



MBX Gateway Driver Help

*MBX Gateway Driver for
Modbus, Modbus Plus and
Modbus TCP Networks*

MBX GATEWAY DRIVER HELP

MBX® Gateway Driver for Modbus, Modbus Plus and Modbus TCP Networks

Version 9

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INTRODUCTION

The MBX Gateway Driver lets applications use MBX devices on remote MBX Gateway Server systems as though they were on the local system. The client system running the MBX Gateway Driver must be a Windows node connected over a TCP/IP network to another system running the MBX Gateway Server. It can then access the Modbus, Modbus Plus and Modbus TCP networks that are connected to the server node.

The MBX Gateway Driver provides complete MBX Driver functionality to the client node applications, including support for Data Master/Slave, Program Master/Slave, Global Data and Peer Cop. An interface adapter, such as a Modicon PCIe-85 card, is not required on the client node. MBX Gateway Driver nodes can communicate with multiple remote servers and all Windows-compatible TCP/IP networks are supported.

This driver is part of Cyberlogic's MBX Driver Suite, MBX OPC Server Suite, MBX OPC Premier Suite, MBX OPC Enterprise Suite and MBX Bridge Suite, providing remote MBX connectivity for these products.

Running 16-Bit Software

The Virtual MBX Driver, which is included with all MBX products, allows all 16-bit NETLIB/NetBIOS-compatible applications, such as Modsoft, to run concurrently with all 32-bit applications in the same computer. For more information, refer to the [Virtual MBX Driver](#) section.

Compatibility

The MBX Gateway Driver is implemented as part of the Cyberlogic MBX architecture, which is the foundation used in other Cyberlogic drivers such as the MBX Driver, the Serial MBX Driver, the Ethernet MBX Driver, and the Mbx.Net Gateway Driver. Consequently, these drivers consistently support identical programming interfaces: MBXAPI, MBXAPI.Net and NETLIB. Supporting these existing standards protects the software and R&D investments of end-users and OEMs.

Software developers can use the MBX Software Development Kit (MBX SDK) to obtain connectivity to Modbus, Modbus Plus and Modbus TCP networks for their applications. Applications developed with the MBX SDK can be used with all MBX family drivers and can execute under all current Windows operating systems.

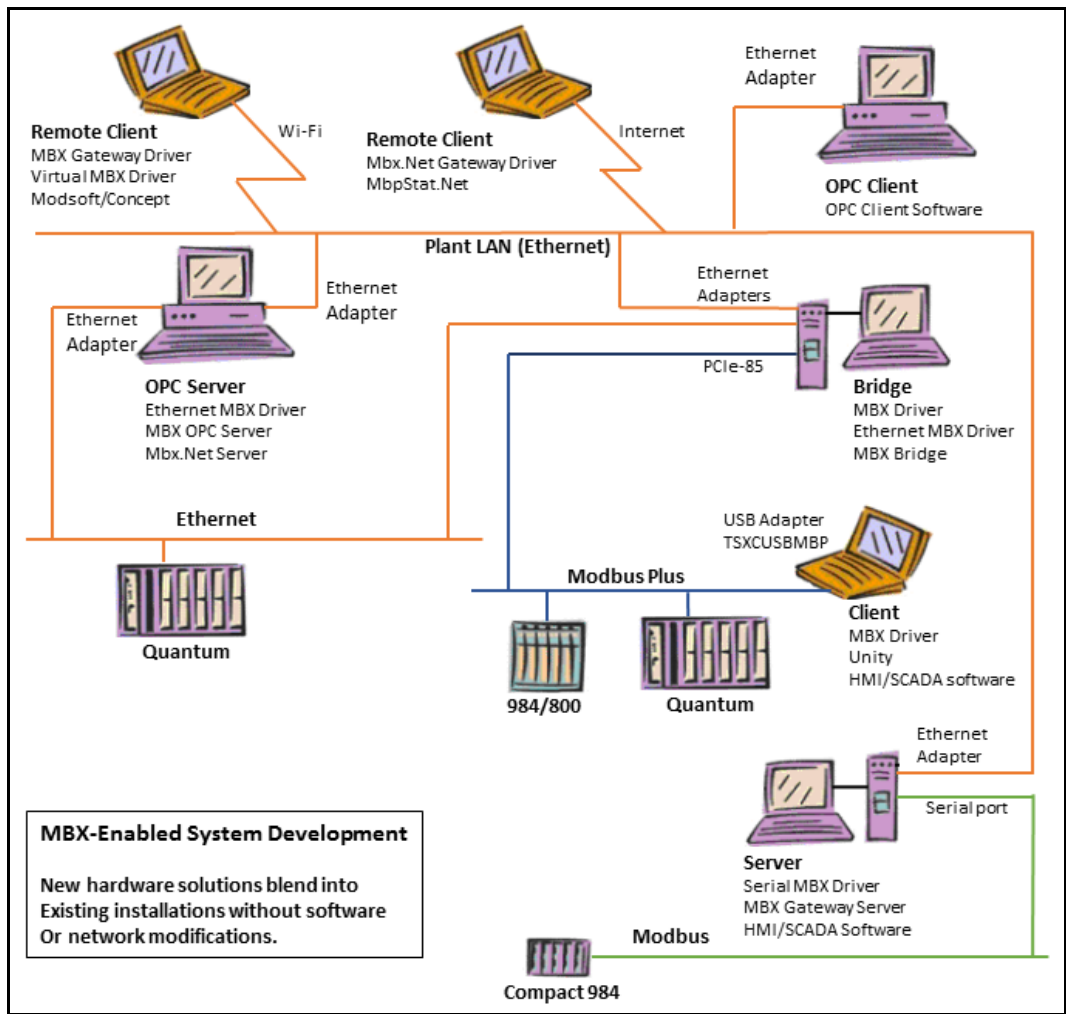
Blending MBX-Supported Networks

The MBX driver family provides support for all Modicon networks through a common architecture, with identical programming interfaces. This means that an application that operates with one of the MBX family drivers, such as the Ethernet MBX Driver, will work with the rest of them as well. Thus, virtually all Modbus Plus compatible software programs can operate over all Modicon-supported networks with no code modifications. You will find a complete description of the MBX family in the [Appendix: MBX Architecture and Companion Products](#).

Migration of existing installations to new hardware products does not require the user to discard working, proven software solutions. As depicted in the diagram below, a user can mix Modbus, Modbus Plus and Modbus TCP based hardware products in existing installations without losing software, network or integration investment.

The MBX family of products includes:

- [MBX Driver](#) is Cyberlogic's device driver for Modbus Plus interface adapters.
- [Ethernet MBX Driver](#) provides Modbus TCP communication.
- [Serial MBX Driver](#) provides Modbus RTU/ASCII communication.
- [MBX Gateway Driver](#) works with the other MBX drivers, giving access to Modbus, Modbus Plus and Modbus TCP networks from remote locations.
- [Mbx.Net Gateway Driver](#) works with the other MBX drivers, giving secure access to Modbus, Modbus Plus and Modbus TCP networks from remote locations, including over the Internet.
- [Virtual MBX Driver](#) works with the other MBX drivers to permit 16-bit legacy software to run in current 32-bit Windows operating systems.
- [MBX Bridge](#) allows you to bridge any combination of Modicon networks by routing messages between MBX devices.
- [MBX OPC Server](#) connects OPC-compliant client software applications to data sources over all Modicon networks.
- [MbpStat.Net](#) is the Modbus Plus network diagnostic utility. It provides the same functionality as the original DOS-based MBPSTAT application.
- [Mbx.Net Server](#) a WCF server that provides secure remote access to all MBX devices.
- [MBX SDK](#) is a software development kit for MBXAPI, MBXAPI.Net and NETLIB compliant development.



WHAT SHOULD I DO NEXT?

The links below will take you directly to the section of this manual that contains the information you need to configure, use and troubleshoot the MBX Gateway Driver.

Learn How the Driver Works

If you are not familiar with how the MBX Gateway Driver provides access to remote MBX devices, you should begin by reading [Communication Using the MBX Gateway Driver](#).

Read a Quick-Start Guide

First-time users of the MBX Gateway Driver will want to read the [Quick-Start Guide](#), which walks through a typical configuration session, step-by-step.

Get Detailed Information on the Configuration Editors

Experienced users who want specific information on features of the configuration editors will find it in the [Configuration Editor Reference](#) section.

Verify That It's Working or Troubleshoot a Problem

If you have already configured the driver, you should verify that it operates as expected. Refer to the [Validation & Troubleshooting](#) section for assistance. In case of communication problems, this section also provides problem-solving hints.

Get Information on Related Products

The MBX family consists of several well-integrated products, which provide connectivity for Modicon networks in distributed environments. For more information about these products, refer to the [Appendix: MBX Architecture and Companion Products](#) section.

Print a Copy of This Document

The content of this document is also provided in PDF format. PDF files can be viewed using the Adobe® Reader program, and can also be used to print the entire document.

Contact Technical Support

To obtain support information, open the Windows **Start** menu and go to the product suite you have installed. From there, select **Product Information**.

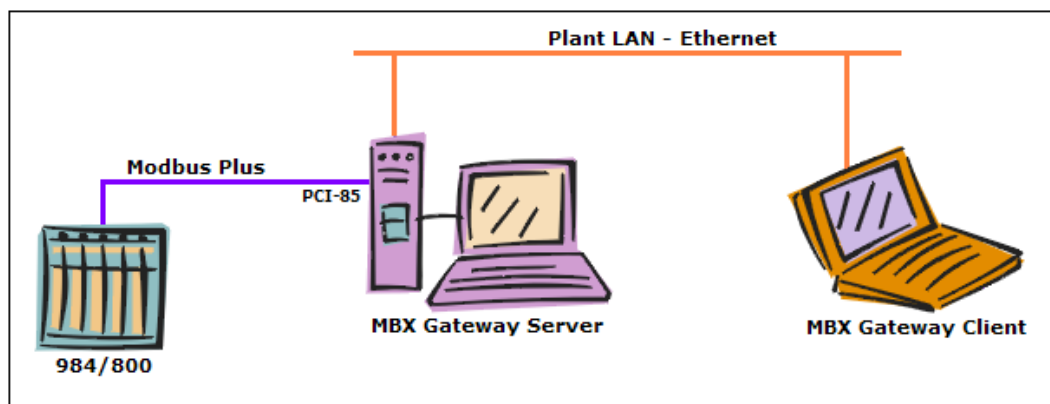
COMMUNICATION USING THE MBX GATEWAY DRIVER

The MBX Gateway Driver allows you to access MBX devices running on other computers on a TCP/IP network as though they were locally configured on your system. The system running the MBX Gateway Driver is considered to be the client system and the system with the MBX devices to be accessed is the server system. The server system must have the MBX Gateway Server running, to provide access to its MBX devices.

The MBX Gateway Driver provides the client node with the full functionality of all MBX devices running on the server. Support for some features may depend on the type and configuration of the device on the server node. Refer to the documentation included with the target MBX driver for more information.

Typical MBX Gateway Driver Architecture

The figure below shows a typical use of the MBX Gateway Driver.



In this setup, the tower system uses the MBX Driver and a PCI-85 card to communicate over Modbus Plus to the 984 controller. The tower is also running the MBX Gateway Server, making it the server system.

The notebook connects to the tower over a standard Ethernet LAN, and intends to communicate with the 984. Rather than installing a Modbus Plus interface adapter and running additional cable to connect directly to the Modbus Plus network, the notebook can simply become a client system by running the MBX Gateway Driver.

To make the connection, you would configure an MBX Gateway device on the notebook, designating the tower system as the server and selecting the tower's MBX device that corresponds to its PCI-85 card. Applications on the notebook can now access the MBX Gateway device, which will function just as though the notebook were directly connected to the Modbus Plus through the PCI-85.

Note

The MBX Gateway Driver works with all of the networks supported by the MBX family of drivers, not just Modbus Plus. If the server is connected to controllers over Modbus or Modbus TCP, it can also make these connections available to client systems.

The above example is a very simple, basic setup. More complex architectures are possible. For example:

- The server can have more than one device that it makes available to client systems. These devices can be of any mixture of adapters or network types.
- Multiple client systems can obtain access through each server, and through each device on a server.
- A client can connect to more than one device on a server. To do this, you simply create additional MBX Gateway Driver devices on the client and associate each with the desired device on the server.
- A client can connect to more than one server. Again, this is achieved by creating additional MBX Gateway Driver devices, one for each desired device on each server.

Main Driver Features

In general, the driver supports all Modbus Plus features including support for Data Master/Slave, Program Master/Slave, Global Data and Peer Cop. The features supported for a given configuration will depend on the type and configuration of the device on the server system.

Since the MBX Gateway Driver uses the same Application Programming Interface (API) as the rest of the MBX drivers, applications designed to work with one of the MBX drivers are guaranteed to work with the MBX Gateway Driver as well. Refer to [MBX SDK](#) section in the MBX Architecture and Companion Products appendix for more information.

QUICK-START GUIDE

Before the MBX Gateway Driver can be used, it must be properly configured. The configuration procedure involves creating one or more MBX Gateway devices and configuring them to work with the MBX Gateway servers on your network. An MBX Gateway device is a logical device that references a physical device on an MBX Gateway Server node. Your software applications will then use these logical devices to communicate over the network.

