



Downloading the SCSIport Miniport Driver for Windows 2000

Version 5-5.10a9

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Driver Information

Prerequisites

- Windows 2000 (Service Pack 2 or above. Service Pack 4 is recommended).
- If you are using storage from one of our partner vendors, click on the Drivers, Software and Manuals link at the top of this page. Links to Emulex partner vendors are located near the top of the Emulex Documentation, Drivers and Software page. Click on the appropriate link to go to the storage vendor's portion of the Website for the correct version of the driver. If you do not see a link for your storage vendor, check with the vendor before loading a driver to determine the version of the driver they support.
- Fibre Channel drives connected to the host adapter using fiber optic or copper duplex media (user supplied).

Note If you are running Windows 2000 with Service Pack 2, the NO_STOPREQ parameter in the EmulexOption must be disabled (it is enabled by default). Perform this task after you have installed the SCSIport Miniport driver and the driver utilities.

Compatibility

- The Emulex® SCSIport Miniport driver is compatible with the following Fibre Channel host bus adapters (HBAs):
 - LP10000DC and LP10000 (minimum firmware version 1.80a2)
 - LP1050DC and LP1050 (minimum firmware version 1.80a3)
 - LP9802DC, LP9802 and LP982 (minimum firmware version 1.00a4)
 - LP9402DC, LP9002L, LP9002DC, LP9000 and LP952L (recommended firmware version 3.90a7)

- LP8000, LP8000DC and LP850
 - If your HBA has a Dragonfly chip version 2.00 or greater, use firmware version 3.90a7.
 - If your HBA has a Dragonfly chip below version 2.00, use firmware version 3.30a7.
- LP7000E (minimum firmware revision 3.21a0)
- All BootBIOS versions, however we recommend 1.60 or higher
- EFIBoot Version 3.00a7 or higher
- Supports arbitrated loop, point-to-point and fabric topologies

Things to Know Before You Download

- Before you download, create a temporary directory for the SCSIport Miniport driver kit.
- The installation procedure for the driver and utilities has changed from earlier versions. For installation information, see the online Installation manual.
- The HBA API files and the driver utility are not part of the driver zip file, they are part of the EmlxApps300a5 zip file. Both the driver zip file and the EmlxApps300a5 zip file are zipped together and referred to as the driver Master Kit.
- Iputilnt provides a user-friendly interface that allows you to locally examine, manage and configure installed host adapters. This utility allows you to update firmware and set parameters. All parameters are read by the utility through the driver's IOCTL interface, so as new parameters are added/subtracted the utility need not change.
- If you are updating the SCSIport Miniport driver, installing the current driver will update the OEMSETUP.INF file and set all Windows driver parameters back to their default settings. If you have modified any of these parameters, write down this information.
- This driver supports a light-weight interface called SLI-2 available in v2.00 firmware (and above). This interface reduces CPU overhead by causing the adapter to DMA command/response/buffer lists to/from host memory without CPU intervention.
- Windows 2000 supports configuring the number of outstanding SCSI requests per SCSI bus. The default setting is 150 SCSI requests per SCSI bus. You can use regedt32 to change the number of requests.
- The Windows 2000 SCSI subsystem allows the disk I/O time-out value to be increased in case of frequent device I/O time-outs. The default setting is 60 seconds.
- Windows 2000 has a parameter that forces the system to scan for more than eight LUNs.

Changes and Corrections

Changes and Corrections for the Driver

The SCSIport Miniport driver Version 5-5.10a9:

- Corrects an issue that made a remote FC Boot inaccessible.
- Resolves an operating system error that occurred during firmware download, if the device was not attached.
- Works around a crash dump LOGO issue.
- Adds IOCTL_LP6000_FCP_PASS_THRU.
- Adds IOCTL_LPX000_GET_DRVINFO.
- Automatically notifies the user when a fixed target has been physically removed from the system. This notification happens based upon the value set for the node_timeout driver parameter. The default is 20 seconds.
- An unsupported command in target mode now returns an "illegal request".
- Corrects a target mode inquiry ASCII data issue.
- Allows passing of persistent binding and LUN mapping information according to WWPN.
- Removes HardALPA option.
- Corrects LUN automap issues.
- Corrects SendAbts issue.
- Works around a g-port issue.
- Changes NAdapter to 32 as the default setting.
- Loads the adjunct driver during installation.
- Adds functionality to abort I/O, to correct a throttle-down problem.

- Corrects the device object flag setting for MultiPulse functionality.
- Checks the WWPN and WWNN for correct failback.
- Adds queue depth management.
- Adds HP SSVID 0x0E11 for installation of the LP10000.
- Improves large-block performance.
- Aborts ADISC if a LOGO is received as a response.
- Corrects Rpis initialization.
- Corrects NodePTR initialization for abortADISC.
- Disables FCP2 if target mode is enabled.
- Sets BusChange to locate a new target when the driver receives a PRLI.

Changes and Corrections for the Utilities

- Corrects a reboot issue when using HBAnyware and updating the driver.

Known Issues

The following issues have been reported at the time of publication. These issues may not yet have been verified or confirmed and may apply to another product, such as hardware.

- If there are multiple HBAs in one system, a reboot is required if a new driver is installed on one or more of the HBAs. A Windows 2000 issue will cause the driver to appear as if it has updated successfully, but the old version of the driver will still be running until the system is rebooted.

Files Included in This Release

SCSIport Miniport Driver Zip File

The kit includes release notes and necessary files to install the SCSIport Miniport driver version 5.10a9 in a Windows Server 2003 or Windows 2000 system.

File Name	Description
readme.txt	Release notes for SCSIport Miniport driver Version 5.10a9.
oemsetup.inf	Driver installation script for the setup program.
txtsetup.oem	Driver installation script for the boot-time setup program (x86 BootBIOS must be installed).
lp SCSI	Tag file used by the installation.
lpxnds.sys	SCSIport Miniport driver v5.10a9.
lpxftr.sys	Adjunct driver v5-1.03a4 supporting persistent binding.
cocopyinf.dll	CopyInf co-installer (32-bit systems only).
lpsimdev.inf	Installation script of Emulex Simulate Device.
lpxnds.cat	SCSIport Miniport driver catalog file.
lpsimdev.cat	Emulex Simulate Device catalog file.

Utilities Zip File

The utilities zip file includes utility files and HBA API libraries.

File Name	Description
setupapps.exe	This executable installs the following files: <ul style="list-style-type: none">• HBAware remote management utility version 2.0a13• The GUI utility, lputilnt, version 1.7a16 (for firmware downloads, etc.)• The Host Bus Adapter (HBA) Application Programming Interface (API) library, supporting common HBA applications
readme.pdf	Utility installation instructions in .pdf format.

Verifying the Dragonfly Chip Version

There are three methods for determining the Dragonfly chip version: Looking at the Host Bus Adapter, running the DOS utility, or running the UNIX-based utility.

Looking at the Host Bus Adapter

The Dragonfly version number can be found on the top of the large chip, usually after the term "DRAGONFLY" or "DFLY".

Running the DOS Utility

1. Boot up the computer in DOS.
2. Enter this command to start the lp6dutil program.

```
c:\>lp6dutil
```

The lp6dutil program runs preliminary tests on all host adapters.

3. Press the Return or Enter key until the main menu is displayed. The lp6dutil utility resets all host adapters and resource information for all host bus adapters is displayed.

Note Press 0 to go back to the previous screen.

```
1 - Test Host Adapters
2 - Modify Test Options
3 - Restart Host Adapters
4 - Input/Output
5 - Maintenance
6 - Show Host Adapters Info
7 - Quit
```

4. Select 6, Show Host Adapter Info.

The Option menu is displayed.

1 - BIU PCI Configuration Parameters	5 - Service Parameters
2 - Host Adapter Info and Status	6 - Status/Counters Info
3 - Adapter Revision Levels	7 - Link Status
4 - Display Configuration Data	8 - Link Attention

5. Select 3, Adapter Revision Levels . If there are multiple host adapters, specify a list of numbers from 1 – 3 separated by spaces, or use a '-' between two numbers to specify a range of host adapters. The following type of information is displayed for the host bus adapter (this is an example only).

```
Chipset Revision Levels:
DragonFly Revision = 0x1002106D

Firmware Revision Levels:
Current Operational Firmware = Initial Operational Firmware
Kernel Revision = 1.00
Initial Operational Firmware Revision = Initial Load 1.01a0
(QS1.01A0 )
SLI-1 Revision = SLI-1 Overlay 1.01a0 (Q1F1.01A0 )
SLI-2 Revision = SLI-2 Overlay 1.01a0 (Q2F1.01A0 )
```

Version 1 shows a chipset revision that contains 210 near the end of the adapter's hex number (DragonFly Revision number).

Version 2 shows a chipset revision that contains 250 near the end of the adapter's hex number.

Using the UNIX-based Utility

1. Enter the appropriate command to start the lputil utility:

```
For AIX enter: /usr/lpp/diagnostics/lputil
For HP-UX enter: /opt/lpfc/bin/lputil
For Linux enter: /usr/sbin/lpfc/lputil
For Solaris PCI bus enter: /usr/sbin/lpfc/lputil
```

The main menu is displayed.

```
LightPulse Common Utility version 1.1 (3/17/99)
Copyright (c) 1999, Emulex Network Systems, Inc.

Emulex Fibre Channel Host Adapters Detected: 1
Host Adapter 0 is an LP7K (Ready Mode)

MAIN MENU

1. List Adapters
2. Adapter Information
3. Firmware Maintenance
4. Reset Adapter

0. Exit

Enter Choice =>
```

2. Select 2, Adapter Information. The Adapter Information Menu is displayed.

```
1. BIU PCI Configuration Parameters
2. Adapter Revision Levels
3. Wakeup Parameters
4. IEEE Address
5. Loop Map
6. Status & Counters
7. Link Status
8. Configuration Parameters

0. Return to Main Menu.
```

3. Select 2, Adapter Revision Levels. If there are multiple host adapters, a list is displayed and you need to select an adapter. The following type of information is displayed for the host bus adapter (this is an example only).

```
BIU: 2002506D
Sequence Manager: 00000000
Endec: 00000000
Operational Firmware: SLI-2 Overlay
      Kernel: LP8K 2.01a0
Initial Firmware: Initial Load 3.81a2 (DS3.81A2)
      SLI-1:LP8K SLI-1 Overlay 3.81a2 (DID3.81A2)
      SLI-2:LP8K SLI-2 Overlay 2.81a2 (D2D3.81A2)
Highest FC-PH Version: 4.3
Lowest FC-PH Version:4.3

Press any key to continue.
```

Version 1 shows a chipset revision that contains 210 near the end of the BIU number.

Version 2 shows a chipset revision that contains 250 near the end of the BIU number.



Installing the SCSIport Miniport Driver for Windows 2000

Version 5-5.10a9

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Installation Overview

The SCSIport Miniport driver download package, which you download from the Web site, includes a zip file for the driver and a zip file for the driver utilities (lputilnt, HBAnyware and HBA API files). When you install the driver package, you will perform the following steps:

1. Download the download package to a temporary directory on your local drive.
2. Extract the contents of the download package -- the driver zip file, the utilities zip file and a readme.first.txt file.
3. Extract the contents of the driver zip file and the contents of the utilities zip file to a temporary directory. (You can extract the two zip files to the same directory or to different directories.)
4. Install the SCSIport Miniport driver.
5. If you are updating an earlier version of the driver, reboot the computer.
6. Install the driver utilities.

Caution If you install the driver utilities before installing the SCSIport Miniport driver and attempt to run HBAnyware, an operating system error may occur (often referred to as a "blue screen"). The computer may freeze and require restarting to make the computer operational.

Driver Information

Prerequisites

- Windows 2000 (Service Pack 2 or above. Service Pack 4 is recommended).
- If you are using storage from one of our partner vendors, click on the Drivers, Software and Manuals link at the top of this page. Links to Emulex partner vendors are located near the top of the Emulex Documentation, Drivers and Software page. Click on the appropriate link to go to the storage vendor's portion of the Website for the correct version of the driver. If you do not see a link for your storage vendor, check with the vendor before loading a driver to determine the version of the driver they support.
- Fibre Channel drives connected to the host adapter using fiber optic or copper duplex media (user supplied).

Note If you are running Windows 2000 with Service Pack 2, the NO_STOPREQ parameter in the EmulexOption must be disabled (it is enabled by default). Perform this task after you have installed the SCSIport Miniport driver and the driver utilities.

Compatibility

- The Emulex® SCSIport Miniport driver is compatible with the following Fibre Channel host bus adapters (HBAs):
 - LP10000DC and LP10000 (minimum firmware version 1.80a2)
 - LP1050DC and LP1050 (minimum firmware version 1.80a3)
 - LP9802DC, LP9802 and LP982 (minimum firmware version 1.00a4)
 - LP9402DC, LP9002L, LP9002DC, LP9000 and LP952L (recommended firmware version 3.90a7)

- LP8000, LP8000DC and LP850
 - If your HBA has a Dragonfly chip version 2.00 or greater, use firmware version 3.90a7.
 - If your HBA has a Dragonfly chip below version 2.00, use firmware version 3.30a7.
- LP7000E (minimum firmware revision 3.21a0)
- All BootBIOS versions, however we recommend 1.60 or higher
- Supports arbitrated loop, point-to-point and fabric topologies

Installing the SCSIport Miniport Driver

Note If you are updating the SCSIport Miniport driver, installing the current driver will update the OEMSETUP.INF file and set all driver parameters back to their default settings. If you have modified any of these parameters, write down this information. Once you update the driver, and update the utilities, use the LightPulse™ Utility (lputilnt) to modify the applicable driver parameters. See the online Configuration manual for more information about modifying driver parameters.

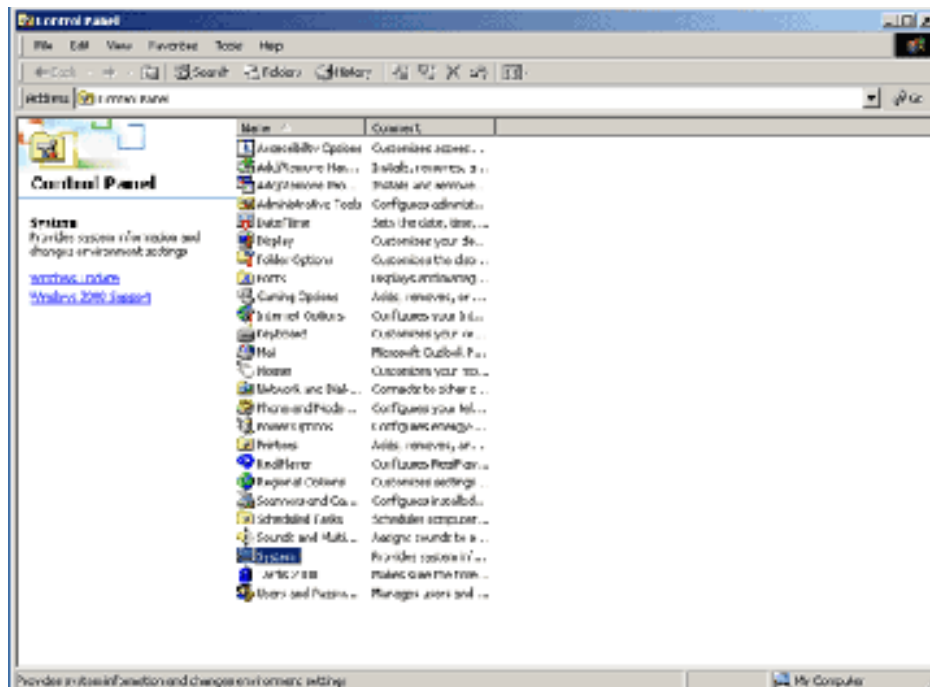
Prerequisites

- Downloaded and extracted contents of the driver download package. See the online Download manual for the latest driver.
- Extracted contents of the driver zip file.

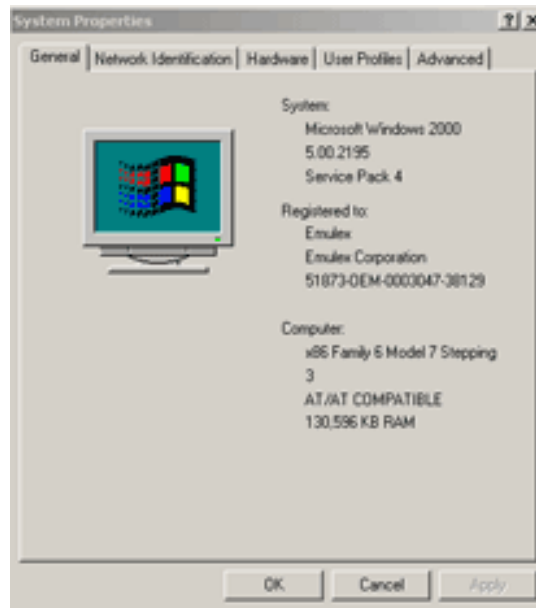
Procedure

To update the SCSIport Miniport driver from the Windows 2000 desktop:

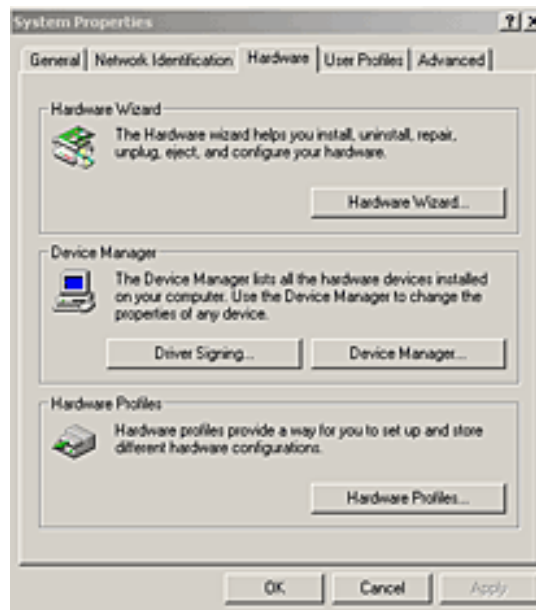
1. Select Start, Settings and Control Panel. The Control Panel is displayed.



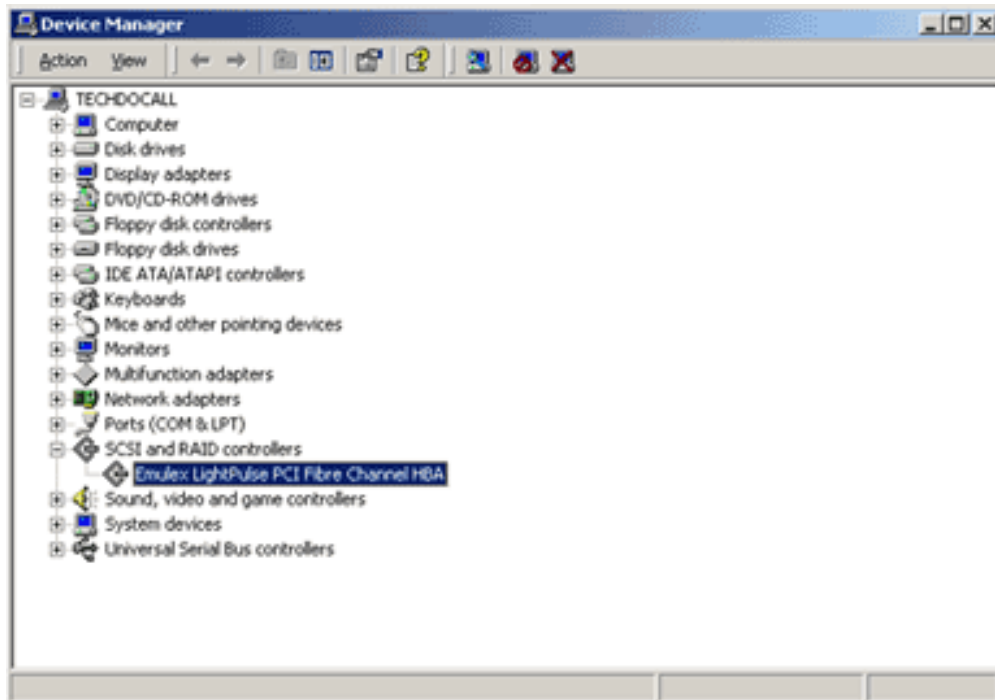
2. Double-click the System icon. The General tab of the System Properties dialog box is displayed.



3. Click the Hardware tab.

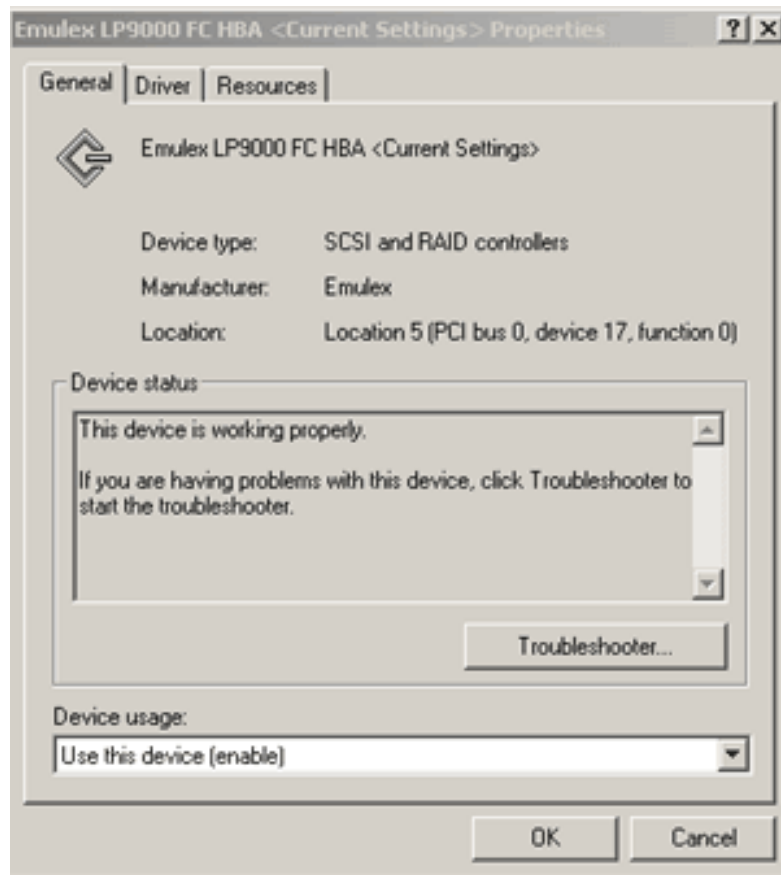


4. Click Device Manager. The Device Manager window is displayed.

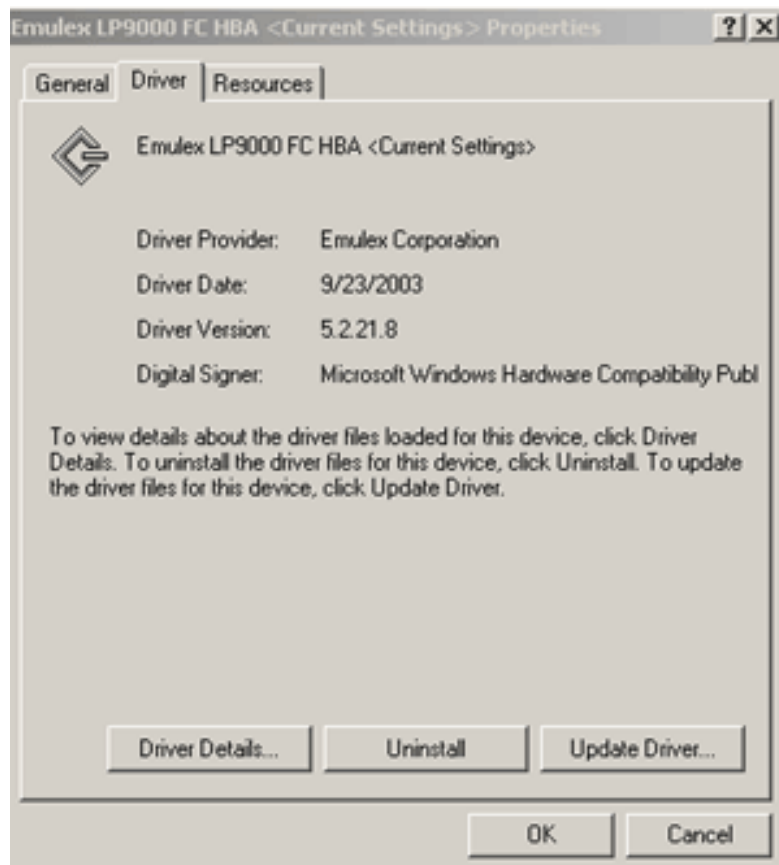


5. Open the SCSI and RAID controllers item in the list.
6. Double-click the Emulex host bus adapter. The General tab of the Device Properties dialog box is displayed.

Caution The driver will be installed only on the selected adapter. If there are other adapters in the system with earlier versions of the SCSIport Miniport driver installed, you must repeat this process for each of these adapters. Otherwise, unpredictable system events may occur.



