

MBX DRIVER

MBX[®] Driver for Modbus Plus Host Interface Adapters

Version 6.0 for Windows[®] XP/2000/NT/Server 2003

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INTRODUCTION

The 32-bit MBX Driver provides connectivity between Modicon ModConnect host interface adapters and 32-bit applications running under Windows XP/2000/NT. It is implemented as part of Cyberlogic's MBX architecture. The MBX architecture is a foundation used in other Cyberlogic products such as the MBX Gateway Driver, the Serial MBX Driver and the Ethernet MBX Driver. Consequently, these products consistently support identical programming interfaces: the MBXAPI and Modicon's industry-standard NETLIB. As a result, software developers can use a single programming model for implementing communications over Modbus, Modbus Plus and Ethernet[®] TCP/IP. This ensures that practically all of the existing Modbus Plus compatible software programs can operate over all Modicon supported networks with no code modifications. This includes both 32-bit Windows XP/2000/NT and 16-bit legacy DOS/Windows applications.

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 supports all current Modicon ModConnect host interface adapters for ISA, EISA, MCA and PC Card (PCMCIA) buses. Multiple interface cards can be installed at the same time, limited only by the number of available slots. Full implementation of all MB+ features provides support for Data Master/Slave, Program Master/Slave, Global Data and Peer Cop. The high performance native API of the MBX Driver takes full advantage of the event-driven, multitasking, multithreaded features of the Windows XP/2000/NT operating systems.

Compatibility

The MBX Driver is compatible with applications supporting the high-performance MBXAPI application programming interface and the industry standard NETLIB interface specification from Modicon. Supporting these existing standards protects the software and R&D investments of end-users and OEMs.

The 32-bit NETLIB compatibility provides an excellent bridge for developers who would like to port their 16-bit NETLIB-compatible applications to 32-bit Windows operating systems (Windows XP/2000/NT). Applications developers can use either NETLIB or the high-performance MBXAPI programming interface. To obtain the MBX Software Development Kit, including the MBXAPI specification, MBXAPI sample source code and NETLIB sample source code, contact your Schneider Automation, Inc. Modicon brand distributor. For a complete reference of all NETLIB library functions, refer to "Modicon IBM Host Based Devices User's Guide" from Schneider Automation (Order #890 USE 102 00).

Remote Connectivity

The MBX Driver includes the MBX Gateway Server. When enabled, the server allows access to all local MBX devices, including host interface adapters, from remote client nodes over any Windows XP/2000/NT-compatible network. The remote client can be a Windows XP/2000/NT node, running the MBX Gateway Driver product. The MBX Gateway Driver provides complete MBX Driver functionality to the client node, including support for Data Master/Slave and Program Master/Slave, Global Data and Peer Cop. Any node on the network can be configured as a client to a number of Gateway Servers while communicating over its local MBX devices.

Running 16-Bit Software

A companion product, the Virtual MBX Driver, 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 on this product, refer to the [MBX Architecture and Companion Products](#) section.

What Should I Do Next?

The Cyberlogic MBX family for Windows XP/2000/NT consists of several well-integrated products that provide connectivity for Modicon Modbus, Modbus Plus and Ethernet networks in distributed environments. For more information about these products, refer to the [MBX Architecture and Companion Products](#) section.

For architectural and implementation details of the MBX Driver product, read the [Theory of Operation](#) section. This section describes the implementation of various features of the driver, including different types of communications – Master Path (DM/PM), Slave Path (DS/PS), Global Data and Peer Cop – as well as troubleshooting and performance monitoring aids.

After installation, the MBX Driver must be configured. You will find information on this topic in the [Configuration](#) section.

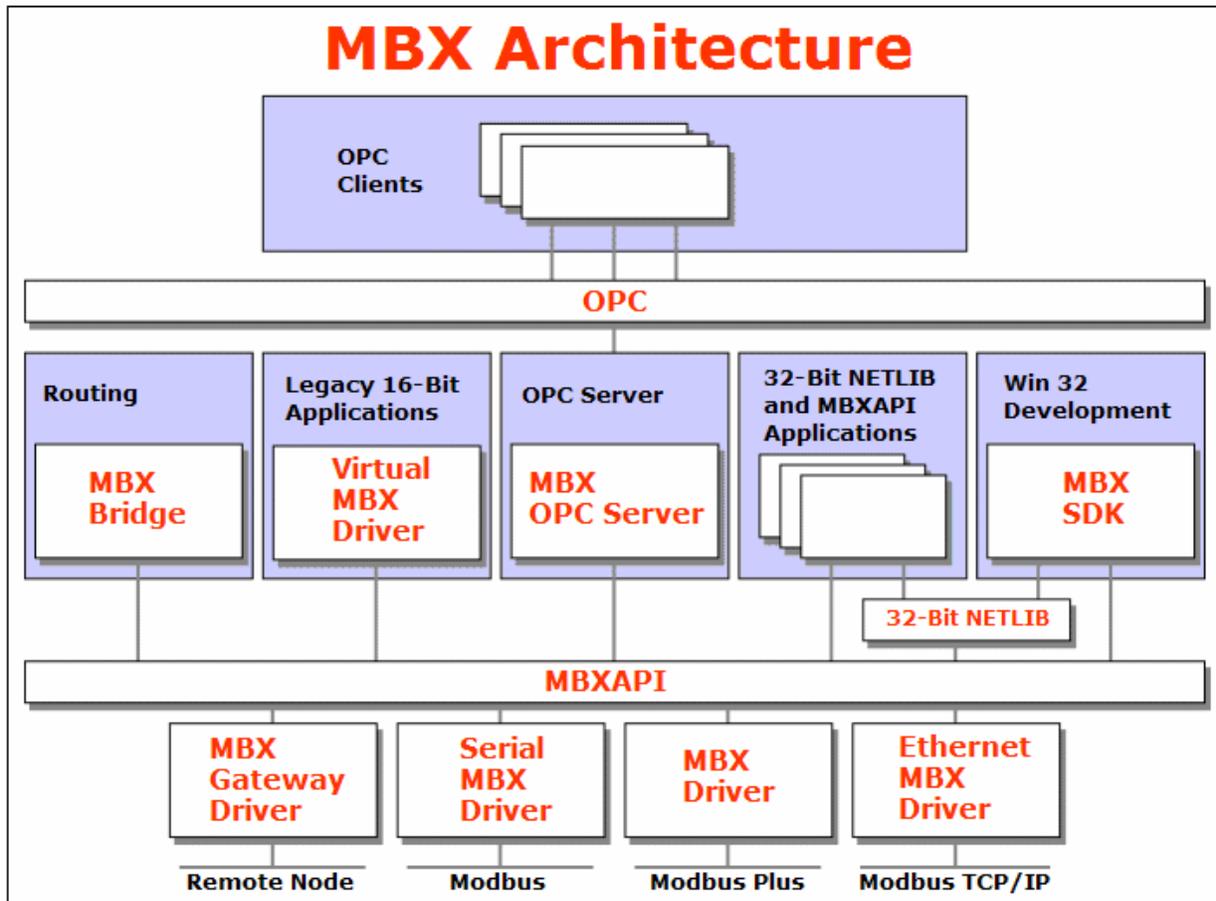
If you have already configured the driver, the [Validation & Troubleshooting](#) section will help you to verify that it operates as expected and contains problem-solving hints to help with communications problems you may encounter.

The content of this document is also provided in the PDF file format. PDF files can be viewed using the Adobe® Reader program. The printer-friendly PDF files can be used to print the complete document with good quality output.

MBX ARCHITECTURE AND COMPANION PRODUCTS

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

The Cyberlogic MBX family for Windows XP/2000/NT consists of several well-integrated products that provide connectivity for Modicon's Modbus, Modbus Plus and Modbus TCP/IP (Ethernet) networks in distributed environments.



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

Software products available in the MBX family are:

MBX Driver: This is Cyberlogic's device driver for Modbus Plus host interface adapters. The MBX Gateway Server is included for remote connectivity.

Ethernet MBX Driver: This driver provides Modbus Plus emulation over TCP/IP. The MBX Gateway Server is included for remote connectivity.

Serial MBX Driver: This driver provides Modbus Plus emulation over serial Modbus. The MBX Gateway Server is included for remote connectivity.

MBX Gateway Driver: This product provides access to Modicon's Modbus, Modbus Plus and Modbus TCP/IP networks from remote locations.

Virtual MBX Driver: This driver works with the other MBX drivers to permit 16-bit legacy software to run in 32-bit Windows operating systems.

MBX Bridge: This product allows you to bridge any combination of Modicon networks by routing messages between MBX devices.

MBX OPC Server: Cyberlogic's premium OPC Server connects OPC compliant client software applications to data sources over all Modicon networks.

MBX SDK: This is a software development kit for MBXAPI and NETLIB compliant development.

MBX Driver

The 32-bit MBX Driver provides connectivity between Modicon ModConnect host interface adapters and 32-bit applications running under Windows XP/2000/NT.

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 supports all current Modicon ModConnect host interface adapters for ISA, EISA, MCA, PCI and PC Card (PCMCIA) buses. Multiple interface cards can be installed at the same time, limited only by the number of available slots. Full implementation of all Modbus Plus features provides 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 32-bit operating systems.

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

Ethernet MBX Driver

The 32-bit Ethernet MBX Driver provides connectivity between Modbus TCP/IP compatible processors and Windows XP/2000/NT based 32-bit applications using either Modicon NETLIB or Cyberlogic's high-performance MBXAPI interface specification. It provides Data Master/Slave and Program Master/Slave features of Modbus Plus on Ethernet networks.

The driver includes the MBX Gateway Server for remote access by the MBX Gateway Driver and is fully compatible with all other MBX family products. The Ethernet MBX Driver does not require a special Ethernet adapter. It is compatible with all Ethernet cards supported by Windows.

Serial MBX Driver

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

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

MBX Gateway Driver

The MBX Gateway Driver lets you access Modbus, Modbus Plus and Modbus TCP/IP networks from a remote location. Through a standard LAN, your local applications can use MBX devices on Gateway Server nodes as though they were on your local system.

The remote client running the MBX Gateway Driver must be a Windows XP/2000/NT node. By accessing the Modbus, Modbus Plus and Ethernet networks connected to server nodes on a network, the MBX Gateway Driver provides complete MBX Driver functionality to the client node, including support for Data Master/Slave, Program Master/Slave, Global Data and Peer Cop. A host interface adapter, such as a Modicon SA85 card, is not required on the client node. MBX Gateway Driver nodes can communicate with multiple Gateway Servers and all Windows XP/2000/NT-compatible computer networks are supported.

The MBX Gateway Driver is compatible with all other MBX family products.

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 32-bit Windows operating systems.

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 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 products to operate:

- MBX Driver
- Ethernet MBX Driver
- Serial MBX Driver
- MBX Gateway Driver

MBX OPC Server

The Cyberlogic MBX OPC Server connects OPC-compliant clients to Modicon Modbus, Modbus Plus and Ethernet 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 in seconds. Other noteworthy features include DirectAccess, Data Write Protection and Health Watchdog.

MBX SDK

Software developers can use the MBX SDK to provide connectivity to Modbus, Modbus Plus and Ethernet networks from their 32-bit C/C++ applications.

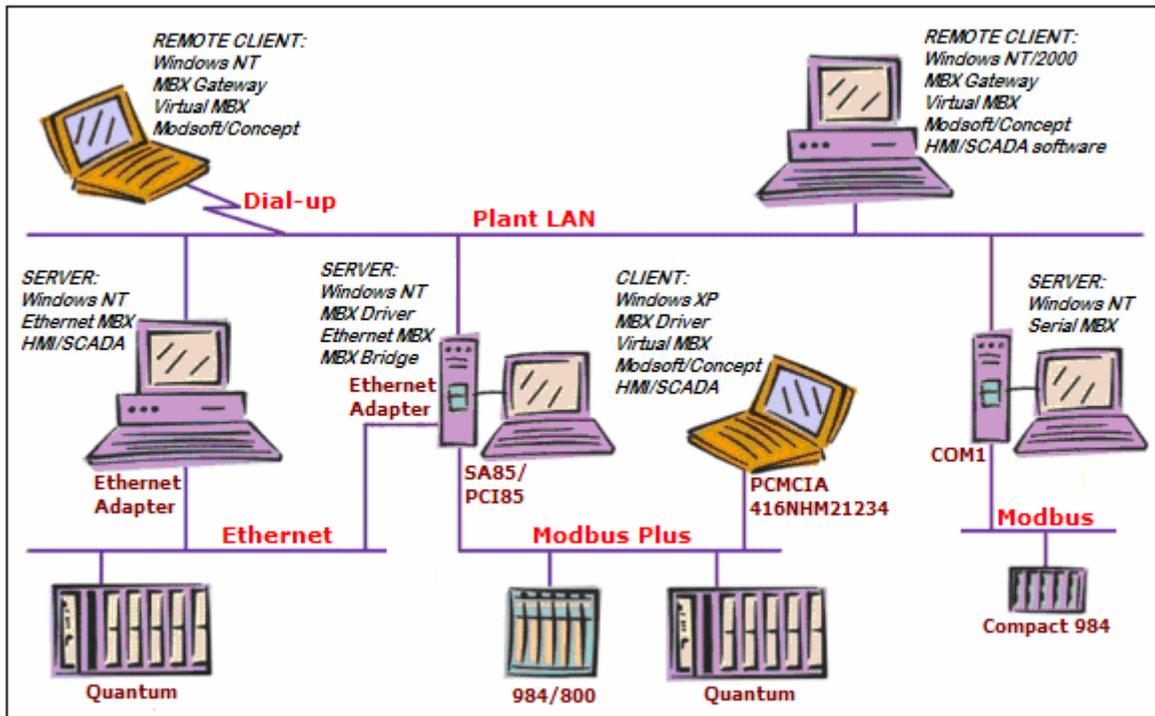
The SDK supports two styles of interfaces, the industry-standard NETLIB and Cyberlogic's high-performance MBXAPI. The NETLIB interface is an excellent bridge for developers who would like to port their 16-bit applications to the 32-bit Windows environments. Developers of new applications can use either the NETLIB or the MBXAPI interface.

Since all MBX driver products are built on the same MBX architecture, applications developed with the MBX SDK can be used with all MBX drivers and can execute under all 32-bit Windows operating systems.

Blending MBX Supported Networks

The MBX driver products provide support for all Modicon networks through a common architecture, with identical programming interfaces: the MBXAPI and the industry-standard NETLIB. This ensures that virtually all of the existing Modbus Plus compatible software programs can operate over all Modicon supported networks with no code modifications. A product operating with one of the MBX driver products, such as the MBX Driver, will operate with the rest of the MBX driver products as well.

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



MBX enabled system deployment:

New hardware solutions will blend into existing installations without software or network modifications

THEORY OF OPERATION

This section is intended to familiarize you with the main features of the MBX Driver. Although the MBX Driver only supports Modbus Plus, we have also included an overview of all Modicon networks.

Schneider Automation, Inc. provides a number of network solutions that allow communications to a variety of its own as well as third party hardware products. The main communication networks include:

- Modbus
- Modbus Plus
- Ethernet

Modbus

Modbus is a master/slave network that allows a master node (typically a host computer) to communicate to one of several slave nodes (typically Modicon PLCs). The master node supports only a solicited mode of operation while the slave nodes can only reply to unsolicited message requests from the master node. Its serial communications are relatively slow. The message structure supports only single-byte destination node addressing. Because of its limitations, serial Modbus communications are primarily used in old legacy installations.

Modbus Plus

Modbus Plus is a 1 Mbit/sec peer-to-peer communication network. Its architecture supports both solicited (Master Path) and unsolicited (Slave Path) communications. It also supports Global Data and Peer Cop communications. The message structure used by Modbus Plus is identical to the Modbus message structure with the exception of the destination node address. Modbus Plus uses a 5-byte routing path to identify the destination node versus the 1-byte destination node addressing of Modbus. Also, a local network is limited to 64 nodes. Modbus Plus is the most prevalent communication network of the three Modicon networks and, therefore, has the best support in third-party automation software products. Most of these products communicate through the NETLIB library, which is well-supported on both 16-bit (DOS/Windows) and 32-bit platforms (Windows XP/2000/NT).

Ethernet

Ethernet is the most recent Modicon network supported by new Schneider Automation products such as Quantum PLCs. The communication protocol is based on the standard TCP/IP protocol with Modbus messages embedded in the standard PDU messages. Ethernet operates at 10 Mbits/sec and supports both solicited and unsolicited communications. The message structure used by Ethernet communications is almost identical to the Modbus message structure with the exception of the destination node address, which is a standard IP address.

The MBX driver products (MBX Driver, MBX Gateway Driver, Ethernet MBX Driver) provide consistent support for all of the above networks through an identical software architecture. The MBX Driver provides driver support for all Modbus Plus host interface adapters from Modicon.

Main Driver Features

The kernel mode device driver of the MBX Driver supports all current Modicon ModConnect host interface adapters for ISA, EISA, MCA and PC Card (PCMCIA) buses. Multiple interface cards can be installed at the same time, limited only by the number of available slots. Each adapter card can operate in either interrupt or polled mode.

The driver supports all MB+ features including support for Data Master/Slave, Program Master/Slave, Global Data and Peer Cop. The high performance native API of the MBX Driver is designed to take full advantage of the event-driven, multitasking, multithreaded features of Windows XP/2000/NT. For legacy applications, a simpler NETLIB interface is also provided.

Solicited (Master Path) Communications

Each host interface adapter card, such as the SA85, allows a maximum of eight simultaneous data-type and program-type solicited transactions. These transactions are called Data/Program Master (DM/PM) path transactions. Despite these physical limitations, the MBX Driver allows up to 65,535 simultaneous Data Master path communications. The eight physical DM paths are multiplexed by the driver among all logical DM paths currently opened by all applications. The PM paths are still limited to a maximum of eight. This technique is highly efficient and greatly improves communication capabilities of applications. This change does not affect any existing applications. New applications take advantage of this capability by opening a large number of DM paths for better performance and simpler message handling.

For more information on Modbus Plus transactions, refer to "Modicon IBM Host Based Devices User's Guide" from Schneider Automation (Order #890 USE 102 00).

Unsolicited (Slave Path) Communications

Each host interface adapter card allows eight simultaneous data-type and program-type unsolicited transactions. These transactions are called Data/Program Slave (DS/PS) path transactions.

Only one user application can receive messages over an individual DS/PS path. While a DS/PS path is in use by an application, it is the application's responsibility to respond to any received command message. If command messages are received over unused DS/PS paths while the driver is in the on-line mode, the driver automatically sends negative response messages to the message originator. When the driver is in the off-line mode, the negative response messages are normally sent by the adapter card.

<p>Note: Adapter cards supporting Peer Cop have a diagnostic watchdog timer that, when enabled, automatically places the adapter card in the off-line state after a pre-configured host inactivity timeout expires. While the driver is operational, it will always place an adapter card in the off-line state when transitioning from the on-line to the off-line mode. However, in an event of a system crash, the driver does not have an opportunity to properly transition the adapter card's state. In this case, adapter cards not supporting the watchdog timer will never respond to the command messages, resulting in lengthy timeouts on the Modbus Plus network. Therefore, we strongly recommend that you enable the watchdog timer and set it to 2.5 sec for adapter cards supporting it. (For compatibility with older adapter cards, the default value of the timer is disabled.)</p>
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Global Data Communications

Each Modbus Plus node can transmit up to 32 words of Global Data to the rest of the nodes on the local network. The Global Data is transmitted as part of each node's token passing message. As a result, in a single token rotation, all Modbus Plus nodes get an opportunity to transmit their Global Data. This type of communication is very fast and it is commonly used for transferring state information between controller nodes.

<p>Caution: Any application can write to the adapter's global output data buffer and there is no arbitration mechanism that prevents one application from overwriting data written by another application. Great care should be taken to ensure that no unintended data corruption takes place. Applications requiring better control over transmitted data should consider using the Specific Output data feature of Peer Cop communications. In addition, adapter cards capable of Peer Cop communications allow for more efficient access to Global Data received from other nodes.</p>

Peer Cop Communications

Peer Cop communications are similar to the Global Data communications. Like the Global Data, the Peer Cop data is transmitted as part of each node's token passing message. As a result, in a single token rotation, all Modbus Plus nodes get an opportunity to transmit their Peer Cop data. This type of communication is very fast and it is commonly used for transferring state information between controller nodes and communicating with distributed I/O nodes on the Modbus Plus network.

The driver automatically detects whether the adapter card is capable of supporting Peer Cop communications. As a result, older and newer versions of adapter cards can be intermixed in the same system. Also, as more adapter cards are upgraded to support Peer Cop, the MBX Driver will support these cards as well.

Peer Cop allows communications for the following types of data: Global Input, Global Output, Specific Input and Specific Output. The following sections provide brief descriptions for all of these data types.

Global Input/Output Data

The Global Data (input and output) functionality is identical to the Global Data functionality already available in Modbus Plus prior to Peer Cop. However, Peer Cop provides this functionality in a more efficient way. For instance, Global Data from multiple nodes can be read in a single operation.

By default, the driver will not transmit any global output data until a user application writes to the global output data buffer. However, for the Peer Cop enabled adapter card, the driver can be configured to transmit up to 32 words of global output data even before any application writes to this buffer. Refer to [PnP Adapter Card Editor](#) or [Non-PnP Adapter Card Editor](#) for more details.

Up to 32 words of global input data may be requested from each configured node on the Modbus Plus network, with the limitation that the total amount of requested data must not exceed 500 words. A health status associated with data from each requested node has also been provided. Applications can use this information to determine the validity of the received data.

Specific Input Data

Up to 32 words of Specific Input data may be requested from each configured node on the Modbus Plus network, with the limitation that the total amount of requested data must not exceed 500 words. A health status associated with data from each requested node has also been provided. Applications can use this information to determine the validity of the received data.

Specific Output Data

Peer Cop communications can send up to 32 words of Specific Output data to each node on the Modbus Plus network. The total amount of data sent from all applications through a single host interface adapter can not exceed 500 words. A health status associated with data for each target node has also been provided. Applications can use this information to determine if the transmitted data is being accepted by target nodes.

For every configured Specific Output word, you can specify the default data that the driver will use before some application overwrites it. (By default, all Specific Output data words are filled with 0.) You can also configure what action the driver should take during a user application exit (either normal or abnormal termination). The Specific Outputs controlled by this application are either left in their last state or restored to a pre-configured default state by the driver.

Summary of Peer Cop Communications

To fully utilize the multi-tasking nature of the Windows XP/2000/NT environment, Peer Cop support in the MBX Driver exhibits the following characteristics:

1. Concurrent Peer Cop functionality from multiple applications using a single host interface adapter card, such as an SA85.
2. Any application can read Peer Cop data from any node on the network. However, only one application is allowed to write Specific Outputs to a given node.
3. Applications can acquire and release access to Peer Cop Specific Outputs. Once control over Specific Outputs at a given node is released by the controlling application, another application can immediately acquire this control.
4. Starting and stopping applications as well as changing the Peer Cop resources by individual applications does not create any instability on the Modbus Plus network.
5. Any Peer Cop related operation by one application does not affect concurrent Peer Cop operations from other applications. This is limited by the possibility of conflicts when attempting to control Specific Outputs at the same node address.
6. Only Peer Cop features configured by the user through the Host Interface Adapter Configuration Editor can be used by applications. This global configuration ensures reliable operation on the MB+ network and prevents applications from unintentionally accessing and controlling Peer Cop data at certain nodes.
7. During the application exit (either normal or abnormal termination), the *Specific Outputs* controlled by the application are either left in their last state or restored to a pre-configured default state by the driver.

The MBX Driver also supports the Health Timeout Timer. The Health Timeout interval specifies the minimum time period that the Peer Cop configured communication must fail before the associated health bit is cleared. The recommended timeout value is 500 msec.

<p>Note: There is a 20 msec latency in this timeout value. Thus, the maximum amount of time that elapses before the health bit clears is the configuration time plus 20 msec. For example, if the user configures the health timeout to be 60 msec, then the health bit will be cleared no sooner than 60 msec and no later than 79 msec after communication has been lost.</p>
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Software developers can refer to the MBX SDK (Software Development Kit for MBXAPI and NETLIB compliant development) for a complete description of all API functions.

Interrupt/Polled Mode of Operation

Most host interface adapter cards can be configured for the interrupt mode of operation. The MBX Driver supports this mode of operation. If multiple adapter cards are used in the same system, each card must use a different interrupt (IRQ) number. The user must also ensure that the configured interrupt number matches the jumper setting on the adapter card. Otherwise, the driver will not receive any interrupts, resulting in a very low rate of messages.

The interrupt mode allows for the highest message rate. However, for most applications, polled mode provides adequate performance while significantly reducing system load.

Event Logger

During system startup, the MBX Driver may detect configuration problems. If a problem is detected, the driver sends an appropriate message to the Windows XP/2000/NT Event Logger. Windows XP/2000/NT provides the [Event Viewer](#) utility to view the error log messages.

Performance Monitor

Microsoft provides a diagnostic tool, the Performance Monitor, as part of the Windows XP/2000/NT operating system. Applications supporting the Performance Monitor allow users to monitor relevant performance counters.

The MBX Driver supports the [Performance Monitor](#). Multiple devices can be monitored simultaneously for comparison.

CONFIGURATION

Before the MBX Driver can be used, it must be properly configured. To accomplish that, you must run the MBX Driver Configuration Editor at least once after the driver installation.

The MBX Driver Configuration Editor is a common component of the MBX Driver products. When configuring the driver for a host interface adapter type device, the MBX Driver Configuration Editor automatically dispatches the proper Adapter Card Configuration Editor. Both editors are well-integrated, allowing for seamless editing.

The specific configuration procedure you must use will vary depending on the adapter card and operating system you are using. The first step is to identify the proper procedure you will need to use.

Getting Started: Finding the Procedure for Your Adapter

There are two interface adapter card editors, one for Plug and Play (PnP) configuration and the other for non-PnP configuration. To use the PnP procedure, your operating system and adapter card must support PnP. If not, you must use the non-PnP procedure. The following sections will help you decide.

Windows NT

Windows NT does not support PnP. If your operating system is Windows NT, you must use the procedure in the [Configuring Non-PnP Adapter Cards](#) section for all adapter cards.

Non-PnP Adapter Cards

The following adapter cards do not support PnP. You must use the procedure in the [Configuring Non-PnP Adapter Cards](#) section to configure them.

- AT984 / MC984
- PCMCIA 416NHM21200/3
- SA85 / SM85

Caution: Microsoft has chosen not to support non-PnP PCMCIA cards for operating systems beginning with Windows 2000. If you wish to use the 416NHM21200/3, you must use the Windows NT operating system.

PnP Adapter Cards

These adapter cards support PnP when installed in systems running Windows XP or 2000. You must use the procedure in the [Configuring PnP Adapter Cards](#) section to configure them under Windows XP or 2000.

- PCI-85 (416NHM30030/2)
- PCMCIA 416NHM21234

CONFIGURING PNP ADAPTER CARDS

This section describes the procedure for configurations that support Plug and Play. To use this procedure, you must be running Windows XP or 2000 and use one of the following adapter cards.

- PCI-85 (416NHM30030/2)
- PCMCIA 416NHM21234

If this is not the case, go to the [Configuring Non-PnP Adapter Cards](#) section.

The procedures you will use to configure PnP adapters is broken into several sections:

- [Typical PnP Configuration Session](#) is a good place to start if you are a first-time user. It is a tutorial that walks you through a complete driver configuration session. It also introduces some diagnostic tools used for validating and troubleshooting the driver.
- [Creating a PnP Device](#) is a guide to creating a new MBX device if you are just getting started or need to add a new adapter card.
- [Editing PnP Device Configuration](#) describes how to open an existing device for editing.
- [PnP Adapter Card Editor](#) describes how to edit the configuration for each model of adapter card.
- [MBX Driver Configuration Editor](#) describes the configuration of the MBX Driver itself.
- [Configuration Backup/Restore](#) shows how to backup and restore your configuration of MBX driver products.

Typical PnP Configuration Session

The following steps show a typical configuration session. Use them only as a guideline. Only the most common features are shown here. For detailed descriptions, refer to the [PnP Adapter Card Editor](#) section.

The procedure is broken into four segments. The first shows how to create an MBX device and configure an adapter card. The second covers Peer Cop configuration. The third covers configuration of the MBX Gateway Server. The last segment introduces the diagnostic capabilities of the software.

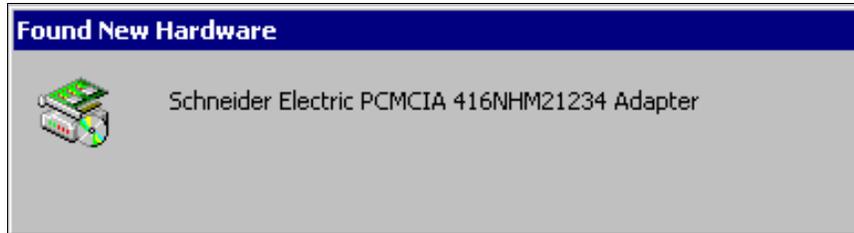
To begin, go to [Creating and Configuring a PnP Device](#).

Creating and Configuring a PnP Device

1. Your PnP card may be a PCMCIA card, such as the PCMCIA 416NHM21234, or it may be a PCI card, such as the PCI-85 (416NHM30030/2). This first step is slightly different for each type.

PCMCIA Cards

Insert the PCMCIA 416NHM21234 into an empty PCMCIA socket. The system will detect that new hardware has been added and display a Found New Hardware message with the PCMCIA 416NHM21234 name.



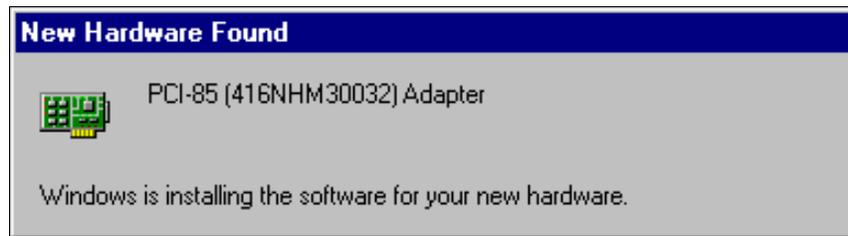
Note: If you didn't see the Found New Hardware message after inserting the PCMCIA 416NHM21234 card, check for the Schneider TSXMBP100 device (with a yellow exclamation point) under the Other Devices branch of the Device Manager. If the Schneider TSXMBP100 device is present, uninstall it (right-click and select *uninstall*) and then select the *Scan for hardware changes* from the Action menu.

The system will automatically allocate resources for the PCMCIA 416NHM21234 card and create an MBX device with the next available device number. All parameters for the new device will default to standard settings. They may or may not fully match the desired setting. Therefore, the next step is to access the Device Manager to finish the configuration process. Proceed to step 2 to continue.

PCI Cards

Install the MBX Driver software. The PCI-85 (416NHM30030/2) card supports Plug and Play and the system automatically detects and configures it when newly installed in the system. For this process to work correctly, the MBX Driver must be installed on your system before you install the card.

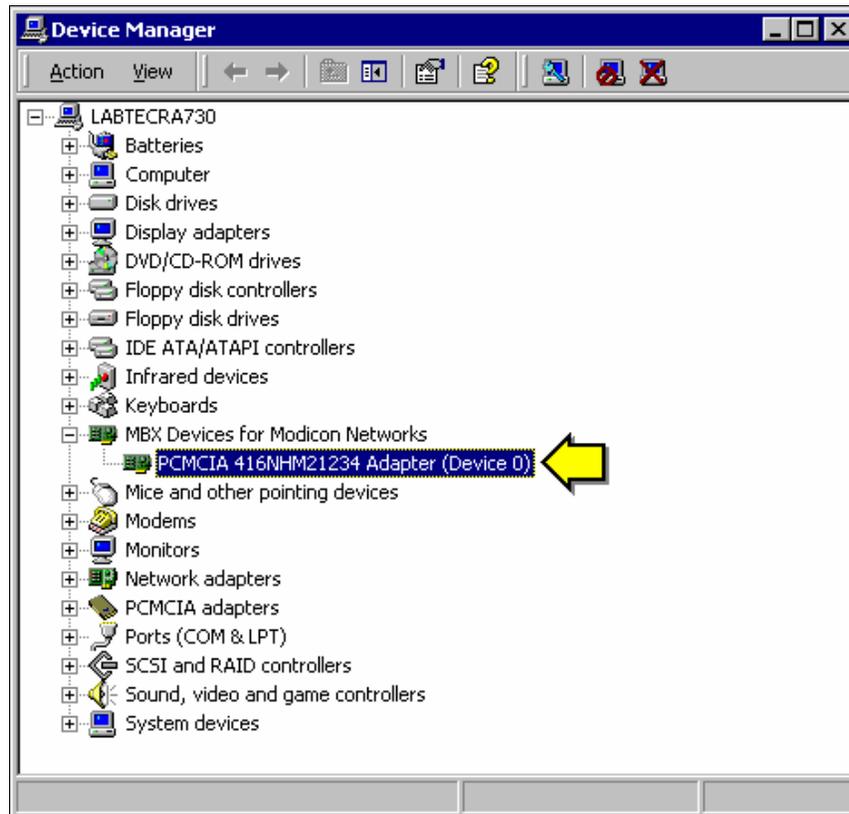
Turn off power and insert the adapter card into an empty PCI slot. Turn the power back on. During booting, the system will detect that new hardware has been added and display a Found New Hardware message with the PCI-85 (416NHM30030/2) name.



Note: If you didn't see the Found New Hardware message after system reboot, check for the Network Controller device (with a yellow exclamation point) under the Other Devices branch of the Device Manager. Windows XP/2000 will create this device if you insert the card prior to installing the MBX Driver software. If the Network Controller device is present, uninstall it (right-click and select *uninstall*) and then select the *Scan for hardware changes* from the Action menu.

The system will automatically allocate resources for the PCI-85 card and create an MBX device with the next available device number. All parameters for the new device will default to standard settings. They may or may not fully match the desired setting. Therefore, the next step is to access the Device Manager to finish the configuration process. Proceed to step 2 to continue.