To accomplish this, you must run the MBX Driver Configuration Editor after you install the software. The MBX Driver Configuration Editor is a common component of all drivers in the MBX family. When configuring an MBX Gateway device, the MBX Driver Configuration Editor automatically dispatches the MBX Gateway Driver Configuration Editor.

The following steps show a typical configuration session. Use it only as a guideline of how to configure the most common features. For detailed descriptions of all of the available features, refer to the [Configuration Editor Reference](#) section.

The procedure is broken into several short segments:

- [Creating an MBX Gateway Device](#)
- [Configuring the MBX Gateway Driver](#)
- [Verifying Your Driver Configuration](#)
- [Backing Up Your Configuration](#)

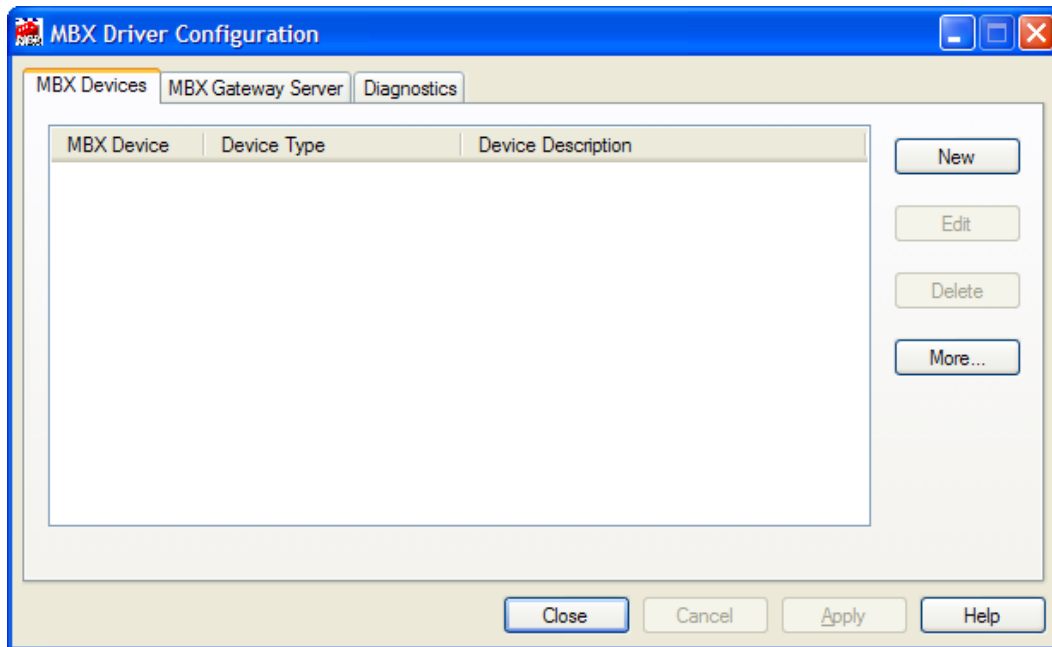
After completing this procedure, you will have a fully-configured MBX Gateway device and will be able to confirm that the driver is running and communicating with other nodes on your network.

To begin, go to [Creating an MBX Gateway Device](#).

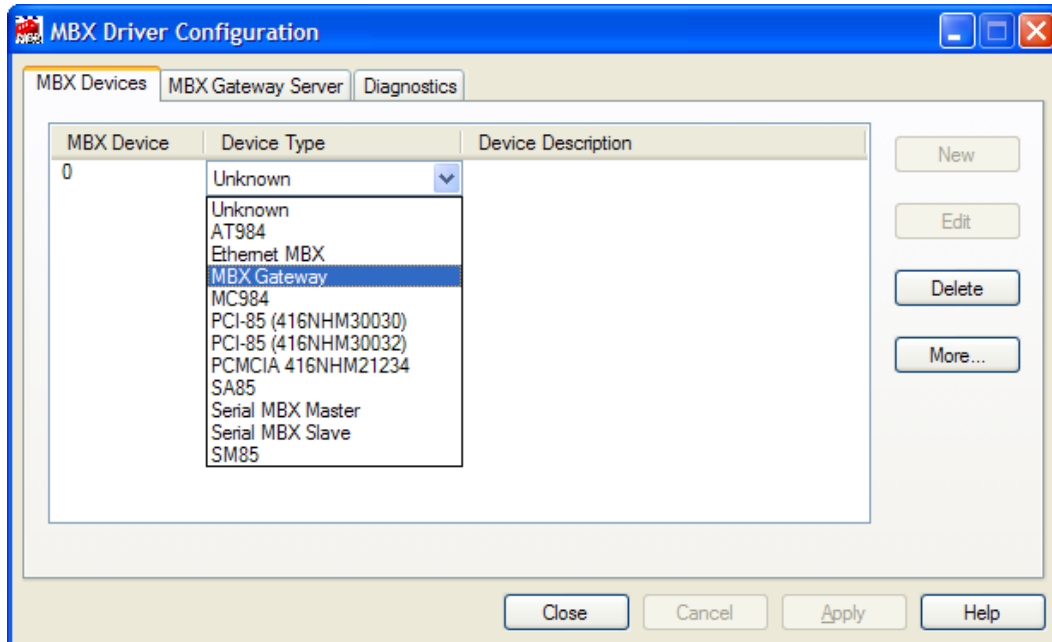
Creating an MBX Gateway Device

The first step in configuring the MBX Gateway Driver is to create an MBX Gateway device. This is a logical device that emulates an interface adapter card and connects across your LAN to an MBX Gateway Server in another computer. Refer to the [Communication Using the MBX Gateway Driver](#) section for more information.

1. From the Windows **Start** menu, go to the product suite you have installed. Next, open the **Configuration** submenu and select **MBX Device Drivers**.



Running the editor for the first time displays the above screen.



2. Click the **New** button and select **MBX Gateway** from the drop-down list.

This creates an MBX Gateway device and launches the MBX Gateway Driver Configuration Editor.

For the next part of the procedure, go to the [Configuring the MBX Gateway Driver](#) section.

Configuring the MBX Gateway Driver

Once you have created the MBX Gateway device, you must specify an MBX Gateway Server system and choose the MBX device on that system that you wish to use for communication.



1. In the **Server IP Address/Host Name** field, enter the IP address or host name of the MBX Gateway Server system that you want to communicate with.

Caution!

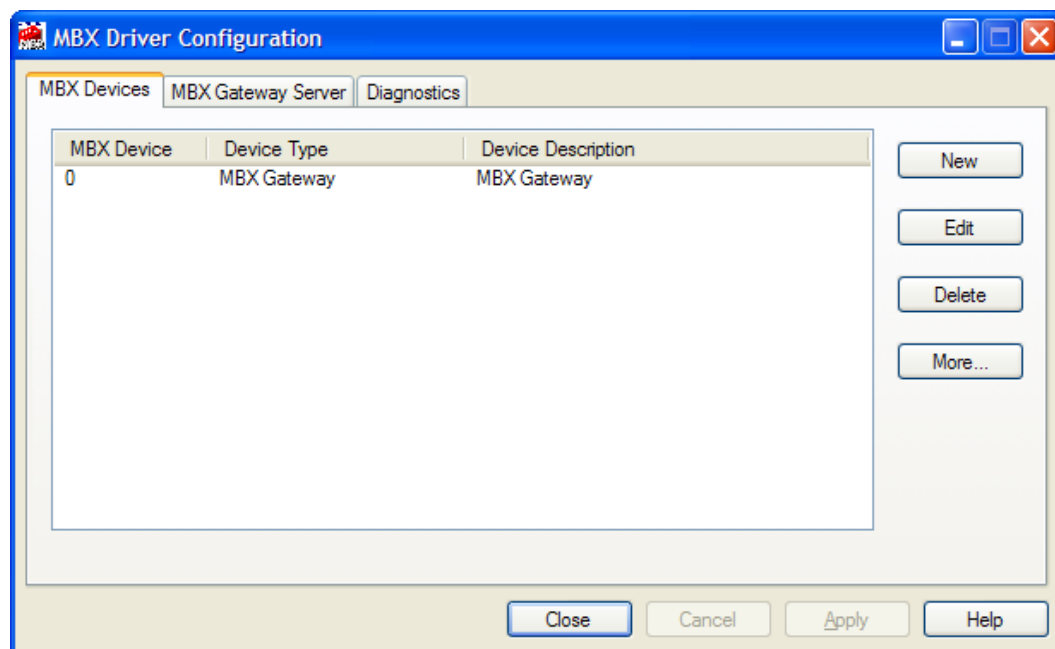
For the MBX Gateway Driver to work, the server system must have the MBX Gateway Server installed, running and properly configured. For details on how to do this, refer to the documentation for the MBX product that is installed on the server system.

2. In the **Server TCP Port** section, choose **Auto Detect**.
3. In the **Server MBX Device** section, select the MBX device number of the desired device on the MBX Gateway Server system.

Note

If you click the **Refresh** button while connected to the network, the list of devices will be updated, making it easier to identify the device you want to use. However, if you know the device number on the server system, you can select it without refreshing the list.

4. Click **OK** to return to the MBX Driver Configuration Editor.



Note

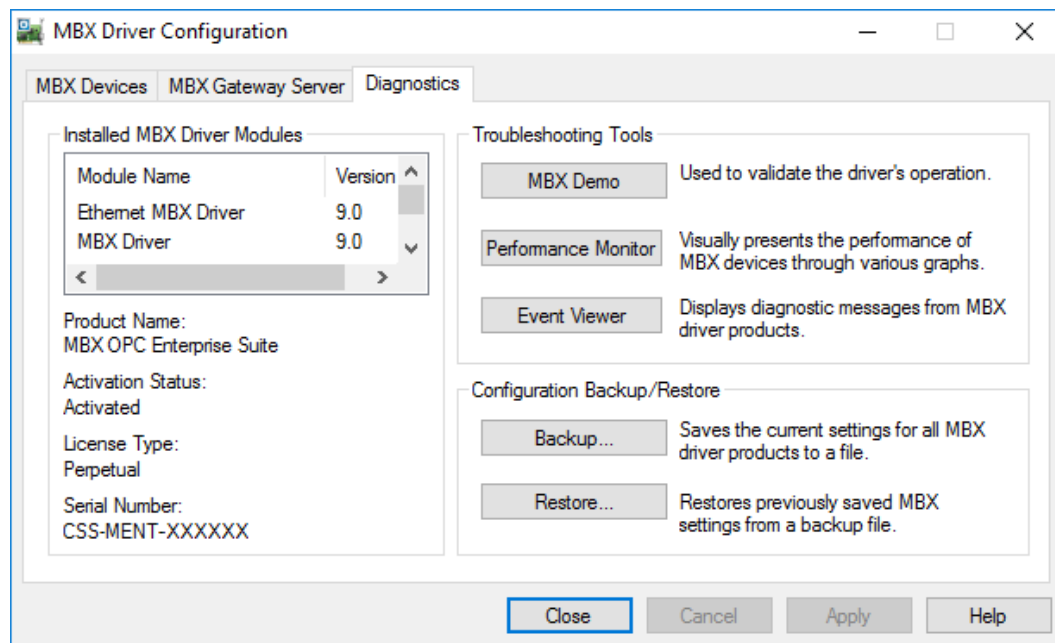
The number shown under MBX Device refers to the MBX Gateway device on this machine. It is not related to the device number of the MBX device on the server machine.

5. If you want to access more than one MBX device on the server system, you must repeat this procedure to create and configure another MBX Gateway device. You can also create MBX Gateway devices that connect to different MBX Gateway Servers.

To continue, proceed to the [Verifying Your Driver Configuration](#) section.

Verifying Your Driver Configuration

The Diagnostics tab features will help you to confirm that the driver is running and is properly configured. They will also provide important help in case troubleshooting or technical support is needed.



1. Select the **Diagnostics** tab.
2. The left pane of this screen shows all MBX components installed on your system. This information, including the version numbers, may be requested if you call for technical support.

This screen also tells you if the software has been activated or if it is running in the two-hour demo mode.

