



Configuring the FC Port Driver for Windows 2000

Versions 5-2.22a8

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Introduction

The Emulex FC Port driver for Windows Server 2003 and Windows 2000 has many options that can be modified to provide for different behavior. You can change these options in one of two ways.

- Use HBAware™ to do any of the following:
 - Discover HBAs
 - Reset HBAs
 - Sort HBAs
 - Set up persistent binding
 - Set driver parameters
 - Update firmware on the local HBA or on remote HBAs

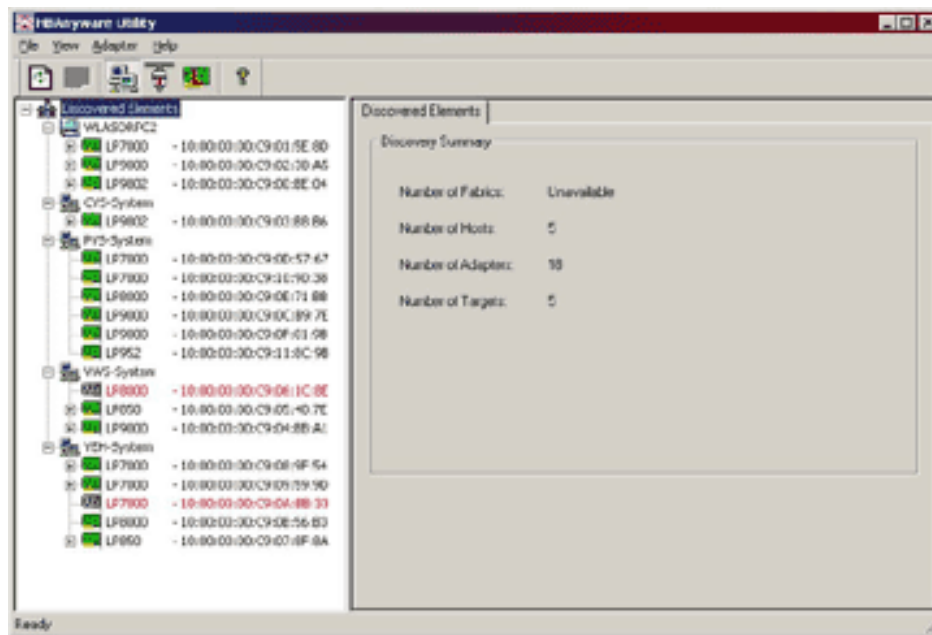
- Use the elxcfg utility to do any of the following:
 - Download PCI configuration data files
 - Assign an AL_PA
 - Perform global and target mapping and masking
 - Globally automap all LUNs
 - Globally unmask all LUNS
 - Set up persistent binding
 - Hot swap a device
 - Set topology options
 - Map device IDs
 - Break SCSI reservations
 - Set driver parameters
 - Update firmware on the local HBA
 - Update x86 BootBIOS
 - Update EFIBoot (64-bit only)

Start HBAAnyware for Windows

After the HBAAnyware server has been installed as an NT service (see the online Installation manual for SCSIport Miniport, Storport Miniport or FC Port driver for more information), access this utility from the desktop Start menu. On your Windows NT, Windows 2000 or Windows Server 2003 desktop:

- Click the Start button, click Programs and choose HBAAnyware.

The main window is displayed.

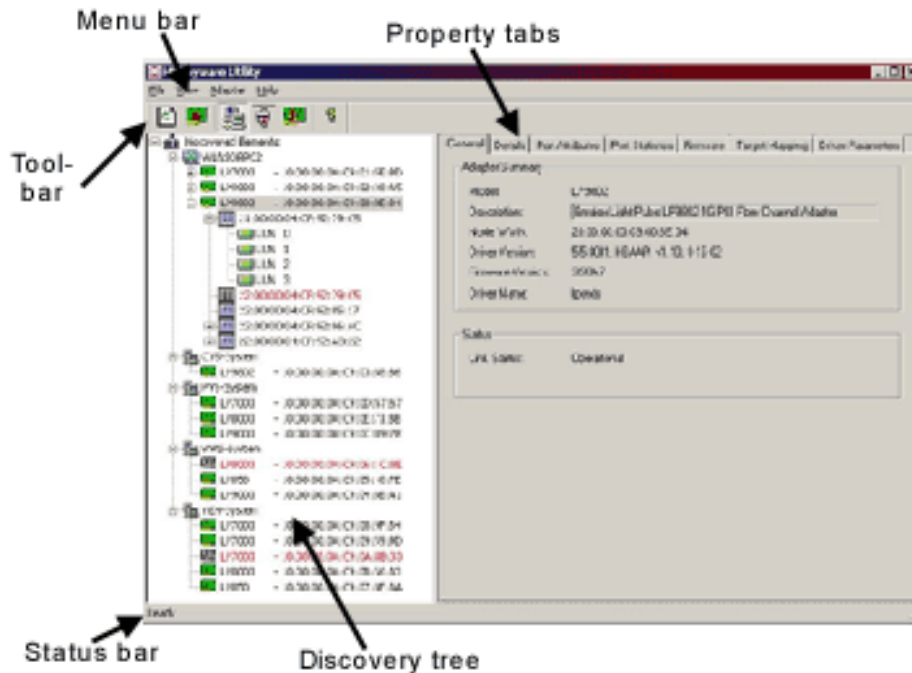


Note HBAAnyware must be running on all remote hosts that are to be discovered and managed.

Remote capabilities of HBAAnyware are subject to fabric zoning configuration. Remote hosts to be discovered and managed by HBAAnyware must be in the same zone.

Use HBAAnyware

The HBAAnyware window contains five basic components: the menu bar, the toolbar, the discovery tree, the property tabs and the status bar.



Note The element you select in the discovery tree determines whether a menu item or toolbar icon is active. For example, if you select the local host or other system host, the Reset Adapter item on the Adapter menu is unavailable. The Reset Adapter toolbar button is unavailable as well.

The Menu Bar

The menu bar contains command menus that enable you to perform a variety of tasks such as exiting HBAAnyware, resetting host bus adapters and sorting items in the discovery tree view. Many of the menu bar commands are also available from the toolbar.

The Toolbar

The toolbar contains buttons that enable you to refresh the discovery tree view, reset the selected host bus adapter and sort the discovery tree view. Many of the toolbar functions are also available from the menu bar.



The toolbar is visible by default. Use the Toolbar item in the View menu to hide the toolbar. If the item is checked, the toolbar is visible.

The Toolbar Buttons

The toolbar buttons perform the following tasks:



Click the Rediscover button to refresh the discovery tree display.



Click the Reset button to reset the selected host bus adapter.

Sort Toolbar Buttons

Discovered adapters can be sorted by host name, fabric addresses or by local HBAs. By default, adapters are sorted by host name, with local HBAs appearing first.

Sorting is performed in ascending order and recognizes letters, numbers, spaces and punctuation marks.



The Sort by Host Name button (default)

- Initially sorts by host name. Host names cannot be changed using HBAnyware. Names must be changed locally on that system.
- Within each host system, sorts by HBA model.
- If there are multiple HBAs with the same model number, the models are sorted by world wide node name.

- If there are targets present, they are sorted by world wide port name. Multiple HBAs can reference the same target.
- If there are LUNs present, they are sorted by LUN name.



The Sort by Fabric ID button

- Initially sorts by fabric ID.
- Within each fabric ID, sorts by HBA model.
- If there are multiple HBAs that have the same model number, the models are sorted by world wide node name.
- If there are targets present, they are sorted by world wide port name. Multiple HBAs can reference the same target.
- If there are LUNs present, they are sorted by LUN name.
- If the fabric ID is all zeros, there is no fabric attachment.

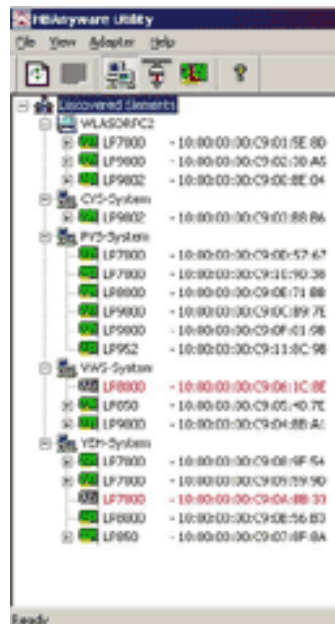


The Sort by Local HBAs Only button

- Sorts by the HBA's local or remote location and is either on or off. Works in conjunction with the Sort by Host Name and Sort by Fabric ID buttons.

The Discovery Tree

The discovery tree (left pane) displays icons representing discovered network (SAN) elements (local host name, system host names and all host bus adapters that are active on each host). Targets and LUNs, when present, are also displayed.



Discovery Tree Icons

Discovery tree icons represent the following:



The local host.



Other hosts connected to the system.



A green HBA icon with black descriptive text represents an HBA that is online.



A gray HBA icon with red descriptive text represents an HBA that is offline or otherwise temporarily inaccessible. Several situations could cause the HBA to be offline or inaccessible:

- The HBA on a local host is not connected to the network but is still available for local access.
- The HBA on a local host is malfunctioning and is inaccessible to the local host as well as to the network.
- The HBA on a local host is busy performing a local download and is temporarily inaccessible to the local host as well as to the network.



The Target icon represents connections to individual storage devices.

Property Tabs

The property tabs display configuration, statistical and status information for network elements. The set of available tabs is context-sensitive, depending on the type of network element or HBA currently selected in the discovery tree.

Status Bar

As you navigate through the menu bar or the toolbar, help messages appear on the status bar near the bottom of the HBAnyware window.

The status bar is visible by default. Use the Status Bar item in the View menu to hide the status bar. If the item is checked, the status bar is visible.

Use HBAware Command-Line Interface

The CLI (command-line interface) Client component of HBAware provides access to the capabilities of the Remote Management library from a console command prompt. This component is intended for use in scripted operations from within shell scripts, batch files, or the specific platform equivalent.

Note HBAware must be running on all remote hosts that are to be discovered and managed.

Remote capabilities of HBAware are subject to fabric zoning configuration. Remote hosts to be discovered and managed by HBAware must be in the same zone.

Using the CLI Client

The CLI Client is a console application named HBACMD.EXE. Each time you run this application from the command line, a single operation is performed.

The first parameter of this command is the requested operation. When the specified operation is completed, the command prompt is displayed. Most operations retrieve information about an entity on the SAN and display that information on the console.

Most of the CLI Client commands require one or more additional parameters that specify the nature of the command. A parameter used by many HBACMD commands specifies the World Wide Node Name of the host bus adapter (HBA) that is the target of the command. For example, the following command displays the port attributes for the HBA with the specified World Wide Node Name:

```
c:\>hbacmd portattrib 10:00:00:00:c9:20:20:200
```

CLI Client Command Reference

Version

Syntax	HBACMD VERSION
Description	The current version of the HBAware CLI Client application.
Parameters	N/A

List HBAs

Syntax	HBACMD LISTHBAS
Description	A list of the discovered manageable Emulex HBAs and their World Wide Node Names.
Parameters	N/A

Display HBA Attributes

Syntax	HBACMD HBAAttrib <wwnn>
Description	A list of attributes for the HBA with the specified World Wide Node Name.
Parameters	wwnn The World Wide Node Name of the HBA. The HBA can be either local or remote.

Port Attributes

Syntax	HBACMD PortAttrib <wwpn>
Description	A list of attributes for the port with the specified World Wide Port Name.
Parameters	wwpn The World Wide Port Name of the port. This port can be either local or remote.

Port Statistics

Syntax	HBACMD PortStat <wwpn>
Description	A list of statistics for the port with the specified World Wide Port Name.
Parameters	wwpn The World Wide Port Name of the port. The port can be either local or remote.

Server Attributes

Syntax	HBACMD ServerAttrib <nodename>
Description	A list of attributes for the specified server.
Parameters	nodename The nodename of the server.

Download

Syntax	HBACMD DOWNLOAD <wwnn> <filename>
Description	Loads the specified firmware image to the (HBA) with the specified WWNN.
Parameters	wwnn The World Wide Node Name of the HBA that is the target of the firmware download. The HBA can be either local or remote. filename The pathname of the firmware image that is to be loaded. This can be any file that is accessible to the CLI client application, but we recommend that you keep image files in the Emulex Repository folder or directory.

Reset Adapter

Syntax	HBACMD RESET <wwpn>
Description	Resets the HBA with the specified World Wide Port Name.
Parameters	wwpn The World Wide Port Name of the port. The port can be either local or remote.

Target Mapping

Syntax	HBACMD TargetMapping <wwpn>
Description	A list of mapped targets for the port with the specified World Wide Port Name.
Parameters	wwpn The World Wide Port Name of the port. The port can be either local or remote.

Introduction

The Configuration Utility (elxcfg) provides a graphical user interface that allows you to modify driver parameters, update firmware and boot code and perform LUN mapping.

Prerequisites

- Installed host adapter with connected device(s)
 - Installed Emulex FC Port driver
 - Installed elxcfg utility
-

Starting the Utility

Start the utility in one of two ways:

- Click Start, Programs and Emulex Configuration Tool.
- Browse to the elxcfg.exe file and run this command.

Discover HBAs - Introduction

You can discover adapters using either elxcfg or HBAnyware.

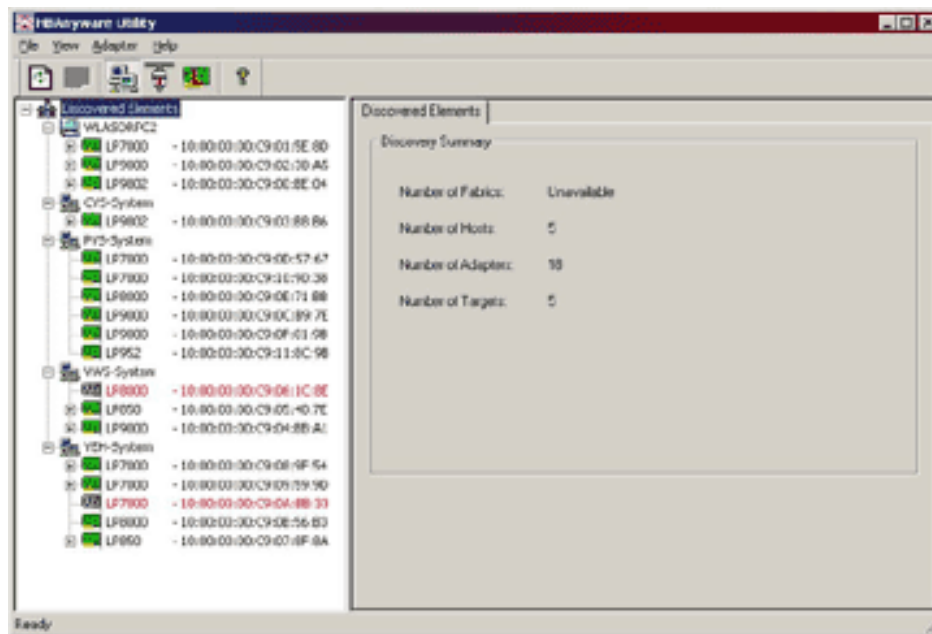
- elxcfg allows you to discover local adapters only.
- HBAnyware allows you to discover both local and remote adapters.

Discover HBAs Using HBAnyware

Local and remote host bus adapters (HBAs) are discovered automatically when you launch HBAnyware.

Note HBAnyware must be installed and the rmserver process (es) must be running on all remote hosts that are to be discovered and managed.

Remote capabilities of HBAnyware are subject to fabric zoning configuration. Remote hosts to be discovered and managed by HBAnyware must be in the same zone.

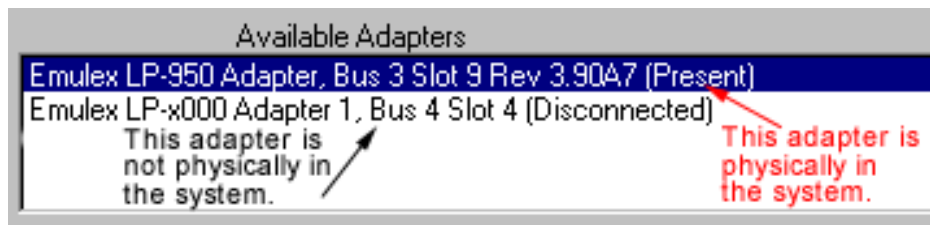


Listing Local HBAs

To list adapters in your system, start the elxcfg utility.

The registry is automatically probed by the utility upon startup. Adapters defined in the registry are listed in the Available Adapters section on the Main window.

Adapters that are physically present in the system have the word "Present" in their descriptions, along with the firmware revision.



If an adapter was physically removed from the system, its definition in the registry is listed as "Disconnected".

Reset HBAs Using HBAnyware

To reset a host bus adapter, do the following:

1. Start HBAnyware.
2. In the directory tree, click the HBA you want to reset.
3. Do one of the following:
 - From the menu bar, click Adapter, and then click Reset Adapter.
 - Click the Reset toolbar button. 

Sort HBAs

Using HBAnyware, you can sort the way discovered adapters are displayed. You can sort adapters by host name, fabric addresses or local HBAs. By default, adapters are sorted by host name.

To sort adapters, do the following:

1. Start HBAnyware.
2. Switch between host name, fabric ID or local HBAs sorting in one of two ways:
 - From the menu bar: click View, then click Sort by Host Name, Sort by Fabric ID or Local HBAs Only. The current adapter display mode is checked.
 - From the toolbar, click one of the following buttons:



Sort by host name (default).



Sort by fabric ID.



Sort by local HBAs only.

3. HBAnyware sorts in ascending order. The sort recognizes letters, numbers, spaces and punctuation marks.

Sort by Host Name

- Initially sorts by host name. Host names cannot be changed using HBAnyware; names must be changed locally on that system.
- Within each host system, sorts by HBA model.
- If multiple HBAs have the same model number, sorts models by world wide node name.
- If targets are present, sorts by world wide port name. Multiple HBAs may refer to the same target.
- If LUNs are present, sorts by LUN name.

Sort by Fabric Address

- Initially sorts by fabric ID.
- Within each fabric ID, sorts by HBA model.
- If multiple HBAs have the same model number, sorts models by world wide node name.
- If targets are present, sorts by world wide port name. Multiple HBAs may refer to the same target.
- If LUNs are present, sorts by LUN name.
- If the fabric ID is all zeros, no fabric attachment is present.

Sort by Local HBAs Only

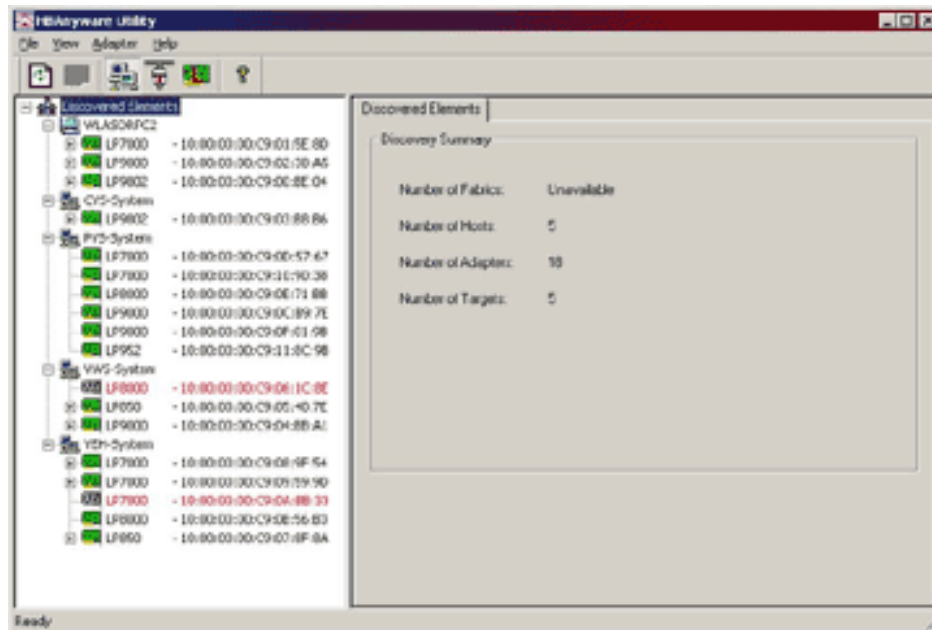
Sort by host name or fabric address.

View Discovered Elements

The Discovered Elements tab in HBAAnyware contains a general summary of the discovered elements. The Discovered Elements node is the root of the discovery tree, but it does not represent a specific network element. Expanding it will reveal all hosts, LUNs, targets and adapters that are visible on the SAN.

To view the discovered elements, do the following:

1. Start HBAAnyware.
2. Click Discovered Elements in the discovery tree.



Field Definitions

Number of Fabrics - the total number of fabrics discovered (displays "Unavailable" if Sort by Host is active).

Number of Hosts - the total number of host computers discovered. This includes servers, workstations, personal computers, multiprocessors and clustered computer complexes (displays "Unavailable" if Sort by Fabric is active).

Number of Adapters - the total number of host bus adapters (HBAs) discovered.

Number of Targets - the total number of unique targets discovered on the SAN. In the discovery tree, the same target can appear under more than one HBA.

View Host Attributes

The Host Attributes tab in HBAnyware contains information specific to the selected host.

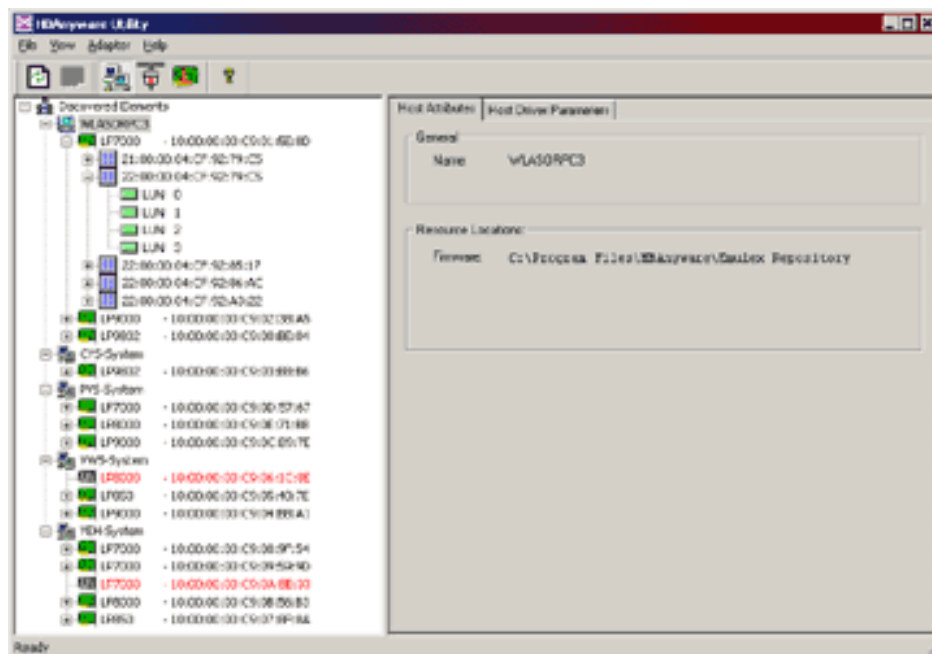
To view the host attributes, do the following:

1. Start HBAnyware.
2. Do one of the following:
 - From the menu bar, click View, then click Sort by Host Name.



- From the toolbar, click the button.

