DHX Gateway Driver Help

DHX Gateway Driver for Allen-Bradley Networks

Version 9

DHX GATEWAY DRIVER HELP

DHX® Gateway™ Driver for DH, DH+™, DH-485 and ControlNet™ Networks

Version 9

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Document last revision date May 26, 2017

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INTRODUCTION

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

The DHX Gateway Driver provides complete DHX Driver functionality to the client node applications, including support for solicited and unsolicited communications. An interface adapter, such as an Allen-Bradley 1784-KTX card, is not required on the client node. DHX Gateway Driver nodes can communicate with multiple remote servers and all Windows-compatible TCP/IP networks are supported.

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

Running 16-Bit Software

The Virtual DHX Driver, which is included with all DHX products, allows 16-bit applications to run concurrently with all 32-bit applications on the same computer. It is compatible with all 16-bit DOS/Windows applications that communicate through the 1784-KT or 1784-KTX adapter cards, such as 6200 programming software. For more information, refer to the Virtual DHX Driver section.

Compatibility

The DHX Gateway Driver is implemented as part of the Cyberlogic DHX architecture, which is the foundation used in other DHX family drivers such as the Ethernet DHX Driver, the Serial DHX Driver and the DHX Driver. Consequently, these drivers consistently support identical programming interfaces: DHXAPI, DHXAPI.Net and 6001-F1E. Supporting these existing standards protects the software and R&D investments of end-users and OEMs.

Software developers can use the DHX Software Development Kit (DHX SDK) to obtain connectivity to DH, DH+, DH-485, ControlNet and Ethernet TCP/IP networks for their applications. Applications developed with the DHX SDK can be used with all DHX family drivers and can execute under all current Windows operating systems.

Blending DHX Supported Networks

The DHX driver family provides support for all Allen-Bradley networks through a common architecture, with identical programming interfaces. This means that an application that operates with one of the DHX family drivers, such as the DHX Gateway Driver, will work with the rest of them as well. Thus, virtually all Allen-Bradley compatible software programs can operate over all networks supported by A-B with no code modifications.

You will find a complete description of the DHX family in the Appendix: DHX Architecture and Companion Products.

Migration of existing installations to new hardware products does not require the user to discard working, proven software solutions. As depicted in the diagram below, a user can mix Data Highway, Data Highway Plus, DH-485, ControlNet and Ethernet based hardware products in existing installations without losing software, network or integration investment.

The DHX family of products includes:

- DHX Driver is Cyberlogic's device driver for Data Highway, Data Highway Plus and DH-485 adapter cards from Allen-Bradley and SST.

- Ethernet DHX Driver provides Data Highway Plus emulation over TCP/IP.

- Serial DHX Driver is a full-duplex DF1 protocol driver for Data Highway, Data Highway Plus, DH-485 and ControlNet networks over serial COM port connections.

- DHX Gateway Driver works with the other DHX drivers, giving access to Data Highway, Data Highway Plus, DH-485, ControlNet and Ethernet networks from remote locations.

- ControlLogix Gateway Driver provides remote access to Allen-Bradley's Data Highway Plus network by letting you access 1756-DHRIO gateway modules in a ControlLogix chassis from a remote location.

- Virtual DHX Driver works with the other DHX drivers to permit 16-bit legacy software to run in current Windows operating systems.

- DHX OPC Server connects OPC-compliant client software applications to data sources over all Allen-Bradley networks.

- DHX SDK is a software development kit for DHXAPI, DHXAPI.Net and 6001-F1E compliant development.
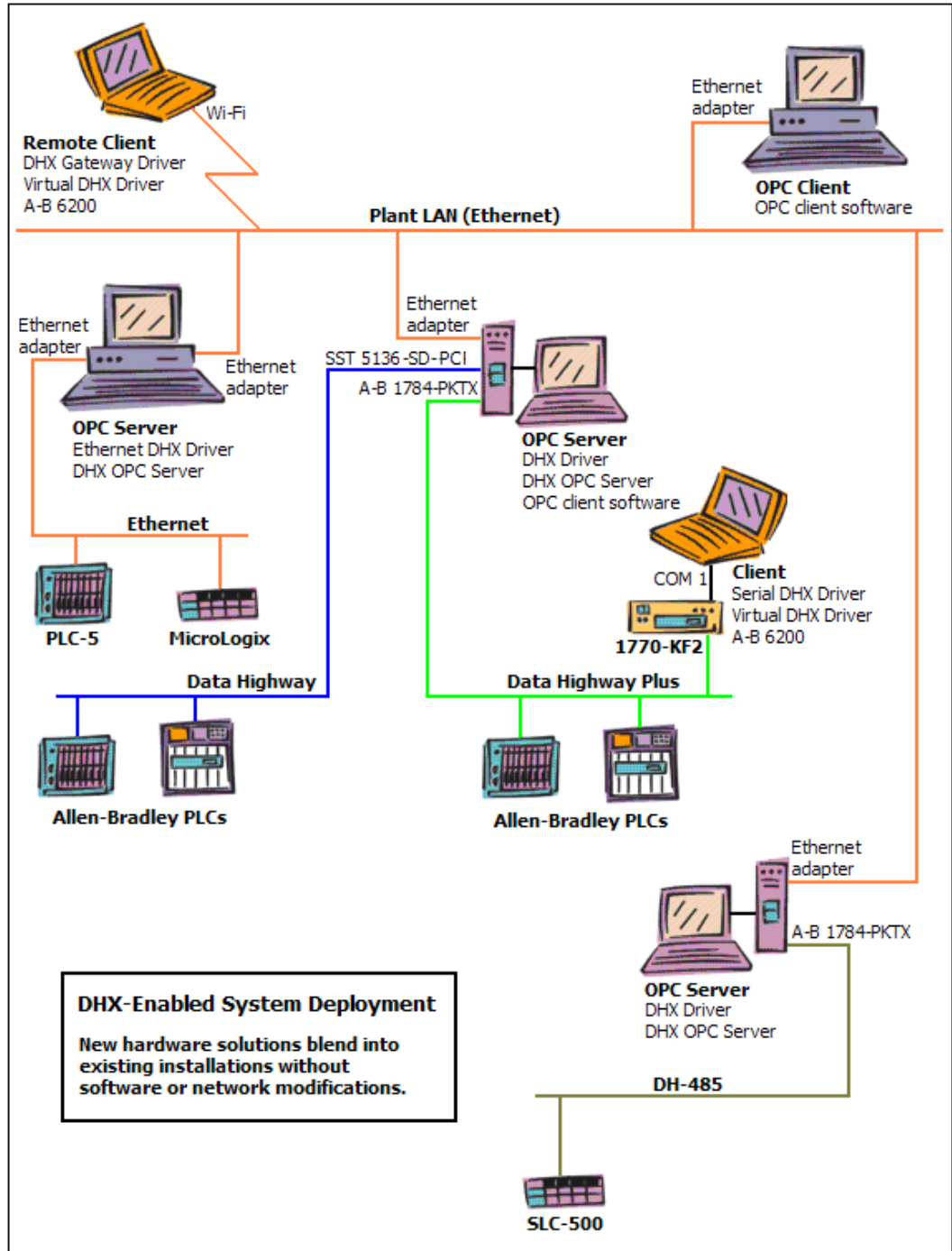
WHAT SHOULD I DO NEXT?

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

Learn How the Driver Works

If you are not familiar how the DHX Gateway Driver provides access to remote DHX devices, you should begin by reading Communication Using the DHX Gateway Driver.

Read a Quick-Start Guide

First-time users of the DHX Gateway Driver will want to read the Quick-Start Guide, which walks through a typical configuration session, step-by-step.

Get Detailed Information on the Configuration Editors

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

Verify That It's Working or Troubleshoot a Problem

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

Get Information on Related Products

The DHX family consists of several well-integrated products, which provide connectivity for Allen-Bradley networks in distributed environments. For more information about these products, refer to the Appendix: DHX Architecture and Companion Products section.

Print a Copy of This Document

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

Contact Technical Support

To obtain support information, open the Windows **Start** menu and go to **Cyberlogic Suites**, and then select **Product Information**.
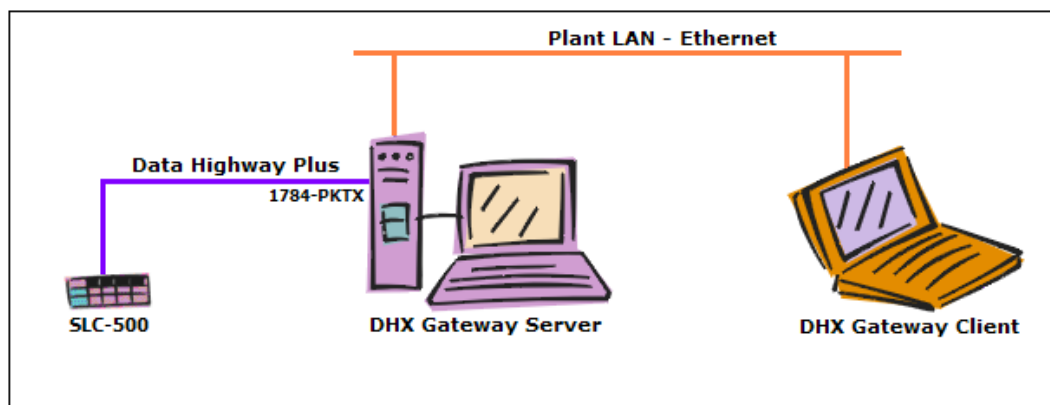
COMMUNICATION USING THE DHX GATEWAY DRIVER

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

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

Note | While the DHX Gateway Driver supports all DHX device types, it does not support the CLX devices, which are used for communicating with ControlLogix processors.

Typical DHX Gateway Driver Architecture

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

In this setup, the tower system uses the DHX Driver and a 1784-PKTX card to communicate over Data Highway Plus to the SLC-500 controller. The tower is also running the DHX Gateway Server, making it the server system.

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

To make the connection, you would configure a DHX Gateway device on the notebook, designating the tower system as the server and selecting the tower's DHX device that corresponds to its 1784-PKTX card. Applications on the notebook can now access the DHX Gateway device, which will function just as though the notebook were directly connected to the DH+ through the 1784-PKTX.

Note	The DHX Gateway Driver works with all of the networks supported by the DHX family of drivers, not just Data Highway Plus. If the server is connected to controllers over Data Highway, DH-485, Ethernet or ControlNet, it can also make these connections available to client systems.

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

- The server can have more than one device that it makes available to client systems. These devices can be of any mixture of adapters or network types.

- Multiple client systems can obtain access through each server, and through each device on a server.

- A client can connect to more than one device on a server. To do this, you simply create additional DHX Gateway Driver devices on the client and associate each with the desired device on the server.

- A client can connect to more than one server. Again, this is achieved by creating additional DHX Gateway Driver devices, one for each desired device on each server.

Main Driver Features

In general, the driver supports all Allen-Bradley network features including support for solicited and unsolicited communication. The features supported for a given configuration will depend on the type and configuration of the device on the server system.

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

QUICK-START GUIDE

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

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

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

The procedure is broken into several short segments:

- Creating a DHX Gateway Device
- Configuring the DHX Gateway Driver
- Verifying Your Driver Configuration
- Backing Up Your Configuration

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

To begin, go to Creating a DHX Gateway Device.