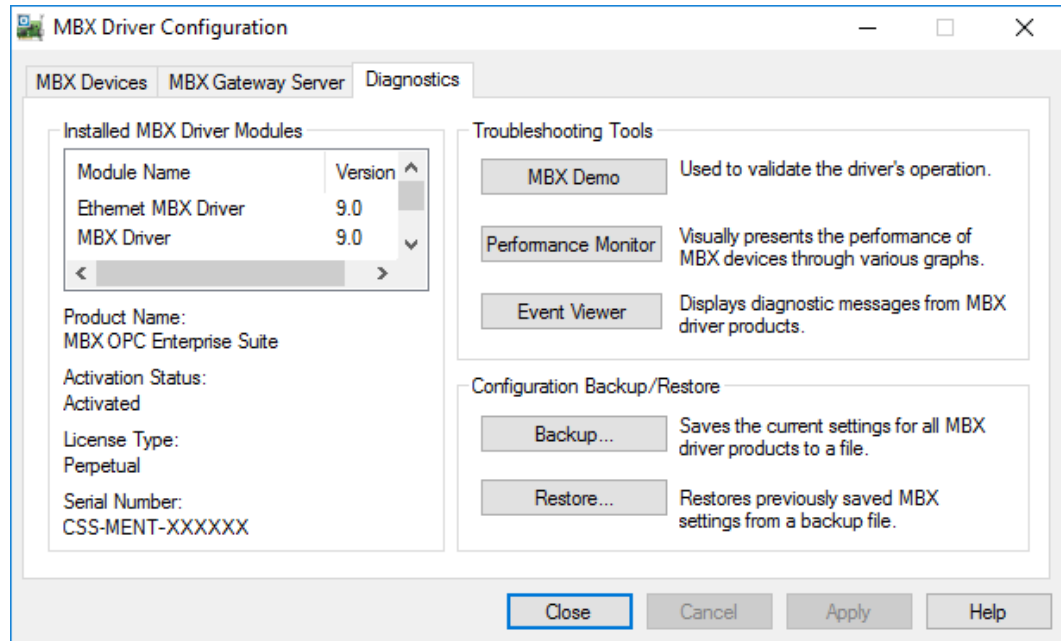
Caution! If you are running in demo mode, the MBX products will stop after two hours of operation and will resume after the system is restarted.

3. The right pane of the screen provides shortcuts to troubleshooting and backup/restore tools. Run the **MBX Demo** program after configuring the MBX Gateway Driver to verify that the driver is configured and running properly. Detailed instructions for running this utility are included in the [Validation & Troubleshooting](#) section.

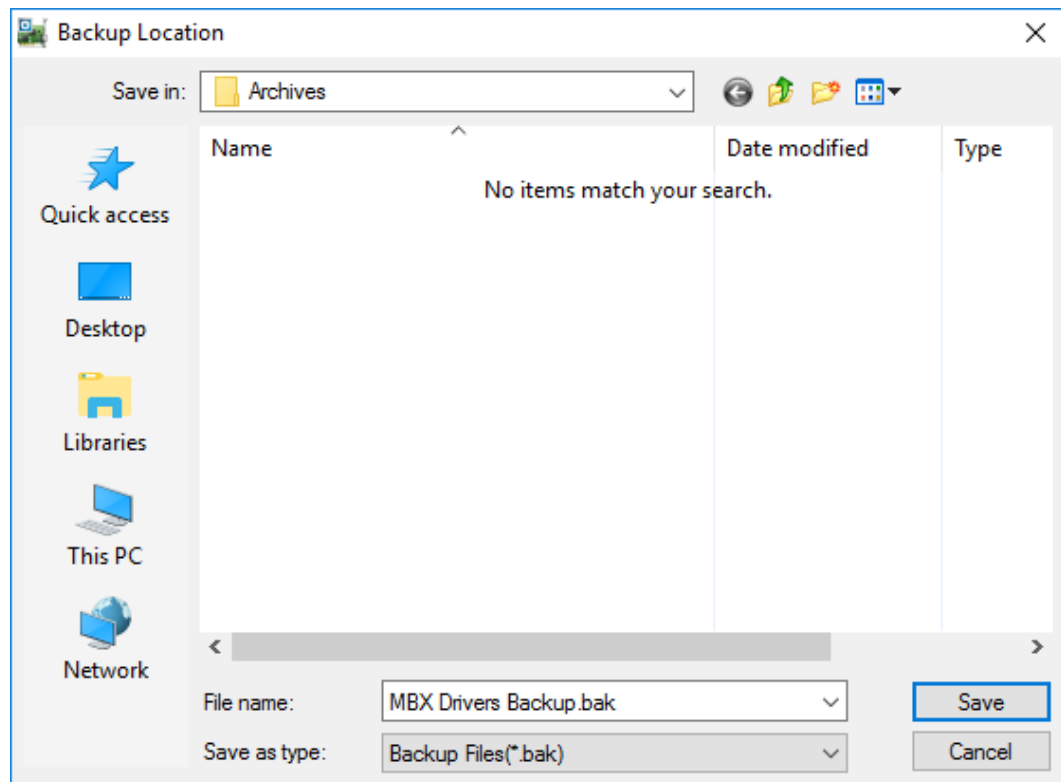
When you are satisfied that the driver is correctly configured, proceed to [Backing Up Your Configuration](#).

Backing Up Your Configuration

To protect the work that you put into configuring and testing the driver, we strongly recommend that you back up the configuration.



1. Select the **Diagnostics** tab of the MBX Driver Configuration editor.
2. Click the **Backup...** button.



3. Browse for the desired backup directory. By default, the last-used directory will be selected.

4. Enter the ***File name*** you want to use for your configuration backup file, and then click the ***Save*** button to complete the backup operation.

CONFIGURATION EDITOR REFERENCE

Before the MBX Gateway Driver can be used, it must be properly configured. The configuration procedure involves creating one or more MBX Gateway devices and configuring them to work with the MBX Gateway Servers on your network. An MBX Gateway device is a logical device that references a physical device on an MBX Gateway Server node. Your software applications will then use these logical devices to communicate over the network.

This section provides a detailed description of each of the configuration editor features. If you are a new user and want a procedure to guide you through a typical configuration session, refer to the [Quick-Start Guide](#).

To create an MBX Gateway device, you must run the [MBX Driver Configuration Editor](#) after you install the software. The MBX Driver Configuration Editor is a common component of all drivers in the MBX family.

When configuring an MBX Gateway device, the MBX Driver Configuration Editor automatically dispatches the [MBX Gateway Driver Configuration Editor](#).

MBX Driver Configuration Editor

The MBX Driver Configuration Editor is a common component of all drivers in the MBX family. It is used to create MBX devices, configure the MBX Gateway Server and provide access to diagnostic information and utilities. When you create or edit an MBX Gateway device, the MBX Driver Configuration Editor automatically dispatches the MBX Gateway Configuration Editor.

To start the MBX Driver Configuration Editor, open the Windows Start menu and go to the product suite you have installed. Next, open the Configuration submenu and select MBX Device Drivers.

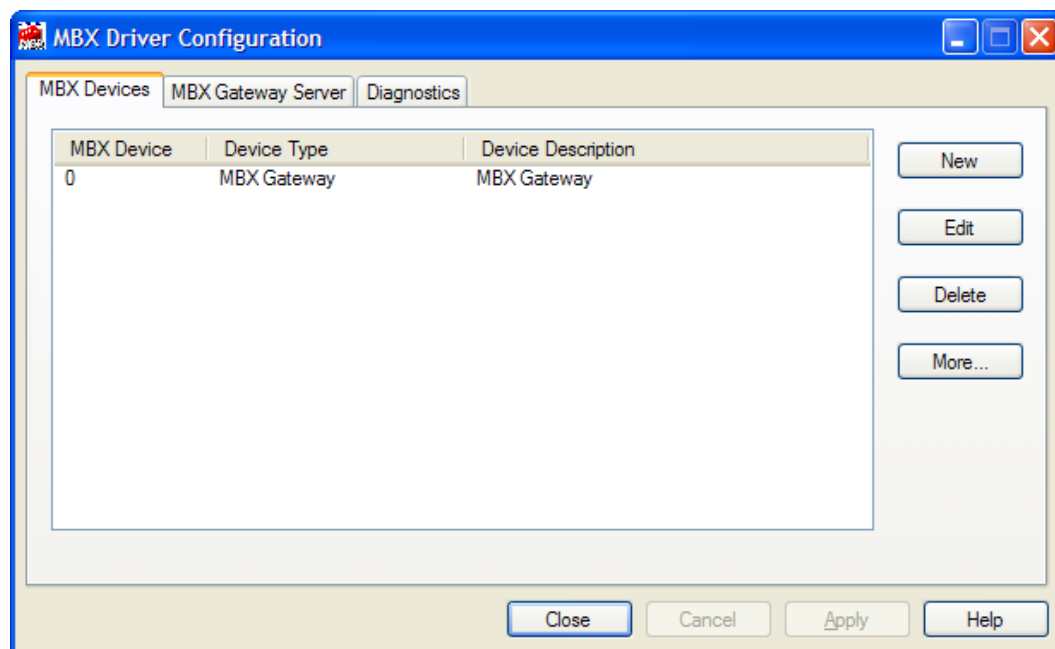
The MBX Driver Configuration Editor consists of three tabs:

- [MBX Devices Tab](#)
- [MBX Gateway Server Tab](#)
- [Diagnostics Tab](#)

The following sections provide complete descriptions of these tabs.

MBX Devices Tab

Every MBX device must be configured on the MBX Devices tab before it can be used by client applications. The MBX Devices tab lists all currently configured MBX devices in your system. The information is provided in three columns: MBX Device, Device Type and Device Description.



MBX Device

This column contains a device number that the editor assigns to every MBX device installed in the system. This is not the Modbus node address. By default, the editor will try to use consecutive numbers for the devices starting from 0. However, this is not a requirement.

Device Type

This column identifies the type of the MBX device, such as PCI-85, Ethernet MBX or MBX Gateway.

Device Description

This is a user-assigned text for device description. During device creation, a default description text will be assigned. Refer to the Changing the Device Description section, below, for information on how to modify this text.

The device description text has no effect on the MBX device operation. However, some applications using this device may be able to show this text.

New

Click this button to create a new MBX device.

Edit

Select an MBX device and click this button to edit it.

Delete

Select an MBX device and click this button to delete it.

More...

Select an MBX device and click this button for additional editing features. You can change the device type or edit the Device Description field.

Creating a New MBX Device

Click the **New** button or right-click inside the list window and select **New** from the context menu. Then select a host interface adapter or other device type from the drop-down list.

Upon selecting the device type, the MBX Driver Configuration Editor will automatically dispatch the configuration editor that is appropriate for that device.

Deleting an Existing MBX Device

Select the device and click the **Delete** button or right-click and select **Delete** from the context menu.

Editing an Existing MBX Device configuration

Select the device and click the **Edit** button or right-click and select **Edit** from the context menu. The MBX Driver Configuration Editor will automatically dispatch the appropriate device configuration editor. The screen that follows will depend on the type of device you selected.

Changing the Device Description

Select the device and click the **More...** button or right-click and select **Edit Description** from the context menu. Modify the device description and press the **Enter** key when you are done.

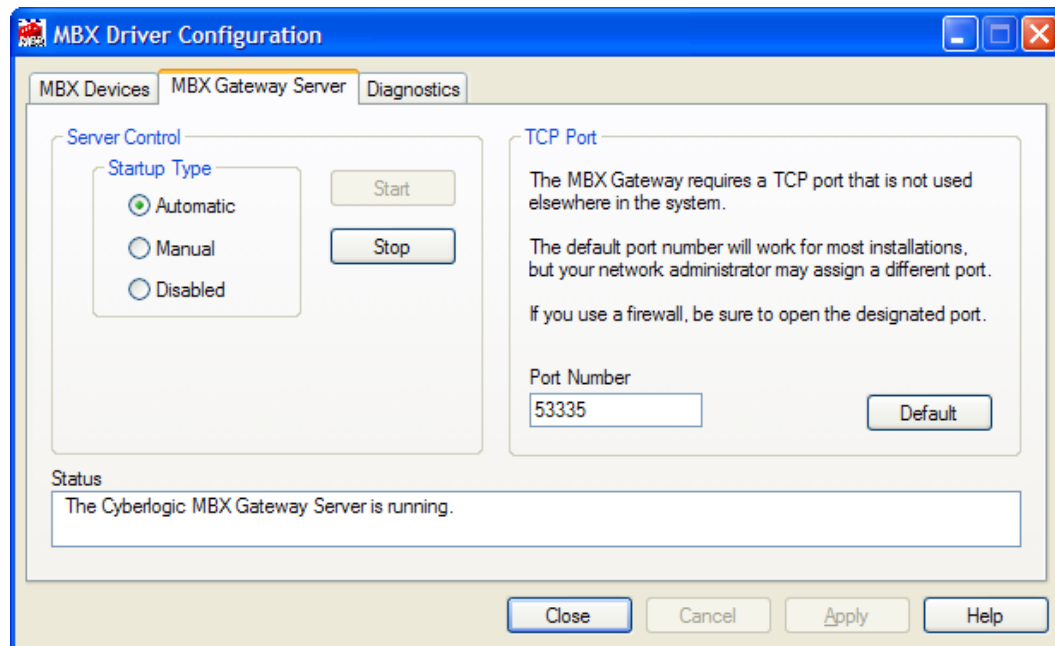
Changing the Device Type

Select the device and click the **More...** button or right-click and select **Change Type** from the context menu. From the drop-down list select the new device type for your MBX device. After you select the new device type, the MBX Driver Configuration Editor will automatically dispatch the appropriate device configuration editor. The screen that follows will depend on the device type selected.

MBX Gateway Server Tab

The MBX Gateway Server allows remote nodes to access all configured MBX devices present on the system that is running the MBX Gateway Server. To set up MBX Gateway

communication, the MBX Gateway Server must be running on the server system and the MBX Gateway Driver must be running on the client system.



Server Control

This section allows you to designate if and how you want the MBX Gateway Server to start.

Automatic

When this option is selected, the MBX Gateway Server will start when Windows boots.

Manual

When this option is selected, the MBX Gateway Server will not start when Windows boots, but you can control it manually using the Start and Stop buttons.