3. Click a host name in the discovery tree.



General Area Field Definitions

Name - the name of the host.

Resource Location Field Definitions

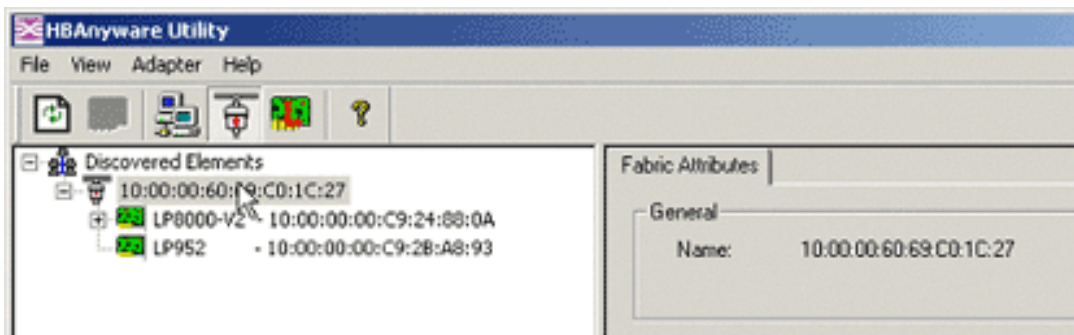
Firmware - the directory path where the firmware image files are moved prior to being downloaded to the HBAs on that host.

View Fabric Attributes

The Fabric Attributes tab in HBAnyware contains information specific to the selected fabric.

To view the fabric attributes, do the following:

1. Start HBAnyware.
2. Do one of the following:
 - From the menu bar, click View, then click Sort by Fabric ID.
 - From the toolbar, click the  button.
3. Click on a fabric address in the discovery tree.



General Area Field Definitions

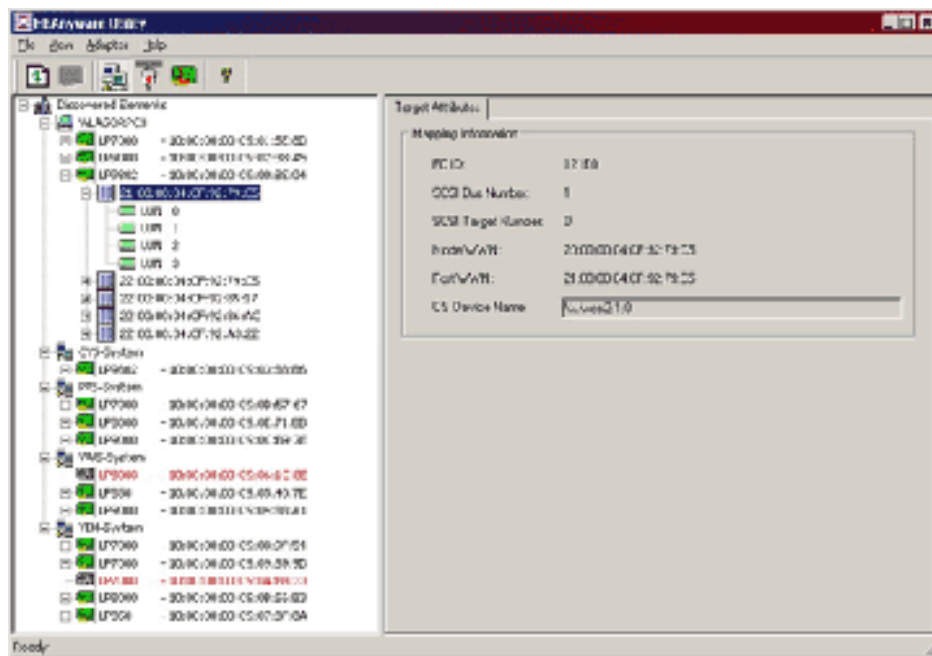
Name - a 64-bit unique identifier assigned to each Fibre Channel fabric.

View Target Attributes

The Target Attributes tab in HBAAnyware contains information specific to the selected target.

To view target attributes, do the following:

1. Start HBAAnyware.
2. Do one of the following:
 - From the menu bar, click View, then click Sort by Host Name.
 - From the toolbar, click the  button.
3. Click a target in the discovery tree.



Target Attributes Field Definitions

Vendor/Product Information

FC ID - the Fibre Channel ID for the target; assigned automatically in the firmware.

SCSI Bus Number - defines the SCSI bus to which the target is mapped.

SCSI Target Number - the target's identifier on the SCSI bus.

Node WWN - the unique 64-bit number, in hexadecimal, for the target (N_PORT or NL_PORT).

Port WWN - the unique 64-bit number, in hexadecimal, for the fabric (F_PORT or FL_PORT).

OS Device Name - operating system device name.

View LUN Attributes

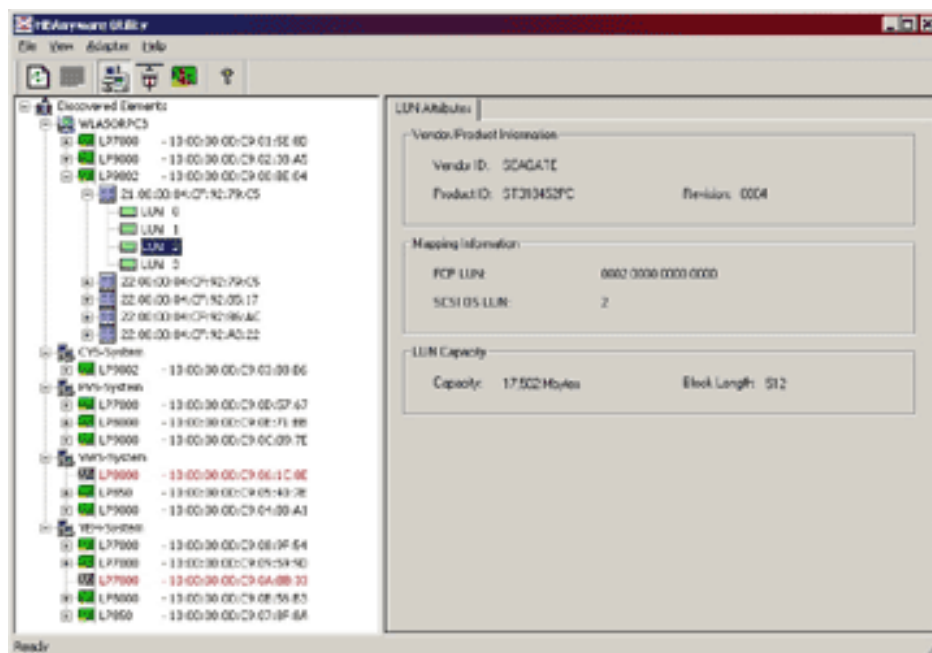
The LUN Attributes tab in HBAnyware contains information specific to the selected logical unit number (LUN).

To view the LUN attributes, do the following:

1. Start HBAnyware.
2. Do one of the following:
 - From the menu bar, click View, then click Sort by Host Name.

- From the toolbar, click the  button.

3. Click a LUN in the discovery tree.



LUN Attributes Field Definitions

Vendor Product Information

Vendor ID - the name of the vendor of the logical unit.

Product ID - the vendor-specific ID for the logical unit.

Revision - the vendor-specific revision number for the logical unit.

Mapping Information

FCP LUN - the Fibre Channel identifier used by the host bus adapter (HBA) to map to the SCSI OS LUN.

SCSI OS LUN - the SCSI identifier used by the operating system to map to the specific LUN.

LUN Capacity

Capacity - the capacity of the logical unit, in megabytes.

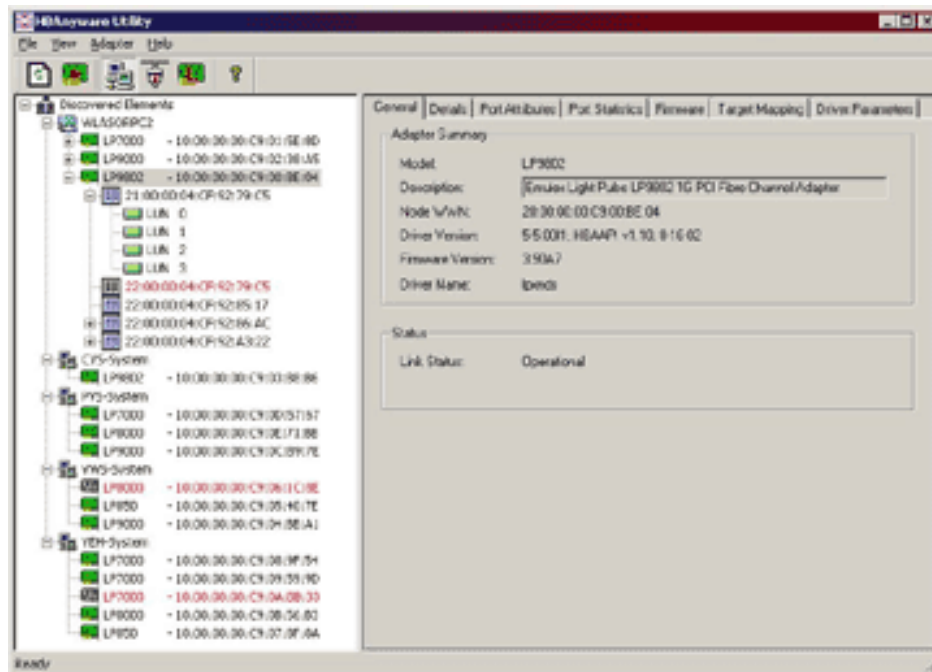
Block Length - the length of a logical unit block in bytes.

View General HBA Attributes

The General tab in HBAnyware contains general attributes associated with the selected host bus adapter (HBA).

To view general attributes, do the following:

1. Start HBAnyware.
2. If desired, sort the discovered HBAs.
3. Click an HBA in the discovery tree.



Adapter Summary Field Definitions

Model - the Emulex HBA model number.

Description - a formal description of the HBA, including model number, bus type and link speed. This field is recessed, indicating that the information in this field may exceed the visible length of the field. Use the arrow keys on your keyboard to scroll and view additional information.

Node WWN - a 64-bit worldwide unique identifier assigned to the node.

Driver Version - the driver version number and the HBA application programming interface (HBA API) version number.

Firmware Version - the version of Emulex firmware currently active on the HBA.

Driver Name - the executable file image name for the driver as it appears in the Emulex driver download package.

Link Status Area

This field reflects the current state of the HBA. There are several possible states:

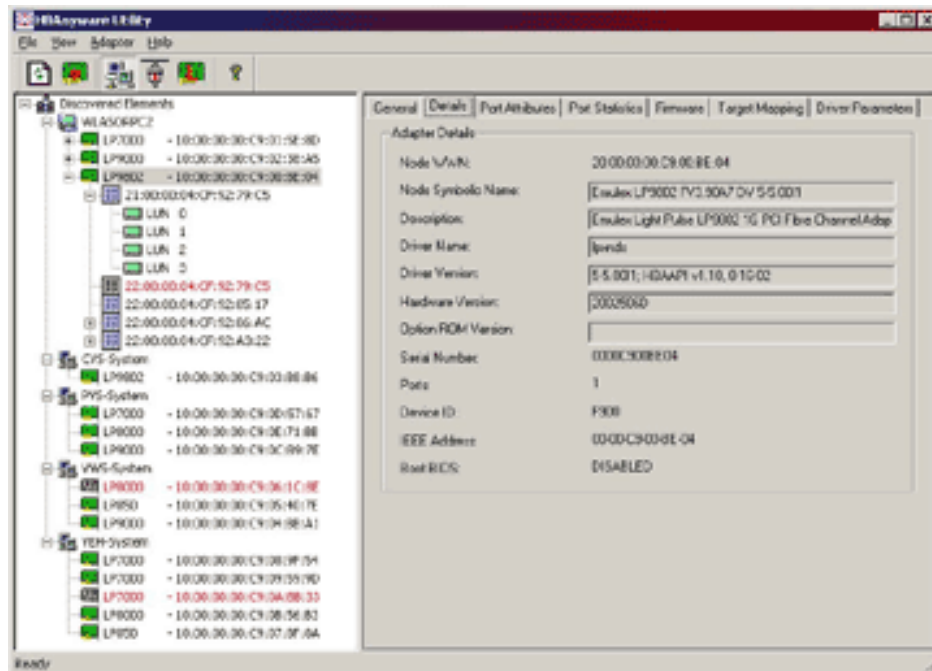
- The operational state indicates that the HBA is connected to the network and operating normally.
- All other states indicate that the HBA is not connected to the network. Gray HBA icons with red descriptive text indicate that the HBA is offline. These offline states are:
 - User offline - the adapter is down or not connected to the network.
 - Bypassed - the HBA is in Fibre Channel discovery mode.
 - Diagnostic Mode - the HBA had been taken over by a diagnostic program.
 - Link Down - there is no access to the network.
 - Port Error - the HBA is in an unknown state; try resetting it.
 - Loopback - an FC-1 mode in which information passed to the FC-1 transmitter is shunted directly to the FC-1 receiver. When a Fibre Channel interface is in loopback mode, the loopback signal overrides any external signal detected by the receiver.
 - Unknown - the HBA is offline for an unknown reason.
 - Resetting - the HBA is in the process of rebooting.
 - Downloading - a firmware or other image is being downloaded to the HBA.

View Detailed HBA Attributes

The Details tab in HBAnyware contains detailed attributes associated with the selected HBA.

To view the detailed attributes, do the following:

1. Start HBAnyware.
2. If desired, sort the discovered HBAs.
3. Click an HBA in the discovery tree. The General tab is displayed.
4. Click the Details tab.



Note Recessed fields indicate that the information in that field may exceed the text display area of the field. Use the arrow keys on your keyboard to scroll and view additional information.

Adapter Details Field Definitions

- Node WWN - a 64-bit worldwide unique identifier assigned to the node.
- Node Symbolic Name - in a fabric, the name registered with the name server.

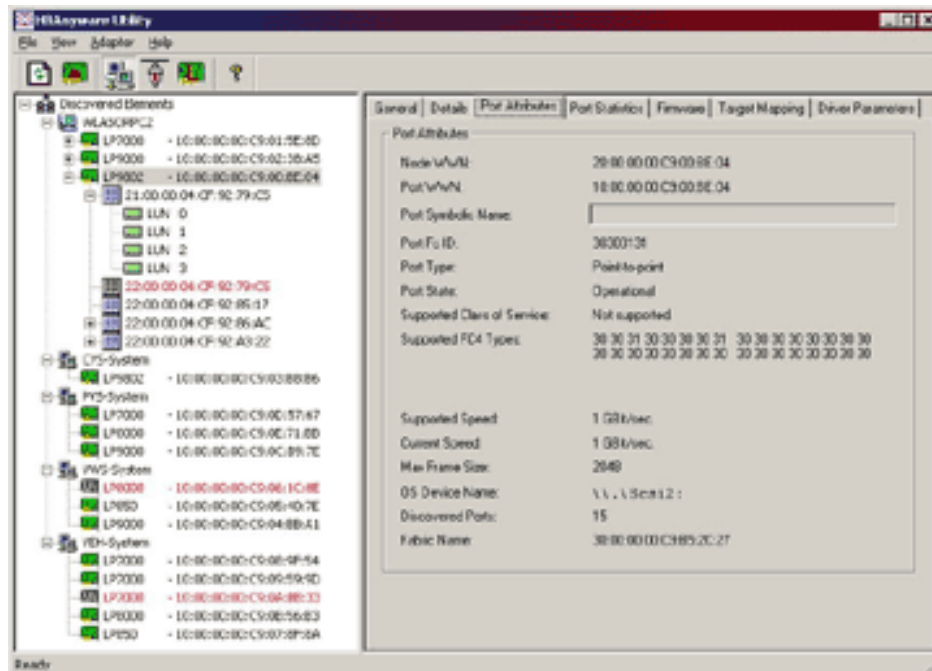
- Description - a formal description of the HBA, including model number, bus type and link speed.
- Driver Name - an executable file image name for the driver as it appears in the Emulex driver download package.
- Driver Version - the driver version number and the HBA application programming interface (HBA API) version number.
- Hardware Version - the board version number, represented by the JEDEC ID, which is machine-readable from the Emulex ASIC.
- Option ROM Version - the optional read-only memory version number; displayed if the BootBIOS bootup message is enabled on the HBA.
- Serial Number - the serial number assigned to the HBA when it was manufactured. Typically, this is a BCD string of the 48-bit IEEE address for the HBA.
- Ports - the number of ports on the HBA. Currently, this is always one. The two ports of dual-channel HBAs are displayed in the discovery tree as two HBAs.
- Device ID - the HBA's default device ID.
- IEEE Address - the Media Access Control (MAC) address is in conformance with the Fibre Channel Link Encapsulation (FC-LE) standard. This address is a 48-bit number that is unique to every HBA in existence. The IEEE Address is printed on a label affixed to one end of the HBA.
- Boot BIOS - the enabled/disabled status of the BootBIOS message on the HBA. This message is updated automatically if the status of the BootBIOS message changes (caused by downloading a different firmware image).

View Port Attributes

The Port Attributes tab in HBAnyware contains information about the port on the selected host bus adapter (HBA).

To view port attributes, do the following:

1. Start HBAnyware.
2. If desired, sort the discovered HBAs.
3. Click an adapter in the discovery tree. The General tab is displayed.
4. Click the Port Attributes tab.



Port Attributes Field Definitions

Node WWN - a 64-bit worldwide unique identifier assigned to the node. The Node WWN is communicated during the login and port discovery processes. This identifier stays with the entity for its lifetime.

Port WWN - a 64-bit worldwide unique identifier assigned to the port. The Port WWN is communicated during the login and port discovery processes. This identifier stays with the entity for its lifetime.

Port Symbolic Name - the name registered by the HBA with a name server. This field is recessed, indicating that the information in this field may exceed the visible length of the field. Use the arrow keys on your keyboard to scroll and view additional information.

Port Fc ID - Fibre Channel ID for the port.

Port Type - describes the current operational mode of the port.

Port State - current status of the port: operational or link down.

Supported Class of Service - a frame delivery scheme exhibiting a set of delivery characteristics and attributes. There are three classes of service.

- Class-1 provides a dedicated connection between a pair of ports with confirmed delivery or notification of nondelivery.
- Class-2 provides a frame switched service with confirmed delivery or notification of nondelivery.
- Class-3 provides a frame switched service similar to Class-2 but without notification of frame delivery or non-delivery.

Supported FC4 Types - a 256-bit (8-word) map of the FC-4 protocol types supported by the port. Each bit in the map corresponds to a Type value as defined by the Fibre Channel standards and contained in the Type field of the frame header.

Supported Speed - maximum link speed supported by the HBA.

Current Speed - link speed for the current session.

Max Frame Size - maximum frame size.

OS Device Name - the platform-specific name by which the HBA is known to the operating system.

Discovered Ports - number of facilities that provide Fibre Channel interface attachment.

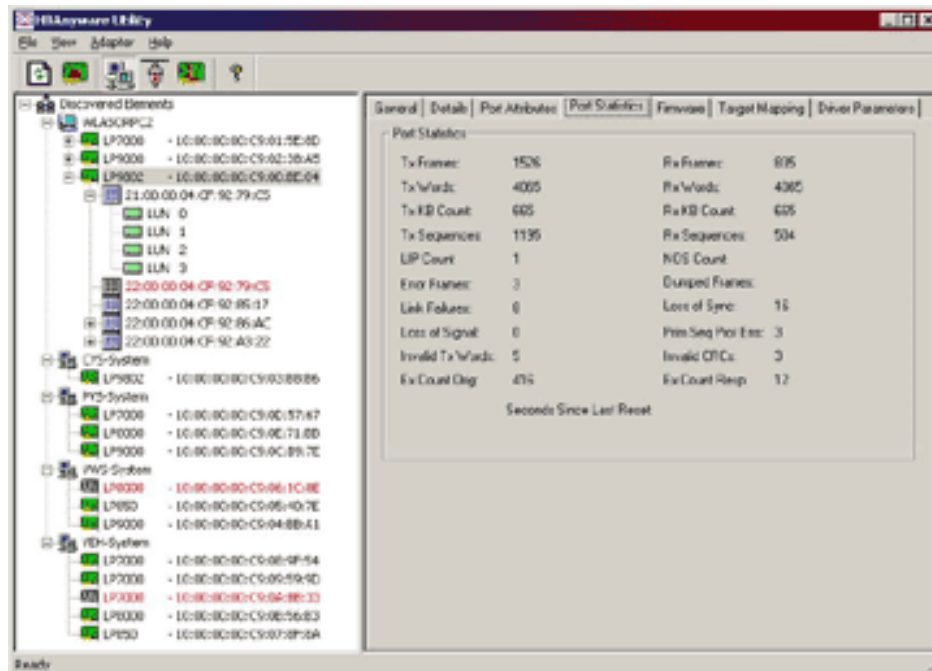
Fabric Name or Host Name - if fabric sort is selected, a 64-bit worldwide unique identifier assigned to the fabric. If host name is selected, the name of the host on which the HBA is installed.

View Port Statistics

The Port Statistics tab in HBAnyware provides cumulative totals for various error events and statistics on the port. Statistics are cleared when the host bus adapter (HBA) is reset.

To view port statistics, do the following:

1. Start HBAnyware.
2. If desired, sort the discovered HBAs.
3. Click an HBA in the discovery tree. The General tab is displayed.
4. Click the Port Statistics tab.



Port Statistics Field Definitions

Tx Frames - Fibre Channel frames transmitted by this HBA port.

Tx Words - Fibre Channel words transmitted by this HBA port.

Tx KB Count - Fibre Channel kilobytes transmitted by this HBA port.

Tx Sequences - Fibre Channel sequences transmitted by this HBA port.

LIP count - the number of loop initialization primitive (LIP) events that have occurred for the port. This field is not supported if the topology is not arbitrated loop. Loop initialization consists of the following:

- Temporarily suspend loop operations
- Determine whether loop capable ports are connected to the loop
- Assign AL_PA IDs
- Provide notification of configuration changes and loop failures
- Place loop ports in the "monitoring" state

Error Frames - the number of frames received with cyclic redundancy check (CRC) errors.

Link Failures - the number of times the link failed. A link failure is a possible cause of a timeout.

Loss of Signal - the number of times the signal was lost.

Invalid Tx Words - the total number of invalid words transmitted by this HBA port.

Ex Count Orig - the number of Fibre Channel exchanges originating on this port.