Creating a DHX Gateway Device

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

1. From the Windows **Start** menu, go to **Cyberlogic Suites**, then open the **Configuration** sub-menu, and then select **DHX Device Drivers**.
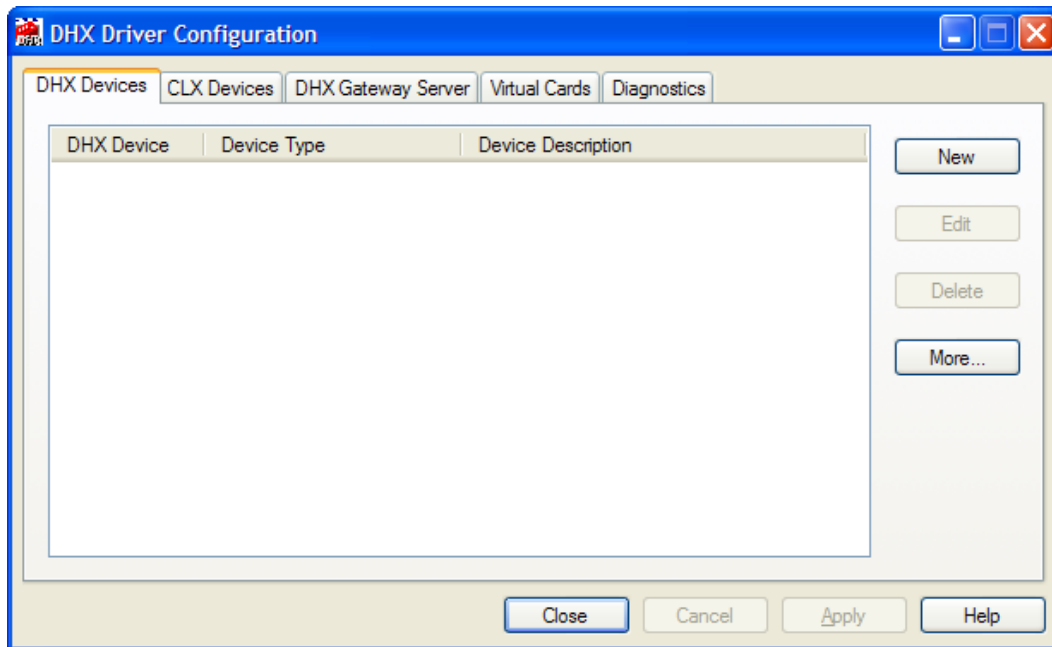
Running the editor for the first time displays the above screen.
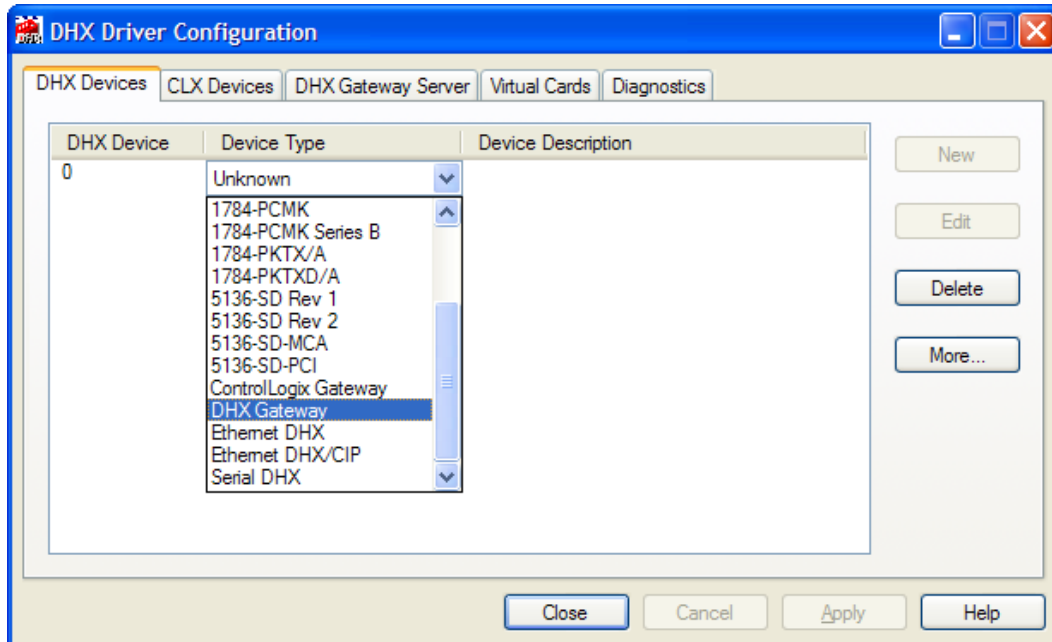
2. Click the **New** button and select **DHX Gateway** from the drop-down list.

This creates a DHX Gateway device and launches the DHX Gateway Driver Configuration Editor.

For the next part of the procedure, go to the Configuring the DHX Gateway Driver section.

Configuring the DHX Gateway Driver

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

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

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

2. In the **Server TCP Port** section, choose **Auto Detect**.

3. In the **Server DHX Device** section, select the desired device on the DHX Gateway Server system.

   As an example, suppose the server has two interface adapters: Device 0 is a 1784-KT and Device 1 is a 1784-KTX. To access the 1784-KT card, you must select **Device 0** in this field. To access the 1784-KTX, you must select **Device 1**.

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

4. Click **OK** to return to the DHX Driver Configuration Editor.
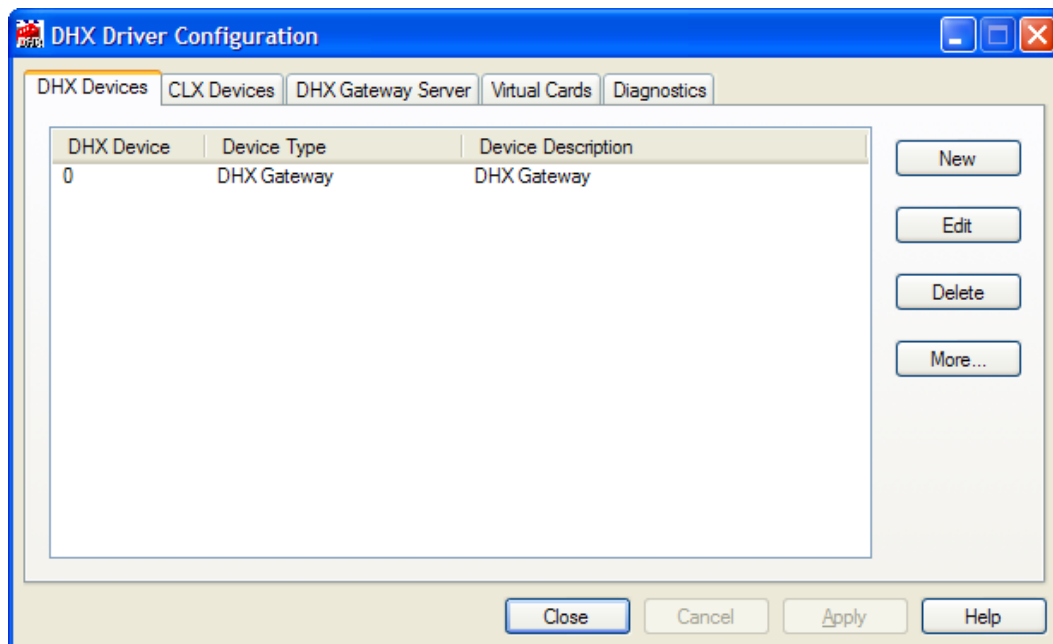
Note	The number shown under DHX Device refers to the DHX Gateway device on this machine. It is not related to the device number of the DHX device on the server machine.

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

To continue, proceed to the Verifying Your Driver Configuration section.

Verifying Your Driver Configuration

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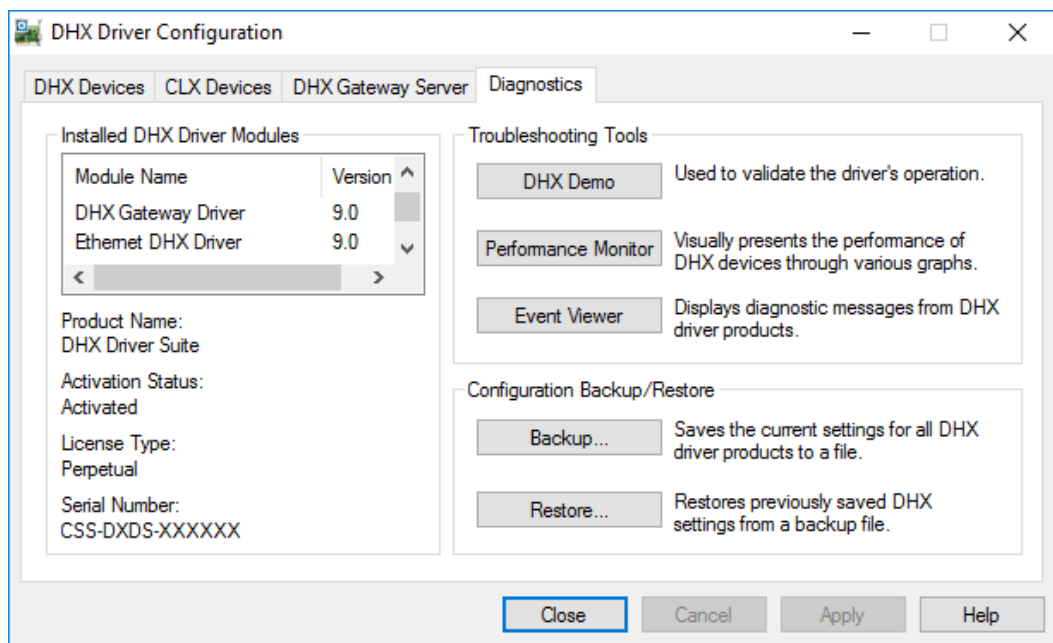
1. Select the **Diagnostics** tab.

2. The left pane of this screen shows all DHX product components installed on your system. This information, including the version numbers, may be requested if you call for technical support.

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

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

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

   When you are satisfied that the driver is correctly configured, proceed to Backing Up Your Configuration.

Backing Up Your Configuration

To protect the work that you put into configuring and testing the driver, we strongly recommend that you back up the configuration.
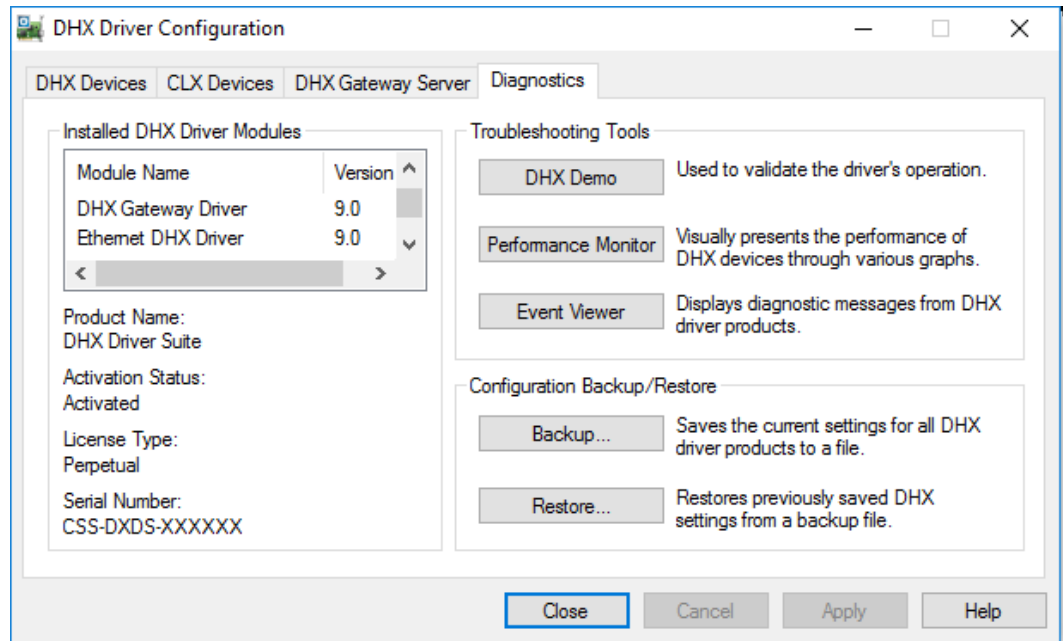
1. Select the **_Diagnostics_** tab of the DHX Driver Configuration editor.

2. Click the **_Backup..._** button.
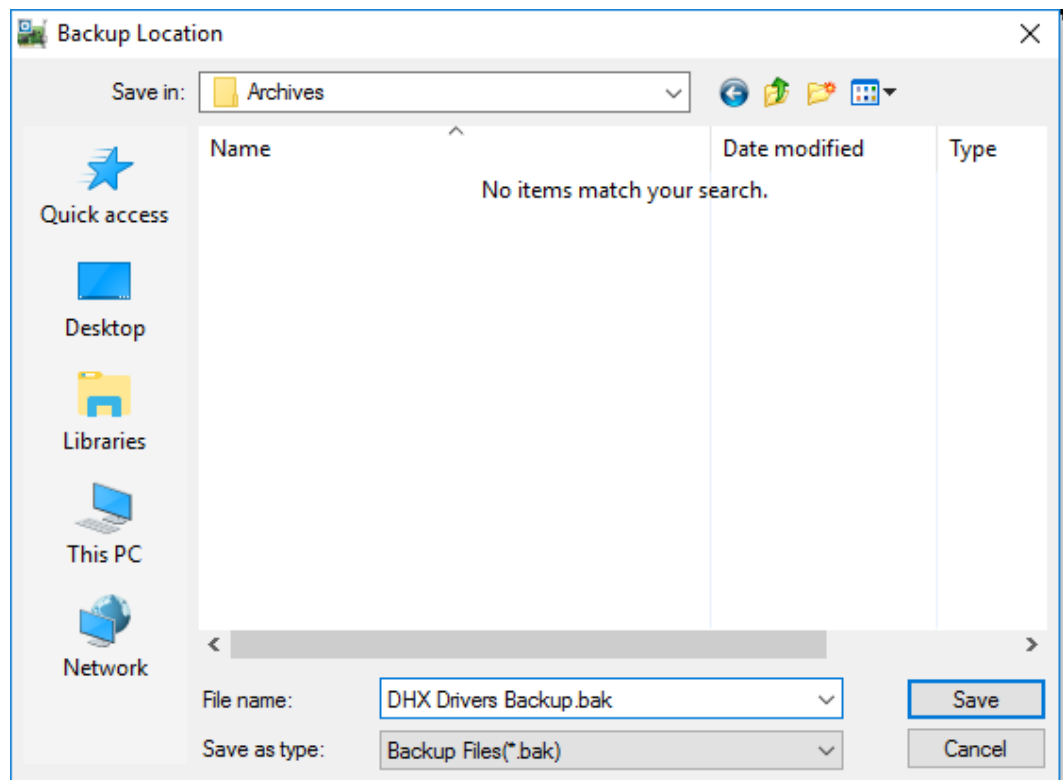
3. Browse for the desired backup directory. By default, the last-used directory will be selected.