7. Click the Driver tab.



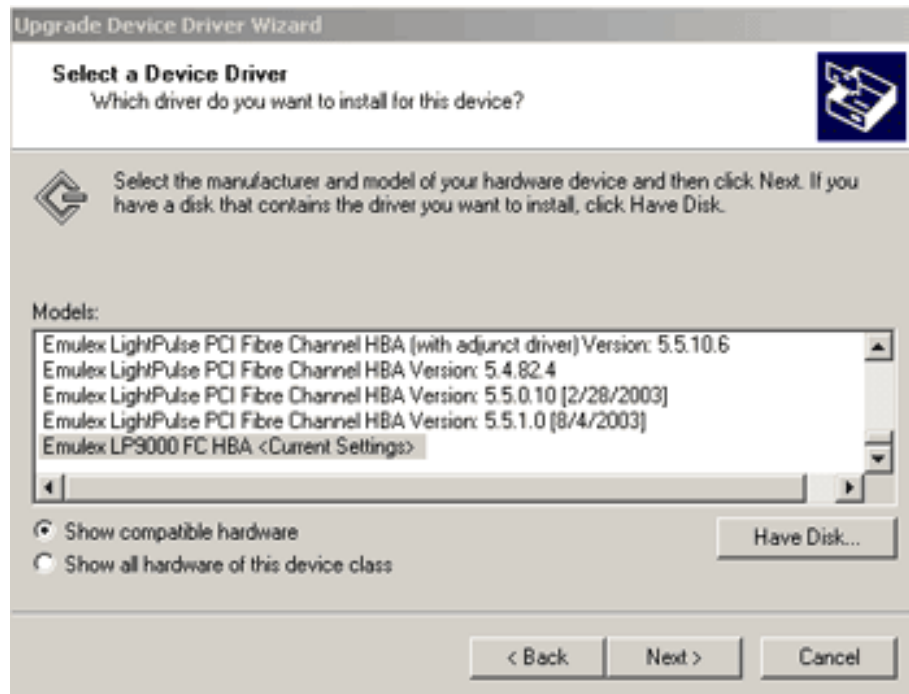
8. Click Update Driver. The Update Device Driver wizard starts.



9. Click Next.



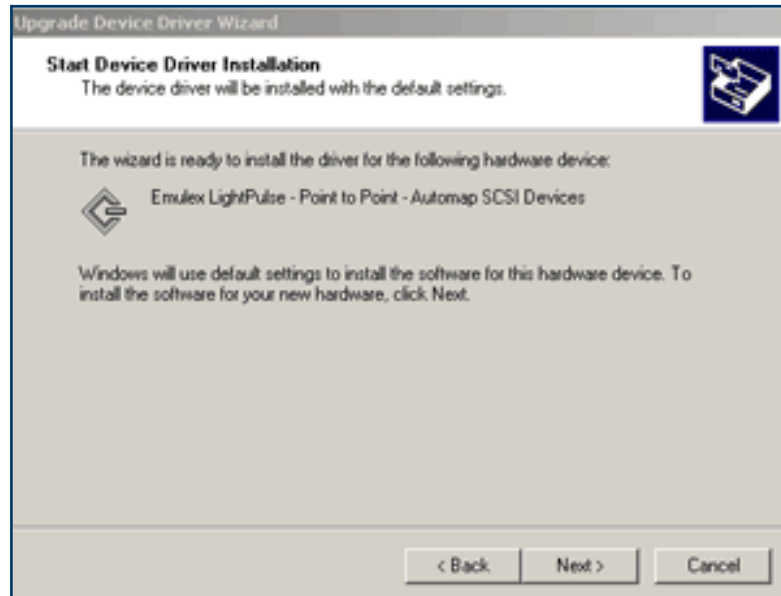
10. Select “Display a list of known drivers for this device so that I can choose a specific driver” and click Next.



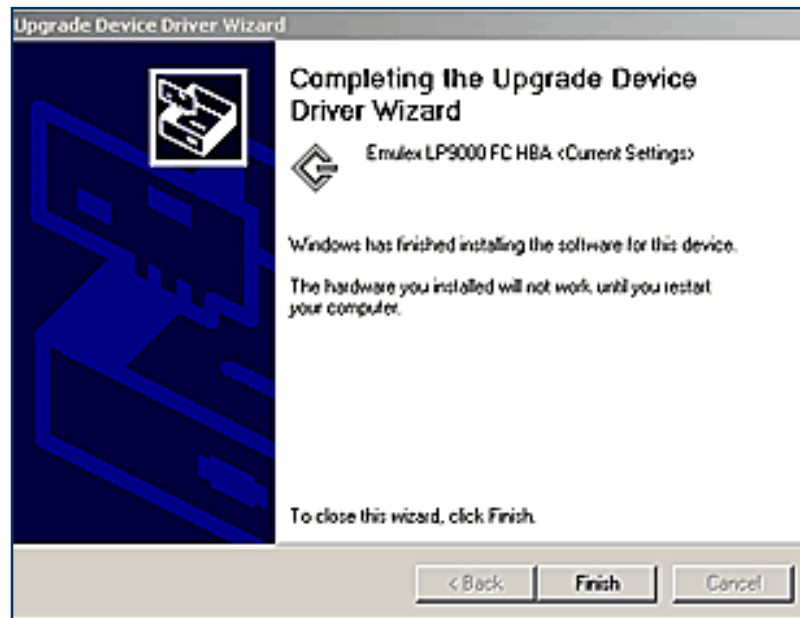
11. Click Have Disk and browse to the location of the driver file (oemsetup.inf).

Note The Emulex LightPulse PCI Fibre Channel Adapter (with Adjunct Driver) supports the HBAnyware utility, the lputilnt utility, persistent binding, LUN mapping and LUN masking.

12. Click Next.



13. Click Next.



14. Click Finish.

15. If you have multiple HBAs in your system, restart the computer. If you have a single HBA in your system, restart the computer if prompted to do so.

16. Select Start, Settings and Control Panel.

17. Double-click the System Icon.

18. Select the Hardware tab.
19. Click Device Manager.
20. Verify that the SCSIport Miniport driver is present.
21. If you are updating an earlier version of the driver, reboot the computer.

Driver installation is complete. You can now install the driver utility package.

Installing the Driver Utilities

Utility setup installs the LightPulse™ utility (lputilnt or lputil64), the HBAnyware utility and the HBA API files.

Prerequisites

- One of these versions of the Windows Server 2003, Windows 2000 or Windows NT driver installed:
 - SCSIport Miniport driver version 6-5.10a9-1 or later (for 64-bit Windows Server 2003 with the adjunct driver)
 - SCSIport Miniport driver version 5-5.10a9-1 or later (for 32-bit Windows Server 2003 and Windows 2000 with the adjunct driver)
 - SCSIport Miniport driver version 4-5.10a9-1 or later (for Windows NT with the adjunct driver)
- Extracted setupapps.exe from the utilities zip file (to a temporary directory).
- Removed versions of older utilities:
 - If version 4.82a4 or older of the SCSIport Miniport driver is installed, the lputilnt utility is still present in the \WINNT\system32 directory. Delete this file and any shortcut icon on your desktop or in your Start\Programs associated with this lputilnt file.
 - If version 6-5.00a10, 5-5.00a10 or 4-5.00a10 of the SCSIport Miniport driver is installed, uninstall the driver utility package, which includes HBAnyware and lputilnt.

Note HBAnyware 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.

Procedure

Follow these steps to install the utility:

1. Run setupapps.exe from the temporary directory.
2. Follow the instructions on the setup windows.

Note If your system does not have Windows Installer, the setup.exe file will install it for you.

3. Click Finish in the last dialog box to exit Setup. Your utility installation is complete. The HBAnyware utility automatically starts running.

Install the Emulex Simulate Device

Installing the Emulex Simulate Device creates a dummy disk to force the driver to load if no disk devices are present at boot time.

The Emulex Simulate Device is enabled by setting the SimulateDevice parameter to 1 (it is disabled by default). You can enable this setting using the LightPulse Utility (lputilnt).

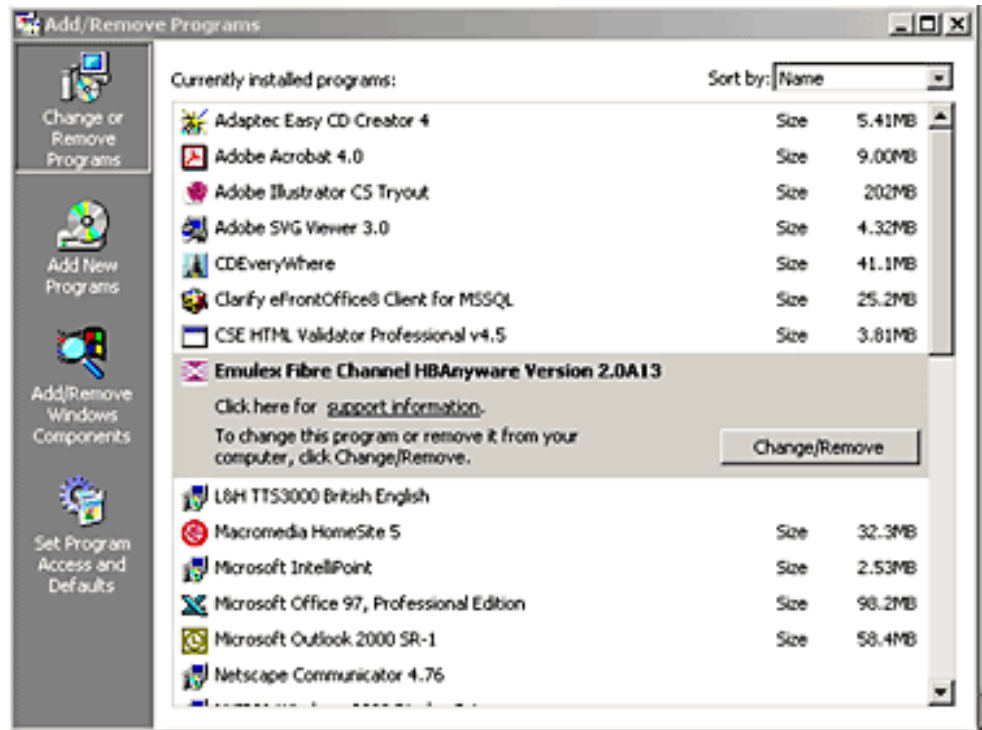
Procedure

1. Restart the computer. A window displays "Found New Hardware Wizard". Click Next.
2. Select "Display a list of known drivers for this device so that I can choose a specific driver", and click Next.
3. Select "System Devices" and click Next.
4. Select "Emulex" in the Manufacturers window. Select "Emulex Simulate Device" in the Models window. Click Next.
5. Follow the instructions to finish installing this device.

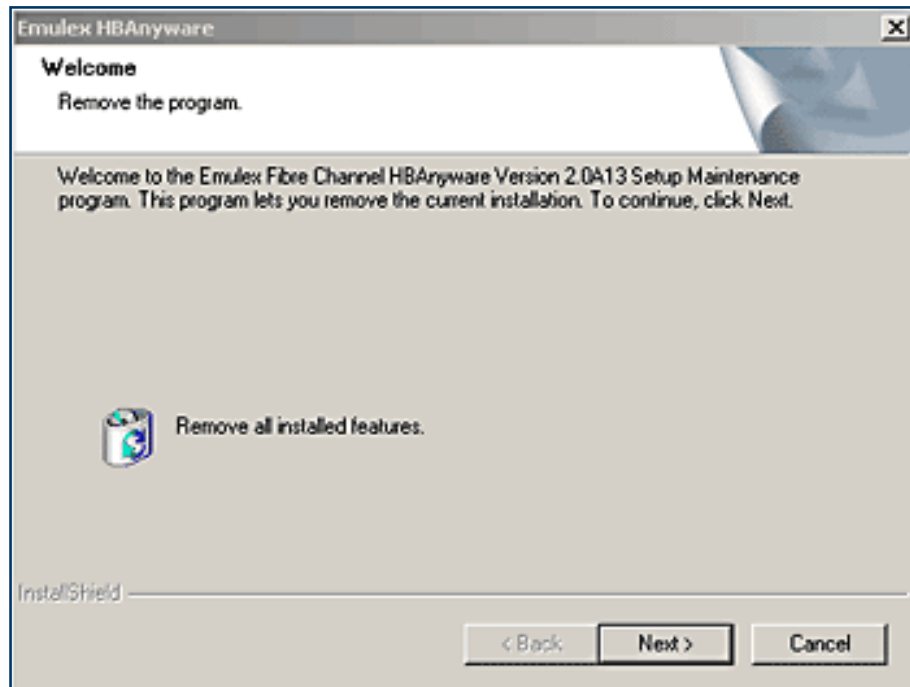
Uninstall the Utility Package

To uninstall the HBAnyware utility package:

1. Click Start, then Settings, and then Control Panel.
2. Double-click Add/Remove Programs.



3. Select the Emulex Fibre Channel item and click Change or Remove Programs. The Emulex HBAnyware window appears.



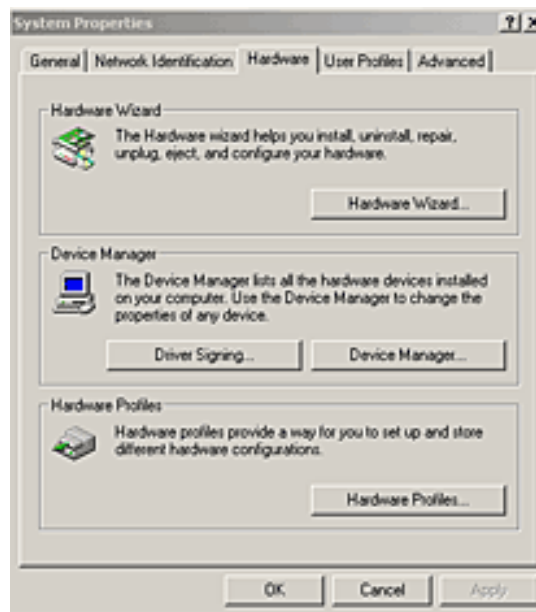
4. Click Next. The utilities are removed from the system.

Uninstall the Driver

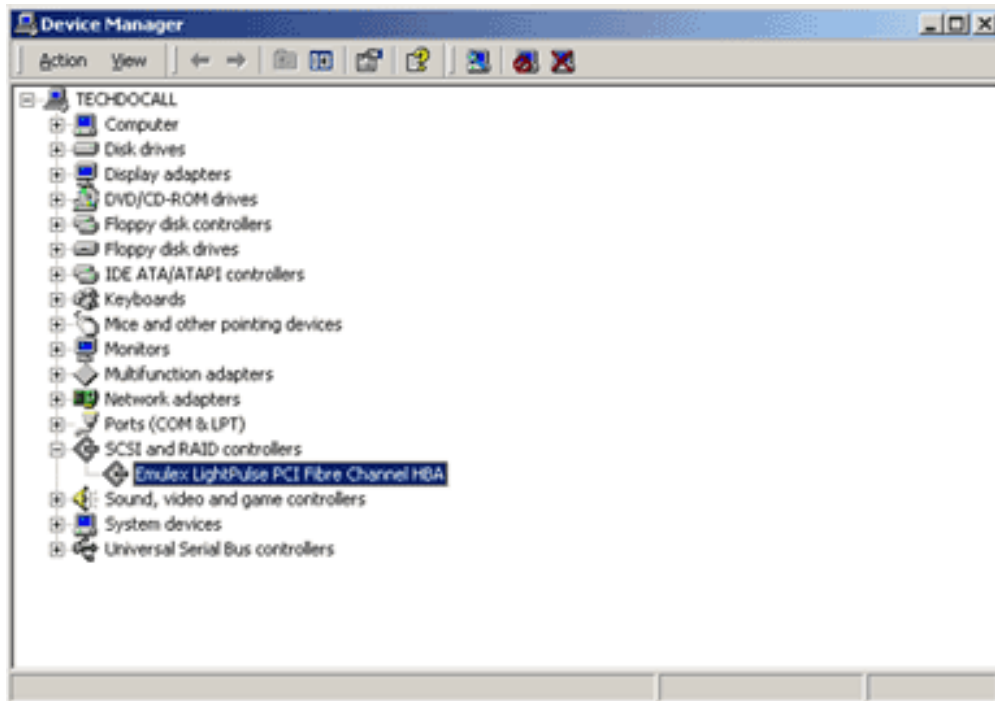
Before you can uninstall the driver, you must first uninstall the utilities package (HBAnyware, lputilnt, and the HBA API library).

To uninstall the driver, do the following:

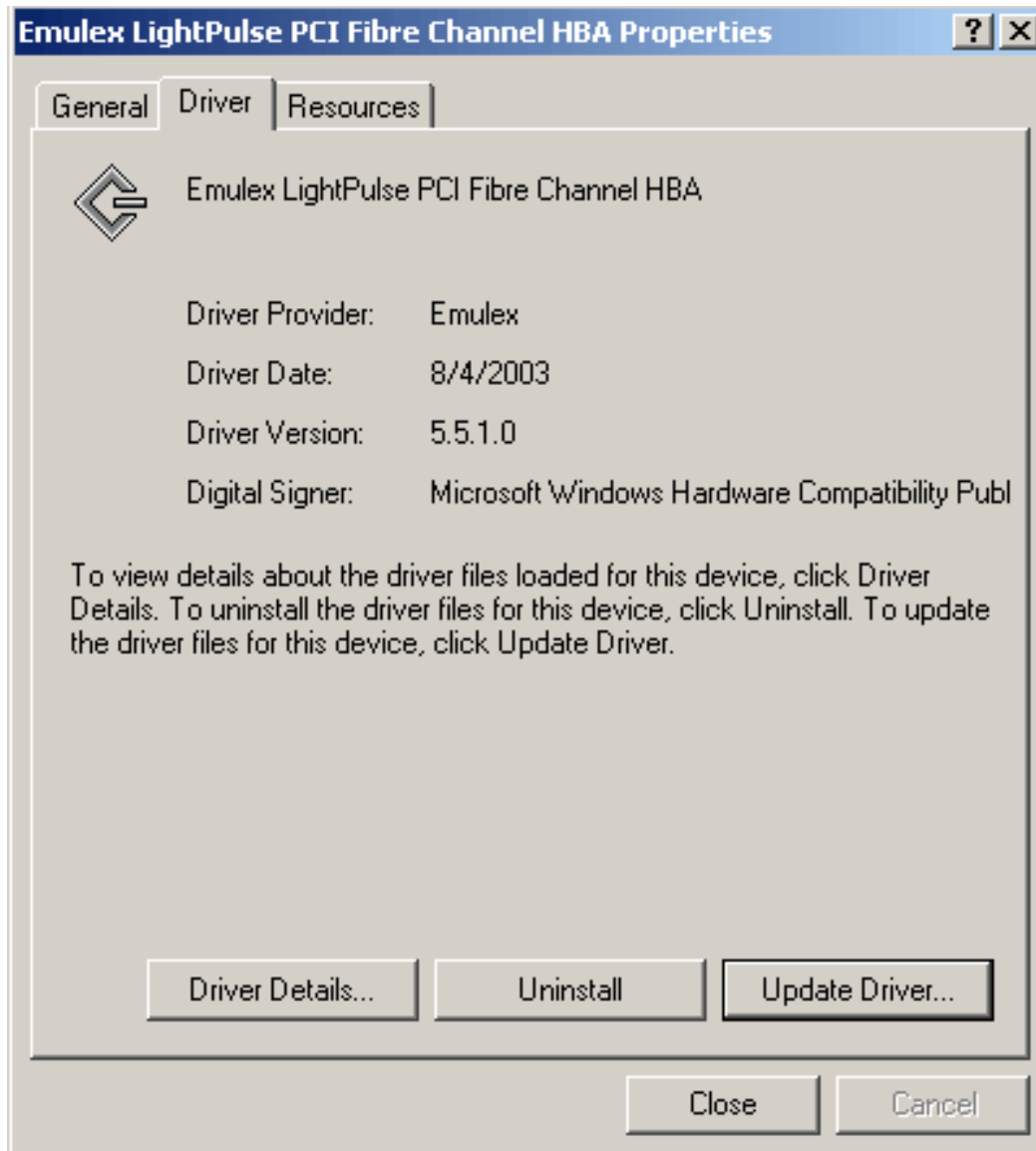
1. From the Windows desktop, click Start, then Settings, and then Control Panel.
2. Double-click the System item. The System Properties dialog box is displayed. Click the Hardware tab.



3. Click Device Manager. The Device Manager dialog box is displayed. Double-click the SCSI and RAID controllers item.



4. Double-click the adapter from which you want to remove the driver. A device-specific dialog box is displayed. Click the Driver tab.



5. Click Uninstall.
6. When prompted, click OK to continue.
7. When prompted, click Yes to reboot the computer. The driver is uninstalled.

Verifying the Dragonfly Chip Version

There are three methods for determining the Dragonfly chip version: Looking at the Host Bus Adapter, running the DOS utility, or running the UNIX-based utility.

Looking at the Host Bus Adapter

The Dragonfly version number can be found on the top of the large chip, usually after the term "DRAGONFLY" or "DFLY".

Running the DOS Utility

1. Boot up the computer in DOS.
2. Enter this command to start the lp6dutil program.

```
c:\>lp6dutil
```

The lp6dutil program runs preliminary tests on all host adapters.

3. Press the Return or Enter key until the main menu is displayed. The lp6dutil utility resets all host adapters and resource information for all host bus adapters is displayed.

Note Press 0 to go back to the previous screen.

```
1 - Test Host Adapters
2 - Modify Test Options
3 - Restart Host Adapters
4 - Input/Output
5 - Maintenance
6 - Show Host Adapters Info
7 - Quit
```

4. Select 6, Show Host Adapter Info.

The Option menu is displayed.

1 - BIU PCI Configuration Parameters	5 - Service Parameters
2 - Host Adapter Info and Status	6 - Status/Counters Info
3 - Adapter Revision Levels	7 - Link Status
4 - Display Configuration Data	8 - Link Attention

5. Select 3, Adapter Revision Levels . If there are multiple host adapters, specify a list of numbers from 1 – 3 separated by spaces, or use a '-' between two numbers to specify a range of host adapters. The following type of information is displayed for the host bus adapter (this is an example only).

```
Chipset Revision Levels:
DragonFly Revision = 0x1002106D

Firmware Revision Levels:
Current Operational Firmware = Initial Operational Firmware
Kernel Revision = 1.00
Initial Operational Firmware Revision = Initial Load 1.01a0
(QS1.01A0 )
SLI-1 Revision = SLI-1 Overlay 1.01a0 (Q1F1.01A0 )
SLI-2 Revision = SLI-2 Overlay 1.01a0 (Q2F1.01A0 )
```

Version 1 shows a chipset revision that contains 210 near the end of the adapter's hex number (DragonFly Revision number).

Version 2 shows a chipset revision that contains 250 near the end of the adapter's hex number.

Using the UNIX-based Utility

1. Enter the appropriate command to start the lputil utility:

```

For AIX enter:    /usr/lpp/diagnostics/lputil
For HP-UX enter: /opt/lpfc/bin/lputil
For Linux enter: /usr/sbin/lpfc/lputil
For Solaris PCI bus enter: /usr/sbin/lpfc/lputil

```

The main menu is displayed.

```

LightPulse Common Utility version 1.1 (3/17/99)
Copyright (c) 1999, Emulex Network Systems, Inc.

Emulex Fibre Channel Host Adapters Detected: 1
Host Adapter 0 is an LP7K (Ready Mode)

MAIN MENU

1. List Adapters
2. Adapter Information
3. Firmware Maintenance
4. Reset Adapter

0. Exit

Enter Choice =>

```

2. Select 2, Adapter Information. The Adapter Information Menu is displayed.

```

1. BIU PCI Configuration Parameters
2. Adapter Revision Levels
3. Wakeup Parameters
4. IEEE Address
5. Loop Map
6. Status & Counters
7. Link Status
8. Configuration Parameters

0. Return to Main Menu.

```

3. Select 2, Adapter Revision Levels. If there are multiple host adapters, a list is displayed and you need to select an adapter. The following type of information is displayed for the host bus adapter (this is an example only).

```
BIU: 2002506D
Sequence Manager: 00000000
Endec: 00000000
Operational Firmware: SLI-2 Overlay
      Kernel: LP8K 2.01a0
Initial Firmware: Initial Load 3.81a2 (DS3.81A2)
      SLI-1:LP8K SLI-1 Overlay 3.81a2 (DID3.81A2)
      SLI-2:LP8K SLI-2 Overlay 2.81a2 (D2D3.81A2)
Highest FC-PH Version: 4.3
Lowest FC-PH Version:4.3

Press any key to continue.
```

Version 1 shows a chipset revision that contains 210 near the end of the BIU number.

Version 2 shows a chipset revision that contains 250 near the end of the BIU number.



Configuring the SCSIport Miniport Driver for Windows 2000

Version 5-5.10a9

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Introduction

The Emulex SCSIport Miniport 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 the LightPulse™ Utility (lputilnt for 32-bit systems, lputil64 for 64-bit systems) to do any of the following:
 - Download PCI configuration data files
 - 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 host bus adapter (HBA)
 - Update x86 BootBIOS
 - Enable the BootBIOS message

- Use the HBAnyware™ Utility 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

Note HBAnyware 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.

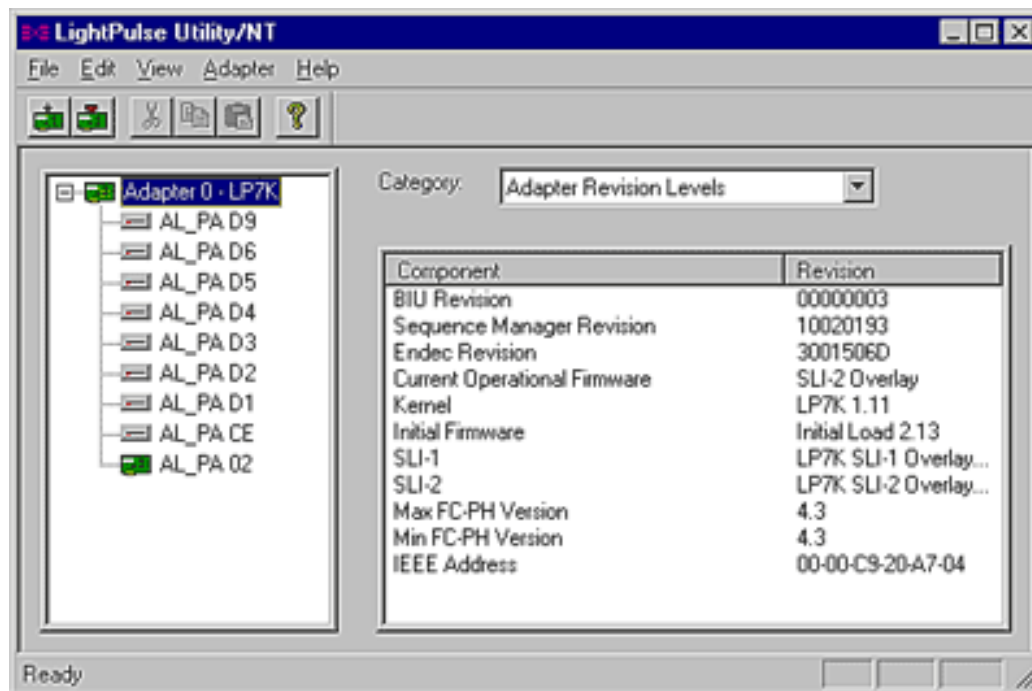
Start Iputilnt or Iputil64

Iputilnt and Iputil64 are executable files. Run the file from your local hard drive.