Rx Frames - the number of Fibre Channel frames received by this HBA port.

Rx Words - the number of Fibre Channel words received by this HBA port.

Rx KB Count - the received kilobyte count by this HBA port.

Rx Sequences - the number of Fibre Channel sequences received by this HBA port.

NOS count - this statistic is currently not supported for the SCSIport Miniport and Storport Miniport drivers, nor is it supported for arbitrated loop.

Dumped Frames - this statistic is not currently supported for the SCSIport Miniport driver, the Storport Miniport driver or the driver for Solaris.

Loss of Sync - the number of times loss of synchronization has occurred.

Prim Seq Prot Errs - the primitive sequence protocol error count. This counter is incremented whenever there is any type of protocol error.

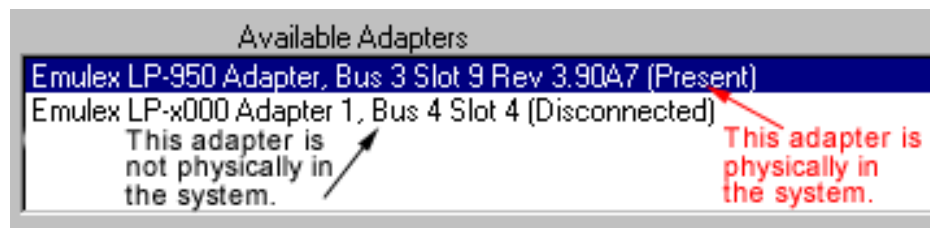
Invalid CRCs - the number of frames received that contain CRC failures.

Ex Count Resp - the number of Fibre Channel exchange responses made by this port.

Removing HBA Information from the Registry

Caution It is not possible to restore adapter information to the registry once it is removed.

1. Start the elxcfg utility. The Main window is displayed.
2. Click an adapter row in the Available Adapters list for an adapter that is not physically present in the system.

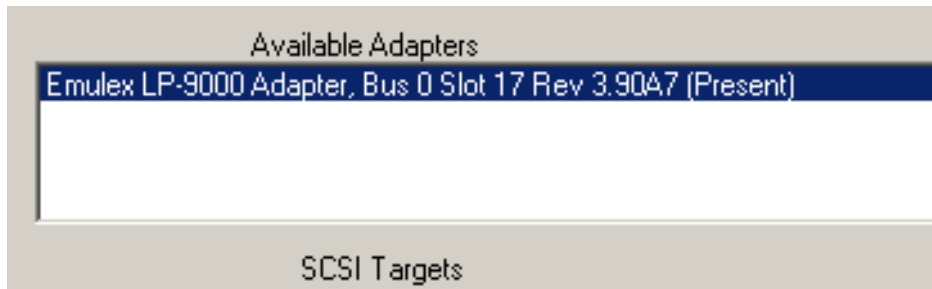


3. From the File menu, click Remove.
4. From the File Menu, click Apply. All configuration information is completely removed.

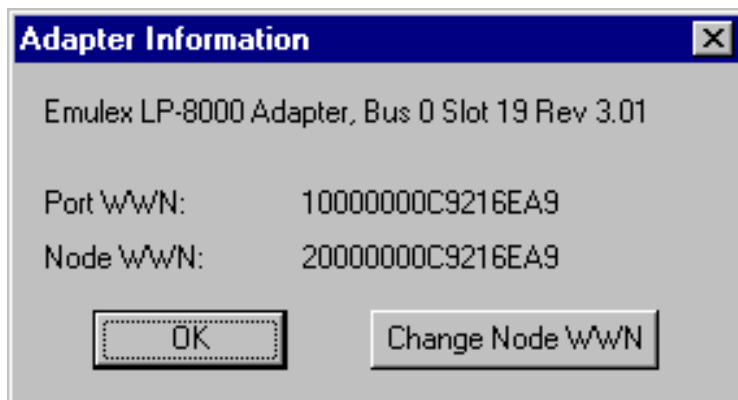
Note Adapters that are physically present in the system cannot be removed.

Changing an HBA's World Wide Name

1. Start the elxcfg utility. The Main window is displayed.
2. Click an adapter row in the Available Adapters list.



The Adapter Information window displays the Port and Node World Wide Names (WWN) for the selected adapter.



3. Click Change Node WWN. A new window is displayed. You can enter a new Node WWN (which applies to all adapters in the system) or you can enable a unique name for each adapter.

- A. To change the Node WWN for all adapters, enter a new Node WWN.

The WWNN will change. The last six characters of the WWNN will be displayed in the following format: 500000C9xxxxxx. xxxxxx represents the 6 characters that you can change.

- B. To select a unique Node WWN for each adapter, select Enable Unique Node WWN. The driver now looks at the NVRAM of each adapter to determine its Node WWN.

4. On the File Menu, click Apply.

Note If the system requires a reboot for this change to take effect, you are prompted to do so when you exit the utility.

Automapping SCSI Devices

The Automatically Map SCSI Devices option allows you to set up the driver to automatically map new SCSI devices as they are discovered. If the devices have already been mapped, either by discovery or manually, this checkbox has no effect.

There are two ways to set up automatic mapping of SCSI devices:

- Select the Automatically Map SCSI Devices option in the Adapter Controls area (procedure on this page).
- Select an installation option with automapping functionality.

Prerequisites

The ability to automap SCSI devices is ultimately controlled by the driver parameter, `AutoMap = n`. If this parameter is set to 1 (the default) SCSI mapping is enabled at the Windows registry level. If this parameter is set to 0, SCSI automapping is disabled at the Windows registry level. You can enable or disable automapping using the `elxcfg` utility (Adapter Controls or Select Configuration window).

Procedure

1. Start the `elxcfg` utility. The Main window is displayed.
2. Locate the Adapter Controls section and select Automatically Map SCSI Devices.

Adapter Controls

- ☒ Automatically Map SCSI Devices
- ☒ Query name server for all N-Ports
- ☒ Allow Multiple paths to SCSI Targets
- ☒ Register For State Change
- ☒ Use Report LUNs
- ☒ Lun Mapping
- ☒ Automatic Lun Mapping
- ☐ Disable Target Reset for Tape Devices
- ☒ Use PLOGI instead of PDISC after LIP
- ☒ Scan in Device ID Order
- ☐ Enable Class 2 for SCSI Devices
- ☒ Report Unknown SCSI Devices
- ☐ Look for Disappearing Devices
- ☒ Translate Queue Full to Busy
- ☐ Use Bus Reset Status for Retries
- ☐ Retry Unit Attention
- ☐ Retry PLOGI Open Failures
- ☒ Enable FCP-2 Recovery
- ☐ Enable FDMI

Static Poll Destination Address

Address

3. On the File menu, click Apply.

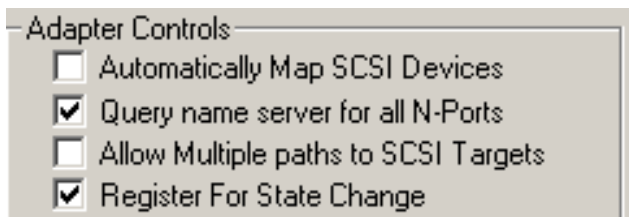
Note If the system requires a reboot for this change to take effect, you are prompted to do so when you exit the utility.

Manually Mapping SCSI Devices

Note The ability to automap SCSI devices is ultimately controlled by the driver parameter, `AutoMap = n`. If this parameter is set to 1 (the default) SCSI mapping is enabled at the Windows registry level. If this parameter is set to 0, SCSI automapping is disabled at the Windows registry level. You can enable or disable automapping using the elxcfg utility (Adapter Controls or Select Configuration window).

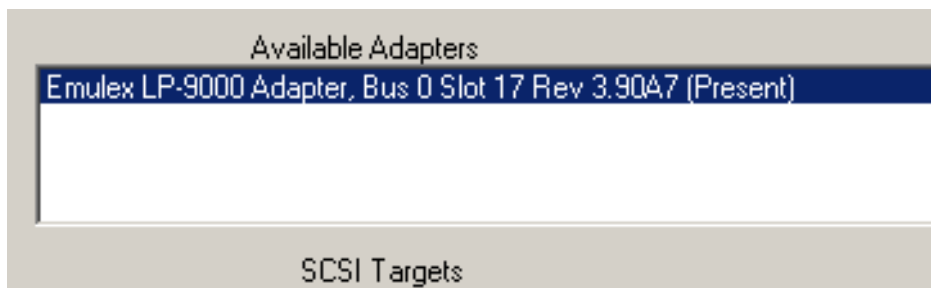
Prerequisites

You must have automapping of SCSI devices disabled. Clear the Automatically Map SCSI Devices option in the Adapter Controls section.

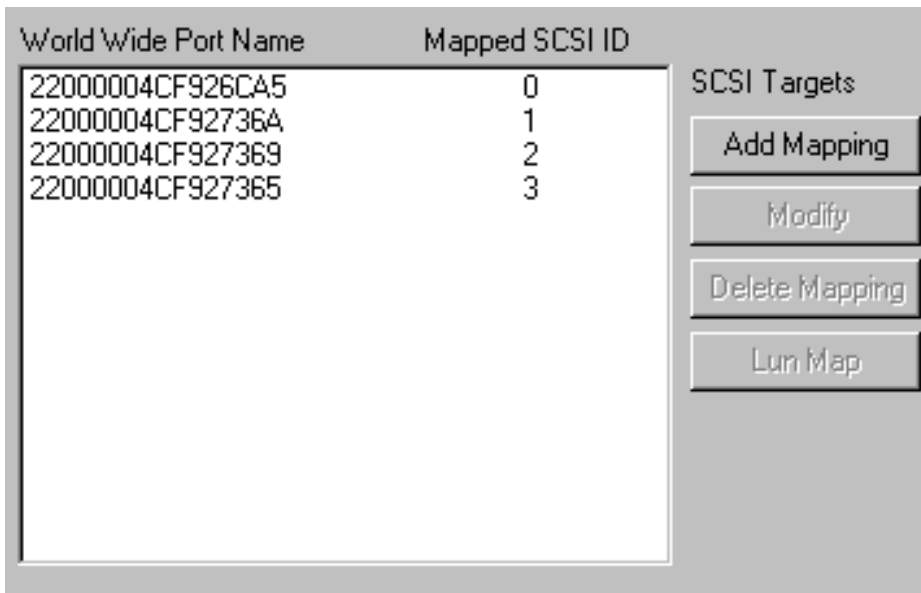


Procedure

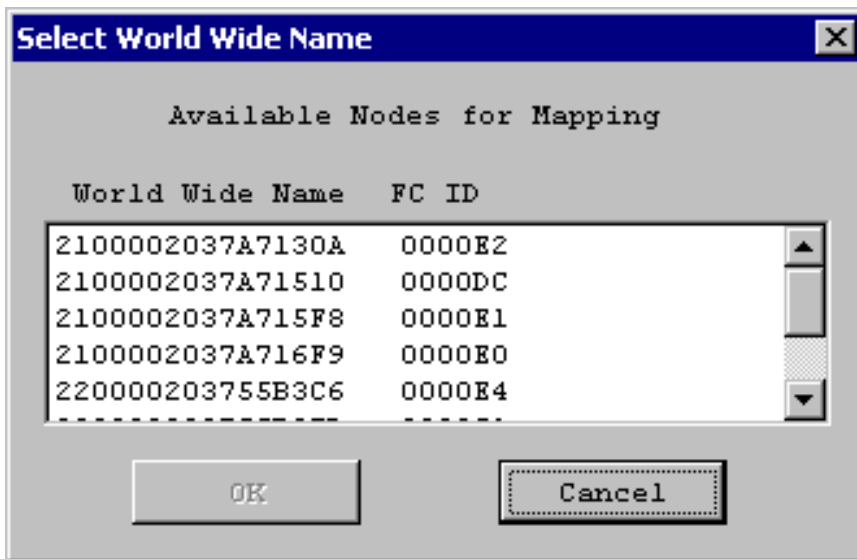
1. Start the elxcfg utility. The Main window is displayed.
2. Select an adapter from the Available Adapters list.



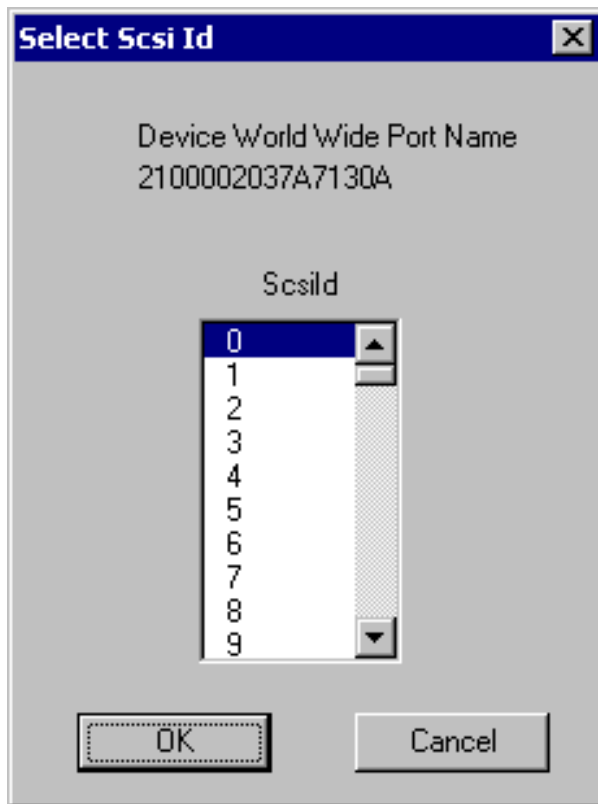
3. Click Add Mapping under the SCSI Targets list.



- The Select World Wide Name dialog box is displayed. In the dialog box, select a World Wide Name and click OK.



- The Select SCSI ID dialog box is displayed. Select a SCSI ID and click OK.



This binds the designated SCSI device to the Windows system.

6. On the File menu, click Apply.

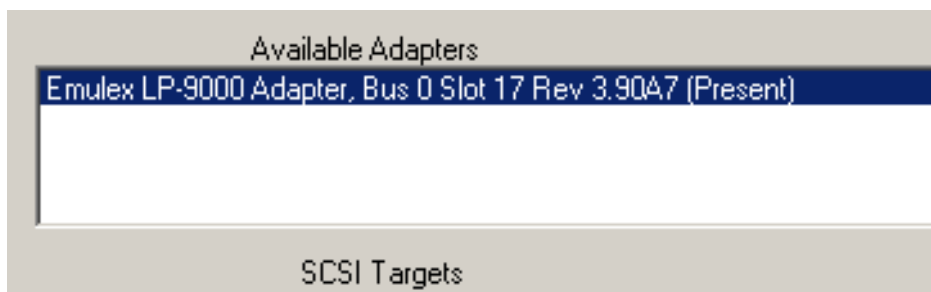
Note If a system reboot is required for changes to take effect, you will be prompted to do so when you exit the utility.

Deleting Mapped SCSI Devices

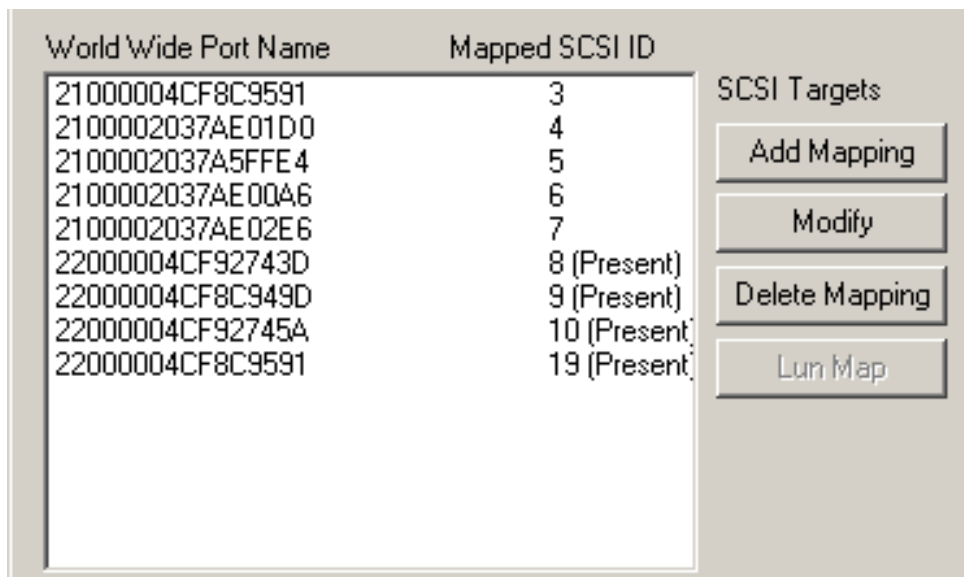
SCSI automapping must be disabled to manually delete "present" mapped SCSI targets. If SCSI automapping is enabled, you can manually delete disconnected, or "non-present" SCSI targets.

Procedure

1. Start the elxcfg utility. The Main window is opened. Select an adapter from the Available Adapters list.



2. Click Delete Mapping under SCSI Targets list.



Note If SCSI automapping is enabled, the Delete Mapping button will be inactive.

3. On the File menu, click Apply.

Note If the system requires a reboot for this change to take effect, you are prompted to do so when you exit the utility.

Set up Persistent Binding - Introduction

The persistent binding feature allows you to control the devices that are to be presented to the system. You can set up persistent binding using either elxcfg or HBAnyware.

- elxcfg allows you to set up persistent binding on local adapters only.
- HBAnyware allows you to set up persistent binding on remote and local adapters.

The Emulex FC Port driver detects all devices attached to the Emulex host bus adapters (HBAs). Global automapping assigns a binding type, target ID, SCSI bus and SCSI ID to the device. The binding type, SCSI bus and SCSI ID may change when the system is rebooted. When persistent binding is applied to one of these targets, the binding type, SCSI bus and SCSI ID remain the same, whether the system is rebooted or whether Global Automap All Targets is subsequently disabled (enabled by default in elxcfg).

The binding information is permanent because it is stored in the Windows registry. The driver refers to the binding information at bootup.

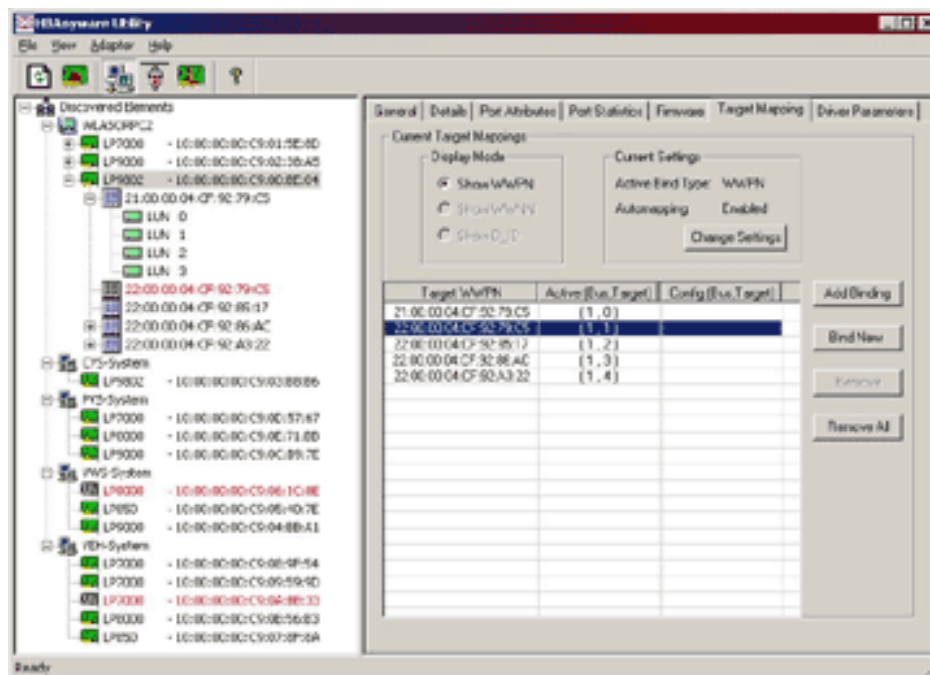
Persistent binding permanently maps a device to the following:

- Binding type (world wide port name (WWPN), world wide node name (WWNN), or a destination identifier (D_ID))
- SCSI bus
- SCSI ID

Set Up Persistent Binding Using HBAnyware

To set up persistent binding, do the following:

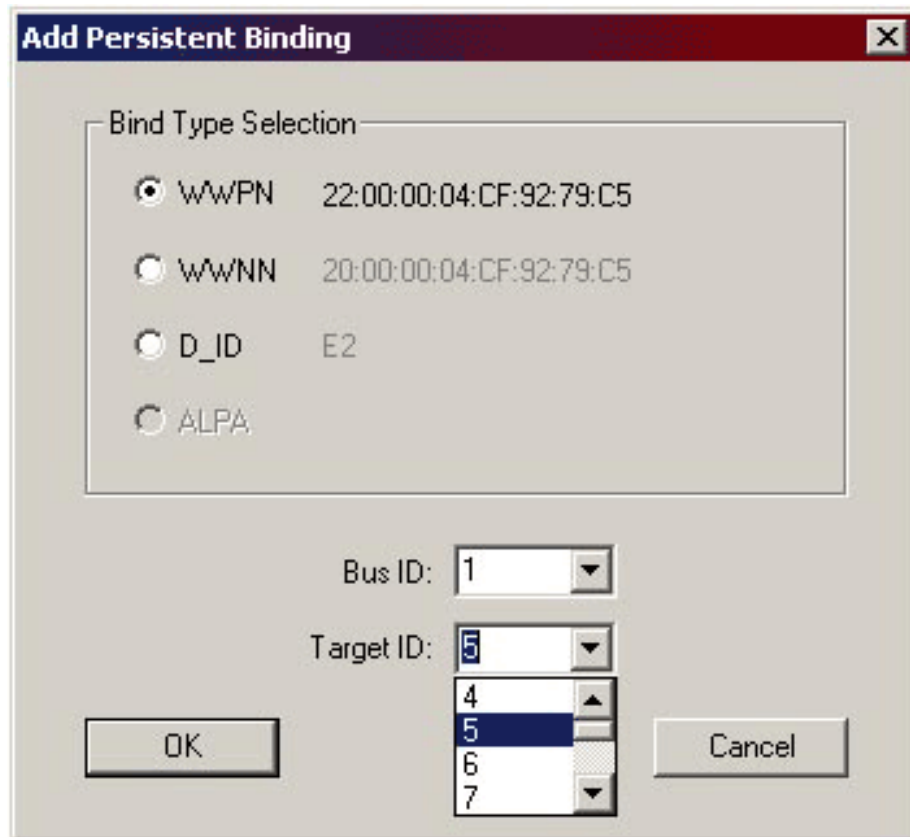
1. Start HBAnyware.
2. In the directory tree, click the adapter for which you want to set up persistent binding.
3. Click the Target Mapping tab. All targets are displayed.



