guides included with your original product purchased by you 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.

7.5.3 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, WITHOUT LIMITATION, THE OPERATION OF NUCLEAR FACILITIES, AIRCRAFT NAVIGATION OF 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.

7.5.4 DISCLAIMER OF ALL OTHER WARRANTIES

THE WARRANTIES SET FORTH IN PARAGRAPH 1 ABOVE 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.

7.5.5 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 AND 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.

7.5.6 Time Limit for Bringing Suit

Any action for breach of warranty must be commenced within 15 months (or in the case of RadioLinx modules, 39 months) following shipment of the Product.

7.5.7 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.

7.5.8 Intellectual Property

A Any documentation included with Product purchased from ProSoft is protected by copyright and may not be photocopied 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.

7.5.9 Additional Restrictions Relating To Software And Other Intellectual Property

In addition to complying 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.

7.5.10 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.

7.5.11 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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