Start the utility in one of two ways:

- Click Start, Programs and Iputilnt (or Iputil64).
- Browse to the Iputilnt.exe or Iputil64.exe file and run this command.

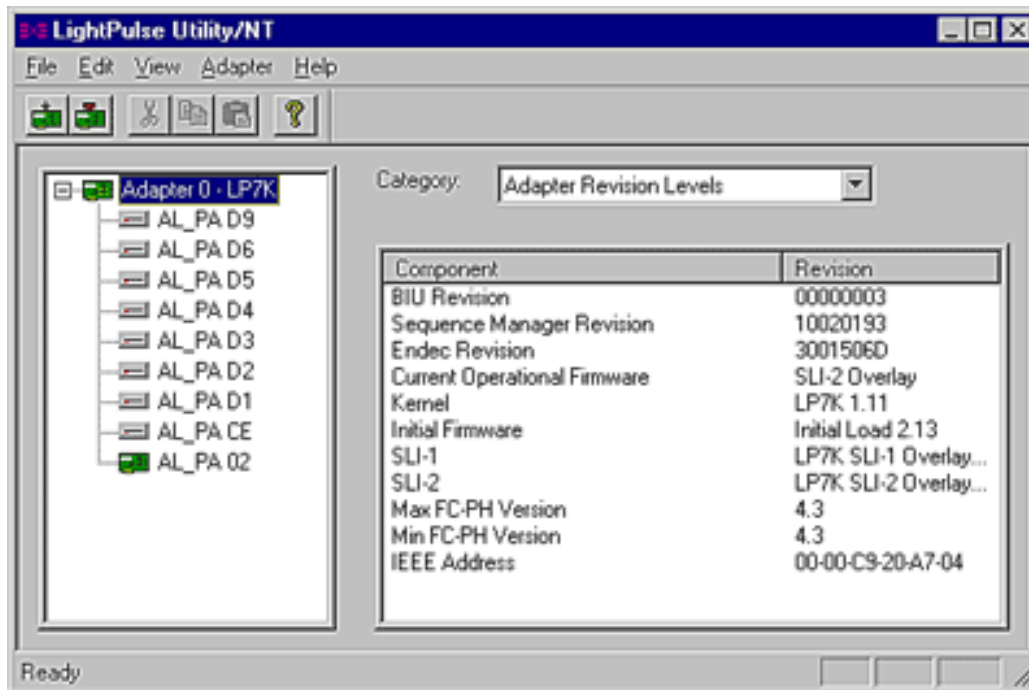
The main window is displayed.



Use Iputilnt

To use Iputilnt, do the following:

1. Start Iputilnt (or Iputil64).
2. Select an adapter from the list on the left.
3. On the menu bar, click Adapter. Or, in the right pane, pull down the Category list.



4. Select a category. Depending on the category you select, you can view information about Emulex HBAs, configure HBAs or update firmware or remote boot code.

Category Summaries

Eight categories are available:

Adapter Revision Levels - View information about the chipset and firmware revision levels of the selected adapter.

Firmware Maintenance - View detailed information about the firmware in the flash ROM of the selected host adapter. Update host adapter firmware and boot code, manage existing firmware and enable or disable the BootBIOS bootup message.

Loop Map - View a list of the members of the selected host adapter.

PCI Registers - View the values of the PCI configuration registers for the selected adapter.

Configuration Data - View information about the data in each of the configuration regions in the flash ROM of the selected host adapter. Download PCI configuration files (CFL).

Driver Parameters - View and change device driver parameters.

Persistent Binding - View and manage persistent binding for the adapter, and LUN mapping and masking for devices in your SAN.

Link Statistics - View statistics about the arbitrated loop of the selected host adapter.

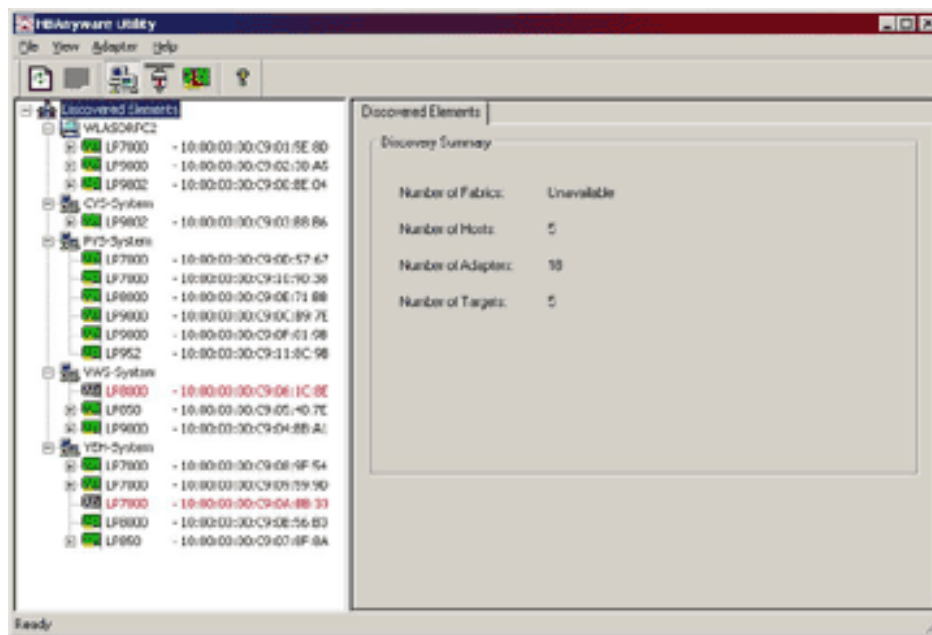
Status and Counters - View status and counters for bytes, frames, sequences, exchanges, and so on.

Start HBAnyware for Windows

After the HBAnyware 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 HBAnyware.

The main window is displayed.

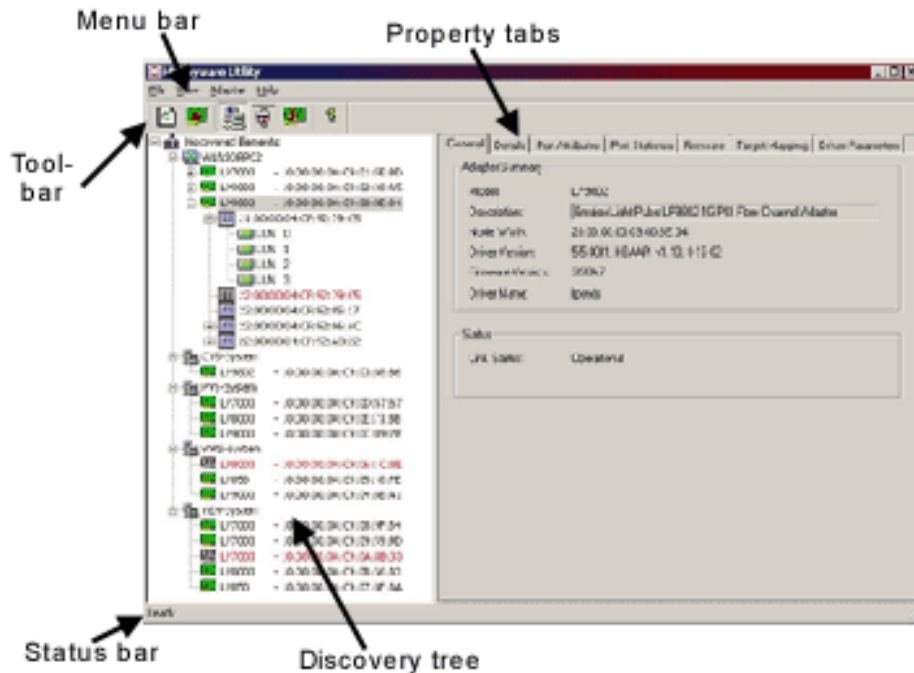


Note HBAnyware must be running on all remote hosts that are to be discovered and managed.

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.

Use HBAnyware

The HBAnyware 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 HBAnyware, 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.

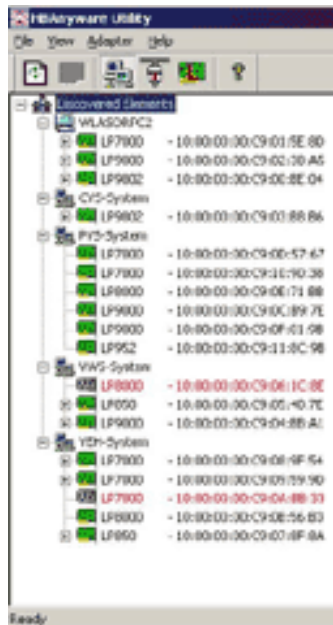


The Sort by Local HBAs Only button

- 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 HBAnyware Command-Line Interface

The CLI (command-line interface) Client component of HBAnyware 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 HBAnyware 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.

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:

```
/usr/sbin/hbanyware/hbacmd portattrib 10:00:00:00:c9:20:20:20
```

CLI Client Command Reference

Version

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

List HBAs

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

Display HBA Attributes

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

Port Attributes

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

Port Statistics

Syntax	<code>./HBACMD PortStat <wwpn></code>
Description	A list of statistics for the port with the specified World Wide Port Name.
Parameters	<code>wwpn</code> 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.

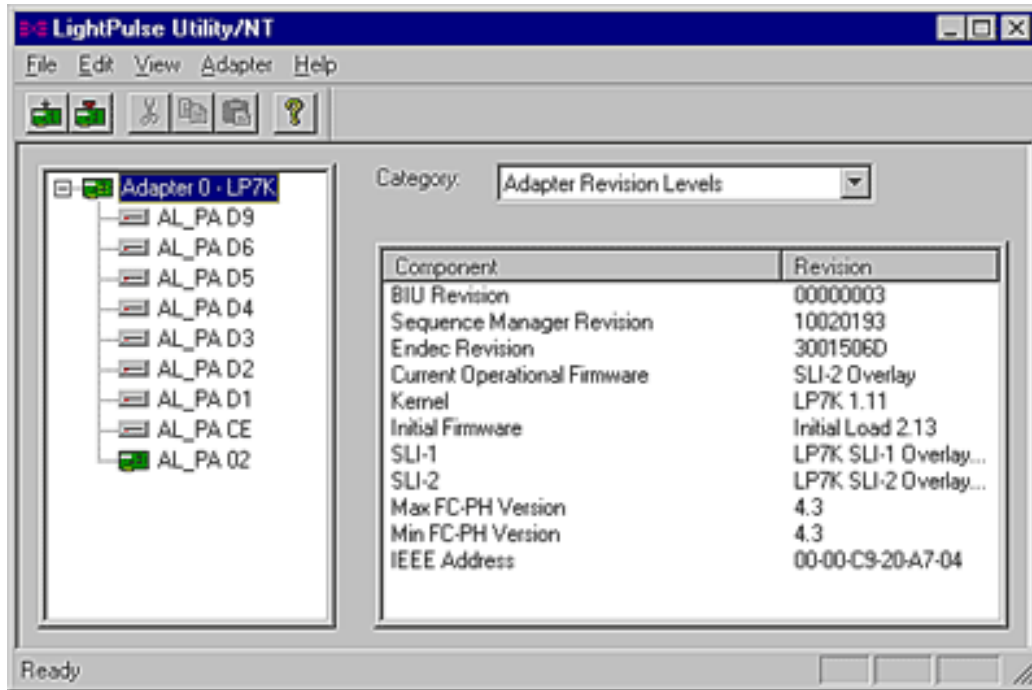
Discover Host Bus Adapters - Introduction

You can discover host bus adapters (HBAs) using either lputilnt or HBAnyware.

- lputilnt allows you to discover local HBAs only.
- HBAnyware allows you to discover both local and remote HBAs.

Discover Local HBAs Using Iputilnt

Local host bus adapters (HBAs) are discovered automatically when you launch Iputilnt.

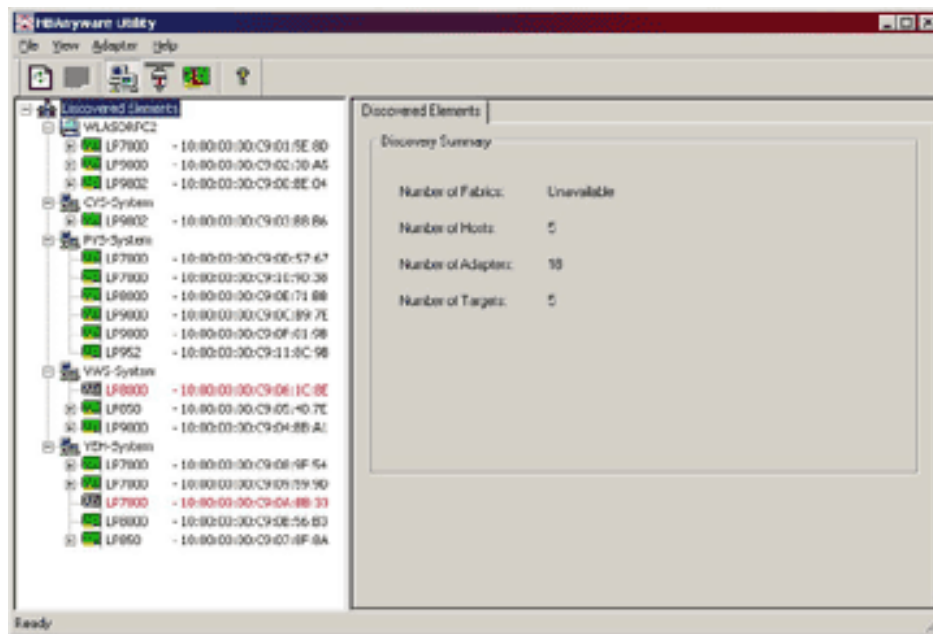


Discover HBAs Using HBAnyware

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.




Reset Adapter - Introduction

You can reset adapters using either lputilnt or HBAnyware.

- lputilnt allows you to reset local adapters only.
- HBAnyware allows you to reset remote and local adapters.


Reset the HBA Using Iputilnt

To reset a host bus adapter, do the following:

1. Start Iputilnt or Iputil64.
2. In the left pane, click the adapter you want to reset.
3. Do one of the following:
 - From the menu bar, click Adapter, and then click Reset Adapter.
 - From the toolbar, click the Reset Adapter button. 

Reset the HBA 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

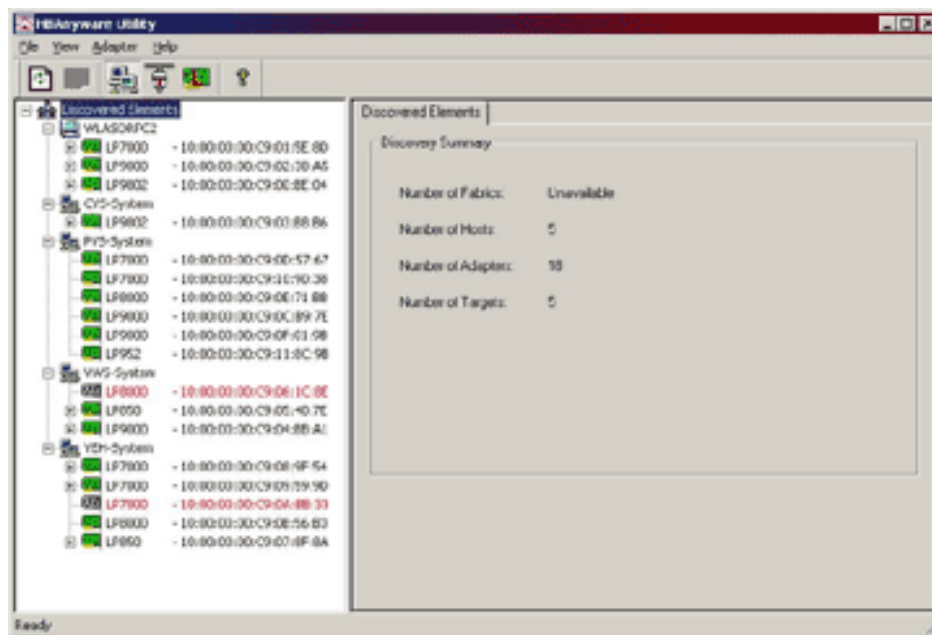
Sort by host name or fabric address.

View Discovered Elements

The Discovered Elements tab in HBAnyware 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 HBAnyware.
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.

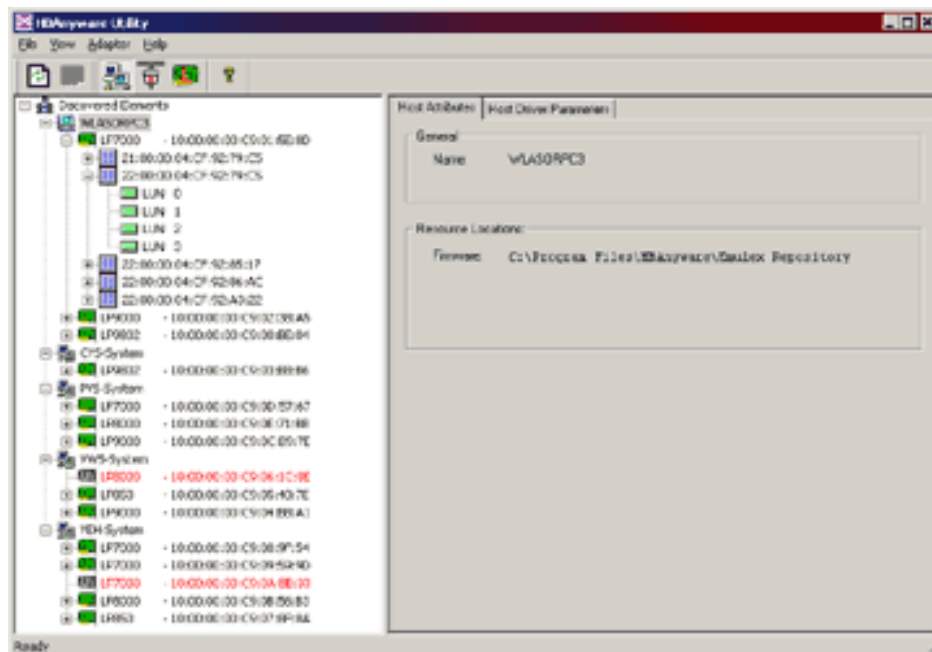
Number of Targets - the total number of unique targets discovered on the SAN. In the discovery tree, the same target can appear under more than one HBA.

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

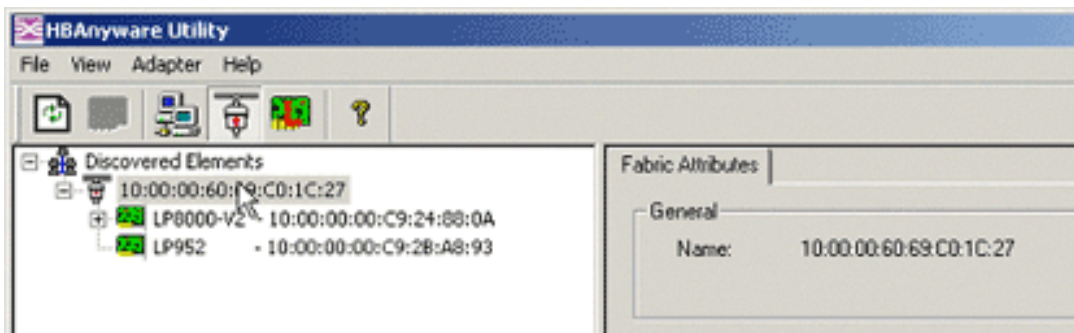
Firmware - the directory path where the firmware image files are moved prior to being downloaded to the HBAs on that host.

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.

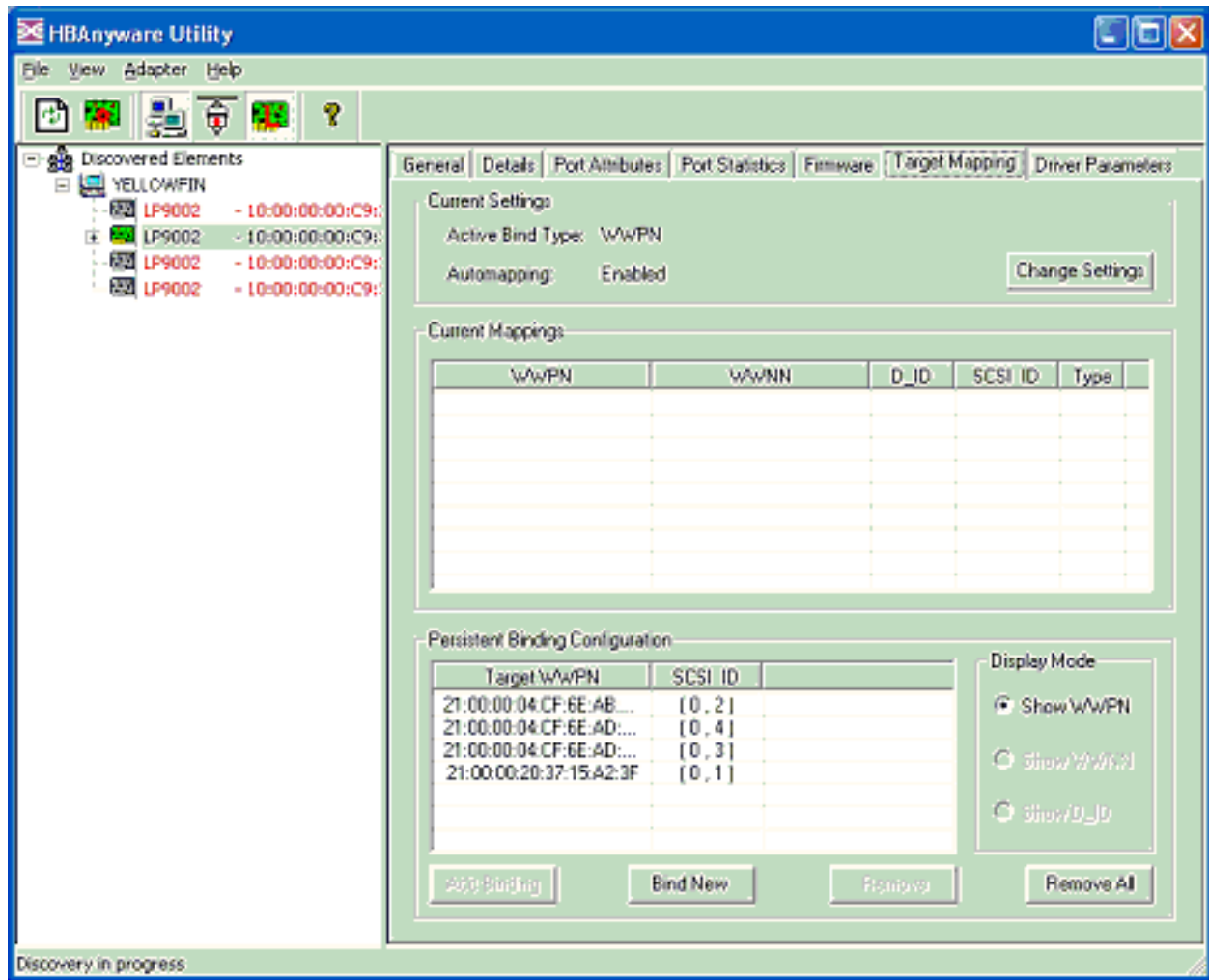
View Target Mapping and Set Up Persistent Binding

The Target Mapping tab in HBAnyware enables you to view current target mapping and to set up persistent binding.

View Target Mapping

To view the Target Mapping tab, 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 target in the discovery tree.