4. Target mappings are displayed by world wide port name (WWPN), world wide node name (WWNN), or device ID (D_ID). In the Display Mode section, choose the display mode you want to use.
5. If you want to change the Active Bind Type (the mode used to persistently bind target mappings) or Automapping setting, click Change Settings. Select the Active Bind Type (WWPN, WWNN or D_ID), and set Automapping to Enabled or Disabled.

To add a persistent binding, do the following:

1. In the Targets Table, click the target that you want to bind.
2. Click Add. The Add Persistent Binding dialog box is displayed.



3. Select the Bind Type that you want to use (WWPN, WWNN or D_ID).
4. Select the Bus ID and Target ID that you want to bind, and click OK.

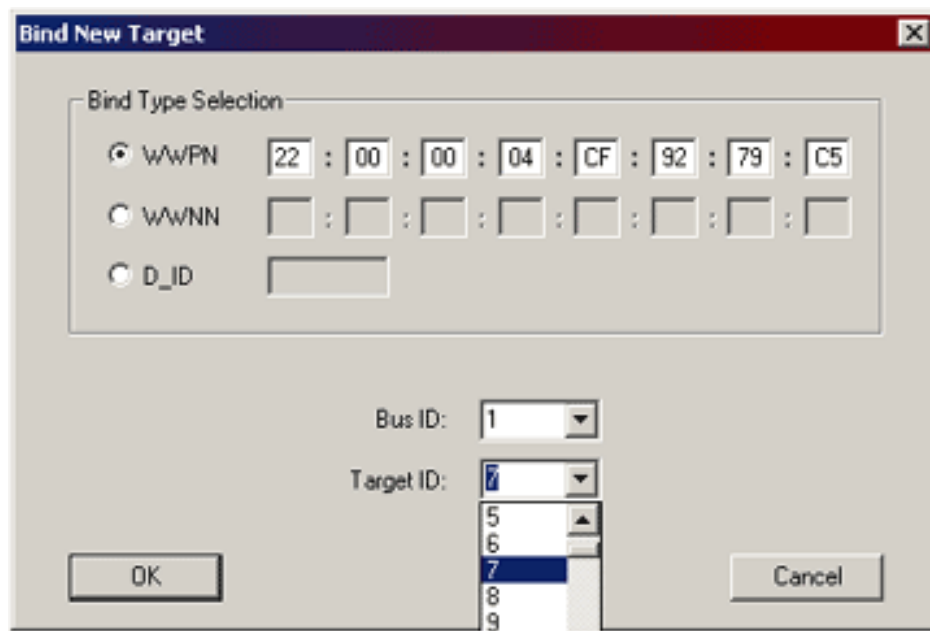
Note

Automapped targets will have entries only in the second column of the Targets Table. Persistently bound targets will have entries in the second and third columns. In this case, the third column contains the SCSI bus and target numbers you specified in the Add Persistent Binding dialog box. This binding will take effect only after the local machine is rebooted.

It is possible to specify a SCSI bus and target that have already been used on behalf of a different FC target. HBAnyware does not detect this until you click the OK button in the Add dialog box. Then a "duplicate binding" error message is displayed, and the request is rejected.

To bind a target that does not appear in the Persistent Binding Table, do the following:

1. Click Bind New. The Bind New Target dialog box is displayed.



2. Click the type of binding you want to use, and type the WWPN, WWNN or D_ID you want to bind to the target.
3. Select the Bus ID and Target ID that you want to bind, and click OK.

Note A target will not appear on the target list if automapping has been disabled and the target is not already persistently bound.

Set Up Persistent Binding and LUN Mapping

Persistent binding allows a system administrator to permanently assign a SCSI ID to a specific target after it has been discovered.

How Does Persistent Binding Work?

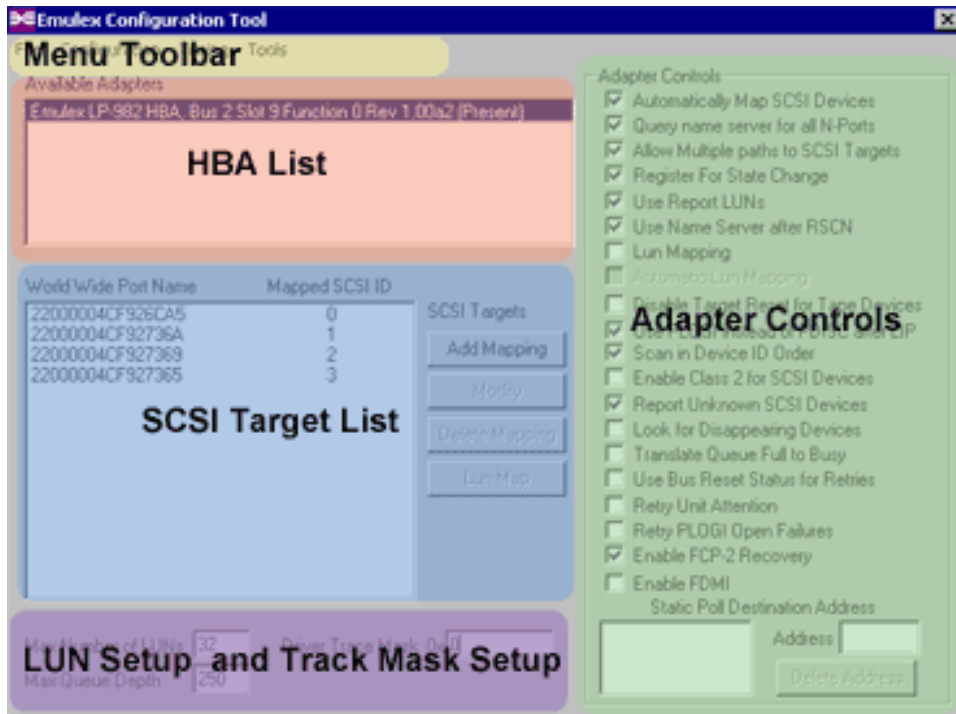
The SCSI ID for a target is assigned by the device driver when the device is first discovered. If persistent binding is used, the SCSI ID/target relationship is maintained during discovery. Discovery occurs each time a system boots or a device is added to or removed from the SAN. After a system has booted, it will maintain a constant view of the same SCSI ID/target relationship.

If persistent binding is not used, the SCSI ID/target relationship can change during discovery.

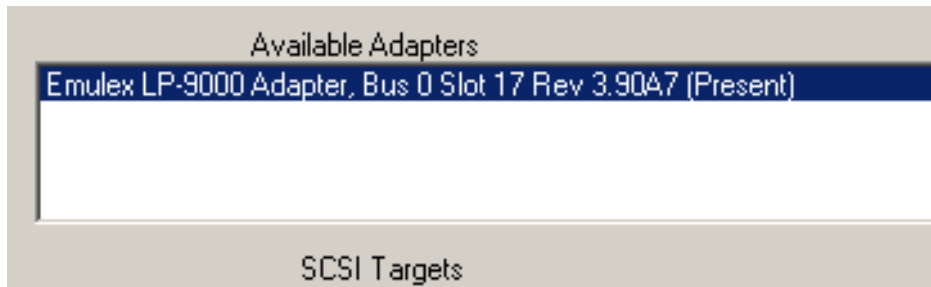
Persistent binding is only a means of assigning SCSI IDs to a specific Fibre Channel device. It does not in any way reserve a particular resource or prevent other Fibre Channel devices from accessing the device.

Procedure for Configuring Persistent Binding for a Target

1. Start the Emulex Configuration Utility: click Start, Programs and Emulex Configuration Tool. The Main window is opened with the following sections. The options that are displayed in the Adapter Controls area depend on how your system is configured.



2. Select an adapter from the Available Adapters list.



3. In the Adapter Controls area, make sure that the check box to Automatically Map SCSI Devices is cleared. If this box is checked, clear it.

Adapter Controls

- ☐ Automatically Map SCSI Devices
- ☒ Query name server for all N-Ports
- ☒ Allow Multiple paths to SCSI Targets
- ☒ Register For State Change
- ☒ Use Report LUNs
- ☒ Use Name Server after RSCN
- ☐ Lun Mapping
- ☐ Automatic Lun Mapping
- ☐ Disable Target Reset for Tape Devices
- ☒ Use PLOGI instead of PDISC after LIP
- ☒ Scan in Device ID Order
- ☐ Enable Class 2 for SCSI Devices
- ☒ Report Unknown SCSI Devices
- ☐ Look for Disappearing Devices
- ☐ Translate Queue Full to Busy
- ☐ Use Bus Reset Status for Retries
- ☐ Retry Unit Attention
- ☐ Retry PLOGI Open Failures
- ☒ Enable FCP-2 Recovery
- ☐ Enable FDMI

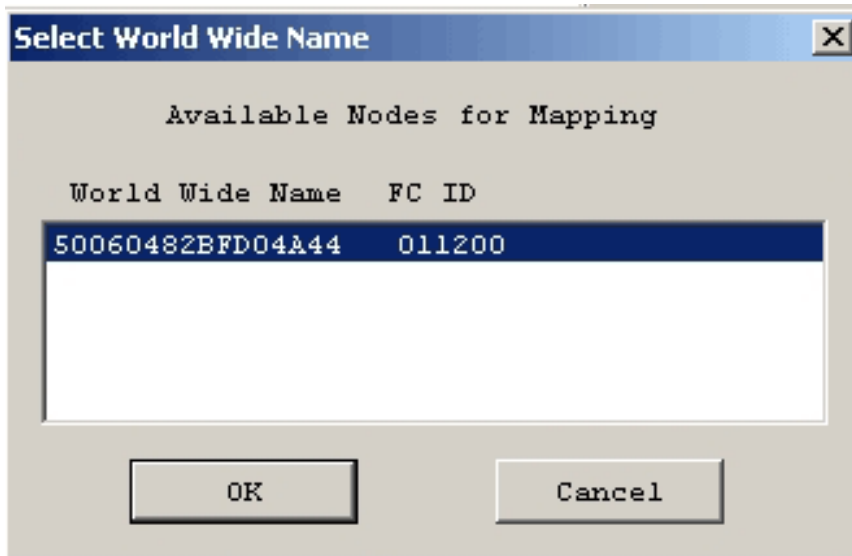
Static Poll Destination Address

	Address	
		Delete Address

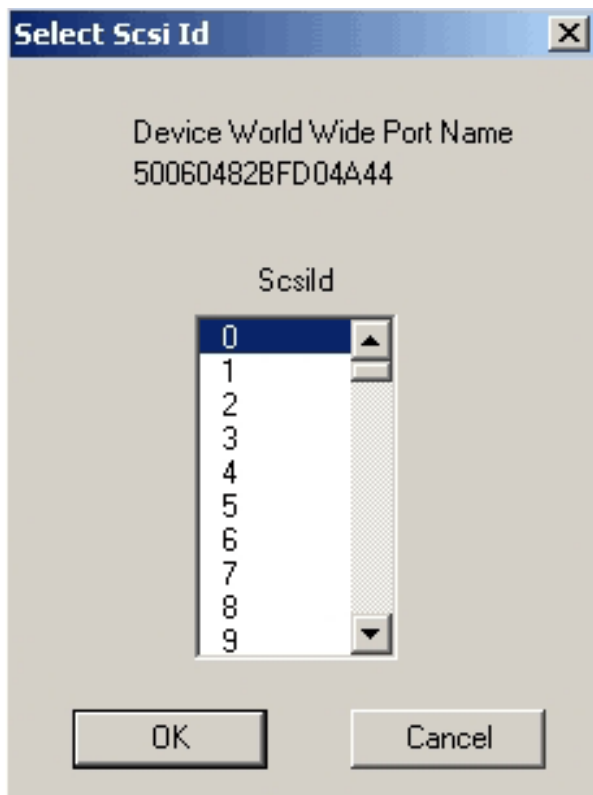
4. In the SCSI Target List area, click Add Mapping.

World Wide Port Name	Mapped SCSI ID	SCSI Targets
22000004CF926CA5	0	Add Mapping Modify Delete Mapping Lun Map
22000004CF92736A	1	
22000004CF927369	2	
22000004CF927365	3	

The Select World Wide Name dialog box is displayed.



5. Select the World Wide Name (WWNN) for the device you wish to select and click OK. The Select SCSI ID dialog box is displayed.



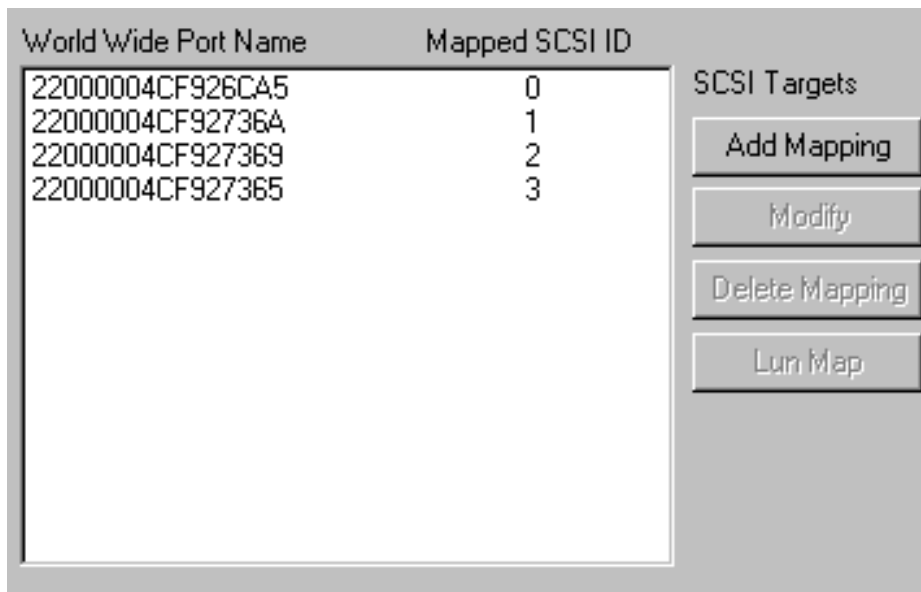
6. Select a SCSI ID to assign to the Device World Wide Port Name and click OK.
7. Once all of the devices have been selected, apply the changes: from the File menu, select Apply.

8. Exit the utility: from the File menu, select Exit.
9. Restart the computer.
10. Start the Emulex Configuration Utility. Your new device and SCSI ID mapping information is displayed in the SCSI Target List area.

Removing a Mapped LUN

To unmap a LUN, perform the following steps:

1. Stop input/output (I/O) on the host for the LUN you want to unmap.
2. On the Main window, SCSI Target List area, highlight the SCSI target you want to delete and click the Delete Mapping button to remove the SCSI target.



Automapping LUNs

If automapping is selected, LUNs are automatically mapped by the driver as they are discovered.

Note Automatic mapping may cause LUN numbers to "change." For example, the LUN indicated by the SCSI applet on the Control Panel may be different from the LUN number on the device. The mapping can be viewed by clicking on the LUN Mapping button.

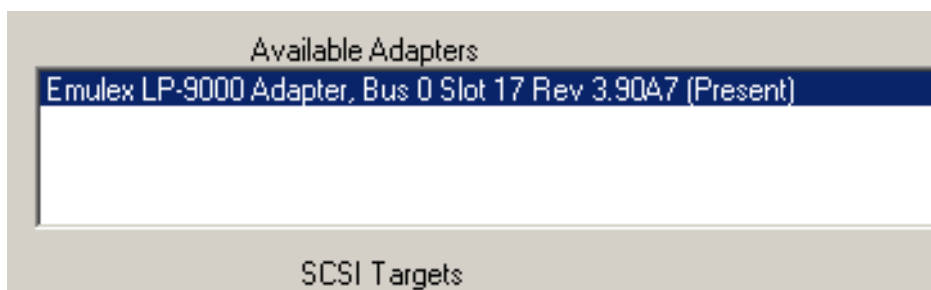
Prerequisites

To automap LUNs, the following must be set up:

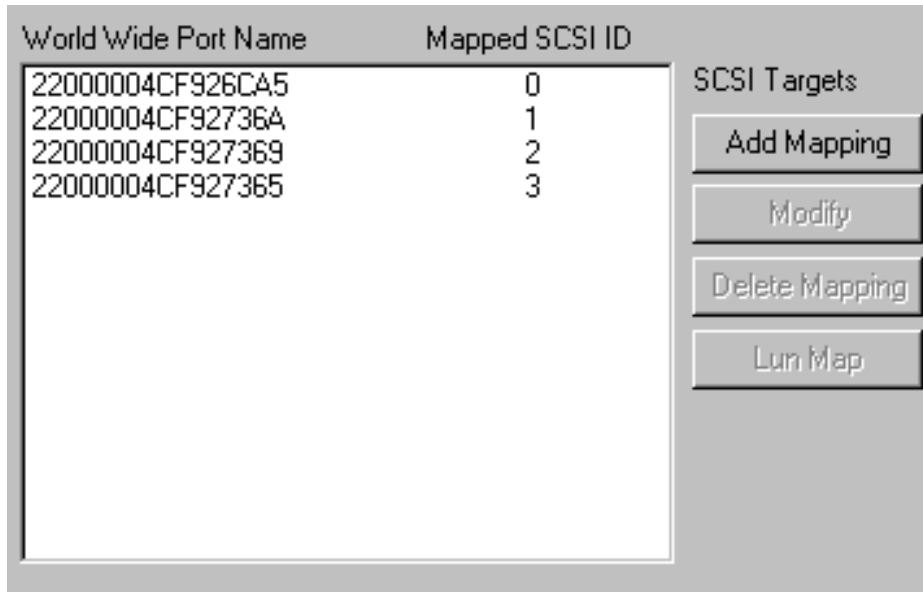
- The Windows registry parameter MapLuns = **n** must be set to 1. When set to 1, LUN mapping is enabled, and each LUN number is translated to a 64-bit Fibre Channel LUN number. For new LUNs, this mapping is performed automatically by the driver. If the report LUNs command is supported by the target, the first 256 LUNs reported may be used by the operating system. The MapLuns parameter defaults to 0.
- The LUN mapping option must be selected. This option is located in the Adapter Controls section on the Main window. If the LUN Mapping option is selected, the Automatic LUN Mapping option is available.

Procedure

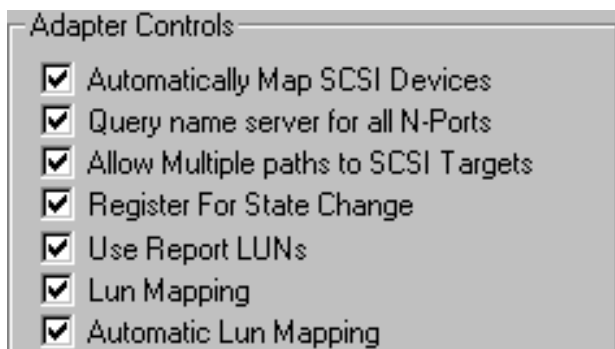
1. Start the elxcfg utility. The Main window is displayed.
2. Select an adapter from the Available Adapters list.



3. Select a target in the SCSI Target area.



4. Locate the Adapter Controls section on the Main window and select Automatic LUN Mapping.



5. On the File menu, click Apply.

Note If the system requires a reboot for this change to take effect, you are prompted to do so when you exit the utility.

Manually Mapping LUNs

Manual LUN mapping accomplishes these tasks:

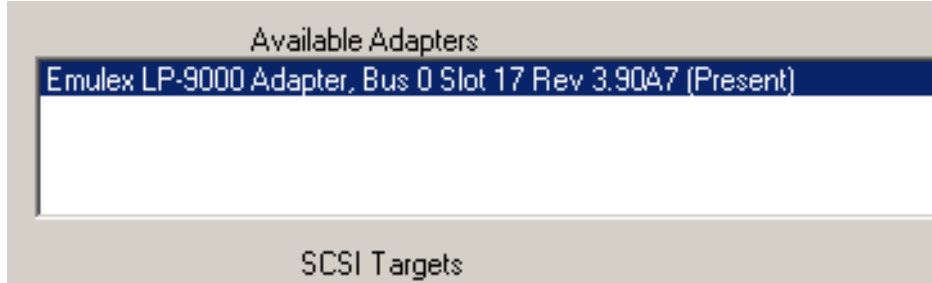
- Designates which LUNs in a storage device or loop will be recognized by the Windows system.
- Restricts certain disks to the Windows system.

Prerequisites

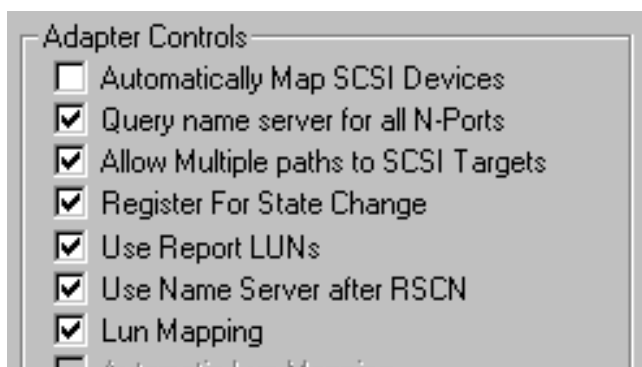
The Windows registry parameter MapLuns = **n** must be set to 2. When set to 2, LUN mapping is enabled, but the driver does not automatically map LUNs. The MapLuns parameter defaults to 0.

Procedure

1. Start the elxcfg utility. The Main window is displayed. Select an adapter from the Available Adapters list.



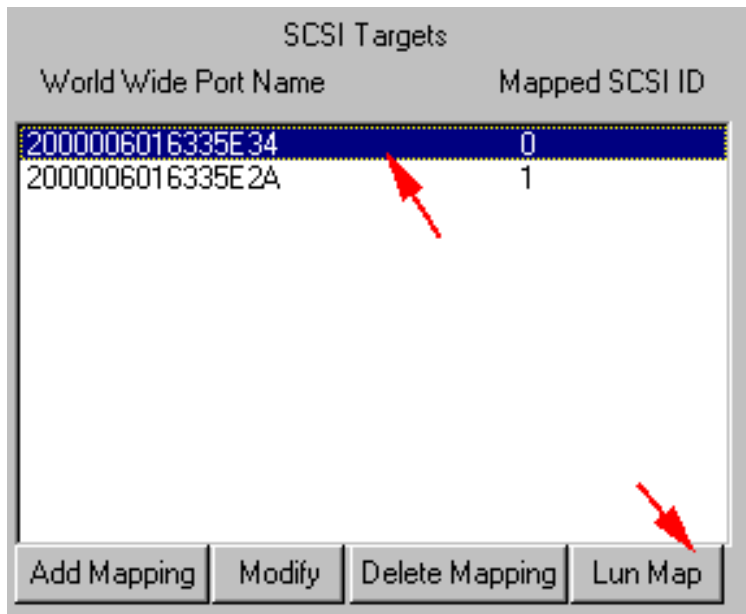
2. In the Adapter Controls section, make sure the Automatically Map SCSI devices check box is cleared and the LUN Mapping check box is selected.