Disabled

When this option is selected, the MBX Gateway Server will not run.

Start

In Automatic or Manual mode, click this button to start the MBX Gateway Server.

Stop

In Automatic or Manual mode, click this button to stop the MBX Gateway Server.

Status

This tells you whether the MBX Gateway Server is running, stopped, starting or stopping.

TCP Port

The port used here must not be used elsewhere in the system. If your system uses a firewall, the port must be opened in the firewall configuration. For details, refer to the [Configuring the Firewall](#) section.

Port Number

Enter the number of the TCP port you wish to use.

Default

Click this button to restore the TCP port value to its default setting of 53335.

Selecting the Startup Type

If you want to use the MBX Gateway Server and want it to start whenever the system is booted, select **Automatic**. This is the recommended setting for systems that will use the Gateway Server.

If you want to use the MBX Gateway Server and want to control it manually, choose **Manual**. The Server will not start on boot-up; instead you must use the Start and Stop buttons to control it.

If you do not want to use the MBX Gateway Server, choose **Disabled**.

Start/Stop the Gateway Server

Click the **Start** or **Stop** button.

Selecting the TCP Port

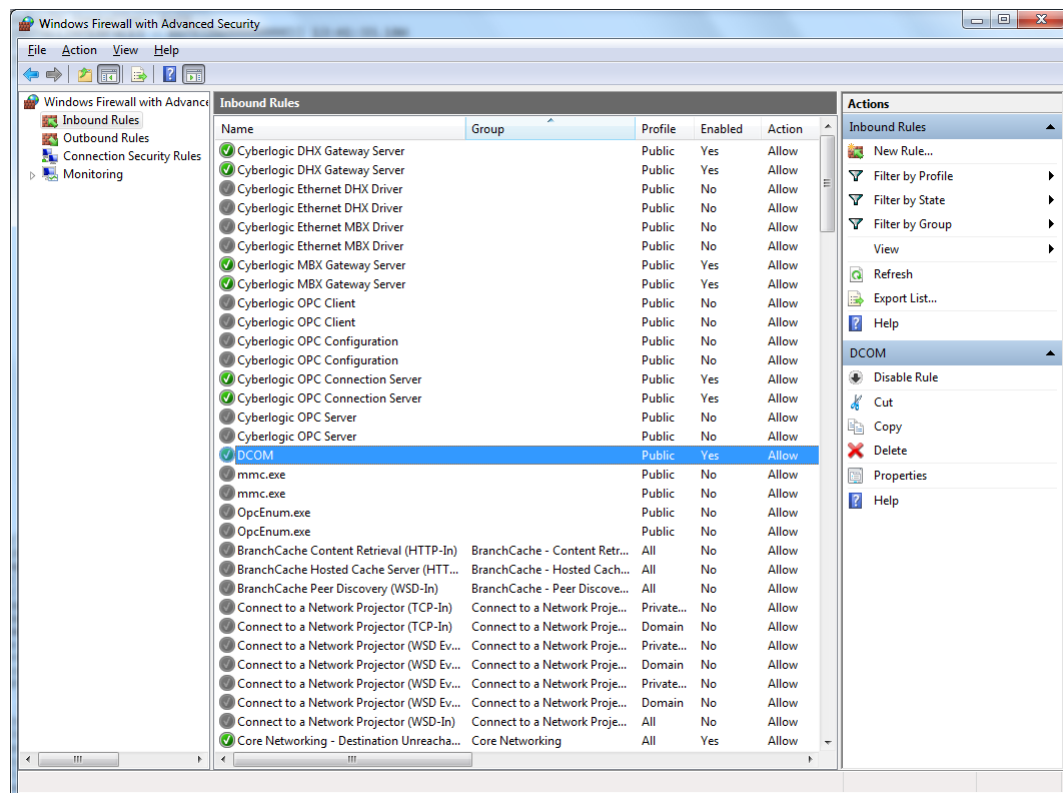
Enter the desired port number in the Port Number field.

You must enter a TCP port that is not used elsewhere in the system. The default, 53335, will work for most installations, but this port may be taken in some unusual cases. If that applies to your system, the system administrator will assign a different port.

Configuring the Firewall

If your system uses a firewall, you must configure it to permit MBX Gateway communication. The procedure shown here is for the Windows 7 firewall. The exact procedure for your system will depend upon the firewall you are using, but the issues are the same for all firewall types.

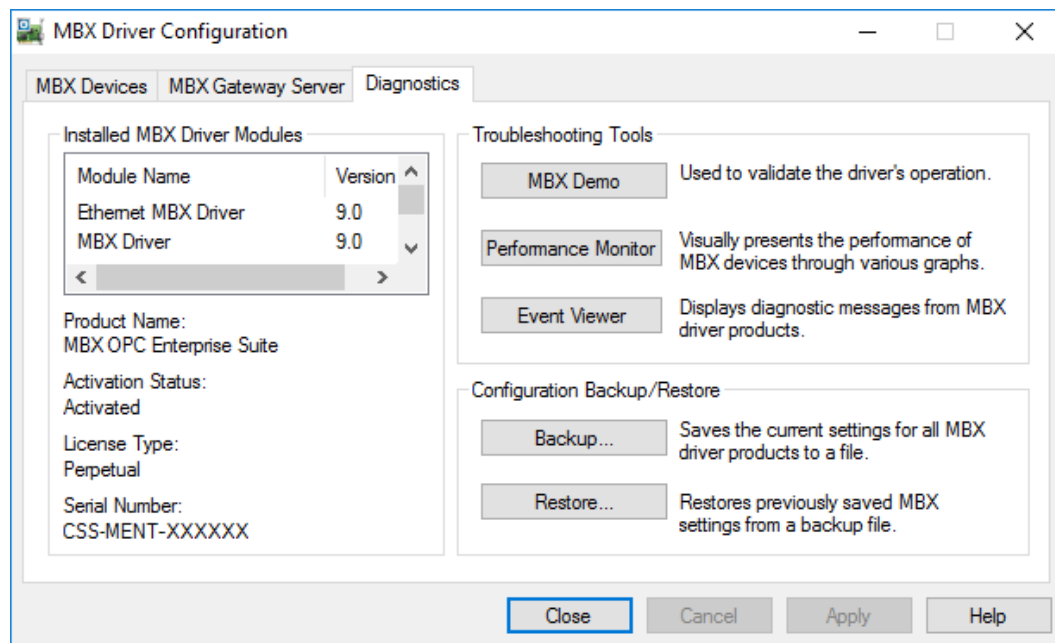
1. To configure Windows 7's firewall, go to **Control Panel** and open **Windows Firewall** and select **Advanced Settings**.



2. Select **Inbound Rules**.
3. Verify that the rules **Cyberlogic MBX Gateway Server** and **DCOM** are enabled. If not, enable them.
4. Close the window to exit.

Diagnostics Tab

The diagnostic features will help you to confirm that the driver is running and is properly configured. They will also provide important help if troubleshooting or technical support is needed.



Installed MBX Driver Modules

This area shows all MBX product components installed on your system, along with their version numbers. This information may be requested if you call for technical support. This screen also tells you if the software has been activated or if it is running in demo mode.

Product Name

MBX products are sold and installed as packaged suites, such as the MBX Driver Suite and MBX OPC Server Suite. This field indicates one of the MBX family suites that is installed on your system. For complete information on all installed Cyberlogic products go to the **Product Information** app accessible from the Windows **Start** menu.

Activation Status

Most Cyberlogic software products operate in a time-limited demonstration mode until they are activated. This field tells you whether or not the installed product has been activated.

If your product requires activation, run the **Activation** wizard, which you will find in the Windows **Start** menu under **Cyberlogic Suites**. You will need the serial number and password that were assigned when you purchased your license for the software.

Note Some OEM versions of MBX products are pre-activated and do not require you to take any additional activation steps.

License Type

This field shows the licensing mode that the software is operating under. If the type displayed is *2 Hour Demo*, the software will run for only two hours at a time, after which you must restart the system to obtain another two hours of use. To enable continuous, uninterrupted operation, you must activate the software.

Serial Number

If you have activated the software by entering the serial number and password, the serial number used will be shown here. This will help you to determine which license goes with which of your systems.

Troubleshooting Tools

The Troubleshooting Tools group provides shortcuts to diagnostic tools that will help you to verify that your drivers are operating as expected. In case of communication problems, these tools will help in the diagnosis.

For details on how to use these tools, refer to the [Validation & Troubleshooting](#) section.

MBX Demo

Run this program after configuring the driver to confirm that it is configured correctly and running properly.

Performance Monitor

Click this button to launch the Windows Performance Monitor, which will allow you to observe numerous performance parameters in graphical form.

Event Viewer

In case of communication difficulties, the Windows Event Viewer may provide error messages to guide you in troubleshooting problems.

Configuration Backup/Restore

The Backup... and Restore... buttons in this group can be used to backup and restore configurations of all MBX driver products on your system.

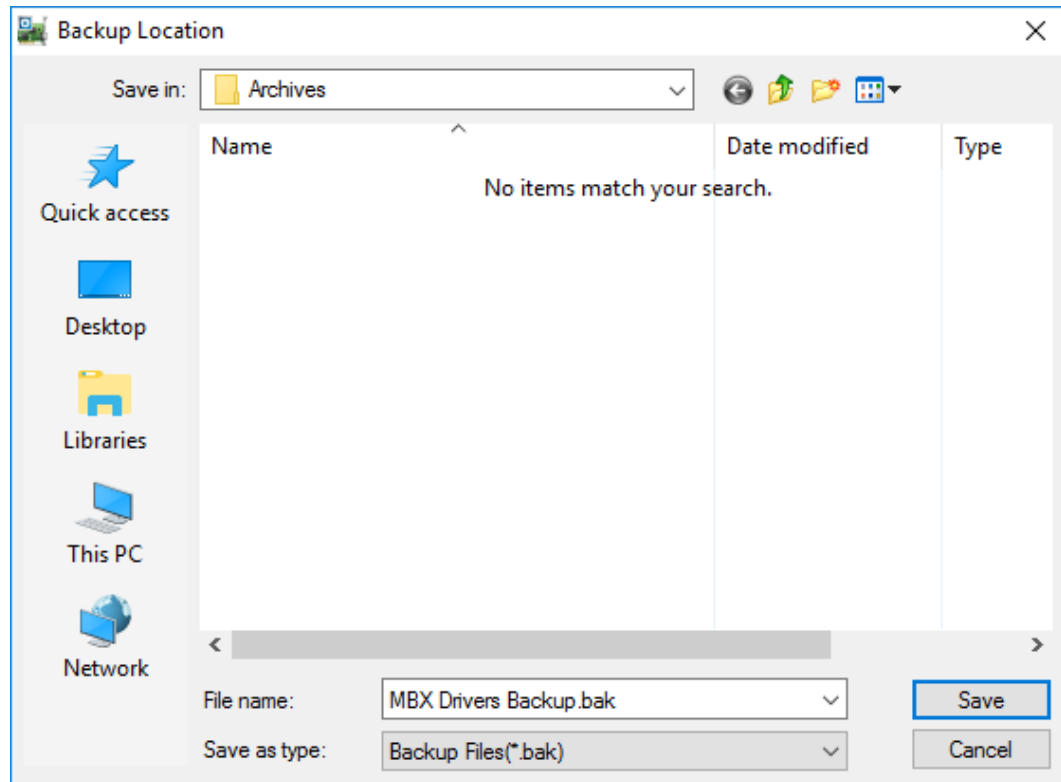
Note

We strongly recommend that you backup your configuration data after the initial configuration and that you maintain up-to-date backups after every configuration change.

Backup Configuration

Use this procedure to backup your configuration.

1. Click the **Backup...** button.

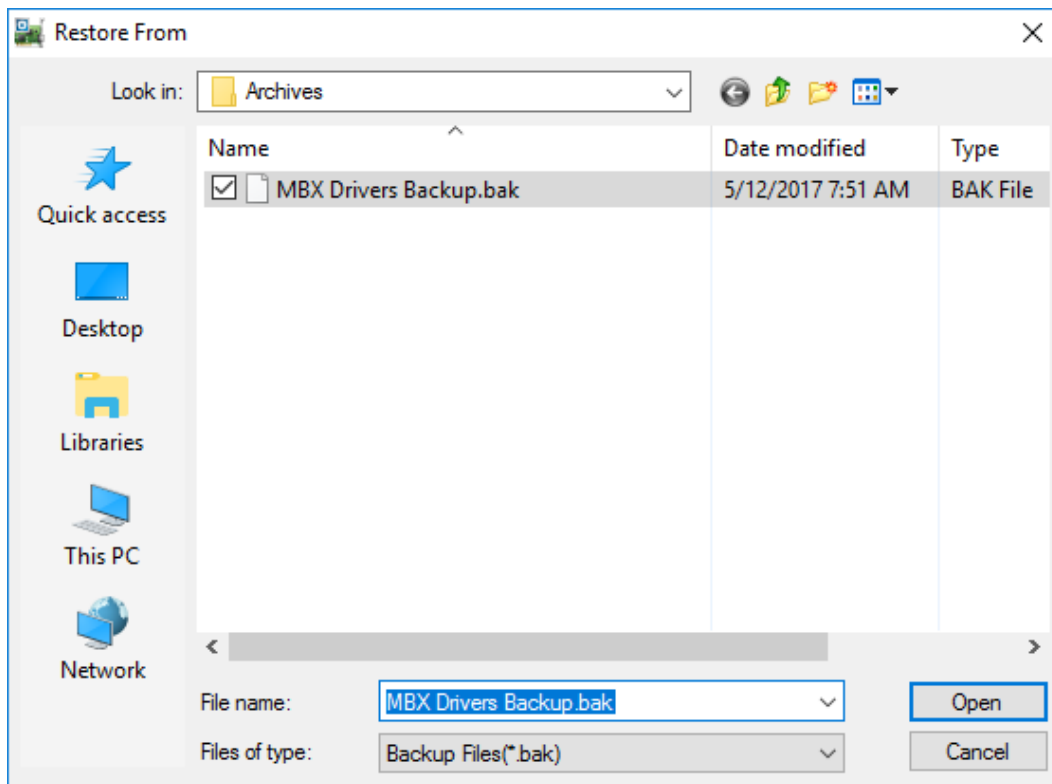


2. Browse for the backup directory. By default, the last-used directory will be selected.
3. Enter the **File name** you want to use for your configuration backup file, and then click the **Save** button to complete the backup operation.