Set Up Persistent Binding

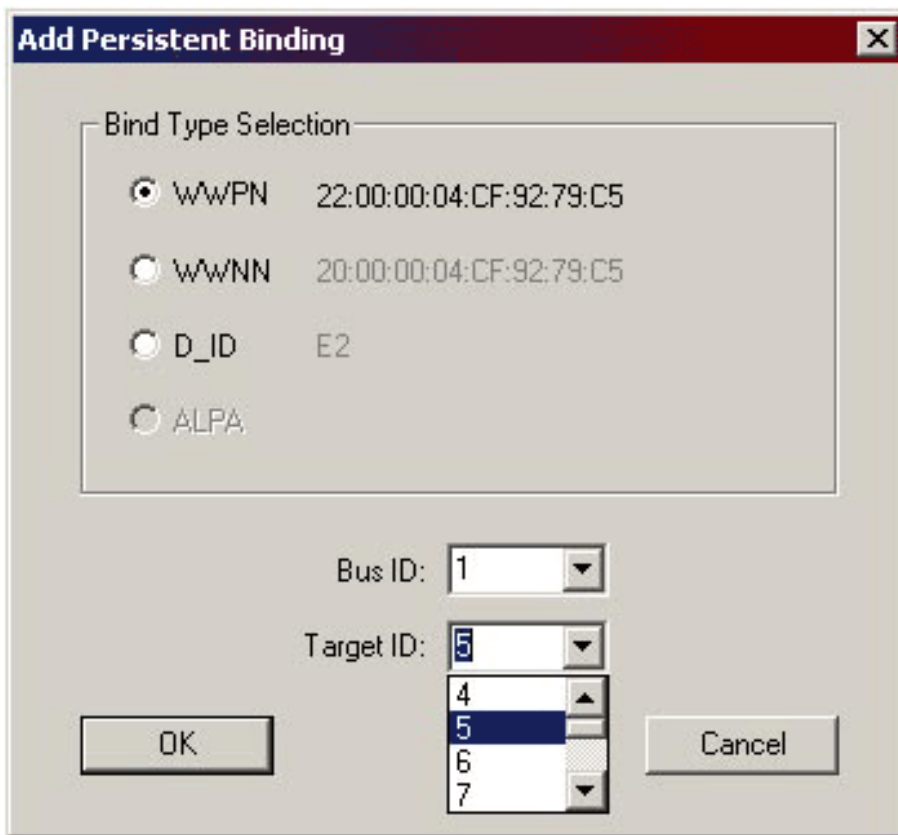
To set up persistent binding, do the following:

1. Start HBAAnyware.
2. In the directory tree, click the host bus adapter (HBA) 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), device ID (D_ID), SCSI ID, or Type. This can be either 'PB', indicating that the mapping was the result of a persistent binding, or 'Auto', indicating that the target was automapped. 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

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.



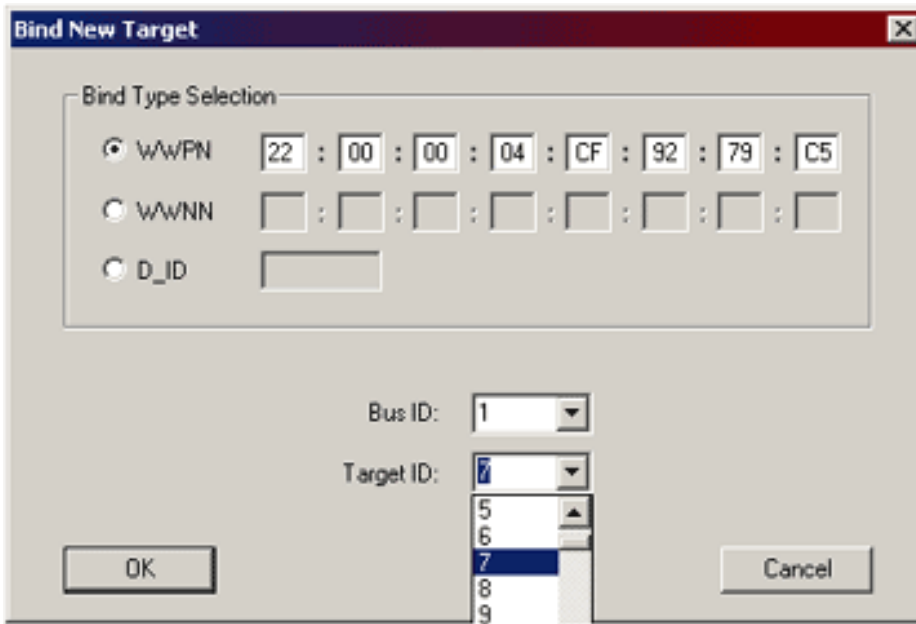
3. Select the Bind Type that you want to use (WWPN, WWNN or D_ID).
4. Select the Bus ID and Target ID that you want to bind, and click OK.

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.

View LUN Attributes

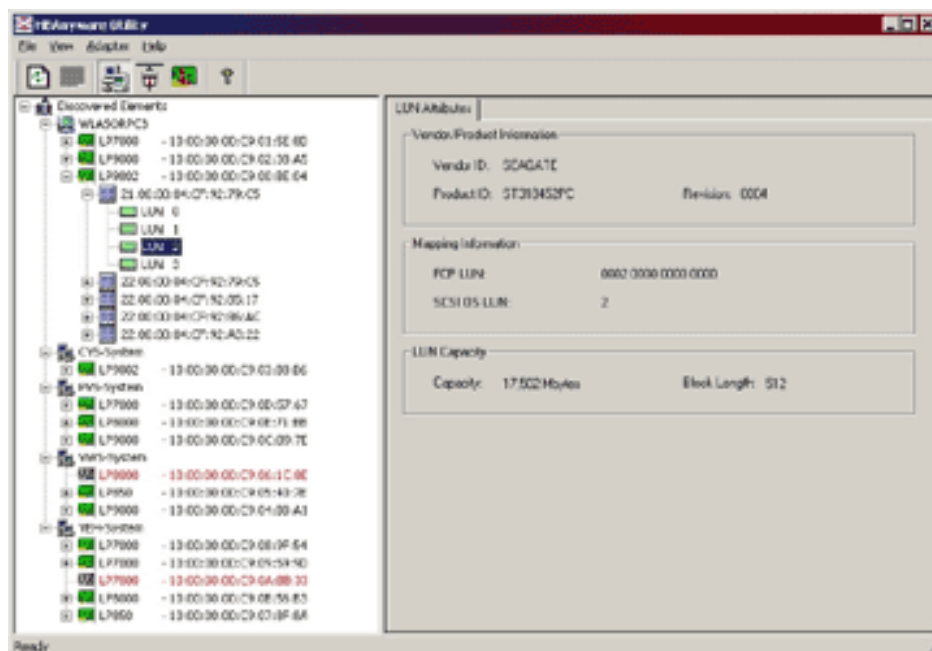
The LUN Attributes tab in HBAnyware contains information specific to the selected logical unit number (LUN).

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.

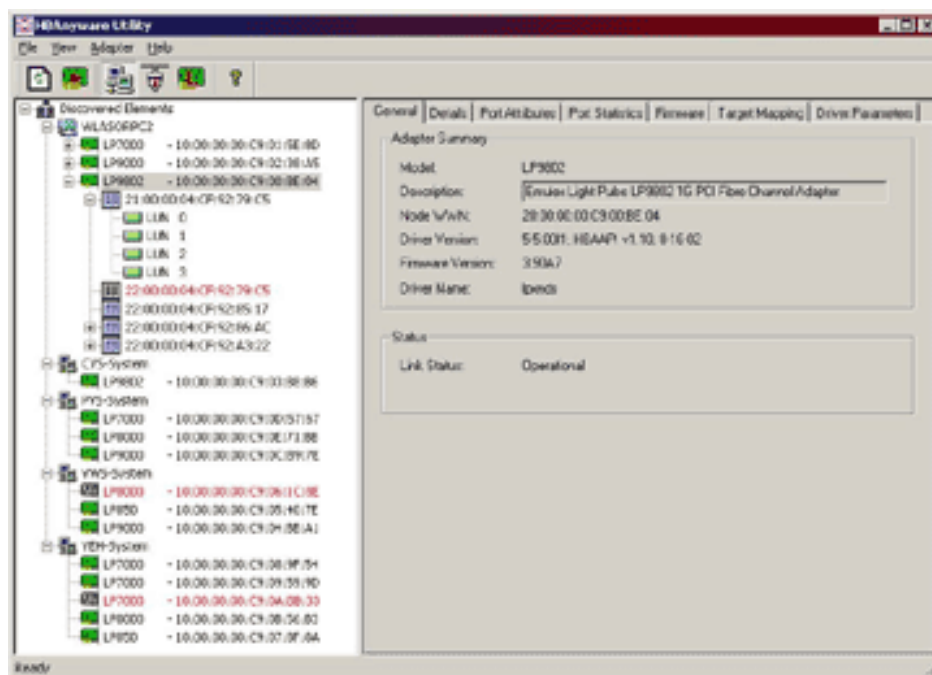
Block Length - the length of a logical unit block in bytes.

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:

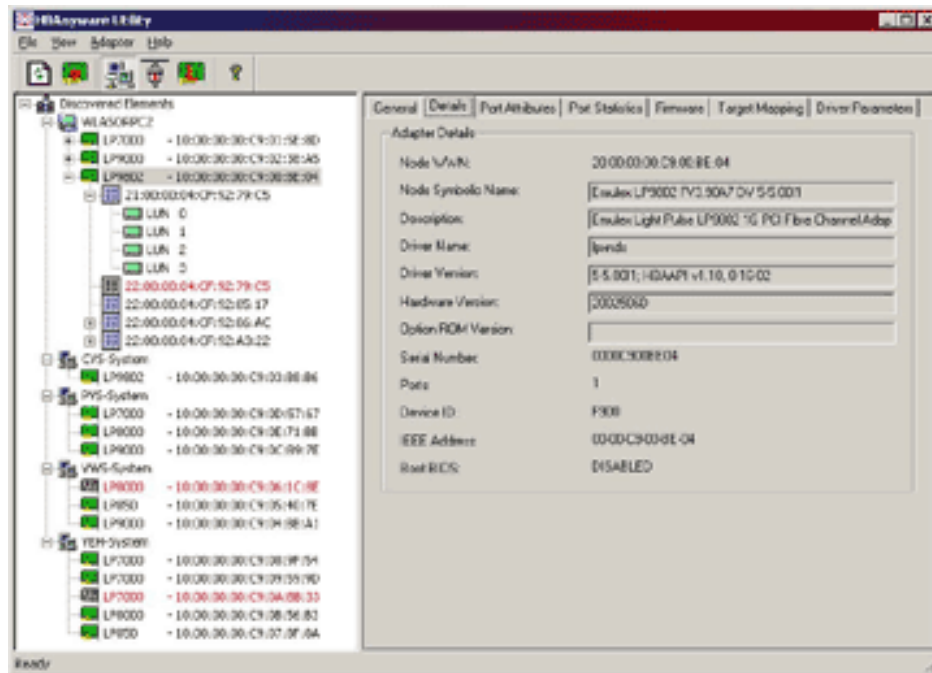
- The operational state indicates that the HBA is connected to the network and operating normally.
- All other states indicate that the HBA is not connected to the network. Gray HBA icons with red descriptive text indicate that the HBA is offline. These offline states are:
 - User offline - the adapter 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.

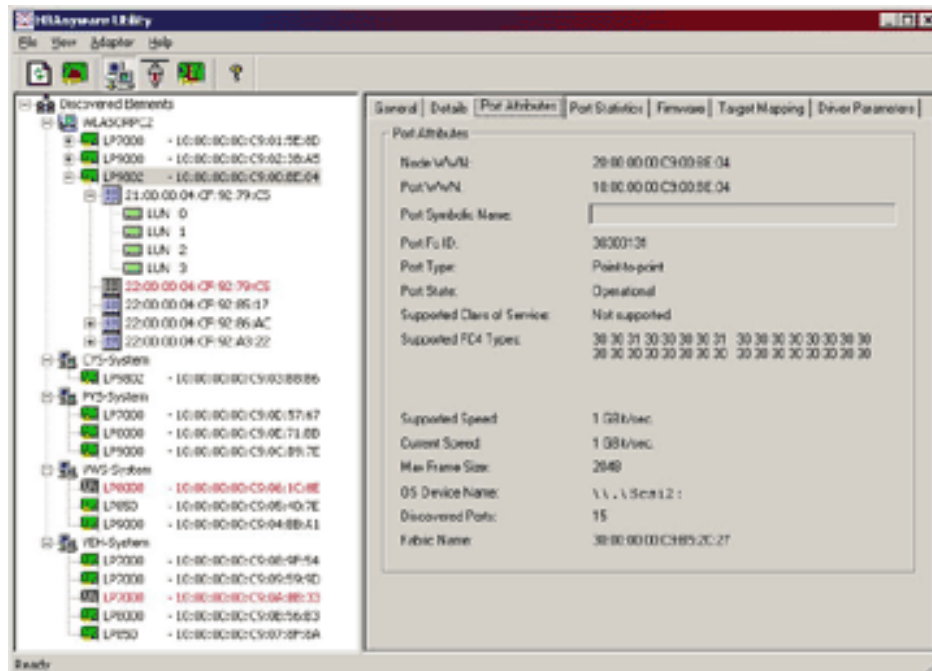
- Description - a formal description of the HBA, including model number, bus type and link speed.
- Driver Name - an executable file image name for the driver as it appears in the Emulex driver download package.
- Driver Version - the driver version number and the HBA application programming interface (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 HBAAnyware contains information about the port on the selected host bus adapter (HBA).

To view port attributes, do the following:

1. Start HBAAnyware.
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.

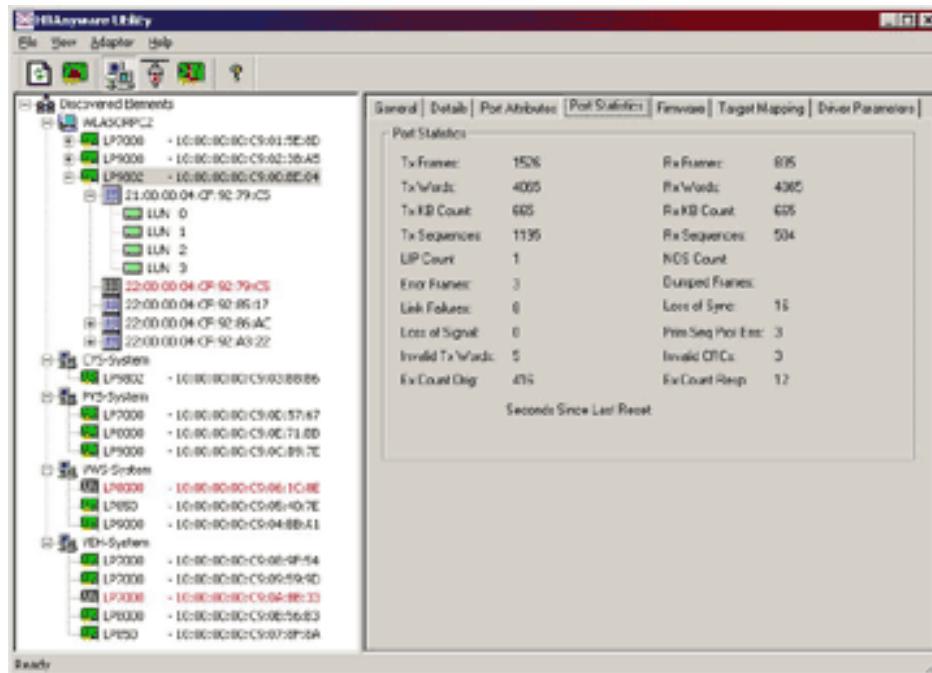
Fabric Name or Host Name - if fabric sort is selected, a 64-bit worldwide unique identifier assigned to the fabric. If host name is selected, the name of the host on which the HBA is installed.

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.

Update Firmware - Introduction

You can update firmware using either lputilnt or HBAnyware.

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

Load Firmware Using Iputilnt

Prerequisites

- One of the following drivers is installed and loaded properly:
 - SCSIport Miniport driver for Windows Server 2003, Windows 2000 or Windows NT.
 - Storport Miniport driver for Windows Server 2003.
- The LightPulse utility (Iputilnt for 32-bit systems or Iputil64 for 64-bit systems) is installed properly.
- The appropriate firmware file has been downloaded and unzipped to a local drive.
- The system is in a state in which this type of maintenance can be performed:
 - I/O activity on the bus has been quieted.
 - Cluster software, or any other software that relies on the HBA to be available, has been stopped or paused.

Caution If you are using Iputilnt to update firmware on an LP10000DC, LP10000, LP1050DC, LP1050 or LP9802DC HBA, you must use Iputilnt version 1.6a9 or later. For any other HBA, you can use Iputilnt version 1.5a1 or later.

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

Procedure

1. Ensure that the firmware update prerequisites have been met.
2. Click Start, Programs and Iputilnt or Iputil64.
3. Select the desired host adapter.
4. Select Firmware Maintenance from the Category list.

Note If the letter W appears next to a firmware entry, it indicates that the image is represented in the wakeup parameters. This means that the HBA will use that specific image if it needs a firmware image.

5. Click Download.
6. Locate the new firmware file.
7. Click Open.
8. The new firmware is transferred to flash ROM.

If you are updating the firmware on a dual-channel HBA, repeat steps 2 through 7 to update the firmware on the second port.

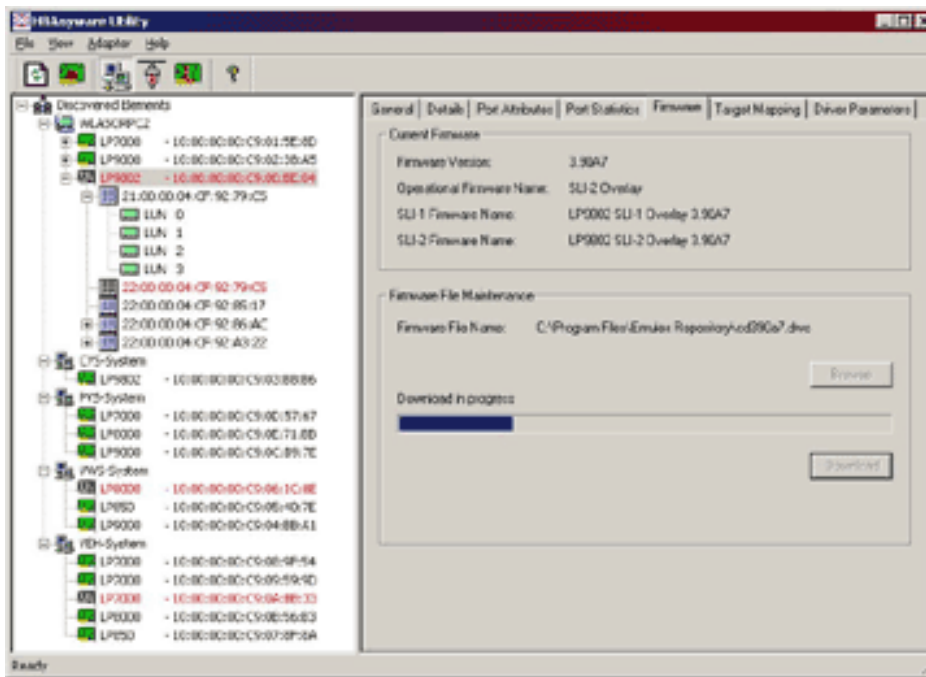
Load Firmware Using HBAnyware

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.

Download PCI Configuration Files

This LightPulse Utility (lputilnt) window provides information about the data in each of the configuration regions in the flash ROM of the selected host adapter. Select a region in the drop-down Region list, and the data contained in that region is displayed. Regions 5, 6 and 7 allow you to download PCI configuration data files to the selected region to change the PCI configuration (PCI device ID).

Note Downloading PCI configuration files is not applicable to the following Emulex HBAs: LP982, LP952L and LP850.

Caution Download PCI configuration files only with the assistance of Emulex technical support.

Global Automap and Unmasking Overview

Globally Automap All Targets

Global Automap All Targets defaults to enabled, to allow the Emulex driver to detect all Fibre Channel 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 SCSI bus and SCSI ID may change when the system is rebooted. When persistent binding is applied to one of these targets, the SCSI bus and SCSI ID remain the same, whether the system is rebooted or Global Automap All Targets is disabled.

If Global Automap All Targets is disabled, the Emulex driver detects Fibre Channel devices attached to the HBA, and does not pass them to the operating system unless they are already persistently bound.

Globally Automap All LUNs

Global Automap All LUNs defaults to enabled and assigns an operating system LUN ID to a Fibre Channel LUN ID for all LUNs behind the targets in your SAN. LUN mapping can also be enabled and disabled at the target level.

Global automapping of LUNs is different from persistent binding. Global LUN automapping does not concern itself with the SCSI ID or SCSI Bus. This is because the global LUN mapping will stay the same for the target when the system is rebooted.

Globally Unmask All LUNS

Globally Unmask All LUNS defaults to enabled, to allow the operating system to see all LUNS behind all targets.

If Globally Unmask All LUNS is set to disabled and you want the operating system to see the LUNS behind a specific target, you need to set unmasking at the target level.

Target LUN Automapping Overview

Target LUN automapping defaults to disabled. If enabled, target LUN automapping assigns operating system LUN IDs to a fixed Fibre Channel target's physical LUNs. Global LUN automapping must be disabled to do target LUN automapping.

Target LUN automapping is different from persistent binding. Persistent binding assigns a binding type (world wide node name, world wide port name or destination identifier) of a Fibre Channel target device to an operating system target ID, SCSI bus and SCSI ID. The SCSI bus and SCSI ID may change when the system is rebooted. When persistent binding

is applied to one of these target devices, the SCSI bus and SCSI ID remain the same when the system is rebooted or global target automapping is disabled.

LUN paths are displayed in Disk Manager (when you perform a re-scan) and are displayed dynamically in HBAnyware.

Target LUN Masking Overview

Target LUN masking defaults to disabled. You can mask and unmask LUNs at the target level. If you have unmasked all LUNs for a specific target (either using the global or target functions), you can mask and unmask an individual LUN as well. The HBA can detect all LUNS for the specific target and will present only the unmasked ones.

Mapping and Masking Window Defaults

The following table describes LUN mapping and masking global defaults.

Field (Function)	Default	Description	Window	
Globally Automap All Targets	Enabled	Emulex driver detects all Fibre Channel devices attached to the Emulex host bus adapters.	Global Automap	
Globally Automap All LUNS	Enabled	Assigns an operating system LUN ID to a Fibre Channel LUN ID for all LUNS behind all targets in the system area network.	Global Automap	
Globally Unmask All LUNS	Enabled	Allows the operating system to see all LUNS behind all targets.	Global Automap	
Automap All LUNS (Target Level)	Disabled	If Globally Automap All LUNS is disabled, this parameter assigns an operating system LUN ID to a Fibre Channel LUN ID for all LUNS behind the selected target.	LUN Mapping	

LUN Unmasking (Target Level)	Disabled	Allows the operating system to see all LUNS behind the selected target. If this parameter is enabled, each individual LUN can be masked or unmasked.	LUN Mapping	
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Globally Automap All Targets

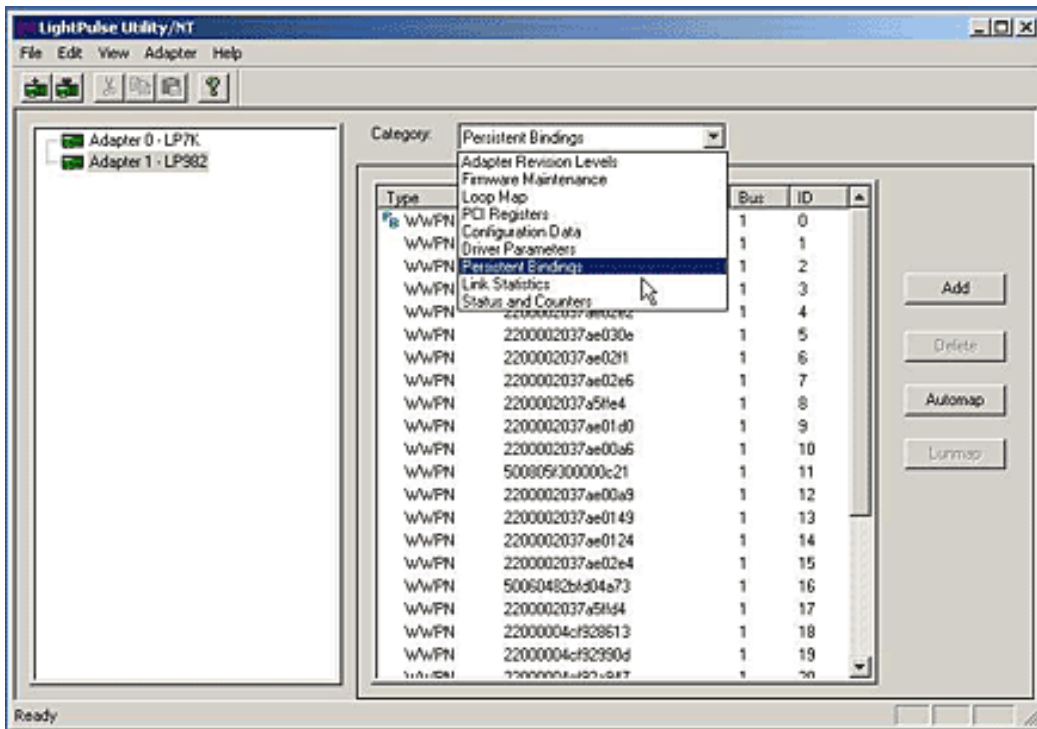
Global Automap All Targets defaults to enabled, to allow the Emulex driver to detect all Fibre Channel devices attached to the Emulex host bus adapters (HBAs).