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

CONFIGURATION EDITOR REFERENCE

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

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

To create a DHX Gateway device, you must run the DHX Driver Configuration Editor after you install the software. The DHX Driver Configuration Editor is a common component of all drivers in the DHX family.

When configuring a DHX Gateway device, the DHX Driver Configuration Editor automatically dispatches the DHX Gateway Driver Configuration Editor.

DHX Driver Configuration Editor

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

The DHX Driver Configuration editor consists of five tabs:

- DHX Devices Tab
- CLX Devices Tab
- DHX Gateway Server Tab
- Virtual Cards Tab
- Diagnostics Tab

The following sections provide complete descriptions of these tabs.

DHX Devices Tab

DHX devices are logical devices that are used to communicate to Programmable Logic Controllers, such as MicroLogix, SLC-500, PLC-5, PLC-3 and PLC-2. Every DHX device must be configured on the DHX Devices tab before it can be used by client applications, such as the DHX OPC Server. The DHX Devices tab lists all currently configured DHX devices in your system. The information is shown in three columns: DHX Device, Device Type and Device Description.
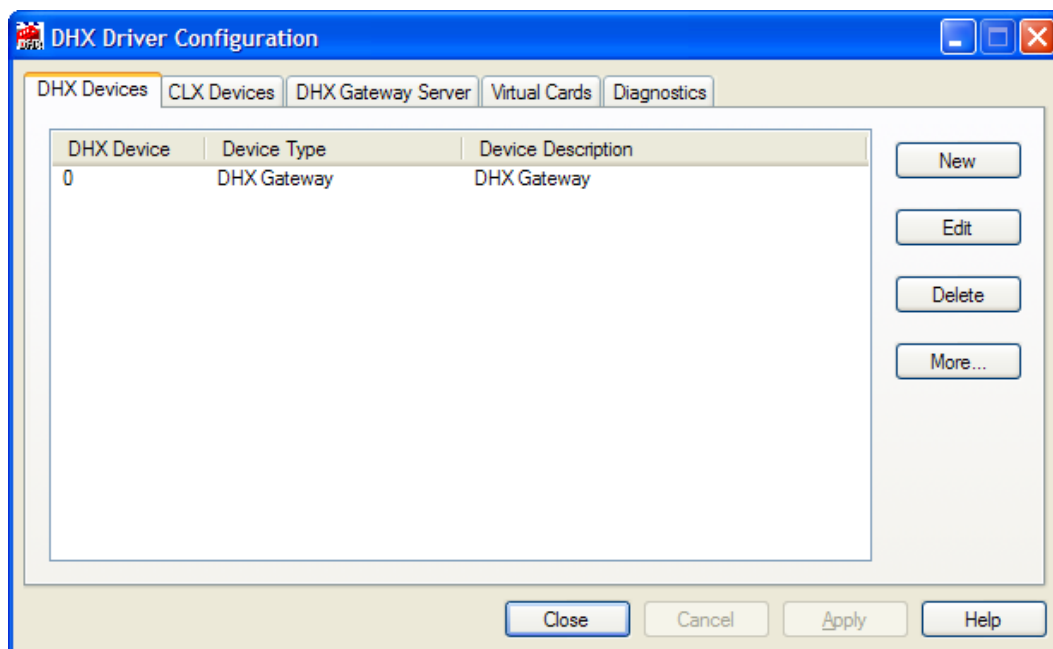
DHX Device

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

Device Type

This column identifies the type of the DHX device, such as 1784-KTX, Ethernet DHX or DHX Gateway.

Device Description

This is user-assigned text for describing a device. 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 DHX device operation. However, some applications using this device may be able to show this text.

New

Click this button to create a new DHX device.

Edit

Select a DHX device and click this button to edit it.

Delete

Select a DHX device and click this button to delete it.

More...

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

Creating a New DHX Device

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

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

Deleting an Existing DHX Device

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

Editing an Existing DHX Device Configuration

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

Changing Device Type

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

CLX Devices Tab

CLX devices are logical devices that are used to communicate to the Logix family of Programmable Automation Controllers, such as ControlLogix, CompactLogix and FlexLogix. Every CLX device must be configured on the CLX Devices tab before it can be used by client applications, such as the DHX OPC Server. The CLX Devices tab lists all

currently configured CLX devices in your system. The information about each device is shown in three columns: CLX Device, Device Type and Device Description.

Note	Ethernet CLX and CLX over DHX devices are used only with the Cyberlogic DHX OPC Server and are available only if you have installed the DHX OPC Server Suite, DHX OPC Premier Suite or DHX OPC Enterprise Suite. Otherwise, the Ethernet CLX and CLX over DHX device types will not be available, and this tab will not appear in the editor. For more information on CLX devices, refer to the DHX Driver help.
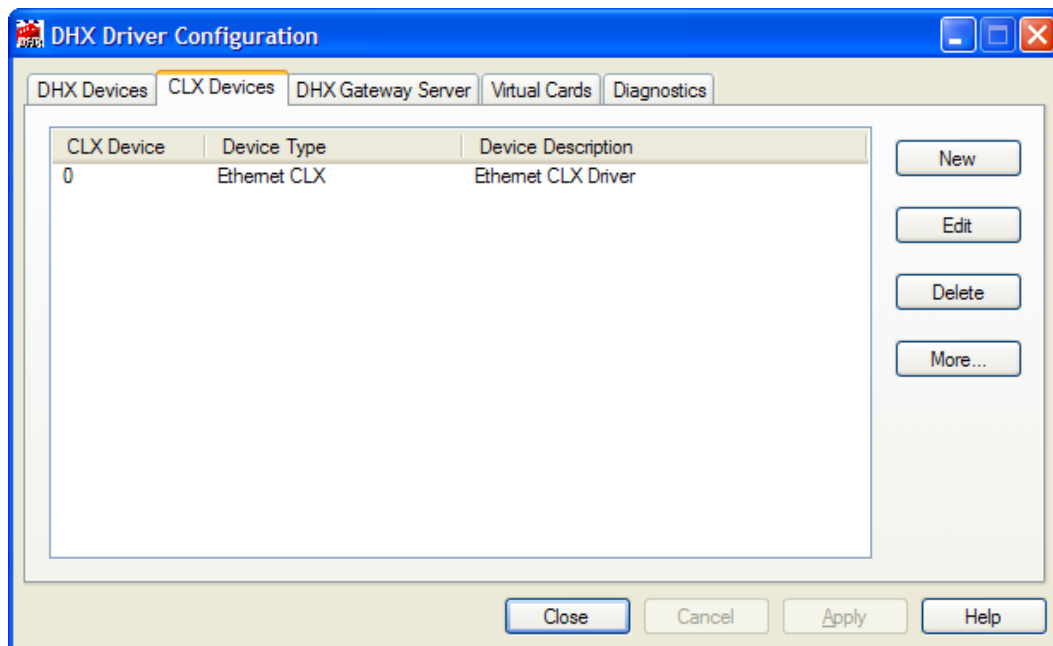
CLX Device

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

Device Type

This column identifies the type of the CLX device, such as Ethernet CLX or CLX over DHX.

An Ethernet CLX device allows communications to the Logix family of Programmable Automation Controllers over an Ethernet network. This type of a device does not require an Ethernet DHX device to operate.

A CLX over DHX device allows communications to the Logix family of Programmable Automation Controllers over networks other than Ethernet. This type of a device requires an appropriate DHX device, such as a 1784-PKTX, to operate.

Device Description

This is user-assigned text for describing a device. 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 CLX device operation. However, some applications using this device may be able to show this text.

New

Click this button to create a new CLX device.

Edit

Select a CLX device and click this button to edit it.

Delete

Select a CLX device and click this button to delete it.

More...

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

Creating a New CLX Device

Click the **New** button or right-click inside the list window and select **New** from the context menu. Then select the desired device type from the drop-down list.

Upon selecting the device type, the DHX Driver Configuration editor will automatically dispatch the appropriate device editor.

Deleting an Existing CLX Device

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

Editing an Existing CLX Device Configuration

Select the device, click the **Edit** button or right-click and select **Edit** from the context menu. The DHX Driver Configuration editor will automatically dispatch the appropriate device configuration editor. The screen that follows will depend upon the selected device type.

Changing Device Description

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

Changing Device Type

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

DHX Gateway Server Tab

All DHX suites include the DHX Gateway Server, a remote connectivity component of the DHX family. The DHX Gateway Server allows remote nodes to access all configured DHX devices present on the system.
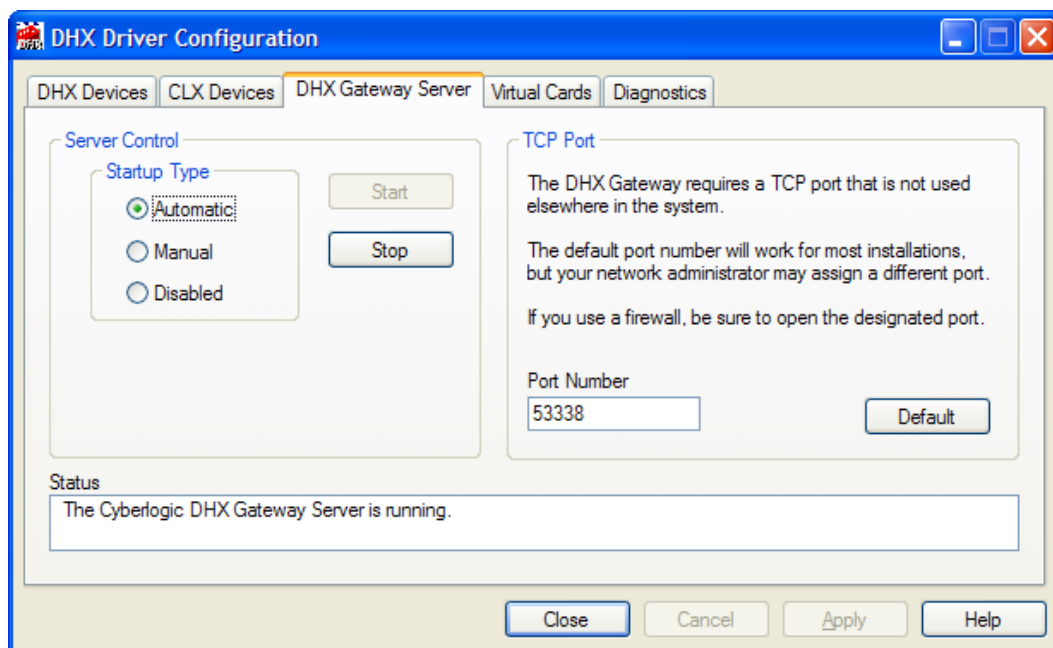
Server Control

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

Automatic

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

Manual

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

Disabled

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

Start

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

Stop

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

Status

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

TCP Port

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

Port Number

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

Default

Click this button to restore the TCP port value to its default setting of 53338.

Selecting the Startup Type

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

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

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

Start/Stop the Gateway Server

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

Selecting the TCP Port

Enter the desired port number in the Port Number field.

You must enter a TCP port that is not used elsewhere in the system. The default, 53338, will work for most installations, but this port may be taken in some unusual cases. If that applies to your system, the system administrator will assign a different port.