Restore Configuration

To restore a configuration that was previously backed up, use this procedure.

1. Click the **Restore...** button.



2. Browse for your configuration backup file. By default, the last used directory will be selected.
3. Select the backup file and click the **Open** button to complete the restore operation.

Caution!

After you finish restoring the configuration, restart the system to ensure proper operation of the restored devices.

Configuration Backup/Restore Utility

The MBX driver products also provide a utility program, CIMbxCfg.exe, that you can use to backup and restore MBX device configurations. The program is located in the \Program Files\Common Files\Cyberlogic Shared\ directory.

The utility accepts the following command line switches:

<i>/Save FileName</i>	Save configuration
<i>/Restore FileName</i>	Restore configuration
<i>/Q</i>	Quiet operation (No error or warning messages)
<i>/?</i>	Help
<i>/H</i>	Help

For example, to backup the configuration of all MBX devices to a file named MbxCfg.bak, located in the directory C:\Program Files\Common Files\Cyberlogic Shared\, use the following command line:

>CIMbxCfg /Save C:\Program Files\Common Files\Cyberlogic Shared\MbxCfg.bak

To restore the configuration that the previous command saved, use the following command:

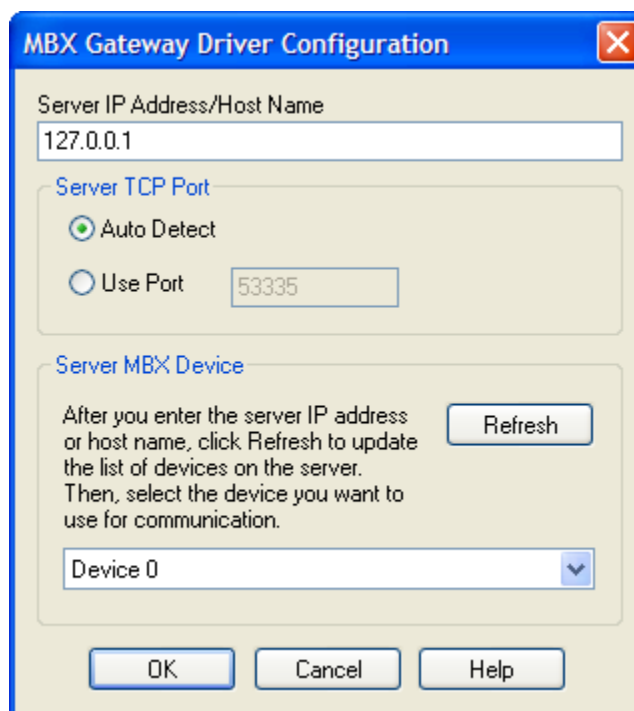
>CIMbxCfg /Restore C:\Program Files\Common Files\Cyberlogic Shared\MbxCfg.bak

You can use different file names to maintain different versions of your backups. However, for most users, a single backup is sufficient.

MBX Gateway Driver Configuration Editor

When editing MBX Gateway devices, the MBX Driver Configuration Editor dispatches the MBX Gateway Driver Configuration Editor.

The MBX Gateway Driver Configuration Editor consists of a single dialog box.



Server IP Address/Host Name

This field allows you to identify the MBX Gateway Server system that this MBX Gateway device will use for communications. You may enter either the IP address of the server or its host name.

Server TCP Port

This is the TCP port that the Gateway Server system will use. Most users should choose **Auto Detect**.

Caution!

For Auto Detect to work correctly, you must configure the Windows firewall on the MBX Gateway Server system to open port 135. The installation program adds this port to the firewall exceptions list, under the name DCOM. For security reasons, it does not check the box to enable the exception. You must do so manually.

In some unusual cases, it may be preferable to select **Use Port** and specify the correct port.

Server MBX Device

This section allows you to specify the MBX device number of the desired device on the MBX Gateway Server system.

As an example, suppose the server has two interface adapters: Device 0 is a PCIe-85 and Device 1 is an TSXCUSBMBP. To access the PCIe-85 card, you must enter **0** in this field. To access the TSXCUSBMBP, you must enter **1**.

Note

If you click the **Refresh** button while connected to the network, the list of devices will be updated, making it easier to identify the device you want to use. However, if you know the device number on the server system, you can select it without refreshing the list.

VALIDATION & TROUBLESHOOTING

The following sections describe how the [MBX Demo](#) and [Performance Monitor](#) are used to verify that the MBX devices are configured correctly.

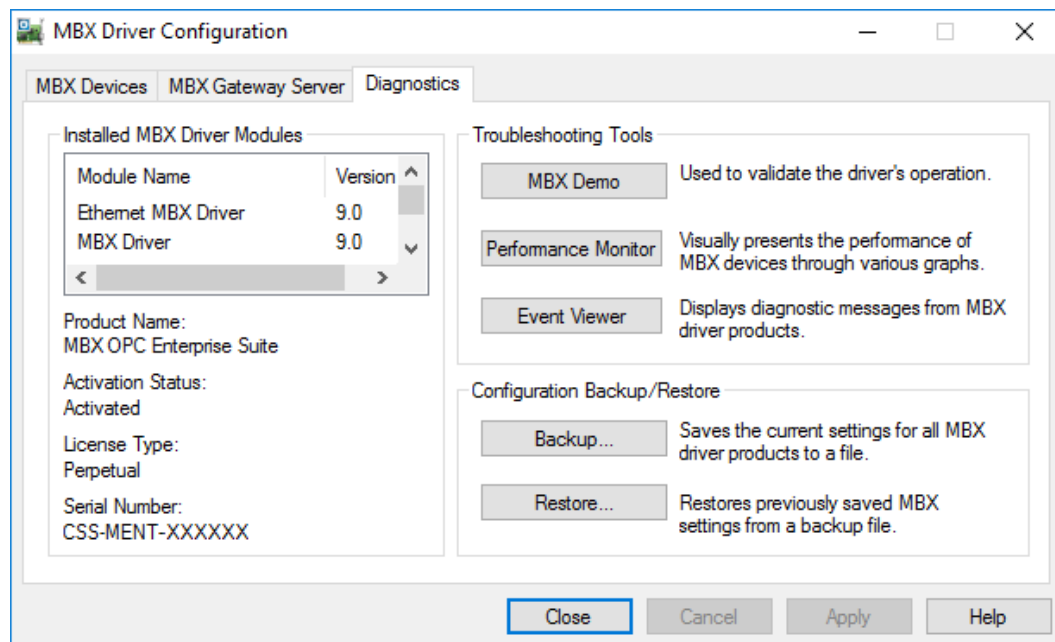
If you are not sure if your Modbus Plus adapter card supports Peer Cop, the [Determining Peer Cop Support](#) section will tell you how to find out.

If you are having difficulties communicating, the troubleshooting sections can help you determine the nature of the problem. Included is a description of the [Event Viewer](#) along with sections for [MBX Gateway Driver Messages](#) and [Frequently Asked Questions](#).

MBX Demo

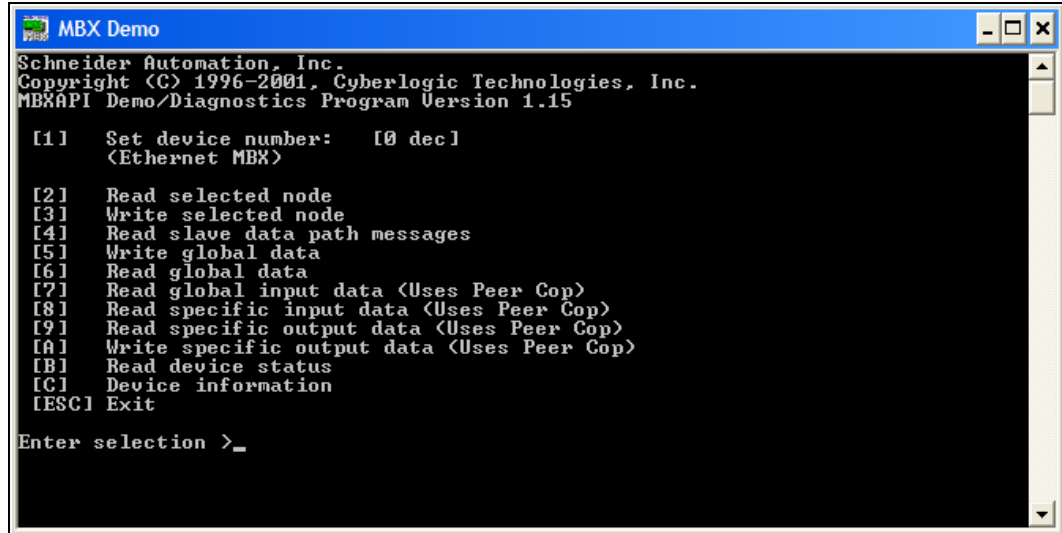
The MBX Demo program can be used to test all configured MBX devices in a system for proper operation. To run the program, open the Windows **Start** menu and locate the product suite you have installed. From there, go to **Diagnostics** and select **MBX Demo**.

Alternatively, open the **MBX Driver Configuration Editor**, go to the **Diagnostics** tab and click **MBX Demo**.



Main Menu

The MBX Demo will quickly access all available features of the configured MBX devices in your system, allowing you to verify their operation.

A screenshot of a Windows-style window titled "MBX Demo". The window contains a text-based menu with the following options:

```
Schneider Automation, Inc.  
Copyright (C) 1996-2001, Cyberlogic Technologies, Inc.  
MBXAPI Demo/Diagnostics Program Version 1.15  
  
[1] Set device number: [0 dec]  
    (Ethernet MBX)  
[2] Read selected node  
[3] Write selected node  
[4] Read slave data path messages  
[5] Write global data  
[6] Read global data  
[7] Read global input data (Uses Peer Cop)  
[8] Read specific input data (Uses Peer Cop)  
[9] Read specific output data (Uses Peer Cop)  
[A] Write specific output data (Uses Peer Cop)  
[B] Read device status  
[C] Device information  
[ESC] Exit  
  
Enter selection >_
```

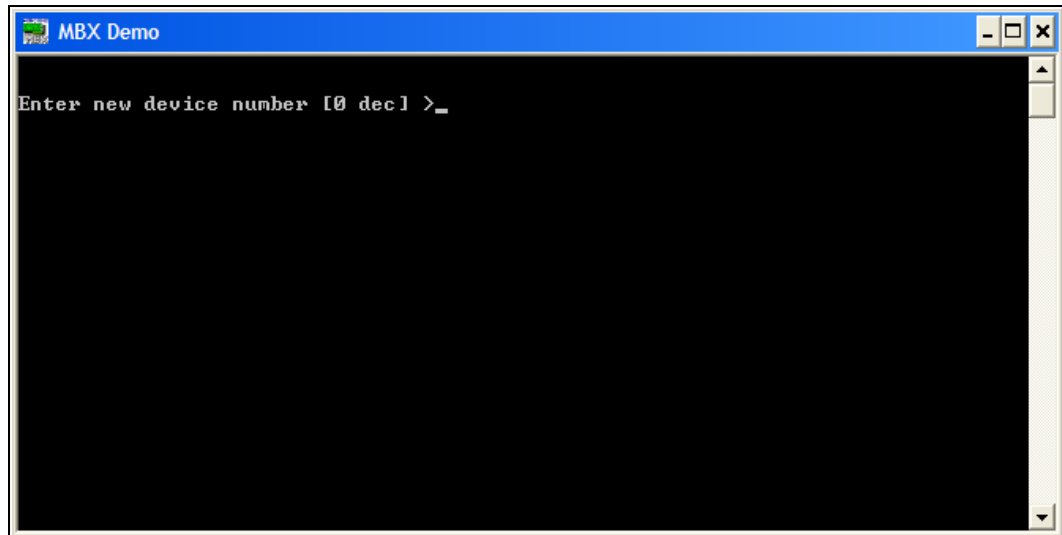
The simple command-line interface mimics earlier tools familiar to most users. It displays menu choices that take the user to secondary level screens.