Prerequisites

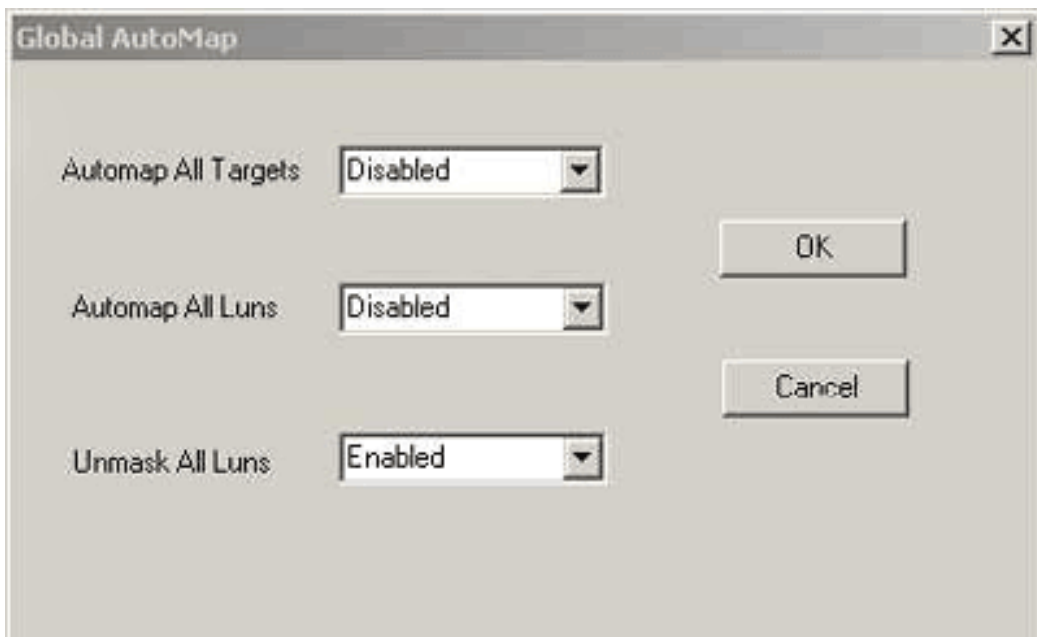
- One of the following drivers installed (see the online Installation manual for more information):
 - SCSIport Miniport adjunct driver
 - Storport Miniport driver
- Installed LightPulse Utility (lputilnt for 32-bit systems, lputil64 for 64-bit systems).
- At least one target device with LUNs has been properly configured.

Procedure

1. Start lputilnt or lputil64.
2. Select a host bus adapter (HBA).
3. Select Persistent Bindings from the Category list.



4. Click Automap. The Global Automap window is displayed.



5. Change the Automap All Targets setting

6. Click OK. The window closes.

A reboot is required for the change to take effect.

Note When persistent binding is applied to one of these targets, the SCSI bus and SCSI ID remain the same, whether the system is rebooted or Global Automap All Targets is disabled.

Globally Automap All LUNs

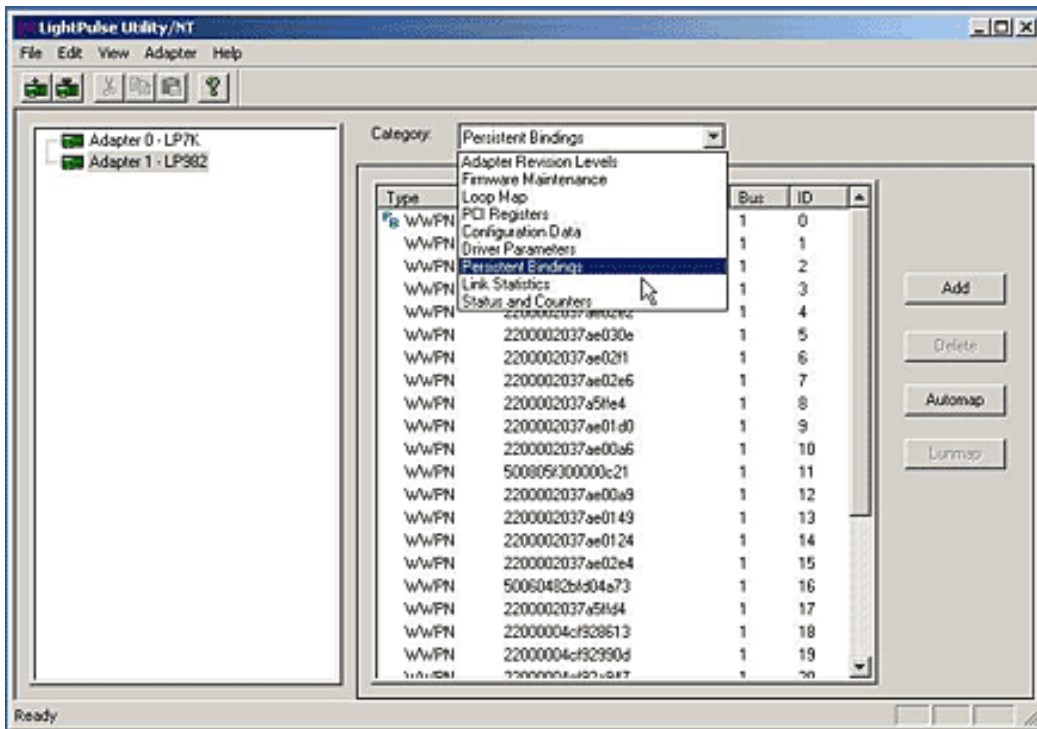
Global Automap All LUNs defaults to enabled and assigns an operating system LUN ID to a Fibre Channel LUN ID for all LUNs behind the targets in your SAN. LUN mapping can also be enabled and disabled at the target level.

Prerequisites

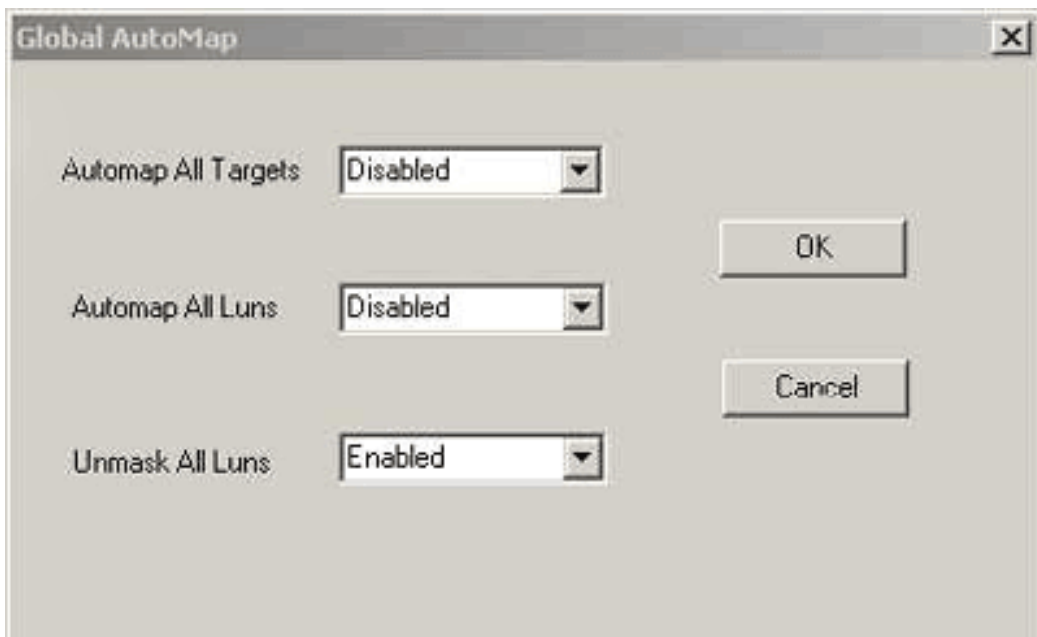
- One of the following drivers installed (see the online Installation manual for more information):
 - SCSIport Miniport adjunct driver or
 - Storport Miniport driver
- Installed LightPulse Utility (lputilnt for 32-bit systems, lputil64 for 64-bit systems).
- A target device with LUNs that have been properly configured.

Procedure

1. Start lputilnt or lputil64.
2. Select a host bus adapter (HBA).
3. Select Persistent Bindings from the Category list.



4. Click Automap. The Global Automap window is displayed.



5. Change the Automap All LUNs setting.

6. Click OK. The window closes.

A reboot is required for the change to take effect.

Globaly Unmask or Mask All LUNs

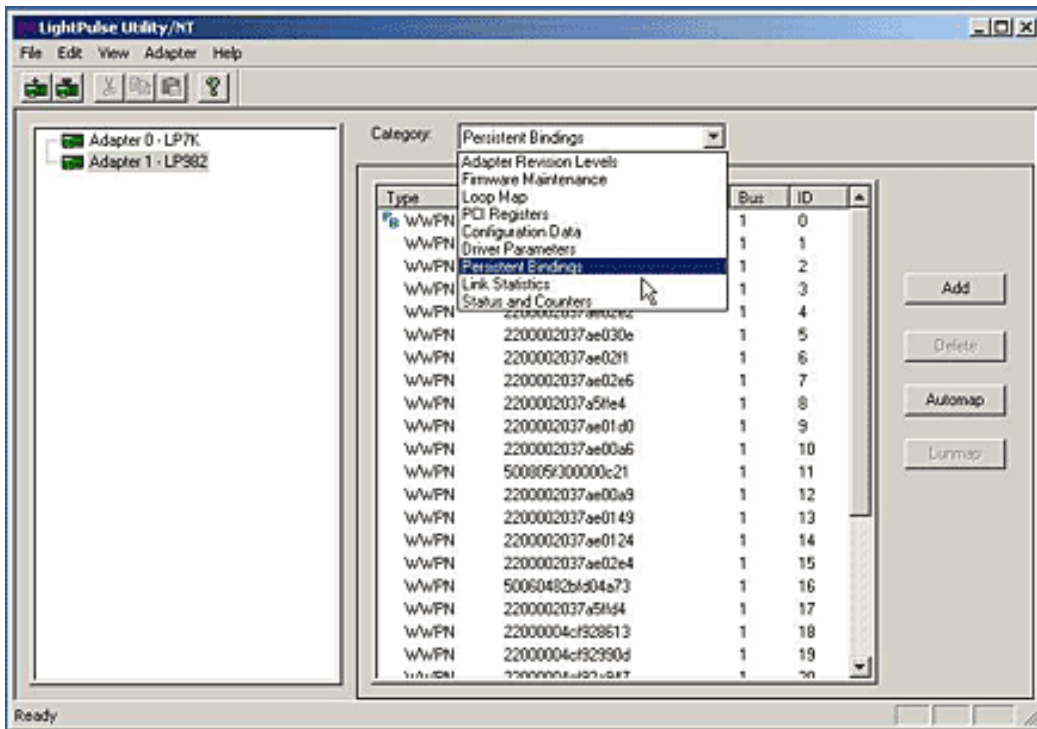
Globally Unmask All LUNs defaults to enabled, to allow the operating system to see all LUNs behind targets.

Prerequisites

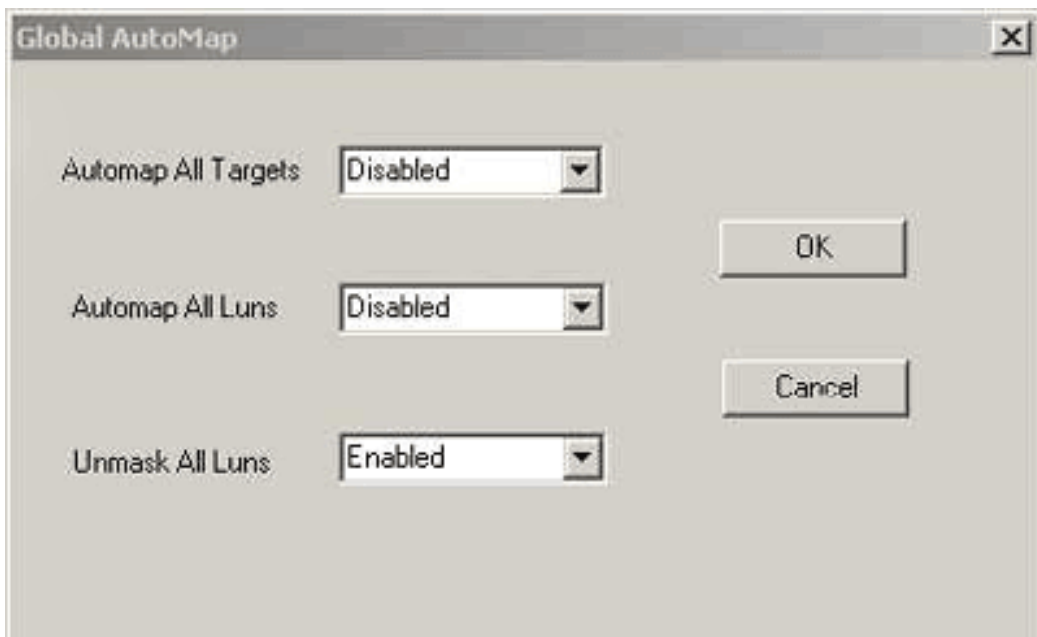
- One of the following drivers installed (see the online Installation manual for more information):
 - SCSIport Miniport adjunct driver
 - Storport Miniport driver
- Installed LightPulse Utility (lputilnt for 32-bit systems, lputil64 for 64-bit systems).
- A target device with LUNs that have been properly configured.

Procedure

1. Start lputilnt or lputil64.
2. Select a host bus adapter (HBA).
3. Select Persistent Bindings from the Category list.



4. Click Automap. The Global Automap window is displayed.



5. Change the Unmask All LUNs setting.

6. Click OK. The window closes.

No reboot is required for this change to take effect.

Automap LUNs for a Target

Target LUN automapping defaults to disabled. If enabled, target LUN automapping assigns an operating system LUN ID to a fixed Fibre Channel target's physical LUN.

Prerequisites

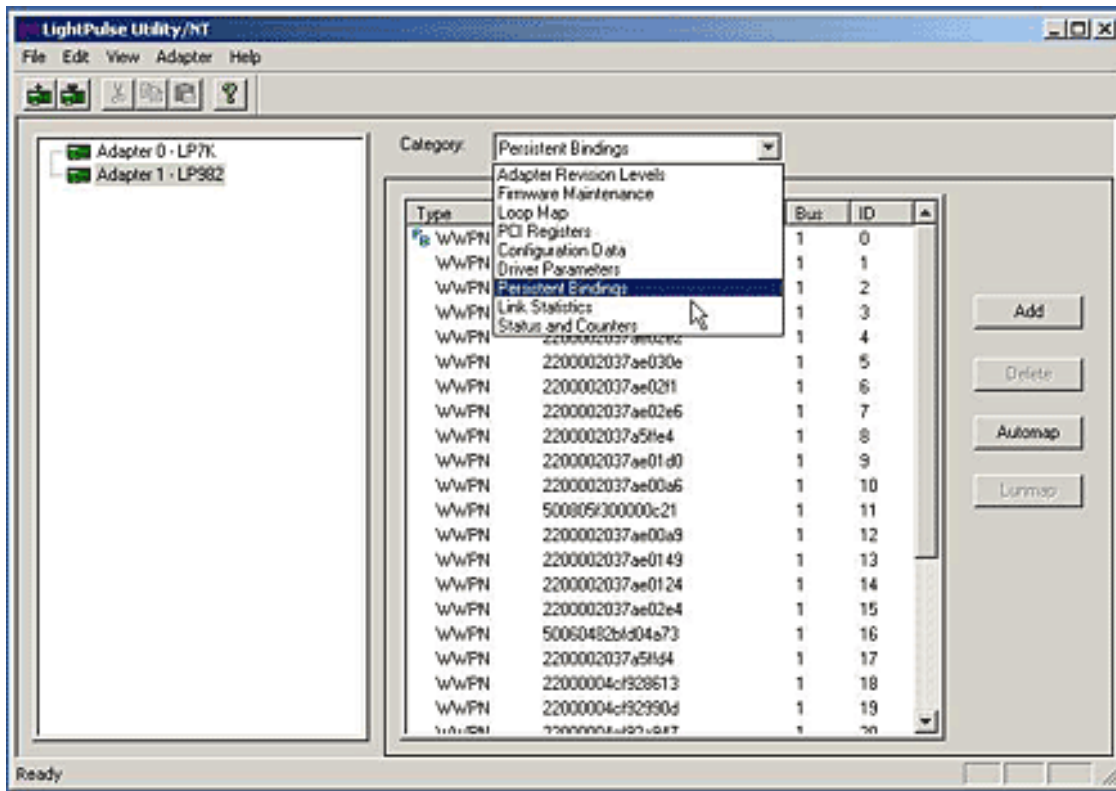
- One of the following drivers installed (see the online Installation manual for more information):
 - SCSIport Miniport adjunct driver
 - Storport Miniport driver
- Installed LightPulse Utility (lputilnt for 32-bit systems, lputil64 for 64-bit systems).
- A target device with LUNs that have been properly configured.
- Global Automap All LUNs disabled.

Procedure

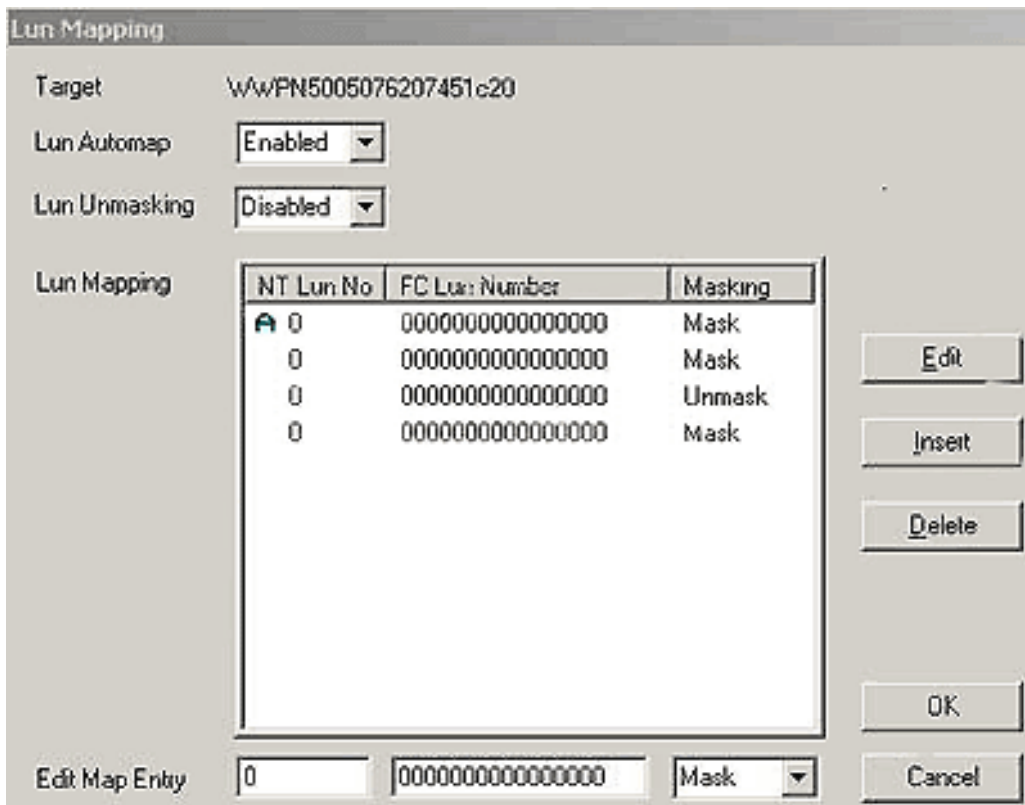
1. Start lputilnt or lputil64.
2. Select a host bus adapter (HBA).

Note The Global Automap All LUNs function must be disabled. If necessary, disable this function and reboot the system.

3. Select Persistent Bindings from the Category list. All targets are displayed.



- Click on a target. The Lunmap button becomes active. Click Lunmap. The Lun Mapping window is displayed.



5. Set the LUN Automap function to enabled. Target automapping assignment occurs and these assignments are displayed on the LUN Mapping window.
6. Click OK.
7. Reboot the system for these changes to take effect.

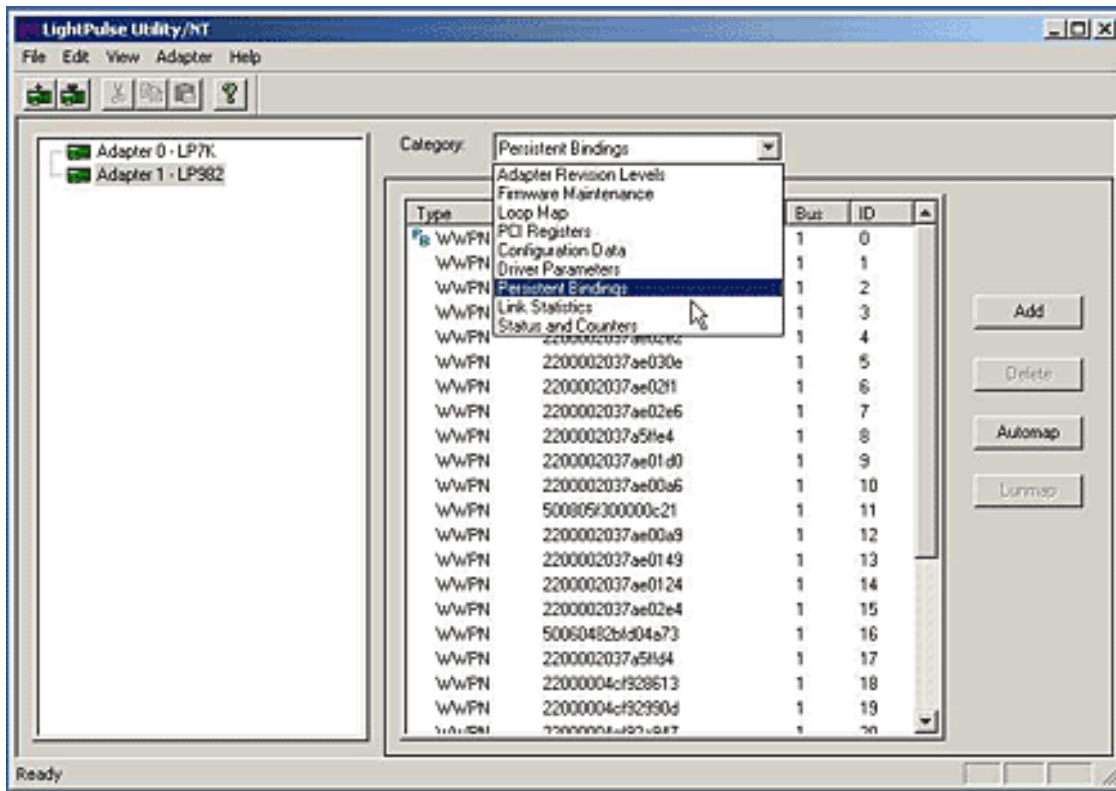
LUN Masking and Unmasking for a Target

Prerequisites

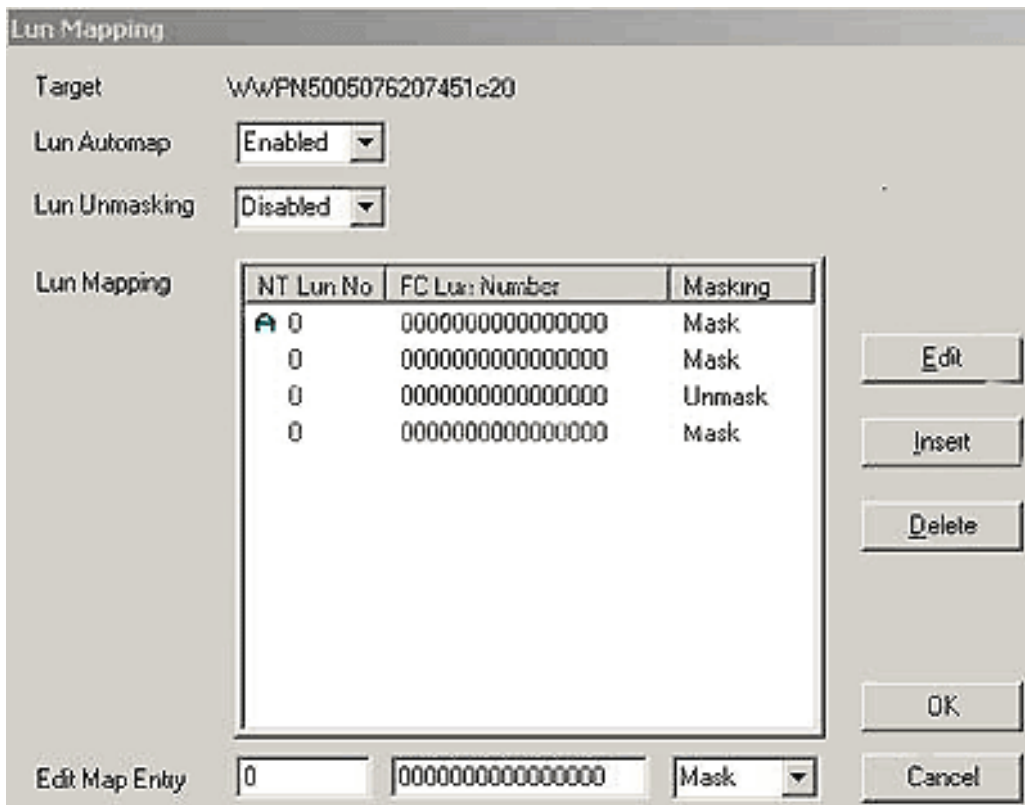
- One of the following drivers installed (see the online Installation manual for more information):
 - SCSIport Miniport adjunct driver
 - Storport Miniport driver
- Installed LightPulse Utility (lputilnt for 32-bit systems, lputil64 for 64-bit systems).
- A target device with LUNs that have been properly configured.

Procedure

1. Start lputilnt or lputil64.
2. Select a host bus adapter (HBA).
3. Select Persistent Bindings from the Category list. All targets are displayed.



4. Click on a target. The Lunmap button becomes active. Click Lunmap. The Lunmap window is displayed. All LUNs are displayed for the target.



Note If LUNs are not displayed, LUN mapping has been disabled at the global level and not enabled at the target level, or the LUNs have been masked at the global level.

- a. To unmask or mask all LUNs for the target, set the LUN Unmasking function to enabled.
 - b. To mask or unmask a LUN, select the row and click Edit. In the Edit Map Entry area, click on the Mask (Unmask) field to change the status.
5. Click OK. No reboot is required for these changes to take effect.

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 lputilnt or HBAnyware.

- lputilnt 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 SCSIport Miniport 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 lputilnt).

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 Iputilnt

The persistent binding feature allows you to control the devices that are to be presented to the system.

The Emulex Miniport 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).