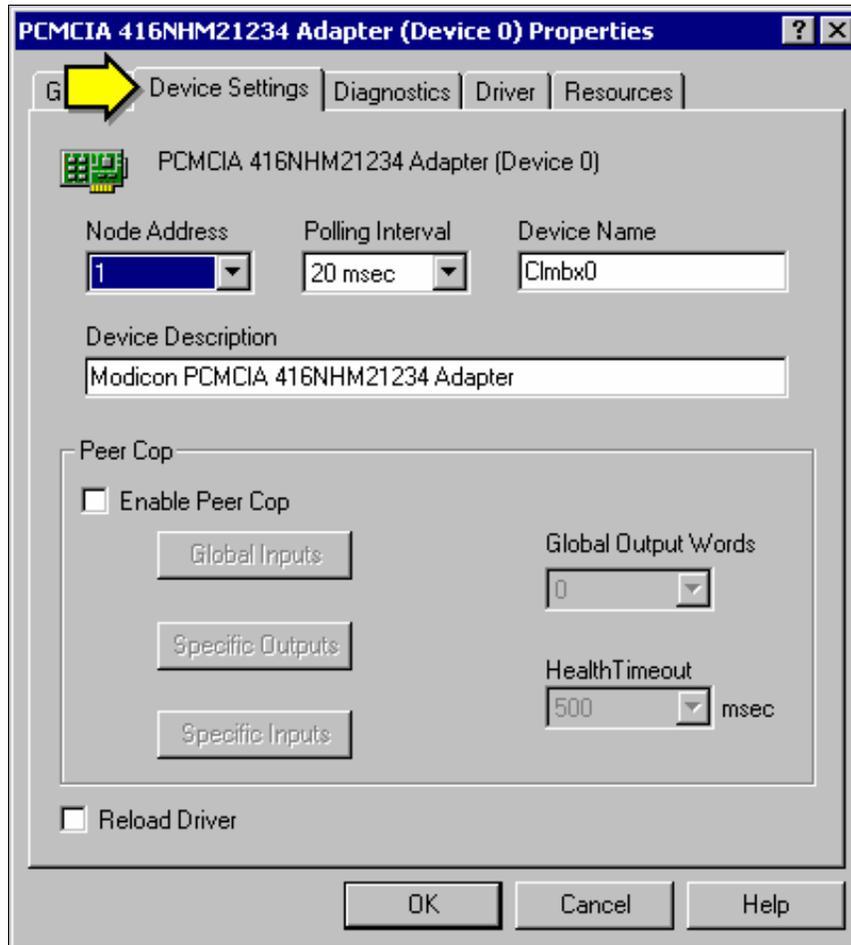
2. Go to the *Control Panel* and double-click on the *System* icon.
3. Choose the *Hardware* tab and then click the *Device Manager* button.



4. Locate the MBX Devices for Modicon Networks branch and expand it. Select the device to be edited, right-click and select *Properties* from the menu.



- Choose the *Device Settings* tab.



This page allows configuration of all parameters related to the selected adapter card. Typically, only the Node Address parameter may have to be changed. Select the proper Node Address for your adapter card. The PCMCIA 416NHM21234 card can only operate in polled mode and we recommend that you use the default Polling Interval value of 20 msec.

- If your applications will use Peer Cop communications, go directly to the [Peer Cop Communications](#) segment, skipping the remainder of this step.

If you will not use Peer Cop, clear the *Enable Peer Cop* checkbox, click the *OK* button, then close the Device Manager.

If you plan to use the MBX Gateway Driver on remote Windows XP/2000/NT nodes, go to the [MBX Gateway Server Configuration](#) segment. Refer to the [Remote Connectivity](#) section for more information on this capability.

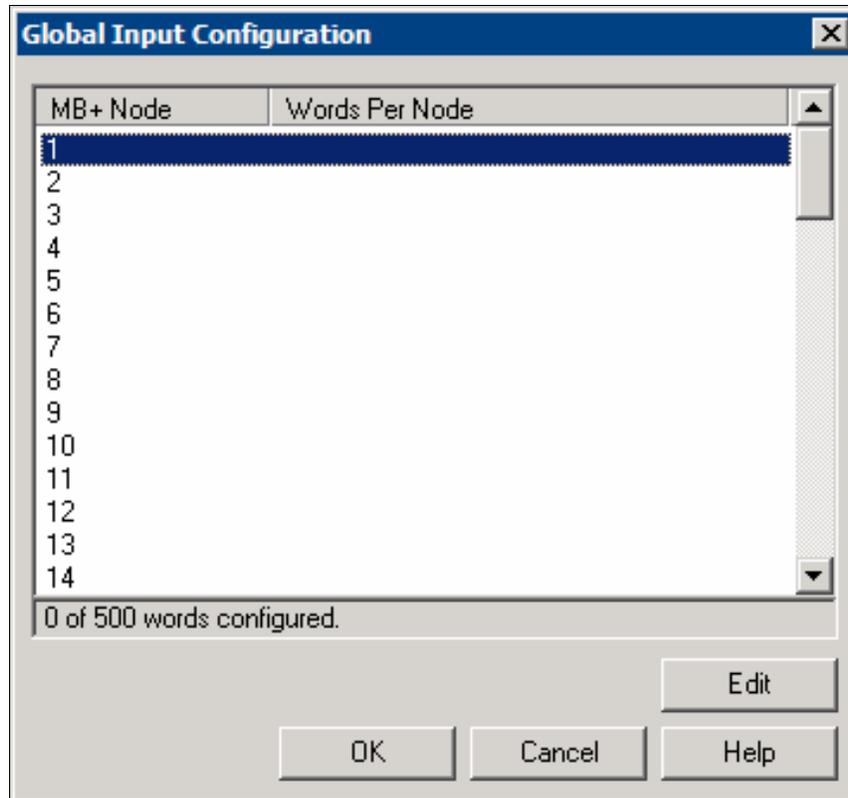
Otherwise, go to the [Diagnostics](#) segment.

Peer Cop Communications

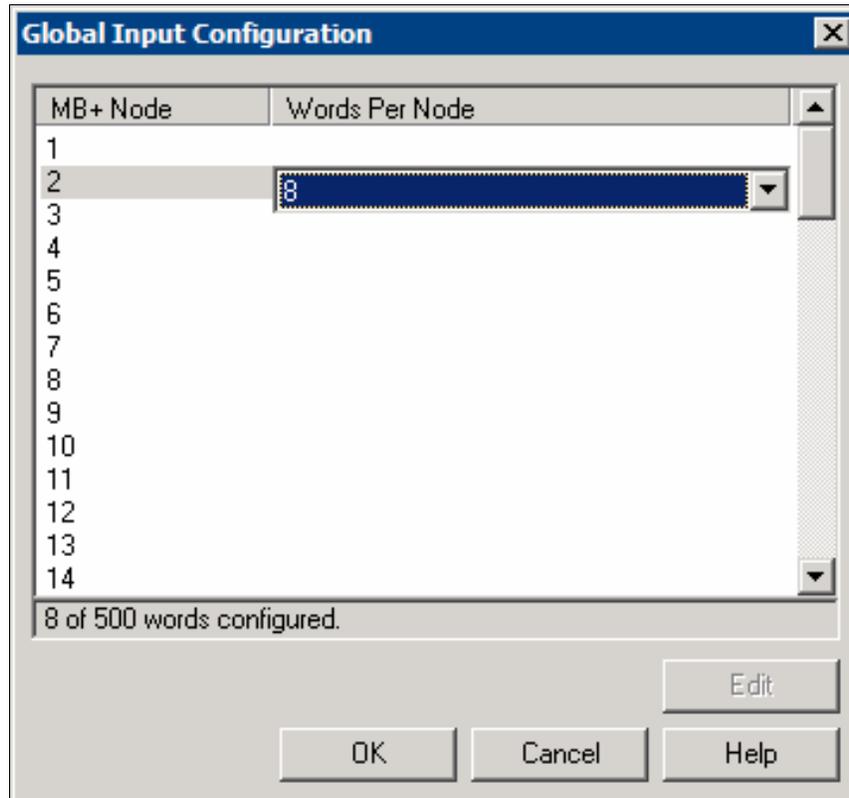
7. Select the *Enable Peer Cop* check box. Then click the *Global Inputs* button.

The Global Data (input and output) functionality is identical to the Global Data functionality already available in Modbus Plus prior to Peer Cop. However, Peer Cop provides this functionality in a more efficient way. For instance, global input data from multiple nodes can be read in a single operation.

8. Select a node intended to receive Global Data. Click the *Edit* button or right-click and select *Edit* from the menu.



From the drop-down box, select the number of words of global data to be requested from the node. Up to 32 words of global input data may be requested from each Modbus Plus node configured here, with the limitation that the total amount of requested data must not exceed 500 words.

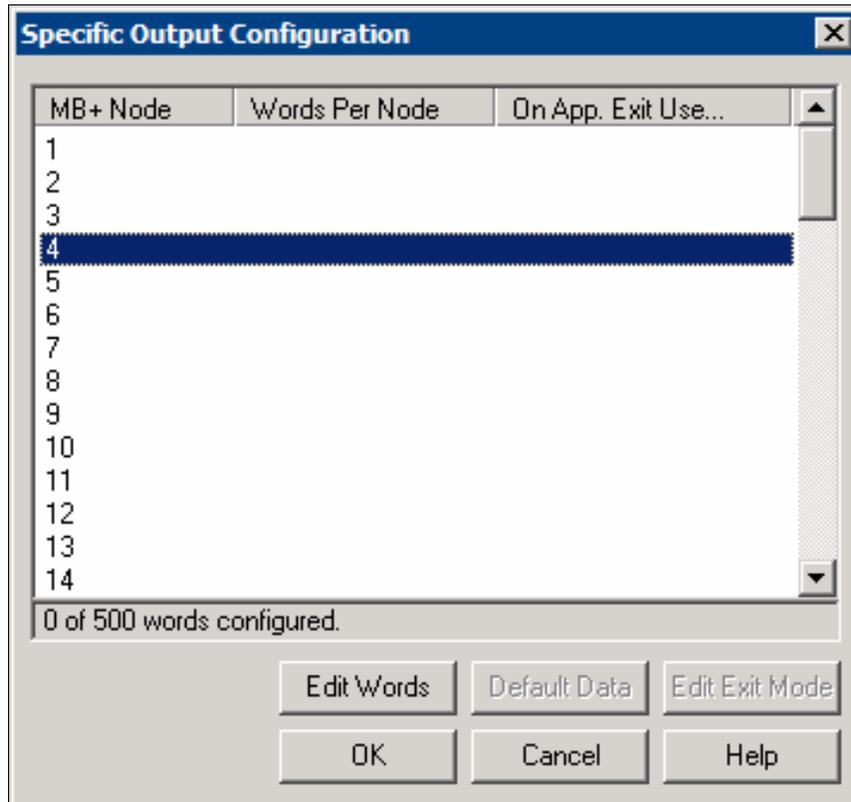


Repeat this step until all nodes are configured, then click the *OK* button.

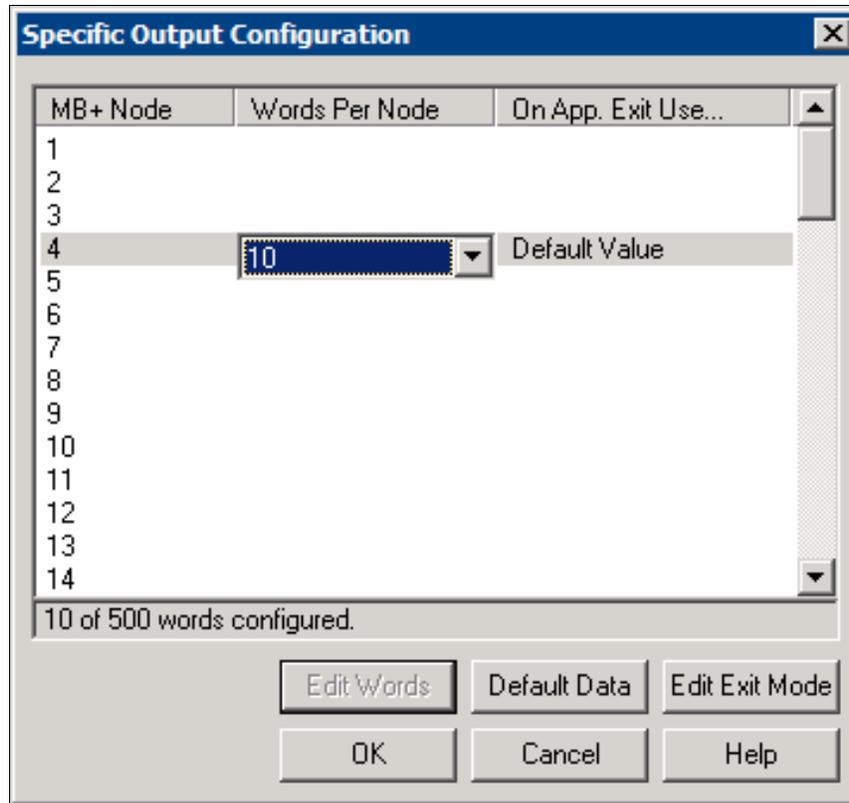
- Click the *Specific Outputs* button.

Peer Cop communications can send up to 32 words of Specific Output data to each node on a Modbus Plus network. The total amount of Specific Output data sent from all applications through a single host interface adapter must not exceed 500 words.

- Select a node intended to receive Specific Output data. Then click the *Edit Words* button (Or right-click and select *Edit* from the menu).



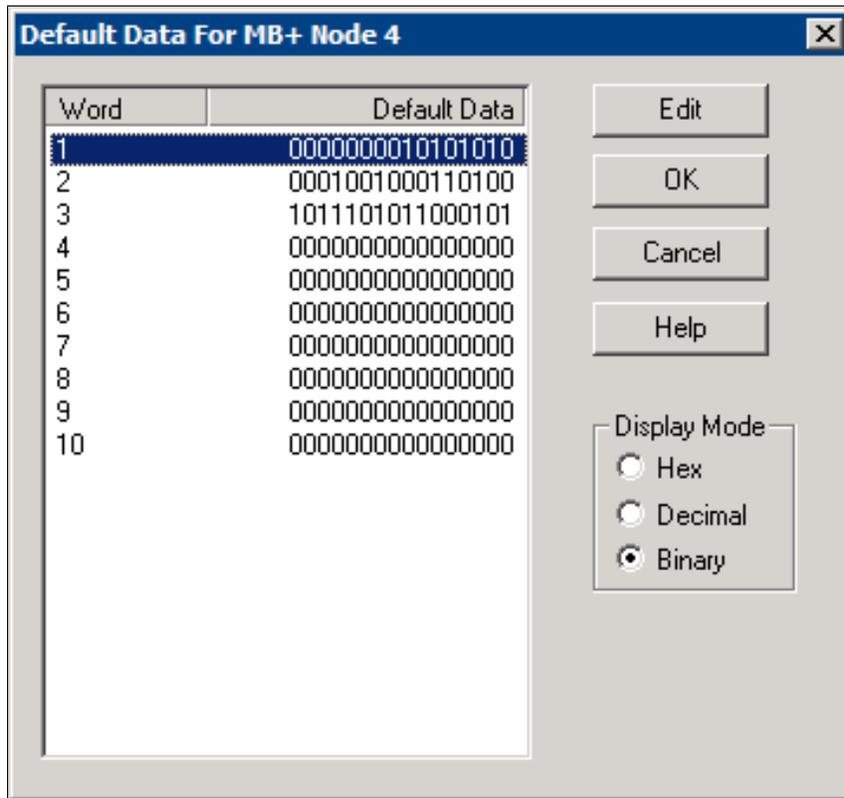
Select the proper number of words from the list and press *Enter*.



For every configured Specific Output, you can specify the default data that the driver will use before any application overwrites it.

11. Click the *Default Data* button. By default, all Specific Output data words are equal to zero.

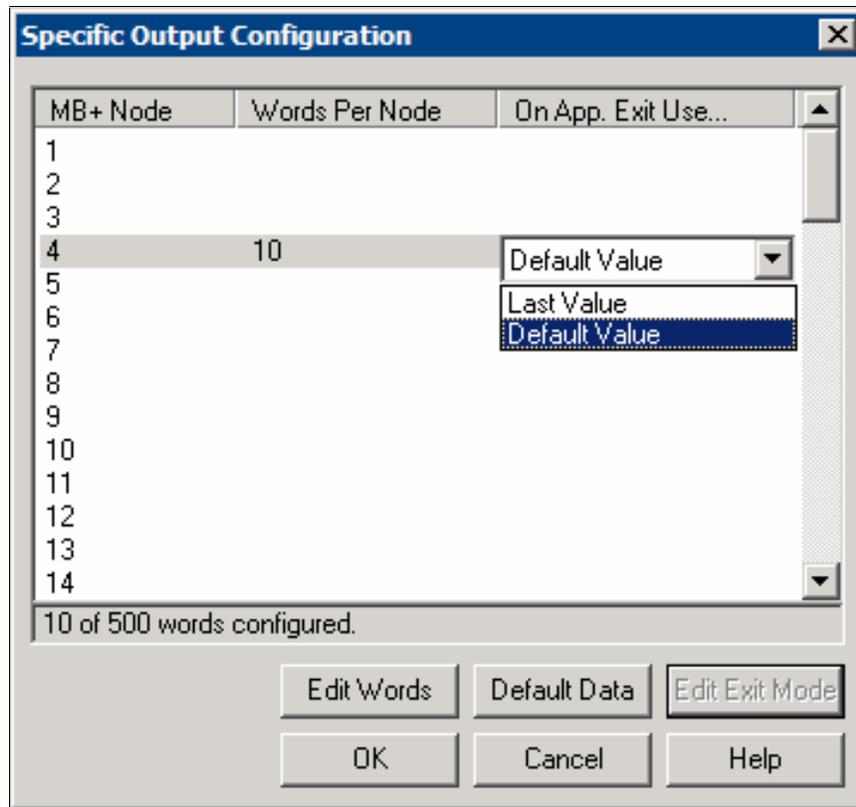
12. Select *Hex*, *Decimal* or *Binary* Display Mode. Select a word to edit and click the *Edit* button. Enter the new data value and press *Enter*.



Repeat this step for every data word that you want to edit. Then click the *OK* button to return to the Specific Output Configuration window.

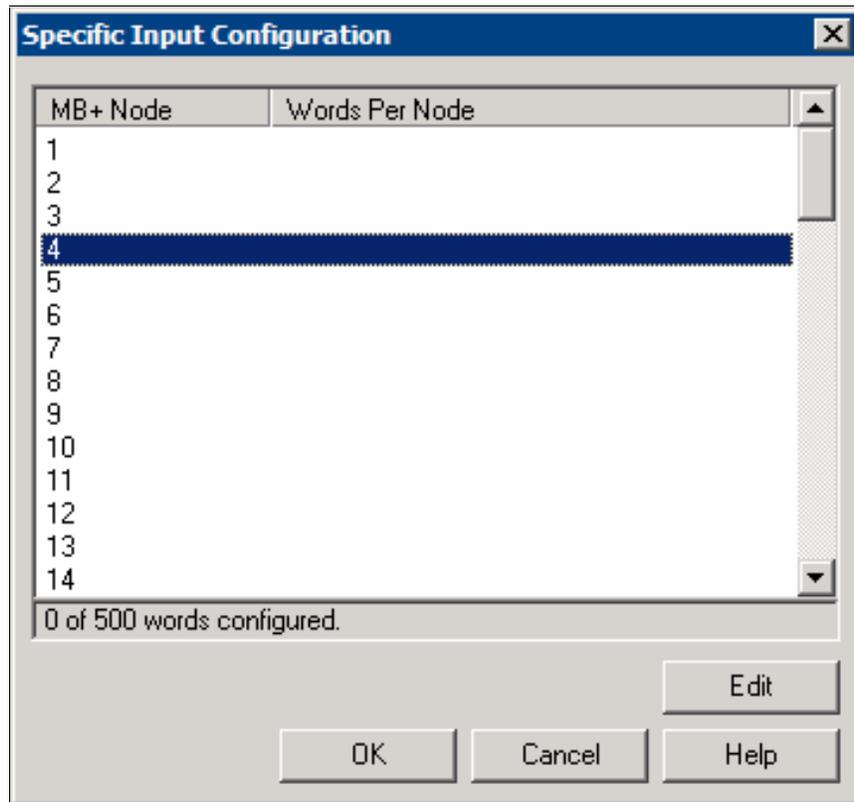
13. Select a node and click the *Edit Exit Mode* button. During the user application exit (either normal or abnormal termination), the Specific Outputs controlled by this application are either left in their last state or restored to a pre-configured default state by the driver.

Select *Default Value* or *Last Value* from the list and press *Enter*.

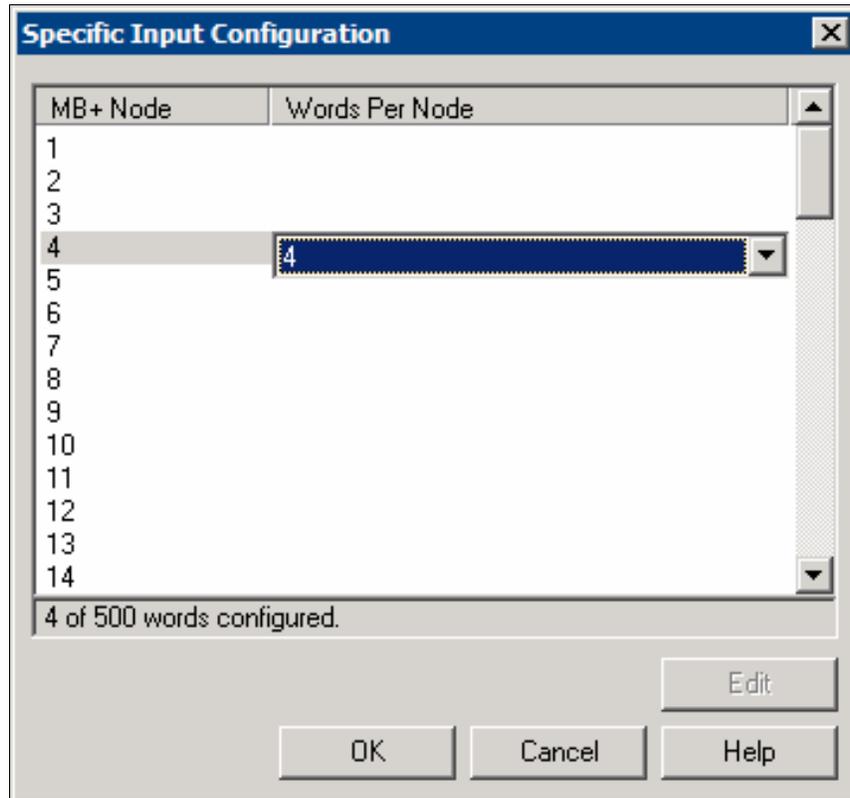


14. Repeat steps 9 through 13 until all nodes have been configured. Then click the *OK* button.

- From the Peer Cop page, click the *Specific Inputs* button. Select a node that you intend to receive Specific Input data from. Then click the *Edit* button (or right-click and select *Edit* from the menu).



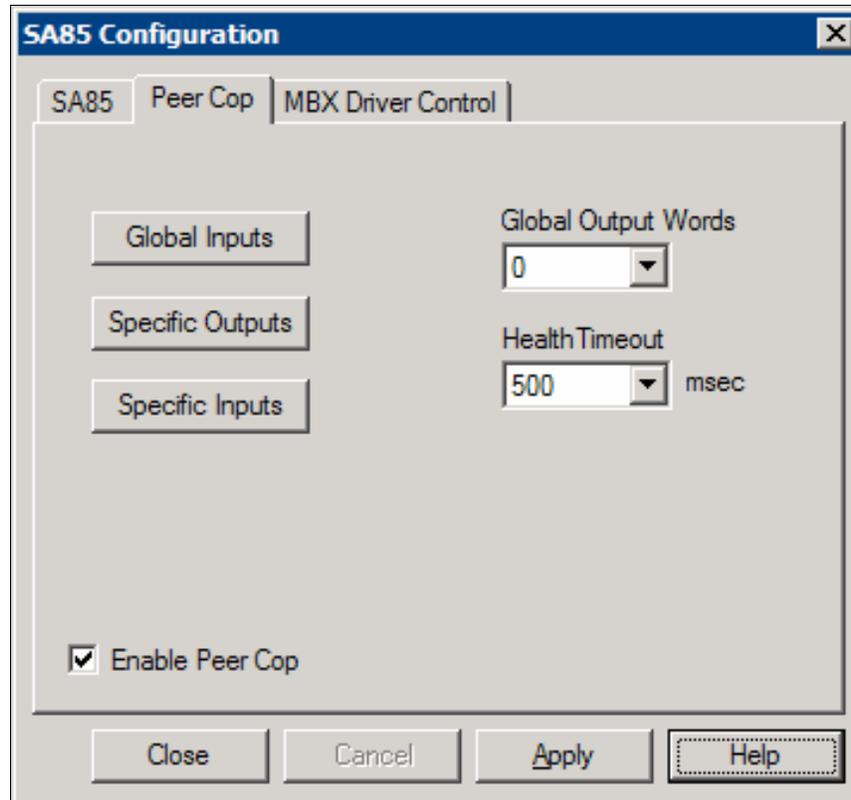
Select the number of desired words from the drop-down box. Up to 32 words of Specific Input data may be requested from each Modbus Plus node configured here, with the limitation that the total amount of requested data must not exceed 500 words



Repeat this step until all nodes have been configured. Then click the *OK* button.

16. By default, the driver will not transmit any global output data until a user application writes to the global output data buffer. However, the driver can be configured to transmit up to 32 words of global output data even before any application writes to this buffer. The data buffer will be set to zero.

From the Global Output Words drop-down, select the default number of Global Output data words to be transmitted by this adapter card.



From the Health Timeout list, select 500 msec.

The Health Timeout interval specifies the minimum time period that the Peer Cop configured communication must fail before the associated health bit is cleared. There is a 20 msec latency in this timeout value. Thus, the maximum amount of time that elapses before the health bit clears is the configuration time plus 20 msec. For example, if the user configures the health timeout to be 60 msec, then the health bit will be cleared no sooner than 60 msec and no later than 79 msec after communication has been lost. The suggested default setting for this timeout is 500 msec.

17. At this point your adapter card is fully configured. Click the *OK* button and then close the Device Manager.

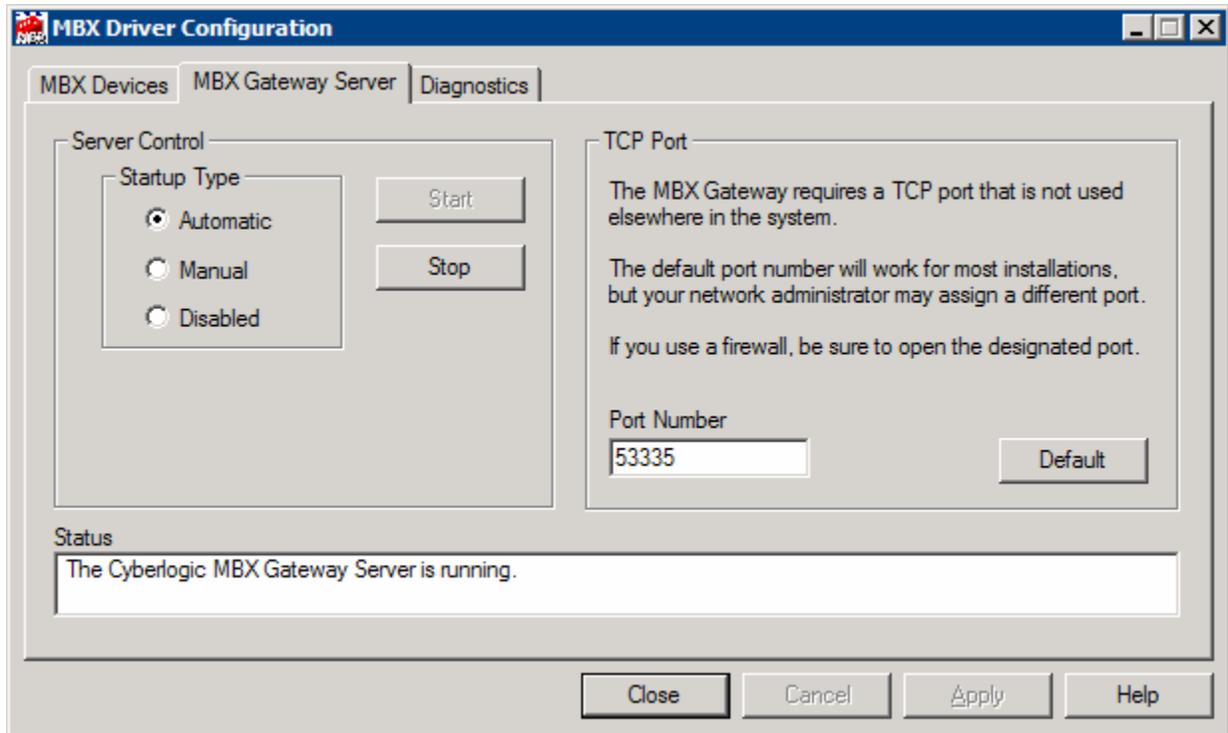
If you plan to use the MBX Gateway Driver on remote Windows XP/2000/NT nodes, go to the [MBX Gateway Server Configuration](#) segment. Refer to the [Remote Connectivity](#) section for more information on this capability.

Otherwise, go to the [Diagnostics](#) segment.

MBX Gateway Server Configuration

The MBX Driver comes with the MBX Gateway Server, a remote connectivity component of the MBX family. The Gateway Server, running in a system, allows remote nodes to access all configured MBX devices present on the same system.

18. Begin by opening the MBX Driver Configuration Editor. (From the Windows Start menu, locate the MBX Driver submenu and select the *MBX Driver Configuration* menu item.)
19. To configure the Gateway Server, select the *MBX Gateway Server* tab. You will see this screen:



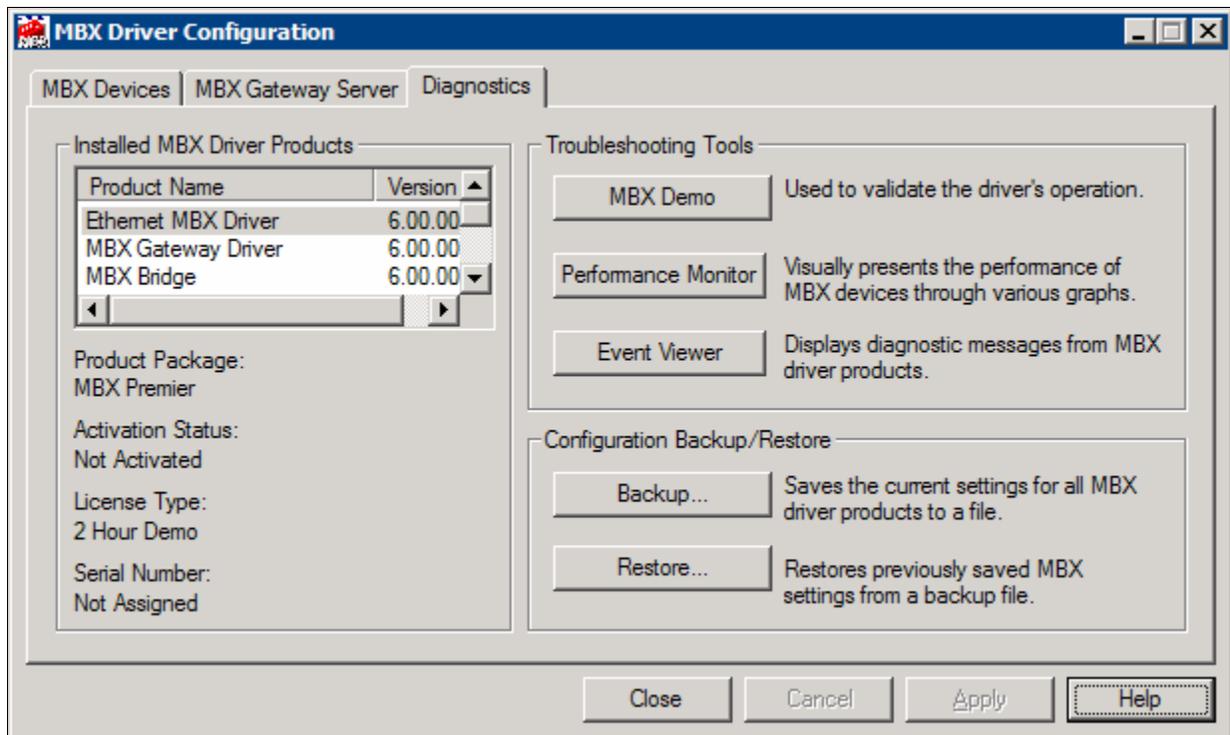
20. By default, the Gateway Server is created in the Automatic startup type. In this mode of operation, the server will start whenever the system is booted, and this is the mode that most users should select. If you want to control the Gateway Server manually, choose *Manual* in the Startup Type selection.
21. 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 and you can set that value here.

If your system uses a firewall, you must open the port that you configure here. The procedure will depend upon the firewall you are using. Refer to the [MBX Gateway Server Tab](#) discussion in the MBX Driver Configuration Editor section for more information.

The MBX Driver configuration is now complete. Go on to the [Diagnostics](#) segment, which will introduce you to the diagnostic features of the product.

Diagnostics

22. Select the *Diagnostics* tab. You will see the following screen:



The left pane of this screen shows all MBX driver products 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 demo mode.

The right pane of the screen provides shortcuts to troubleshooting and backup/restore tools. You should run the MBX Demo program after configuring the MBX Driver to ensure the driver is configured and running properly. You should also back up your configuration. Refer to the [Diagnostics Tab](#) discussion in the MBX Driver Configuration Editor section for more information on how to use these tools.

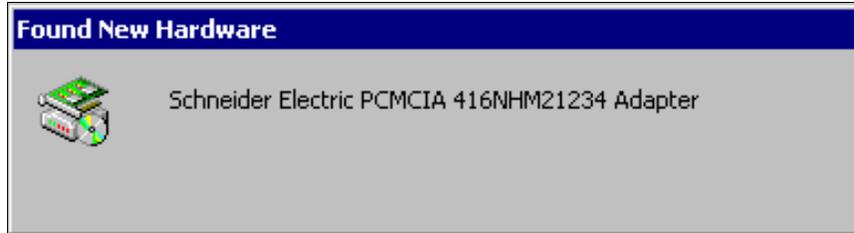
Creating a PnP Device

This section describes creating an MBX device that represents a physical interface adapter card. Once an MBX device is created, refer to the [Editing PnP Device Configuration](#) section for information on editing an existing adapter configuration. If you need a quick-start guide or a step-by-step configuration session tutorial, go back to the [Typical PnP Configuration Session](#) section.

1. Your PnP card may be a PCMCIA card, such as the PCMCIA 416NHM21234, or it may be a PCI card, such as the PCI-85 (416NHM30030/2). This first step is slightly different for each type.

PCMCIA

Insert the PCMCIA 416NHM21234 into an empty PCMCIA socket. The system will detect that new hardware has been added and display a Found New Hardware message with the PCMCIA 416NHM21234 name.



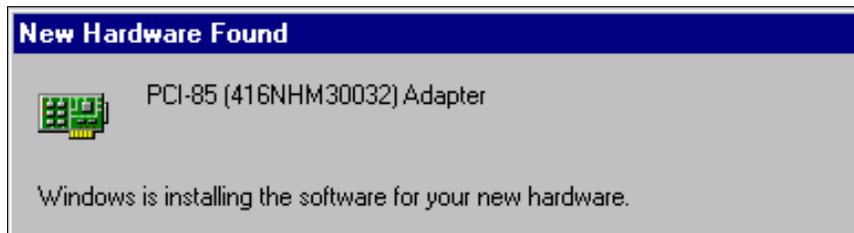
Note: If you don't see the Found New Hardware message after inserting the PCMCIA 416NHM21234 card, check for the Schneider TSXMBP100 device (with a yellow exclamation point) under the Other Devices branch of the Device Manager. Windows XP/2000 will create this device if you insert the card prior to installing the MBX Driver software. If the Schneider TSXMBP100 device is present, uninstall it (right-click and select *uninstall*) and then select the *Scan for hardware changes* from the Action menu.