Press **Esc** at any screen to return to the main menu shown above.

Press **Esc** in the main window to exit the program.

[1] Set Device Number

When the MBX Demo program starts, the device number defaults to 0. To change it, press **1**.

A screenshot of the "MBX Demo" window showing the prompt for setting a device number:

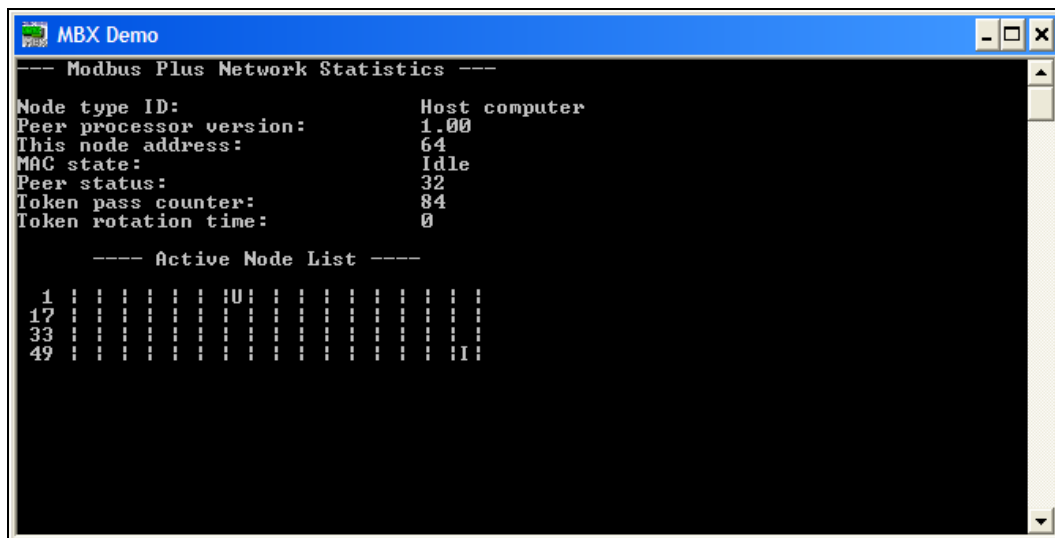
```
Enter new device number [0 dec] >_
```

At the prompt, enter the desired device number and press the **Enter** key to change the selected device and return to the main menu.

Verify that the device type shown on the main menu matches the type you configured for the selected device number.

[B] Read Device Status

From the main menu, press **B**. This launches the device status screen, which shows all active nodes on the network.



In the Active Node List grid, the letter I designates the node you are working from and the letter U designates other nodes found on the network.

Note The nodes shown here will depend on the configuration of the device on the server system.

For example, if you are connecting to an Ethernet MBX device, only nodes that were configured using the mapped addressing technique will be shown here. If you have not configured mapped addressing, the only node you will see here is the one you are working from.

As another example, if the device on the server is a Serial MBX master, you will see only the nodes that are configured as active.

Verify that all expected nodes are shown and that the node addresses are correct, then press **Esc** to return to the main menu.

[C] Device Information

From the main menu, press **C** to launch the Device information screen.

```

C:\Program Files\Common Files\Cyberlogic Shared\MbxDemo.exe
Device Type:          TCP/IP Device   Network Protocol:    TCP/IP
Device Number:       0                Baud Rate:          10.000000 Mbps
Memory Address:      N/A              Bus/Interface Type: N/A
Port Address:        N/A              Bus Number:         N/A
Interrupt IRQ:       N/A              Slot Number:        N/A
Polling Interval:    N/A              Supports Peer Cop:  No
Max Nodes:           256              Peer Cop Enabled:   No
Node Address:        64                Watchdog Timer:     Disabled

Device Status:       On-Line          Total Dev Driver Calls: 275
Device Open Count:   1                Total Error Calls:    0
DM Open/Active Count: 0/0          PM Open/Active Count: 0/0
Total DM Cmd Packets: 0                Total PM Cmd Packets: 0
Total DM Reply Pkt's: 0                Total PM Reply Pkt's: 0
Total DM Cmd Timeouts: 0              Total PM Cmd Timeouts: 0
DS Open/Active Count: 0/0          PS Open/Active Count: 0/0
Total DS Cmd Packets: 0                Total PS Cmd Packets: 0
Total DS Reply Pkt's: 0                Total PS Reply Pkt's: 0
Total Lost DS Cmd's: 0                Total Lost PS Cmd's: 0
Tot/Active Glb Data RD: 0/0          Tot/Active Glb Data WR: 0/0
Tot/Active Spec Inp RD: 0/0          Tot/Active Spec Out WR: 0/0
Pending I/O Req's:   0                Active Dev Stat Req's: 0
Total/Lost Interrupts: 0/0          Total Dev Stat Req's: 0
Total XMT Packets:   0                Total Device Faults:  0
Total RCU Packets:   0                Last Crash code:     0x0
    
```

This screen shows configuration, statistical and diagnostic information about the driver, the device and the network.

After viewing the information, press **Esc** to return to the main menu.

[2] Read Selected Node

To read data from registers on a specific node, press **2**.

```

MBX Demo
Enter routing path (e.g. 25.1.34.16) >7
Enter reference value (e.g. 40001) >40001
Enter length (e.g. 10) >5
    
```

Enter the **routing path** of the node you want to read from. This may be an IP address, a Modbus routing path or node number, depending on the type of network. For more details, refer to the MBX Demo documentation for the device type you are connecting to on the server.

The **reference value** is the register address of the data you want to read. If you want to read from more than a single register, enter the first register's reference value.

The **length** is the number of consecutive data items you want to read.

In the example shown, we want to read from the device at node 7, and will read five registers beginning with 40001, that is, registers 40001 – 40005.

Press **Enter** to initiate the read. The requested data will be displayed on the screen. Press **Esc** to return to the main menu.

Other Operations

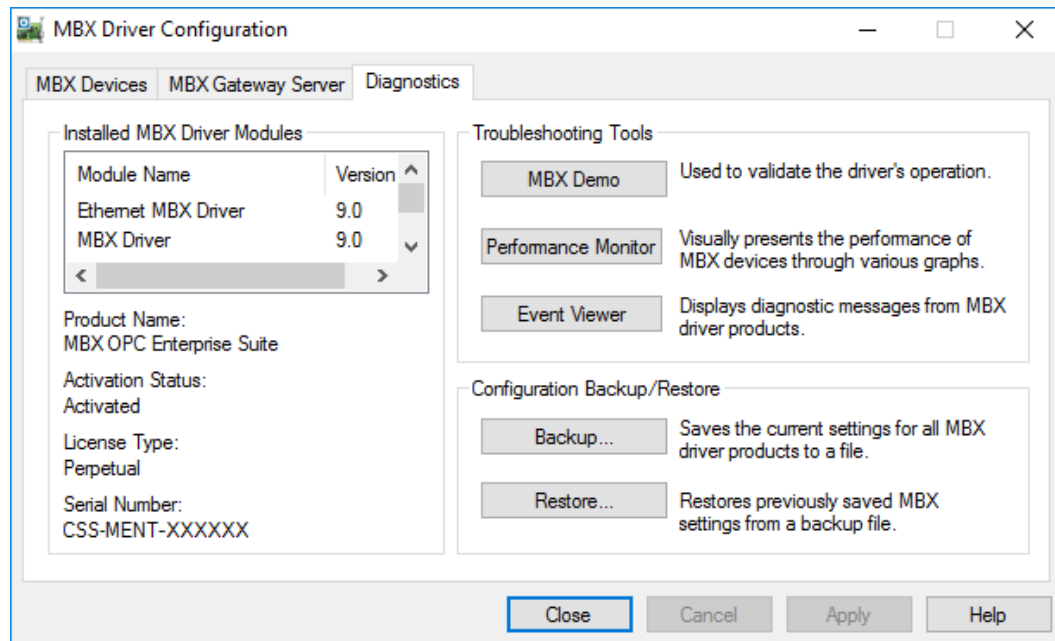
The rest of the functions available on the main menu will perform read and write operations in a manner similar to the Read Selected Node function.

Performance Monitor

Microsoft provides a diagnostic tool, the Performance Monitor, as part of the Windows operating system. Applications supporting the Performance Monitor, including the MBX driver family, allow users to monitor relevant performance information. Multiple devices can be monitored simultaneously for comparison.

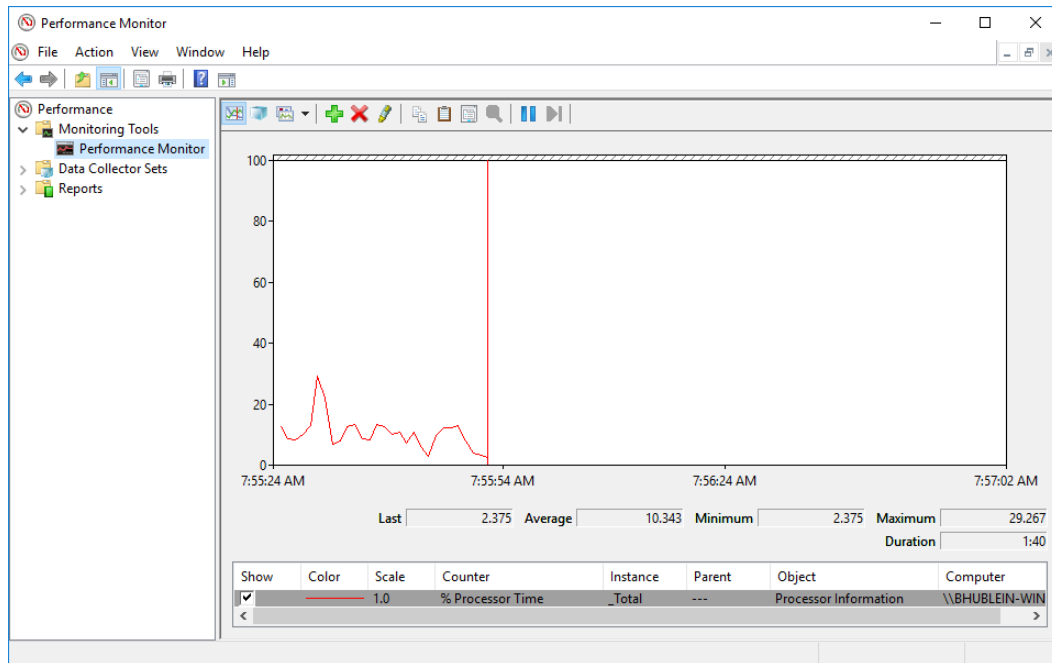
To run the program, open the Windows **Start** menu and locate the product suite you have installed. From there, go to **Diagnostics** and select **Performance Monitor**.

Alternatively, go to the Diagnostics tab of the MBX Driver Configuration Editor and click the **Performance Monitor** button.



How to Use the Performance Monitor

Since extensive help is provided for this program by Microsoft, only a few points relevant to the MBX Driver family are shown here.



1. When the Performance Monitor program starts, click the **+** button on the tool bar.

Available counters

Select counters from computer:

<Local computer> Browse...

- Cyberlogic CLX Devices
- Cyberlogic MBX Devices
 - Device Driver Calls/sec**
 - Device Open Count
 - Device Statistics/sec
 - DM Path Command Packets/sec
 - DM Path Reply Packets/sec
 - DS Path Command Packets/sec
 - DS Path Reply Packets/sec

Instances of selected object:

- <All instances>
- Device0
- Device1

Search: [] Search

Add >>

Added counters

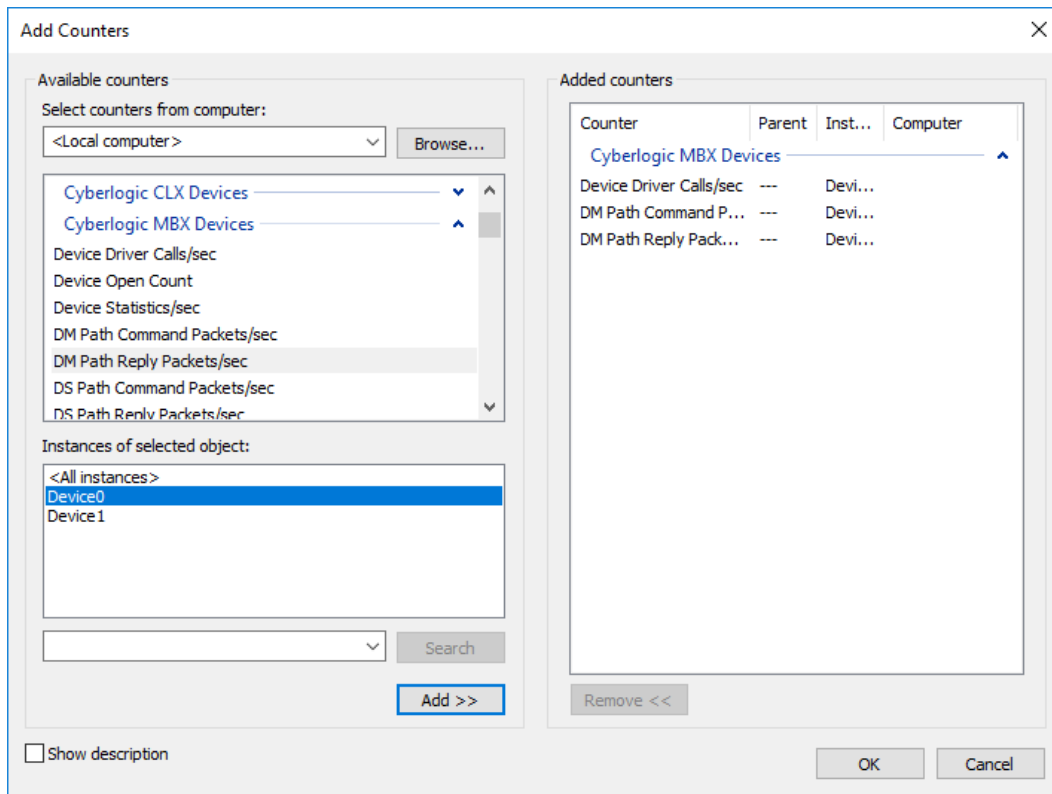
Counter	Parent	Inst...	Computer
---------	--------	---------	----------