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:

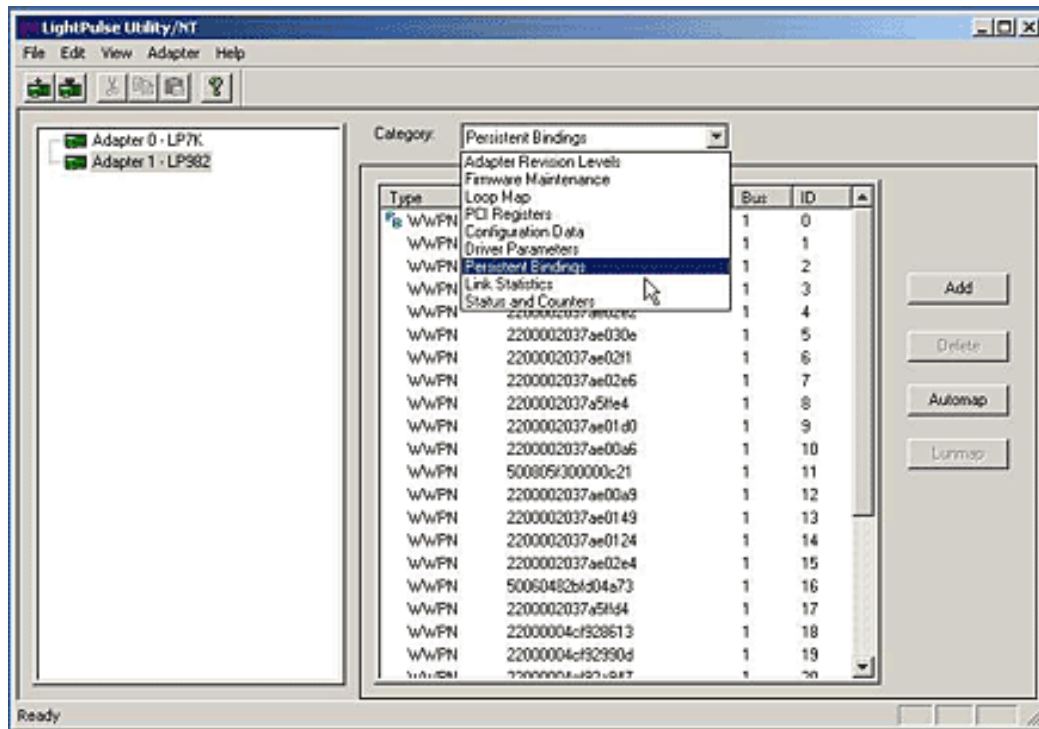
- Binding type (world wide port name (WWPN), world wide node name (WWNN), or a destination identifier (D_ID))
- SCSI bus
- SCSI ID

Prerequisites

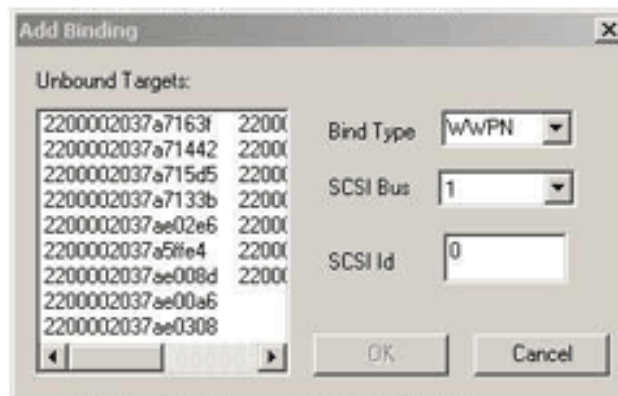
- Installed Miniport driver with the adjunct driver (see the online Installation manual for more information).
- Installed LightPulse Utility (Iputilnt) (see the online Installation manual for more information).
- Global Automap All Targets is enabled. Global Automap All Targets is enabled or disabled from the Global Automap window.

Procedure to Set Up Persistent Binding

1. Click Start, Programs and Iputilnt.
2. Select a host bus adapter (HBA).
3. Select Persistent Binding from the Category list. All targets are displayed.



4. Click on a target and click Add. The Add Binding window is displayed.

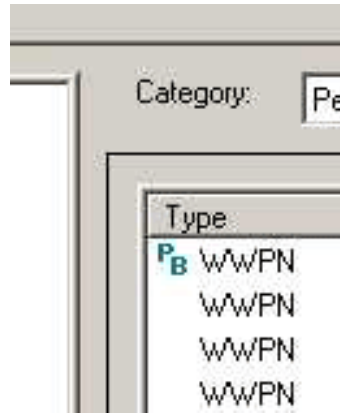


5. In the Unbound Targets list, click the target to be bound.

6. If necessary, change the Bind Type for the target.

7. If necessary, change the SCSI Bus and SCSI ID values.

8. Click OK, and the target is bound. The letters "PB" will be displayed next to the target row.

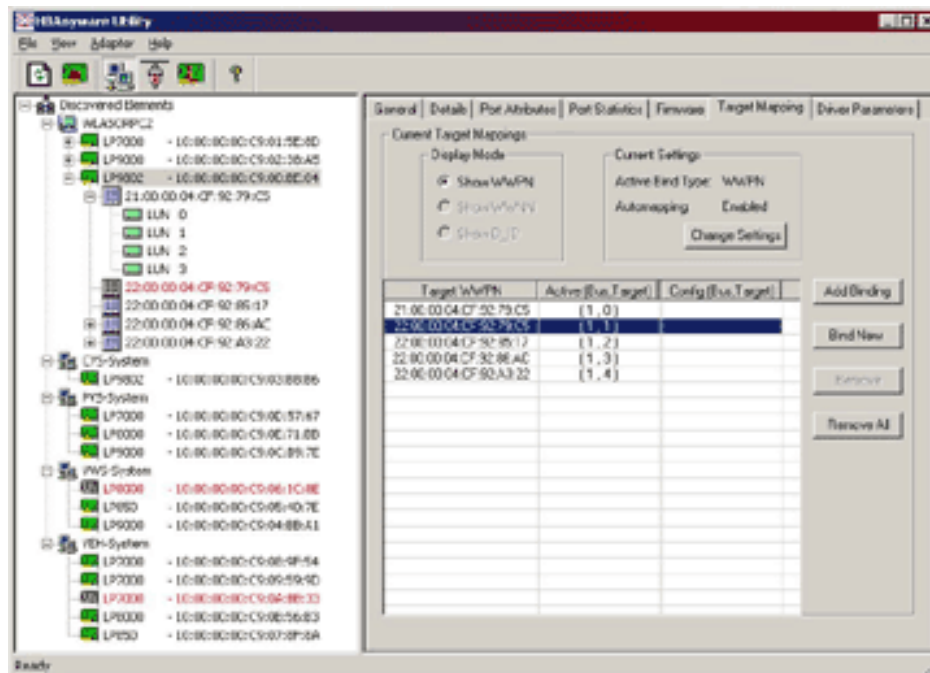


9. Reboot the system. Targets that are persistently bound will be displayed.

Set Up Persistent Binding Using HBAnyware

To set up persistent binding, do the following:

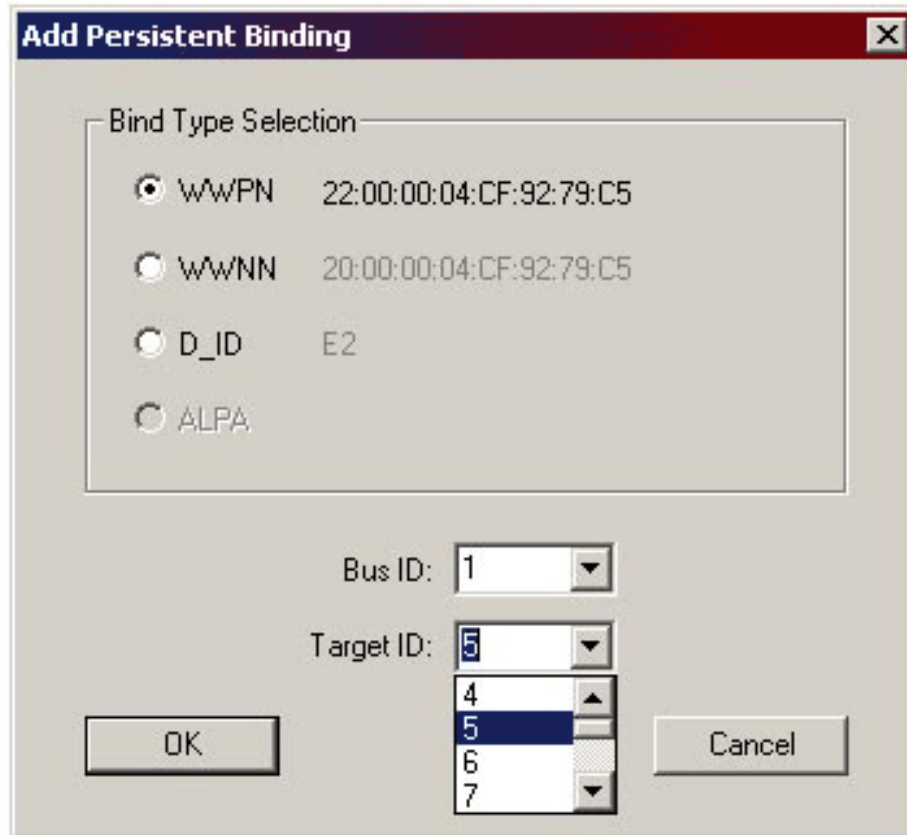
1. Start HBAnyware.
2. In the directory tree, click the adapter for which you want to set up persistent binding.
3. Click the Target Mapping tab. All targets are displayed.



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.



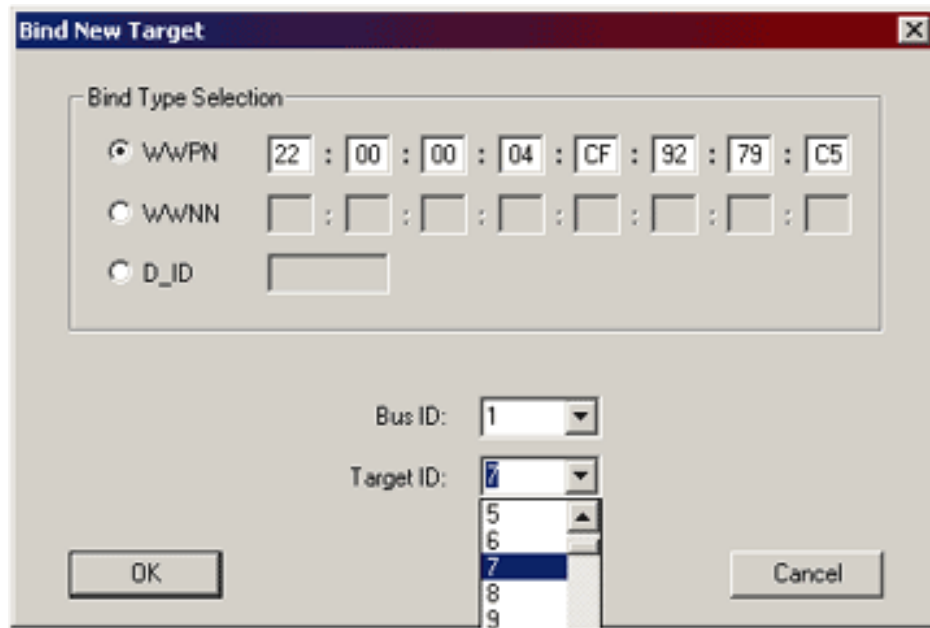
3. Select the Bind Type that you want to use (WWPN, WWNN or D_ID).
4. Select the Bus ID and Target ID that you want to bind, and click OK.

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.

Hot Swapping a Device

Environments that allow hot-swapping of an array controller or drive typically require mapping the new device in place of the old. If the new device has a different WWPN than the original device, it will be remapped as a new device. The following registry options determine whether a device is mapped based on its WWPN, NodeName or D_ID:

Map to	Registry Settings
WWPN (default)	HardAddress=0;MapNodeName=0;
Nodename	HardAdress=0;MapNodeName=1;
D_ID	HardAddress=1; (MapNodeName=doesn't matter)

Procedure

1. Device mapping must be set to either NodeName or D_ID. If necessary, use `lputilnt` (Driver Parameter category) to switch the mapping to either NodeName or D_ID.
 - Map by NodeName (HardAddress=0;MapNodeName=1). Upon replacement, a disk array with one or more hot swappable controllers maintains the same Fibre Channel node name, but uses a unique Fibre Channel WWPN per controller.
 - Map to D_ID (HardAddress=1; (MapNodeName=doesn't matter)). Upon replacement, a native Fibre Channel disk drive or array controller identifies itself with a different Fibre Channel node name and WWPN.
2. If the parameter was changed in step 1, reboot the system.
3. Remove the old disk array, array controller or disk drive.
4. Install the new device.

The new device will map correctly.

Topology Information

The driver supports two modes of operation based on the parameter: "Topology=n". These are arbitrated loop and point-to-point.

Note The presence of a fabric is detected automatically.

Topology values may be 0 to 3.

- If set to 0 = FC-AL (arbitrated loop).
- If set to 1 = point-to-point fabric.
- If set to 2= *FC-AL attempt first, then attempt point-to-point.
- If set to 3= *point-to-point fabric attempted first, then attempt FC-AL.

Note * Topology fail-over requires v3.20 firmware or higher. If firmware is used that does not support topology fail-over options 0 and 2 are analagous, and options 1 and 3 are analagous.

Arbitrated Loop Operation

FC-AL (Loop) topology only is used. After successful loop initialization, the driver attempts login with FL_PORT (switched fabric loop port).

- If FL_PORT login is successful, public loop operation is employed.
- If FL_PORT login is unsuccessful, private loop mode is entered.

Point-to-Point Operation

- If F_PORT (point-to-point) login is successful, fabric mode is used.
- If F_PORT login is unsuccessful, N_PORT-to-N_PORT direct connection topology will be used.

If a switch is discovered, the driver performs the following tasks:

- FL_PORT login (Topology=0;).
- F_PORT login (Topology=1;).
- Simple Name Server login.
- State Change Registration.
- Symbolic Name Registration.
- FCP Type Registration if RegFcpType is set to 1.
- The driver logs out and re-logs in. The name server indicates that registration is complete.
- Simple Name Server Query for devices (the registry parameter SnsAll determines whether all N_Ports are requested (SnsALL=1;) or only SCSI FCP N_Ports (SnsAll=0; default)
- Discovery/device creation occurs for each target device described by the Name Server.
- RSCN and LOGO/PRLO are handled by the driver. Reception of either causes new discovery/logins to take place.

Note 1: This driver is "Soft-Zone-Safe".

2: In a fabric environment, the order that disk devices are created is based upon the name server response data (which is not guaranteed to be in any special order). Between successive boots, the same device **may be identified with a different physical device number**. However, any devices which have been assigned a device letter through disk administrator continue to use that letter regardless of the physical device number.

Map Device IDs

The mapping scheme is different between fabric devices and private loop devices. If global automap is enabled, the following mapping information applies.

Switched Fabric Environment

In a switched fabric environment, devices are initially mapped based on the order they are returned from the simple name server (SNS). Once the devices are mapped (at boot), the devices continue to be tracked based on how the HardAddress and MapNodeName parameters are set:

- WWPN: HardAddress=0;MapNodeName=0;
- NodeName: HardAddress=0;MapNodeName=1;
- D_ID: HardAddress=1;(MapNodeName=doesn't matter)

Private Loop Environment

In a private loop environment (FC–AL, no switch), devices are initially mapped based on a fixed address ordering.

Windows Server 2003 and Windows 2000 SCSI Map Table

Windows NT SCSI Map Table

Once mapped (at boot), the devices continue to be tracked based on how the HardAddress and MapNodeName parameters are set:

- WWPN: HardAddress=0;MapNodeName=0;
- NodeName: HardAddress=0;MapNodeName=1;
- D_ID: HardAddress=1;(MapNodeName=doesn't matter)

SCSI Address Map - Windows Server 2003 and Windows 2000

The driver emulates two SCSI busses and 128 targets on each bus to map 256 devices maximum.

The device mapping starts on either Bus 0 or Bus 1, depending on the driver EmulexOption parameter.

This table identifies the fixed mapping between the Windows Server 2003 or Windows 2000 bus/target/LUN and the Fibre Channel native address (AL_PA/SEL_ID). There are two potential mappings based on the ScanDown parameter. Refer to the appropriate columns in the table below.

The index for the following table can be derived by:

```
#define TARGETS_PER_BUS 128
i = (Srb->PathId > 0) ? Srb->PathId-1 : 0; //Bus 0 = dummy bus
nodeInx = ((i * TARGETS_PER_BUS) + Srb->TargetId) ;
```

- * Use this translation if ScanDown = 0 (default)
- ** Use this translation if ScanDown = 1
- *** If bit 9 of EmulexOption = 0;, then device addressing begins with Bus #0, not Bus #1

			ScanDown = 0 (default)		ScanDown = 1	
BUS #	TARGET #	LUN #	AL_PA*	SEL_ID*	AL_PA**	SEL_ID**
0	0-127	0-255	none	none	none	none
1***	0	0-255	0x01	0x7D	0xEF	0x00
	1	0-255	0x02	0x7C	0xE8	0x01
	2	0-255	0x04	0x7B	0xE4	0x02
	3	0-255	0x08	0x7A	0xE2	0x03
	4	0-255	0x0F	0x79	0xE1	0x04
	5	0-255	0x10	0x78	0xE0	0x05
	6	0-255	0x17	0x77	0xDC	0x06
	7	0-255	0x18	0x76	0xDA	0x07
	8	0-255	0x1B	0x75	0xD9	0x08

9	0-255	0x1D	0x74	0xD6	0x09
10	0-255	0x1E	0x73	0xD5	0x0A
11	0-255	0x1F	0x72	0xD4	0x0B
12	0-255	0x23	0x71	0xD3	0x0C
13	0-255	0x25	0x70	0xD2	0x0D
14	0-255	0x26	0x6F	0xD1	0x0E
15	0-255	0x27	0x6E	0xCE	0x0F
16	0-255	0x29	0x6D	0xCD	0x10
17	0-255	0x2A	0x6C	0xCC	0x11
18	0-255	0x2B	0x6B	0xCB	0x12
19	0-255	0x2C	0x6A	0xCA	0x13
20	0-255	0x2D	0x69	0xC9	0x14
21	0-255	0x2E	0x68	0xC7	0x15
22	0-255	0x31	0x67	0xC6	0x16
23	0-255	0x32	0x66	0xC5	0x17
24	0-255	0x33	0x65	0xC3	0x18
25	0-255	0x34	0x64	0xBC	0x19
26	0-255	0x35	0x63	0xBA	0x1A
27	0-255	0x36	0x62	0xB9	0x1B
28	0-255	0x39	0x61	0xB6	0x1C
29	0-255	0x3A	0x60	0xB5	0x1D
30	0-255	0x3C	0x5F	0xB4	0x1E
31	0-255	0x43	0x5E	0xB3	0x1F
32	0-255	0x45	0x5D	0xB2	0x20
33	0-255	0x46	0x5C	0xB1	0x21
34	0-255	0x47	0x5B	0xAE	0x22
35	0-255	0x49	0x5A	0xAD	0x23
36	0-255	0x4A	0x59	0xAC	0x24
37	0-255	0x4B	0x58	0xAB	0x25
38	0-255	0x4C	0x57	0xAA	0x26
39	0-255	0x4D	0x56	0xA9	0x27
40	0-255	0x4E	0x55	0xA7	0x28
41	0-255	0x51	0x54	0xA6	0x29
42	0-255	0x52	0x53	0xA5	0x2A

43	0-255	0x53	0x52	0xA3	0x2B
44	0-255	0x54	0x51	0x9F	0x2C
45	0-255	0x55	0x50	0x9E	0x2D
46	0-255	0x55	0x4F	0x9D	0x2E
47	0-255	0x59	0x4E	0x9B	0x2F
48	0-255	0x5A	0x4D	0x98	0x30
49	0-255	0x5C	0x4C	0x97	0x31
50	0-255	0x63	0x4B	0x90	0x32
51	0-255	0x65	0x4A	0x8F	0x33
52	0-255	0x66	0x49	0x88	0x34
53	0-255	0x67	0x48	0x84	0x35
54	0-255	0x69	0x47	0x82	0x36
55	0-255	0x6A	0x46	0x81	0x37
56	0-255	0x6B	0x45	0x810	0x38
57	0-255	0x6C	0x44	0x7C	0x39
58	0-255	0x6D	0x43	0x7A	0x3A
59	0-255	0x6E	0x42	0x79	0x3B
60	0-255	0x71	0x41	0x76	0x3C
61	0-255	0x72	0x40	0x75	0x3D
62	0-255	0x73	0x3F	0x74	0x3E
63	0-255	0x74	0x3E	0x73	0x3F
64	0-255	0x75	0x3D	0x72	0x40
65	0-255	0x76	0x3C	0x71	0x41
66	0-255	0x79	0x3B	0x6E	0x42
67	0-255	0x77A	0x3A	0x6D	0x43
68	0-255	0x7C	0x39	0x6C	0x44
69	0-255	0x80	0x38	0x6B	0x45
70	0-255	0x81	0x37	0x6A	0x46
71	0-255	0x82	0x36	0x69	0x47
72	0-255	0x84	0x35	0x67	0x48
73	0-255	0x88	0x34	0x66	0x49
74	0-255	0x8F	0x33	0x65	0x4A
75	0-255	0x90	0x32	0x63	0x4B
76	0-255	0x97	0x31	0x5C	0x4C

77	0-255	0x98	0x30	0x5A	0x4D
78	0-255	0x9B	0x2F	0x59	0x4E
79	0-255	0x9D	0x2E	0x56	0x4F
80	0-255	0x9E	0x2D	0x55	0x50
81	0-255	0x9F	0x2C	0x54	0x51
82	0-255	0xAE	0x2B	0x53	0x52
83	0-255	0xA5	0x2A	0x52	0x53
84	0-255	0xA6	0x29	0x51	0x54
85	0-255	0xA7	0x28	0x4E	0x55
86	0-255	0xA9	0x27	0x4D	0x56
87	0-255	0xAA	0x26	0x4C	0x57
88	0-255	0xAB	0x25	0x4B	0x58
89	0-255	0xAC	0x24	0x4A	0x59
90	0-255	0xAD	0x23	0x49	0x5A
91	0-255	0xAE	0x22	0x47	0x5B
92	0-255	0xB1	0x21	0x46	0x5C
93	0-255	0xB2	0x20	0x45	0x5D
94	0-255	0xB3	0x1F	0x43	0x5E
95	0-255	0xB4	0x1E	0x3C	0x3C
96	0-255	0xB5	0x1D	0x3A	0x60
97	0-255	0xB6	0x1C	0x39	0x61
98	0-255	0xB9	0x1B	0x36	0x62
99	0-255	0xBA	0x1A	0x35	0x63
100	0-255	0xBC	0x19	0x34	0x64
101	0-255	0xC3	0x18	0x33	0x65
102	0-255	0xC5	0x17	0x32	0x66
103	0-255	0xC6	0x16	0x31	0x67
104	0-255	0xC7	0x15	0x2E	0x68
105	0-255	0xC9	0x14	0x2D	0x69
106	0-255	0xCA	0x13	0x2C	0x6A
107	0-255	0xCB	0x12	0x2B	0x6B
108	0-255	0xCC	0x11	0x2A	0x6C
109	0-255	0xCD	0x10	0x29	0x6D
110	0-255	0xCE	0x0F	0x27	0x6E

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111	0-255	0xD1	0x0E/	0x26	0x6F
112	0-255	0xD2	0x0D	0x25	0x70
113	0-255	0xD3	0x0C	0x23	0x71
114	0-255	0xD4	0x0B	0x1F	0x72
115	0-255	0xD5	0x0A	0x1E	0x73
116	0-255	0xD6	0x09	0x1D	0x74
117	0-255	0xD9	0x08	0x1B	0x75
118	0-255	0xDA	0x07	0x18	0x76
119	0-255	0xDC	0x06	0x17	0x77
120	0-255	0xE0	0x05	0x10	0x78
121	0-255	0xE1	0x04	0x0F	0x79
122	0-255	0xE2	0x03	0x08	0x7A
123	0-255	0xE4	0x02	0x04	0x7B
124	0-255	0xE8	0x01	0x02	0x7C
125	0-255	0xEF	0x00	0x01	0x7D
126	0-255	none	none	none	none
127	0-255	none	none	none	none

SCSI Address Map - Windows NT

The driver emulates eight SCSI busses and 32 targets on each bus to map 256 devices maximum.

The device mapping starts on either Bus 0 or Bus 1, depending on the driver EmulexOption parameter.

This table identifies the fixed mapping between the Windows NT bus/target/LUN and the Fibre Channel native address (AL_PA/SEL_ID). There are two potential mappings based on the ScanDown parameter. Refer to the proper columns in the table below.