Configuring the Firewall

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

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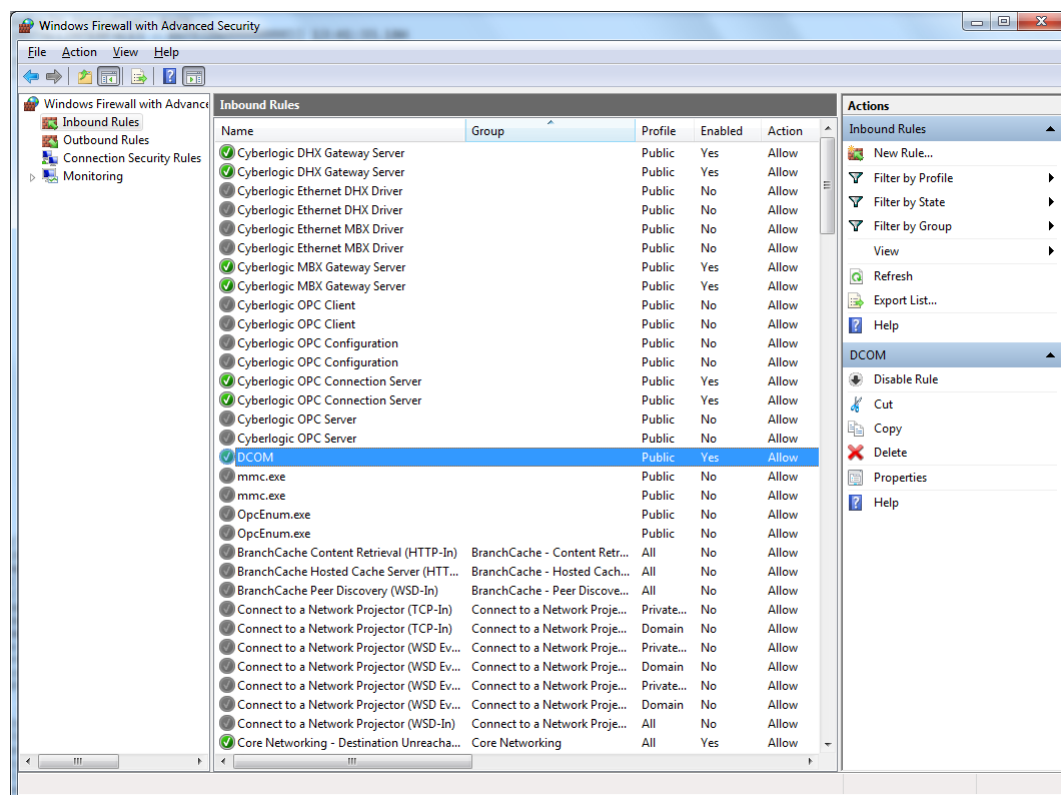

2. Select ***Inbound Rules***.

3. Verify that the rules ***Cyberlogic DHX Gateway Server*** and ***DCOM*** are enabled. If not, enable them.

4. Close the window to exit.

Virtual Cards Tab

Virtual cards allow legacy 16-bit DOS and Windows applications to use any of the DHX devices you have configured in your system. They do this by making those devices appear to function as 1784-KT or 1784-KTX cards.

The Virtual Cards tab lists all currently-configured virtual cards. The information is provided in five columns: Card, Memory Address, Interrupt, Timeout and Mapped to DHX Device….
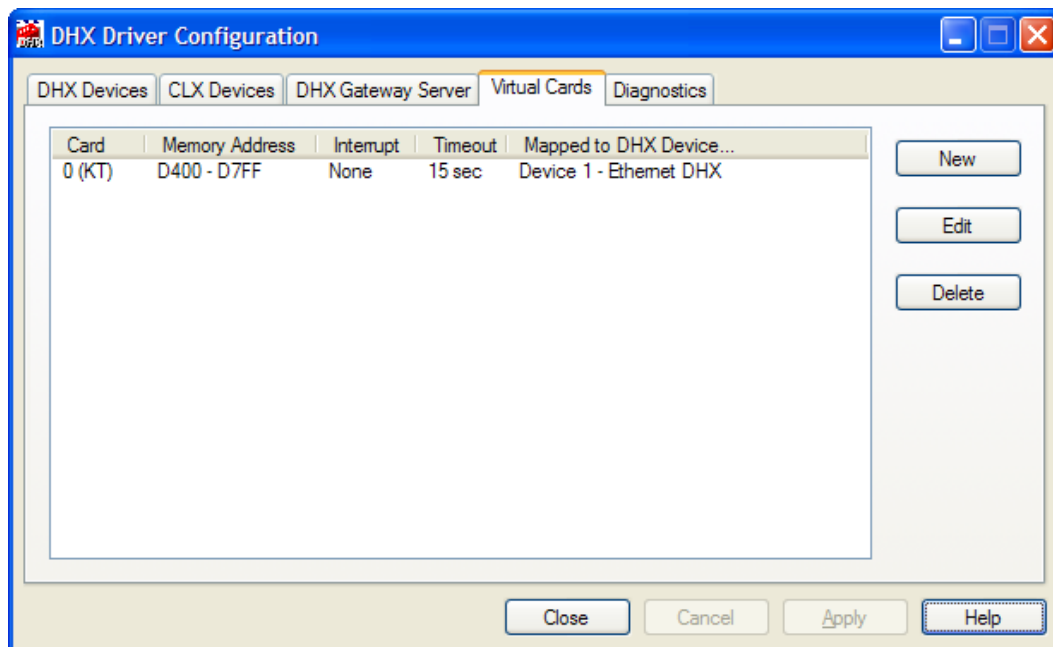
Card

This column displays a number that the editor assigns to every virtual adapter card and also indicates the card type (KT or KTX).

Memory Address

This is the memory address range allocated to the virtual adapter card.

Interrupt

This is the interrupt IRQ line to be emulated by the virtual adapter card. If it is *None*, then the virtual card will operate in polled mode.

Timeout

This is the message timeout value for the virtual adapter card.

Mapped to DHX Device...

This is the actual DHX device used by the virtual adapter card for all of its communications.

New

Click this button to create a new virtual card.

Edit

Select a virtual card and click this button to edit it.

Delete

Select a virtual card and click this button to delete it.

Creating a New Virtual Card

Click the **New** button or right-click inside the list window and select **New** from the context menu. The Edit Card Properties window will open to allow you to configure the new virtual card.

Deleting an Existing Virtual Card

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

Editing an Existing Virtual Card

Select an existing virtual adapter card and click the **Edit** button or right-click and select **Edit** from the context menu. In either case, the following dialog will appear.
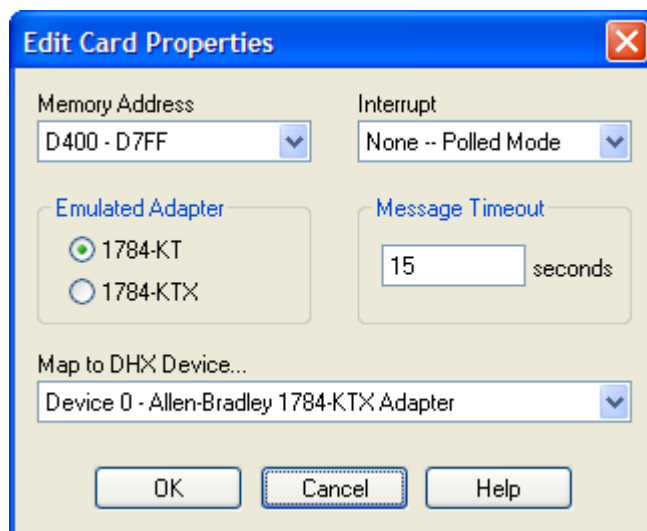
Memory Address

This is the memory address range allocated to the virtual adapter card. This setting must match your 16-bit software configuration.

Interrupt

This is the interrupt (IRQ) line to be emulated by the virtual adapter card. Most programs do not need interrupt emulation.

Emulated Adapter

This selection determines whether the virtual adapter will emulate the 1784-KT or 1784-KTX card. The choice of adapter will affect the memory addresses and interrupts that can be chosen.

Message Timeout

This is the message timeout value for this virtual adapter card. It specifies the time that the Virtual DHX Driver should wait for reply messages before declaring a timeout condition.

If you encounter communication timeouts, you should increase this value. For most applications, a 15-second timeout value is adequate.

Mapped to DHX Device…

This is the DHX device that is used by this virtual adapter card for all of its communications. The DHX device must already have been configured and tested. If you have not done this, refer to the Configuration section of the appropriate DHX family driver: DHX Driver, Ethernet DHX Driver or DHX Gateway Driver.

Diagnostics Tab

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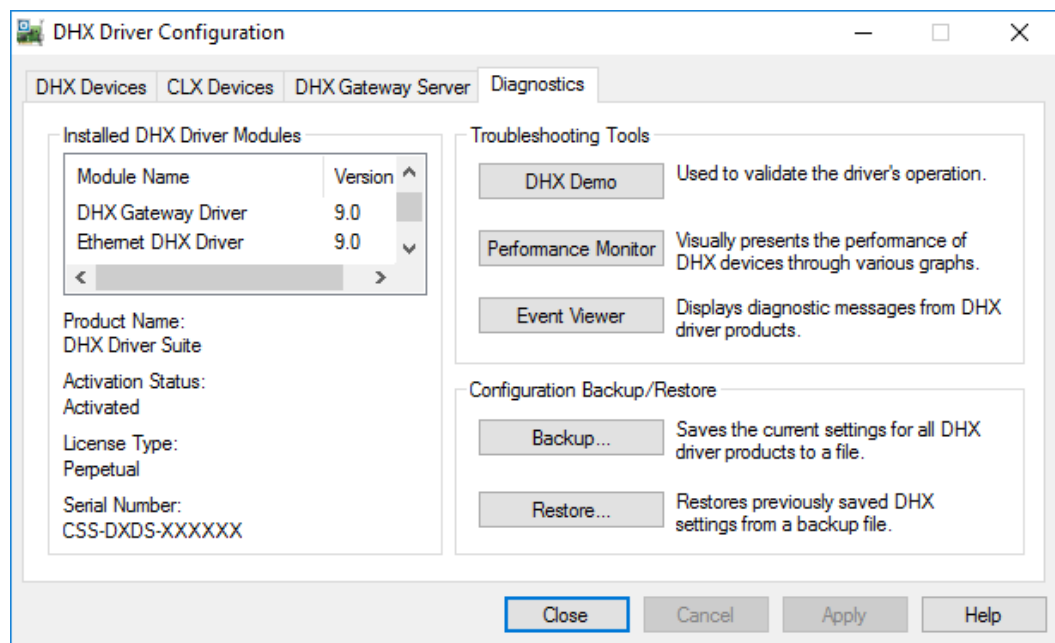
Installed DHX Driver Products

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

Product Package

DHX products are sold and installed as packaged suites, such as the DHX Driver Suite and DHX OPC Server Suite. This field indicates the suite that is installed on your system.

Activation Status

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

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

License Type

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

Serial Number

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

Troubleshooting Tools

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

For details on how to use these tools, refer to the Validation & Troubleshooting section.

DHX Demo

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

Performance Monitor

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

Event Viewer

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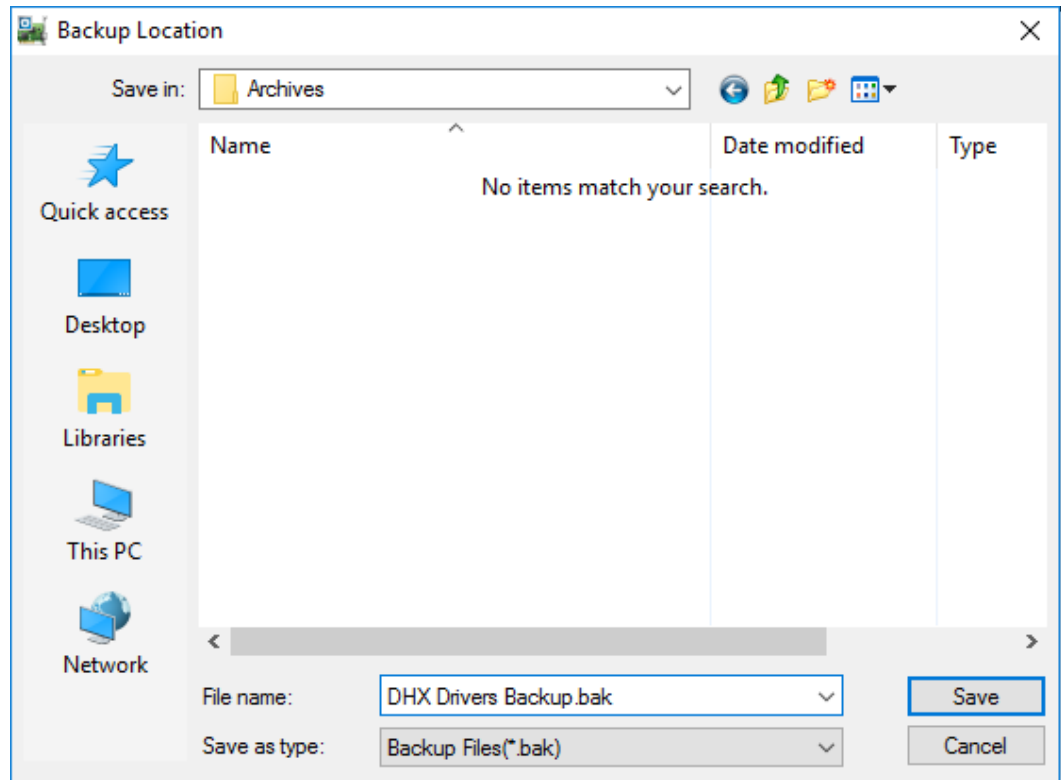
Configuration Backup/Restore

The Backup… and Restore… buttons in this group can be used to backup and restore configurations of all DHX family drivers on your system.