Remove <<

Show description

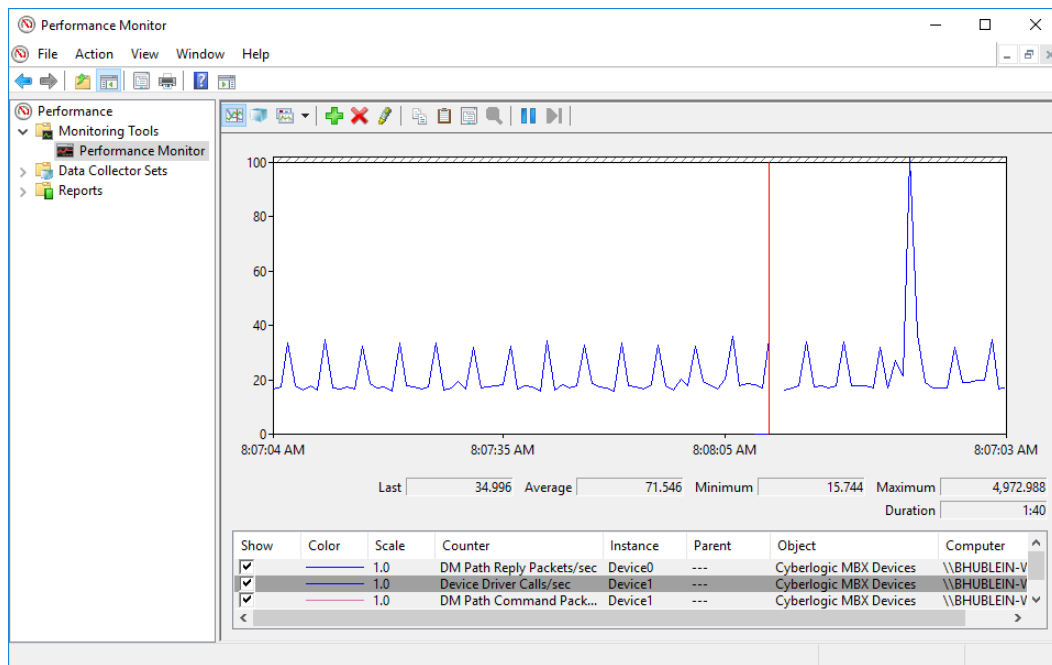
OK Cancel

2. Select **Cyberlogic MBX Devices** from the **Available counters** list.



3. Choose a counter and the MBX device, and then click **Add**. Repeat this for all the counters you want to view.

4. Click **OK**. The counters you chose will then be displayed in graphical format.



Determining Peer Cop Support

Peer Cop support is available only on Modbus Plus networks. If your MBX Gateway device is mapped to a Modbus Plus adapter on the server system, you can determine if Peer Cop is supported by following these steps.

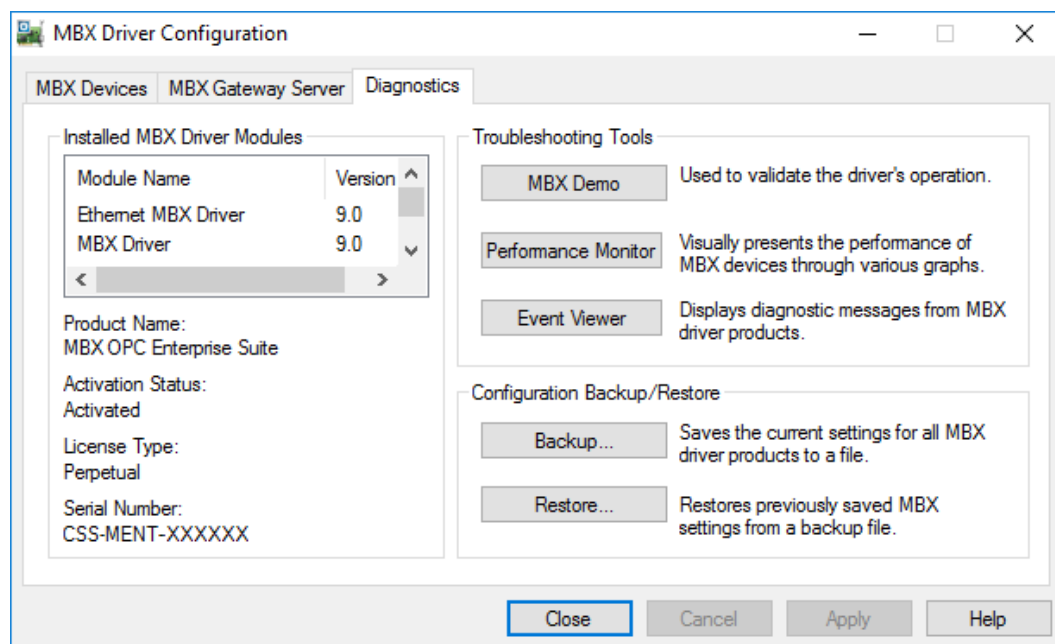
Note You may use the following procedure to determine if Peer Cop is supported even if Peer Cop was not enabled during the board configuration.

1. Start the [MBX Demo](#) program.
2. Select the **[1] Set device number** option and enter the device number of your card.
3. Select the **[C] Device information** option.
4. Locate the **Supports Peer Cop** field. If this field reports Yes, then your card supports Peer Cop. If No, then your card does not support Peer Cop.

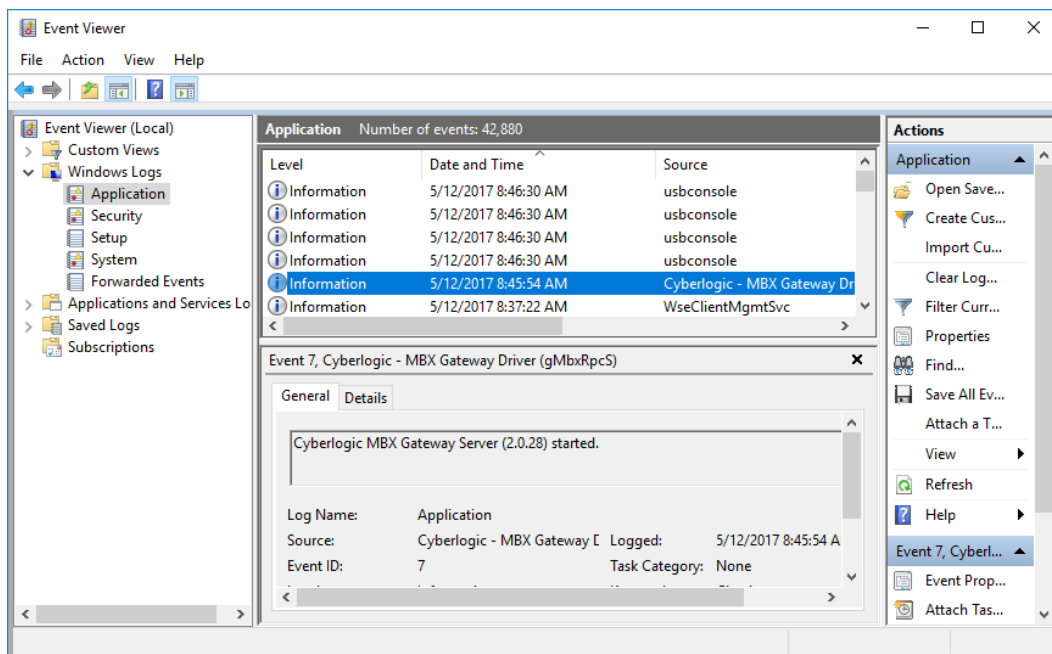
Event Viewer

During startup and operation, the MBX drivers may detect problems or other significant events. When a noteworthy event is detected, the driver sends an appropriate message to the Windows Event Logger. You can view these messages using the following procedure.

1. Open the Windows **Start** menu and locate the product suite you have installed. From there, go to **Diagnostics** and select **Event Viewer**.



Alternatively, click the **Event Viewer** button on the Diagnostics tab of the MBX Driver Configuration Editor.



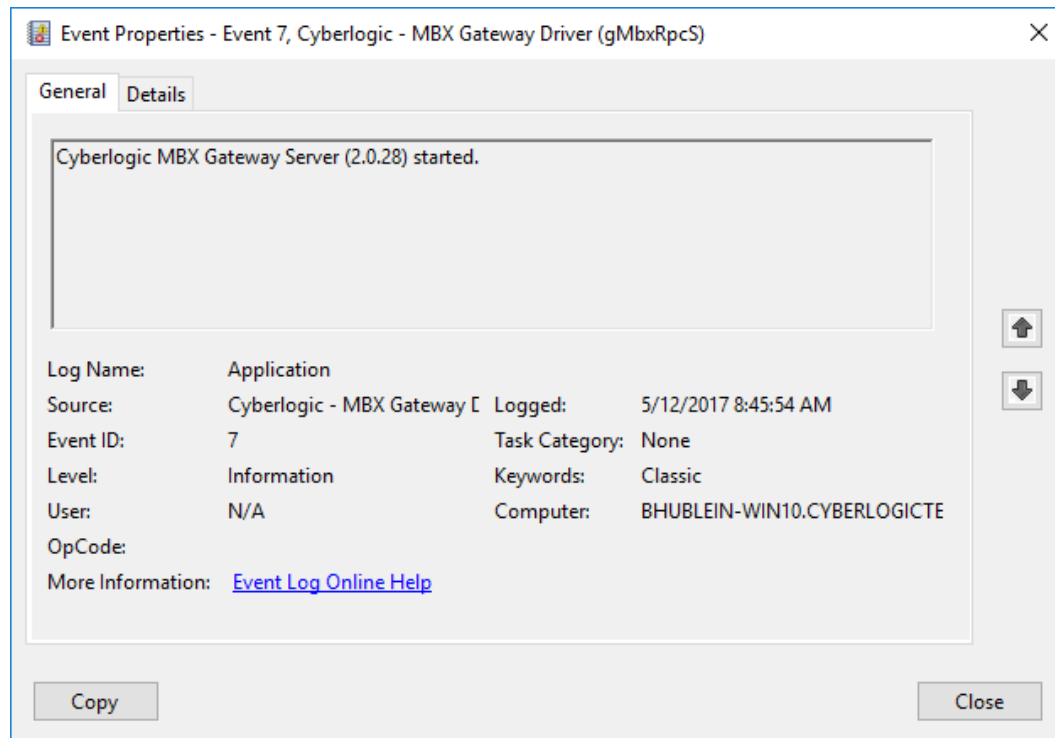
2. If you are looking for events relating to the MBX Driver, select the **Windows Logs | Application** branch from the Event Viewer tree, and look for entries in the **Source** column named **Cyberlogic – MBX Gateway Driver (gMbxRpcS)**.

For other types of events, select the Application branch from the Event Viewer tree, and look for entries in the **Source** column that begin with **Cyberlogic**.

Caution!

The Event Viewer does not clear itself after rebooting. Check the time stamps of the messages to be sure that you are not looking at an old error message.

3. Double-click on the desired entry to display a complete event message.



MBX Gateway Driver Messages

GMBXAPIM.DLL failed to load. Reinstall the product.

A necessary DLL could not be loaded. This may indicate a corrupted installation. Repair the existing installation or remove and reinstall the software.

Cyberlogic MBX Gateway Server is already running!

The driver could not start because another copy of it is already running.

Cyberlogic MBX Gateway (<Version Number>) started.

The driver successfully started. The driver's version number may be requested if you call Cyberlogic Tech Support.

Registration DLL failed to load. The I/O operations of the MBX Gateway have been disabled. Reinstall the product.

A necessary registration DLL could not be loaded. This may indicate a corrupted installation. Repair the existing installation, or remove and reinstall the software.

Product license verification failed. The I/O operations of the MBX Gateway have been disabled. Reinstall the product.

A registration check indicated that the software's evaluation time has expired. Run the Activation Wizard to authorize further use of the software.

This is a <Number of Hours>-hour promotional copy of the MBX Gateway. The application started at <Start Time> and the driver will stop at <Stop Time>.

This is a time-limited installation of the software. After the stop time, the driver will not allow any further I/O operations.