The index for the following table can be derived by:

```
#define TARGETS_PER_BUS 32
i = (Srb->PathId > 0) ? Srb->PathId-1 : 0; //Bus 0 = dummy bus
nodeInx = ((i * TARGETS_PER_BUS) + Srb-.TargetId) ;
```

* Use this translation if ScanDown=0 (default)

** Use this translation if ScanDown=1

*** If bit 9 of EmulexOption =0;, then device addressing begins with Bus #0, not Bus #1

			ScanDown = 0 (default)		ScanDown = 1	
BUS #	TARGET #	LUN #	AL_PA*	SEL_ID*	AL_PA**	SEL_ID**
0	0-31	0-7	none	none	none	none
1***	0	0-7	0x01	0x7D	0xEF	0x00
	1	0-7	0x02	0x7C	0xE8	0x01
	2	0-7	0x04	0x7B	0xE4	0x02
	3	0-7	0x08	0x7A	0xE2	0x03
	4	0-7	0x0F	0x79	0xE1	0x04
	5	0-7	0x10	0x78	0xE0	0x05
	6	0-7	0x17	0x77	0xDC	0x06
	7	0-7	0x18	0x76	0xDA	0x07
	8	0-7	0x1B	0x75	0xD9	0x08
	9	0-7	0x1D	0x74	0xD6	0x09
	10	0-7	0x1E	0x73	0xD5	0x0A
	11	0-7	0x1F	0x72	0xD4	0x0B

	12	0-7	0x23	0x71	0xD3	0x0C
	13	0-7	0x25	0x70	0xD2	0x0D
	14	0-7	0x26	0x6F	0xD1	0x0E
	15	0-7	0x27	0x6E	0xCE	0x0F
	16	0-7	0x29	0x6D	0xCD	0x10
	17	0-7	0x2A	0x6C	0xCC	0x11
	18	0-7	0x2B	0x6B	0xCB	0x12
	19	0-7	0x2C	0x6A	0xCA	0x13
	20	0-7	0x2D	0x69	0xC9	0x14
	21	0-7	0x2E	0x68	0xC7	0x15
	22	0-7	0x31	0x67	0xC6	0x16
	23	0-7	0x32	0x66	0xC5	0x17
	24	0-7	0x33	0x65	0xC3	0x18
	25	0-7	0x34	0x64	0xBC	0x19
	26	0-7	0x35	0x63	0xBA	0x1A
	27	0-7	0x36	0x62	0xB9	0x1B
	28	0-7	0x39	0x61	0xB6	0x1C
	29	0-7	0x3A	0x60	0xB5	0x1D
	30	0-7	0x3C	0x5F	0xB4	0x1E
	31	0-7	0x43	0x5E	0xB3	0x1F
2***	0	0-7	0x45	0x5D	0xB2	0x20
	1	0-7	0x46	0x5C	0xB1	0x21
	2	0-7	0x47	0x5B	0xAE	0x22
	3	0-7	0x49	0x5A	0xAD	0x23
	4	0-7	0x4A	0x59	0xAC	0x24
	5	0-7	0x4B	0x58	0xAB	0x25
	6	0-7	0x4C	0x57	0xAA	0x26
	7	0-7	0x4D	0x56	0xA9	0x27
	8	0-7	0x4E	0x55	0xA7	0x28
	9	0-7	0x51	0x54	0xA6	0x29
	10	0-7	0x52	0x53	0xA5	0x2A
	11	0-7	0x53	0x52	0xA3	0x2B
	12	0-7	0x54	0x51	0x9F	0x2C
	13	0-7	0x55	0x50	0x9E	0x2D

	14	0-7	0x56	0x4F	0x9D	0x2E
	15	0-7	0x59	0x4E	0x9B	0x2F
	16	0-7	0x5A	0x4D	0x98	0x30
	17	0-7	0x5C	0x4C	0x97	0x31
	18	0-7	0x63	0x4B	0x90	0x32
	19	0-7	0x65	0x4A	0x8F	0x33
	20	0-7	0x66	0x49	0x88	0x34
	21	0-7	0x67	0x48	0x84	0x35
	22	0-7	0x69	0x47	0x82	0x36
	23	0-7	0x6A	0x46	0x81	0x37
	24	0-7	0x6B	0x45	0x80	0x38
	25	0-7	0x6C	0x44	0x7C	0x39
	26	0-7	0x6D	0x43	0x7A	0x3A
	27	0-7	0x6E	0x42	0x79	0x3B
	28	0-7	0x71	0x41	0x76	0x3C
	29	0-7	0x72	0x40	0x75	0x3D
	30	0-7	0x73	0x3F	0x74	0x3E
	31	0-7	0x74	0x3E	0x73	0x3F
3***	0	0-7	0x75	0x3D	0x72	0x40
	1	0-7	0x76	0x3C	0x71	0x41
	2	0-7	0x79	0x3B	0x6E	0x42
	3	0-7	0x7A	0x3A	0x6D	0x43
	4	0-7	0x7C	0x39	0x6C	0x44
	5	0-7	0x80	0x38	0x6B	0x45
	6	0-7	0x81	0x37	0x6A	0x46
	7	0-7	0x82	0x36	0x69	0x47
	8	0-7	0x84	0x35	0x67	0x48
	9	0-7	0x88	0x34	0x66	0x49
	10	0-7	0x8F	0x33	0x65	0x4A
	11	0-7	0x90	0x32	0x63	0x4B
	12	0-7	0x97	0x31	0x5C	0x4C
	13	0-7	0x98	0x30	0x5A	0x4D
	14	0-7	0x9B	0x2F	0x59	0x4E
	15	0-7	0x9D	0x2E	0x56	0x4F

	16	0-7	0x9E	0x2D	0x55	0x50
	17	0-7	0x9F	0x2C	0x54	0x51
	18	0-7	0xA3	0x2B	0x53	0x52
	19	0-7	0xA5	0x2A	0x52	0x53
	20	0-7	0xA6	0x29	0x51	0x54
	21	0-7	0xA7	0x28	0x4E	0x55
	22	0-7	0xA9	0x27	0x4D	0x56
	23	0-7	0xAA	0x26	0x4C	0x57
	24	0-7	0xAB	0x25	0x4B	0x58
	25	0-7	0xAC	0x24	0x4A	0x59
	26	0-7	0xAD	0x23	0x49	0x5A
	27	0-7	0xAE	0x22	0x47	0x5B
	28	0-7	0xB1	0x21	0x46	0x5C
	29	0-7	0xB2	0x20	0x45	0x5D
	30	0-7	0xB3	0x1F	0x43	0x5E
	31	0-7	0xB4	0x1E	0x3C	0x5F
4***	0	0-7	0xB5	0x1D	0x3A	0x60
	1	0-7	0xB6	0x1C	0x39	0x61
	2	0-7	0xB9	0x1B	0x36	0x62
	3	0-7	0xBA	0x1A	0x35	0x63
	4	0-7	0xBC	0x19	0x34	0x64
	5	0-7	0xC3	0x18	0x33	0x65
	6	0-7	0xC5	0x17	0x32	0x66
	7	0-7	0xC6	0x16	0x31	0x67
	8	0-7	0xC7	0x15	0x2E	0x68
	9	0-7	0xC9	0x14	0x2D	0x69
	10	0-7	0xCA	0x13	0x2C	0x6A
	11	0-7	0xCB	0x12	0x2B	0x6B
	12	0-7	0xCC	0x11	0x2A	0x6C
	13	0-7	0xCD	0x10	0x29	0x6D
	14	0-7	0xCE	0x0F	0x27	0x6E
	15	0-7	0xD1	0x0E	0x26	0x6F
	16	0-7	0xD2	0x0D	0x25	0x70
	17	0-7	0xD3	0x0C	0x23	0x71

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	18	0-7	0xD4	0x0B	0x1F	0x72
	19	0-7	0xD5	0x0A	0x1E	0x73
	20	0-7	0xD6	0x09	0x1D	0x74
	21	0-7	0xD9	0x08	0x1B	0x75
	22	0-7	0xDA	0x07	0x18	0x76
	23	0-7	0xDC	0x06	0x17	0x77
	24	0-7	0xE0	0x05	0x10	0x78
	25	0-7	0xE1	0x04	0x0F	0x79
	26	0-7	0xE2	0x03	0x08	0x7A
	27	0-7	0xE4	0x02	0x04	0x7B
	28	0-7	0xE8	0x01	0x02	0x7C
	29	0-7	0xEF	0x00	0x01	0x7D
	30	0-7	none	none	none	none
	31	0-7	none	none	none	none

Breaking SCSI Reservations

Breaking SCSI reservations is necessary for Microsoft clusters (consisting of two or more servers) to operate during failover. One of the cluster nodes sets a persistent reserve on the disk resource. If that cluster node fails, another cluster node must break the SCSI reservation by resetting the target device, so the drive will be available and the secondary cluster node can set the persistent reservation. Microsoft does this by issuing a SCSI bus reset call to the device driver. There is no direct match for this reset operation in Fibre Channel. However, the Emulex driver can translate a SCSI bus reset into one of several different configurable operations.

By default, the driver uses the currently accepted way of breaking SCSI reservations by translating a SCSI bus reset call from Windows to target reset task management SCSI commands sent to all attached targets on the bus.

If a Microsoft cluster is not failing over properly and there are messages referring to SCSI reservations in the Windows event log, the target reset parameter (the ResetTPRLO parameter in the Windows registry) has been changed.

ResetTPRLO Parameter Definitions

If set to 0 = SCSI reset bus translates to target reset task management SCSI commands (default).

If set to 1 = SCSI reset bus translates to third party process logout.

If set to 2 = ABTS all outstanding commands, then sends a third party process logout to all currently logged targets.

Set Driver Parameters - Introduction

Driver parameters allow you to specify how the driver will behave in certain situations. See the driver parameters table for a detailed description of each parameter.

You can set driver parameters using either `lputilnt` or `HBAnyware`.

- `lputilnt` allows you to set driver parameters on local adapters only.
- `HBAnyware` allows you to set driver parameters on remote and local adapters.

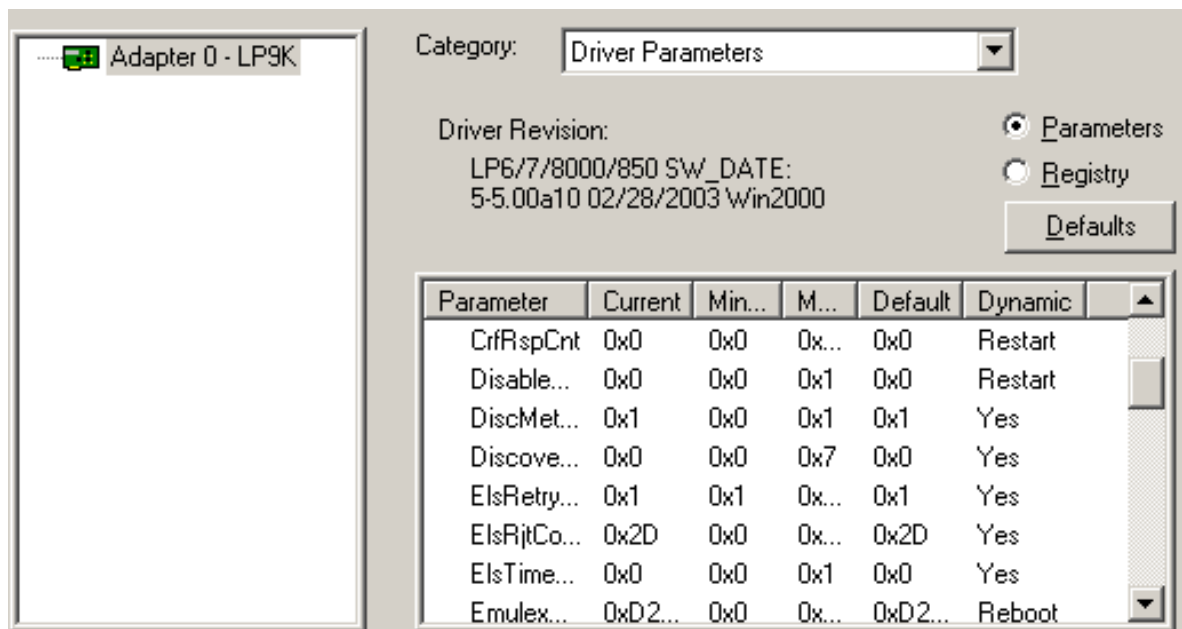
Set Driver Parameters Using Iputilnt

The driver parameters window contains information for each parameter, including current, minimum, maximum and default parameter settings. The Dynamic column provides information about what needs to happen before a change is effective.

- Dynamic - parameter can be changed and the change is effective while the system is running.
- Restart - parameter change requires that the host bus adapter be reset from the utility before the change is effective.
- Reboot - parameter change requires that the entire machine be rebooted before the change is effective. If a parameter change requires a reboot, you are prompted to do so when you exit the utility.

To change a driver parameter, follow these steps:

1. Start Iputilnt or Iputil64.
2. Select a host bus adapter (HBA).
3. Select Driver Parameters from the category list.



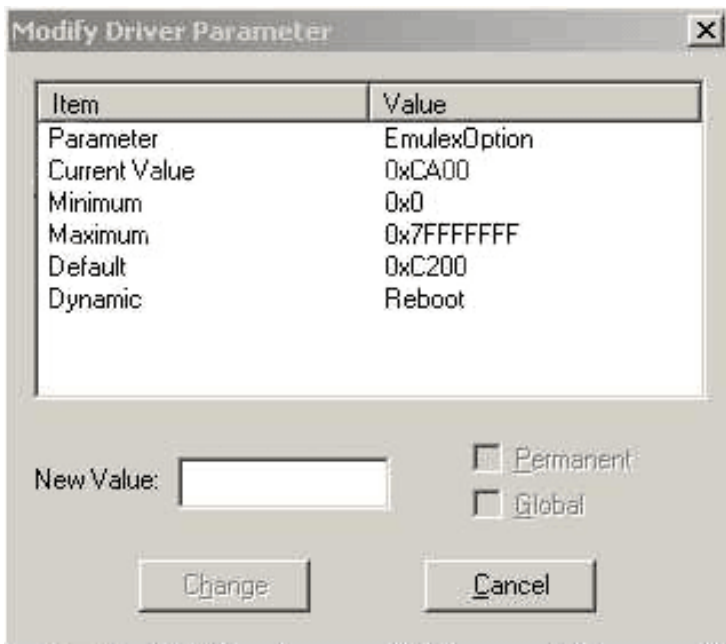
Category:

Driver Revision:
LP6/7/8000/850 SW_DATE:
5-5.00a10 02/28/2003 Win2000

Parameters
 Registry

Parameter	Current	Min...	M...	Default	Dynamic
CrfRspCnt	0x0	0x0	0x...	0x0	Restart
Disable...	0x0	0x0	0x1	0x0	Restart
DiscMet...	0x1	0x0	0x1	0x1	Yes
Discove...	0x0	0x0	0x7	0x0	Yes
ElsRetry...	0x1	0x1	0x...	0x1	Yes
ElsRjtCo...	0x2D	0x0	0x...	0x2D	Yes
ElsTime...	0x0	0x0	0x1	0x0	Yes
Emulex...	0xD2...	0x0	0x...	0xD2...	Reboot

4. Double-click the parameter you want to edit. The Modify Driver Parameter window is displayed.



5. In New Value, enter the new value. You can enter numbers in decimal or hexadecimal format. Numbers in hexadecimal format must be prefaced by "0x", for example, 0x2d.

6. If desired, make the change permanent or global.

- Select Permanent to cause the new value to be written to the system registry. If Permanent is not selected, the parameter reverts to its last permanent setting when the host is rebooted.
- Select Global to change the global registry entry. Otherwise, the change affects the selected adapter only (Windows 2000, Service Pack 3 only).

7. Click OK.

Set Driver Parameters Using HBAnywhere

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).

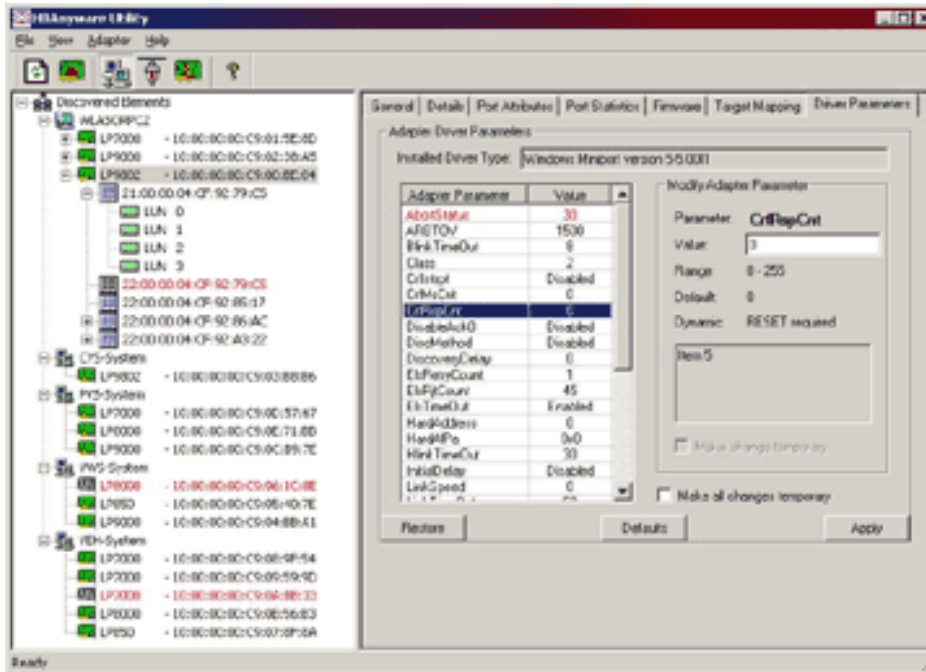
This page contains instructions for the following:

- 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 HBAnywhere.
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.

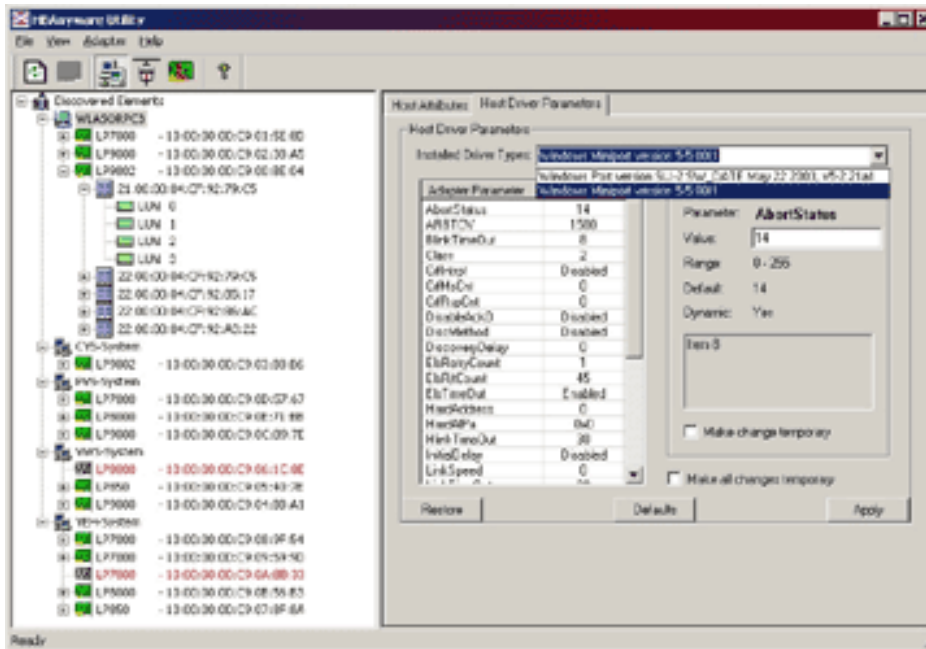


Note The illustration above is an example. The driver parameters you see may be different, depending on the installed driver.

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.

Parameters Table

The Windows Registry table provides information for parameters that can be changed, and includes allowable range of values and factory defaults. Parameters can be entered in decimal or hexadecimal format. See the Set Parameters page for more information on hexadecimal format.

Parameter	Definition
AbortStatus = 0xn	<p>AbortStatus controls the operating system SCSI request block (SRB) error status when the Emulex driver must return a command to the operating system for a general error condition. The default setting is SRB_STATUS_BUS_RESET (0x0E). The default causes completed commands to go up to the Microsoft class driver level in Windows. Unpredictable results may occur if this value is changed. This parameter value can be from 0x00 to 0xFF.</p> <p>Default = SRB_STATUS_BUS_RESET (0x0E).</p>
ARBTOV=n	<p>ARBTOV represents FC-AL arbitration timeout prior to LIP. Value is in milliseconds from 500 to 20000. Unpredictable results may occur if this value is changed.</p> <p>Default = 1500</p>
BlinkTimeOut=n	<p>BlinkTimeOut controls the waiting time, in seconds, for the link to come up during boot. This timer is only in effect at boot time. This parameter value can be from 1 to 30.</p> <p>Default = 8</p>
Class=n	<p>Class controls which Fibre Channel class will be used.</p> <p>If set to 1 = class 2.</p> <p>If set to 2 = class 3.</p> <p>Default = 2</p>
Crflntrpt=n	<p>This Coalesce Response Feature must be used in conjunction with CrfMsCnt and CrfRspCnt. This feature allows the host bus adapter to hold off from interrupting the host as long as the host has made progress on the outstanding response queue during the last CrfMsCnt period. This parameter value can be from 0 or 1.</p> <p>Default = 0</p>
CrfMsCnt=n	<p>This Coalesce Response Feature specifies a count of milliseconds after which an interrupt response is generated if CrfRspCnt has not been satisfied. Zero specifies immediate response notification. The CRF feature allows either 'x' (crfmscnt) milliseconds or 'y' (crfrspcnt) response entries posted prior to generating an interrupt. This parameter value can be from 0 to 63.</p> <p>Default = 0</p>

CrfrspCnt=n	<p>This Coalesce Response Feature specifies a count of response entries after which an Interrupt response is generated. Zero specifies immediate response notification. The CRF feature allows either 'x' (crfmscnt) milliseconds or 'y' (crfrspcnt) response entries posted prior to generating an interrupt. This parameter value can be from 0 to 255.</p> <p>Default = 0</p>
Note:	<p>Crfintrpt, CrfmsCnt, and CrfrspCnt work together to allow better CPU utilization by processing multiple I/O responses per interrupt. Each time a response is posted the host adapter compares the current response count and, if it is greater than or equal to CrfrspCnt, an interrupt posts. An interrupt also posts if, after CrfmsCnt milliseconds, a response interrupt has not yet been posted. Zero specifies immediate response notification.</p>
DisableAck0=n	<p>DisableAck0 determines Class 2 ACK_0 functionality.</p> <p>If set to 0 = enabled.</p> <p>If set to 1 = disabled (ACK_1 is used)</p> <p>Default = 0</p>
DiscoveryDelay=n	<p>DiscoveryDelay controls whether the driver waits for 'n' seconds to start port discovery after link up.</p> <p>If set to 0 = immediate discovery after link up.</p> <p>If set from 1 to 7 = the number of seconds to wait after link-up before starting port discovery.</p> <p>Setting this parameter >= 2 seconds helps device availability with certain target vendors.</p> <p>Default = 0</p>
DiscMethod=n	<p>Values are 0 or 1.</p> <p>If set to 0 = issues ADISC to check existence of nodes previously logged in, before issuing PLOGI in discovery. Setting this parameter to 0 may increase compatibility to tape drives.</p> <p>If set to 1 = uses PLOGI only in discovery.</p> <p>Default = 1</p>
ElsRetryCount = n	<p>ElsRetryCount controls how many retries are attempted when an ELS_REQUEST (such as PLOGI, PRLI, etc.) fails. The parameter value may be from 1 to 255.</p> <p>Default = 1</p>

<p>ElsRjtCount=n</p>	<p>ElsRjtCount controls how to treat LINK_SERVICE_REJECTs with either LOGICAL_BUSY/INVALID_NODE_NAME or UNABLE_PROCESS/CMO_IN_PROCESS explanations. A non-zero count allows these responses to be retried on a fixed 2-second interval for up to the value specified. This parameter value can be from 0 to 255.</p> <p>Default = 45</p>
<p>ElsTimeOut=n</p>	<p>ElsTimeOut controls whether the driver reinitializes the link when two consecutive extended link service requests (such as PLOGI or PRLI) time out.</p> <p>If set to 1 = reinitialize link when two consecutive ELSs time out.</p> <p>If set to 0 = no recovery action takes place. Device discovery will continue.</p> <p>This parameter value can be 0 or 1.</p> <p>Default = 0</p>
<p>EmulexOption=n</p>	<p>The EmulexOption value can be from 0x0 to 0x7FFFFFFF. n is a bit vector, one bit per option.</p> <p>Windows Server 2003 and Windows 2000 default=0x0000D200. Windows NT default=0x0000C200.</p> <p>Note Changing the Emulex Option default value is not recommended unless you are running Windows 2000 with Service Pack 3 or above.</p>
<p>EnableDPC=n</p>	<p>If set to 0 = process I/O completion at interrupt level.</p> <p>If set to 1 = process at DPC level.</p> <p>Default = 0</p>
<p>ErrRetryMax=n</p>	<p>ErrRetryMax specifies the number of retries while receiving an I/O error (error attention 0x10000000 (SERR or PERR)). This value may be 0 - 0xFFFFFFFF.</p> <p>If set to 0 = retry indefinitely.</p> <p>If set to 1 = no retry.</p> <p>If set to 2 = 0xFFFFFFFF : number of retries + 1.</p> <p>Default = 0x00000001</p>
<p>FrameSizeMSB=n</p>	<p>FrameSizeMSB (most significant byte) controls the upper byte of the receive frame size field if issued in PLOGI (common service parameters). This allows the FrameSize to be constrained on 256-byte increments from 256 (1) to 2048 (8) and is used to artificially limit the frame size received by the host bus adapter. This parameter value can be 0 to 8.</p> <p>Default = 0</p>