The system will automatically allocate resources for the PCMCIA 416NHM21234 card and create an MBX device with the next available device number. All parameters for the new device will default to standard settings. They may or may not fully match the desired setting. Therefore, the next step is to access the Device Manager to finish the configuration process. Proceed to Step 2.

PCI

Install the MBX Driver software. The PCI-85 (416NHM30030/2) card supports Plug and Play and the system automatically detects and configures it when newly installed in the system. For this process to work correctly, the MBX Driver must be installed on your system before you install the card.

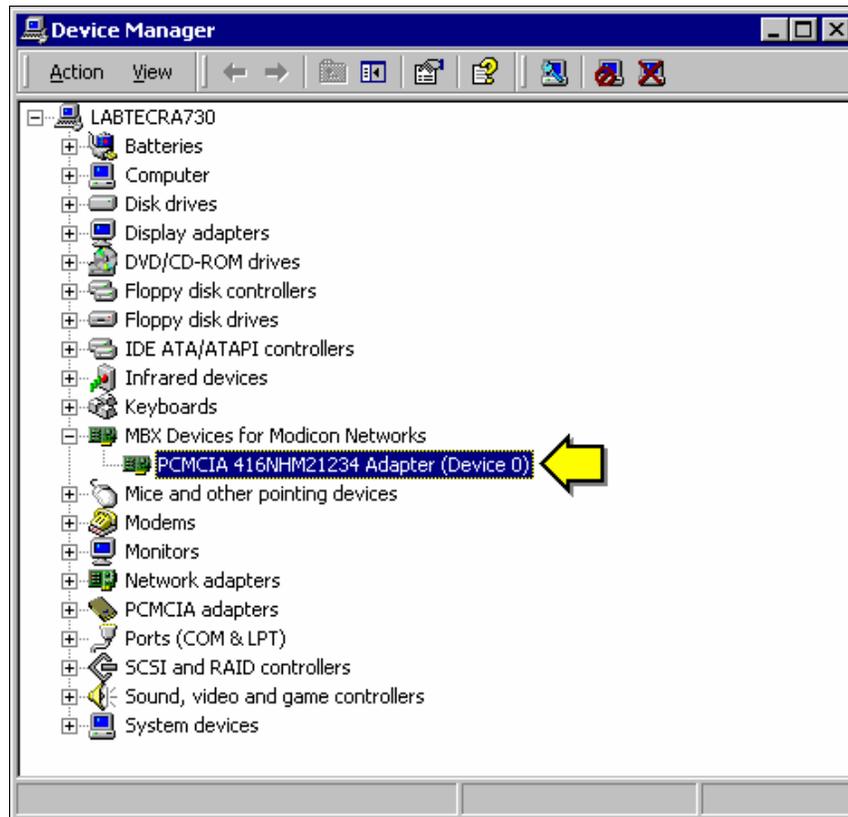
Turn off power and insert the adapter card into an empty PCI slot. Turn the power back on. During booting, the system will detect that new hardware has been added and display a Found New Hardware message with the PCI-85 (416NHM30030/2) name.



Note: If you don't see the Found New Hardware message after system reboot, check for the Network Controller device (with a yellow exclamation point) under the Other Devices branch of the Device Manager. Windows XP/2000 will create this device if you insert the card prior to installing the MBX Driver software. If the Network Controller device is present, uninstall it (right-click and select *uninstall*) and then select the *Scan for hardware changes* from the Action menu.

The system will automatically allocate resources for the PCI-85 card and create an MBX device with the next available device number. All parameters for the new device will default to standard settings. They may or may not fully match the desired setting. Therefore, the next step is to access the Device Manager to finish the configuration process. Proceed to Step 2.

2. Go to the Control Panel and double-click on the *System* icon.
3. Choose the *Hardware* tab and then click the *Device Manager* button.
4. Locate the MBX Devices for Modicon Networks branch and expand it. Select the device to be modified, right-click and select *Properties* from the menu. In this example, we show a PCMCIA device.

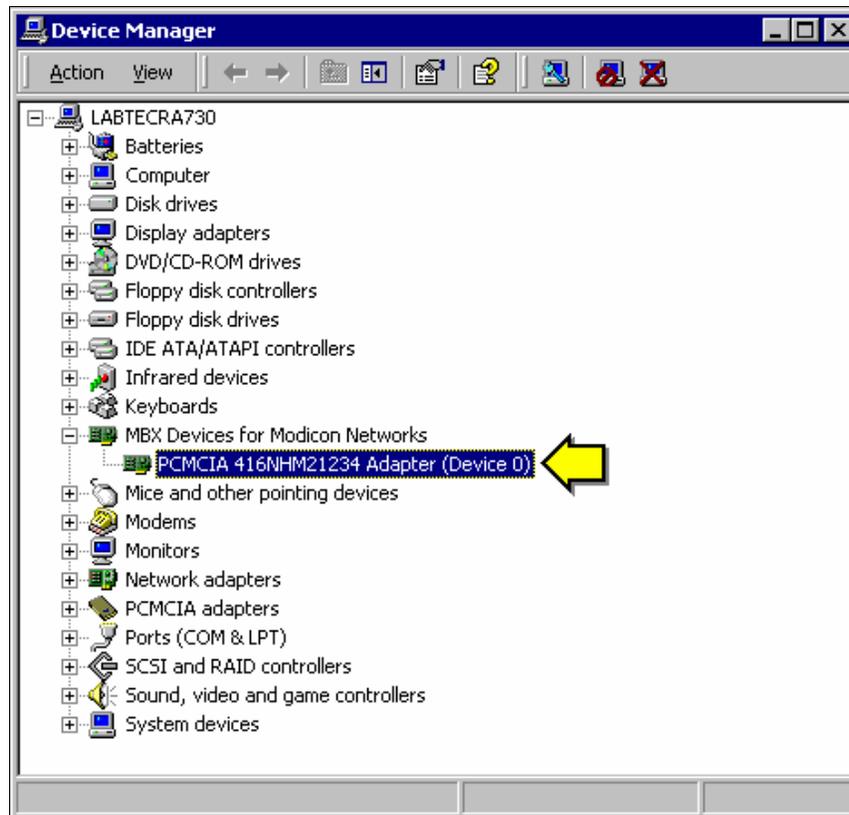


5. To finish the configuration process, proceed to the [PnP Adapter Card Editor](#) section.

Editing PnP Device Configuration

This section shows you how to reconfigure an existing MBX device. For information on creating an MBX device, refer to the [Creating a PnP Device](#) section. If you need a quick-start guide or a step-by-step configuration session tutorial, go to the [Typical PnP Configuration Session](#) section.

1. Go to the *Control Panel* and double-click on the *System* icon.
2. Choose the *Hardware* tab and then click the *Device Manager* button.



3. Locate the *MBX Devices for Modicon Networks* branch and expand it. Select the device to be modified, right-click and select *Properties* from the menu. For more information about editing a device configuration, proceed to the [PnP Adapter Card Editor](#) section.

PnP Adapter Card Editor

When you edit a PnP adapter card configuration, the Device Manager dispatches the PnP Adapter Card Configuration editor. The editor consists of five tabs.

Some tabs are standard for all device types and are automatically provided by the Device Manager. Of concern for configuration purposes are the Device Settings Tab and Resources Tab, which are specific to each adapter, and the Diagnostics Tab, which is common to all.

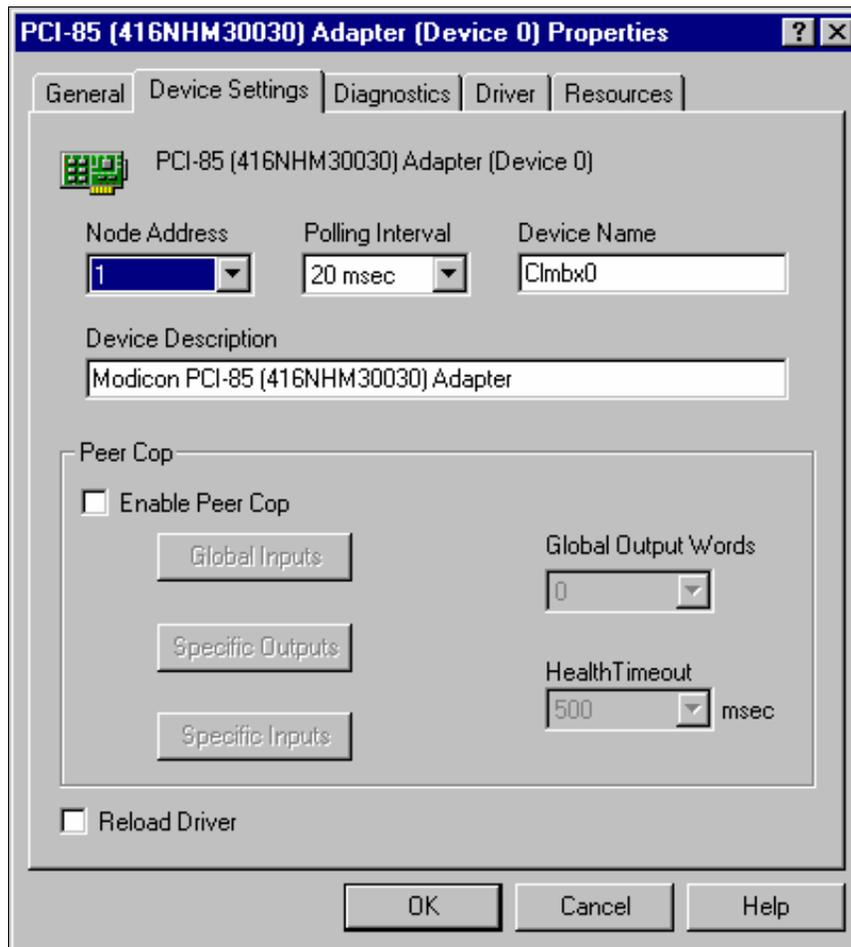
The following sections describe the configuration details for each supported adapter card type.

- [PCI-85 \(416NHM30030/2\)](#)
- [PCMCIA 416NHM21234](#)

At the end are sections covering the [Peer Cop](#) configuration and the [Diagnostics Tab](#), which are common to all adapter card types.

PCI-85 (416NHM30030/2)

Device Settings Tab



Node Address

This is the Modbus Plus node address for the adapter. Valid node addresses range from 1 to 64. The default for this parameter is 1.

Polling Interval

This parameter specifies the polling interval, in milliseconds, that the driver will use when running in polled mode. The valid range for the Polling Interval is 20-1000 msec. The default value is 20 msec.

Device Name

This parameter assigns a name to identify the device. The default for this parameter is *CIMbx#*, where # is the selected device number.

Device Description

This is a user assigned text for device description. During device creation, a default description text will be assigned. 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.

Peer Cop

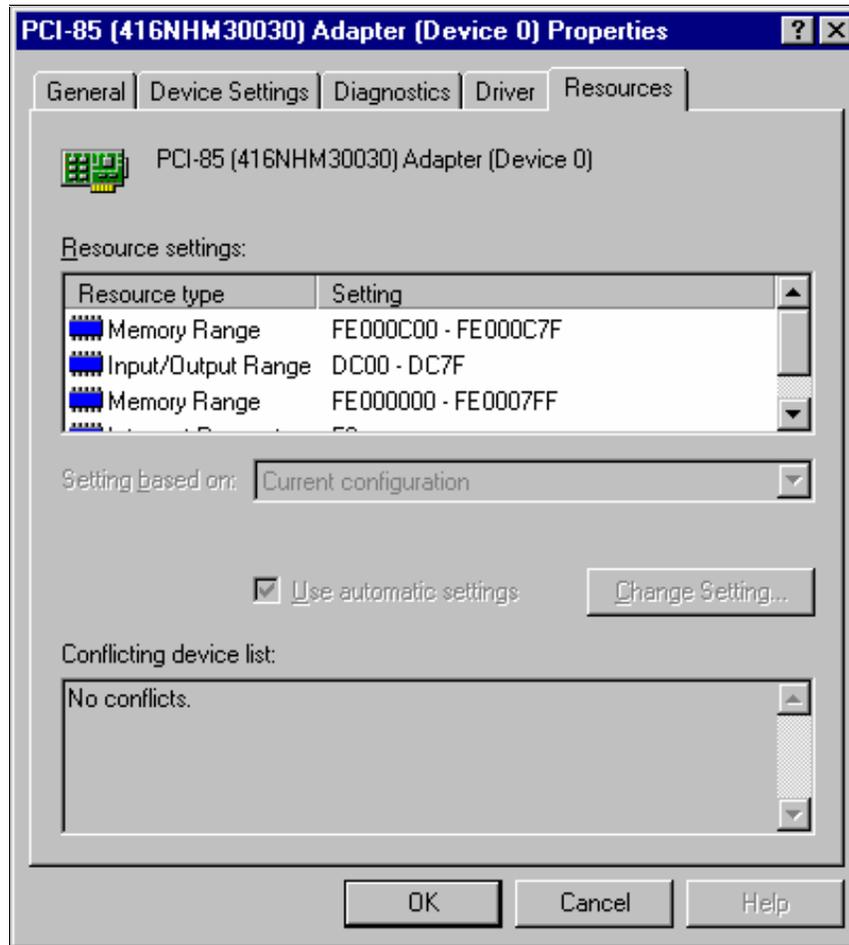
The PCI-85 (416NHM30030/2) card supports Peer Cop functionality. Refer to the [Peer Cop](#) section if you need to configure Peer Cop support.

Reload Driver

When this box is checked, the driver will reload using the new configuration parameters after the *OK* button is clicked.

Resources Tab

Note: A Plug and Play card, such as the PCI-85, should always use resources automatically allocated by the system. Be sure that the *Use automatic settings* check box is checked.



Memory Range

This parameter specifies the base address of the adapter card's memory window. Two memory ranges are automatically selected by the system and should not be changed.

Interrupt Request

In interrupt mode, this parameter specifies the IRQ number for the interrupt line used. The interrupt line is automatically selected by the system and should not be changed by the user.

The MBX Driver can operate in either polled mode or interrupt mode. Normally, the computer's BIOS will assign an interrupt line to the PCI-85 adapter card. Typically, this line is shared with other PCI cards in your system. If an interrupt line is successfully assigned, the driver will operate in the interrupt mode. If the BIOS fails to assign an interrupt line, the driver will operate in polled mode. The interrupt mode

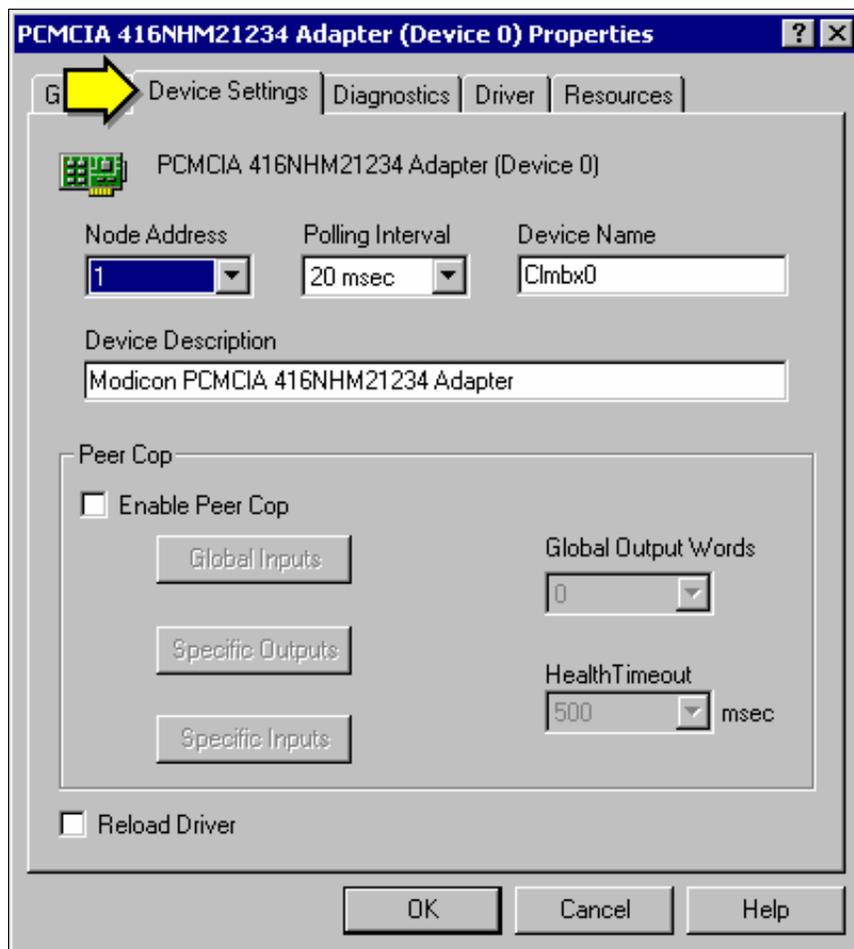
provides better performance than the polled mode at the cost of higher processor load. It is permitted to mix interrupt and polled modes of operation for different cards in the same system.

PCMCIA 416NHM21234

Note: The PCMCIA 416NHM21234 card supports Plug and Play (PnP) and can be plugged in at any time (before or after the system boot). However, before removal, you must exit all applications that are using the card and stop the driver. To stop the driver, follow the procedure below.

1. Go to the *Control Panel* and double-click the *Add/Remove Hardware* icon.
2. Follow the *Add/Remove Hardware* wizard. Select *Uninstall/Unplug device* when presented with a choice.
3. Select *Unplug/Eject a device* when presented with a choice.
4. Select your card from the list and complete the wizard.

Device Settings Tab



Node Address

This is the Modbus Plus node address for the adapter. Valid Node Addresses range from 1 to 64. The default for this parameter is 1.

Polling Interval

This parameter specifies the polling interval, in milliseconds, that the driver will use when running in polled mode. The valid range for the Polling Interval is 20-1000 msec. The default value is 20 msec.

Device Name

This parameter assigns a name to identify the device. The default for this parameter is *CIMbx#*, where # is the selected device number.

Device Description

This is a user assigned text for device description. During device creation, a default description text will be assigned. 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.

Peer Cop

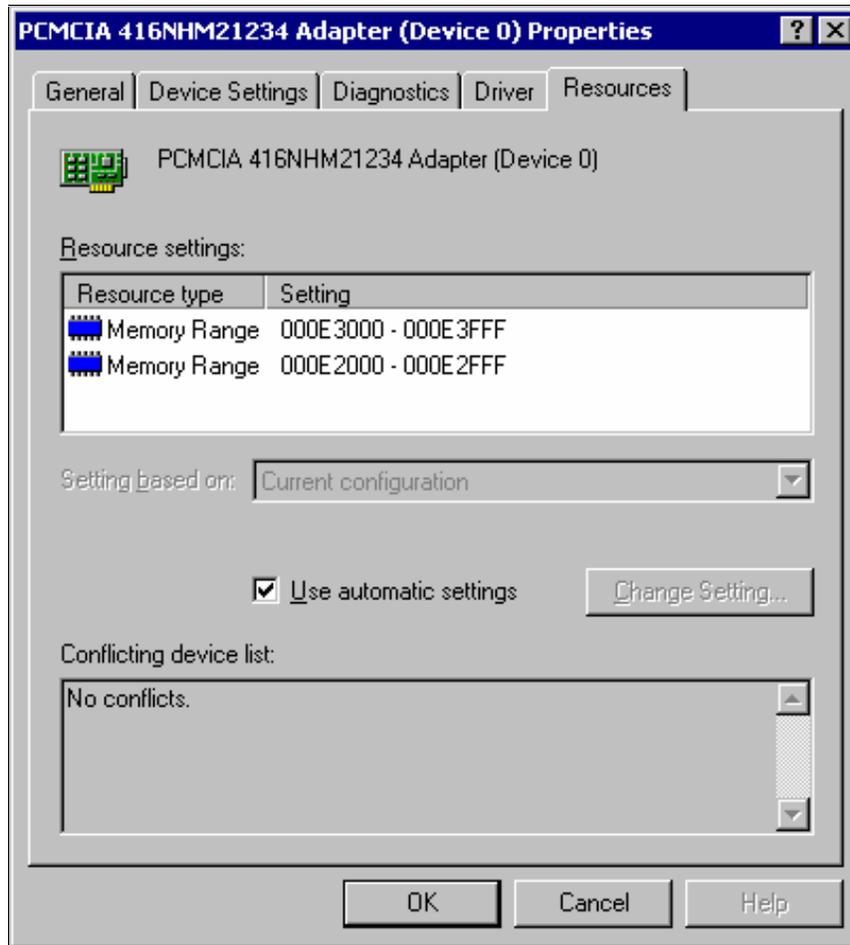
The PCMCIA 416NHM21234 card supports *Peer Cop* functionality. Refer to the [Peer Cop](#) section if you need to configure Peer Cop support.

Reload Driver

When this box is checked, the driver will reload using the new configuration parameters after the **OK** button is clicked.

Resources Tab

Note: A Plug and Play card, such as the PCMCIA 416NHM21234, should always use resources automatically allocated by the system. Be sure that the *Use automatic settings* check box is checked.



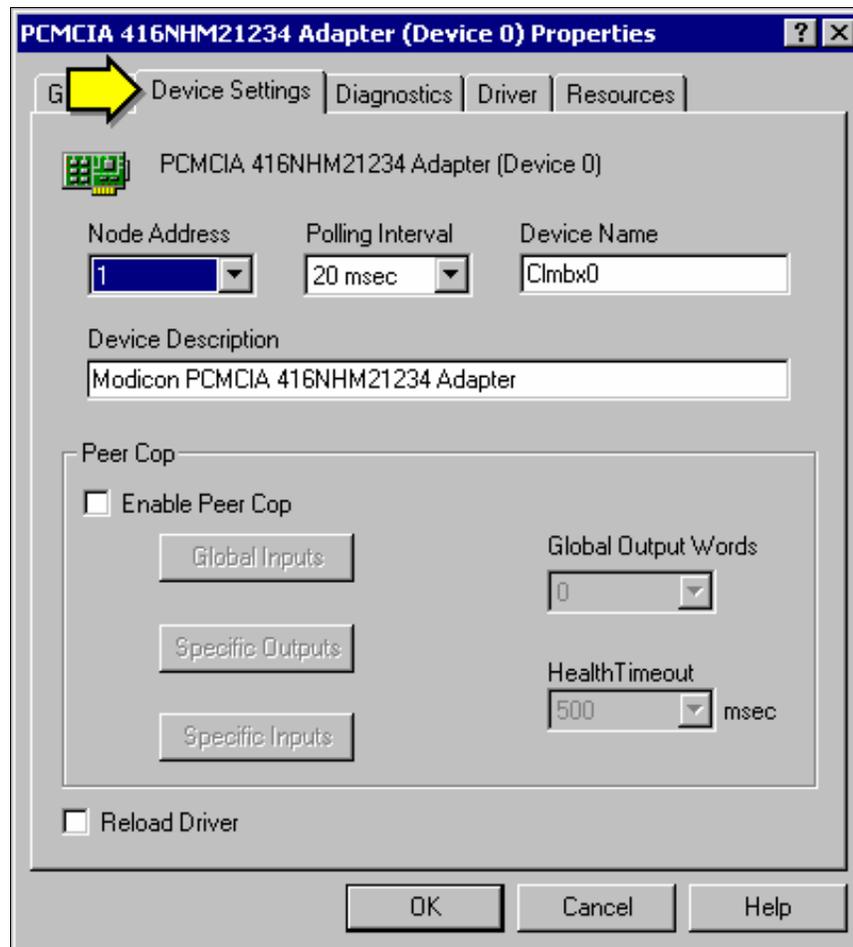
Memory Range

This parameter specifies the base address of the adapter card's memory window. Two memory ranges are automatically selected by the system and should not be changed.

Peer Cop

The Peer Cop communication settings are available on the Device Settings tab for PnP adapter cards. These settings are relevant only for the adapter cards supporting Peer Cop. Otherwise all settings will be ignored.

By default, Peer Cop communications are disabled. Enable them only if your applications require this type of communication. Unnecessary transmissions of Peer Cop related data may slow down the token rotation which consequently may affect the communication throughput for other types of messages.



Enable Peer Cop

This check box enables Peer Cop communications for the adapter card. By default, Peer Cop communications are disabled. Enable them only if your applications require this type of communication. Unnecessary transmissions of Peer Cop related data may slow down the token rotation and consequently may affect the communication throughput for other types of messages.

Global Inputs

Click this button to edit the Global Input Data. Refer to the [Global Inputs Configuration](#) section for more details.

Specific Outputs

Click this button to edit the Specific Output Data. Refer to the [Specific Outputs Configuration](#) section for more details.

Specific Inputs

Click this button to edit the Specific Input Data. Refer to the [Specific Inputs Configuration](#) section for more details.

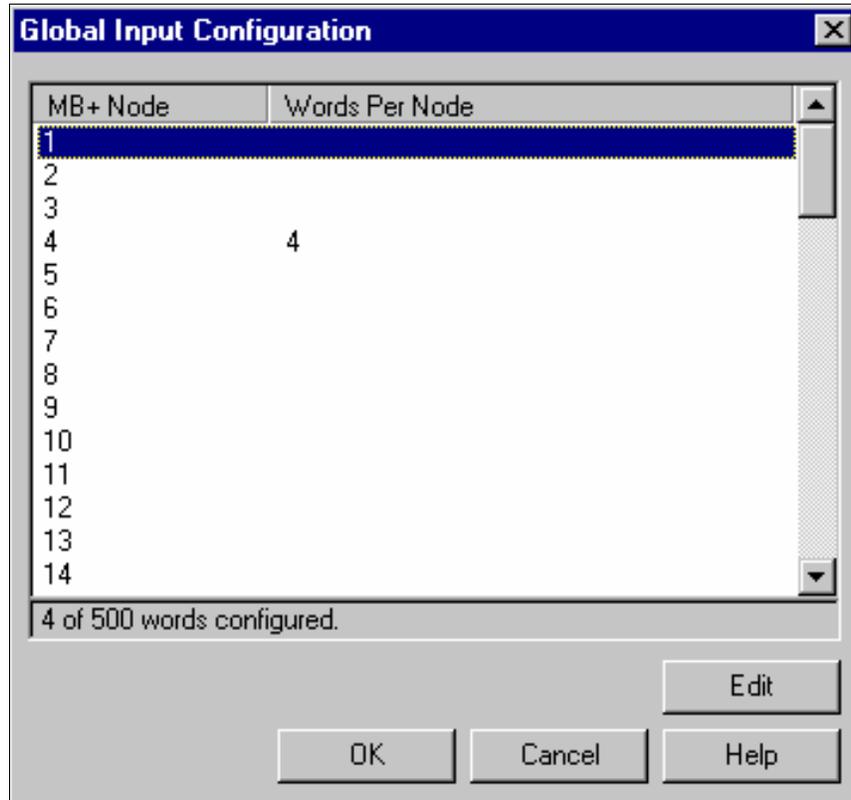
Global Output Words

By default, the driver will not transmit any global output data until a user application writes to the global output data buffer (defaults to 0). However, for the Peer Cop enabled adapter cards, the driver can be configured to transmit up to 32 words of global output data even before any application writes to this buffer. Refer to [Peer Cop Communications](#) in the Operation section for more information.

Health Timeout

The MBX Driver supports the Health Timeout Timer. The Health Timeout interval specifies the minimum time period that the Peer Cop configured communication must fail before the associated health bit clears. The recommended timeout value is 500 msec, which is the default setting.

Global Inputs Configuration



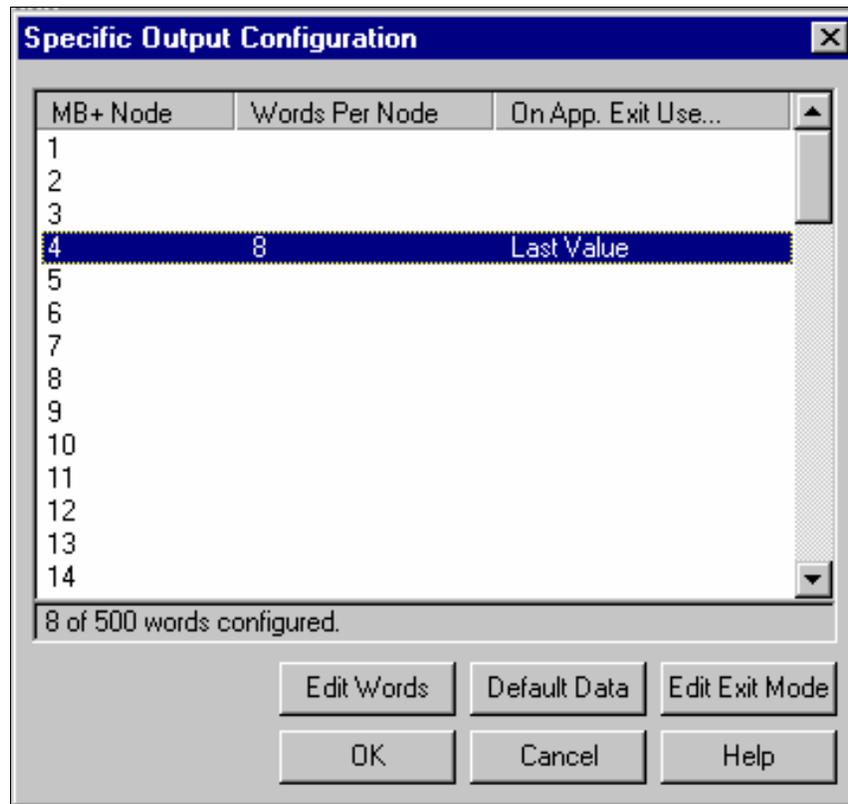
The global input data functionality is identical to the Global Data functionality already available in Modbus Plus prior to Peer Cop. However, Peer Cop provides this functionality in a more efficient way. For instance, Global Data from multiple nodes can be read in a single operation.

Up to 32 words of global input data may be requested from each configured node on the Modbus Plus network, with the limitation that the total amount of requested data must not exceed 500 words. Only nodes configured here can be read this way.

Setting Words Per Node To Read

Select a node to configure. Click the *Edit* button or right-click and select *Edit* from the menu. Select the number of words to read from the list and press *Enter*.

Specific Outputs Configuration



Peer Cop communications send up to 32 words of Specific Output data to each node on the Modbus Plus network. The total amount of data sent from all applications through a single host interface adapter must not exceed 500 words. Only nodes configured here can be written this way.

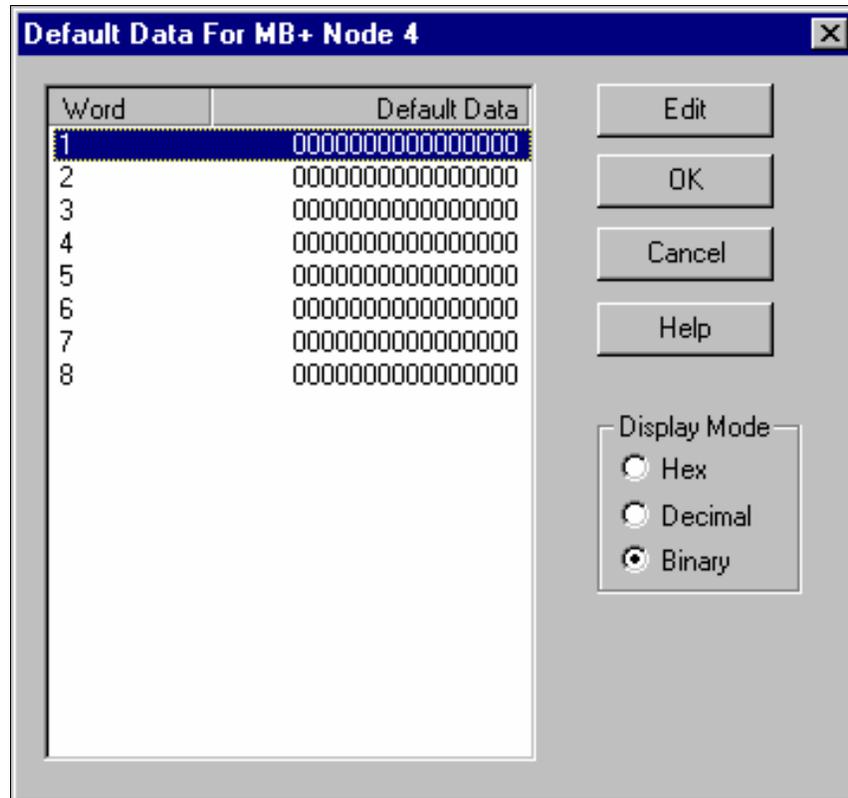
For every Specific Output word configured, you can specify the default data that the driver will use before some application overwrites it. By default, all Specific Output data words are filled with 0. You can also configure what action the driver should take on a user application exit (either normal or abnormal termination). The Specific Outputs controlled by this application are either left in their last state or restored to a pre-configured default state by the driver.

Setting Words Per Node To Write

First select the node to configure. Click the *Edit Words* button or right-click in the *Words Per Node* column and select *Edit* from the menu. Finally select the number of words to write from the list and press *Enter*.

Setting Default Data To Write

Select the node to configure. Click the *Default Data* button or right-click in the *Words Per Node* column and select *Default Data* from the menu. You will see the following screen:



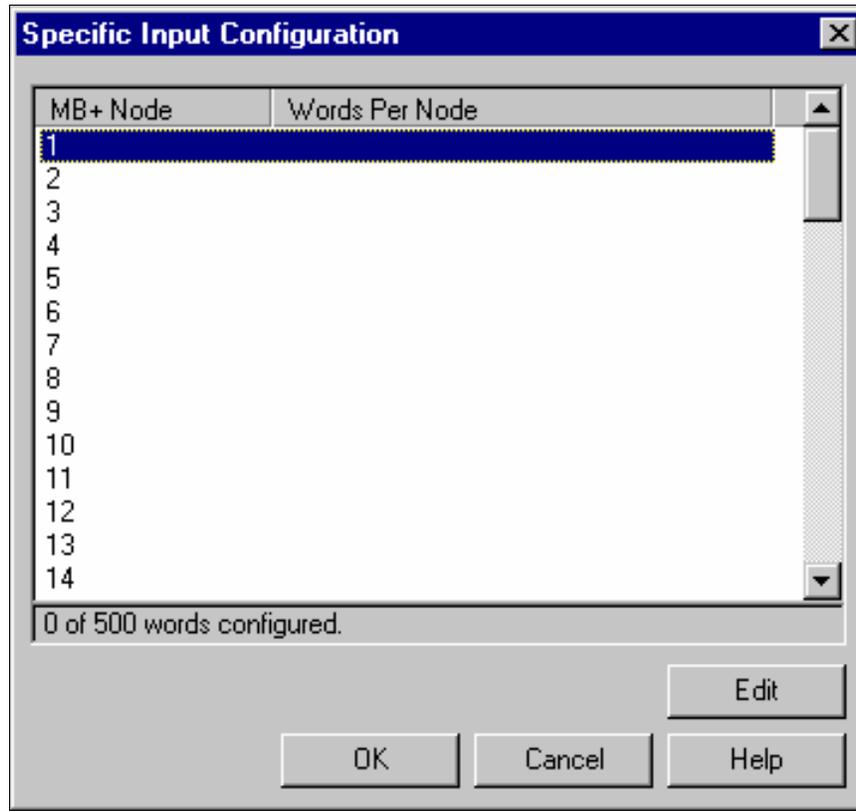
By default, all Specific Output data words are filled with zeros. The default data can be viewed and edited in Hex, Decimal or Binary. Select *Hex*, *Decimal* or *Binary Display Mode*. Select a word to edit and click the *Edit* button. Enter a new data value and press *Enter*. Repeat the above for every data word that you want to edit, and then click the *OK* button.