This is a promotional copy of the MBX Gateway. The allowed operation time has expired. The I/O operations of the MBX Gateway have been disabled.

This is a time-limited installation of the software. The stop time has been reached or exceeded, so the driver will not allow any further I/O operations.

The Cyberlogic License Server failed to respond with valid license information. The I/O operations of the MBX Gateway have been disabled. Contact the manufacturer's technical support.

The driver experienced a problem when it tried to contact the Cyberlogic License Server. If the license server is not running, start it and then try restarting the driver. If the license server is already running, contact Cyberlogic Tech Support.

Frequently Asked Questions

I've installed the software. What's next?

The next step is to create one or more MBX Gateway devices and configure each to work with an MBX Gateway server on your network. Refer to the [Quick-Start Guide](#) section. After this is done, run the [MBX Demo](#) to test the driver.

I've configured an MBX Gateway device. How do I know that it's working?

To test the MBX Gateway device, there are two options in the Validation & Troubleshooting section. First use the [MBX Demo](#) to confirm that the device is operating properly, and then use the [Performance Monitor](#) as a benchmark reference.

I have configured my MBX Gateway device. However, when I try to do any Peer Cop related I/O requests, I get an error. What's the problem?

The adapter card on the MBX Gateway Server may not support Peer Cop. (Early versions of Modbus Plus host interface adapter cards do not support Peer Cop.) To see if your device supports Peer Cop, refer to the [Determining Peer Cop Support](#) section.

In MBX Demo, when I select "Read Device Status" or "Device Information," I

get an error that says "There are no more bindings (Error code 2)."

The MBX Gateway Driver could not find the specified MBX Gateway Server. There is probably an incorrect MBX Gateway Server IP Address/Host Name or Device Number. Refer to the [MBX Gateway Driver Configuration Editor](#) section for details on finding and entering this information.

In MBX Demo, when I select "Read Device Status" or "Device Information" I get an error that says "The system cannot find the file specified (Error code 1806)."

Cause 1

Make sure that at least one MBX Gateway device has been configured. If not, refer to [Quick-Start Guide](#) for details on setting up an MBX Gateway device.

Cause 2

The MBX Gateway Driver could not find the MBX device specified under Server MBX Device at the MBX Gateway Server node. Refer to [MBX Gateway Driver Configuration Editor](#) for details on finding and entering this information.

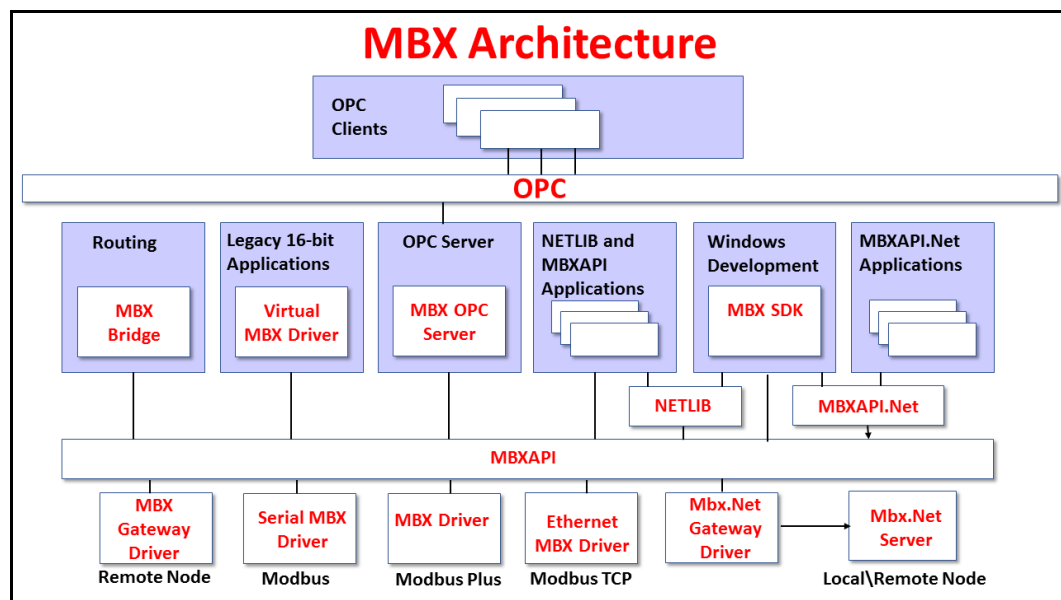
I have two MBX Gateway devices configured in the system. How do I communicate through the second one?

MBX Demo uses the device number to determine which card to use. [1] *Set Device Number* lets you choose which configured MBX Gateway device the demo will use. If you are using some other software product, contact the manufacturer for more information on using multiple devices.

APPENDIX: MBX ARCHITECTURE AND COMPANION PRODUCTS

The MBX Gateway Driver is part of the Cyberlogic MBX family. This family consists of several well-integrated components that provide connectivity for Modicon's Modbus, Modbus Plus and Modbus TCP (Ethernet) networks in distributed environments.

This section illustrates the layout of the MBX architecture. It includes a description of each MBX component along with suggested methods for employing them to support Modicon networks.



The MBX architecture presents a consistent framework to address different connectivity needs.

MBX Driver

The MBX Driver provides connectivity between Modbus Plus interface adapters and Windows-based applications. It supports all Modbus Plus interface adapters for PCI Express (PCIe), PCI, USB and PCMCIA buses that are compatible with the supported operating systems. For a complete list of supported adapters, refer to the MBX Driver help file. Multiple interface cards can be installed at the same time, limited only by the number of available slots.

The kernel mode device driver of the MBX Driver is the highest-performance Modbus Plus driver in the industry. The driver operates in either interrupt or polled mode and fully implements all Modbus Plus features, providing support for Data Master/Slave, Program Master/Slave, Global Data and Peer Cop. The high-performance native API (MBXAPI) of the MBX Driver takes advantage of the event-driven, multitasking, multithreaded features of Windows operating systems.

The driver includes the MBX Gateway Server for remote access by the MBX Gateway Driver and is fully compatible with all other components of the MBX family.

The MBX Driver is included in the following products:

- MBX OPC Enterprise Suite
- MBX OPC Premier Suite
- MBX OPC Server Suite
- MBX Bridge Suite
- MBX Driver Suite

Ethernet MBX Driver

The Cyberlogic Ethernet MBX Driver emulates Modbus Plus over the Modbus TCP protocol. This allows most Modbus Plus-compatible software to gain instant access to Modbus TCP-enabled devices without code modifications. It is compatible with all Ethernet cards supported by Windows.

The driver includes the MBX Gateway Server for remote access by the MBX Gateway Driver and is fully compatible with all other components of the MBX family.

The Ethernet MBX Driver is included in the following products:

- MBX OPC Enterprise Suite
- MBX OPC Premier Suite
- MBX OPC Server Suite
- MBX Bridge Suite
- MBX Driver Suite

Serial MBX Driver

The Serial MBX Driver provides connectivity to Modbus-compatible devices through standard serial COM ports. It supports both master and slave node communications for Modbus ASCII and Modbus RTU protocols.

The driver includes the MBX Gateway Server for remote access by the MBX Gateway Driver and is fully compatible with all other components of the MBX family.

The Serial MBX Driver is included in the following products:

- MBX OPC Enterprise Suite
- MBX OPC Premier Suite
- MBX OPC Server Suite
- MBX Bridge Suite
- MBX Driver Suite (Some OEM versions do not include the Serial MBX Driver.)

MBX Gateway Driver

The MBX Gateway Driver lets applications use MBX devices on remote MBX Gateway Server nodes as though they were on the local system. The client system running the MBX Gateway Driver must be a Windows node connected over a standard LAN to another system running the MBX Gateway Server. It can then access the Modbus, Modbus Plus and Modbus TCP networks that are connected to the server node.

For example, the MBX Gateway Driver provides complete MBX Driver functionality to the client node applications, including support for Data Master/Slave, Program Master/Slave, Global Data and Peer Cop. An interface adapter, such as a PCIe-85 card, is not required on the client node. MBX Gateway Driver nodes can communicate with multiple remote servers and all Windows-compatible TCP/IP networks are supported.

The MBX Gateway Driver is compatible with all other components of the MBX family.

The MBX Gateway Driver is included in the following products:

- MBX OPC Enterprise Suite
- MBX OPC Premier Suite
- MBX OPC Server Suite
- MBX Bridge Suite
- MBX Driver Suite

Mbx.Net Gateway Driver

The Cyberlogic Mbx.Net Gateway Driver provides similar functionality to the Cyberlogic MBX Gateway Driver. However, the Mbx.Net Gateway Driver uses newer and more secure infrastructure, and allows for more communication protocols.

The driver connects existing applications that use the MBXAPI, MBXAPI.Net or NETLIB to the Mbx.Net Server. The server can be on the local network or anywhere on the internet. The Mbx.Net Gateway node provides access to all MBX devices as though they were on the local system. The connection can be through Http, Net.Tcp or Net.Pipe protocols. A secure connection can be established and protected by a user name/password.

The Mbx.Net Gateway Driver is compatible with all other components of the MBX family.

The Mbx.Net Gateway Driver is included in the following products:

- Mbx.Net Suite
- Mbx.Net Premier Suite

Virtual MBX Driver

The Virtual MBX Driver enables 16-bit NETLIB/NetBIOS-compatible applications, such as Modsoft and Concept, to run concurrently with 32-bit applications on the same computer.

It allows multiple 16-bit applications and multiple instances of a single 16-bit application to run under the latest 32-bit Windows operating systems.

If your computer uses a 64-bit edition of Windows, refer to Cyberlogic Knowledge Base article *KB2010-02 Running 16-Bit Applications* for important information on using the Virtual MBX Driver on your system.

The Virtual MBX Driver is fully compatible with all MBX components and requires at least one of these drivers to operate:

- MBX Driver
- Ethernet MBX Driver
- Serial MBX Driver
- MBX Gateway Driver
- Mbx.Net Gateway Driver

The Virtual MBX Driver is included in the following products:

- MBX OPC Enterprise Suite
- MBX OPC Premier Suite
- MBX OPC Server Suite
- MBX Bridge Suite
- MBX Driver Suite

MBX Bridge

The MBX Bridge seamlessly routes messages between MBX-compatible devices. For example, the MBX Bridge can route messages between Ethernet and Modbus Plus networks, between Modbus and Modbus Plus networks or any other combination of the supported networks.

Depending on the user's needs, it requires one or more of the following drivers to operate:

- MBX Driver
- Ethernet MBX Driver
- Serial MBX Driver
- MBX Gateway Driver
- Mbx.Net Gateway Driver

The MBX Bridge is included in the MBX Bridge Suite.

MBX OPC Server

The Cyberlogic MBX OPC Server connects OPC-compliant client applications to Modbus, Modbus Plus and Modbus TCP networks. It supports the latest OPC Data Access and OPC

Alarms and Events specifications and uses the MBX drivers for connectivity to Modicon networks.

The MBX OPC Server supports multiple, priority-based access paths for reliable, redundant communications. It also supports both solicited and unsolicited communications and uses an advanced transaction optimizer to guarantee minimum load on your networks. With only a couple of mouse clicks, the MBX OPC Server will automatically detect and configure the attached networks and node devices. Other noteworthy features include DirectAccess, Data Write Protection and Health Watchdog.

The MBX OPC Server is included in the following products:

- MBX OPC Enterprise Suite
- MBX OPC Premier Suite
- MBX OPC Server Suite

MbpStat.Net

The MbpStat.Net provides the same functionality as the original DOS-based MBPSTAT application. It can monitor local or remote Modbus Plus by connecting to systems running the Mbx.Net Server. It can run on 32-bit and 64-bit Windows, and it does not require the Virtual MBX Driver.

The MbpStat.Net is included in the following products:

- Mbx.Net Suite
- Mbx.Net Premier Suite

Mbx.Net Server

The Cyberlogic Mbx.Net Server connects applications that use the MBXAPI, MBXAPI.Net or NETLIB to Modbus, Modbus Plus and Modbus TCP networks. The client applications and server can be on the local network or connected through the Internet.

The server is a Windows Communication Foundation (WCF) server that supports Http, Net.Tcp and Net.pipe protocols. It allows connections to be secured with a user name/password. When used with an application like MbpStat.Net it allows remote monitoring of networks and devices. Existing applications can use the server along with the Mbx.Net Gateway Driver to securely connect to remote devices.

The Mbx.Net Server is included in the following products:

- Mbx.Net Suite
- Mbx.Net Premier Suite

MBX SDK

Software developers can use the MBX Software Development Kit to provide connectivity to Modbus, Modbus Plus and Modbus TCP networks from their 32-bit and 64-bit C/C++/C# applications.

The SDK supports NETLIB, and Cyberlogic's high-performance MBXAPI and MBXAPI.Net interfaces. NETLIB is an excellent bridge for developers who would like to port their 16-bit applications to the latest Windows environments. Developers of new applications can use any of the three interfaces. For a complete reference of all NETLIB library functions, refer to *Modicon IBM Host Based Devices User's Guide*, available from Schneider Electric (Order #890 USE 102 00).

Since all MBX family drivers are built on the same MBX architecture, applications developed with the MBX SDK can be used with all MBX family drivers and can execute under all current Windows operating systems.