3. On the File menu, click Apply.

Note If LUN Mapping was selected in step 2, reboot the system.

4. Select a target in the SCSI Target List area.



5. Click Lun Map under the list of SCSI targets. The LUN Map dialog box is displayed.
6. Click Add in the LUN Map dialog box.
7. Select a 64-bit Fibre Channel LUN, then click OK.

The format of this number is found under the FCP standard or PLDA (Private Loop Drive Attachment) standard.

8. Enter the NT LUN number. This number is self-incrementing.
9. On the File menu, click Apply.

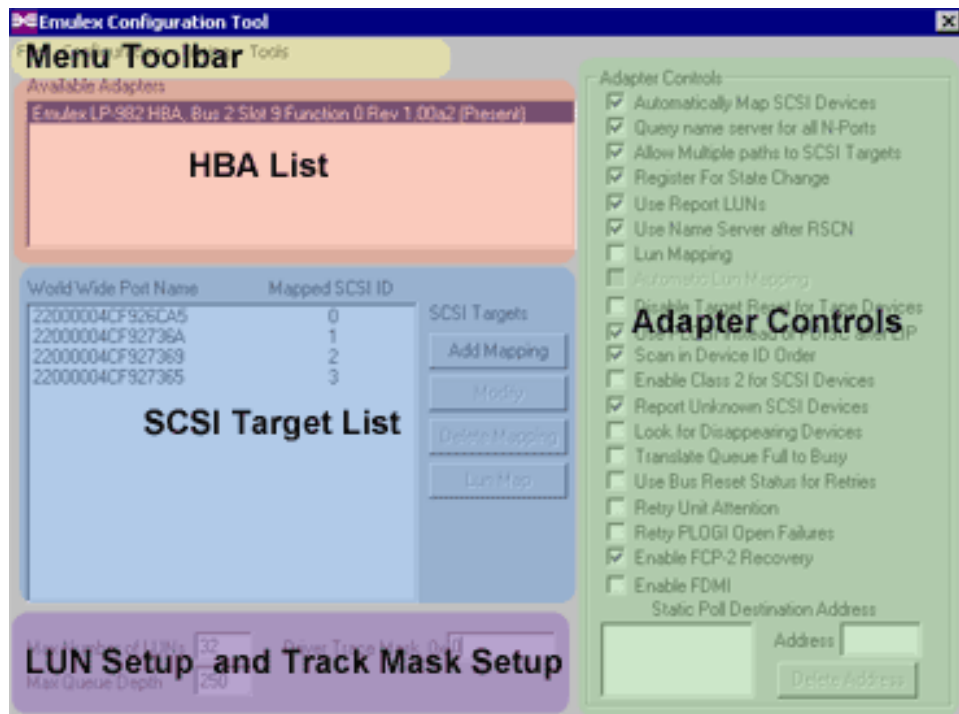
Note Targets and LUNs may be added dynamically by scanning for new devices with the Windows 2000 device manager.

Setting Up Maximum Number of LUNs and Maximum Queue Depth

The maximum number of LUNs represents the maximum number of LUNs the driver will poll during device discovery. The minimum value is 1, the maximum value is 256. The default is 32.

The maximum queue depth represents the number of outstanding commands to a single LUN. The default is 8.

Set up these values in the LUN Setup section located near the bottom left area of the main window.



Procedure

1. Start the elxcfg utility. The Main window is displayed.
2. Locate the LUN Setup Section and enter a value for Maximum Number of LUNs.
3. Locate the LUN Setup Section and enter a value for Maximum Queue Depth.
4. On the File menu, click Apply.

Note If a system reboot is required for changes to take effect, you will be prompted to do so when you exit the utility.

Setting Up the Driver to Use Report LUNs to Determine the LUNs that are Present

For all SCSI devices, set up this option to direct the driver to issue a Report LUNs SCSI command to determine the LUNs present on all storage devices. The target device is responsible for reporting all present LUNs. If the target device supports Report LUNs, the maximum number of LUNs is ignored for the target device.

If the target does not support the Report LUNs SCSI command or the option is disabled, the driver polls each device for the present LUNs. The driver starts with LUN 0 and proceeds for each LUN up to the maximum LUN value.

1. Start the elxcfg utility. The Main window is displayed.
2. Locate the Adapter Controls section and select Use Report LUNs.

Adapter Controls

- ☒ Automatically Map SCSI Devices
- ☒ Query name server for all N-Ports
- ☒ Allow Multiple paths to SCSI Targets
- ☒ Register For State Change
- ☒ Use Report LUNs
- ☐ Lun Mapping
- ☐ Automatic Lun Mapping
- ☐ Disable Target Reset for Tape Devices
- ☒ Use PLOGI instead of PDISC after LIP
- ☒ Scan in Device ID Order
- ☐ Enable Class 2 for SCSI Devices
- ☒ Report Unknown SCSI Devices
- ☐ Look for Disappearing Devices
- ☒ Translate Queue Full to Busy
- ☐ Use Bus Reset Status for Retries
- ☐ Retry Unit Attention
- ☐ Retry PLOGI Open Failures
- ☒ Enable FCP-2 Recovery
- ☐ Enable FDMI

Static Poll Destination Address

Address

3. On the File menu, click Apply.

Note If the system requires a reboot for this change to take effect, you are prompted to do so when you exit the utility.

Configuring I/O Performance Interruption Parameters

The Max Interrupt Latency, Min I/O Completions per Interrupt, and Max I/O Completions per Interrupt values work together to tune the system performance.

Conditions Necessary to Generate an Interrupt

An I/O performance interruption is generated if one of the following conditions apply:

- At least one command has completed and the timer controlling the interrupt latency expires.
- The number of commands completed equals the Min I/O Completions per Interrupt.
- The Max I/O Completions per Interrupt was reached on the previous interrupt and there are still completed commands waiting to be processed.

Performance Parameter Defaults

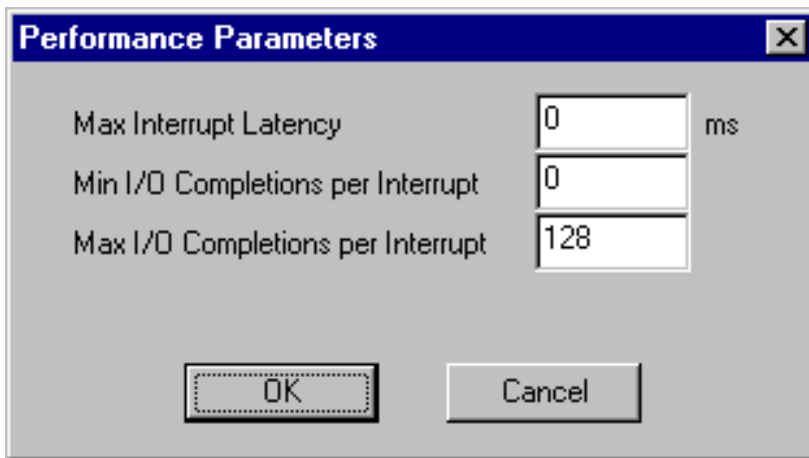
The default values are:

- Max Interrupt Latency = 0
- Min I/O Completions per Interrupt = 0
- Max I/O Completions per Interrupt = 128

Procedure

Follow these steps:

1. Start the elxcfg utility. The Main window is displayed.
2. From the Tuning menu, click Performance to open the Performance Parameters window.



3. Change the values as necessary.

Note The Max Interrupt Latency and Min/Max I/O Completions per Interrupt values are meaningful only if you are running firmware version 3.0 or later.

The Max Interrupt Latency value represents the InterruptCoalesce value and is a combination of fields. Bits 0 to 7 represent the number of I/Os that should complete before an interrupt occurs. Bits 8 to 14 represent the number of milliseconds that expire before an interrupt is generated if some I/Os complete, but less than the number of I/Os specified in bits 0 to 7.

The Min I/O Completions per Interrupt value is the minimum number of I/Os the driver completes in a single interrupt.

The Max I/O Completions per Interrupt value is the maximum number of I/Os the driver completes in a single interrupt.

The Max Interrupt Latency and Min/Max I/O Completions per Interrupt values work together to determine when an interrupt is generated after one of the conditions is met. These values are typically modified to achieve overall system fairness.

4. Click OK. The Performance Parameters window is closed.
5. On the File menu, click Apply.

Note If a system reboot is required for changes to take effect, you will be prompted to do so when you exit the utility.

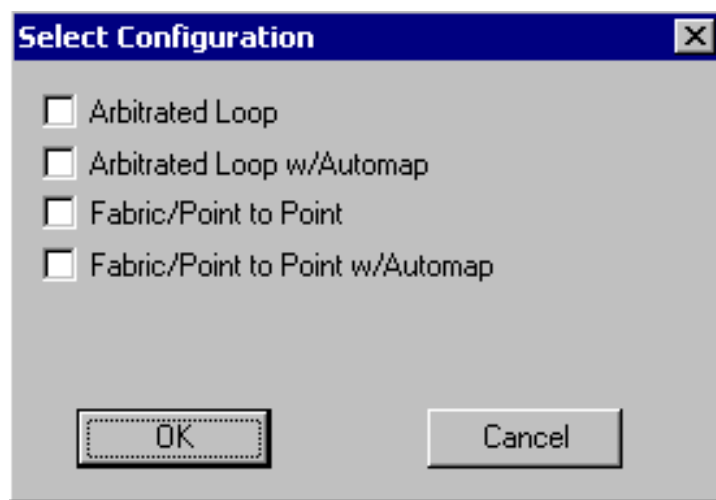
Changing Topology

Prerequisites

The ability to enable a topology with automapping functionality is ultimately controlled by the Windows driver parameter AutoMap = **n**. If this parameter is set to 1 (the default), you can select a topology with automapping functionality.

Procedure

1. Start the elxcfg utility.
2. Select Set from the Configuration Menu to display the Select Configuration window.
3. To change the topology, select the appropriate method.



4. Click OK.

Note Changing the topology to one with automapping functionality changes the setting of the Automatically Map SCSI Devices option in the Adapter Controls section. Changing the topology in this window, however, does not change the description of the device in the Windows Control Panel's Device Manager.

5. On the File menu, click Apply.

Note If the system requires a reboot for this change to take effect, you are prompted to do so when you exit the utility.

Topology Definitions

Arbitrated Loop, No Automap of SCSI Devices

Use this option for loop when other systems already reside on the loop. This option will keep the operating system from trying to grab all of the devices on the loop.

- No fabric
- No automap
- SCSI devices must be mapped manually with elxcfg

Arbitrated Loop, Automap SCSI Devices

Basic loop and disk drive(s) configuration

- No fabric
- SCSI devices will be automatically mapped when discovered

Fabric, No Automap of SCSI Devices

- Point-to-point connection to fabric
- No automap
- SCSI devices must be mapped manually with elxcfg

Fabric, Automap SCSI Devices

This is a basic fabric and disk drive(s) configuration. The connection to the fabric is assumed to be point-to-point.

- Point-to-point connection to fabric
- SCSI devices will be automatically mapped when discovered

Setting Up Auto Topology Detection

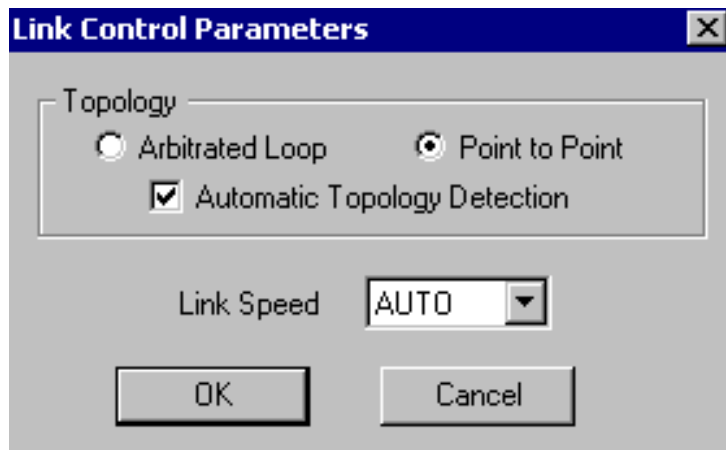
If automatic topology detection is selected, the adapter first attempts the topology type selected in this window. If initialization fails, the adapter tries the other topology type.

Prerequisites

- An adapter that is supported by firmware version 3.20 or above and supports multiple link speeds.

Procedure

1. Start the elxcfg utility.
2. From the Tuning menu, click Link Control. The Link Control Parameters window is displayed.



3. Select the desired topology method.
4. To change the link speed, select a link speed option.
5. Click OK.

Note To determine whether the topology selected in this window has automapping functionality, look at the Adapter Controls section on the main window. If Automatically Map SCSI Devices is selected, the topology has automapping functionality.

6. On the File menu, click Apply.

Note If the system requires a reboot for this change to take effect, you are prompted to do so when you exit the utility.

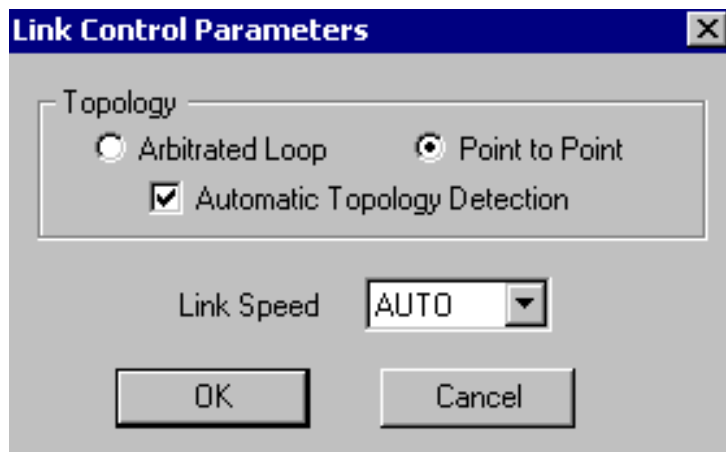
Selecting Link Speed

Prerequisites

- An adapter that is supported by firmware version 3.20 or above, and supports multiple link speeds.

Procedure

1. Start the elxcfg utility.
2. Select Link Control from the Tuning Menu. The Link Control Parameters window is displayed.



3. Change the link speed. Select 1 GB, 2 GB or AUTO. If the Link Speed is set to Auto, automatic speed negotiation is in effect.
4. Click OK.
5. On the File menu, click Apply.

Note If the system requires a reboot for this change to take effect, you are prompted to do so when you exit the utility.

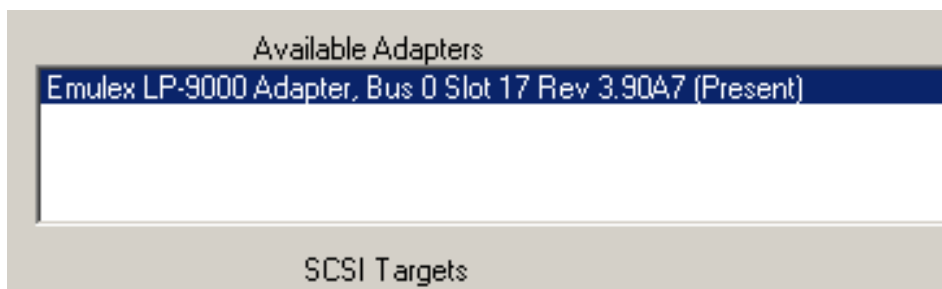
Enabling Networking (Windows Server 2003 and Windows 2000)

Prerequisites

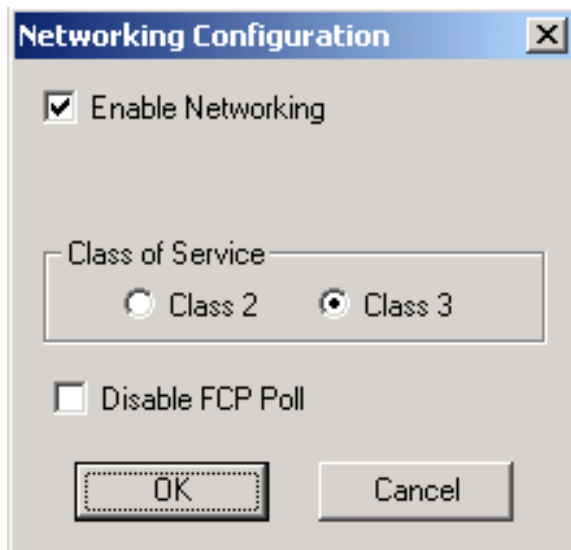
- Installed FC Port driver
- Installed driver utilities

Procedure

1. Start the elxcfg utility. The Main window is displayed.
2. Select an adapter from the Available Adapters list.



3. From the Tools menu, select Networking. The Networking Configuration window is displayed.



4. Select Enable Networking to enable networking on the selected adapter.

5. Select Class 2 or Class 3.

- Class 2 is a connectionless class of service with confirmation of delivery, or notification of non-deliverability of frames.
- Class 3 is a connectionless class of service with no confirmation of delivery or notification of non-deliverability of frames. If a frame cannot be delivered or processed, it is discarded without notification.

Attribute	Class 2	Class 3
Connection-oriented?	No	No
Bandwidth Reserved?	No	No
Guaranteed Latency?	No	No
Guaranteed Delivery Order?	No	No
Confirmation of Delivery (ACK)?	Yes	No
Frame Multiplexing?	Yes	Yes
End-to-End Flow Control?	Yes	No
Link-Level Flow Control?	Yes	No

6. Select Disable FCP Polling only if SCSI functionality is not required on the selected adapter. Clearing this option keeps the selected adapter from looking for SCSI-3 (FCP) devices.

7. Click OK.

8. On the File menu, click Apply.

The system finds new hardware and may issue the standard Windows warnings.

9. Close the Emulex Configuration Utility, elxcfg.
10. Scan for new devices. Right-click My Computer and select Manage. The Computer Management window is displayed.
11. Select Device Manager.
12. Right-click Network Adapter.
13. Select "Scan for New Hardware Changes" from the Action menu. The Found New Hardware Wizard is displayed.

14. Click Have Disk and select the appropriate driver option.
15. Configure the driver for IP:
 - a. Right-click My Network Places and select Properties. The Networking and Dial-up Connections window is opened.
 - b. Select Local Area Network and right-click Properties.
 - c. Select Internet Protocol and click Properties.
 - d. Enter IP address information and click OK.
16. Your adapter is now enabled for networking.

Note If you change the IP class of service after the initial installation, a reboot is required for this change to take effect.

Changing Timer Settings

The timer settings allow you to configure the retry behaviors of the driver.

Timer Setting Defaults

The default values are:

- Link Timer = 30 seconds
- Retries = 64
- Error Detect Timeout Value (E_D_TOV) = 2000 milliseconds
- Arbitrated Loop Timeout Value (AL_TOV) = 15 milliseconds
- Wait Ready Timer = 45 seconds
- Retry Timer = 2000 milliseconds
- Resource Allocation Timeout Value (R_A_TOV) = 2 seconds
- Arbitration Timeout Value (ARB_TOV) = 1000 milliseconds

Procedure

1. Start the elxcfg utility.
2. Select Timers from the Tuning Menu to open the Timer Settings window.

Link Timer	30	sec	Wait Ready Timer	45	sec
Retries	64		Retry Timer	200	ms
E_D_TOV	2000	ms	R_A_TOV	2	sec
AL_TOV	15	ms	ARB_TOV	1000	ms
Apply			Exit		

3. Change values as necessary.

4. Click OK. The Timer Settings window is closed.
5. On the File menu, click Apply.

Note If a system reboot is required for changes to take effect, you will be prompted to do so when you exit the utility.

Timer Setting Definitions

Link Timer

Corresponds to the LinkDownTimer parameter and is used to determine a hard link failure. If the link is down longer than the link timer value, all I/Os on that link are returned with selection timeout error. If the link is restored before the LinkDownTimer expires, the I/O continues with no error condition.

Retries

Corresponds to the RetryAttempts parameter and represents the number of times the driver retries a command, completing with a retryable error before returning the command to the caller with an error status.

E_D_TOV

This parameter changes the Error Detect Timeout Value.

Note If a switch is present, this value is obtained from the switch, thus overriding any values entered here.

AL_TOV

This parameter changes the Arbitrated Loop Timeout Value.

Wait Ready Timer

Corresponds to the WaitReadyTimeVal parameter and is used to return commands to unavailable devices. When a command is received for a device that is not currently present, the driver waits for the Wait Ready Timer length for the device to become available. If it does not become available in the time period, then the driver returns the command and all subsequent commands for the device with SCSI selection timeout errors. If the timer values are set to -1, then the driver uses 2*R_A_TOV as the timer value. If the timer is set to 0, then the driver waits indefinitely for devices to become available.

Retry Timer

The length of time, in milliseconds, the driver waits before retrying a command.

R_A_TOV

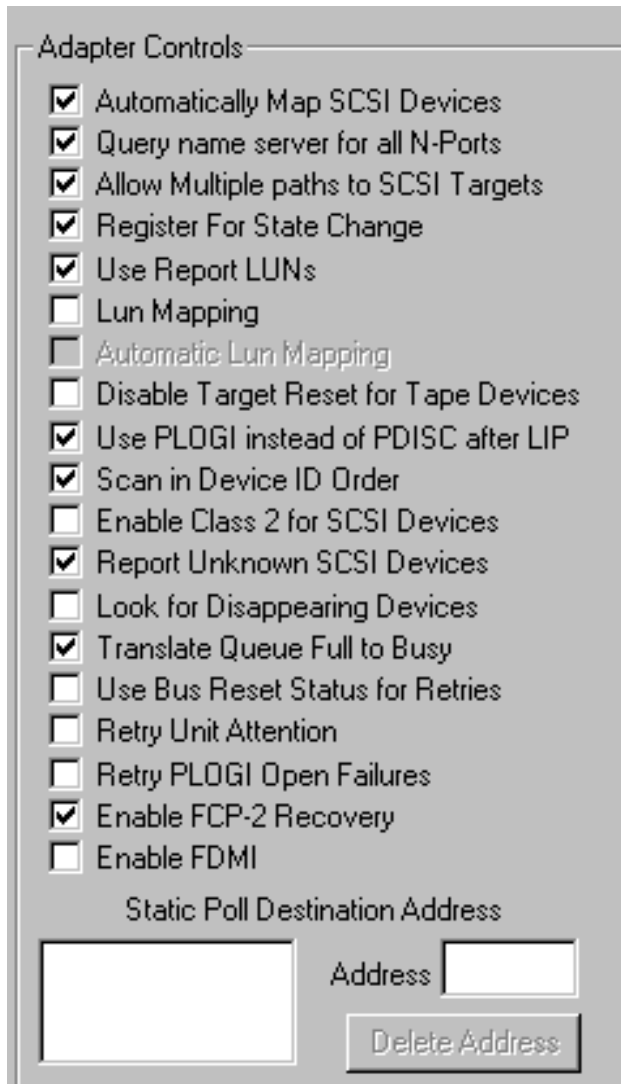
This parameter changes the Resource Allocation Timeout Value. If a switch is present, this value is obtained from the switch, thus overriding any values entered here.