Setting Application Exit Mode

During a user application exit (either normal or abnormal termination), the Specific Outputs controlled by this application are either left in their last state or restored to a pre-configured default state by the driver. The *Edit Exit Mode* button sets the required behavior of the driver.

Click the *Edit Exit Mode* button. Select *Default Value* or *Last Value* from the list and press *Enter*.

Specific Inputs Configuration



Up to 32 words of Specific Input data may be requested from each Modbus Plus node configured here, with the limitation that the total amount of requested data must not exceed 500 words. Only nodes configured here can be read this way.

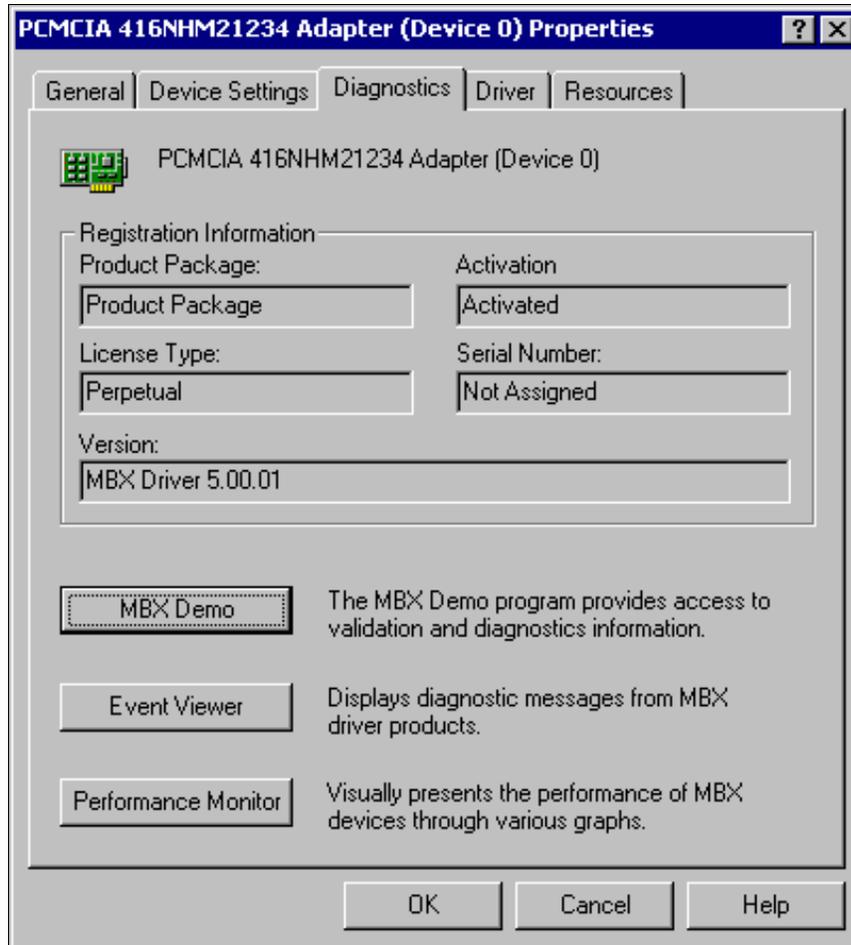
Setting Words Per Node to Read

Select a node to configure. Click the *Edit* button or right-click and select *Edit* from the menu. Select the number of words to read from the list and press *Enter*.

Caution: The Specific Output data from another node is accepted by a Specific Input data block only if the Specific Input data block is configured for the sending node and the length of the Specific Input data block (Words Per Node) exactly matches the length of the Specific Output data block from the expected node.

Diagnostics Tab

The top portion of this screen shows the registration information for the MBX Driver. This information, including the version number, may be requested if you call for technical support.



Run the [MBX Demo](#) program after configuring the MBX Driver to confirm that the driver is configured correctly and running properly.

In case of communication difficulties, the [Event Viewer](#) may provide error messages to guide you in troubleshooting problems.

To observe the performance of your communications, run the [Performance Monitor](#).

Refer to the [Validation & Troubleshooting](#) section for more information.

CONFIGURING NON-PNP ADAPTER CARDS

This section describes the procedure for configurations that do not support Plug and Play. You must use this procedure for the following adapter cards.

- AT984 / MC984
- PCMCIA 416NHM21200/3
- SA85 / SM85

<p>Caution: Microsoft has chosen not to support non-PnP PCMCIA cards for operating systems beginning with Windows 2000. If you wish to use the 416NHM21200/3, you must use the Windows NT operating system.</p>
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In addition, you must use this procedure for the following adapter cards when running under Windows NT. (If you are using the adapters below with Windows XP or 2000, go to the [Configuring PnP Adapter Cards](#) section.)

- PCI-85 (416NHM30030/2)
- PCMCIA 416NHM21234

The procedures you will use to configure non-PnP adapters is broken into several sections:

- [Typical Non-PnP Configuration Session](#) is a good place to start if you are a first-time user. It is a tutorial that walks you through a complete driver configuration session. It also introduces some diagnostic tools used for validating and troubleshooting the driver.
- [Creating a Non-PnP Device](#) is a guide to creating a new MBX device if you are just getting started or need to add a new adapter card.
- [Editing Non-PnP Device Configuration](#) describes how to open an existing device for editing.
- [Non-PnP Adapter Card Editor](#) describes how to edit the configuration for each model of adapter card.
- [MBX Driver Configuration Editor](#) describes the configuration of the MBX Driver itself.
- [Configuration Backup/Restore](#) shows how to backup and restore your configuration of MBX driver products.

Typical Non-PnP Configuration Session

The following steps show a typical configuration session. Use them only as a guideline. Only the most common features are shown here. For detailed descriptions, refer to the [Non-PnP Adapter Card Editor](#) section.

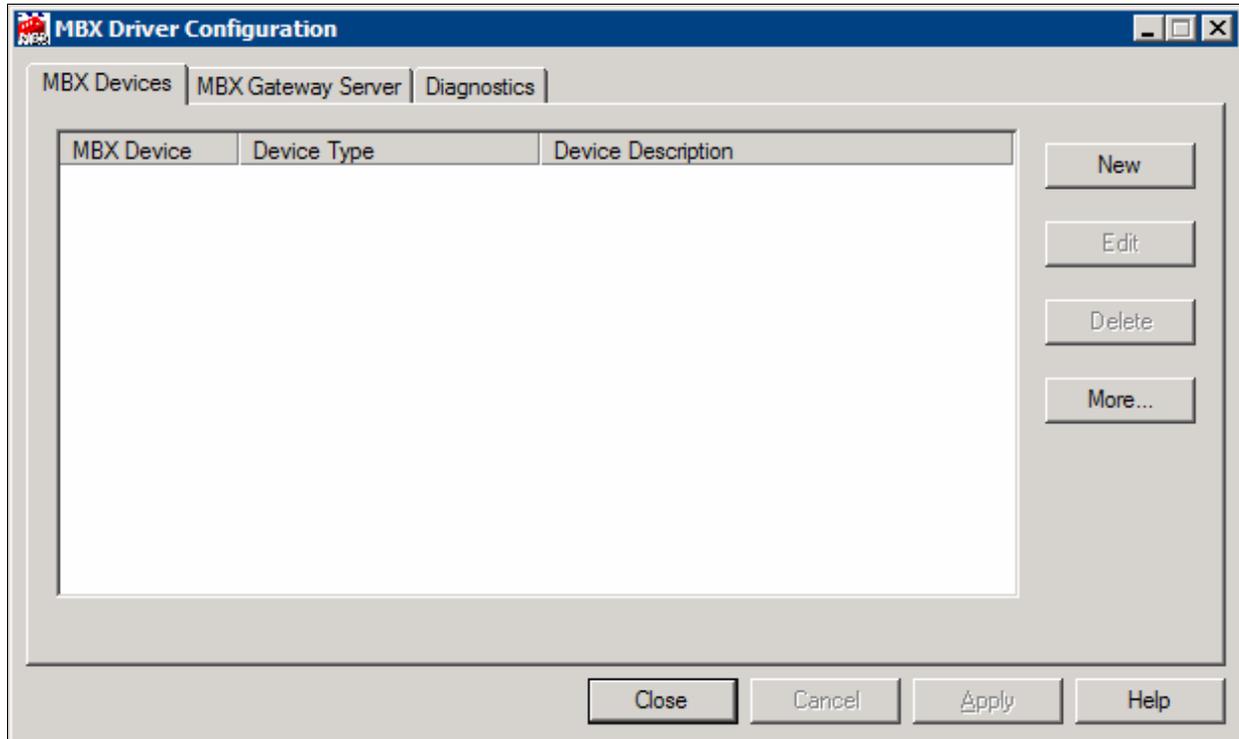
The procedure is broken into four segments. The first shows how to create an MBX device and configure an adapter card. The second covers Peer Cop configuration. The third covers configuration of the MBX Gateway Server. The last segment introduces the diagnostic capabilities of the software.

To begin, go to [Creating and Configuring a Non-PnP Device](#).

Creating and Configuring a Non-PnP Device

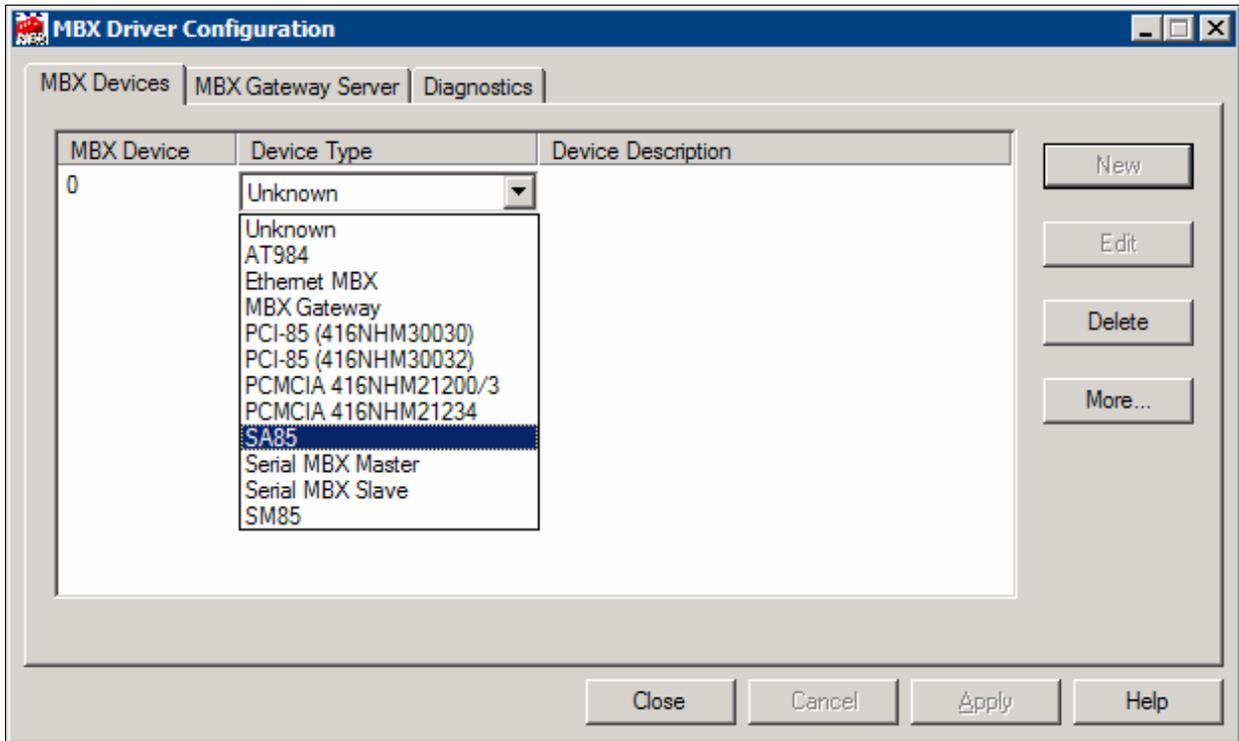
1. From the Windows Start menu, locate the MBX Driver submenu and select the *MBX Driver Configuration* menu item.

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

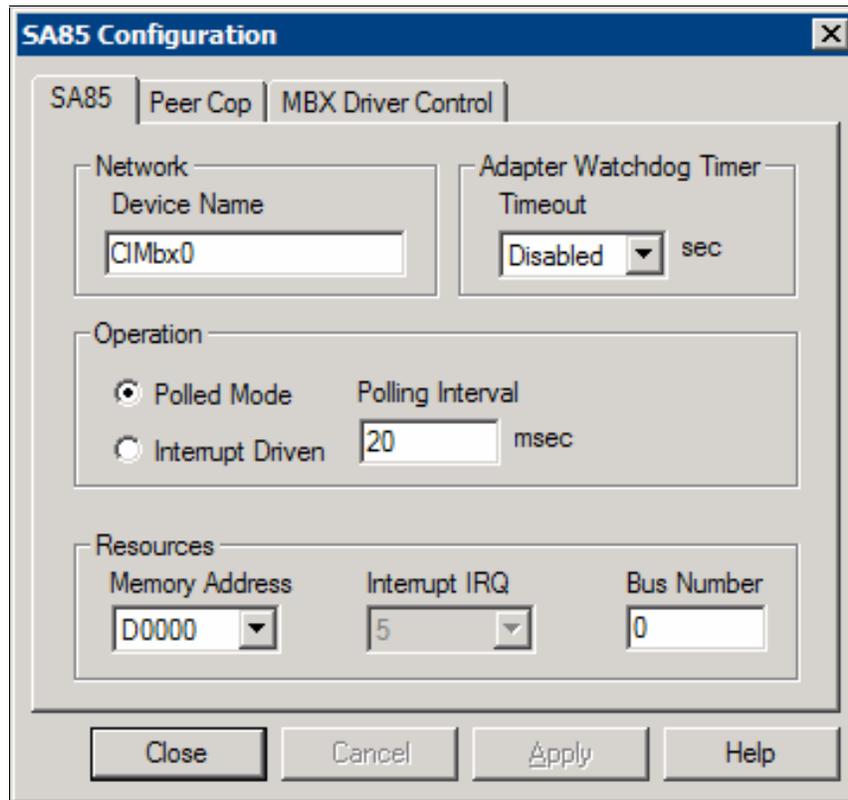


The first step in configuring the MBX Driver is to set up at least one host interface adapter. For this example, we will use the SA85 card.

2. Click the *New* button and select SA85 from the drop-down list.



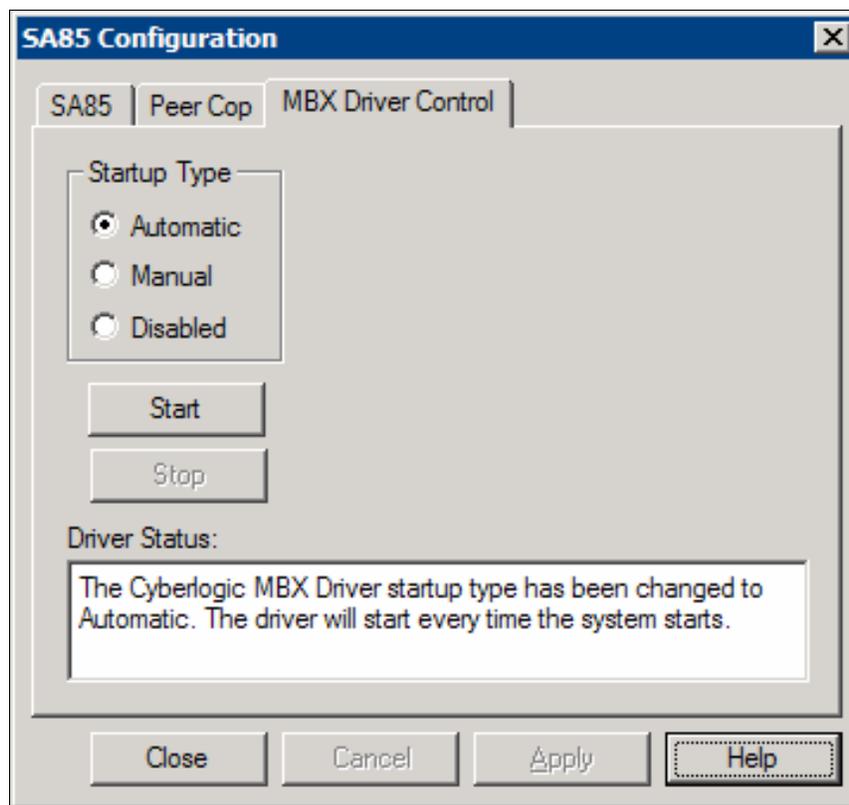
3. The MBX Driver Configuration Editor will automatically dispatch the SA85 Configuration Editor. You will see the following screen:



The SA85 Configuration Editor has three configuration tabs. By default, the card configuration tab is selected. This tab allows configuration of all parameters related to the selected adapter card. Typically, only parameters related to the hardware settings need to be configured. We recommend that you initially configure the card for the polled mode of operation.

Select the *Memory Address* that matches the DIP switch settings on your card.

4. Select the *MBX Driver Control* tab. You will see the following screen:



Use the MBX Driver Control tab to start the MBX Driver and configure the startup options. By default the driver is configured for the *Automatic* startup type. In this mode, the driver automatically starts during the system boot. This is the recommended mode of operation for the driver.

5. Select the *Automatic* startup type.

The *Peer Cop* tab is relevant only for adapter cards that support Peer Cop, such as the current version of the dual-channel SA85. If your card supports Peer Cop and your applications will use Peer Cop communications, go directly to the [Peer Cop Communications](#) segment, skipping the rest of this step.

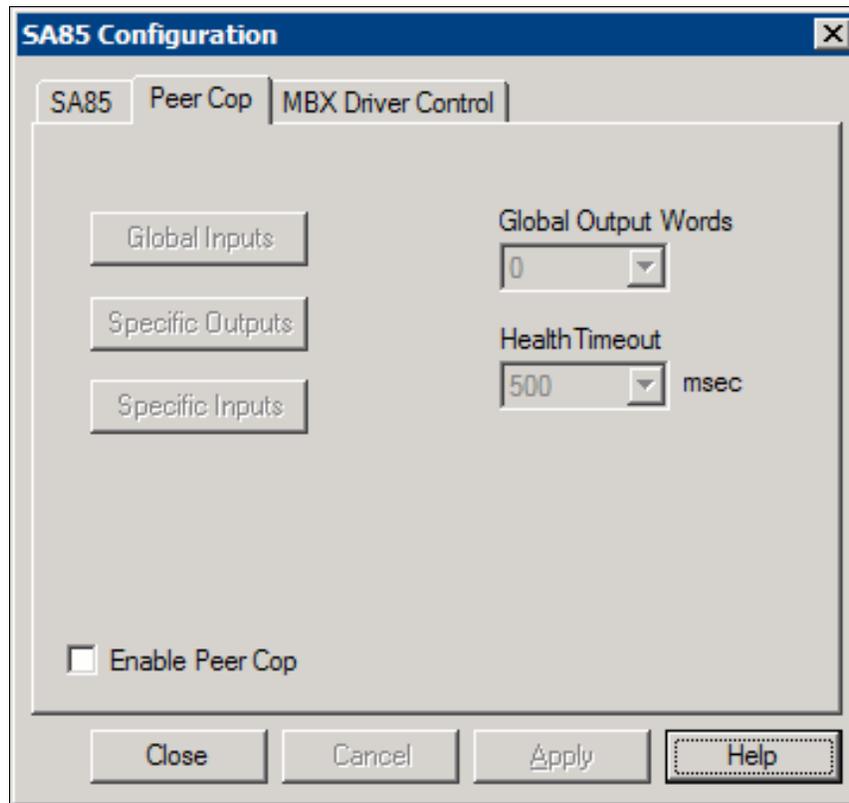
If you do not wish to use Peer Cop communication, click the *OK* button. You will return to the MBX Driver Configuration Editor.

If you plan to use the MBX Gateway Driver on remote Windows XP/2000/NT nodes, go to the [MBX Gateway Server Configuration](#) segment. Refer to the [Remote Connectivity](#) section for more information on this capability.

Otherwise, go to the [Diagnostics](#) segment.

Peer Cop Communications

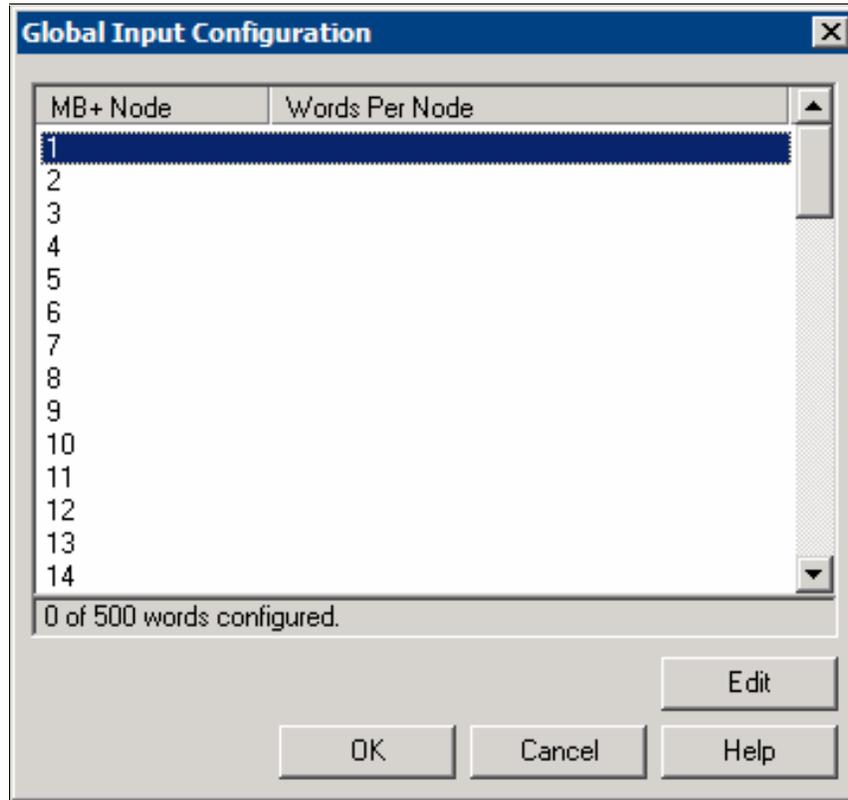
6. Select the *Peer Cop* tab.



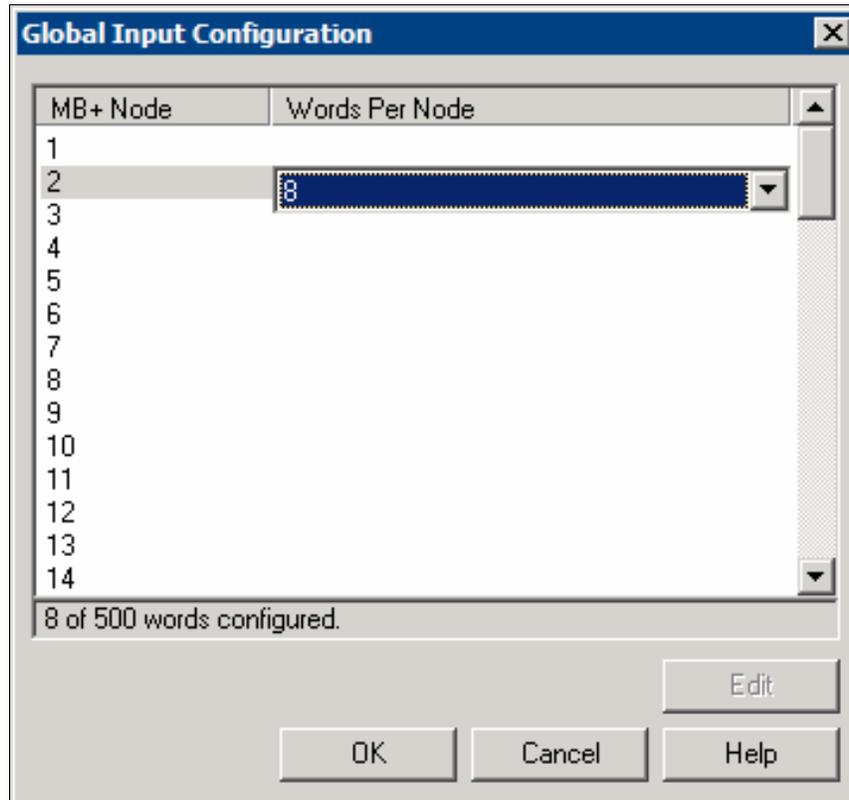
7. Select the *Enable Peer Cop* check box. Then click the *Global Inputs* button.

The Global Data (input and output) functionality is identical to the Global Data functionality already available in Modbus Plus prior to Peer Cop. However, Peer Cop provides this functionality in a more efficient way. For instance, global input data from multiple nodes can be read in a single operation.

8. Select a node intended to receive Global Data. Click the *Edit* button or right-click and select *Edit* from the menu.



From the drop-down box, select the number of words of global data to be requested from the node. Up to 32 words of global input data may be requested from each Modbus Plus node configured here, with the limitation that the total amount of requested data must not exceed 500 words.

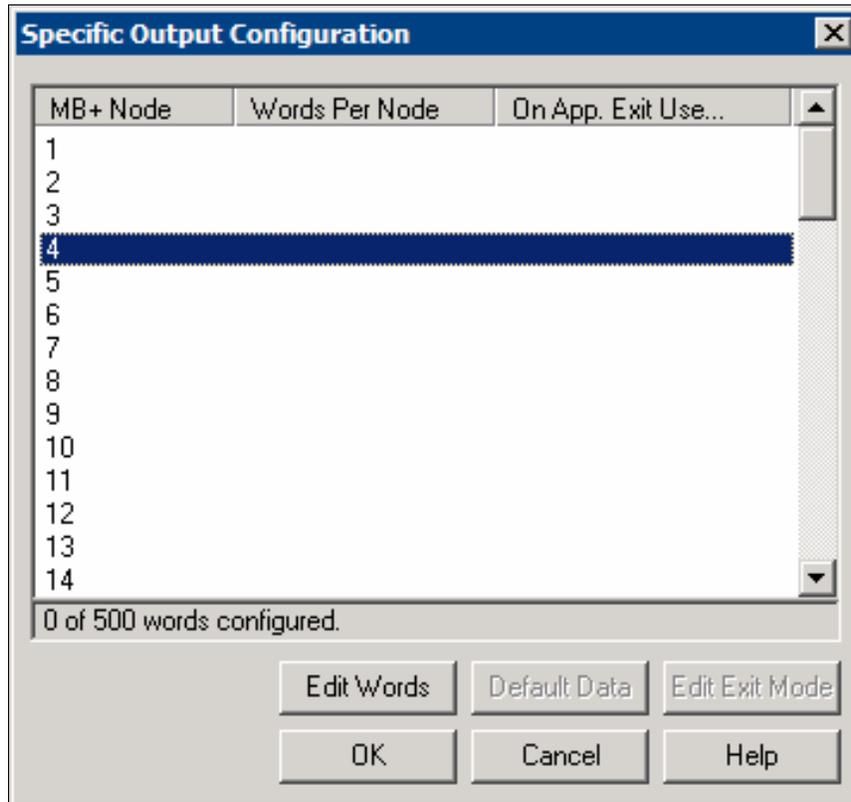


Repeat this step until all nodes are configured, then click the *OK* button.

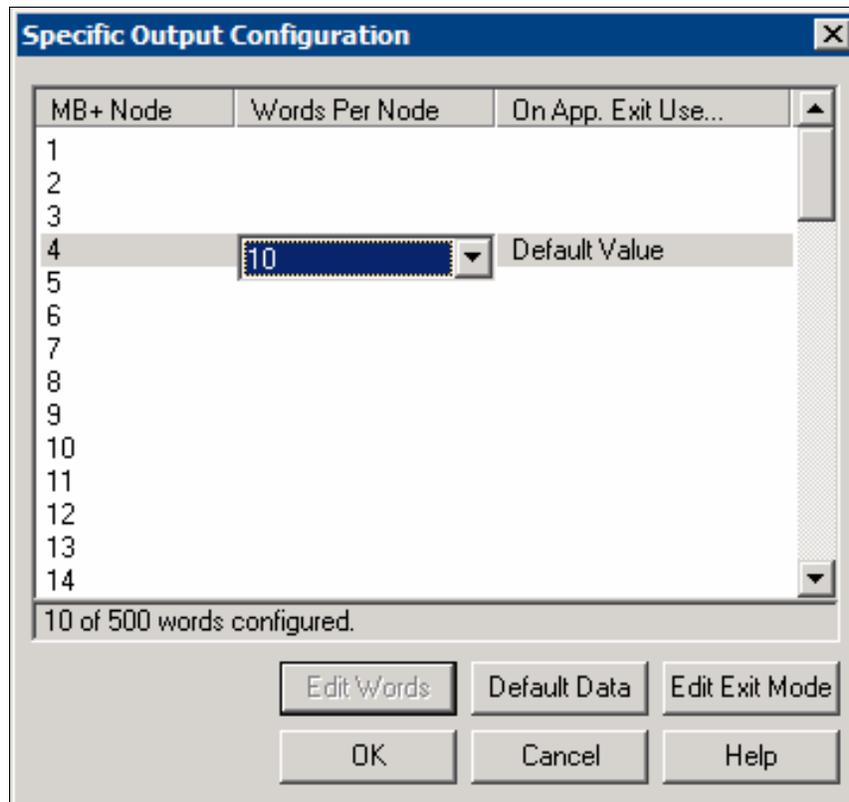
9. Click the *Specific Outputs* button.

Peer Cop communications can send up to 32 words of Specific Output data to each node on a Modbus Plus network. The total amount of Specific Output data sent from all applications through a single host interface adapter must not exceed 500 words.

10. Select a node intended to receive Specific Output data. Then click the *Edit Words* button (Or right-click and select *Edit* from the menu).



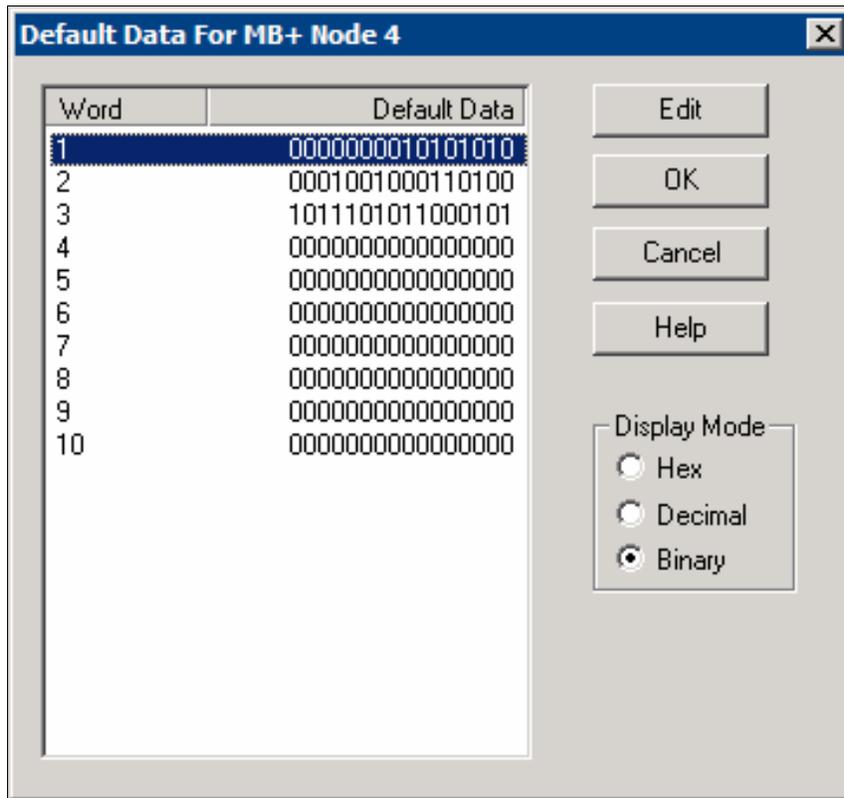
Select the proper number of words from the list and press *Enter*.



For every configured Specific Output, you can specify the default data that the driver will use before any application overwrites it.

11. Click the *Default Data* button. By default, all *Specific Output* data words are equal to zero.

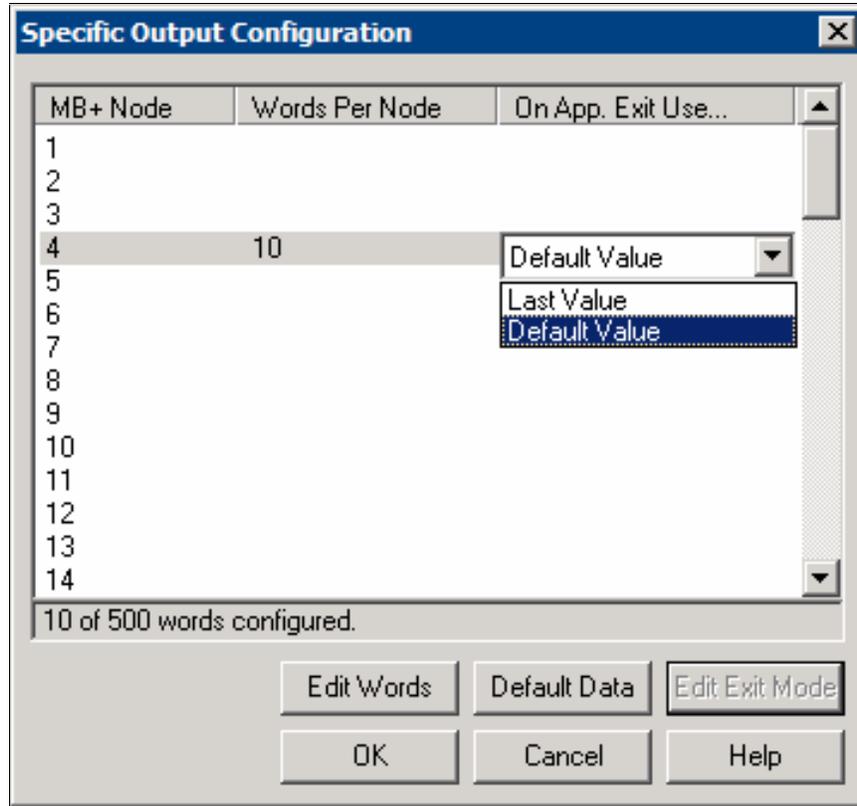
12. Select *Hex*, *Decimal* or *Binary* Display Mode. Select a word to edit and click the *Edit* button. Enter the new data value and press *Enter*.