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

Backup Configuration

Use this procedure to backup your configuration.
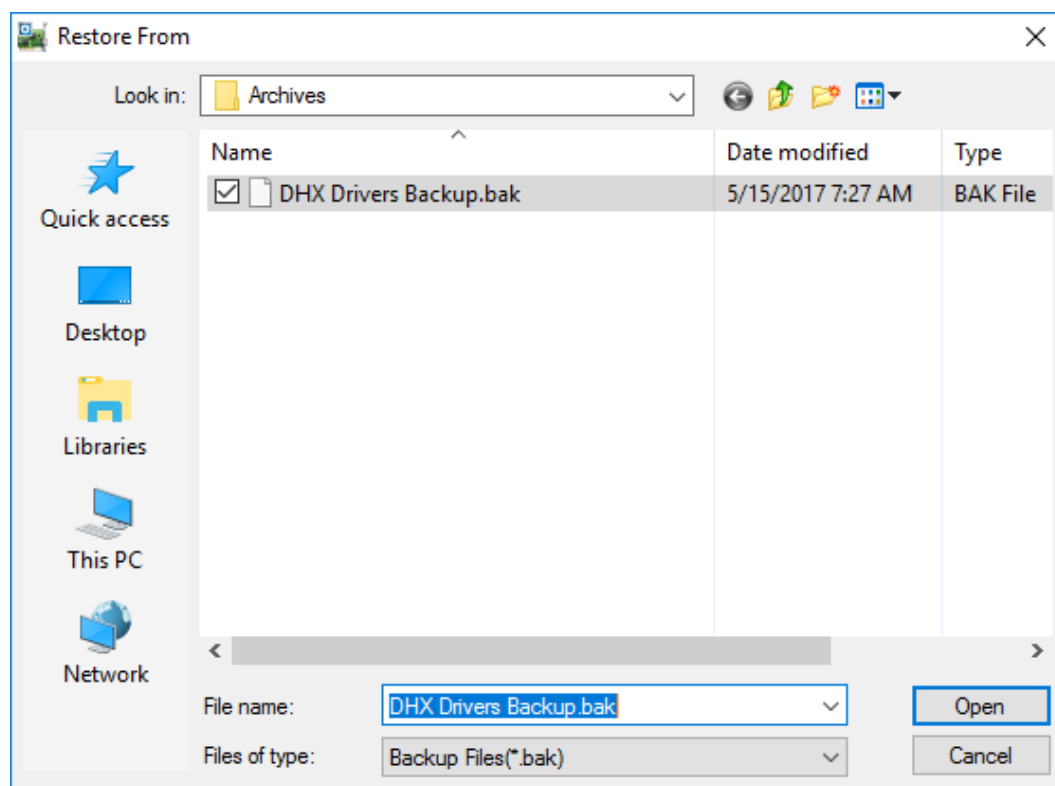
1. Click the **Backup…** button.

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

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

<u>Restore Configuration</u>

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

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

2. Browse for your configuration backup file. By default, the last used directory will be selected.

3. Select the backup file and click the **Open** button to complete the restore operation.

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

Configuration Backup/Restore Utility

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

The utility accepts the following command line switches:

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

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

> ClDhxCfg /Save C:\Program Files\Common Files\Cyberlogic Shared\DhxCfg.bak

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

> ClDhxCfg /Restore C:\Program Files\Common Files\Cyberlogic Shared\DhxCfg.bak

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

DHX Gateway Driver Configuration Editor

When editing DHX Gateway devices, the DHX Driver Configuration editor dispatches the DHX Gateway Driver Configuration editor.

The DHX Gateway Driver Configuration editor consists of a single dialog box.
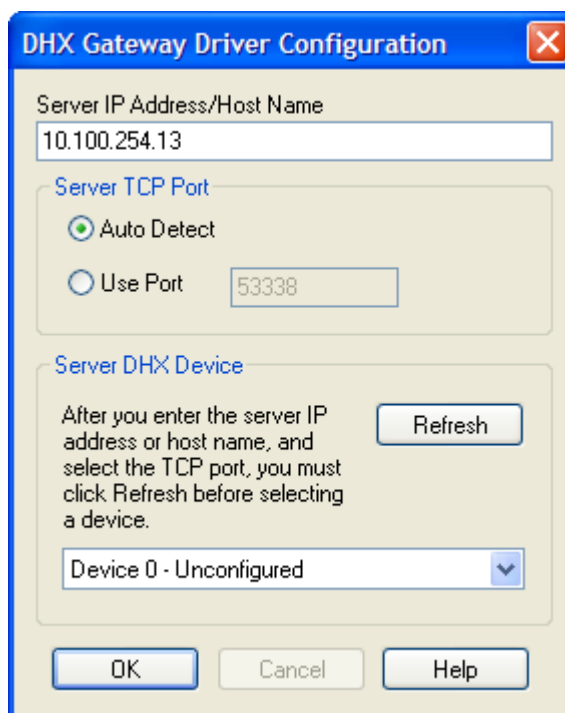
<u>Server IP Address/Host Name</u>

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

<u>Server TCP Port</u>

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

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

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

Server DHX Device

This section allows you to select the DHX device number of the desired device on the DHX Gateway Server system.

As an example, suppose the server has two interface adapters: Device 0 is a 1784-KT and Device 1 is a 1784-KTX. If you want to use the Gateway Driver to access the 1784-KT card, you must select **Device 0** in the Server DHX Device field. To access the 1784-KTX, you must select **Device 1**.

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

VALIDATION & TROUBLESHOOTING

The following sections describe how the DHX Demo, Performance Monitor and Event Viewer can be used to verify that the DHX Gateway Driver is configured correctly.

In case of communication or configuration difficulties, the Frequently Asked Questions section may help you to solve the problem.
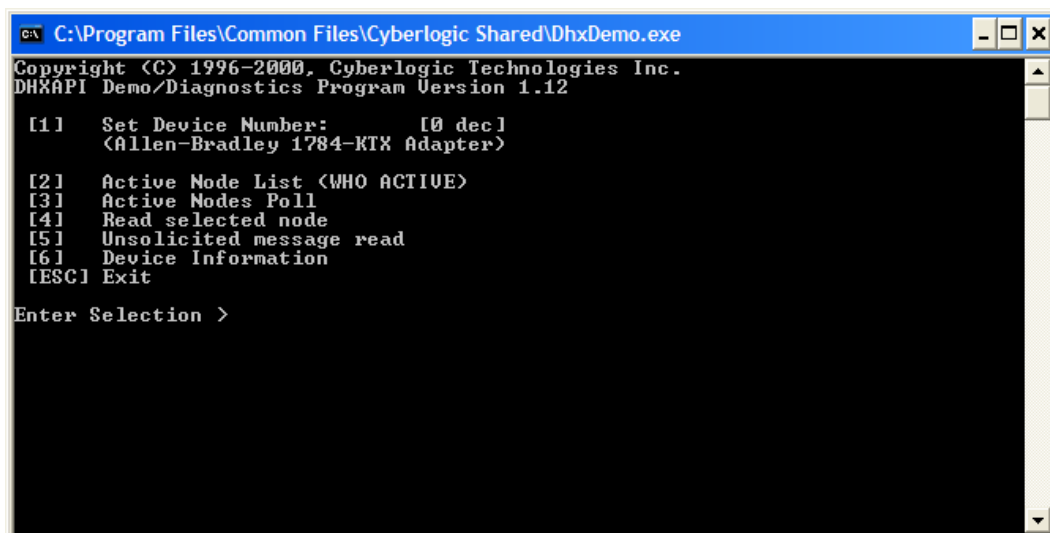
DHX Demo

The DHX Demo program can be used to test all configured DHX devices in a system for proper operation. To run the program, open the Windows **Start** menu and locate the **Cyberlogic Suites** sub-menu. From there, go to the **Diagnostics** sub-menu and select **DHX Demo**.

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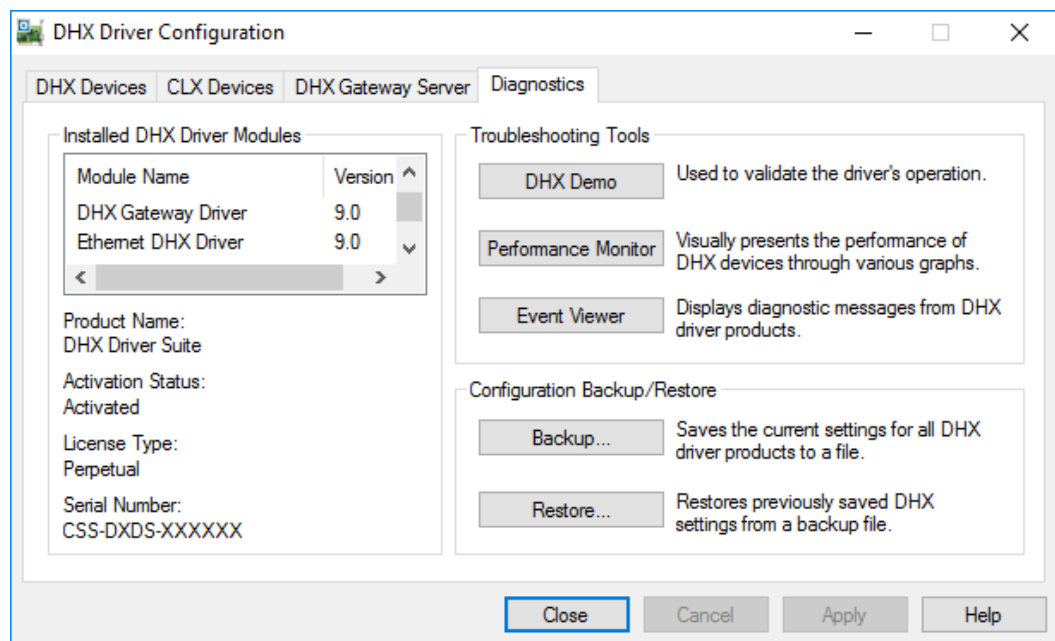
Main Menu

The DHX Demo will quickly access all available features of the configured DHX devices in your system, allowing you to verify their operation.
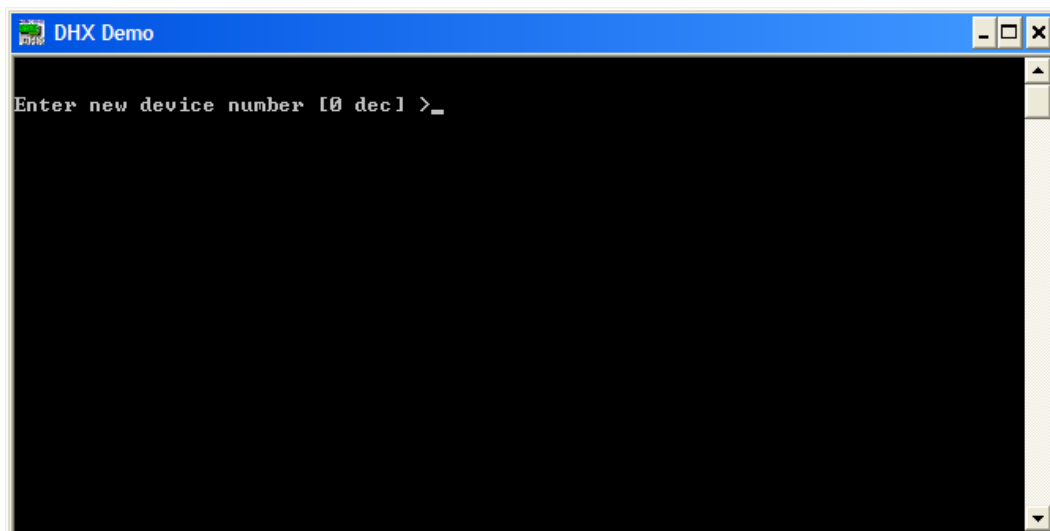
The simple command-line interface displays menu choices that take the user to secondary level screens.