ARB_TOV

This parameter changes the Arbitration Timeout Value.

Determining What the Name Server Will Query

1. Start the elxcfg utility. The Main window is displayed.
2. Locate the Adapter Controls section.



Adapter Controls

- ☒ Automatically Map SCSI Devices
- ☒ Query name server for all N-Ports
- ☒ Allow Multiple paths to SCSI Targets
- ☒ Register For State Change
- ☒ Use Report LUNs
- ☐ Lun Mapping
- ☐ Automatic Lun Mapping
- ☐ Disable Target Reset for Tape Devices
- ☒ Use PLOGI instead of PDISC after LIP
- ☒ Scan in Device ID Order
- ☐ Enable Class 2 for SCSI Devices
- ☒ Report Unknown SCSI Devices
- ☐ Look for Disappearing Devices
- ☒ Translate Queue Full to Busy
- ☐ Use Bus Reset Status for Retries
- ☐ Retry Unit Attention
- ☐ Retry PLOGI Open Failures
- ☒ Enable FCP-2 Recovery
- ☐ Enable FDMI

Static Poll Destination Address

Address

3. Select or clear Query name server for all N-Ports:
 - Selected - the driver polls the name server for all connected N-Ports.
 - Cleared - the driver asks for all registered SCSI FCP devices.

Note Emulex adapters register as SCSI FCP devices. If the only devices on the Fibre Channel are Emulex adapters and storage devices, the same list of devices is returned, no matter how Query name server for all N-Ports is set up.

4. On the File menu, click Apply.

Note If the system requires a reboot for this change to take effect, you are prompted to do so when you exit the utility.

Allowing Multiple Paths to SCSI Targets

1. Start the elxcfg utility. The Main window is displayed.
2. Locate the Adapter Controls section.

Adapter Controls

- ☒ Automatically Map SCSI Devices
- ☒ Query name server for all N-Ports
- ☒ Allow Multiple paths to SCSI Targets
- ☒ Register For State Change
- ☒ Use Report LUNs
- ☐ Lun Mapping
- ☐ Automatic Lun Mapping
- ☐ Disable Target Reset for Tape Devices
- ☒ Use PLOGI instead of PDISC after LIP
- ☒ Scan in Device ID Order
- ☐ Enable Class 2 for SCSI Devices
- ☒ Report Unknown SCSI Devices
- ☐ Look for Disappearing Devices
- ☒ Translate Queue Full to Busy
- ☐ Use Bus Reset Status for Retries
- ☐ Retry Unit Attention
- ☐ Retry PLOGI Open Failures
- ☒ Enable FCP-2 Recovery
- ☐ Enable FDMI

Static Poll Destination Address

Address

3. Select or clear Allow Multiple paths to SCSI Targets:
 - Selected - Mapped SCSI devices are reported on each connected port.
 - Cleared - Mapped SCSI devices are reported only on the first connected port.
4. On the File menu, click Apply.

Note If the system requires a reboot for this change to take effect, you are prompted to do so when you exit the utility.

Registering for State Change Notification

1. Start the elxcfg utility. The Main window is displayed.
2. Locate the Adapter Controls section.

Adapter Controls

- ☒ Automatically Map SCSI Devices
- ☒ Query name server for all N-Ports
- ☒ Allow Multiple paths to SCSI Targets
- ☒ Register For State Change
- ☒ Use Report LUNs
- ☐ Lun Mapping
- ☐ Automatic Lun Mapping
- ☐ Disable Target Reset for Tape Devices
- ☒ Use PLOGI instead of PDISC after LIP
- ☒ Scan in Device ID Order
- ☐ Enable Class 2 for SCSI Devices
- ☒ Report Unknown SCSI Devices
- ☐ Look for Disappearing Devices
- ☒ Translate Queue Full to Busy
- ☐ Use Bus Reset Status for Retries
- ☐ Retry Unit Attention
- ☐ Retry PLOGI Open Failures
- ☒ Enable FCP-2 Recovery
- ☐ Enable FDMI

Static Poll Destination Address

Address

3. Select or clear Register for State Change:
 - Selected - When a fabric is present, the driver registers with the fabric to receive registered state change notification (RSCN) ELS requests from the fabric. RSCN is a Fibre Channel switch function that allows notification to registered nodes if a change occurs to other specified nodes.
 - Cleared - The driver does not register with the fabric, even if the fabric is present.

Note Clearing this option, or disabling State Change Notification, disables the automatic discovery of new devices. It also prevents recovery when cables are moved on a switch connected to a storage device.

4. On the File menu, click Apply.

Note If the system requires a reboot for this change to take effect, you are prompted to do so when you exit the utility.

Disabling Target Reset for Tape Devices

1. Start the elxcfg utility. The Main window is displayed.
2. Locate the Adapter Controls section.

Adapter Controls

- ☒ Automatically Map SCSI Devices
- ☒ Query name server for all N-Ports
- ☒ Allow Multiple paths to SCSI Targets
- ☒ Register For State Change
- ☒ Use Report LUNs
- ☐ Lun Mapping
- ☐ Automatic Lun Mapping
- ☐ Disable Target Reset for Tape Devices
- ☒ Use PLOGI instead of PDISC after LIP
- ☒ Scan in Device ID Order
- ☐ Enable Class 2 for SCSI Devices
- ☒ Report Unknown SCSI Devices
- ☐ Look for Disappearing Devices
- ☒ Translate Queue Full to Busy
- ☐ Use Bus Reset Status for Retries
- ☐ Retry Unit Attention
- ☐ Retry PLOGI Open Failures
- ☒ Enable FCP-2 Recovery
- ☐ Enable FDMI

Static Poll Destination Address

Address

3. Select or clear Disable Target Reset for Tape Devices:
 - Selected - The driver does not send a Target Reset command to tape drives and media changers in response to a SCSI Bus Reset command.
 - Cleared - The driver sends a Target Reset command to tape drives and media changers in response to a SCSI Bus Reset command.

4. On the File menu, click Apply.

Note If the system requires a reboot for this change to take effect, you are prompted to do so when you exit the utility.

Setting Up Implicit Logouts on Rediscovery

The Use PLOGI instead of PDISC after LIP option determines whether the driver causes implicit logouts on a link failure. The driver defaults to causing implicit logouts and rediscovering using PLOGI.

1. Start the elxcfg utility. The Main window is displayed.
2. Locate the Adapter Controls section.

The screenshot shows the 'Adapter Controls' section of the elxcfg utility. It contains a list of 20 checkboxes and a static poll destination address field. The checkboxes are as follows:

- ☒ Automatically Map SCSI Devices
- ☒ Query name server for all N-Ports
- ☒ Allow Multiple paths to SCSI Targets
- ☒ Register For State Change
- ☒ Use Report LUNs
- ☐ Lun Mapping
- ☐ Automatic Lun Mapping
- ☐ Disable Target Reset for Tape Devices
- ☒ Use PLOGI instead of PDISC after LIP
- ☒ Scan in Device ID Order
- ☐ Enable Class 2 for SCSI Devices
- ☒ Report Unknown SCSI Devices
- ☐ Look for Disappearing Devices
- ☒ Translate Queue Full to Busy
- ☐ Use Bus Reset Status for Retries
- ☐ Retry Unit Attention
- ☐ Retry PLOGI Open Failures
- ☒ Enable FCP-2 Recovery
- ☐ Enable FDMI

Below the checkboxes is a section labeled 'Static Poll Destination Address'. It contains a large empty text box on the left, the label 'Address' in the middle, and a smaller empty text box on the right. Below the smaller text box is a button labeled 'Delete Address'.

3. Select or clear Use PLOGI instead of PDISC after LIP:
 - Selected - The driver causes implicit logouts with all devices on a link failure and rediscovered using PLOGI.

- Cleared - The driver does not cause implicit logouts and rediscovers using PDISC where applicable.

Note If FCP-2 recovery is enabled, ForcePLOGI should be set to 0 to maximize the value of setting FCTape.

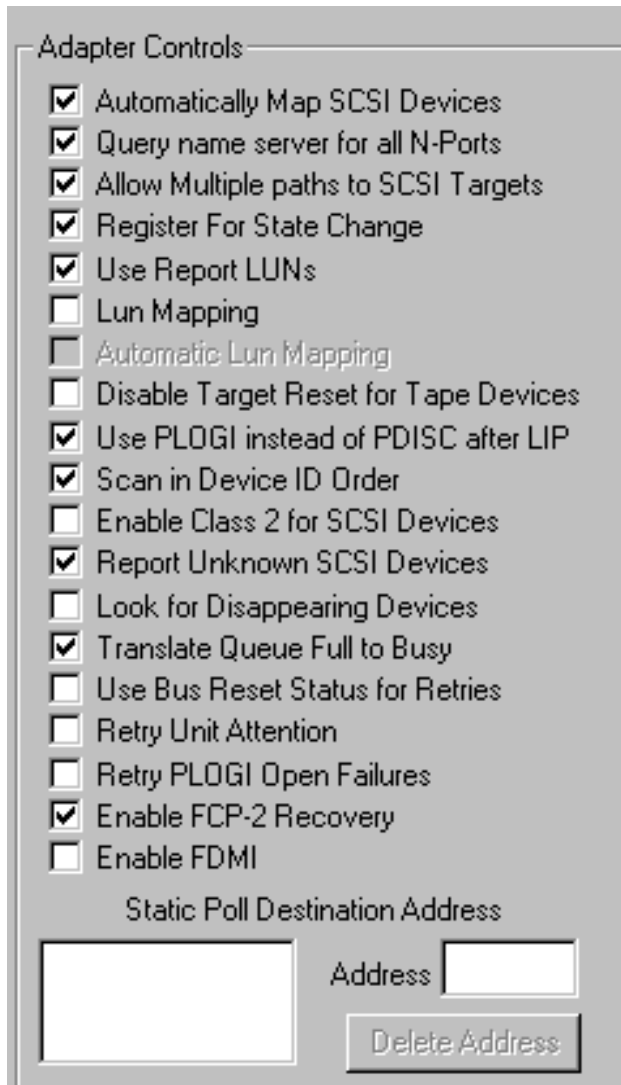
4. On the File menu, click Apply.

Note If the system requires a reboot for this change to take effect, you are prompted to do so when you exit the utility.

Changing the Scan of Device ID Order

The local loop defaults to being scanned from AL_PA 0xEF to AL_PA 0x01.

1. Start the elxcfg utility. The Main window is displayed.
2. Locate the Adapter Controls section.



3. Select or clear Scan in Device ID Order:
 - Selected - The local loop is scanned from AL_PA 0xEF to AL_PA 0x01. Also, the NT ID for automapped SCSI devices is the same as the device's device ID.

- Cleared - The local loop is scanned from AL_PA 0x01 to AL_PA 0xEF.

4. On the File menu, click Apply.

Note If the system requires a reboot for this change to take effect, you are prompted to do so when you exit the utility.

Enabling Class 2 for SCSI Devices

Class 2 provides a frame switched service with confirmed delivery or notification of nondelivery. The driver defaults to using Class 3 when communicating with all SCSI devices. Class 3 provides a frame switched service similar to Class 2, but without notification of frame delivery or non-delivery.

1. Start the elxcfg utility. The Main window is displayed.
2. Locate the Adapter Controls section.

Adapter Controls

- ☒ Automatically Map SCSI Devices
- ☒ Query name server for all N-Ports
- ☒ Allow Multiple paths to SCSI Targets
- ☒ Register For State Change
- ☒ Use Report LUNs
- ☐ Lun Mapping
- ☐ Automatic Lun Mapping
- ☐ Disable Target Reset for Tape Devices
- ☒ Use PLOGI instead of PDISC after LIP
- ☒ Scan in Device ID Order
- ☐ Enable Class 2 for SCSI Devices
- ☒ Report Unknown SCSI Devices
- ☐ Look for Disappearing Devices
- ☒ Translate Queue Full to Busy
- ☐ Use Bus Reset Status for Retries
- ☐ Retry Unit Attention
- ☐ Retry PLOGI Open Failures
- ☒ Enable FCP-2 Recovery
- ☐ Enable FDMI

Static Poll Destination Address

Address

3. Select or clear Enable Class 2 for SCSI Devices:
 - Selected - If the target device indicates Class 2 capability in the PLOGI

Accept, the driver may use Class 2 for communicating with the device.

- Cleared - The driver uses Class 3 to communicate with all SCSI devices.

4. On the File menu, click Apply.

A reboot is required for this change to take effect.

Reporting Unknown SCSI Devices

1. Start the elxcfg utility. The Main window is displayed.
2. Locate the Adapter Controls section.

Adapter Controls

- ☒ Automatically Map SCSI Devices
- ☒ Query name server for all N-Ports
- ☒ Allow Multiple paths to SCSI Targets
- ☒ Register For State Change
- ☒ Use Report LUNs
- ☐ Lun Mapping
- ☐ Automatic Lun Mapping
- ☐ Disable Target Reset for Tape Devices
- ☒ Use PLOGI instead of PDISC after LIP
- ☒ Scan in Device ID Order
- ☐ Enable Class 2 for SCSI Devices
- ☒ Report Unknown SCSI Devices
- ☐ Look for Disappearing Devices
- ☒ Translate Queue Full to Busy
- ☐ Use Bus Reset Status for Retries
- ☐ Retry Unit Attention
- ☐ Retry PLOGI Open Failures
- ☒ Enable FCP-2 Recovery
- ☐ Enable FDMI

Static Poll Destination Address

Address

3. Select or clear Report Unknown SCSI Devices:
 - Selected - The driver makes available to upper level drivers all devices that have a Peripheral Qualifier value of 0 or 1.
 - Cleared - Only devices with a Peripheral Qualifier of 0 are made available to upper level drivers.

4. On the File menu, click Apply.

Note If the system requires a reboot for this change to take effect, you are prompted to do so when you exit the utility.

Looking for Disappearing Devices

Look for Disappearing Devices determines whether the driver detects a target that disappears and then "quietly" reappears. A target "quietly" reappears when no loop initialization primitive sequence (LIP) occurs for a device on a loop, or no registered state change notification (RSCN) is issued for a device on a switch. For example, a smart hub has put a port on bypass without generating an LIP. If the device encounters an error that causes it to be removed from the available devices list in the driver, and then the hub removes the bypass, the device is rediscovered if Look for Disappearing Devices is selected.

The driver defaults to not detecting these targets.

1. Start the elxcfg utility. The Main window is displayed.
2. Locate the Adapter Controls section.

Adapter Controls

- ☒ Automatically Map SCSI Devices
- ☒ Query name server for all N-Ports
- ☒ Allow Multiple paths to SCSI Targets
- ☒ Register For State Change
- ☒ Use Report LUNs
- ☐ Lun Mapping
- ☐ Automatic Lun Mapping
- ☐ Disable Target Reset for Tape Devices
- ☒ Use PLOGI instead of PDISC after LIP
- ☒ Scan in Device ID Order
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- ☐ Look for Disappearing Devices
- ☒ Translate Queue Full to Busy
- ☐ Use Bus Reset Status for Retries
- ☐ Retry Unit Attention
- ☐ Retry PLOGI Open Failures
- ☒ Enable FCP-2 Recovery
- ☐ Enable FDMI

Static Poll Destination Address

Address

3. Select or clear Look for Disappearing Devices:

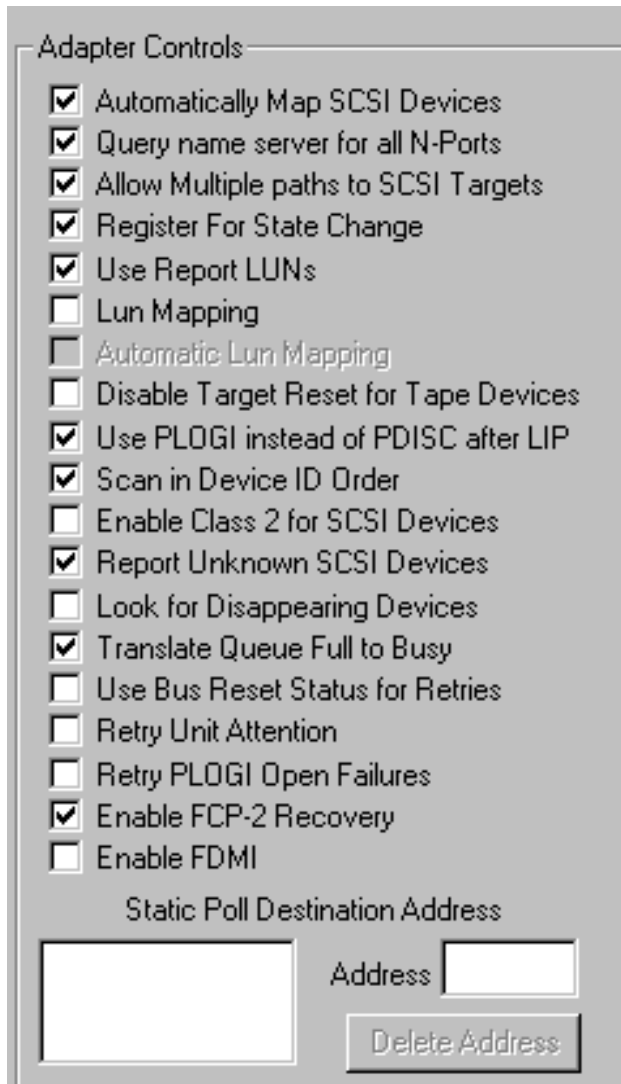
- Selected - After a device disappears, the driver polls the Fibre Channel address of the device periodically to see if it has reappeared.
- Cleared - After a device disappears and then "quietly" reappears, it is not detected. A device reappears only if an LIP, a link failure and restoration, or an RSCN is received.

4. On the File menu, click Apply.

Note If the system requires a reboot for this change to take effect, you are prompted to do so when you exit the utility.

Translating Queue Full to Busy

1. Start the elxcfg utility. The Main window is displayed.
2. Locate the Adapter Controls section.



Adapter Controls

- ☒ Automatically Map SCSI Devices
- ☒ Query name server for all N-Ports
- ☒ Allow Multiple paths to SCSI Targets
- ☒ Register For State Change
- ☒ Use Report LUNs
- ☐ Lun Mapping
- ☐ Automatic Lun Mapping
- ☐ Disable Target Reset for Tape Devices
- ☒ Use PLOGI instead of PDISC after LIP
- ☒ Scan in Device ID Order
- ☐ Enable Class 2 for SCSI Devices
- ☒ Report Unknown SCSI Devices
- ☐ Look for Disappearing Devices
- ☒ Translate Queue Full to Busy
- ☐ Use Bus Reset Status for Retries
- ☐ Retry Unit Attention
- ☐ Retry PLOGI Open Failures
- ☒ Enable FCP-2 Recovery
- ☐ Enable FDMI

Static Poll Destination Address

Address

3. Select or clear Translate Queue Full to Busy:
 - Selected - Translates SCSI Queue Full status to SCSI Busy status to work around a behavior of the disk class driver.
 - Cleared - Translation is not performed and SCSI Queue Full status is returned.

4. On the File menu, click Apply.

Note If the system requires a reboot for this change to take effect, you are prompted to do so when you exit the utility.

Using Bus Reset Status for Retries

1. Start the elxcfg utility. The Main window is displayed.
2. Locate the Adapter Controls section.

Adapter Controls

- ☒ Automatically Map SCSI Devices
- ☒ Query name server for all N-Ports
- ☒ Allow Multiple paths to SCSI Targets
- ☒ Register For State Change
- ☒ Use Report LUNs
- ☐ Lun Mapping
- ☐ Automatic Lun Mapping
- ☐ Disable Target Reset for Tape Devices
- ☒ Use PLOGI instead of PDISC after LIP
- ☒ Scan in Device ID Order
- ☐ Enable Class 2 for SCSI Devices
- ☒ Report Unknown SCSI Devices
- ☐ Look for Disappearing Devices
- ☒ Translate Queue Full to Busy
- ☐ Use Bus Reset Status for Retries
- ☐ Retry Unit Attention
- ☐ Retry PLOGI Open Failures
- ☒ Enable FCP-2 Recovery
- ☐ Enable FDMI

Static Poll Destination Address

Address

3. Select or clear Use Bus Reset Status for Retries:
 - Selected - Driver does not retry commands internally. Instead, commands to be retried are returned to the caller with `SRB_STATUS_BUS_RESET` status. This normally results in a command retry.
 - Cleared - Driver retries commands internally.

4. On the File menu, click Apply.

Note If the system requires a reboot for this change to take effect, you are prompted to do so when you exit the utility.

Retrying Unit Attention Errors

1. Start the elxcfg utility. The Main window is displayed.
2. Locate the Adapter Controls section.

Adapter Controls

- ☒ Automatically Map SCSI Devices
- ☒ Query name server for all N-Ports
- ☒ Allow Multiple paths to SCSI Targets
- ☒ Register For State Change
- ☒ Use Report LUNs
- ☐ Lun Mapping
- ☐ Automatic Lun Mapping
- ☐ Disable Target Reset for Tape Devices
- ☒ Use PLOGI instead of PDISC after LIP
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- ☒ Report Unknown SCSI Devices
- ☐ Look for Disappearing Devices
- ☒ Translate Queue Full to Busy
- ☐ Use Bus Reset Status for Retries
- ☐ Retry Unit Attention
- ☐ Retry PLOGI Open Failures
- ☒ Enable FCP-2 Recovery
- ☐ Enable FDMI

Static Poll Destination Address

Address

3. Select or clear Retry Unit Attention:
 - Selected - The driver retries unit attention errors.
 - Cleared - The driver does not retry commands internally.
4. On the File menu, click Apply.

Note If the system requires a reboot for this change to take effect, you are prompted to do so when you exit the utility.

Retrying PLOGI Open Failures

This parameter is a workaround for some loops with targets that do not respond to OPN (x, y) soon after loop initialization is complete. By default, the driver retries PLOGIs that fail with an open failure error [the device did not respond to OPN(x,y)].

1. Start the elxcfg utility. The Main window is displayed.
2. Locate the Adapter Controls section.

Adapter Controls

- ☒ Automatically Map SCSI Devices
- ☒ Query name server for all N-Ports
- ☒ Allow Multiple paths to SCSI Targets
- ☒ Register For State Change
- ☒ Use Report LUNs
- ☐ Lun Mapping
- ☐ Automatic Lun Mapping
- ☐ Disable Target Reset for Tape Devices
- ☒ Use PLOGI instead of PDISC after LIP
- ☒ Scan in Device ID Order
- ☐ Enable Class 2 for SCSI Devices
- ☒ Report Unknown SCSI Devices
- ☐ Look for Disappearing Devices
- ☒ Translate Queue Full to Busy
- ☐ Use Bus Reset Status for Retries
- ☐ Retry Unit Attention
- ☐ Retry PLOGI Open Failures
- ☒ Enable FCP-2 Recovery
- ☐ Enable FDMI

Static Poll Destination Address

	Address	
	Delete Address	

3. Select or clear Retry PLOGI Open Failures:

- Selected - the driver retries PLOGIs that fail with an open failure error [the device did not respond to OPN(x,y)]. If a PLOGI completes with an open failure (loop only), then the PLOGI is retried up to three times.
- Cleared - The driver does not retry PLOGIs.