Repeat this step for every data word that you want to edit. Then click the *OK* button to return to the *Specific Output Configuration* window.

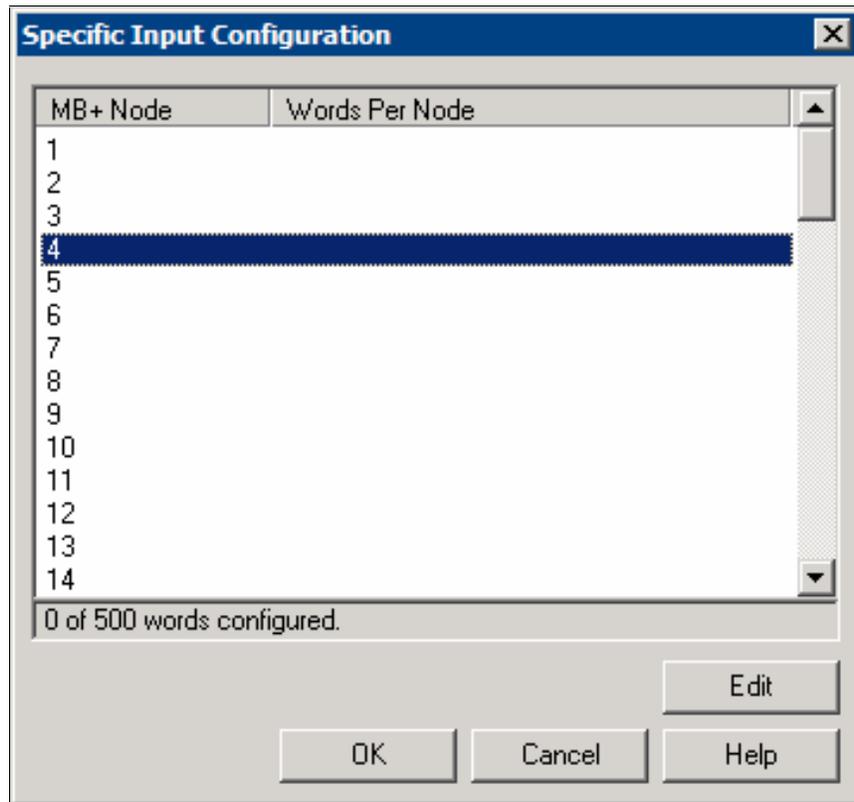
13. Select a node and click the *Edit Exit Mode* button. During the user application exit (either normal or abnormal termination), the Specific Outputs controlled by this application are either left in their last state or restored to a pre-configured default state by the driver.

Select *Default Value* or *Last Value* from the list and press *Enter*.

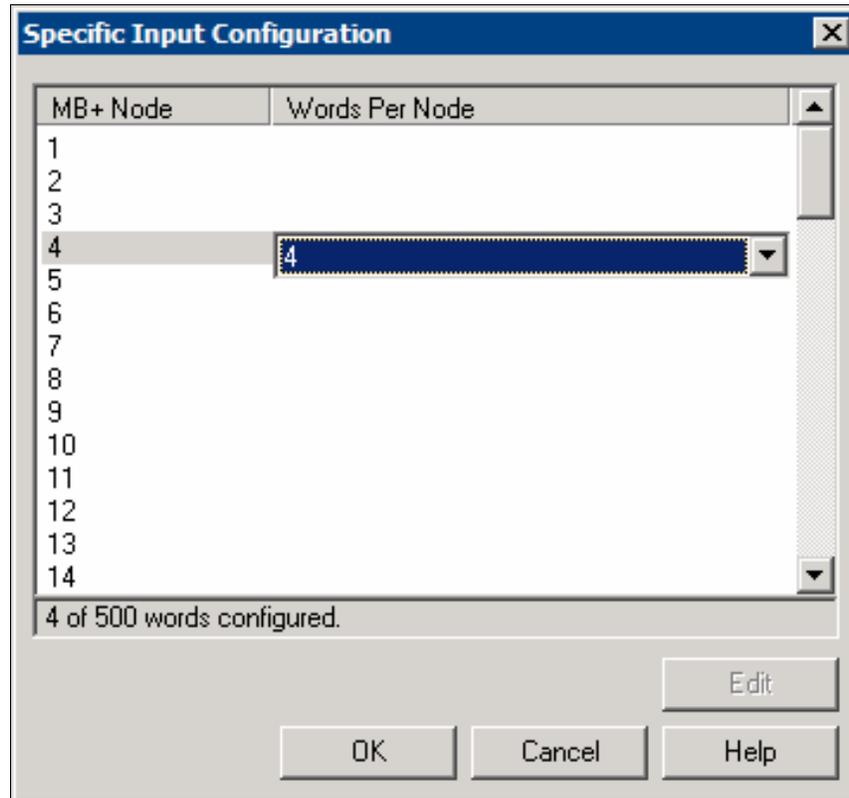


14. Repeat steps 9 through 13 until all nodes have been configured. Then click the *OK* button.

- From the *Peer Cop* page, click the *Specific Inputs* button. Select a node that you intend to receive *Specific Input* data from. Then click the *Edit* button (or right-click and select *Edit* from the menu).



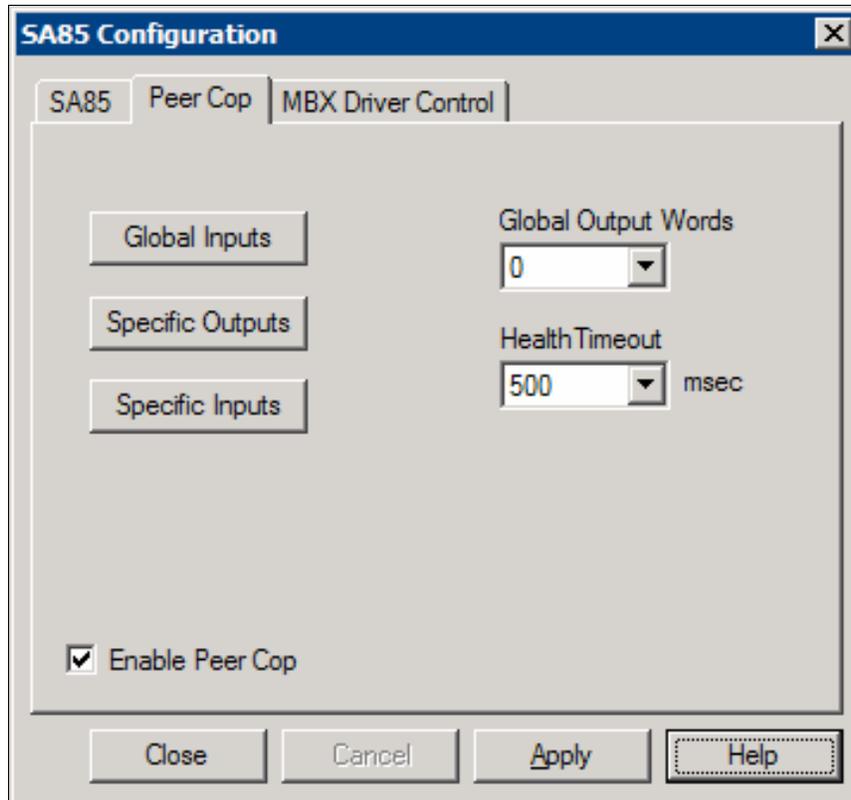
Select the number of desired words from the drop-down box. Up to 32 words of *Specific Input* data may be requested from each Modbus Plus node configured here, with the limitation that the total amount of requested data must not exceed 500 words



Repeat this step until all nodes have been configured. Then click the *OK* button.

16. By default, the driver will not transmit any global output data until a user application writes to the global output data buffer. However, the driver can be configured to transmit up to 32 words of global output data even before any application writes to this buffer. The data buffer will be set to zero.

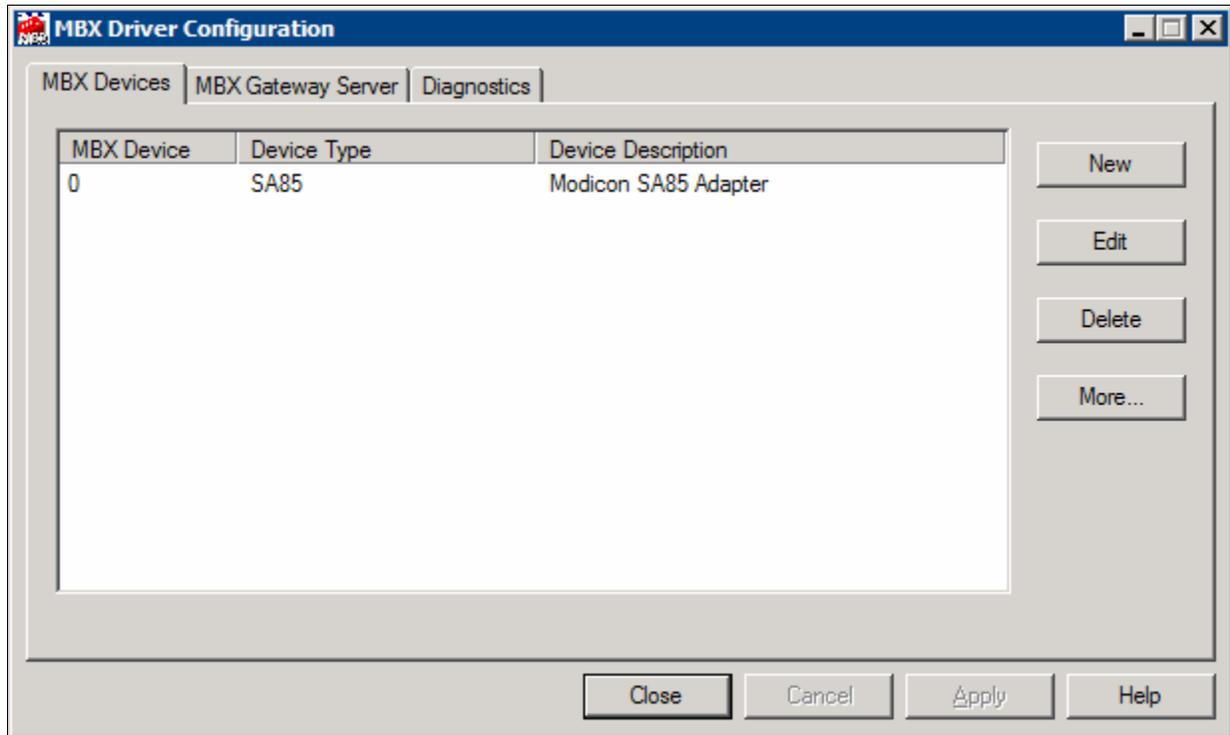
From the *Global Output Words* drop-down, select the default number of Global Output data words to be transmitted by this adapter card.



From the *Health Timeout* list, select 500 msec.

The Health Timeout interval specifies the minimum time period that the Peer Cop configured communication must fail before the associated health bit is cleared. There is a 20 msec latency in this timeout value. Thus, the maximum amount of time that elapses before the health bit clears is the configuration time plus 20 msec. For example, if the user configures the health timeout to be 60 msec, then the health bit will be cleared no sooner than 60 msec and no later than 79 msec after communication has been lost. The suggested default setting for this timeout is 500 msec.

17. Click the *OK* button. You will return to the MBX Driver Configuration Editor.



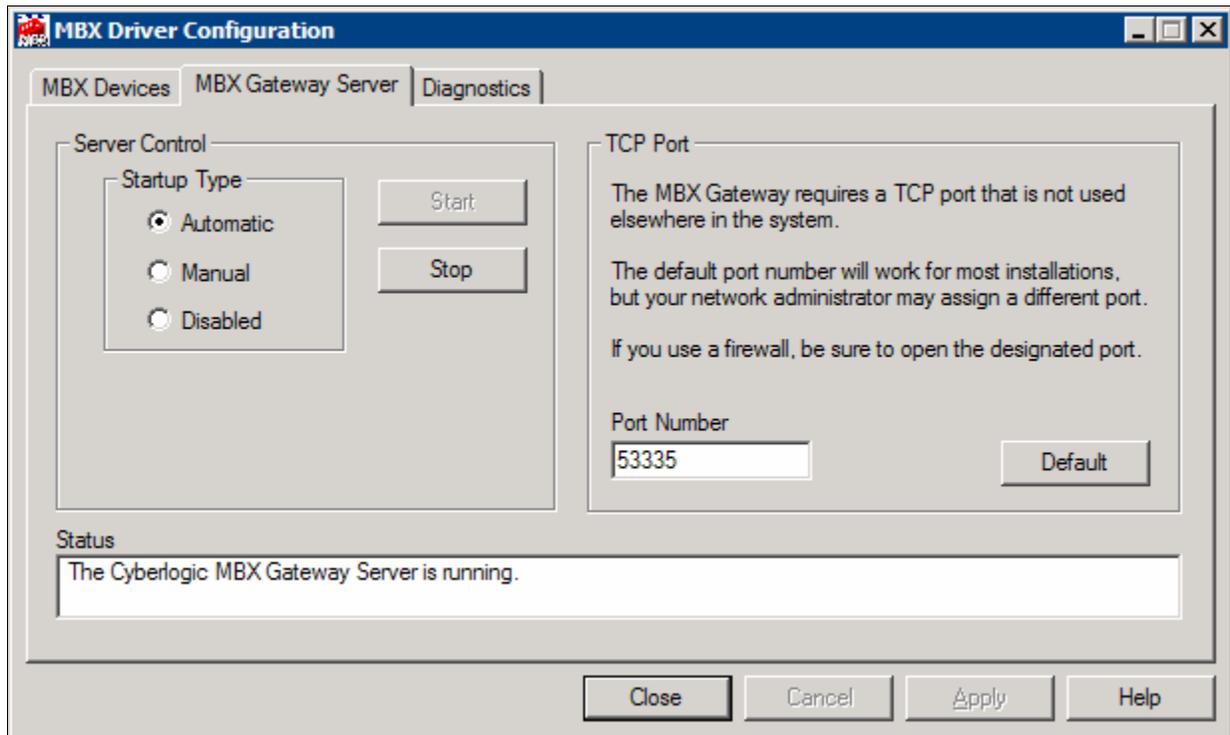
If you plan to use the MBX Gateway Driver on remote Windows XP/2000/NT nodes, go to the [MBX Gateway Server Configuration](#) segment. Refer to the [Remote Connectivity](#) section for more information on this capability.

Otherwise, go to the [Diagnostics](#) segment.

MBX Gateway Server Configuration

The MBX Driver comes with the MBX Gateway Server, a remote connectivity component of the MBX family. The Gateway Server, running in a system, allows remote nodes to access all configured MBX devices present on the same system.

18. To configure the Gateway Server, select the *MBX Gateway Server* tab. You will see this screen:



19. By default, the Gateway Server is created in the Automatic startup type. In this mode of operation, the server will start whenever the system is booted, and this is the mode that most users should select. If you want to control the Gateway Server manually, choose *Manual* in the Startup Type selection.

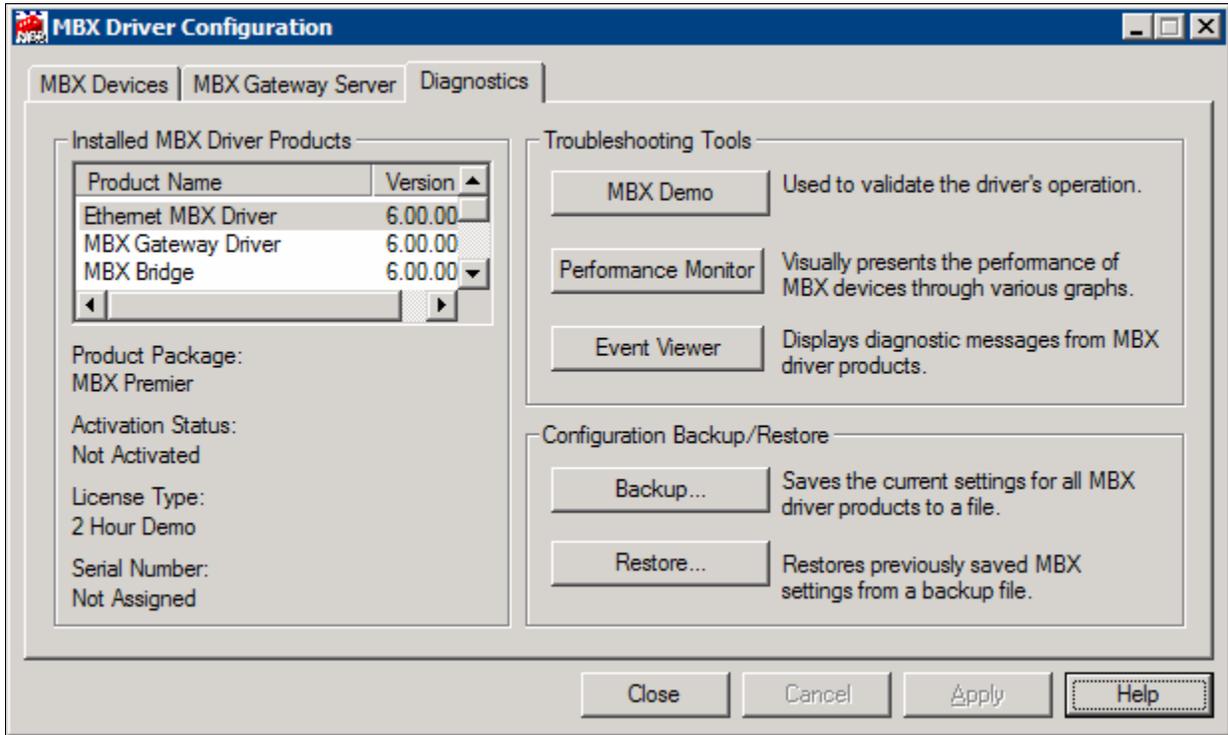
20. You must enter a TCP port that is not used elsewhere in the system. The default, 53335, will work for most installations, but this port may be taken in some unusual cases. If that applies to your system, the system administrator will assign a different port and you can set that value here.

If your system uses a firewall, you must open the port that you configure here. The procedure will depend upon the firewall you are using. Refer to the [MBX Gateway Server Tab](#) discussion in the MBX Driver Configuration Editor section for more information.

The MBX Driver configuration is now complete. Go on to the [Diagnostics](#) segment, which will introduce you to the diagnostic features of the product.

Diagnostics

21. Select the *Diagnostics* tab. You will see the following screen:



The left pane of this screen shows all MBX driver products 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 demo mode.

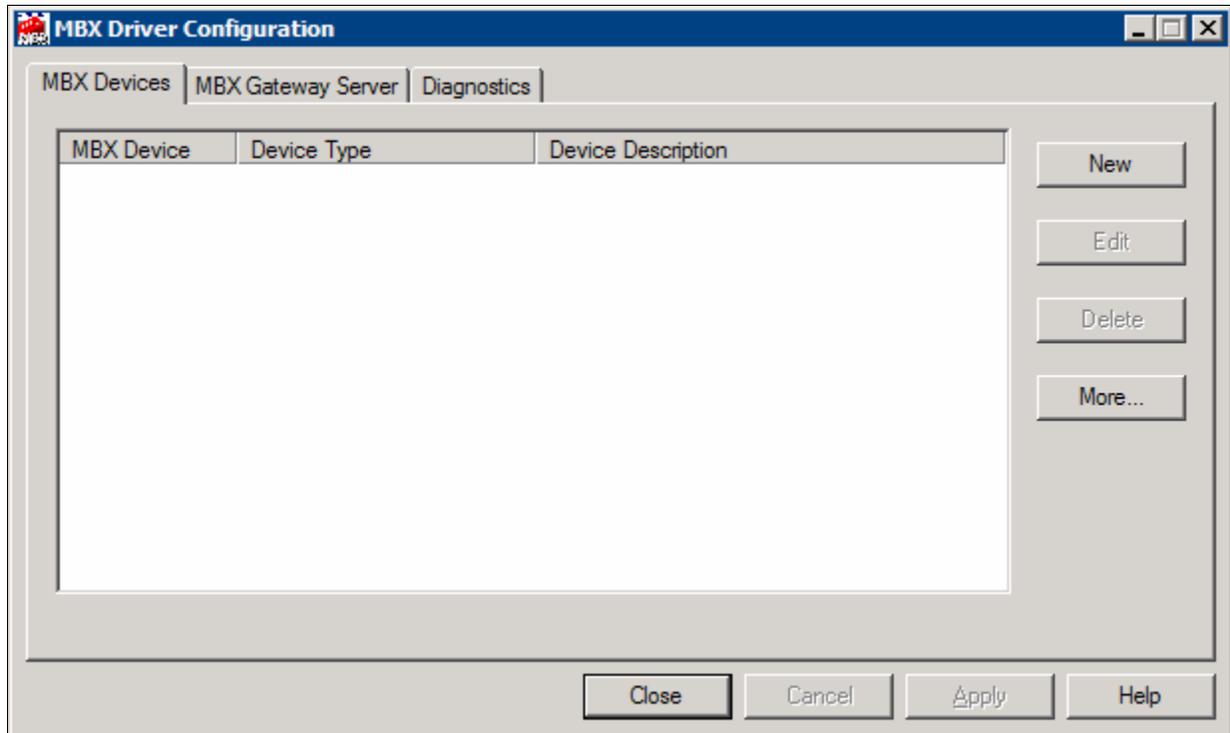
The right pane of the screen provides shortcuts to troubleshooting and backup/restore tools. You should run the MBX Demo program after configuring the MBX Driver to ensure the driver is configured and running properly. You should also back up your configuration. Refer to the [Diagnostics Tab](#) discussion in the MBX Driver Configuration Editor section for more information on how to use these tools.

Creating a Non-PnP Device

This section describes creating an MBX device that represents a physical interface adapter card. Once an MBX device is created, refer to the [Editing Non-PnP Device Configuration](#) section for information on editing an existing adapter configuration. If you need a quick-start guide or a step-by-step configuration session tutorial, go back to the [Typical Non-PnP Configuration Session](#) section.

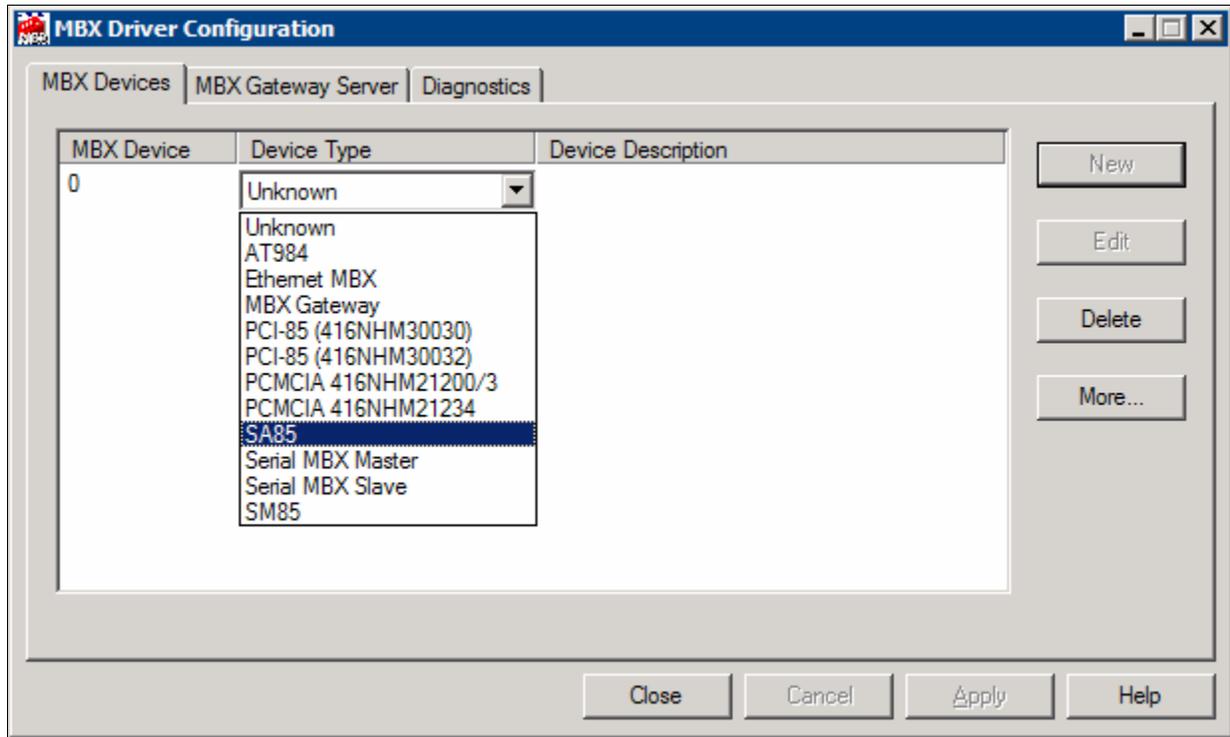
1. From the Windows Start menu, locate the MBX Driver submenu and select the *MBX Driver Configuration* menu item.

Running the editor for the first time displays the following screen:



The first step in configuring the MBX Driver is to set up at least one host interface adapter. For this example, we will use the SA85 card.

2. Click the *New* button and select SA85 from the drop-down list.

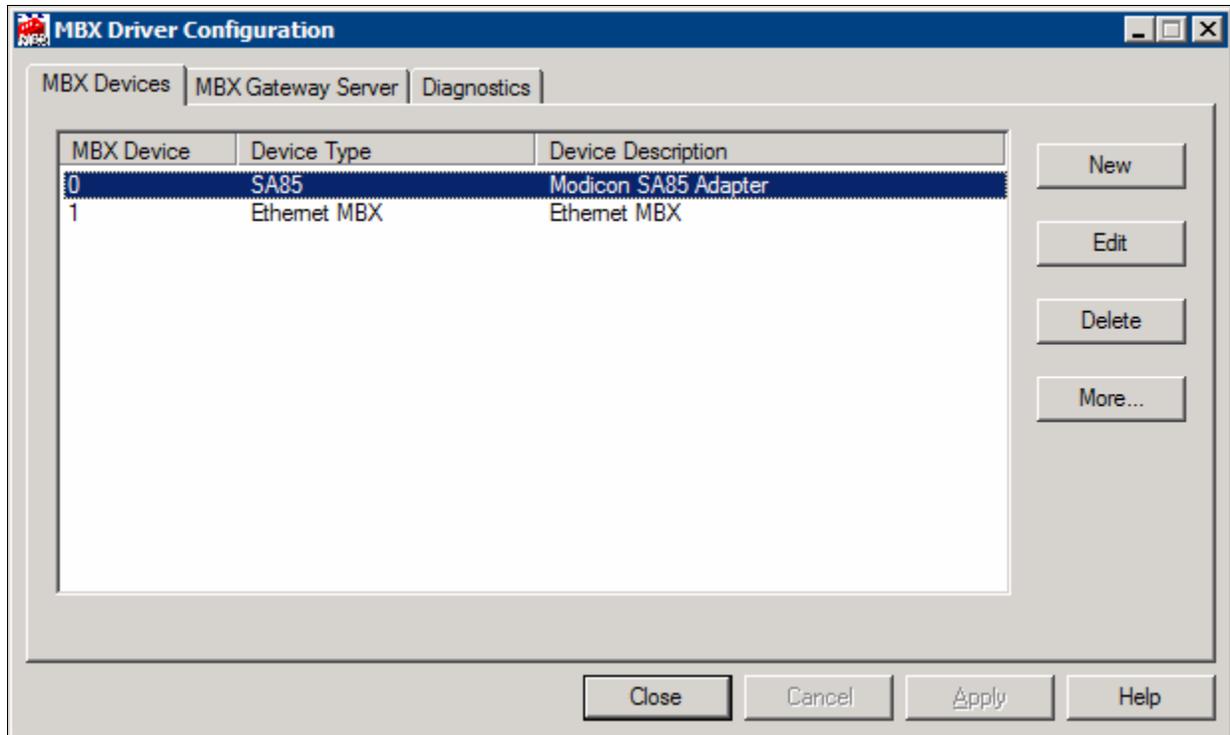


The MBX Driver Configuration Editor will automatically dispatch the [Non-PnP Adapter Card Editor](#). Refer to that section for information on editing the device you just created.

Editing Non-PnP Device Configuration

This section shows you how to reconfigure an existing MBX device. For information on creating an MBX device, refer to the [Creating a Non-PnP Device](#) section. If you need a quick-start guide or a step-by-step configuration session tutorial, go to the [Typical Non-PnP Configuration Session](#) section.

1. From the Windows Start menu, locate the MBX Driver submenu and select the *MBX Driver Configuration* menu item.
2. Select an MBX device to edit (*SA85* in this example) and click the *Edit* button.



The MBX Driver Configuration Editor will automatically dispatch the [Non-PnP Adapter Card Editor](#). Refer to that section for information on editing the device you selected.

Non-PnP Adapter Card Editor

When you edit a non-PnP adapter card configuration, the Device Manager dispatches the non-PnP Adapter Card Configuration editor. The editor consists of three tabs: <Card Type>, Peer Cop and MBX Driver Control.

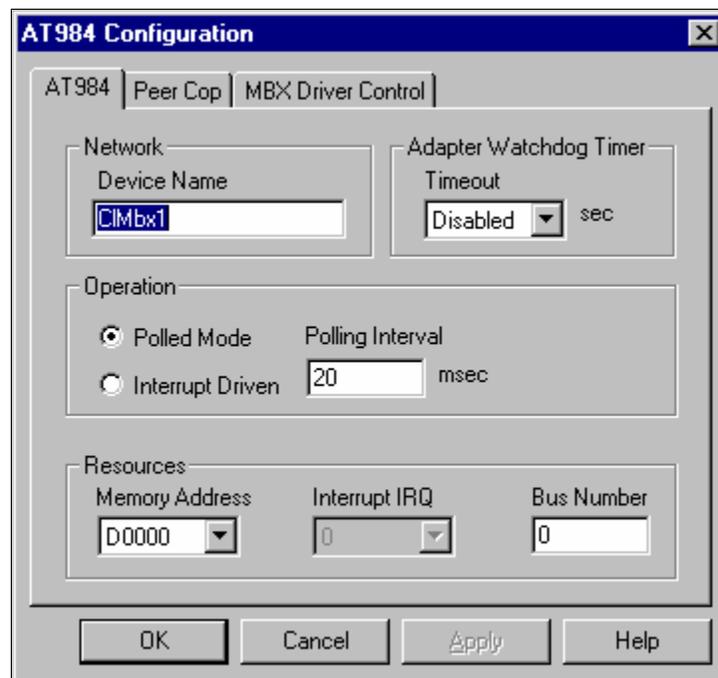
Some tabs are standard for all device types and are automatically provided by the Device Manager. Of concern for configuration purposes are the Device Settings Tab and Resources Tab, which are specific to each adapter, and the Diagnostics Tab, which is common to all.

The following sections describe the <Card Type> tab for each supported adapter card.

- [AT984](#)
- [MC984](#)
- [PCI-85 \(416NHM30030/2\)](#)
- [PCMCIA 416NHM21200/3](#)
- [PCMCIA 416NHM21234](#)
- [SA85](#)
- [SM85](#)

At the end are sections covering the [Peer Cop Tab](#) and [MBX Driver Control Tab](#), which are common to all adapter card types.

AT984



Device Name

This parameter allows the user to assign a name to identify the device. The default for this parameter is *CIMbx#*, where # is the selected device number.

Adapter Watchdog Timer

Adapter cards supporting Peer Cop have a diagnostic watchdog timer that, when enabled, automatically places the adapter card in the off-line state after a pre-configured host inactivity timeout expires.

While the driver is operational, it will always place an adapter card in the off-line state when transitioning from the on-line to the off-line mode. However, in an event of a system crash, the driver does not have an opportunity to properly transition the adapter card's state. In this case, adapter cards that do not support the watchdog timer will never respond to the command messages, resulting in lengthy timeouts on the Modbus Plus network. Therefore, it is strongly recommended that the watchdog timer is enabled and set to 2.55 sec for adapter cards supporting it. For compatibility with older adapter cards, the default value of the timer is *Disabled*.

Polled mode/Interrupt driven

The kernel mode device driver can operate in either polled mode or interrupt mode. Selecting the proper mode of operation depends on the adapter card configuration. The interrupt mode provides better performance than the polled mode, however, interrupt mode requires more processor overhead. It is permitted to mix interrupt and polled modes of operation for different cards in the same system. The default for this parameter is *Polled Mode*.

Polling Interval

This parameter specifies the polling interval, in milliseconds, that the driver will use when running in polled mode. The valid range for the polling interval is 20-1000 msec. The default value is 20 msec.

Memory Address

This parameter specifies the base address of the adapter card. The default for this parameter is *D0000*. This address must match the switch settings on the card and must be unique for each adapter card.

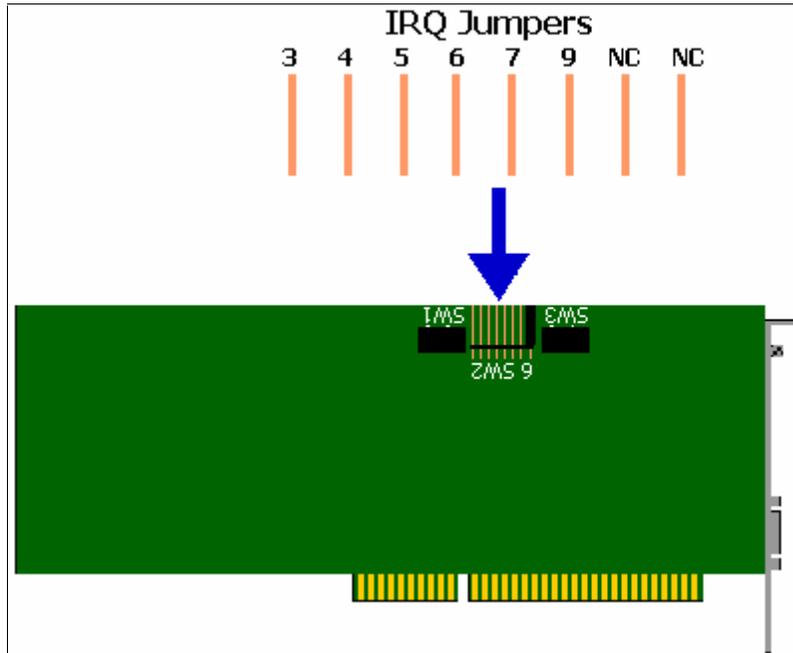
Interrupt IRQ

When interrupt mode is selected, this parameter specifies the IRQ number for the interrupt line used. The default for this parameter is 5. This IRQ number must match the IRQ setting on the adapter card and must be a unique value for each card in the system.

To change the IRQ setting on the adapter card, follow the procedure below:

1. Shutdown Windows and turn off your computer.

2. If your adapter card is already installed inside the computer, open the computer case and carefully remove the adapter card. Your card will look similar to the diagram below.