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

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

[1] Set Device Number

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

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

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

[2] Active Node List (WHO ACTIVE)

From the main menu, press **2**. This launches the Active Node List (WHO ACTIVE) screen, which shows all active nodes on the network.
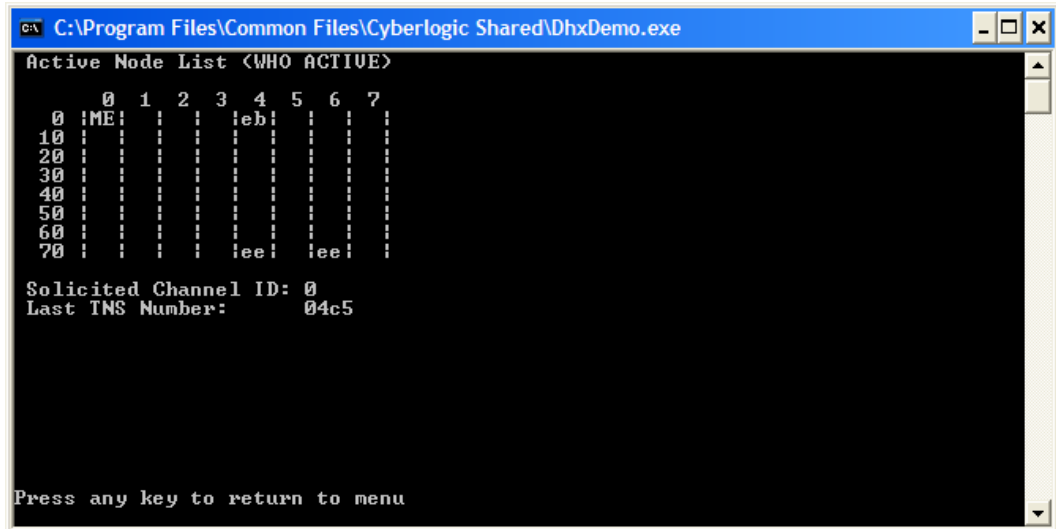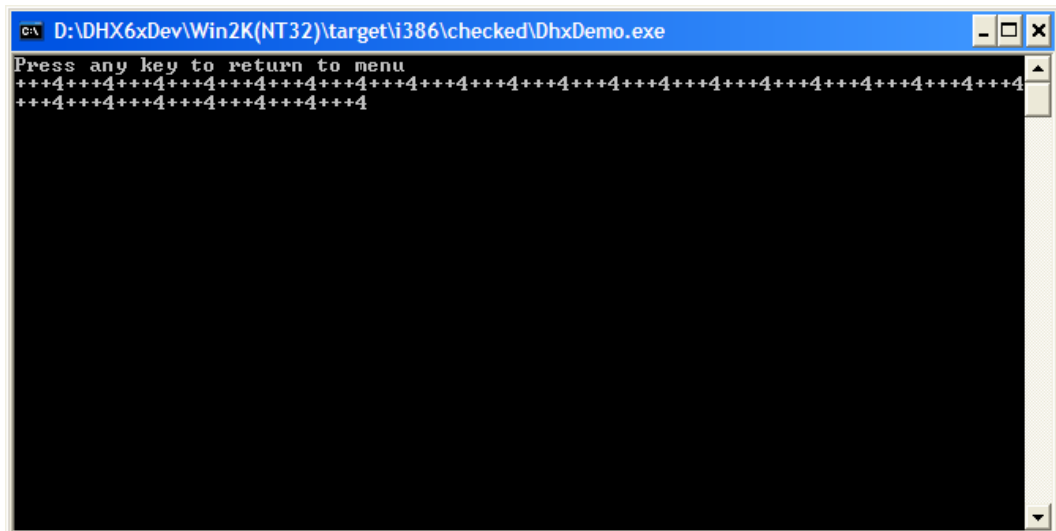

In the Active Node List grid, ME designates the node you are working from, and the identifier codes are shown for other nodes found on the network.

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

[3] Active Nodes Poll

Press **[3]** to poll the nodes on the network.

The software will continuously send diagnostic status commands to each of the other nodes on the network. If they respond properly, the software displays "+", otherwise it displays "?". After polling each node, the software displays the total number of active nodes, including the local node.

In the example shown, the three remote nodes have responded correctly, so there are three + signs followed by a 4 to indicate that there are four nodes—three remote and one local.

This function continuously interrogates the nodes with no delays between nodes or repetitions. Therefore, it is useful if you need a simple way to put a high load on the network.

[4] Read Selected Node

To read data from registers on a specific node, press **4**.
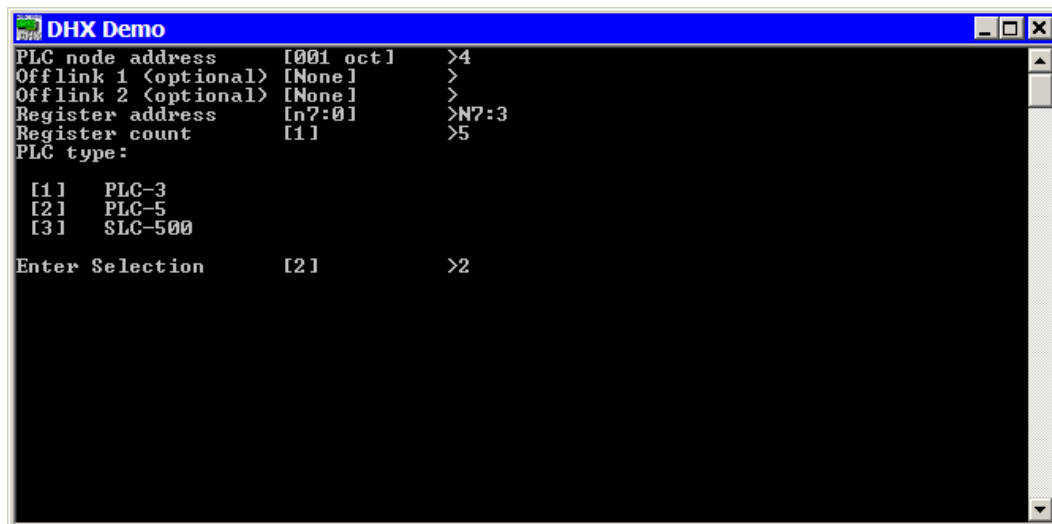
Enter the **PLC node address** you want to read from. Note that this value is entered in octal.

If you are using offlink addressing, enter the values for **Offlink 1** and **Offlink 2**.

Enter the **Register address** for the register you want to read. If you want to read from more than a single register, enter the first register's address.

Enter the **Register count**, which is the number of consecutive registers you want to read.

Enter your selection for the **PLC type** you are reading from.

In the example shown, we want to read from the PLC-5 at node address 4, without offlink addressing. We will read five consecutive registers beginning with N7:3, that is, registers N7:3 through N7:7.

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

[5] Unsolicited Message Read

To read unsolicited messages, press **5**.

This is an advanced feature of DHX Demo and is primarily intended for use by software developers. Only the most basic operation is shown here.

To receive all unsolicited messages, press **Y**. If you want to receive only unclaimed messages, press N
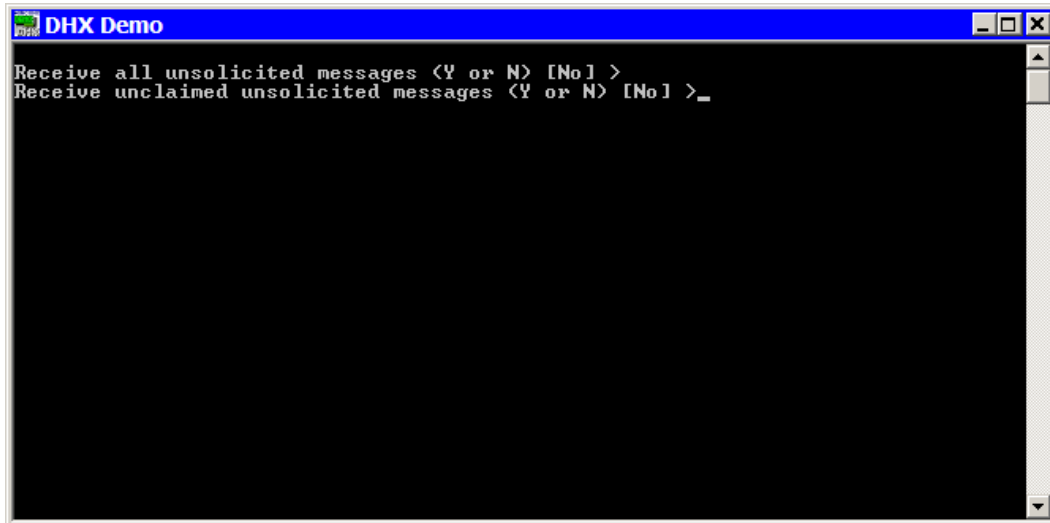

To receive all unsolicited messages, answer **Y** for the first question. The software will immediately begin receiving messages.

If you want to receive only unclaimed messages, answer **N** for the first question, then **Y** for the second. Again, the software will immediately begin receiving messages.

When an unsolicited message arrives, it will be displayed on the screen and the software will send a "success" response to the originating node. You may then press **N** to see the next message or **Esc** to return to the main menu.

[6] Device Information

From the main menu, press **6** to launch the Device Information screen.
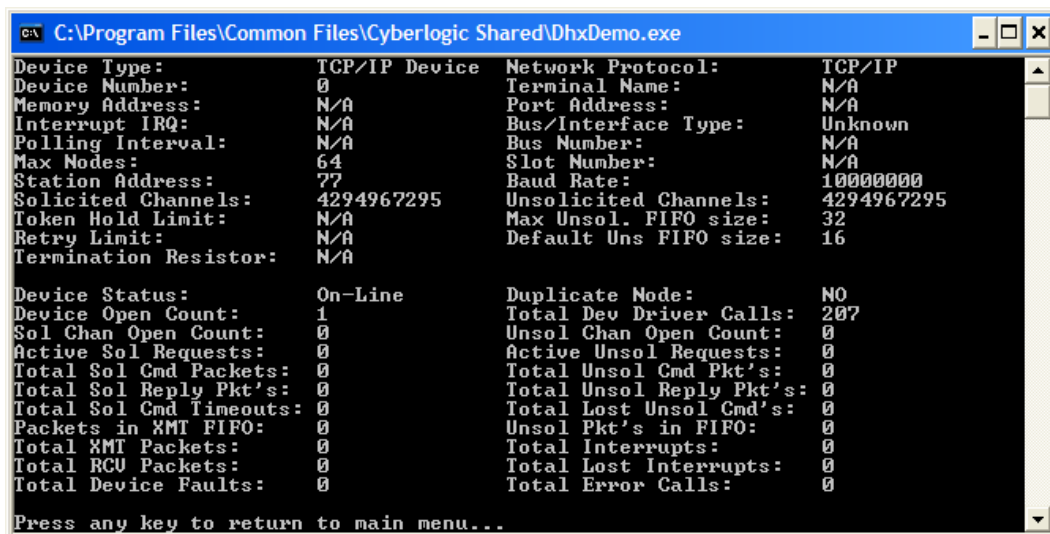
This screen shows configuration, statistical and diagnostic information about the driver, the device and the network.

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

Performance Monitor

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

To run the program, open the Windows **Start** menu and locate the **Cyberlogic Suites** sub-menu. From there, go to the **Diagnostics** sub-menu and select **Performance Monitor**.

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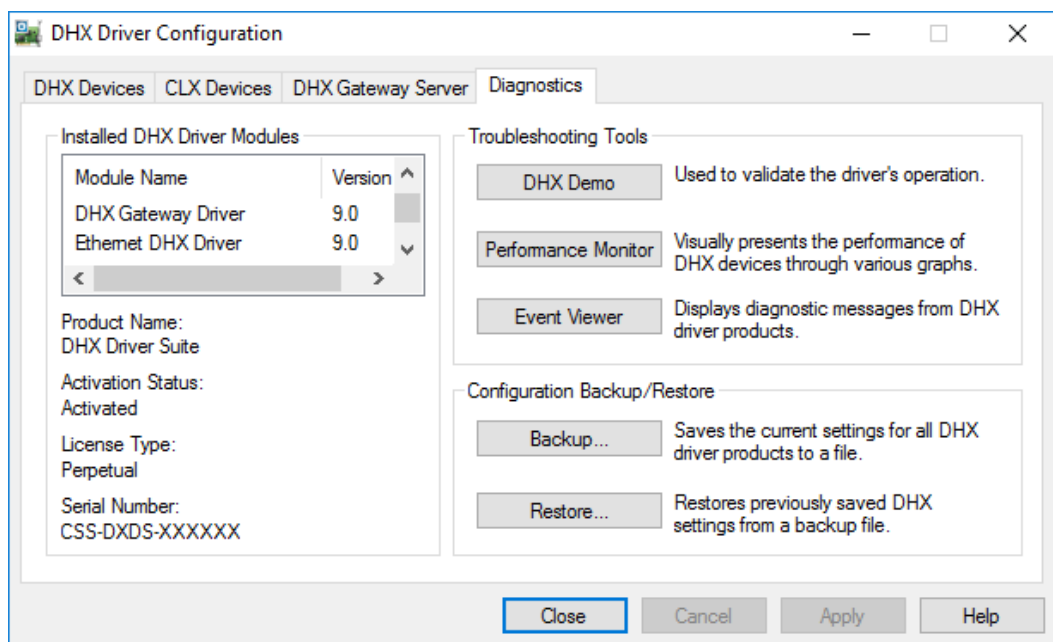
How to Use the Performance Monitor