4. On the File menu, click Apply.

Note If the system requires a reboot for this change to take effect, you are prompted to do so when you exit the utility.

Enabling FCP-2 Recovery

The Enable FCP-2 Recovery option enables FCP-2 sequence level error recovery. If the target is capable and requests recovery, the firmware can perform FCP-2 recovery.

This feature defaults to being enabled.

Note For this option to be most effective, the "Use PLOGI instead of PDISC after LIP" option should be cleared.

1. Start the elxcfg utility. The Main window is displayed.
2. Locate the Adapter Controls section.

Adapter Controls

- ☒ Automatically Map SCSI Devices
- ☒ Query name server for all N-Ports
- ☒ Allow Multiple paths to SCSI Targets
- ☒ Register For State Change
- ☒ Use Report LUNs
- ☐ Lun Mapping
- ☐ Automatic Lun Mapping
- ☐ Disable Target Reset for Tape Devices
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- ☒ Scan in Device ID Order
- ☐ Enable Class 2 for SCSI Devices
- ☒ Report Unknown SCSI Devices
- ☐ Look for Disappearing Devices
- ☒ Translate Queue Full to Busy
- ☐ Use Bus Reset Status for Retries
- ☐ Retry Unit Attention
- ☐ Retry PLOGI Open Failures
- ☒ Enable FCP-2 Recovery
- ☐ Enable FDMI

Static Poll Destination Address

Address

3. Select or clear Enable FCP-2 Recovery:

- Selected - Allows the use of the FCP-2 exchange error recovery protocol with SCSI targets that support the protocol.
- Cleared - FCP-2 exchange error recovery protocol is not allowed.

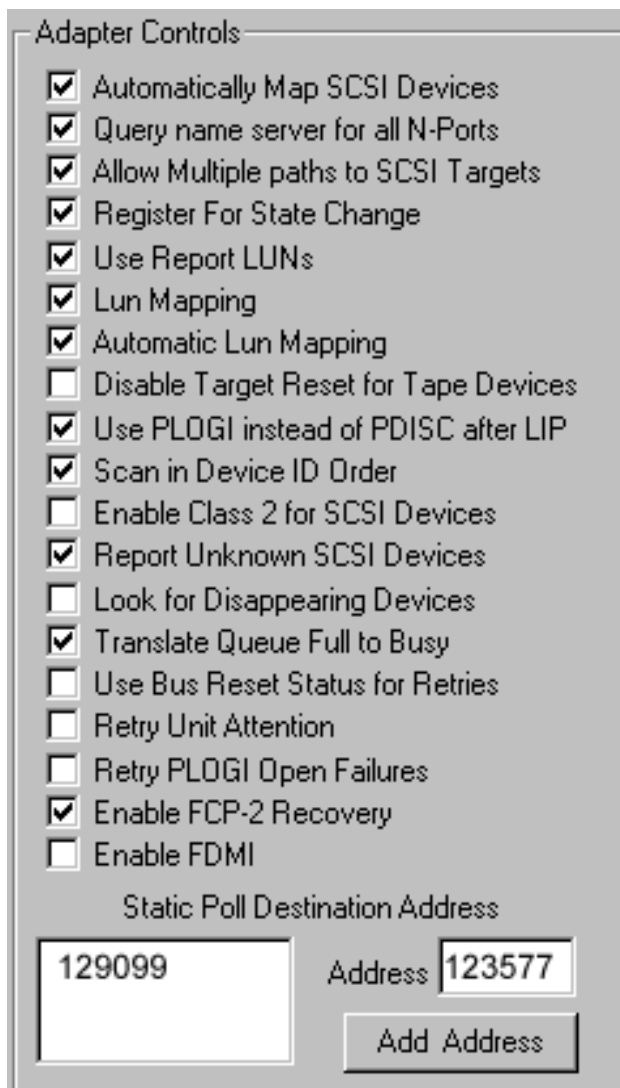
4. On the File menu, click Apply.

Note If the system requires a reboot for this change to take effect, you are prompted to do so when you exit the utility.

Setting Up Static Poll Destination

The Static Poll Destination Address lists a 24-bit Fibre Channel address that is polled for devices when the adapter boots.

1. Start the elxcfg utility. The Main window is displayed.
2. Locate the Adapter Controls section.



3. Enter the six hexadecimal digits of the Fibre Channel address in the Address box.
4. Click the Add Address button. The number appears in the left box.
5. On the File menu, click Apply.

Note If the system requires a reboot for this change to take effect, you are prompted to do so when you exit the utility.

Enabling FDMI

The Fabric Device Management Interface (FDMI) enables the management of devices such as HBAs through the fabric. The driver accesses the HBA Management Service by the address x'FFFFFFA'. The driver registers the HBA attributes and the Port attributes during initialization if "Enable FDMI" is set.

This feature defaults to being disabled.

1. Start the elxcfg utility. The Main window is displayed.
2. Locate the Adapter Controls section.

Adapter Controls

- ☒ Automatically Map SCSI Devices
- ☒ Query name server for all N-Ports
- ☒ Allow Multiple paths to SCSI Targets
- ☒ Register For State Change
- ☒ Use Report LUNs
- ☐ Lun Mapping
- ☐ Automatic Lun Mapping
- ☐ Disable Target Reset for Tape Devices
- ☒ Use PLOGI instead of PDISC after LIP
- ☒ Scan in Device ID Order
- ☐ Enable Class 2 for SCSI Devices
- ☒ Report Unknown SCSI Devices
- ☐ Look for Disappearing Devices
- ☒ Translate Queue Full to Busy
- ☐ Use Bus Reset Status for Retries
- ☐ Retry Unit Attention
- ☐ Retry PLOGI Open Failures
- ☒ Enable FCP-2 Recovery
- ☐ Enable FDMI

Static Poll Destination Address

Address

3. Select or clear Enable FDMI:

- Selected - Enables the Fibre Device Management Interface.
- Cleared - Disables the Fibre Device Management Interface.

4. On the File menu, click Apply.

Note If the system requires a reboot for this change to take effect, you are prompted to do so when you exit the utility.

Windows Individual Adapter Parameters

The elxsl2 key represents keys for each adapter installed in the system. The keys are the electrical PCI bus number and slot number of the adapter. The electrical slot number may not match the mechanical slot number. Each of the global values may be overridden by using the same value name under the per adapter key. The following values are available under the individual adapter key.

DidPollList = n	A list of DWORDs representing a list of 3-byte Fibre Channel addresses to be checked during polling. Using the binary editor in the registry editor, these DWORDs must be entered in little-endian mode (for example, address 11 22 33 must be entered as 33 22 11 00) Default = <empty> Type: REG_BINARY
ffTraceMask = n	This value sets the trace mask on the HBA. The option value is 0 - 0xffffffff. If the PCI Print option is selected, the resulting messages are printed using KdPrint from inside the driver. Default = 0 Type: REG_DWORD
NameServerDelay = n	This value represents the number of milliseconds the driver waits before sending a name server request. This delay takes effect after a link failure/FLOGI or the receipt of an RSCN. The option value is 0 - 0xffffffff. Default = 0 Type: REG_DWORD
QuickFail = n	The option value is 0 - 0xffffffff. If QuickFail is set to 1, the wait ready time has to expire only once before I/Os are returned to the upper levels. Also, when QuickFail is set to 1, any devices not present in the name server data obtained after an RSCN are immediately marked as failed. This causes failover to occur more quickly. If QuickFail is set to 1, and the adapter is connected to a multi-switch fabric, the NameServerDelay value should be set to at least 800 milliseconds. Default = 0 Type: REG_DWORD

ScsiMap = n	A key that contains the map of World Wide Port names to SCSI IDs. Each value under this key binds one World Wide Port name to a single SCSI ID. Each value uses the 16-digit hexadecimal representation of the World Wide Port name as the value name. The value is the SCSI ID to which the World Wide Port name is mapped. Each value is of type REG_DWORD. Also contained in ScsiMap is the LUN mapping if LUN mapping is enabled. The value name for each LUN map is created from the World Wide Port name of the device. The value name is LunMappingXXXXXXXXXXXXXXXXXX, where XXXXXXXXXXXXXXXXXXXX is the 16-digit hexadecimal World Wide Port name of the target. The LunMapping value is of type REG_BINARY and is an array of Scsi Lun Mapping structures. The structure is defined as follows: <pre>typedef sliLunMap { LARGE_INTEGER FibreChannelLun; ULONG NtLun: 8; ULONG Disabled: 1; ULONG Present: 1; ULONG Pad: 22; } SLI_LUN_MAP, *PSLI_LUN_MAP;</pre>
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Windows Parameters

The table below lists parameters that can be changed, allowable range of values, and factory defaults. Some parameters can be changed using the Emulex Configuration Utility, elxcfg. These are noted in the following table.

Parameter	Definition	How to Change Using elxcfg
AllowAckO = 0xn	If set to 1, and the device supports class 2, this option allows the use of ACK_O for sequence acknowledgment. If set to 0, ACK_O is not allowed. Default = 0 Type: REG_DWORD	Not Applicable
AL_TOV = 0xn	This option sets the time, in milliseconds, to be used for the Arbitrated Loop Timeout Value. Default = 15 Type: REG_DWORD	Timer Settings window (from the Tuning menu, select Timers)
ARB_TOV = n	This option sets the time, in milliseconds, to be used for the Arbitration Timeout Value. Default = 1000 Type: REG_DWORD	Timer Settings window (from the Tuning menu, select Timers)
AttemptReEstablish = n	If set to 0, when a target disappears and then "quietly" reappears, it is not detected. A target has quietly reappeared when no LIP occurs for a device on a loop or no RSCN is issued for a device on a switch. If set to 1, after a device disappears, the driver polls the Fibre Channel address of the device periodically to see if it has reappeared. Default = 0 Type: REG_DWORD	Adapter Controls, Look for Disappearing Devices option
AutoMap = n	If set to 0, automapping of new SCSI devices is disabled. If set to 1, automapping may be disabled or enabled using the Configuration Utility (elxcfg). Default = 1 Type: REG_DWORD	Adapter Controls, Automatically Map SCSI Devices option.

BusResetForBreakRes = n (Windows Server 2003 and Windows 2000 only)	If set to 0, the driver will issue a target reset to a given target ID. If set to 1, the driver will issue a bus reset instead of a target reset when receiving an IOCTL_STORAGE_BREAK_RESERVATION_IOCTL. Default = 0 Type: REG_DWORD	Not Applicable
DriverTraceMask = n	This value represents a trace type and corresponding mask value. This value defaults to a global driver trace mask value of 0. If a driver trace mask value is set up for a host bus adapter or port in the system, this value will be reflected in this field. This bit mask has a number of available trace options. Trace data is written into the system event log and, if the debugger is connected, to the debugger window. Default = 0 Type: REG_DWORD	elxcfg main window, DriverTraceMask field
E_D_TOV = n	This option sets the time, in milliseconds, to be used for the Error Detect Timeout Value. Default = 1000 Type: REG_DWORD	Timer Settings window (from the Tuning menu, select Timers)
EnableHotPlug = n (Windows NT Only)	If set to 0, the Compaq Hot Plug PCI interface is not created by the driver. If set to 1, the Compaq Hot Plug PCI interface is exported by the driver. Default = 1 Type: REG_DWORD Note: The Compaq PCI Hot Plug interface is automatically configured when the driver is installed. This interface removes the Compaq PCI Hot Plug interface: EnableHotPlug=0	Not Applicable
EnableFDMI = n	This option enables the Fibre Device Management Interface (FDMI). If set to 1, the EnableFDMI feature is enabled. If set to 0, this feature is disabled. Default value: 0 Type: REG_DWORD	Adapter Controls, Enable FDMI option

FcTape = n	This option enables the FCP-2 sequence level error. If set to 1, the firmware is enabled to perform FCP-2 recovery if the target is capable and requests recovery. If set to 0, the firmware does not perform FCP-2 recovery. In order to maximize the value of setting FcTape to 1, ForcePlogi should be set to 0. Default = 1 Type: REG_DWORD	Adapter Controls, Enable FCP-2 Recovery option
ForcePlogi= n	If set to a value other than zero, the driver causes implicit logouts with all devices on a link failure and rediscovers using PLOGI. If this value is set to 0, the driver does not cause implicit logouts and rediscovers using PDISC where applicable. Default = 1 Type: REG_DWORD	Adapter Controls, Use PLOGI instead of PDISC after LIP option
InitLinkFlags = n	The InitLinkFlags option is divided into several fields. Bits 1 to 3 are the initialization type. If bits 1 to 3 are 000, the link is initialized as Arbitrated Loop. If bits 1 to 3 are 010, the link is initialized as point-to-point. The presence of a fabric is automatically detected in either case. Bit 23, if set, indicates the adapter should attempt the other topology type if the first selection fails to initialize. This option is available only with firmware that supports this option. Bits 24 to 31 are the encoded speed value. If bits 24 to 31 are 0x00, the link speed is discovered automatically. If bits 24 to 31 are 0x01, the link speed is forced to 1 gigabit per second. If bits 24 to 31 are 0x02, the link speed is forced to 2 gigabits per second. This option is available only with adapters that support more than one link speed. Default = 0 Type: REG_DWORD	For topology: Select Configuration window (from the Configuration menu, select Set) For link speed: Select Link Control Parameters window (from the Timing menu, select Link Control)

InterruptCoalesce = n	This option is a combination of fields. The first field consists of bits 0 to 7, which is the number of I/Os that should complete before an interrupt occurs. Bits 8 to 14 are the number of milliseconds that expire before an interrupt is generated if some I/Os complete, but less than the number of I/Os specified in bits 0 to 7. This option is meaningful only with firmware version 3.0 or later. Default = 0 Type: REG_DWORD	Performance Parameters window (from the Tuning menu, select Performance)
losPerInterrupt = n	This is the maximum number of I/Os the driver completes in a single interrupt. This option may be changed to achieve an overall system fairness. Default = 128 Type: REG_DWORD	Performance Parameters window (from the Tuning menu, select Performance)
LinkDownTimer = n	LinkDownTimer is the number of seconds the driver waits after detecting a link down condition before I/O is returned with an error. If the link is restored before the LinkDownTimer expires, the I/O continues with no error condition. Default = 30 seconds Type: REG_DWORD	Timer Settings window (from the Tuning menu, select Timers)
MapLuns = n	If set to 0, each LUN is addressed without any address translation. If set to 1, LUN mapping is enabled, and each LUN number is translated to a 64-bit Fibre Channel LUN. For new LUNs, this mapping is performed automatically by the driver. If the report LUNs command is supported by the target, the first 256 LUNs reported may be used by the operating system. If the value is 2, LUN mapping is enabled, but the driver does not automatically map LUNs. Default = 0 Type: REG_DWORD	Adapter Controls, LUN Mapping option and Automatic LUN Mapping option
MaximumLun = n	This option represents the maximum number of LUNs to probe for during device discovery. Default = 32 Type: REG_DWORD	elxcfg main window, Maximum Number of LUNs field

MaximumQueueDepth = n	This option represents the maximum number of SCSI commands that may be issued to a single LUN before one of the commands must complete. Default = 8 Type: REG_DWORD	elxcfg main window, Maximum Queue Depth field
MultipleScsiClaims = n	If set to 1, the driver reports each SCSI device for every port to which it is connected. If set to 0, the driver reports the SCSI device only on the first port to which it is connected. Default = 0 Type: REG_DWORD	Adapter Controls, Allow Multiple SCSI Path to SCSI Targets option
Network = n	This option contains two single-bit fields and one 16-bit integer. Bit 31 is the Network Enable bit for the port. If the Network Enable bit is set, then the network driver can bind to this port. If the Network Enable bit is not set, then the network driver cannot bind to this port. Bit 30 is the Class of Service bit. If the Class of Service bit is set, network traffic uses Class 2. If the Class of Service bit is not set, network traffic uses Class 3. Bits 15 to 0 are the MTU to use for this network connection. Default = 1514 (Network Disabled, Class 3, MTU = 1514 bytes) Type: REG_DWORD	Network Configuration window (from the Tools menu, select Networking), Adapter Controls, Enable Class 2 for SCSI Devices option
NodeId = n	The NodeId is a 32-bit quantity that is used with a fixed 32-bit value to create a World Wide Node name for the entire system. The created World Wide Node name has the value of 0x50000c90xxxxxxx, where xxxxxxxx is the 32-bit value contained by the NodeId value. It is up to the assignor of the NodeId to ensure the uniqueness on a single Fibre Channel fabric. If the value is 0, or the value is not present in the registry, the Node World Wide name is derived from NVRAM on the adapter. Default = 0 Type: REG_DWORD	Not Applicable
NsQueryAll = n	If set to 1, the driver requests all N-Ports connected to the fabric from the name server. If set to 0, the driver requests only registered SCSI FCP devices. Default = 1 Type: REG_DWORD	Adapter Controls, Query name server for all N-Ports option

QuickFail = n	QuickFail is useful in redundant path setups. When QuickFail is a value other than zero, the I/O returns with an error as soon as the WaitReadyTimeVal expires the first time. Also, if a node is not present in the Name Server response after an RSCN, the node is immediately marked offline and I/O is returned. If set to 0, the driver sends a PLOGI after the initial WaitReadyTimeVal expiration and waits one additional WaitReadyTimeVal before returning I/O with an error. Default = 0 Type: REG_DWORD	Not Applicable
RA_TOV = n	This option is the time, in seconds, for the Resource Allocation Timeout Value. Default = 2 Type: REG_DWORD	Timer Settings window (from the Tuning menu, select Timers)
RegisterForStateChange = n	If set to 1, the driver registers for RSCN state change notifications if a fabric is present. If set to 0, the driver does not register for the RSCN state change notifications. Default = 1 Type: REG_DWORD	Adapter Controls, Register for State Change option
RetryAttempts =n	This option is the number of times the driver retries a command completing with a retryable status before returning the status to the caller. Default = 64 Type: REG_DWORD	Not Applicable
RetryPlogiOpenFailures = n	If this option is other than 0, the driver retries PLOGIs that fail with an open failure up to three times. If this value is set to 0, a PLOGI that fails with an open failure is an indication that no device is present. This has meaning only for private loop and local loop devices. Default = 0 Type: REG_DWORD	Adapter Controls, Retry PLOGI Open Failures option
RetryTimer = n	This option is the time, in milliseconds, the driver waits before retrying a command. Default = 2000 Type: REG_DWORD	Timer Settings window (from the Tuning menu, select Timers)

RetryUnitAttention = n	If set to 1, the driver retries commands that complete with Unit Attention status. If set to 0, the driver completes the command with appropriate status. Default = 0 Type: REG_DWORD	Adapter Controls, Retry Unit Attention option
ScanDeviceIdOrder = n	If set to 0, the local loop is scanned from AL_PA 0x01 to AL_PA 0xEF. If 1, the local loop is scanned from 0xEF to 0. Also, if 1, the ID for automapped SCSI devices is the same as the device's ID. Default = 1 Type: REG_DWORD	Adapter Controls, Scan in Device ID Order option
ShowUnknowns = n	If set to 0, only LUNs with a Peripheral Qualifier of 0 are reported in the Inquiry buffer. If set to 1, the LUNs with a Peripheral Qualifier of 0 or 1 are reported in the Inquiry buffer. Default = 0 Type: REG_DWORD	Adapter Controls, Report Unknown SCSI Devices option
TranslateQueueFull = n	If set to 1, the driver translates SCSI Queue Full status to SCSI Busy status (to work around a behavior of the disk class driver). If set to 0, the driver does not translate the status. Default = 0 Type: REG_DWORD	Adapter Controls, Translate Queue Full to Busy option
TapeResetMask = n	If set to 1, the driver does not send the Target Reset command to tape drives and media changes in response to the Emulex driver receiving a SCSI Bus Reset command. If set to 0, the Target Reset command is sent. Default = 0 Type: REG_DWORD	Adapter Controls, Disable Target Reset for Tape device option
UseReportLuns = n	If set to 1, the driver uses the SCSI Report LUNs command to determine the presence of LUNs on SCSI devices. If set to 0, the driver polls up to the number of LUNs configured with the MaximumLun configuration option. Default = 0 Type: REG_DWORD	Adapter Controls, Use Report LUNs option

UseResetForRetry = n	If set to 0, the driver retries commands internally. If set to 1, the driver does not retry commands internally. Instead, commands to be retried are returned to the caller with SRB_STATUS_BUS_RESET status. This normally results in a command retry. Default = 0 Type: REG_DWORD	Adapter Controls, Use Bus Reset Status for Retries option
UseTargetReset = n	If set to 1, the driver uses the task management function target reset to emulate a SCSI bus reset. If set to 0, the driver uses TPRLO. Default = 1 Type: REG_DWORD	Not Applicable
UniqueNodeWwns = n	If set to 1, the driver uses the Node World Wide name stored in the NVRAM of each adapter. If set to 0, the driver uses the Node World Wide name of the first adapter found for the the Node World Wide name of all adapters. If NodeId is a value other than zero, this option has no meaning. Default = 1 Type: REG_DWORD	Not Applicable
WaitReadyTimeVal = n	This option is the time, in seconds, the driver waits for a device to become available before commands to the device are returned with SCSI selection timeout errors. If this value is -1, then the timer value uses 2 * R_A_TOV. If the timer value is 0, then the driver waits forever for the target to become available. Default = -1 Type: REG_DWORD	Timer Settings window (from the Tuning menu, select Timers)

Driver Trace Mask Message Table

The following is a list of trace types and the mask values. It is possible to bitwise OR two or more trace types.