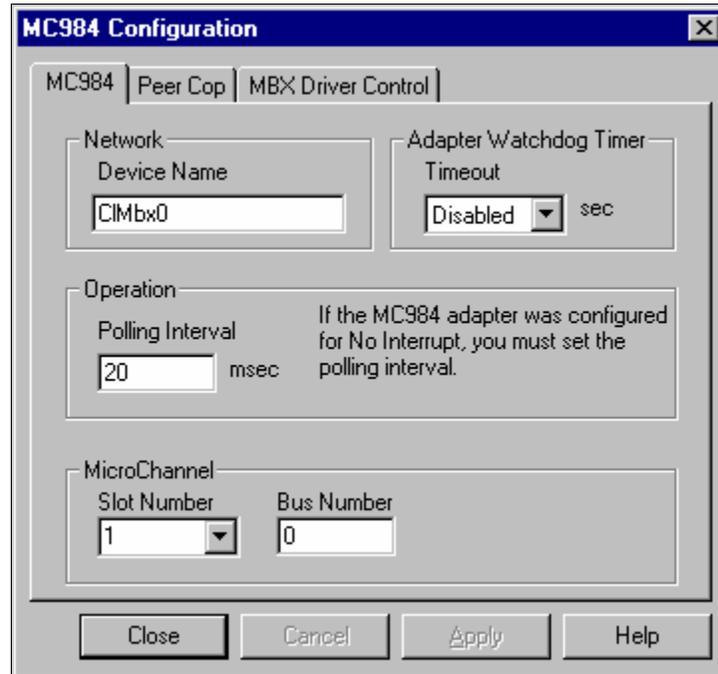
3. Locate the IRQ jumper block on the card. Move the IRQ jumper to the desired IRQ position.
4. Insert the adapter card back into the computer and turn on the computer. Refer to the [Validation](#) section to verify the card's operation.

For more information on adapter card configuration, refer to "Modicon IBM Host Based Devices User's Guide" from Schneider Automation (Order #890 USE 102 00).

Bus Number

Windows XP/2000/NT architecture allows multiple buses of the same type in the same system. This parameter specifies the bus number for the adapter card. The default for this parameter is 0 and in most cases should not be changed.

MC984



Device Name

This parameter assigns a name to identify the device. The default for this parameter is *CIMbx#*, where # is the selected device number.

Adapter Watchdog Timer

Adapter cards supporting Peer Cop have a diagnostic watchdog timer that, when enabled, automatically places the adapter card in the off-line state after a pre-configured host inactivity timeout expires.

While the driver is operational, it will always place an adapter card in the off-line state when transitioning from the on-line to the off-line mode. However, in an event of a system crash, the driver does not have an opportunity to properly transition the adapter card's state. In this case, adapter cards that do not support the watchdog timer will never respond to the command messages, resulting in lengthy timeouts on the Modbus Plus network. Therefore, it is strongly recommended that the watchdog timer is enabled and set to 2.55 sec for adapter cards supporting it. For compatibility with older adapter cards, the default value of the timer is *Disabled*.

Polling Interval

This parameter specifies the polling interval, in milliseconds, that the driver will use when running in polled mode. The valid range for the polling interval is 20-1000 msec. The default value is 20 msec.

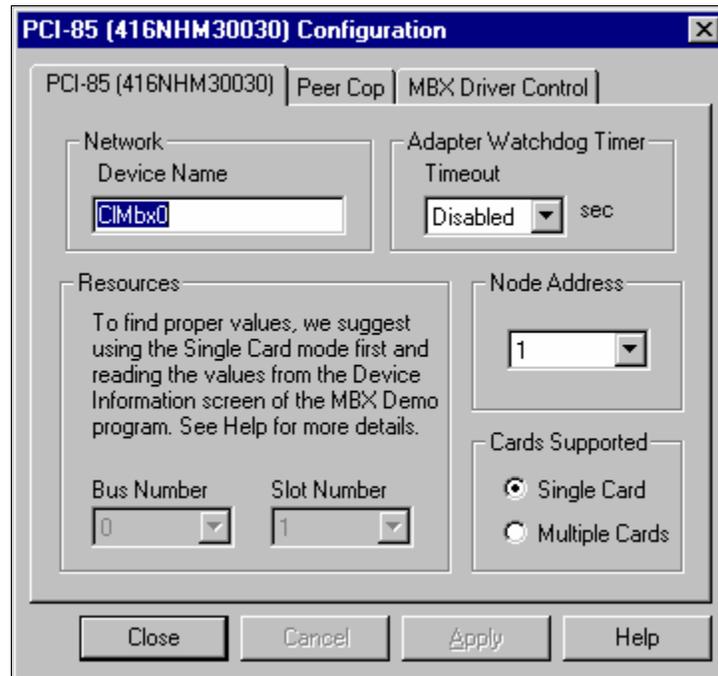
Slot Number

For all Micro Channel cards, the slot number for the adapter card must be specified. Valid *Slot Numbers* start from 1. The default for this parameter is 1.

Bus Number

Windows XP/2000/NT architecture allows multiple buses of the same type in the same system. This parameter specifies the bus number for the adapter card. The default for this parameter is 0 and in most cases should not be changed.

PCI-85 (416NHM30030/2)



Device Name

This parameter assigns a name to identify the device. The default for this parameter is *CIMbx#*, where # is the selected device number.

Adapter Watchdog Timer

The PCI-85 card has a diagnostic watchdog timer that, when enabled, places the adapter card in the off-line state after a pre-configured host inactivity timeout expires.

While the driver is operational, it will always place an adapter card in the off-line state when transitioning from the on-line to the off-line mode. However, in an event of a system crash, the driver does not have an opportunity to properly transition the adapter card's state. In this case, adapter cards that do not support the watchdog timer will never respond to the command messages, resulting in lengthy timeouts on the Modbus Plus network. Therefore, it is strongly recommended that the watchdog timer is enabled and set to 2.55 sec for adapter cards supporting. For compatibility with older adapter cards, the default value of the timer is *Disabled*.

Node Address

This is the Modbus Plus node address for the adapter. Valid node addresses range from 1 to 64. The default for this parameter is 1.

Polled Mode/Interrupt Mode

The MBX Driver can operate in either polled mode or interrupt mode. Normally, the computer's BIOS will assign an interrupt line to the PCI-85 adapter card. Typically, this line is shared with other PCI cards in your system. If an interrupt line is successfully assigned, the driver will operate in the interrupt mode. If the BIOS fails to assign an interrupt line, the driver will operate in polled mode with a 20 msec polling interval. The interrupt mode provides better performance than the polled mode at the cost of higher processor load. It is permitted to mix interrupt and polled modes of operation for different cards in the same system.

Cards Supported

The PCI-85 adapter card can be configured to operate in one of two modes: Multiple Card support or Single Card support.

In the Single Card mode, only one PCI-85 adapter can be present in the system. However, you can mix the single-connector (416NHM30030) with the dual-connector version (416NHM30032) adapter. In this mode of operation, the adapter card can be plugged into any PCI slot and the driver will automatically locate the card. This is the default mode of operation.

In the Multiple Card mode, multiple PCI-85 adapters can be used at the same time. In this mode of operation, the adapter card must be plugged into the selected PCI slot.

Note:	It is common for computers to have multiple PCI buses. To find the proper values for the Bus Number and the Slot Number of your adapter card, we recommend using the Single Card mode first and reading the values from the Device Information screen of the MBX Demo program. Once these values are identified, reconfigure the device to the Multiple Cards mode.
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Bus Number

Windows NT/2000/XP architecture allows multiple buses of the same type in the same system. This parameter specifies the bus number for the adapter card and is only used in the Multiple Cards mode. The default for this parameter is 0.

Slot Number

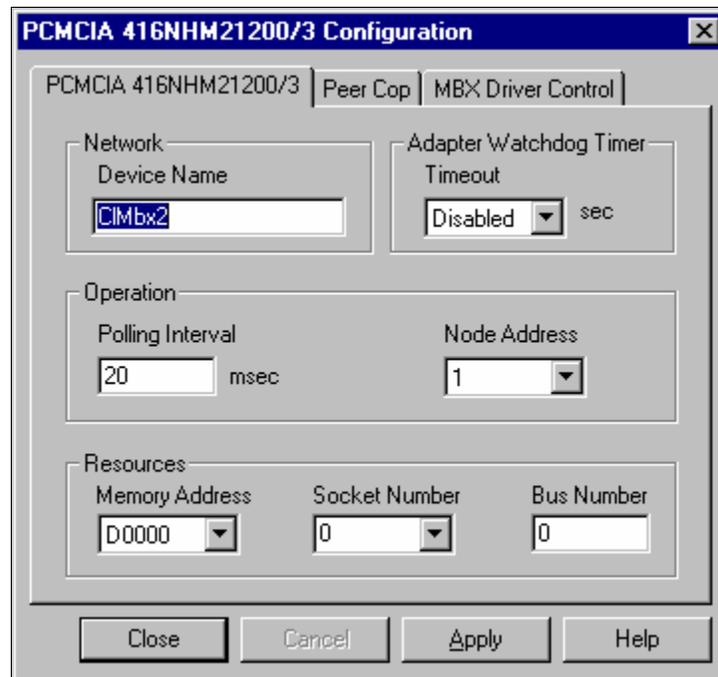
Identifies the PCI slot in which the adapter card is installed and is only used in the Multiple Cards mode. Valid Slot Numbers are in the range of 0-31.

PCMCIA 416NHM21200/3

Windows XP/2000 does not support non-Plug-and-Play PCMCIA adapter cards. Therefore, the PCMCIA 416NHM21200/3 card is not supported under Windows XP/2000. You can use the PCMCIA 416NHM21234 card instead.

This section explains the configuration of the PCMCIA 416NHM21200/3 card under Windows NT.

Caution: The PCMCIA card must be plugged in before Windows NT boots and it must not be removed while the system is running.



Device Name

This parameter assigns a name to identify the device. The default for this parameter is *CIMbx#*, where # is the selected device number.

Adapter Watchdog Timer

Adapter cards supporting Peer Cop have a diagnostic watchdog timer that, when enabled, places the adapter card in the off-line state after a pre-configured host inactivity timeout expires.

While the driver is operational, it will always place an adapter card in the off-line state when transitioning from the on-line to the off-line mode. However, in an event of a system crash, the driver does not have an opportunity to properly transition the adapter card's state. In this case, adapter cards that do not support the watchdog timer will never respond to the command messages, resulting in lengthy timeouts on the Modbus Plus network. Therefore, it is strongly recommended that the watchdog timer is enabled and set to 2.55 sec for adapter cards supporting. For compatibility with older adapter cards, the default value of the timer is *Disabled*.

Polling Interval

This parameter specifies the polling interval, in milliseconds, that the driver will use when running in polled mode. The valid range for the polling interval is 20-1000 msec. The default value is 20 msec.

Node Address

This is the Modbus Plus node address for the adapter. Valid node addresses range from 1 to 64. The default for this parameter is 1.

Socket Number

Identifies the socket in which the PCMCIA adapter is installed. Valid socket numbers start from 0. The default for this parameter is 0.

Bus Number

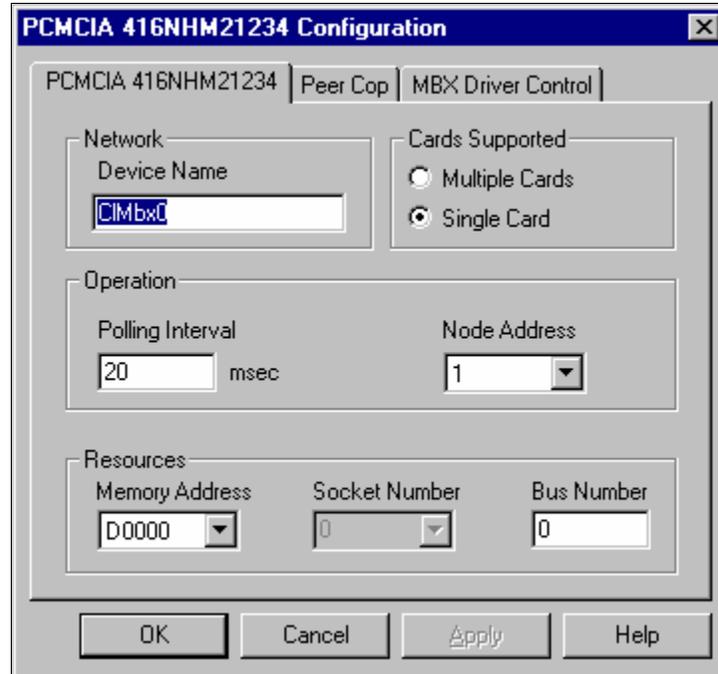
The Windows NT architecture allows multiple buses of the same type in the same system. This parameter specifies the bus number for the adapter card. The default for this parameter is 0 and in most cases should not be changed.

Memory Address

This parameter specifies the base address of the adapter card. The default for this parameter is D0000. This address must be unique for each adapter card.

PCMCIA 416NHM21234

Caution: The PCMCIA card must be plugged in before Windows NT/2000/XP boots and it must not be removed while the system is running.



Device Name

This parameter assigns a name to identify the device. The default for this parameter is *CIMbx#*, where # is the selected device number.

Cards Supported

The PCMCIA 416NHM21234 adapter card can be configured to operate in one of two modes: Multiple Card support or Single Card support.

In the Single Card mode, only a single PCMCIA 416NHM21234 adapter can be present in the system. However, you can mix the PCMCIA 416NHM21234 with the 416NHM21200/3 adapters. In this mode of operation, the adapter card can be plugged into any PCMCIA slot and the driver will automatically locate the card. This is the default mode of operation and is compatible with most PC Card support software from Microsoft and third parties.

Caution: In the Single Card mode, the system may allocate an interrupt IRQ line to your adapter that may interfere with other I/O cards in your system. The PCMCIA 416NHM21234 does not require an interrupt line to operate since it always operates in polled mode. See the Knowledge Base article "Masking IRQ's for PCMCIA Devices" (article ID: Q168303) from Microsoft for information on eliminating IRQ line conflicts.

In the Multiple Card mode, multiple PCMCIA 416NHM21234 adapters can be used at the same time. In this mode of operation, the adapter card must be plugged into the selected PCMCIA slot. This mode of operation is compatible with the standard PC Card support from Microsoft, but may not be compatible with some PC Card support products from third parties.

Polling Interval

This parameter specifies the polling interval, in milliseconds, that the driver will use when running in polled mode. The valid range for the polling interval is 20-1000 msec. The default value is 20 msec.

Node Address

This is the Modbus Plus node address for the adapter. Valid node addresses range from 1 to 64. The default for this parameter is 1.

Socket Number

Identifies the socket in which the PCMCIA adapter is installed. Valid Socket Numbers start from 0.

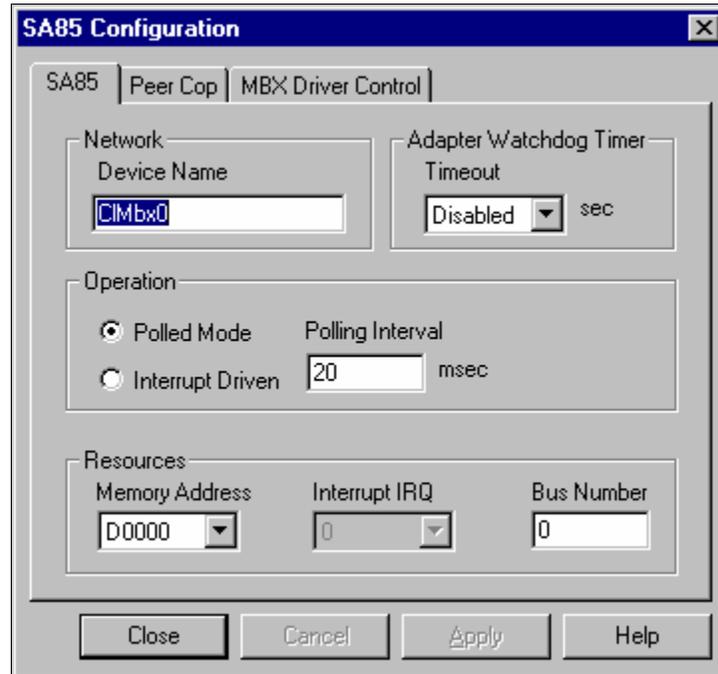
Memory Address

This parameter specifies the base address of the adapter card. The default is *D0000*. This address must be unique for each adapter card.

Bus Number

Windows NT/2000/XP architecture allows multiple buses of the same type in the same system. This parameter specifies the bus number for the adapter card. The default for this parameter is 0 and, in most cases, should not be changed.

SA85



Device Name

This parameter assigns a name to identify the device. The default for this parameter is *CIMbx#*, where # is the selected device number.

Adapter Watchdog Timer

Adapter cards supporting Peer Cop have a diagnostic watchdog timer that, when enabled, automatically places the adapter card in the off-line state after a pre-configured host inactivity timeout expires.

While the driver is operational, it will always place an adapter card in the off-line state when transitioning from the on-line to the off-line mode. However, in an event of a system crash, the driver does not have an opportunity to properly transition the adapter card's state. In this case, adapter cards that do not support the watchdog timer will never respond to the command messages, resulting in lengthy timeouts on the Modbus Plus network. Therefore, it is strongly recommended that the watchdog timer is enabled and set to 2.55 sec for adapter cards supporting it. For compatibility with older adapter cards, the default value of the timer is *Disabled*.

Polled mode/Interrupt driven

The kernel mode device driver can operate in either polled mode or interrupt mode. Selecting the proper mode of operation depends on the adapter card configuration. The interrupt mode provides better performance than the polled mode, however, interrupt mode requires more processor overhead. It is legal to mix interrupt and polled modes of operation for different cards in the same system. The default for this parameter is *Polled Mode*.

Polling Interval

This parameter specifies the polling interval, in milliseconds, that the driver will use when running in polled mode. The valid range for the polling interval is 20-1000 msec. The default value is 20 msec.

Memory Address

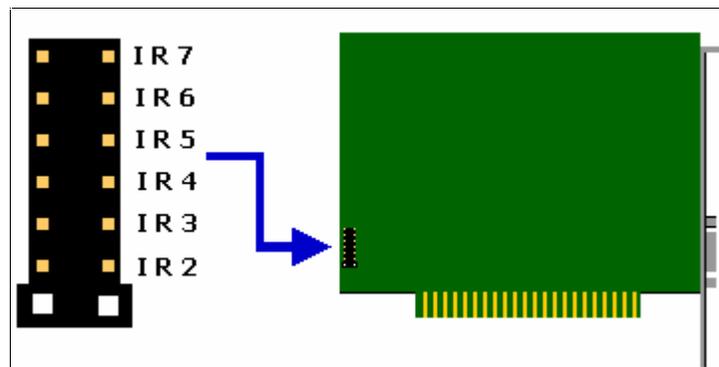
This parameter specifies the base address of the adapter card. The default is *D0000*. This address must match the switch settings on the card and be unique for each adapter card.

Interrupt IRQ

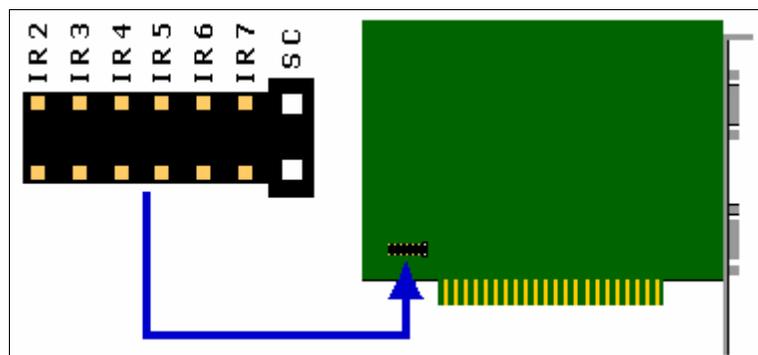
When the interrupt mode is selected, this parameter specifies the IRQ number for the interrupt line used. The default is 5. This IRQ number must match the IRQ setting on the adapter card and be a unique value for each card in the system.

To change the IRQ setting on the adapter card, follow the procedure below:

1. Shutdown Windows and turn off your computer.
2. If your adapter card is already installed inside the computer, open the computer case and carefully remove the adapter card. Your card will look similar to the diagram below.



Single Channel SA85



Dual Channel SA85

3. Locate the IRQ jumper block on the card. Move the IRQ jumper to the desired IRQ position.

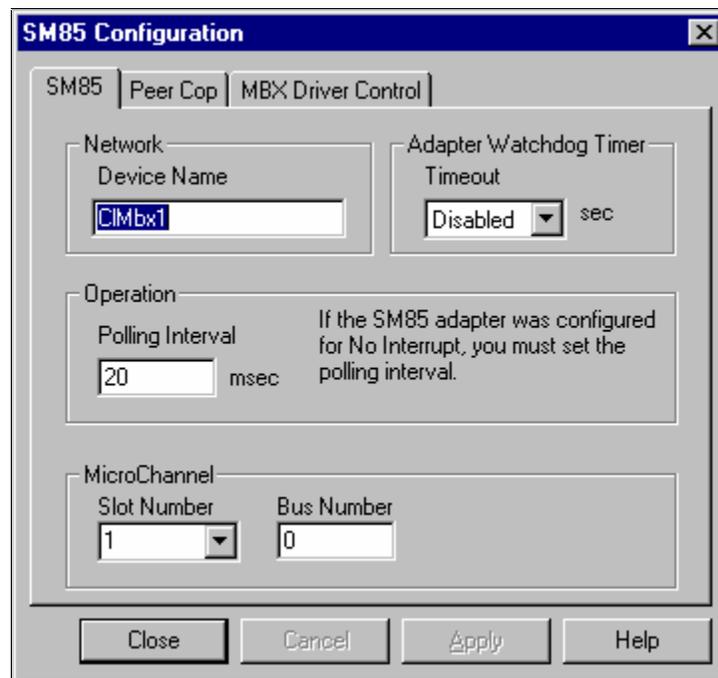
4. Insert the adapter card back into the computer and turn on the computer. Refer to the [Validation & Troubleshooting](#) section to verify the card's operation.

For more information on adapter card configuration, refer to "Modicon IBM Host Based Devices User's Guide" from Schneider Automation (Order #890 USE 102 00).

Bus Number

Windows XP/2000/NT architecture allows multiple buses of the same type in the same system. This parameter specifies the bus number for the adapter card. The default for this parameter is 0 and in most cases should not be changed.

SM85



The image shows the SM85 Configuration dialog box. It has a title bar with 'SM85 Configuration' and a close button. Below the title bar are three tabs: 'SM85', 'Peer Cop', and 'MBX Driver Control'. The 'SM85' tab is selected. The dialog is divided into several sections: 'Network' with a 'Device Name' text box containing 'CIMbx1'; 'Adapter Watchdog Timer' with a 'Timeout' dropdown menu set to 'Disabled' and the unit 'sec'; 'Operation' with a 'Polling Interval' text box containing '20' and the unit 'msec', and a note: 'If the SM85 adapter was configured for No Interrupt, you must set the polling interval.'; and 'MicroChannel' with a 'Slot Number' dropdown menu set to '1' and a 'Bus Number' text box containing '0'. At the bottom are four buttons: 'Close', 'Cancel', 'Apply', and 'Help'.

Device Name

This parameter assigns a name to identify the device. The default for this parameter is *CIMbx#*, where # is the selected device number.

Adapter Watchdog Timer

Adapter cards supporting Peer Cop have a diagnostic watchdog timer that, when enabled, automatically places the adapter card in the off-line state after a pre-configured host inactivity timeout expires.

While the driver is operational, it will always place an adapter card in the off-line state when transitioning from the on-line to the off-line mode. However, in an event of a system crash, the driver does not have an opportunity to properly transition the adapter card's state. In this case, adapter cards that do not support the watchdog timer will never respond to the command messages, resulting in lengthy timeouts on the Modbus Plus network. Therefore, it is strongly recommended that the watchdog timer is enabled and set to 2.55 sec for adapter cards supporting it. For compatibility with older adapter cards, the default value of the timer is *Disabled*.

Polling Interval

This parameter specifies the polling interval, in milliseconds, that the driver will use when running in polled mode. The valid range for the polling interval is 20-1000 msec. The default value is 20 msec.

Slot Number

For all Micro Channel cards, the slot number for the adapter card must be specified. Valid Slot Numbers start at 1.

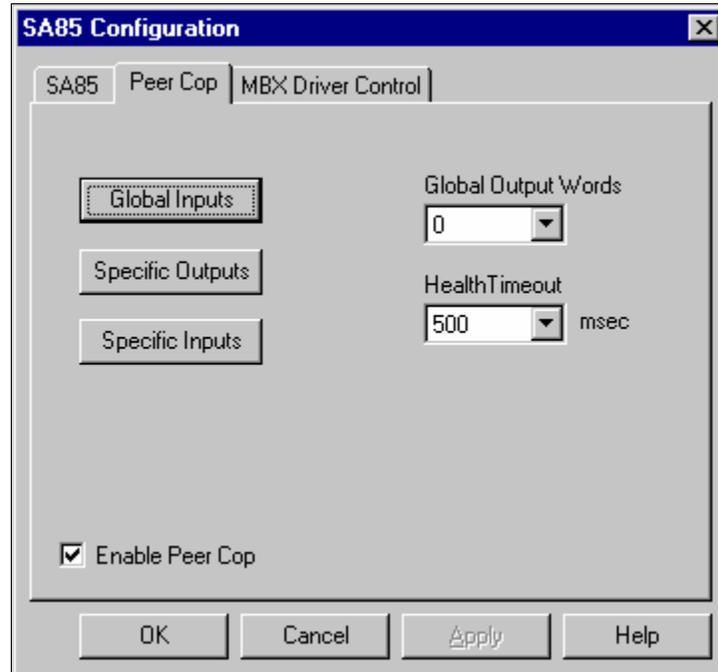
Bus Number

Windows XP/2000/NT architecture allows multiple buses of the same type in the same system. This parameter specifies the bus number for the adapter card. The default for this parameter is 0 and in most cases should not be changed.

Peer Cop Tab

This tab sets the configuration parameters related to the Peer Cop communications. These settings are relevant only for the adapter cards supporting Peer Cop. Otherwise all settings will be ignored.

By default, Peer Cop communications are disabled. Enable them only if your applications require this type of communication. Unnecessary transmissions of Peer Cop related data may slow down the token rotation which consequently may affect the communication throughput for other types of messages.



Enable Peer Cop

This check box enables Peer Cop communications for the adapter card. By default, Peer Cop communications are disabled. Enable them only if your applications require this type of communication. Unnecessary transmissions of Peer Cop related data may slow down the token rotation and consequently may affect the communication throughput for other types of messages.

Global Inputs

Click this button to edit the Global Input Data. Refer to the [Global Inputs Configuration](#) section for more details.

Specific Outputs

Click this button to edit the Specific Output Data. Refer to the [Specific Outputs Configuration](#) section for more details.

Specific Inputs

Click this button to edit the Specific Input Data. Refer to the [Specific Inputs Configuration](#) section for more details.

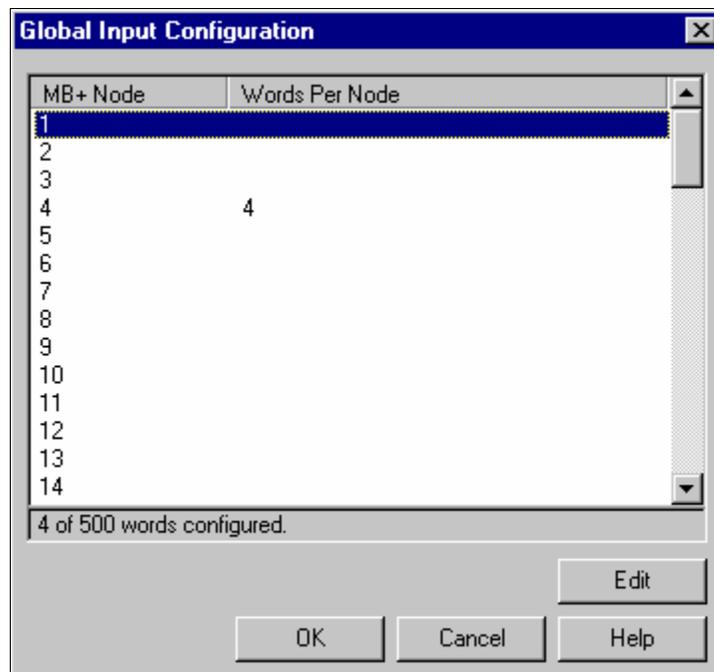
Global Output Words

By default, the driver will not transmit any global output data until a user application writes to the global output data buffer (defaults to 0). However, for the Peer Cop enabled adapter cards, the driver can be configured to transmit up to 32 words of global output data even before any application writes to this buffer. Refer to [Peer Cop Communications](#) in the Operation section for more information.

Health Timeout

The MBX Driver supports the Health Timeout Timer. The Health Timeout interval specifies the minimum time period that the Peer Cop configured communication must fail before the associated health bit clears. The recommended timeout value is 500 msec, which is the default setting.

Global Inputs Configuration



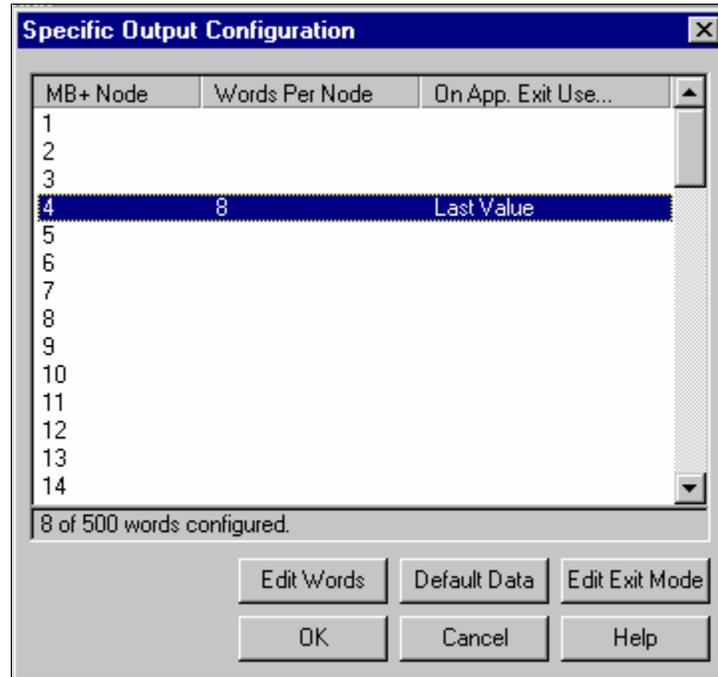
The global input data functionality is identical to the Global Data functionality already available in Modbus Plus prior to Peer Cop. However, Peer Cop provides this functionality in a more efficient way. For instance, Global Data from multiple nodes can be read in a single operation.

Up to 32 words of global input data may be requested from each configured node on the Modbus Plus network, with the limitation that the total amount of requested data must not exceed 500 words. Only nodes configured here can be read this way.

Setting Words Per Node to read

Select a node to configure. Click the *Edit* button or right-click and select *Edit* from the menu. Select the number of words to read from the list and press *Enter*.

Specific Outputs Configuration



Peer Cop communications send up to 32 words of Specific Output data to each node on the Modbus Plus network. The total amount of data sent from all applications through a single host interface adapter must not exceed 500 words. Only nodes configured here can be written this way.

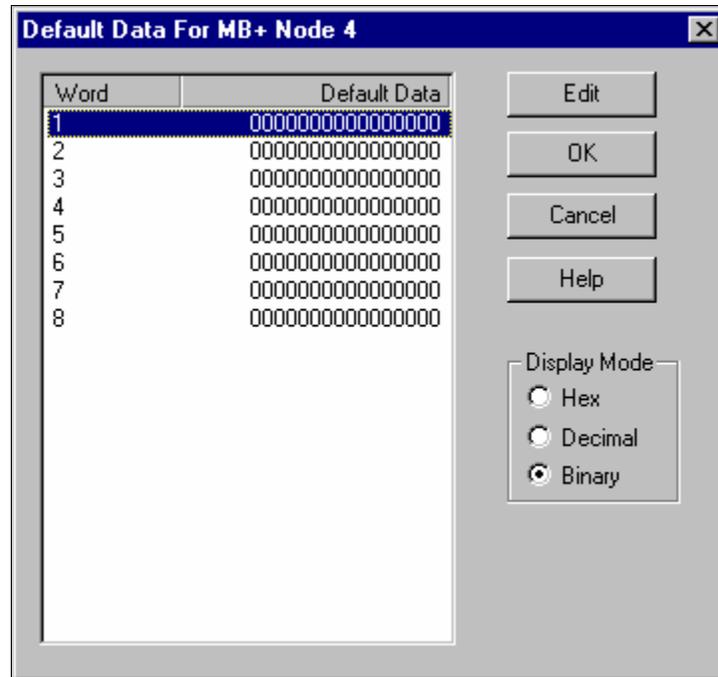
For every Specific Output word configured, you can specify the default data that the driver will use before some application overwrites it. By default, all Specific Output data words are filled with 0. You can also configure what action the driver should take on a user application exit (either normal or abnormal termination). The Specific Outputs controlled by this application are either left in their last state or restored to a pre-configured default state by the driver.

Setting Words Per Node to Write

First select the node to configure. Click the *Edit Words* button or right-click in the *Words Per Node* column and select *Edit* from the menu. Finally select the number of words to write from the list and press *Enter*.

Setting Default Data to Write

Select the node to configure. Click the *Default Data* button or right-click in the *Words Per Node* column and select *Default Data* from the menu. You will see the following screen:



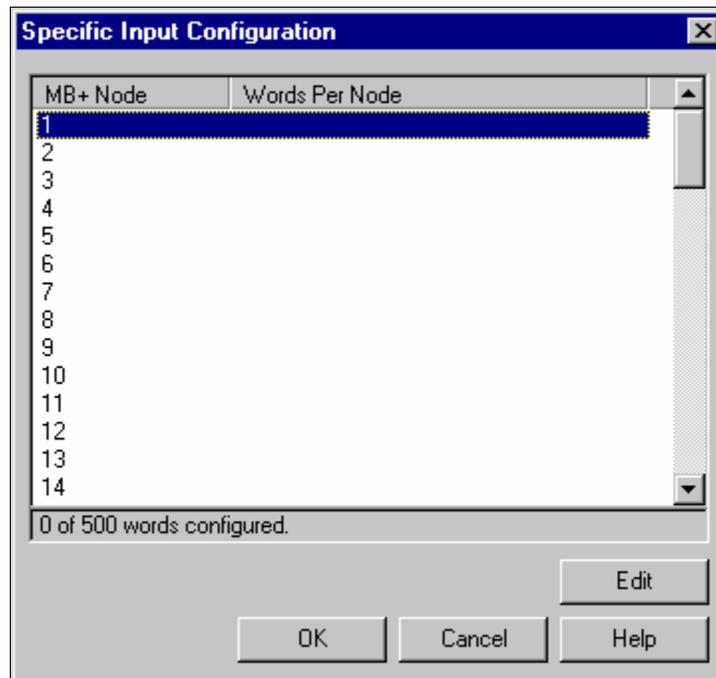
By default, all Specific Output data words are filled with zeros. The default data can be viewed and edited in Hex, Decimal or Binary. Select *Hex*, *Decimal* or *Binary Display Mode*. Select a word to edit and click the *Edit* button. Enter a new data value and press *Enter*. Repeat the above for every data word that you want to edit, and then click the *OK* button.