Since extensive help is provided for this program by Microsoft, only a few points relevant to the DHX family drivers are shown here.
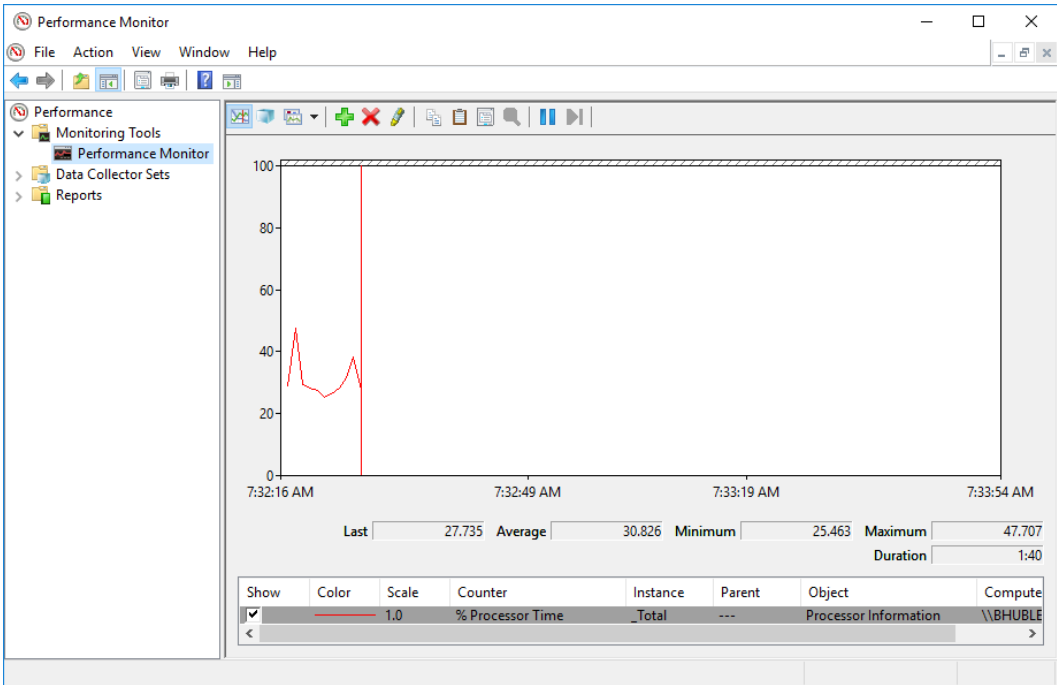
1. When the Performance Monitor program starts, click the **+** button on the tool bar.

2. Select *Cyberlogic DHX Devices* from the *Available counters* list.
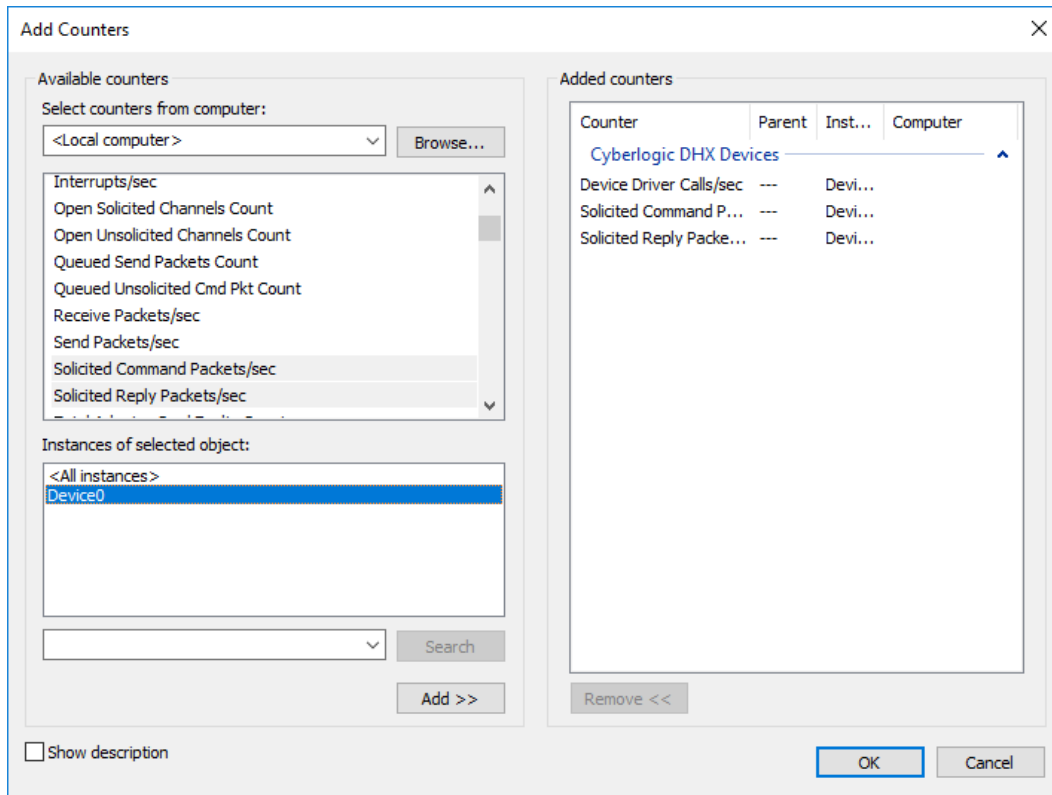
3. Choose a counter and the DHX device, and click **Add**. Repeat this for all the counters you want to view.

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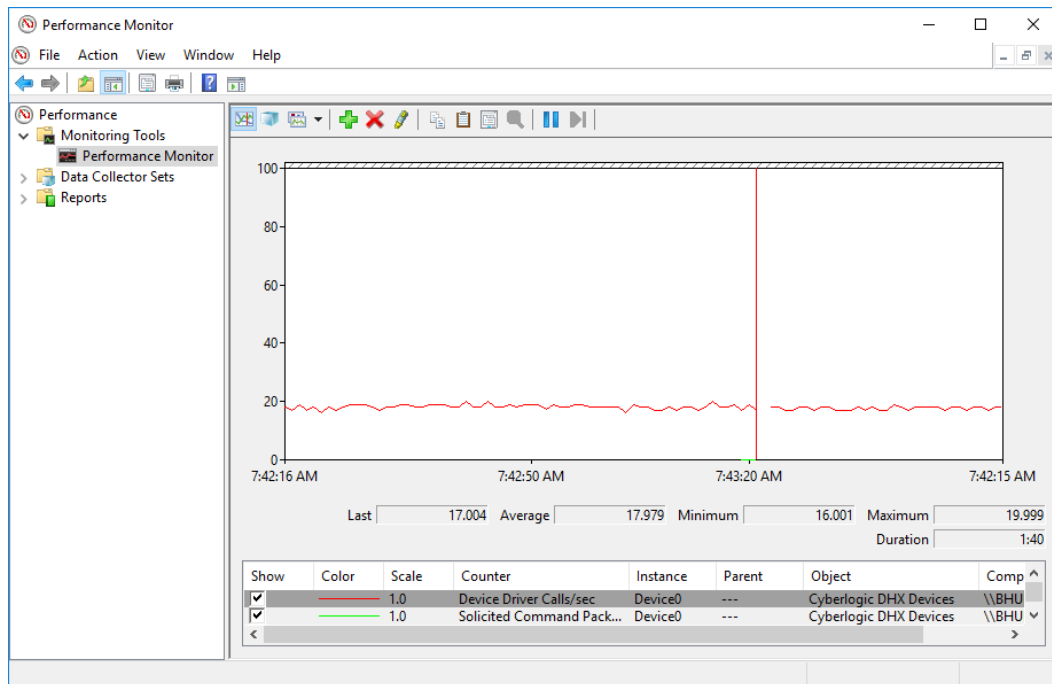
Event Viewer

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

1. Open the Windows **Start** menu and locate the **Cyberlogic Suites** sub-menu. From there, go to the **Diagnostics** sub-menu and select **Event Viewer**.
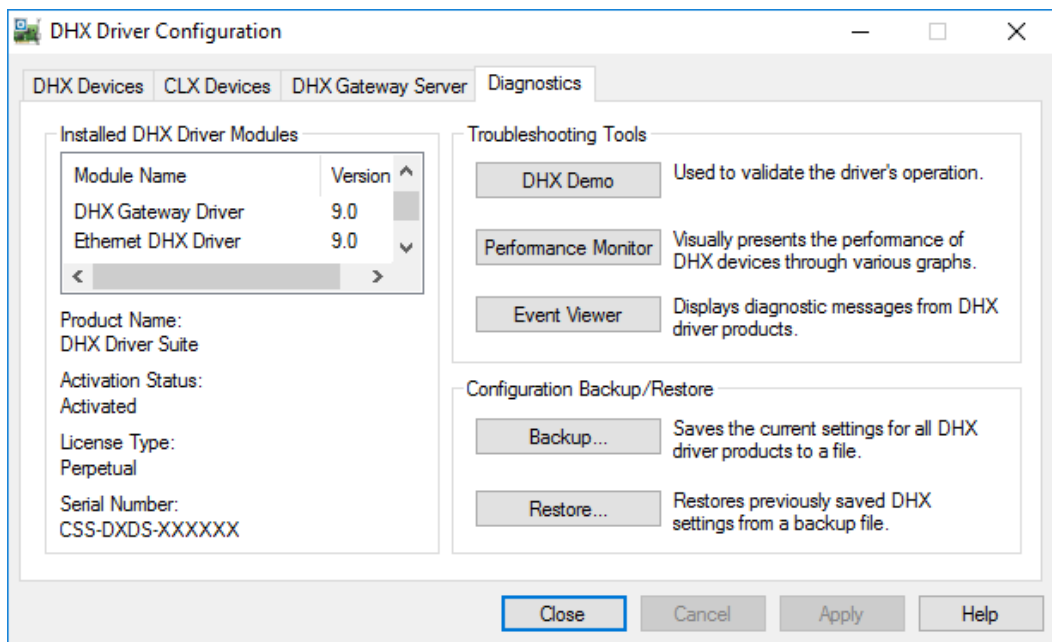
Alternatively, click the **Event Viewer** button on the Diagnostics tab of the DHX Driver Configuration Editor.
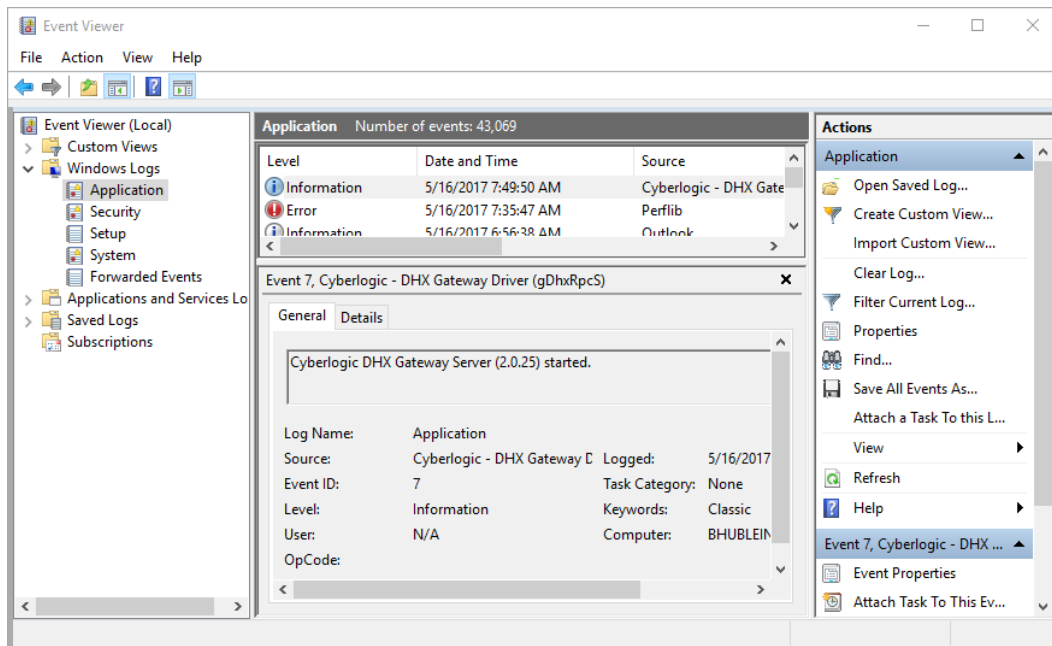
2. If you are looking for entries relating to the DHX Driver, select **System** from the Event Viewer tree, and look for entries in the **Source** column named **CLDHX** or **CLDhxPnP**.