Trace Type	Mask Value	Description
SLI_TRACE_MAILBOX	0x00000001	Internal Emulex trace messages for mailbox status to HBA
SLI_TRACE_SCSI_ERR	0x00000002	All SCSI informational status. Most of the string ends with multiple values in the following order: TargetId, Lun, SrbStatus and ScsiStatus
SLI_TRACE_IOTAGS	0x00000004	Internal Emulex trace messages for I/Os
SLI_TRACE_IOCB	0x00000008	Internal Emulex trace messages for Input/Output Control Block (IOCB)
SLI_TRACE_FABRIC	0x00000010	Trace message between the fabric and the node. Messages include login/out, Name server, etc.
SLI_TRACE_SCSI_MAPPING	0x00000020	SCSI mapping status includes SCSI LUN mapping
SLI_TRACE_INIT	0x00000040	Trace messages during startup and initialization
SLI_TRACE_IOCTL	0x00000080	Trace messages for the I/O control (IOCTL)
SLI_TRACE_SCSI_RESET	0x00000100	Trace messages when a SCSI reset occurs
SLI_TRACE_LOGIN	0x00000200	Trace messages during a logon process
SLI_TRACE_NET_XMIT	0x00000400	Trace messages for startup and transmitting of IP protocol
SLI_TRACE_NET_RECV	0x00000800	Trace messages for receiving IP protocol
SLI_TRACE_WAIT_READY	0x00001000	Status for wait queue including timeout and resetting
SLI_TRACE_RECV_ELS	0x00002000	Internal information on ELS receive status
SLI_TRACE_DOWNLOAD	0x00004000	Status and information on firmware download to HBA

SLI_TRACE_PRLI	0x00008000	Trace messages for port login
SLI_TRACE_REPORT_LUNS	0x00010000	Status on SCSI LUN reporting
SLI_TRACE_ENTRIES	0x00020000	Information on nodes entries includes create, close, cleanup, etc.
SLI_TRACE_ELS_ERRORS	0x00040000	Internal information and status on ELS command
SLI_TRACE_PNP	0x00080000	Trace messages on PNP includes BusRelations, QUERY_CAPABILITES, etc.
SLI_TRACE_POWER	0x00100000	Trace messages on system power status
SLI_TRACE_SCSI_EXC	0x00200000	Status on SRB exception with the following values in this order: TargetId, Lun, SrbStatus and ScsiStatus
SLI_TRACE_UNSUPPORTED	0x00400000	Information on unsupported IRP and PNP requests
SLI_TRACE_LOGO	0x00800000	Information on Port logon
SLI_TRACE_FARP	0x01000000	Trace messages on FARP
SLI_TRACE_PASS_THROUGH	0x02000000	Information and status on SCSI passthrough
SLI_TRACE_RNID	0x04000000	Information on sending RNID
SLI_TRACE_NSAPI	0x08000000	Information and status NSAPI

Set Driver Parameters Using HBAnyware

The Driver Parameters tab allows you to modify driver parameters either for an individual adapter or for all adapters, with the same single driver type and version, that are in one host.

For example, if you set driver parameters on a host that includes two adapters with the SCSIport Miniport driver installed, you can make changes to the driver parameters for both adapters simultaneously.

For each parameter, the tab displays the current value, the range of acceptable values, the default value, and whether the parameter is dynamic (a dynamic parameter allows the change to take effect without restarting the HBA or rebooting the system).

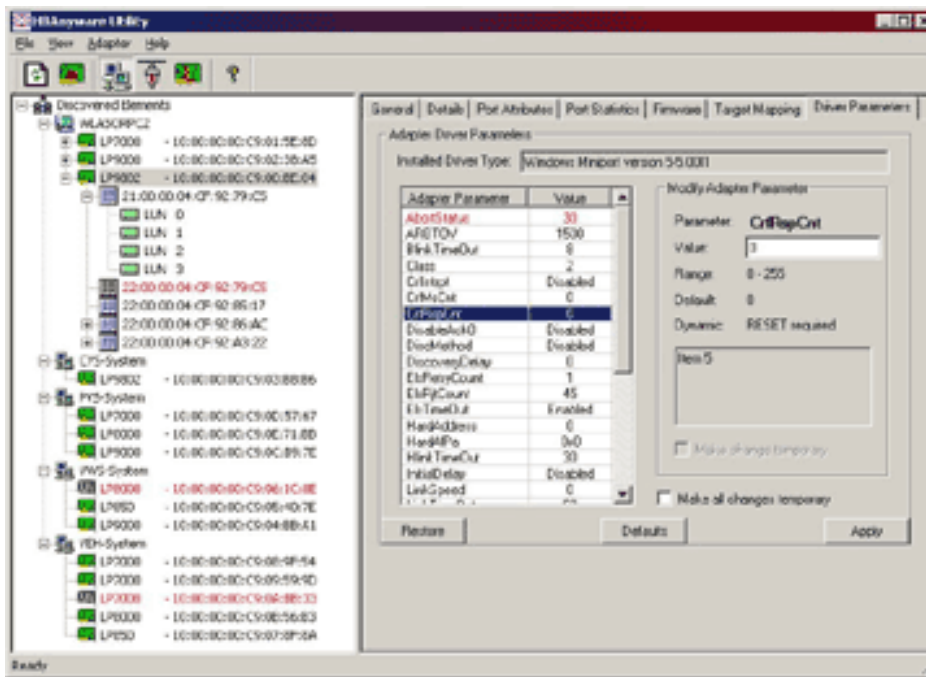
This page contains instructions for the following:

- View Driver Parameters for an Adapter
- View Driver Parameters for a Host
- Change a Parameter's Value
- Restore Parameters to Their Earlier Values
- Reset All Default Values

View Driver Parameters for an Adapter

To display the driver parameters for an adapter, do the following:

1. Start HBAnyware.
2. Do one of the following:
 - From the menu bar, click View, then click Sort by Host Name.
 - From the toolbar, click the  button.
3. In the discovery tree, click the adapter for which you want to change a parameter. The General tab is displayed.
4. Click the Driver Parameters tab. The Installed Driver Types field displays the driver that is installed on the adapter.

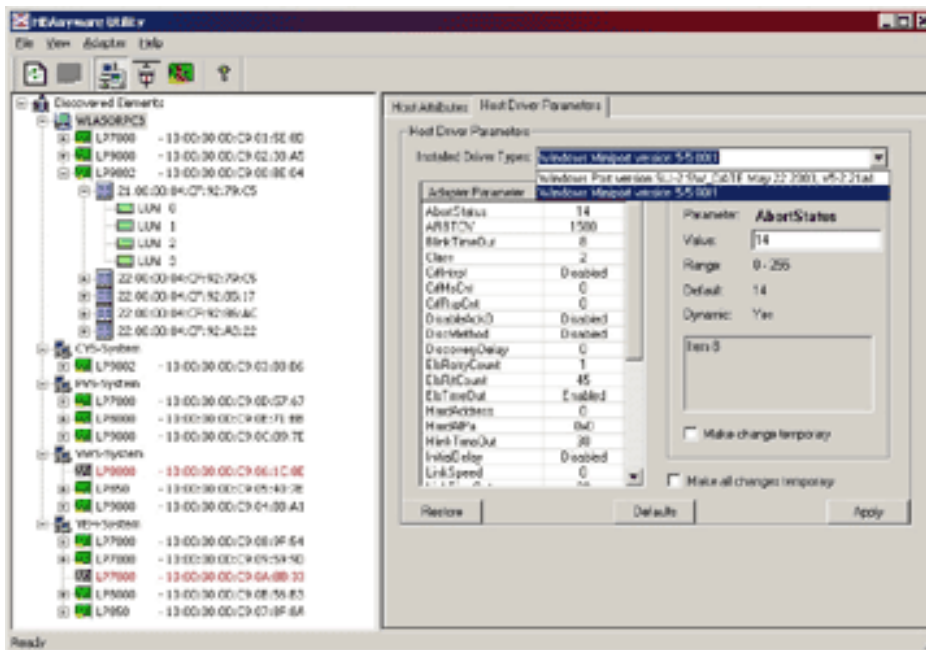


Note The illustration above is an example. The driver parameters you see may be different, depending on the installed driver.

View Driver Parameters for a Host

To display the driver parameters for a host, do the following:

1. Start HBAAnyware.
2. Do one of the following:
 - From the menu bar, click View, then click Sort by Host Name.
 - From the toolbar, click the  button.
3. In the discovery tree, click the host for which you want to change a parameter. The Host Attributes tab is displayed.
4. Click the Host Driver Parameters tab. The Installed Driver Types drop-down box displays a list of all driver types and driver versions that are installed on the adapters in the host. Click the driver for which you want to make changes.



Note The illustration above is an example. The driver parameters you see may be different, depending on the installed driver.

Change a Parameter's Value

After you follow the appropriate procedure to display the host or adapter parameter tab, do the following to change a parameter's value:

1. In the driver parameters tab, click the parameter that you want to change. Information about the parameter appears on the right side of the screen.
2. Enter a new value in the Value field. You must enter values in decimal or hexadecimal format, depending on how the current value is presented. If the value is in hexadecimal format, it is prefaced by "0x", for example 0x2d, and if you change the value you must enter it in hexadecimal format.
3. If you want the change to be temporary (causing the parameter to revert to its last permanent setting when the system is rebooted), check the "Make change temporary" box. This option is available only for dynamic parameters.
4. If you are making changes to multiple parameters, and you want all the changes to be temporary, check the "Make all changes temporary" box. This setting overrides the setting of the "Make change temporary" box. Only dynamic parameters can be made temporary.

5. To apply your changes, click Apply.

Restore All Parameters to Their Earlier Values

If you have made changes to parameters and have not saved them by clicking Apply, and you want to restore the parameters to their last saved values, click Restore.

Reset All Default Values

If you want to reset all parameter values to their default (out-of-box) values, click Defaults.

Update Firmware - Introduction

You can update firmware using either elxcfg or HBAnyware.

- elxcfg allows you to update firmware on local HBAs only.
- HBAnyware allows you to update firmware on remote and local HBAs.

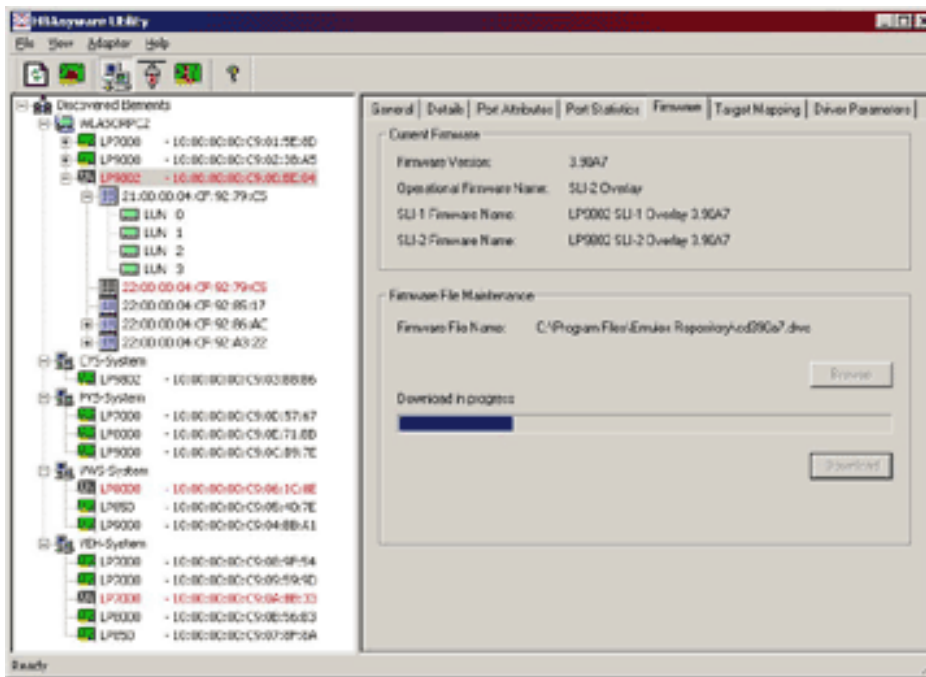
Load Firmware Using HBAnyware

Prerequisites

- One of the following drivers is installed properly:
 - SCSIport Miniport driver for Windows Server 2003, Windows 2000 or Windows NT
 - Storport Miniport driver for Windows Server 2003
 - FC Port driver for Windows Server 2003, Windows 2000 or Windows NT
 - Emulex driver for Solaris
 - Emulex driver for Linux
- HBAnyware has been installed properly.
- The firmware file has been downloaded from the Emulex Web site to the Emulex Repository folder (RMRepository). This folder is in the Program Files folder.
- The firmware file has been extracted into the Emulex Repository folder.

Loading Procedure

1. Start HBAnyware.
2. In the discovery tree (left pane), click the adapter to which you want to load the firmware.
3. In the property tabs (right pane), select the Firmware tab.



4. On the Firmware tab, click the Browse button. The Select Firmware File browse window is displayed.
5. Browse to the Emulex Repository. Select the firmware file to download and click OK. A status bar displays the progress of the download. During this time the host bus adapter (or adapters) in the discovery tree is displayed in red text, indicating that it is offline. It is displayed in black text when the update is complete.

If you are updating the firmware on a dual-channel HBA, repeat steps 2 through 5 to update the firmware on the second port.

Current Firmware Field Descriptions

Firmware Version - the Emulex firmware version number for this model of HBA.

Operational Firmware Name - if visible, the name of the firmware that is operational.

SLI-1 Firmware Name - the name of the SLI-1 firmware overlay.

SLI-2 Firmware Name - the name of the SLI-2 firmware overlay.

Note If the state of the boot code message on the board has changed, this change will be reflected immediately on the Details tab.

Updating Firmware

Prerequisites

- The FC Port driver for Windows Server 2003, Windows 2000 or Windows NT is installed.
- elxcfg version 1.41a10 or later is installed.
- The firmware file has been downloaded to a local drive.

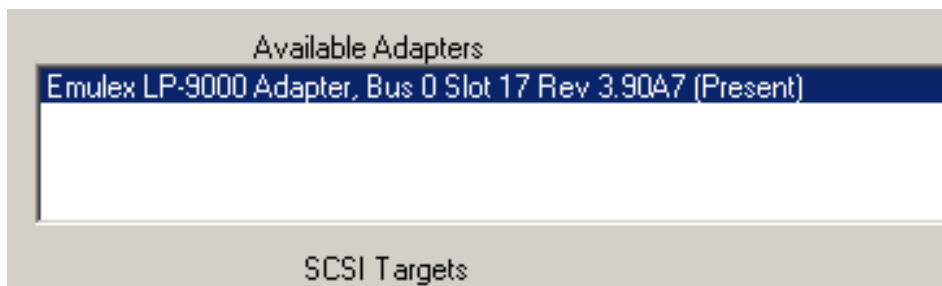
Procedure

This procedure uses the elxcfg utility.

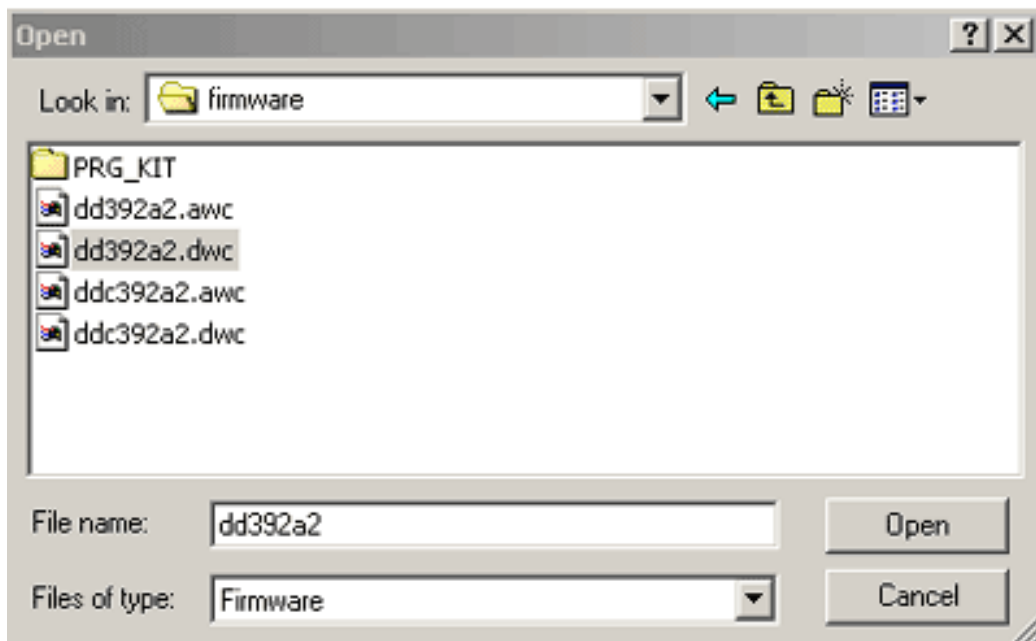
Caution Using the Emulex Configuration Tool to change the adapter firmware to an earlier version may cause the system to lock or devices connected to the adapter to become unavailable. If this happens, reboot the system.

Firmware versions differ between adapter versions. Make sure you have downloaded the appropriate firmware for your adapter.

1. Start the elxcfg utility. The Main window is displayed.
2. Select an adapter from the Available Adapters list.

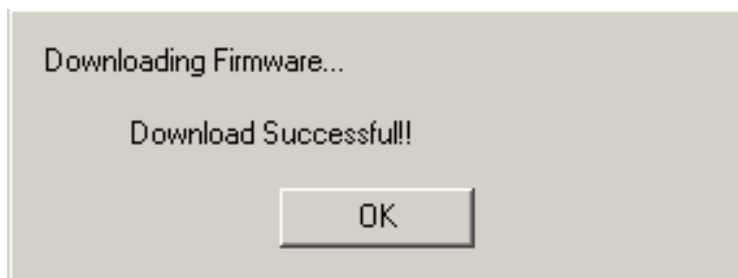


3. Select Download Firmware from the Tools menu. A browse window is displayed.
4. Browse and select the firmware file. In the following example, the .dwc and .awc files have been saved in a firmware file created on the local directory:



5. Click Open.

Firmware is verified and downloaded, and the following confirmation window is displayed.



If you are updating the firmware on a dual-channel HBA, repeat steps 2 through 5 to update the firmware on the second port.

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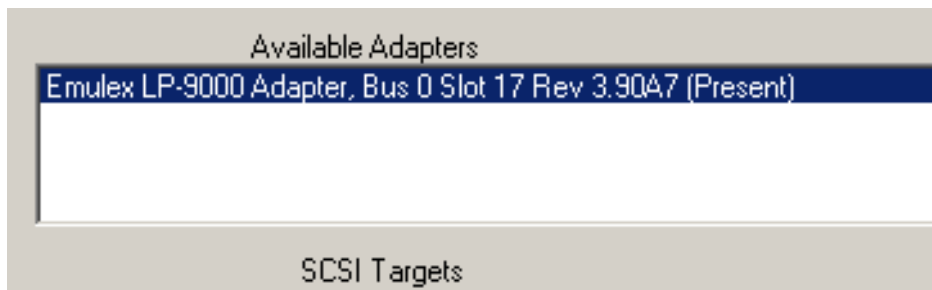
Updating x86 BootBIOS

Prerequisites

- One of the following drivers is installed properly:
 - FC Port driver for Windows Server 2003
 - FC Port driver for Windows 2000 or Windows NT
- elxcfg version 1.41a13 or later is installed.
- The x86 BootBIOS file has been downloaded to a local drive.

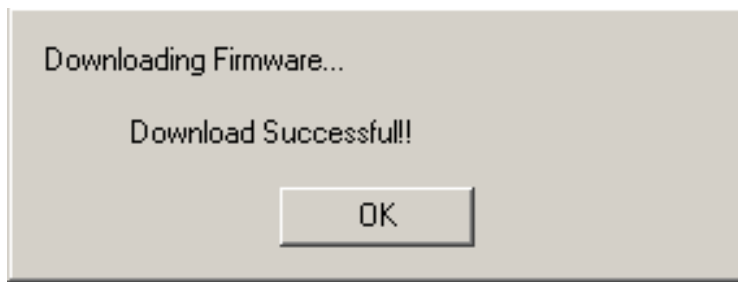
Procedure

1. Start the elxcfg utility. The Main window is opened.
2. Select an adapter from the Available Adapters list.



3. Select Download Firmware from the Tools menu. A browse window is displayed.
4. Select the remote boot file.
5. Click Open.

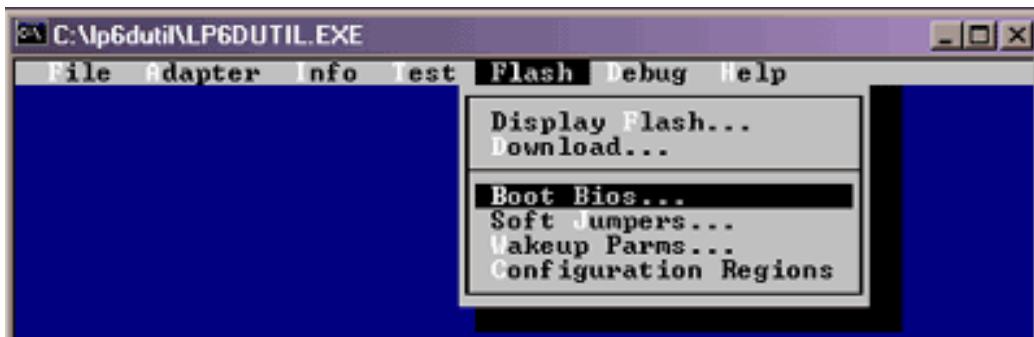
The remote boot file is verified and downloaded, and the following confirmation window is displayed.



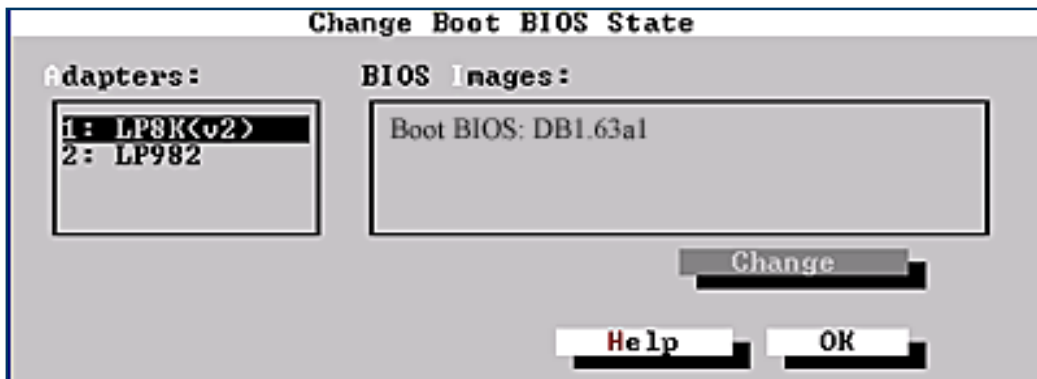
Enable or Disable the BootBIOS Message Using the Emulex Utility for DOS

The Change Boot BIOS State window is used to change the x86 BootBIOS state for an adapter. You can enable the BootBIOS message (if x86 BootBIOS is installed) or disable the BootBIOS message (if it was previously enabled).

1. After you are running lp6dutil, press and hold down the ALT key and press L. The Flash Menu displays.



2. Press B. The Change Boot BIOS State window is displayed.



Note The Change Boot BIOS State window is used to toggle the BootBIOS message. You will also need to enable x86 BootBIOS using the BIOS utility.

3. Specify the location of the x86 BootBIOS file and the adapter to be enabled:
 - a. Highlight the HBA in the Adapters list.
 - b. Press the Enter Key.
 - c. Highlight the x86 BootBIOS image in the BIOS Images list.

- d. Press the Enter key.
4. Tab until you select the Change button and press the Enter key. The BootBIOS message is enabled or disabled for the selected adapter.
5. Tab until you select the OK button and press the Enter key.
6. The process begins. Results of the process are displayed.