Setting Application Exit Mode

During a user application exit (either normal or abnormal termination), the Specific Outputs controlled by this application are either left in their last state or restored to a pre-configured default state by the driver. The *Edit Exit Mode* button sets the required behavior of the driver.

Click the *Edit Exit Mode* button. Select *Default Value* or *Last Value* from the list and press *Enter*.

Specific Inputs Configuration



Up to 32 words of Specific Input data may be requested from each Modbus Plus node configured here, with the limitation that the total amount of requested data must not exceed 500 words. Only nodes configured here can be read this way.

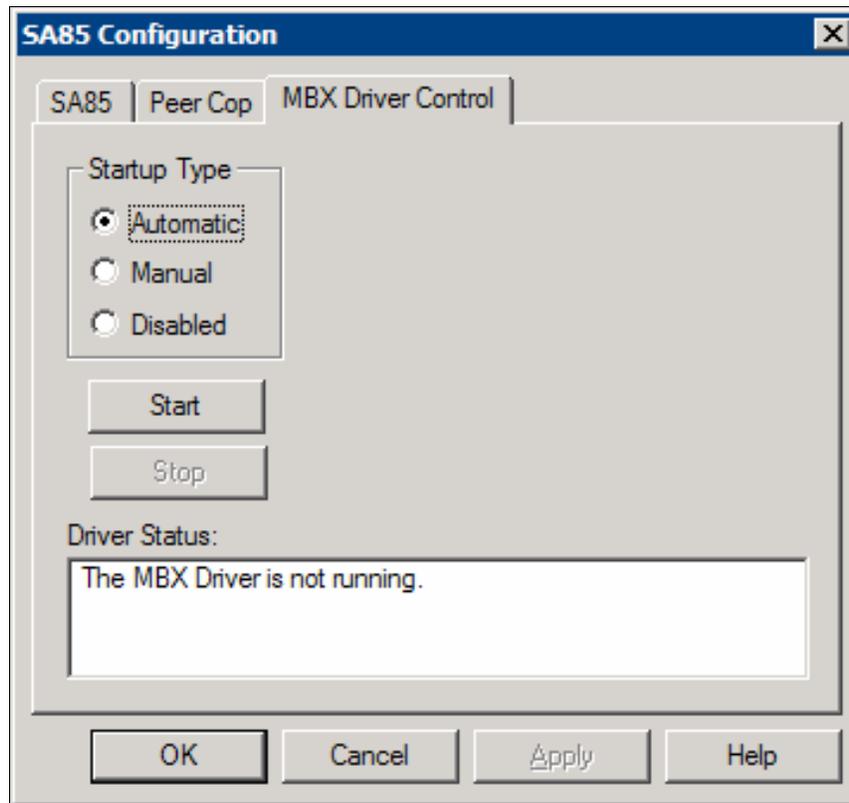
Setting Words Per Node to Read

Select a node to configure. Click the *Edit* button or right-click and select *Edit* from the menu. Select the number of words to read from the list and press *Enter*.

Caution: The Specific Output data from another node is accepted by a Specific Input data block only if the Specific Input data block is configured for the sending node and the length of the Specific Input data block (Words Per Node) exactly matches the length of the Specific Output data block from the expected node.

MBX Driver Control Tab

The MBX Driver Control tab sets the startup type and monitors the current driver status.



By default, the MBX Driver is configured for the Automatic startup type. In this mode, the driver starts automatically during the system boot. Most users should select the *Automatic* startup type.

Note: These settings are global and common to all host interface adapter devices.

Selecting the Startup Type

In the Startup Type section select *Automatic*, *Manual* or *Disabled*.

Start/Stop the MBX Driver

Click the *Start* button to start the driver or *Stop* button to stop the driver.

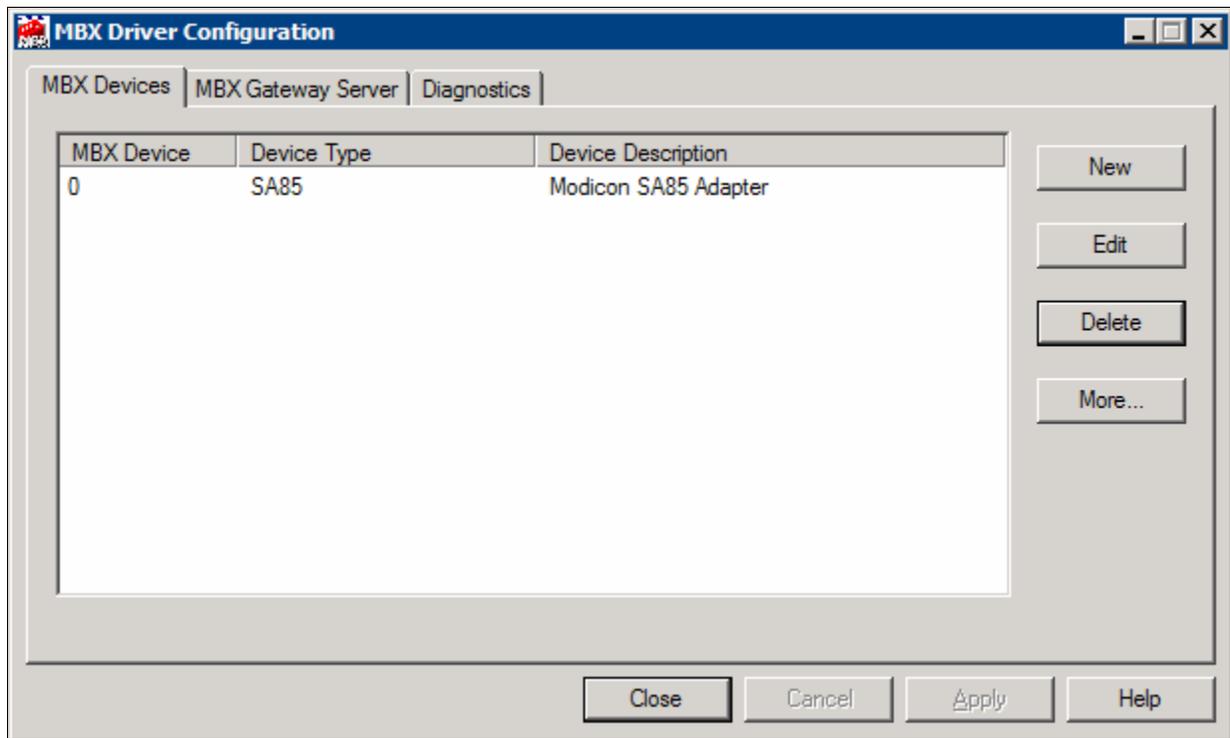
MBX DRIVER CONFIGURATION EDITOR

The MBX Driver Configuration Editor is a common component of MBX driver products. When configuring an MBX device, the MBX Driver Configuration Editor automatically dispatches the selected Host Interface Adapter Configuration Editor. Both editors are well-integrated, allowing for seamless editing.

The MBX Driver Configuration Editor consists of three tabs: [MBX Devices Tab](#), [MBX Gateway Server Tab](#) and [Diagnostics Tab](#). The following sections provide complete descriptions of these pages.

MBX Devices Tab

Every MBX device must be configured in the MBX Device tab before it can be used by client applications. The MBX Device 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 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

Identifies the type of the MBX device, such as SA85, 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 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.

Creating a New MBX Device

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

Upon selecting the device type, the MBX Driver Configuration Editor will automatically dispatch the Host Interface Adapter Configuration Editor.

Deleting an Existing MBX Device

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

Editing an Existing MBX Device configuration

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

Changing Device Description

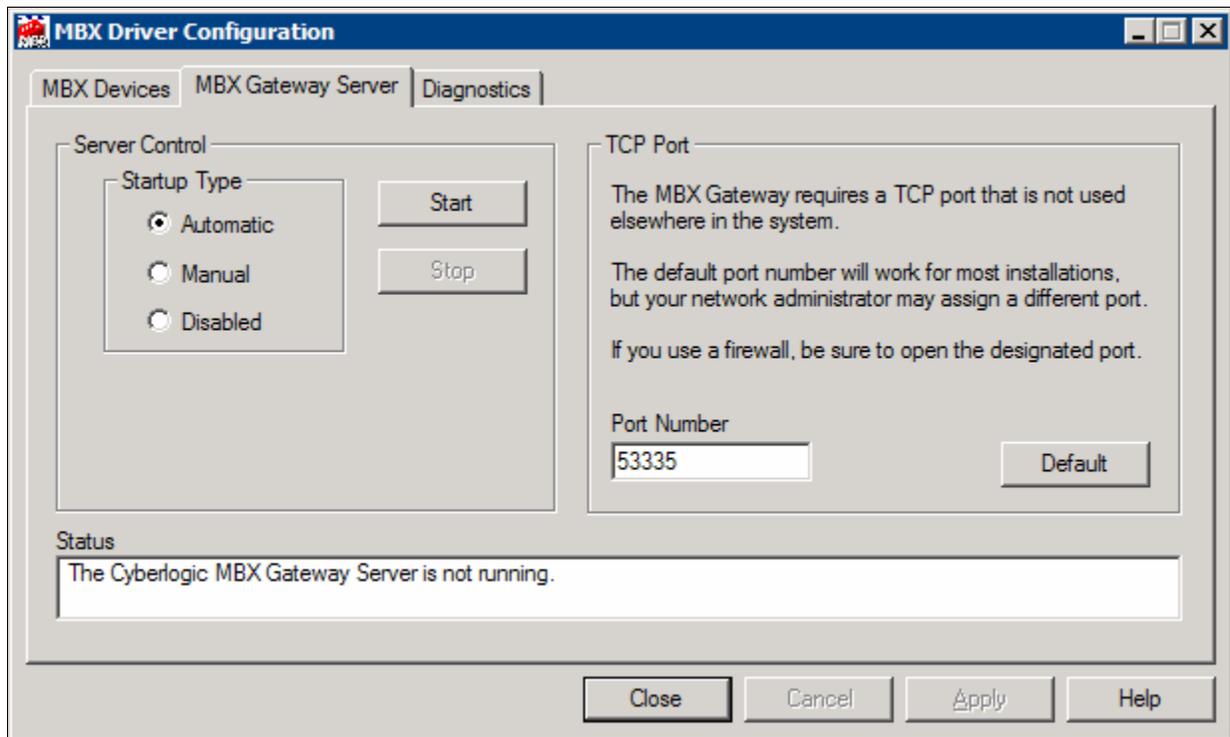
Select the device and click the *More...* button or right-click and select *Edit Description* from the pop-up menu. Modify your device description and press *Enter* when done.

Changing Device Type

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

MBX Gateway Server Tab

The MBX Driver comes with the MBX Gateway Server, a remote connectivity component of the MBX family. The Gateway Server allows remote nodes to access all configured MBX devices present on the server system, including MBX Driver devices. You set up the Gateway Server on the *MBX Gateway Server* tab.



Selecting the Startup Type

By default, the Gateway Server is created in the Automatic startup type. In this mode of operation, the server will start whenever the system is booted, and this is the mode that most users should select. If you want to control the Gateway Server manually, choose *Manual* in the Startup Type selection.

If you select *Disabled* while the Gateway Server is running, it will continue to run until you stop it or reboot the system. After that, it will not run until you change the startup type to Automatic or Manual.

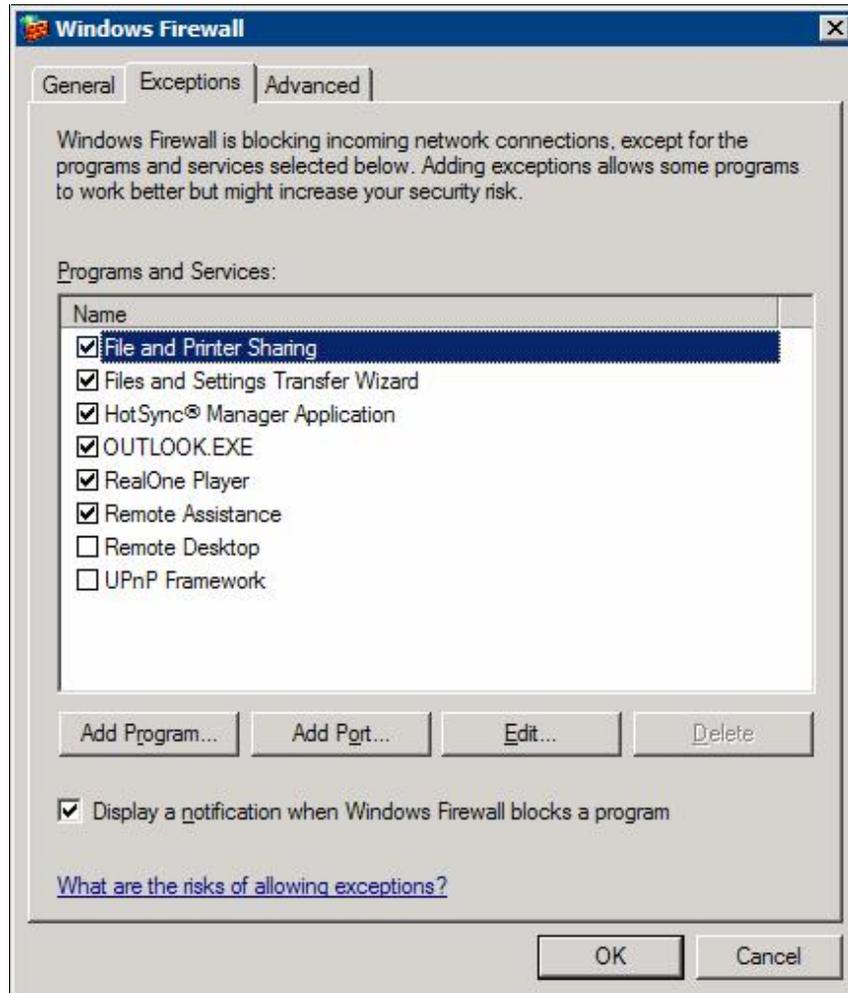
Start/Stop the Gateway Server

Click the *Start* or *Stop* button.

Selecting the TCP Port

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 and you can set that value here.

If your system uses a firewall, you must open the port that you configure here. The procedure will depend upon the firewall you are using. To open a port using Windows XP's firewall, go to *Control Panel*, open *Windows Firewall* and select the *Exceptions* tab. Now click *Add Port...* .



Enter a descriptive name in the *Name* field and the port you wish to open in the *Port number* field. Select *TCP* and click *OK* twice to save your changes and exit.

Add a Port

Use these settings to open a port through Windows Firewall. To find the port number and protocol, consult the documentation for the program or service you want to use.

Name: Cyberlogic MBX Gateway Server

Port number: 53335

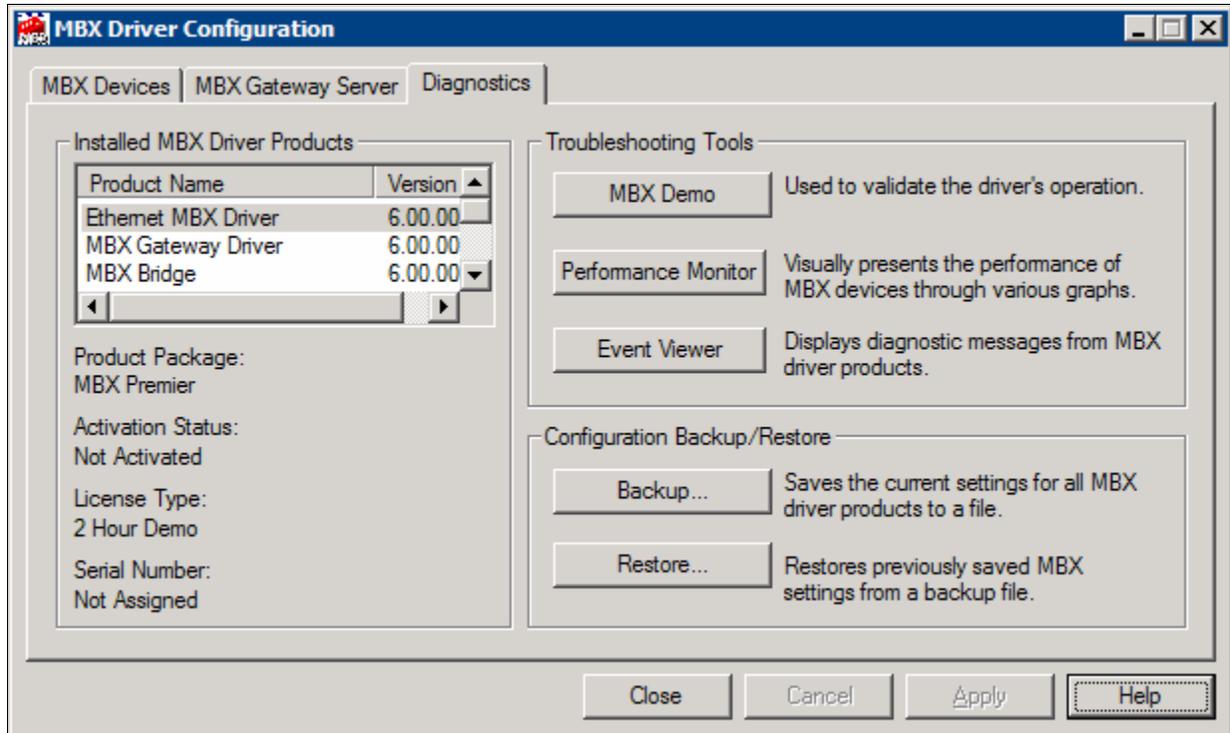
TCP UDP

[What are the risks of opening a port?](#)

Change scope... OK Cancel

Diagnostics Tab

The left pane of this screen shows all MBX driver products 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 demo mode.



The right pane of the screen is divided into two groups: Troubleshooting Tools and Configuration Backup/Restore.

Troubleshooting Tools

The Troubleshooting Tools group provides shortcuts to diagnostic tools. Run the [MBX Demo](#) program after configuring the MBX Driver to ensure the driver is configured correctly and running properly.

To observe the performance of your communications, run the [Performance Monitor](#).

In case of communication difficulties, the [Event Viewer](#) may provide error messages to guide you in troubleshooting problems.

Refer to the [Validation & Troubleshooting](#) section for more information on these features.

Configuration Backup/Restore

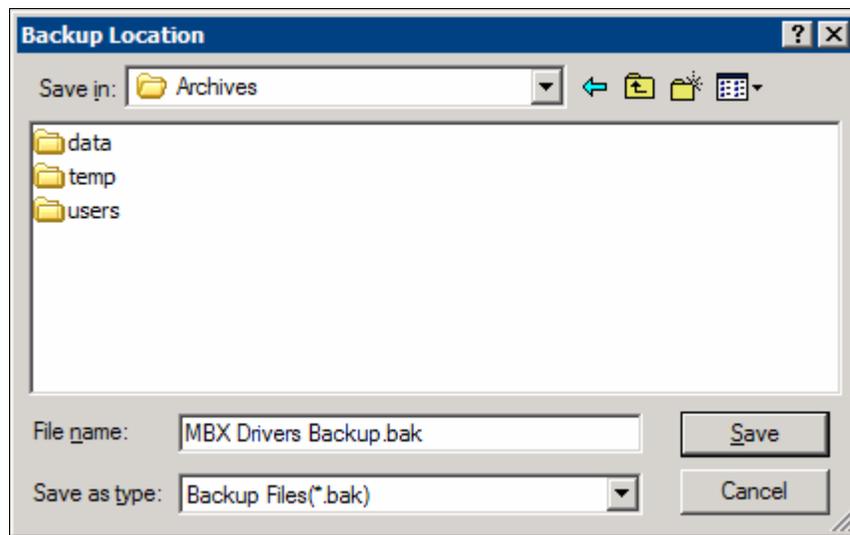
Creating and configuring MBX devices may be a time-consuming process. Therefore, we strongly recommend that you backup the configuration data.

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

Backup Configuration

Click the *Backup...* button. Browse for your backup directory and enter the file name of your configuration backup file. By default, the last-used directory will be selected.

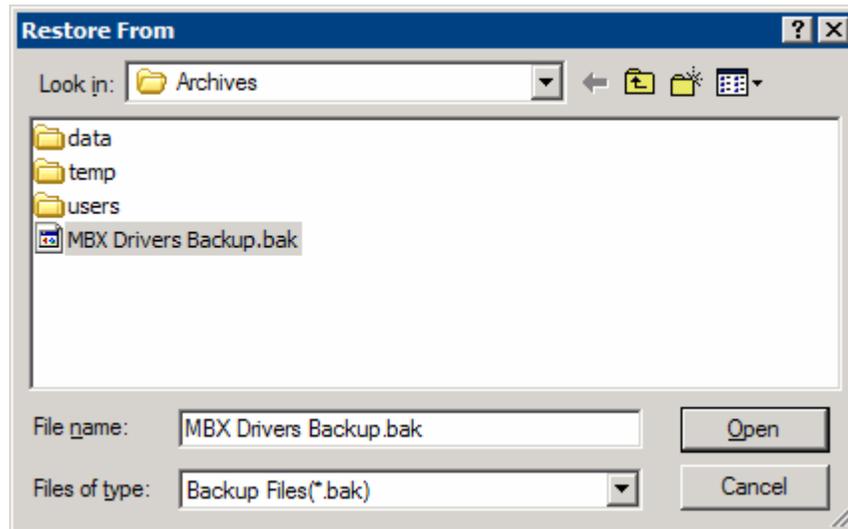
Click the *Save* button to complete the backup operation.



Restore Configuration

Click the *Restore...* button. Browse for your configuration backup file. By default, the last used directory will be selected.

Select the backup file and click the *Open* button to complete the restore operation. 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 can be used to backup and restore MBX device configurations. The program is located in the \Program Files\Common Files\Cyberlogic Shared\ directory. It accepts the following command line switches:

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

For example, to save the configuration of all MBX devices in the MbxCfg.bak file (located in 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 saved in MbxCfg.bak, use the following command:

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

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

VALIDATION & TROUBLESHOOTING

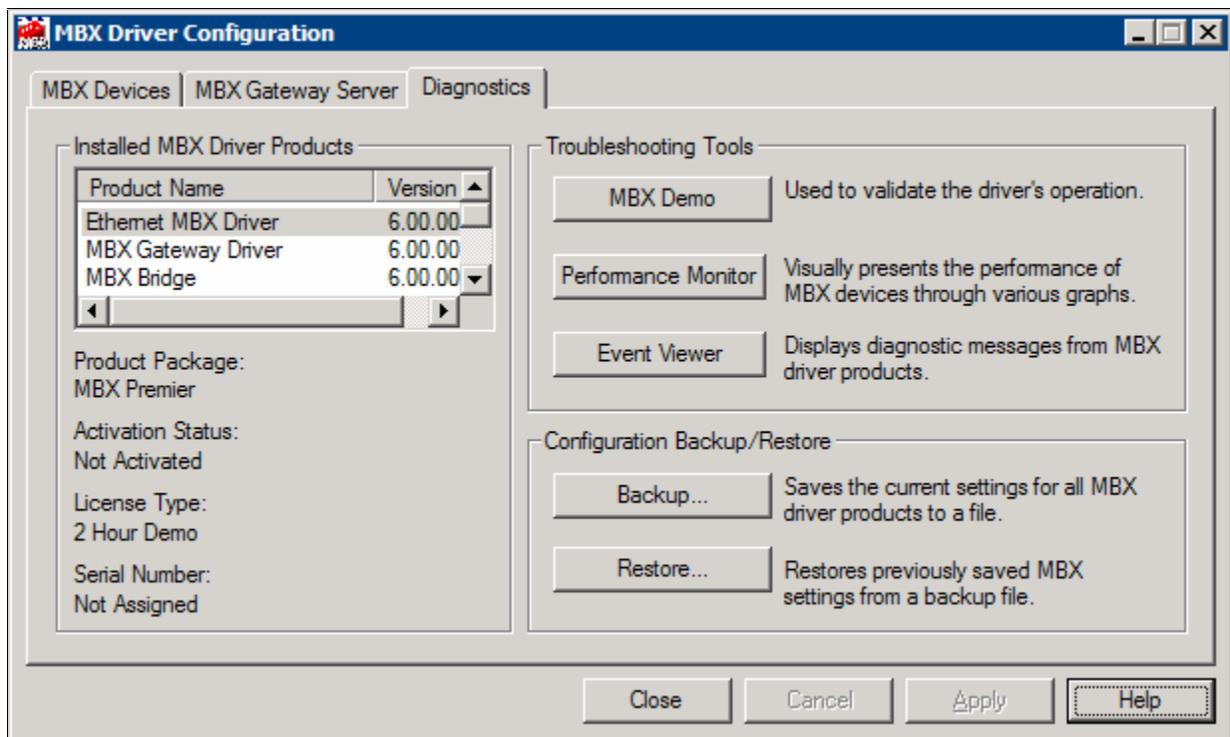
The following sections describe how the [MBX Demo](#) and [Performance Monitor](#) are used to verify that the MBX devices are configured correctly. Also included is a section, [Determining Peer Cop Support](#), showing you how to determine whether your card supports Peer Cop.

If you are having difficulties communicating through any MBX device, the troubleshooting sections can help you determine the nature of the problem. Included is a description of the [Event Viewer](#), a list of [MBX Driver Messages](#), a list of [Crash Codes](#) and a [Frequently Asked Questions](#) section.

MBX Demo

The MBX Demo program can be used to test all configured MBX devices in a system for proper operation. To activate the program, open the Windows *Start* menu and locate the MBX Driver submenu. From that menu, select *MBX Demo*.

Alternatively an MBX Demo button is located in the Diagnostics tab of the MBX Driver Configuration Editor:



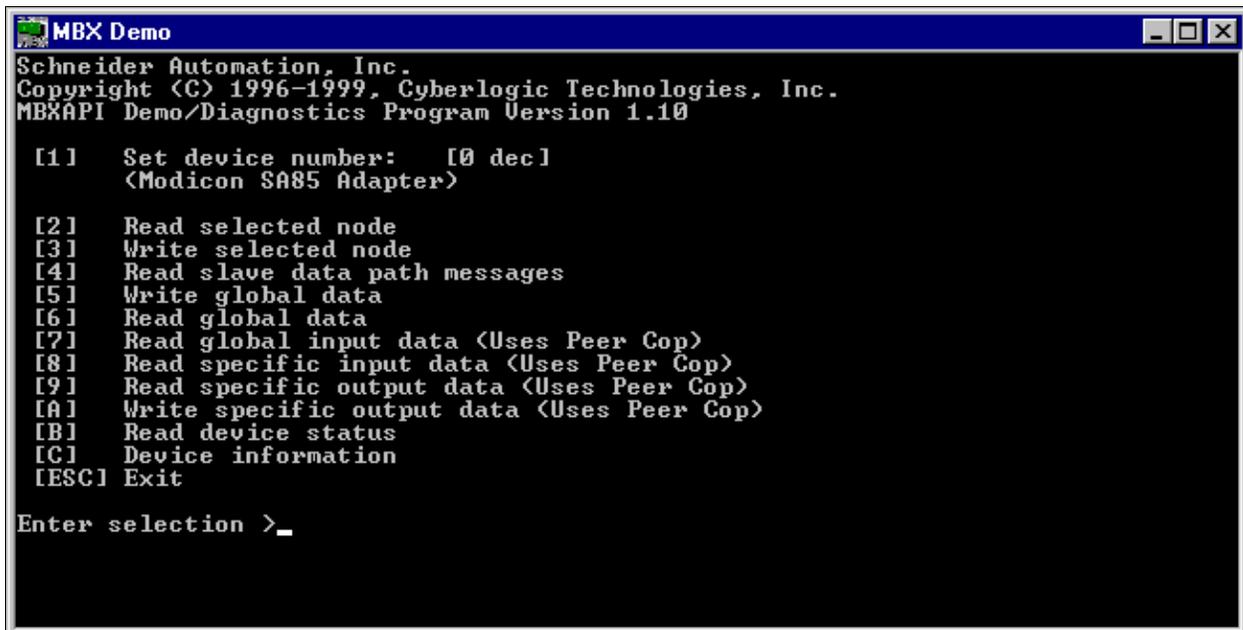
How to Use the MBX Demo Program

Although its user interface resembles a DOS-based legacy program, the MBX Demo is a 32-bit program. It will quickly access all available features of the configured MBX devices in a system for validation of driver operation.

The simple command-line interface is designed to mimic earlier tools familiar to most users. It displays numbered menu choices taking the user to secondary level screens. Pressing *Esc* at any screen returns the user to the main window shown below. Pressing *Esc* in the main window exits the program.

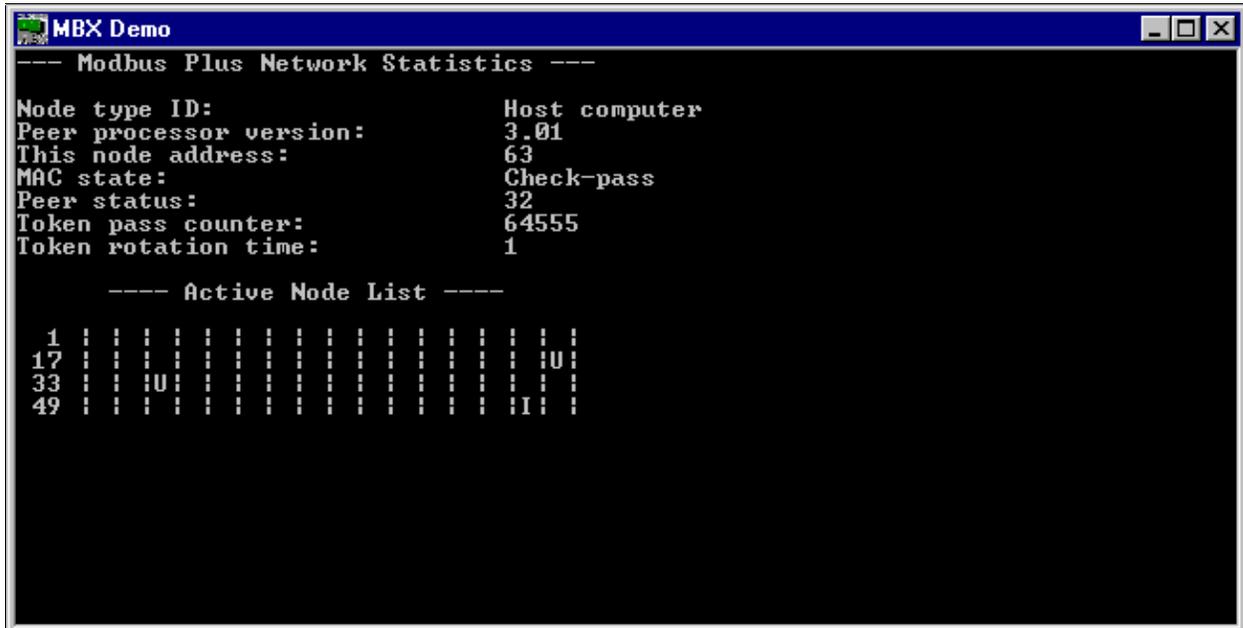
Device Number

When the MBX Demo program starts, the Device Number defaults to device 0. It may be changed by choosing the *Set device number* option.

A screenshot of a Windows-style window titled "MBX Demo". The window has a blue title bar with standard minimize, maximize, and close buttons. The main content area is black with white text. At the top, it displays the copyright information: "Schneider Automation, Inc. Copyright (C) 1996-1999, Cyberlogic Technologies, Inc. MBXAPI Demo/Diagnosics Program Version 1.10". Below this is a list of menu options, each with a number in brackets: [1] Set device number: [0 dec] <Modicon SA85 Adapter>, [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, and [ESC] Exit. At the bottom, there is a prompt "Enter selection >_" with a cursor pointing to the underscore.

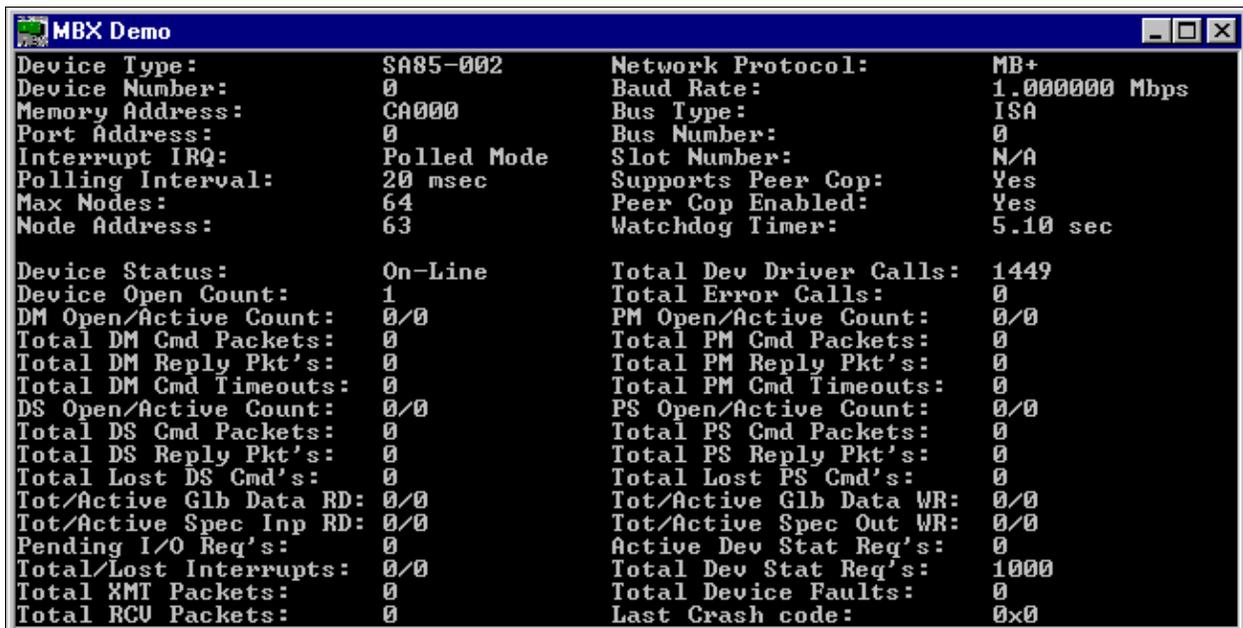
Read Device Status

This screen shows all active nodes on the network.



Device Information

The Device information option shows configuration, statistical and diagnostic information about the driver, the device and the network.