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

3. Look for entries with the name of the driver you are using 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 desired entry to display a complete event message.
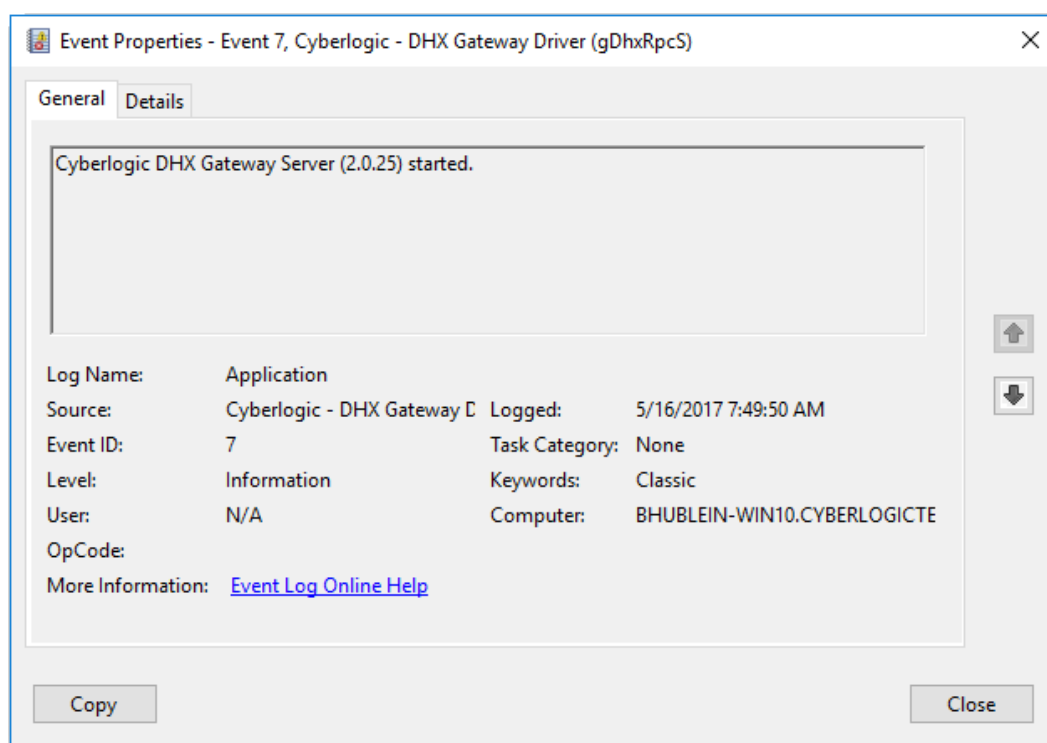
DHX Gateway Driver Messages

GDHXAPIM.DLL failed to load. Reinstall the product.

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

Cyberlogic DHX Gateway Server is already running!

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

Cyberlogic DHX Gateway (<Version Number>) started.

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

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

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

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

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

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

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

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

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

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

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

Frequently Asked Questions

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

The next step is to create one or more DHX Gateway devices and configure each to work with an DHX Gateway server on your network. Refer to the Quick-Start Guide section for a step-by-step procedure. After this is done, run the DHX Demo to test the driver.

I've configured a DHX Gateway Device. How do I know that it's working?

First, use the DHX Demo to confirm that the device is operating properly. Then, use the Performance Monitor as a benchmark reference.

When I select "Active Node List" or "Device Information" in the DHX Demo, I get an error that says "There are no more bindings (Error code 2)."

The DHX Gateway Driver could not find the specified DHX Gateway Server. There is probably an incorrect server IP address or host name entered. Refer to the DHX Gateway Driver Configuration Editor section for details on finding and entering this information.

When I select "Active Node List" or "Device Information" in the DHX Demo, I get an error that says "The system cannot find the file specified (Error code 1806)."

- Cause 1.   Be sure that at least one DHX Gateway Driver device has been configured. If not, refer to the Quick-Start Guide section for details on setting up a DHX Gateway Driver device.

- Cause 2.   The DHX Gateway Driver could not find the DHX device that was specified under Server DHX Device at the DHX Gateway Server node. Refer to the Quick-Start Guide section for details on finding and entering this information.

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

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

APPENDIX: DHX ARCHITECTURE AND COMPANION PRODUCTS

The DHX Gateway Driver is part of the Cyberlogic DHX family. This family consists of several well-integrated products that provide connectivity for Data Highway, Data Highway Plus, DH-485, ControlNet and Ethernet networks in distributed environments.

This section illustrates the layout of the DHX architecture. It includes a description of each DHX component along with suggested methods for employing them to support Allen-Bradley networks.
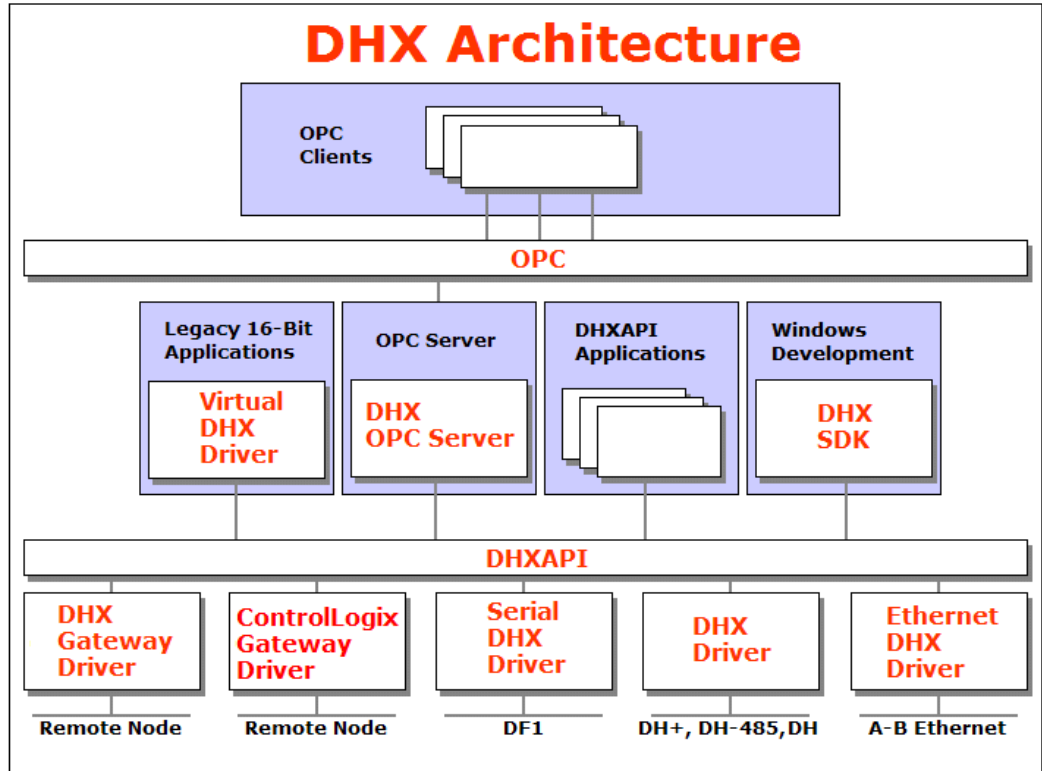
The DHX architecture presents a consistent framework
to address different connectivity needs.

DHX Driver

The DHX Driver provides connectivity between Windows-based applications and interface adapter cards from Allen-Bradley and SST. A few of the many cards supported are the 1784-PKTX and 1784-PCMK from Allen-Bradley, as well as the SST DHP-PCI and 5136-SD-PCI from SST. These provide communication over Data Highway, Data Highway Plus and DH 485.

The kernel mode device driver of the DHX Driver has exceptional performance and stability. It operates in either interrupt or polled mode and fully implements all network features, including solicited and unsolicited communication. The high performance native API (DHXAPI) of the DHX Driver takes full advantage of the event-driven, multitasking, multithreaded features of Windows operating systems.

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

The DHX Driver is included in the following products:

- DHX OPC Enterprise Suite
- DHX OPC Premier Suite
- DHX OPC Server Suite
- DHX Driver Suite

Ethernet DHX Driver

The Cyberlogic Ethernet DHX Driver emulates Data Highway Plus over the Ethernet TCP/IP protocol. It supports most DHXAPI and 6001-F1E-compatible software, providing instant access to Ethernet TCP/IP compatible devices without code modifications. It is compatible with all Ethernet cards supported by Windows.

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

The Ethernet DHX Driver is included in the following products:

- DHX OPC Enterprise Suite
- DHX OPC Premier Suite
- DHX OPC Server Suite
- DHX Driver Suite

Serial DHX Driver

The Cyberlogic Serial DHX Driver provides connectivity to full-duplex DF1-compatible devices through standard serial COM ports. These devices include the 1770-KF2, 1785-KE, 1770-KF3 and 1770-KFC15 interface modules for Data Highway, Data Highway Plus, DH-485 and ControlNet, as well as direct connection to devices with full-duplex DF1-compatible ports. The Serial DHX Driver supports both the DF1 BCC and DF1 CRC-16 protocols.

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

The Serial DHX Driver is included in the following products:

- DHX OPC Enterprise Suite
- DHX OPC Premier Suite
- DHX OPC Server Suite
- DHX Driver Suite

DHX Gateway Driver

The DHX Gateway Driver lets applications use DHX devices on remote DHX Gateway Server nodes as though they were on the local system. The client system running the DHX Gateway Driver must be a Windows node connected over a TCP/IP network to another system running the DHX Gateway Server. It can then access the Data Highway, Data Highway Plus, DH-485 and ControlNet networks that are connected to the server node.

For example, the DHX Gateway Driver provides complete DHX Driver functionality to the client node applications. An interface adapter, such as a 1784-PCMK card, is not required on the client node. DHX Gateway Driver nodes can communicate with multiple remote servers and all Windows-compatible TCP/IP networks are supported.

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

The DHX Gateway Driver is included in the following products:

- DHX OPC Enterprise Suite
- DHX OPC Premier Suite
- DHX OPC Server Suite
- DHX Driver Suite

ControlLogix Gateway Driver

The ControlLogix Gateway Driver lets applications access Data Highway Plus networks from a remote location through a ControlLogix gateway module. With this driver, a remote system can communicate over a standard Ethernet network to a ControlLogix chassis containing a 1756-DHRIO module. That module then acts as a gateway to a Data Highway Plus network. This allows the remote system to access the PLC-5s, SLC-500s and any other devices on the Data Highway Plus network as though it were connected directly to that network.

The ControlLogix Gateway Driver is fully compatible with all other components of the DHX family.

The ControlLogix Gateway Driver is included in the following products:

- DHX OPC Enterprise Suite
- DHX OPC Premier Suite
- DHX OPC Server Suite
- DHX Driver Suite

Virtual DHX Driver

The Virtual DHX Driver allows 16-bit DOS and Windows applications using 1784-KT/KTX interface adapters to run concurrently with 32-bit applications on the same computer. It allows multiple 16-bit applications and multiple instances of a single 16-bit application to

run under the latest Windows operating systems. By emulating the physical 1784-KT/KTX adapters, the Virtual DHX Driver will work with all legacy software, regardless of which DOS driver is used.

If your computer uses Windows 7 or the 64-bit edition of any Windows version, refer to Cyberlogic Knowledge Base article *KB2010-02 Running 16-Bit Applications* for important information on using the Virtual DHX Driver on your system.

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

- DHX Driver
- Ethernet DHX Driver
- Serial DHX Driver
- DHX Gateway Driver
- ControlLogix Gateway Driver

The Virtual DHX Driver is included in the following products:

- DHX OPC Enterprise Suite
- DHX OPC Premier Suite
- DHX OPC Server Suite
- DHX Driver Suite

DHX OPC Server

The Cyberlogic DHX OPC Server connects OPC-compliant clients to Data Highway, Data Highway Plus, DH-485, ControlNet and Ethernet networks. It supports the latest OPC Data Access and OPC Alarms and Events specifications and uses the DHX drivers for connectivity to Allen-Bradley networks.

The DHX 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 DHX OPC Server will automatically detect and configure the attached networks and node devices. Other noteworthy features include DirectAccess, Data Write Protection and Health Watchdog.

The DHX OPC Server is included in the following products:

- DHX OPC Enterprise Suite
- DHX OPC Premier Suite
- DHX OPC Server Suite

DHX SDK

Software developers can use the DHX Software Development Kit to provide connectivity to Data Highway, Data Highway Plus, DH-485, Ethernet and ControlNet networks from their 32-bit and 64-bit C/C++/C# applications.

The SDK supports 6001-F1E and Cyberlogic's high-performance DHXAPI and DHXAPI.Net interfaces. The 6001-F1E interface is an excellent bridge for developers who would like to port their 16-bit applications to the latest Windows environments. Developers of new applications can use any of the three interfaces. For a complete 6001-F1E specification, contact any Allen-Bradley distributor.

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