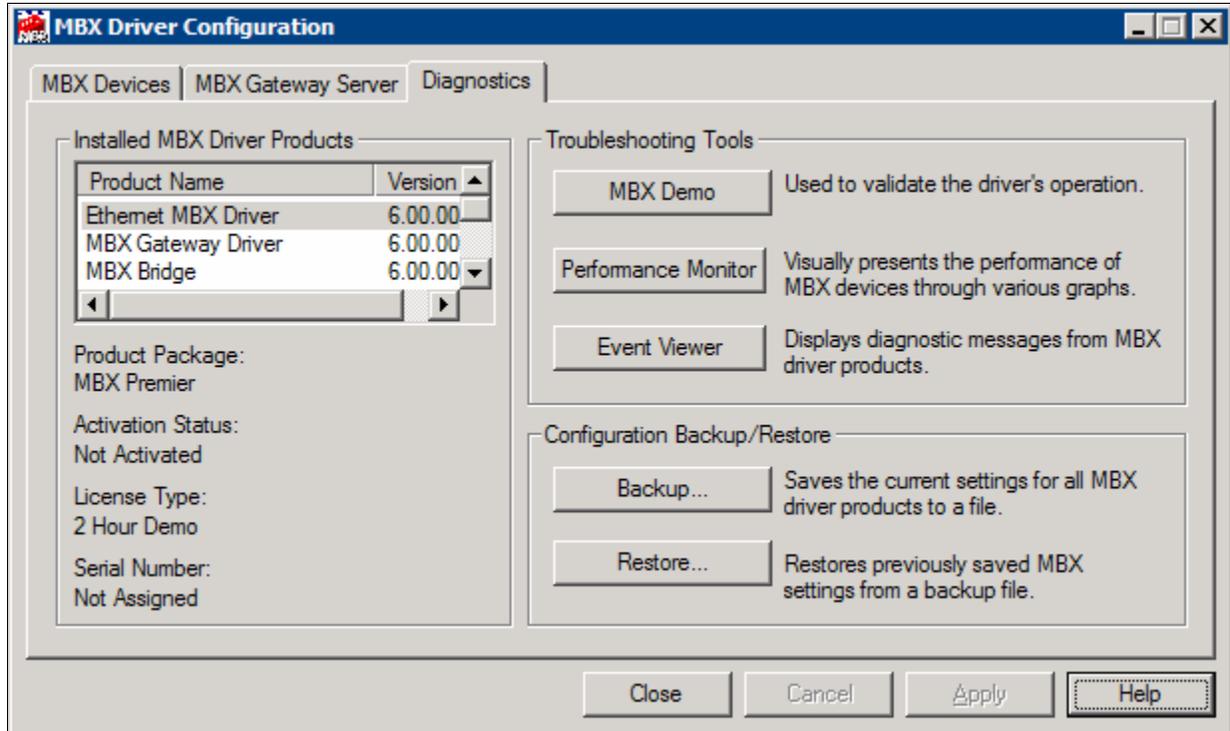


Performance Monitor

Microsoft provides a diagnostic tool, the Performance Monitor, as part of the Windows XP/2000/NT operating system. Applications supporting the Performance Monitor allow users to monitor relevant performance information. The MBX Driver supports the Performance Monitor. Multiple devices can be monitored simultaneously for comparison.

To start this program, click on its icon from Start/Settings/Control Panel/Administrative Tools group.

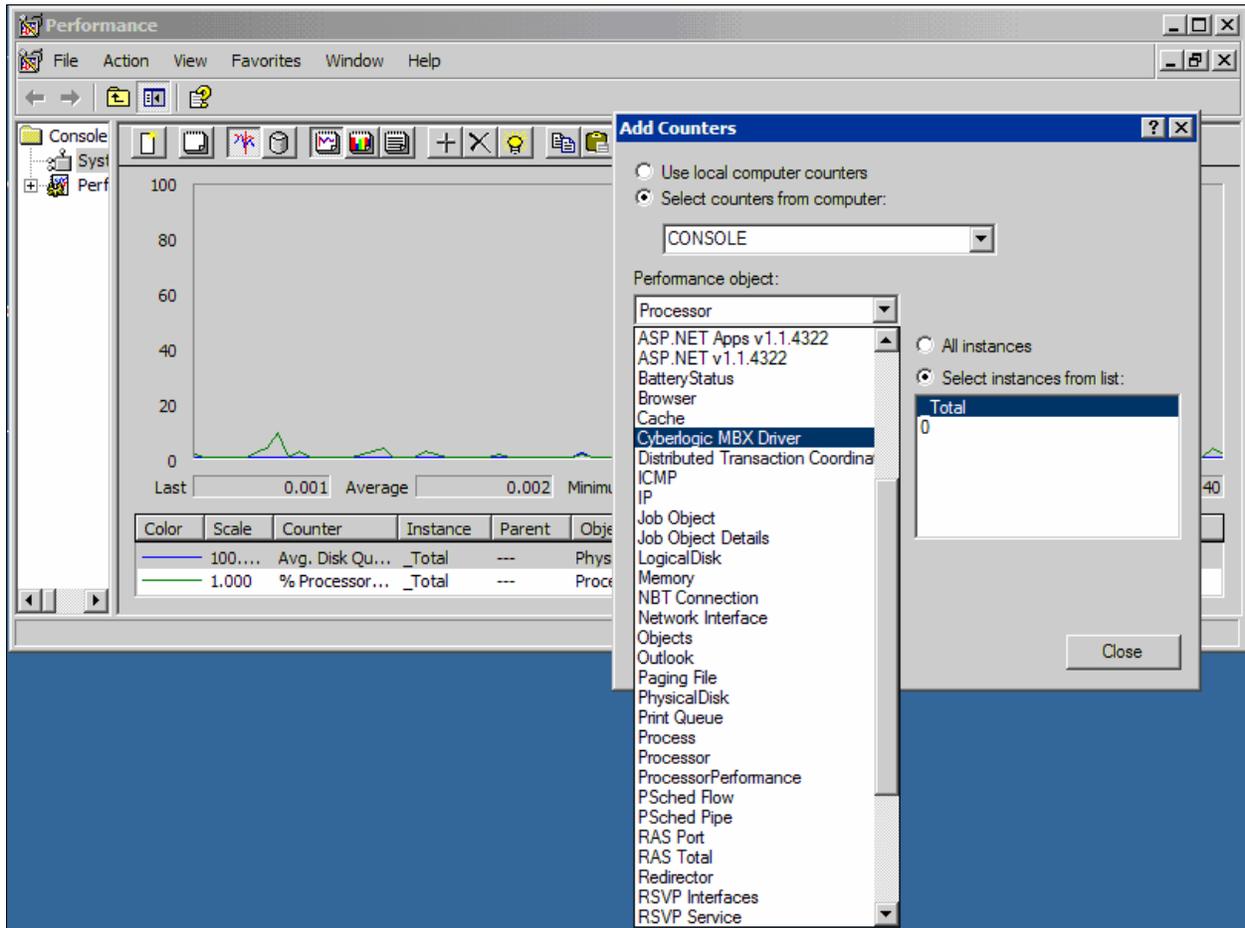
Alternatively, a Performance Monitor button is located in the Diagnostics tab of the MBX Driver Configuration Editor:



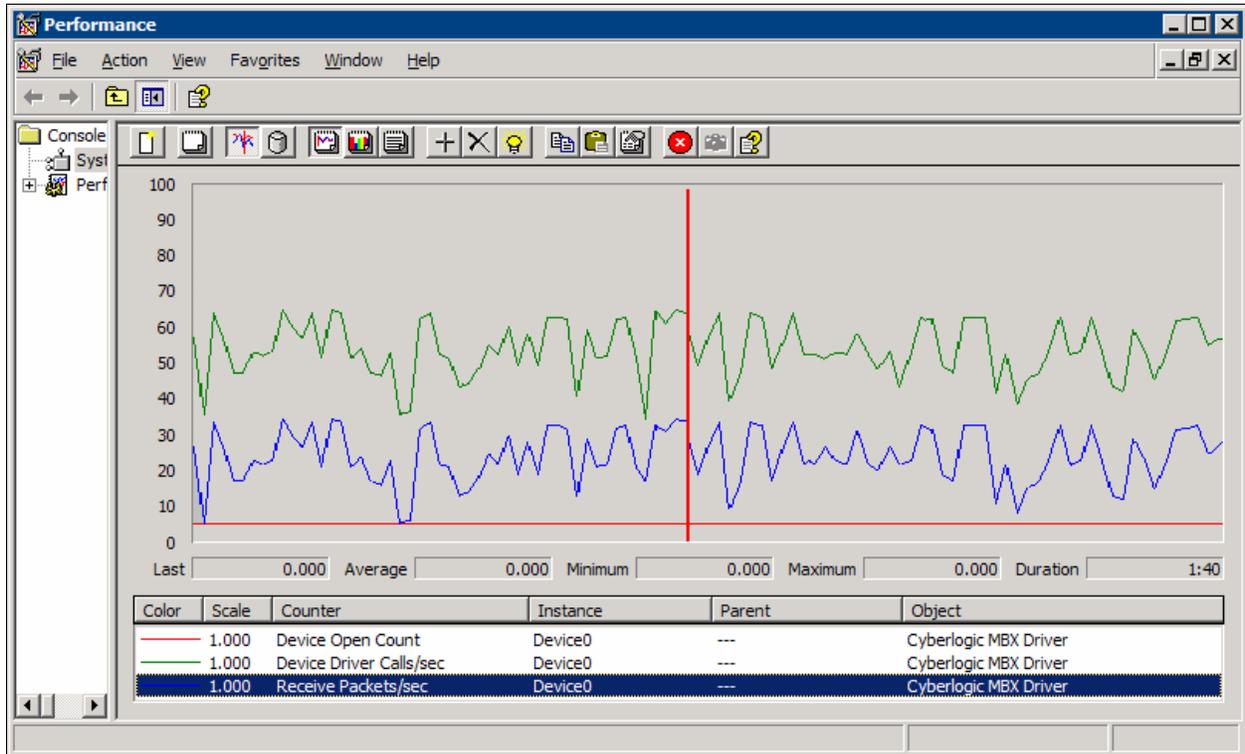
How to Use the Performance Monitor

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

When the Performance Monitor program starts, select the *Add to Chart* option from the Edit menu (or click the + button on the tool bar) and then select *Cyberlogic MBX Driver* from the Object list. After choosing a monitoring option, click *Add* and then *Done*.



Shown below are three of the many monitoring options.



Determining Peer Cop Support

Before determining whether your card supports Peer Cop, be sure the card is installed and properly configured. Refer to the [Configuration](#) section for more information.

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.

Once you verify that your card functions correctly, follow the procedure described below.

1. Start the [MBX Demo](#) program.
2. Select the *Set device number* option and enter the device number of your card.
3. Select the *Device information* option.

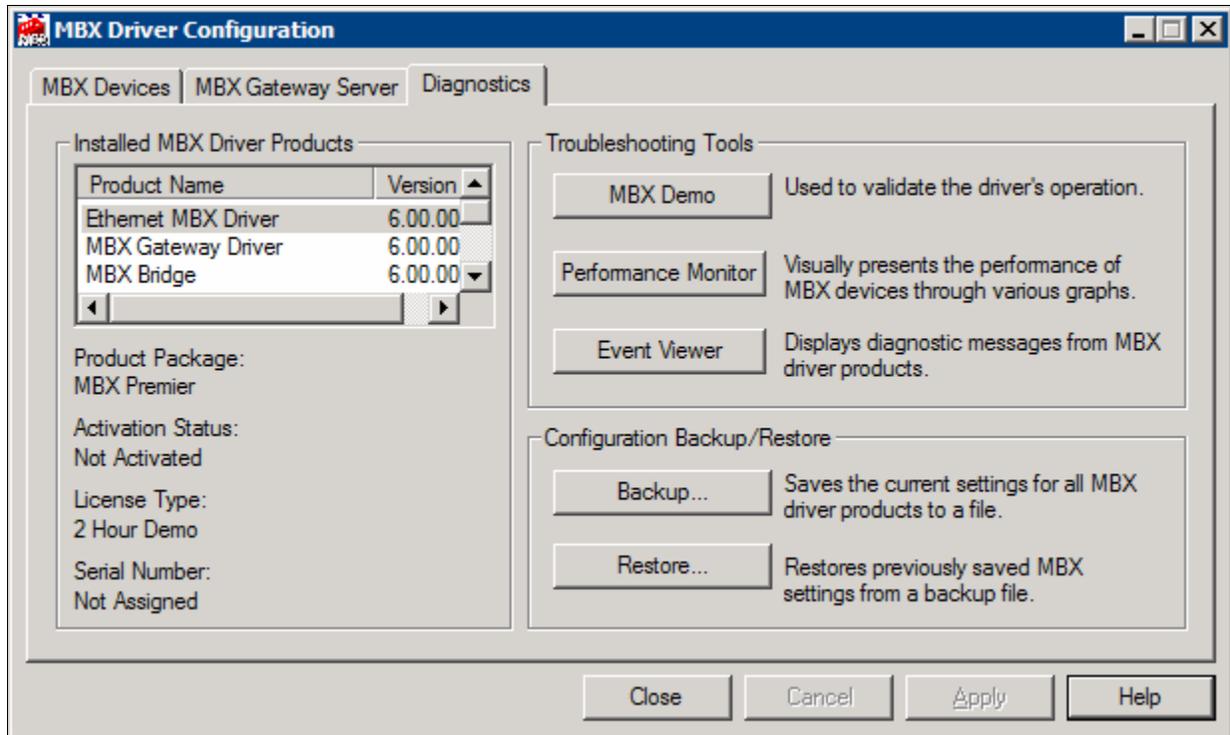
The Device Information screen displays configuration, statistical and diagnostic information about the driver, the device and the network. Locate the *Supports Peer Cop* field. If this field reports *Yes*, then your card supports Peer Cop. If *No*, then your card does not support Peer Cop.

Event Viewer

During system startup, the MBX Driver may detect configuration problems. When a problem is detected, the driver sends an appropriate message to the Windows XP/2000/NT Event Logger. To view the error log messages:

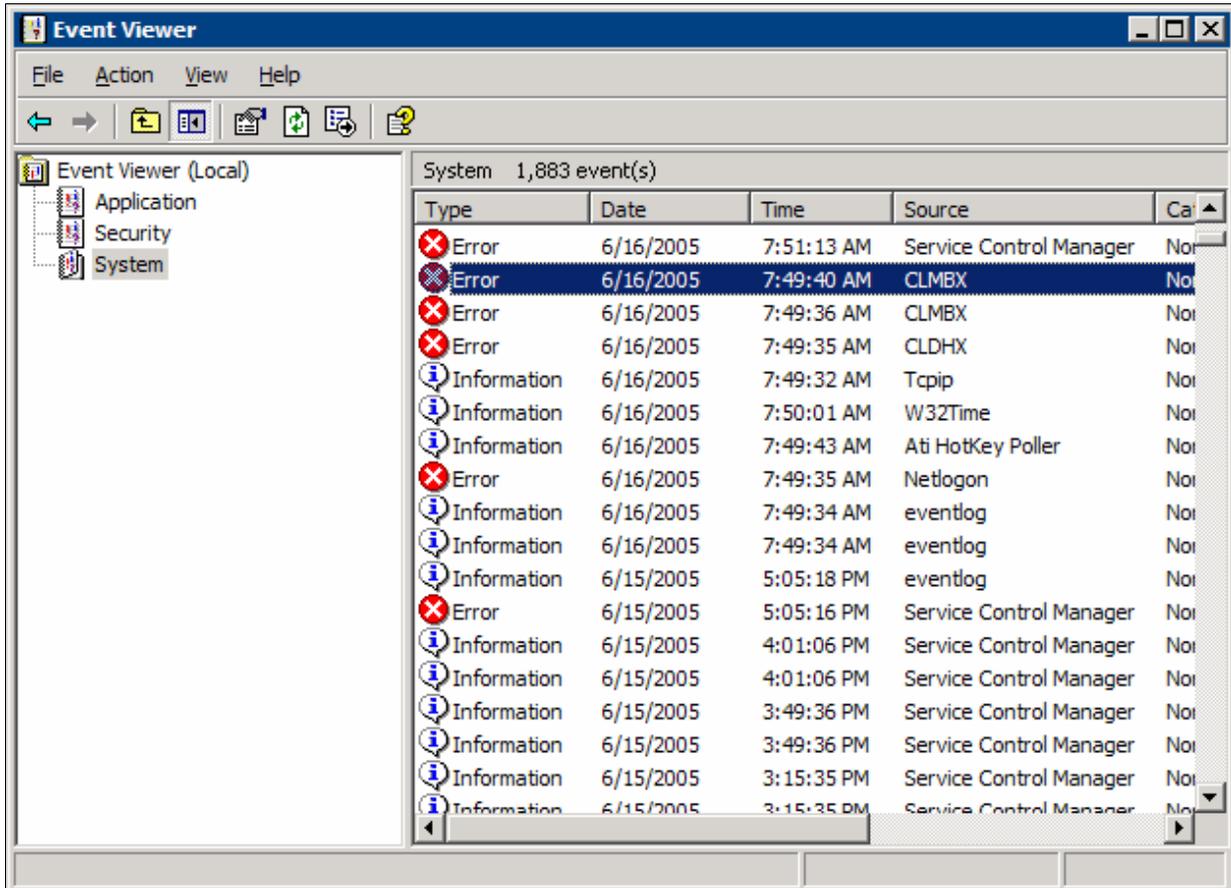
1. From the Administrative Tools group run *Event Viewer*.

Alternatively, an Event Viewer button is located in the Diagnostics tab of the MBX Driver Configuration Editor.

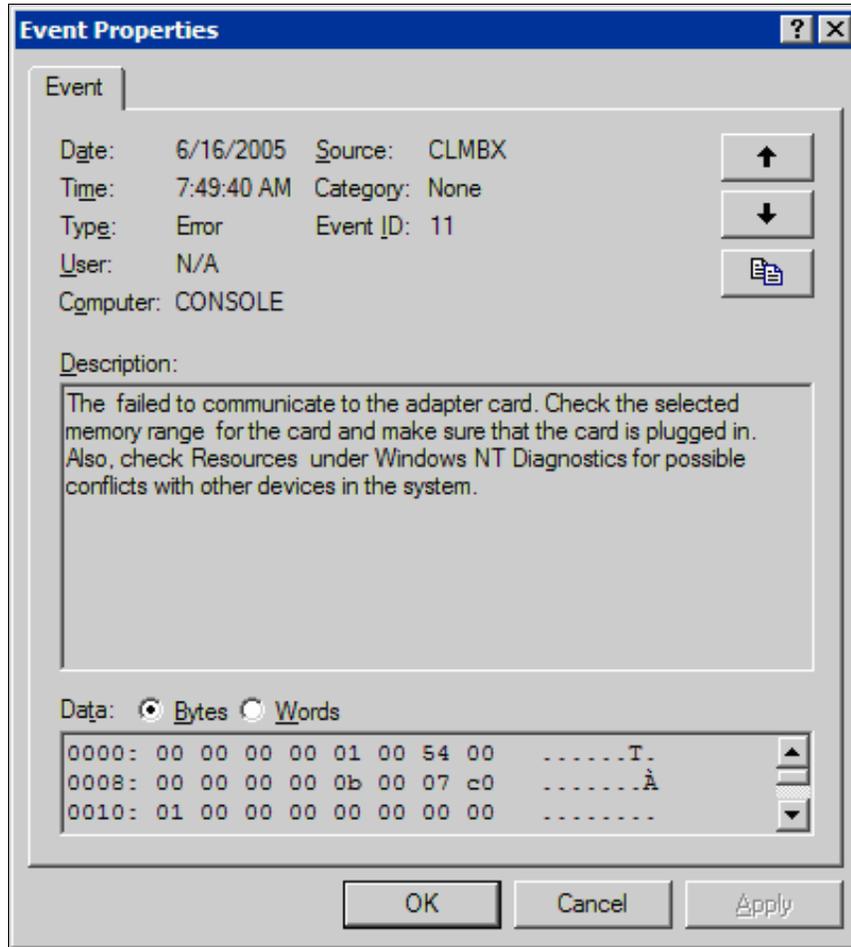


2. Select *System* from the Log menu.
3. Look for entries with *CLMBX* in the Source column.

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.

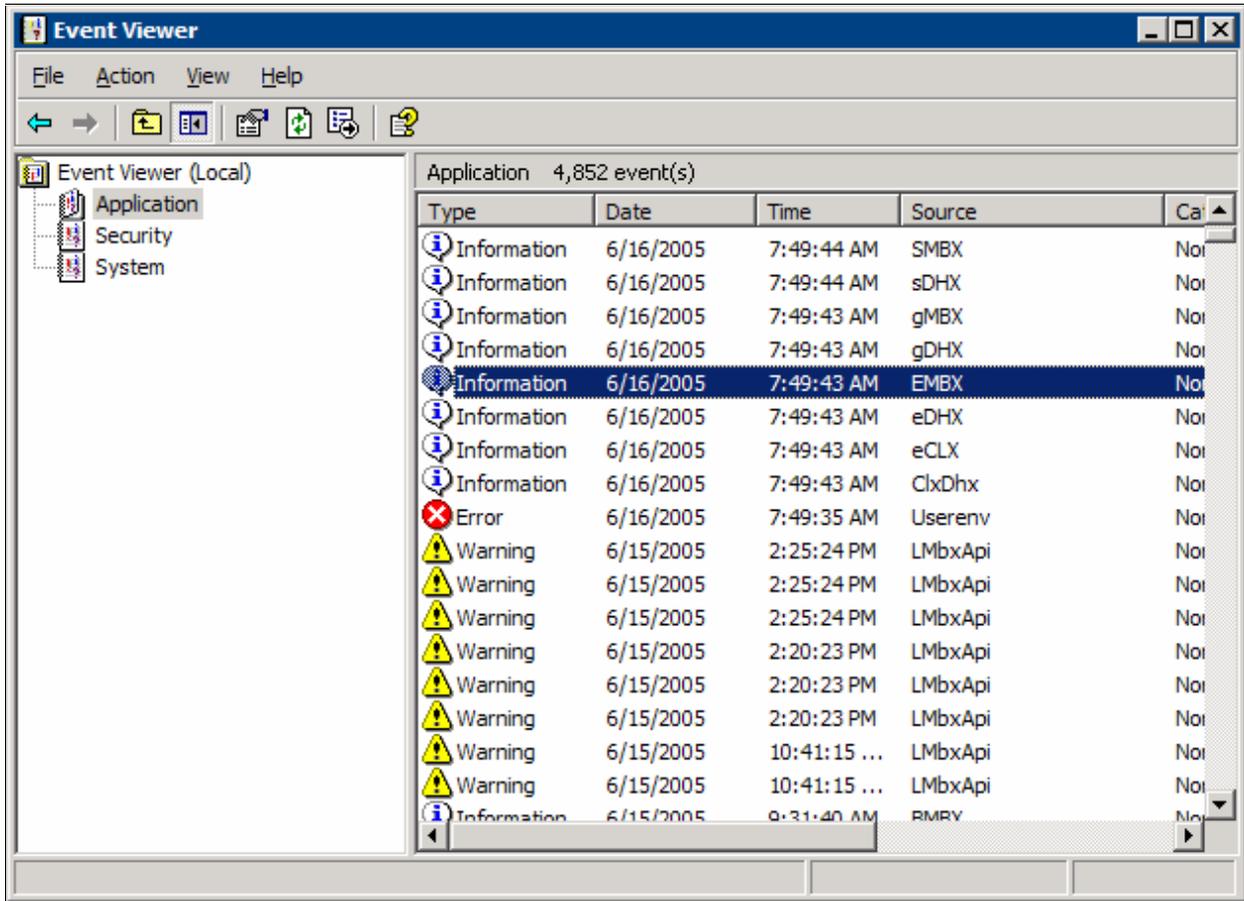


4. Double-click on the selected entry to display a complete event message as seen below.



For further descriptions of the error log messages, refer to the Help file for your specific MBX product.

5. You can also select Application events, then look for MBX entries such as sMBX and eMBX.



MBX Driver Messages

Errors

Adapter card ID for <device name> in selected slot does not match the expected card ID.

Invalid configuration parameter. MCA adapter cards, such as SM85 and MC984, have unique ID codes used to identify them. The card inserted in the specified MCA slot does not match the expected card ID.

Adapter card initialization for <device name> failed. The AIDA command <command name> timed-out. Please contact technical support of manufacturer for more assistance.

The PCMCIA 416NHM21234 card failed its initialization sequence. This may indicate a faulty card or a compatibility problem with your computer's PCMCIA controller chip/device driver. Contact technical support for more information on a possible solution.

Adapter card initialization for <device name> failed. Received tuple code <received code>. Expected to receive <expected code>. Please contact technical support of manufacturer for more assistance.

The PCMCIA 416NHM21234 card failed its initialization sequence. This may indicate a faulty card or a compatibility problem with your computer's PCMCIA controller chip/device driver. Contact technical support for more information on a possible solution.

Adapter card's dual-port memory diagnostics for <device name> at selected memory address failed (Pattern 0x<hex value>). Check the selected memory range for the card and make sure that the card is plugged in. Also, check Resources under Windows NT Diagnostics for possible conflicts with other devices in the system. Try another adapter card.

May indicate a faulty card.

Adapter card's interface diagnostics for <device name> failed (Pattern 0x<hex value>). Check the selected memory range for the card and make sure that the card is plugged in. Also, check Resources under Windows NT Diagnostics for possible conflicts with other devices in the system. Try another adapter card.

May indicate a faulty card.

Connecting ISR routine to selected interrupt line for <device name> failed. Some device driver in the system did not report it's resource usage. Try to remove some questionable drivers from the system and restart this driver. You may also select another interrupt line.

Unreported interrupt already used by another device driver.

Hardware resources allocation for device <device name> failed. Check Resources under Windows NT Diagnostics for possible conflicts with other devices in the system.

Invalid configuration parameter. One of the requested system resources (such as the memory address or interrupt IRQ), has already been allocated to a different device.

Mapping selected interrupt into system interrupt vector for <device name> failed. Check device configuration and restart the driver.

Unreported interrupt already used by another device driver.

Mapping selected physical memory address to logical address space for <device name> failed. Check device configuration and restart the driver.

Unreported memory range already used by another device driver.

Not enough memory in <paged/nonpaged> pool was available to allocate internal storage needed for <Device Name>. Close some applications. Add more memory to your system.

Memory allocation from the specified memory pool failed. This is a fatal error. The driver will not load.

Parameter <parameter name> for device <device name> has invalid value (<parameter value>). Check device configuration and restart the driver.

Invalid configuration parameter. This is a fatal error.

Parameter <parameter name> for device <device name> has invalid value (End of dump data has parameter value). Check device configuration and restart the driver.

Invalid configuration parameter. This is a fatal error.

The bus number selected for device <device name> is not supported by this computer system.

Invalid configuration parameter.

The <device name> failed to communicate to the adapter card. Check the selected memory range for the card and make sure that the card is plugged in. Also, check Resources under Windows NT Diagnostics for possible conflicts with other devices in the system.

The device driver is unable to communicate to the selected adapter card.

The interface to the adapter card for <device name> has crashed (Crash code: 0x<hex value>). Check for possible conflicts with other devices in the system. Try another adapter card.

May indicate a faulty card.

The slot number in the selected bus for device <device name> is not supported by this computer system.

Invalid configuration parameter.

Unexpected error in <function name> for <device name>. Please contact technical support of manufacturer.

Indicates a programming bug in the device driver.

<device name> was detected as the TSXMBP100 adapter card. This card is not supported by this driver software. Contact the hardware manufacture to upgrade to the PCMCIA 416NHM21234 card.

Since the TSXMBP100 and the PCMCIA 416NHM21234 cards use the same card ID, the operating system cannot tell them apart. However, the TSXMBP100 card uses different firmware and does not provide full functionality of the PCMCIA 416NHM21234 card. Only the PCMCIA 416NHM21234 card is supported by this driver.

Warnings

Device <device name> has no value for parameter <parameter name>.

Invalid configuration parameter.

Not enough memory in <paged/nonpaged> pool was available to allocate internal storage needed for <Device Name>. The driver may not operate correctly. Close some applications. Add more memory to your system.

Memory allocation from the specified memory pool failed. This is only a warning. The requested operation will fail but the driver will continue to operate.

Parameter <parameter name> for device <Device name> is out of range. Defaults to <parameter value>. Check device configuration and restart the driver.

Invalid configuration parameter.

This is a promotional copy of the CLMbx.sys device driver. The driver will operate for 4 hrs.

Time limited version of the driver

Informational

CLMbx.sys driver version <version number>

Version information.

Crash Codes

Occasionally, due to adapter card malfunctions, the MBX Driver may detect an adapter card fault. In most cases, this is due to electrical interference, either internal or external to the computer system. However, it can also be an indication of a card failure. The MBX Driver tries to recover from these failures automatically. Every time a fault condition is detected, an internal adapter fault counter is incremented and the last crash code is internally recorded. Both of these numbers can be viewed through the Device Information screen of the MBX Demo program. The following is a complete list of all crash codes that can aid in diagnosing these types of problems.

<u>Crash</u>	<u>Symbolic Name</u>	<u>Error Type</u>	<u>Description</u>
0x00	IFCINTACT	None	Interface operational
0x01	IFCTIMOUT	Interface	2.0-sec interface timeout
0x02	BADIFCOPC	Interface	Bad interface op-code
0x03	IFCDATERR	Interface	Interface data error
0x04	IFCTSTERR	Interface	Interface test error
0x05	IFCDONERR	Interface	x-fer done error
0x06	BADIFCPTH	Interface	Bad interface path
0x07	BADXFRSVR	Interface	Bad transfer state
0x08	BADXFRLN	Interface	Bad transfer length
0x09	GLBDATLEN	Interface	Global-data length error
0x0A	GLBDATADR	Interface	Global-data address error
0x0B	GLBDATPRS	Interface	Global-data not present
0x81	CKSUMERR	Fatal	PROM check-sum error
0x82	RAMDATERR	Fatal	Internal RAM data test error
0x83	EXTDATERR	Fatal	External RAM data test error
0x84	EXTADRERR	Fatal	External RAM address test error
0x85	BADCTINDX	Fatal	Bad confidence test index
0x86	EXT0EVENT	Fatal	External <i>int0</i> event error
0x87	EXT1EVENT	Fatal	External <i>int1</i> event error
0x88	DMA0EVENT	Fatal	DMA <i>int0</i> event error
0x89	COMMEVENT	Fatal	Comm-int event error

0x8A	XMTNGEVNT	Fatal	Xmit-no-good event error
0x8B	RSPTOSVAR	Fatal	No-response timeout MAC-state
0x8C	RSPTOIDLE	Fatal	No- response timeout MAC-idle
0x8D	RCVOKSVAR	Fatal	Receive-ok MAC-state
0x8E	XMTOKSVAR	Fatal	Transmit-ok MAC-state
0x8F	NORCVBUF	Fatal	No receive buffer free
0x90	BADINXLEN	Fatal	Bad input-transfer length
0x91	RESBUFERR	Fatal	Reserved rcv-buf error
0x92	BADTCsvar	Fatal	Bad trans-control state
0x93	BADWRKREQ	Fatal	Bad work request bit
0x94	OVFDATQUE	Fatal	Node-queue overflow
0x95	BADDATQUE	Fatal	Bad data-queue overflow
0x96	NOPATHERR	Fatal	Empty data-path error
0x97	BADPTHINX	Fatal	Bad path search index
0x98	BADDSPATH	Fatal	Bad data-slave path
0x100		Internal	Uncontrolled adapter crash
0x101		Internal	Adapter card initialization fault
0x102		Internal	Adapter card software reset fault
0x103		Internal	Adapter I/O timeout fault
0x104		Internal	Interface timeout
0x105		Internal	Interface semaphore fault

Frequently Asked Questions

Helpful Hints

After installing the MBX Driver software, we suggest running the [MBX Demo](#) program to ensure the driver is configured correctly and running properly.

Initially, always configure the MBX device for polled mode of operation. In this mode, a memory range is the only resource that needs to be configured. Later, you can change it to interrupt mode.

If you are experiencing problems with performance, make sure both the adapter card and the driver are set up for either polled mode or interrupt mode.

In polled mode, the recommended polling rate to use for optimum performance is 20 msec. The interrupt mode of operation will provide higher message rates at the expense of higher CPU load. Low-end systems, such as 486-based systems, may provide a better overall performance with adapter cards configured to run in polled mode.

Make sure the adapter card's memory address is unique and does not conflict with other cards in the system. Check for error messages in the [Event Viewer](#). They may aid in detecting hardware conflicts.

Make sure that you are communicating through the right device.

Make sure that you selected a unique node address for your device.

Frequently Asked Questions

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

The next step is to configure a device. You will need to know the card's memory address and interrupt. Refer to the [Configuration](#) section for more details.

I've configured my device, but when the system boots up, the Event Viewer shows some error messages. How do I fix that?

The two most common errors result from either a conflict with another device or the driver configuration not matching the card configuration. Verify that the card's memory address matches the driver's address. Also, compare the state of the interrupt jumper on the card with the polled/interrupt mode setting of the driver.

If the configurations match, there may be a conflict in the system or the card may be faulty. If possible, try a card that is known to be good in the system with the same settings. If errors still occur, try setting the card to polled mode and moving it to a new memory address (C8000, D0000, D4000 and D8000 are usually good addresses to try). Make sure you change both the driver and card settings.

There might be a conflict with my device. What do I do?

Try setting the card to polled mode and moving it to a new memory address (C8000, D0000, D4000 and D8000 are usually good addresses to try). Make sure you change both the driver and card settings.

When I configure a device, should I use polled mode or interrupt mode?

We recommend polled mode. Interrupt mode gives slightly higher performance, but it puts a greater load on the CPU. Finding free interrupts and worrying about interrupt conflicts may also be a concern. For the majority of applications, running in polled mode with a 20 msec polling interval will provide sufficient throughput. Whichever mode you choose, make sure the jumper setting on the card matches the driver setting.

The card seems to be working, but I can't see one of the nodes on the network. What's wrong?

There are two things to check. First, make sure the card is plugged into the network. Second, it's likely that both nodes have the same network node address. Shutdown the system, change the card's network address by changing the DIP switch settings (refer to the "*Modicon IBM Host Based Devices User's Guide*" from Modicon) and restart the system. You will now be able to see all of the nodes.

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

The MBX Demo program uses the device number to determine which card to use. The Set Device Number option lets you choose which device the demo will use. If you are using some other software, contact the manufacturer for more information on using multiple cards.

I have configured Peer Cop for my SA85 adapter card. However, when I try to do any Peer Cop related I/O requests, I get an error. What's the problem?

Your adapter card may not support Peer Cop. Early versions of all host interface adapter cards do not support Peer Cop. To see if your card supports Peer Cop, refer to the [Determining Peer Cop Support](#) section.

I tried to use the PCMCIA TSXMBP100 card with this driver, but the driver failed to operate with it. What's the problem?

Since the TSXMBP100 and the PCMCIA 416NHM21234 cards use the same card ID, the operating system cannot tell them apart. However, the TSXMBP100 card uses different firmware and does not provide the full functionality of the PCMCIA 416NHM21234 card. Only the PCMCIA 416NHM21234 card is supported by this driver. Contact your Schneider distributor to upgrade to the PCMCIA 416NHM21234 card.