<p>HardAddress=n</p>	<p>HardAddress controls whether the driver maps addresses based on World Wide Port Name (WWPN) or uses the target device's D_ID.</p> <p>If set to 0 = map bus/target addresses to a WWPN.</p> <p>If set to 1 = map bus/target addresses to fixed FC-AL hard address or fabric D_ID, some hot swap applications can require HardAddress=1;.</p> <p>Default = 0</p>
<p>HlinkTimeOut=0xn</p>	<p>HlinkTimeOut measures how long the physical link is down. HlinkTimeOut is a parameter that is nested inside of LinkTimeOut. HlinkTimeOut measures the timeout from hardware link-down to hardware link-up. If this timeout is exceeded, then the driver stops issuing busy status for requests and starts to issue selection_timeout error status. This value may be set smaller than LinkTimeOut as it does not include port discovery. This parameter value can be from 0 to 255 seconds. Setting this value to 0 causes the timeout to occur after 0 seconds.</p> <p>Default = 30</p>
<p>HpploTimeOut= n (NT only)</p>	<p>HpploTimeOut controls the maximum length of time that I/O is returned with busy status while the adapter is in a Hot Plug PCI "not ready state" (just powered off/on, but not yet ready). If this timeout is exceeded prior to replacing/powering on the host bus adapter, I/O requests are returned with SRB_STATUS_ERROR status. This parameter value in seconds can be from 0 to 255. Setting this value to 0 causes the timeout to occur after 0 seconds.</p> <p>Default = 30</p>
<p>HostName="name"</p>	<p>This parameter is user-defined and may be used to specify the Symbolic Node Name to be registered to the name server. The Symbolic Node Name needs to be surrounded by double quotation marks ("). It is limited to 32 characters in length.</p>
<p>InitialDelay=n</p>	<p>InitialDelay controls whether the driver waits for two seconds to start port discovery at the initial link up.</p> <p>If set to 0 = don't wait 2 seconds at startup.</p> <p>If set to 1 = wait 2 seconds at startup.</p> <p>Default = 1</p>

LinkSpeed= n	<p>LinkSpeed has significance only if the host adapter supports other than one Gbit. LinkSpeed value can be 0 to 2 Gbit.</p> <p>Note: Setting this option incorrectly may cause the host bus adapter to fail to initialize.</p> <p>If set to 0 = auto speed selection.</p> <p>If set to 1 = 1 Gbit.</p> <p>If set to 2 = 2 Gbit.</p> <p>Default = 0</p>
LinkTimeOut= n	<p>LinkTimeOut measures how long the physical link is down plus how long it takes to discover remote devices. LinkTimeOut measures the timeout at which the driver no longer "BUSYs" requests but issues selection_timeout error status. This LinkTimeOut includes port login and discovery time. This parameter value can be 1 to 500 seconds.</p> <p>Default = 60</p>
LipFFrecovery= n	<p>LipFFrecovery controls whether the driver issues a LIP when the link has been down for LinkTimeOut/2.</p> <p>If set to 0 = don't issue a LIP when LinkDownTime = LinkTimeOut/2.</p> <p>If set to 1 = issue a LIP when LinkDownTime = LinkTimeOut/2, helps recover some older dual-port devices.</p> <p>Default = 0</p>
LogErrors= n	<p>LogErrors allows extra event messages to be logged in the Windows System Event Log. Events logged by the Emulex SCSIport Miniport driver will be Event ID 11 only. Other Event IDs (i.e. 9, 15) are not logged by the Emulex SCSIport Miniport driver.</p> <p>The Event ID 11 messages can be decoded by opening up the message in Event Viewer and using the four bytes at offset 0x10 in the Event Detail. These four bytes can be decoded using the tables in the online Troubleshooting manual.</p> <p>If set to 0 = do not log general adapter/disk errors.</p> <p>If set to 1 = use the event log to log general errors.</p> <p>Default = 0</p>
MapNodeName= n	<p>MapNodeName controls whether the driver maps and tracks devices based on WWPN or NodeName.</p> <p>If set to 0 = map devices based on WWPN (World-Wide-Port-Name).</p> <p>If set to 1 = map devices based on NodeName.</p> <p>Default = 0</p>

<p>NodeTimeOut=n</p>	<p>NodeTimeOut controls the timeout at which a formerly logged in node disappeared from the SAN. NodeTimeOut provides a delay in issuing SRB_STATUS_SELECTION_TIMEOUT errors for nodes that have disappeared from the SAN.</p> <p>After the timer expires, the driver makes one more attempt to re-discover the device. If that fails, the driver returns SRB_STATUS_SELECTION_TIMEOUT.</p> <p>The parameter value can be from 0 to 255 seconds. Setting this value to 0 causes the timeout to occur after 0 seconds.</p> <p>Default = 20</p>
<p>QueueAction=n</p>	<p>If set to 0 = QueueAction is Windows Server 2003 or Windows 2000-specified (SIMPLE_QUEUE_TAG)</p> <p>If set to 1 = QueueAction will be HEAD_OF_QUEUE_TAG.</p> <p>If set to 2 = QueueAction will be ORDERED_QUEUE_TAG.</p> <p>Note: Changing the default value is not recommended. Unpredictable results may occur.</p> <p>Default = 0</p>
<p>QueueDepth=n</p>	<p>QueueDepth requests per LUN/target (see QueueTarget parameter). This value can be 1 to 255 (decimal).</p> <p>Default = 32</p>
<p>QueueTarget=n</p>	<p>If set to 0 = QueueDepth applies on a per LUN basis.</p> <p>If set to 1 = QueueDepth applies on a per target basis.</p> <p>This parameter value can be 0 or 1 (decimal).</p> <p>Default = 0</p>
<p>RegFcpType=n</p>	<p>This parameter allows the driver to control whether the host appears as an FCP type or a general device with no type in the NameServer database.</p> <p>If set to 1 = register the FCP type with the name server.</p> <p>If set to 0 = does not register the FCP type with the name server.</p> <p>Default = 1</p> <p>Unpredictable results may occur if this parameter is changed.</p>

ResetFF= n	<p>ResetFF is used to force reservations to be freed when a ResetBus is issued. This is meaningful only for FC-AL topology and Seagate native Fibre Channel disk drives.</p> <p>If set to 0 = ResetBus action follows ResetTPRLO parameter behavior.</p> <p>If set to 1 = ResetBus action follows ResetTPRLO parameter behavior and completes the action with LIP (FF).</p> <p>Emulex recommends breaking reservations with Target Reset.</p> <p>Default = 0</p>
ResetTPRLO= n	<p>This parameter is used to handle a SCSI Reset Bus call from the operating system. It is not recommended to change this value from its default or accepted OEM setting.</p> <p>If set to 0 = Send Target Reset Task Management commands to every logged-in target device. Send Fibre Channel aborts to all outstanding commands, then re-establish a login to each target device with PLOGI and PRLI. Link reinitialization is initiated only if ResetFF=1 (not recommended).</p> <p>If set to 1 = Send TPRLO ELS command to every logged-in target device with Global Process Logout bit = 1 and Type Code field = 8. Link reinitialization is initiated only if ResetFF=1 (not recommended).</p> <p>If set to 2 = Send Fibre Channel aborts to all outstanding commands, then send TPRLO to every logged-in target device with Global Process Logout bit = 1 and Type Code field = 8. Link reinitialization is initiated only if ResetFF = 1 (not recommended).</p> <p>Default = 0</p>
RetryNodePurge= n	<p>RetryNodePurge controls whether the driver causes port discovery just prior to purging a node, due to NodeTimeOut exceeded. Setting this parameter to 1 allows the driver to retry discovery of a node prior to purge. This option should be enabled for all hubs that do not issue a LIP whenever a port is “un-bypassed”. The Emulex Digital hub does not require this option to be enabled. This parameter value can be set to 0 or 1.</p> <p>Default = 1</p>
RTTOV= n	<p>R_T_TOV is the receiver-transmitter timeout as specified in the ANSI Fibre Channel standard. R_T_TOV represents the timeout between phases of offline to online protocol. This parameter may have a value in milliseconds from 100 to 511.</p> <p>Default = 256</p> <p>Unpredictable results may occur if this parameter is changed.</p>

<p>ScanDown=n</p>	<p>ScanDown controls AL_PA to Window Bus/Target mapping.</p> <p>If set to 0 = lowest AL_PA = lowest physical disk (ascending AL_PA order).</p> <p>If set to 1 = highest AL_PA = lowest physical disk (ascending SEL_ID order).</p> <p>This option applies to private loop only.</p> <p>Windows Server 2003 and Windows 2000 default = 1 Windows NT default = 0</p>
<p>SendEcho=n</p>	<p>SendEcho controls whether the driver sends an echo frame to itself every four seconds.</p> <p>Setting this parameter to 1 allows early detection of a spurious hub port bypass, and should be enabled for all hubs that do not issue a LIP whenever a port is 'un-bypassed'. The Emulex digital hub does not require this option to be enabled. SendEcho parameter value can be set to 0 or 1.</p> <p>Default = 0</p>
<p>SimulateDevice=n</p>	<p>If set to 0 = don't create a 'dummy' disk device.</p> <p>If set to 1 = create a dummy disk to force the driver to load if no disk devices are present at boot time.</p> <p>Default = 0</p>
<p>SnsALL=n</p>	<p>SnsAll controls which N_Ports are queried from the NameServer.</p> <p>If set to 0 = SCSI FCP only.</p> <p>If set to 1 = all N_Ports.</p> <p>Default = 0</p>
<p>TargetBlkSize=n</p>	<p>TargetBlkSize specifies the number of 512-byte blocks to allocate for an internal target RAM disk. This parameter is used in conjunction with the TargetEnable SCSI Target Emulator feature (see TargetEnable parameter definition). TargetBlkSize value may be 0 to 16384.</p> <p>Default = 16384</p>

TargetEnable= n	<p>TargetEnable allows the device driver to emulate a very simple SCSI FCP target device. To other initiators, it will appear as a small disk device of size TargetBlkSize/2 bytes. This is a very simple implementation and only supports basic SCSI operations.</p> <p>Because the driver will also act as an initiator simultaneously through the same host bus adapter, the small target device will appear in the Device Manager/Disk Administrator on the host that is presenting the target.</p> <p>This parameter was designed for the test environment.</p> <p>Note If target mode is enabled, FCP2 is disabled.</p> <p>If set to 0 = target disabled.</p> <p>If set to 1 = target enabled from boot.</p> <p>If set to 2 = target enabled after IOCTL.</p> <p>Default = 0</p>
Topology= n	<p>Topology values may be 0 to 3.</p> <p>If set to 0 = FC-AL (loop).</p> <p>If set to 1 = PT-PT fabric.</p> <p>If set to 2= *FC-AL first, then attempt PT-PT.</p> <p>If set to 3= *PT-PT fabric first, then attempt FC-AL.</p> <p>* Topology fail-over requires v3.20 firmware or higher. If firmware is used that does not support topology fail-over, options 0 and 2 are analogous and options 1 and 3 are analagous.</p> <p>Default = 2</p>
TrafficCop= n	<p>If set to 1 = enable FC-AL loop master to run unfair and break potential arbitration problems by sending frames to itself.</p> <p>If set to 0 = run fair, no frames all the time.</p> <p>Default = 0</p> <p>Unpredictable results may occur if this value is changed.</p>

EmulexOption Detail

Hexadecimal values from 0x0 - 0x7FFFFFFF. Windows Server 2003 and Windows 2000 default=0x0000D200. Windows NT default=0x0000C200. This is a bit vector, one bit per option is listed in this table.

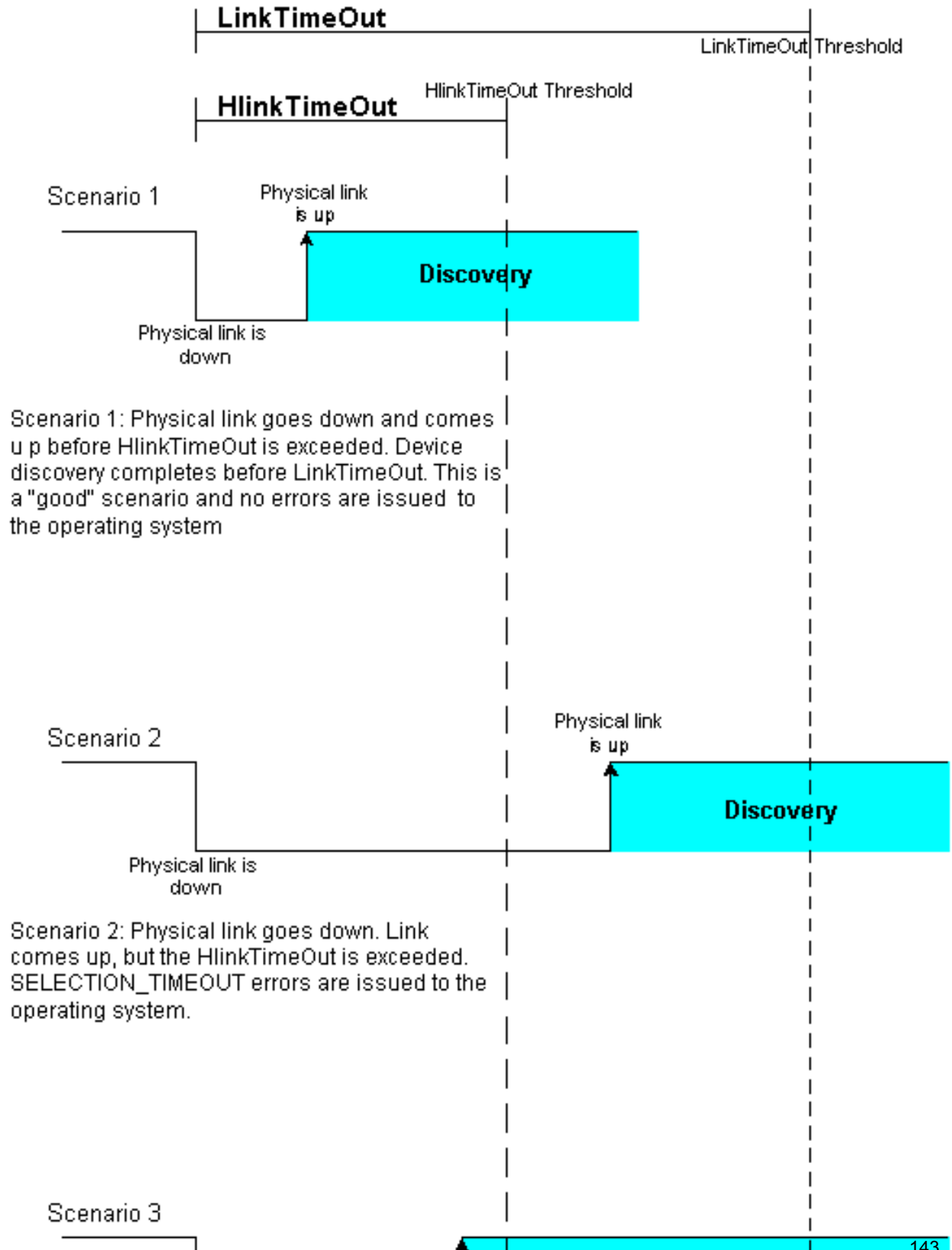
Note Those options with an asterisk (*) indicate that the option is enabled by default.

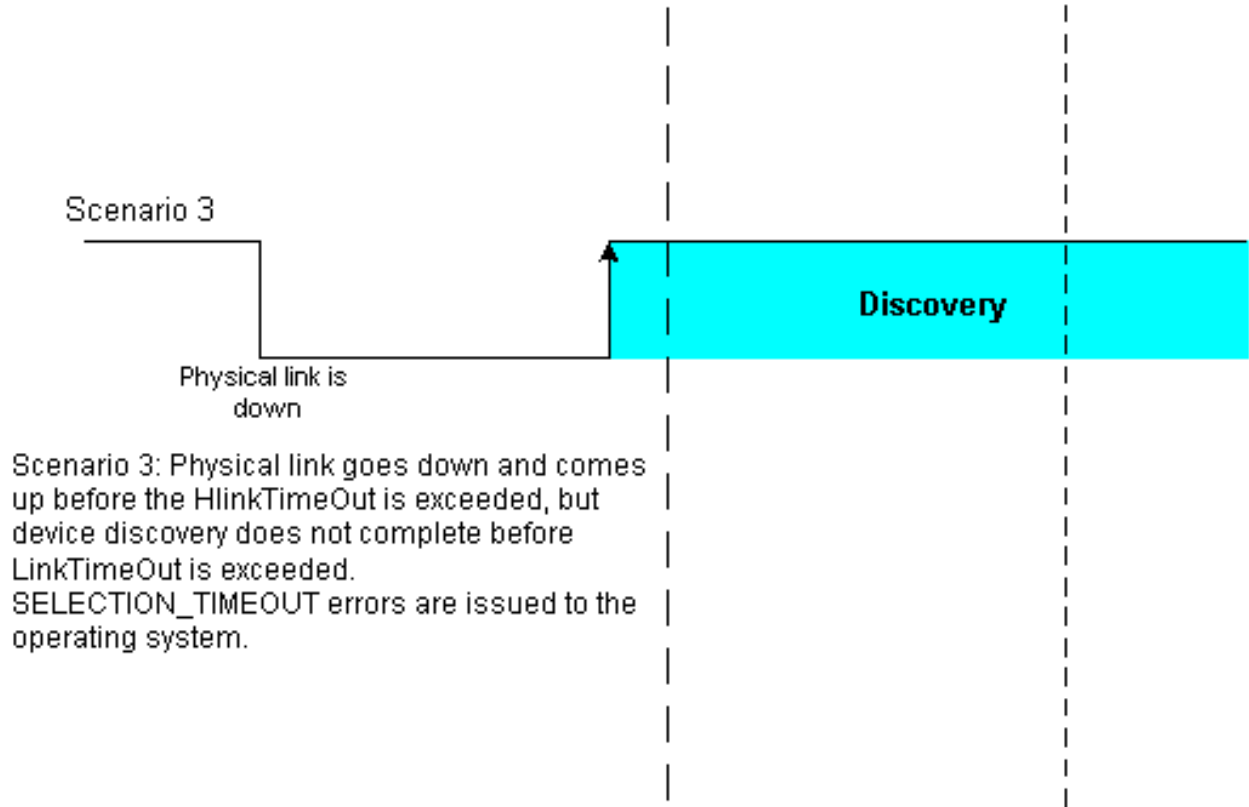
Hexadecimal Value	Definition
0x00000001	DISABLE_SCSI_BUSY. Don't return SRB_STATUS_BUSY to SCSI_BUSY errors.
0x00000002	LOG_STARTIO_ERRORS. Log all returned errors from STARTIO in the Event Log.
0x00000004	USE_BUS_RESET. This option is used only if DISABLE_SCSI_BUSY and DISABLE_SCSI_QBUSY are not set. USE_BUS_RESET allows the driver to return SRB_STATUS_BUS_RESET instead of SRB_STATUS_BUSY.
0x00000008	DISABLE_SCSI_QBUSY. Don't return SRB_STATUS_BUSY to SCSI QUEUE FULL errors.
0x00000010	DISABLE_SCSI_RSP_CHECK. Don't validate SCSI RSP field validity.
0x00000020	Reserved
0x00000040	Reserved
0x00000080	LIRP_DISABLE. This option does not allow LIRP/LILP loop init phase.
0x00000100	HBA_RESET_DISABLE. Debugging option to prevent the driver from resetting the HBA.
0x00000200*	VSA_ENABLE. Allow volume set addressing.
0x00000400	Reserved.
0x00000800	INIT_BY_FTRDRV. This option works with lpxftr.sys for persistent binding, LUN mapping and LUN masking support.

0x00001000*	NO_STOPREQ. This option is enabled by default, and must be enabled to run the SCSIport Miniport driver with Windows 2000 Service Pack 3 or above. This option must be disabled to run the SCSIport Miniport driver with Windows 2000 Service Pack 2. This option is related to resolving a Microsoft SRB_STATUS_BUSY issue.
0x00006000	SERR & PERR Configuration. This is a 2-bit option. 0x00004000*: Configure SERR & PERR as BIOS configured. If this bit is set, bit 13 (0x00002000) will be ignored. 0x00002000 if bit 14 (0x00004000) is 0, 0 for this bit turns off SERR &PERR and 1 turns on the value for SERR& PERR.
0x00008000*	SLIMPTR_ENABLE. This option enables firmware to use its memory for the host pointer instead of using host memory. This increases performance.
0x00010000	Reserved.
0x00020000	INDIV_RSTBUS. This option controls the SCSI bus reset to reset separate buses according to the pathID from the upper layer. Disable this option to allow a single bus reset to reset all SCSI buses (the standard mechanism in all previous releases).
0x00040000	FDMI_ENABLE. This option enables FDMI support.

SCSIport Miniport LinkTimeOut and HlinkTimeOut Parameters

Both timers start when the physical link goes down.





Scenario 3: Physical link goes down and comes up before the HlinkTimeout is exceeded, but device discovery does not complete before LinkTimeout is exceeded. SELECTION_TIMEOUT errors are issued to the operating system.

Load an Updated Version of x86 BootBIOS

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.
- The LightPulse utility (lputilnt for 32-bit systems or lputil64 for 64-bit systems) is installed properly.
- The x86 BootBIOS file has been downloaded to a local drive.

Procedure

1. Start lputilnt or lputil64.
2. Select the desired host adapter.
3. Select Firmware Maintenance from the Category list.
4. Click Download.
5. Locate the new x86 BootBIOS file.
6. Click Open.
7. The new boot code is transferred to flash ROM.
8. Exit the lputilnt utility.
9. Reboot the system.

Enable the BIOS Bootup Message

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.
- The LightPulse utility (lputilnt for 32-bit systems or lputil64 for 64-bit systems) is installed properly.
- Boot code is loaded on the host bus adapter

Procedure

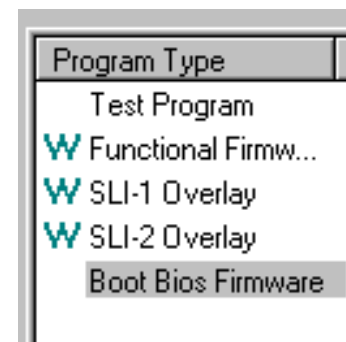
1. Click Start, Programs and lputilnt or lputil64.
2. Select the desired host bus adapter.
3. Select Firmware Maintenance from the Category list.
4. Select the Boot BIOS Firmware image.

If Boot BIOS Firmware is not listed, you must load x86 BootBIOS on the HBA.

5. Click Enable.

The Enable button changes to Disable and the letter W appears to the left of "Boot BIOS Firmware". This indicates that the x86 BootBIOS firmware is in use.

6. Exit the lputilnt utility.



7. Reboot the system.

As the computer boots, the Boot Utility message appears at the top of the screen.

8. Press <Alt E> to start the Boot Utility.

Continue by enabling x86 BootBIOS on adapters using the Boot Utility.



Troubleshooting the SCSIport Miniport Driver for Windows 2000

Version 5-5.10a9

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Introduction

There are several circumstances in which your system may operate in an unexpected manner. The Troubleshooting manual contains reference tables on event codes and error messages and provides information regarding unusual situations.

Event Log Introduction

To view the log:

1. Click Start, select Programs, Administrative Tools, Event Viewer or right click on My Computer and select Manage.
2. Click on Event Viewer in Computer Management. The Event Viewer window is displayed.
3. Double-click any event with the source name LPxNDS.
4. Examine the entry at offset 0x10 and Event ID 11.

Note Event ID 9's are not logged by the Emulex SCSIport Miniport driver. These messages can be decoded using MS Q Article Q182335.

SCSIport Miniport Driver Event Codes

The Fibre Channel SCSIport Miniport driver logs events and errors in the operating system event log. Serious errors are always logged, while informational events are logged only if the parameter “LogErrors=1” is used. All logged events are issued an event ID of 11, Internal Adapter Error, but this does not necessarily indicate that an adapter error occurred. There are several exceptions:

- 0xC1 is logged as BAD FIRMWARE WARNING (event ID 26)
- 0xC2 is logged as BAD FIRMWARE WARNING (event ID 26)
- 0xED is logged as BUS TIMEOUT (event ID 9)

Byte offset 0x10 of the event is the driver event code, while byte offset 0x11-0x13 contains event-specific information.

Note Entries marked with an asterisk (*) are logged only when "LogErrors=1" is used.

0x10 Offset	Explanation	0x11-0x13 further information
0xC0	Invalid Link Speed Selection	
0xC1	AutoTopology not supported in this firmware	Current firmware version
		0x11 bit 4-7: major rev
		0x11 bit 0-3
		0x12 bit 4-7: minor rev
		0x12 bit 0-3: 1=A, 2=B, 3=N, 4=X
		0x13 bit 0-7: patch level
		e.g. 0x11 = 0x30 0x12 = 0x24 0x13 = 0x02 ==> 3.02x2
0xC3*	Reestablishing Link	

0xC2	Invalid data fix is not supported in this firmware	Current firmware version (see 0xC1)
0xD0	SNS_REQ (XMIT_SEQ) failed	0x11= cmdStat, 12= Parm err
0xD1	SNS_RSP (RCV_SEQ) failed	0x11= cmdStat, 12= Parm err
0xD2	No Resources	0x11= 0: locb cmd 1: Mailbox cmd, 0x12= cmd
0xD3*	RCV_ELS_REQ failed	0x11= cmdStat, 12= Parm err
0xD4*	XMT_ELS_REQ failed	0x11= cmdStat, 12= Parm err
0xD5	Too many targets found (160+)	0x11 - 13 = D_ID that didn't fit
0xD6*	SNS request timeout	0x11 - 13 no additional information
0xD7*	Mailbox interrupt timeout	0x11 = mailbox word 0
0xD8*	TPRLO requested when busy	0x11 = local req. state, 12= discState, 13= mailbox word 0
0xD9*	Link down timeout occurred	0x11 = local req. state, 12= discState, 13= mailbox word 0
0xDA*	Hard link down timeout occurred	0x11 = local req. state, 12= discState, 13= mailbox word 0
0xE0*	Node purged from configuration	0x11 - 0x13 = D_ID of node purged
0xE1	Error interrupt occurred	Status register bytes 1-3 in event 11-13. E1 error indicates an adapter hardware failure, return this host adapter for repair
0xE2	Mailbox cmd timeout	0x11= command
0xE3	Mailbox rsp err	0x11= command, 12-13 = mbxStatus

0xE4	Adapter not ready after initialization	Status register bytes 1-3 in event 11-13
0xE6	Mailbox int but cmd not complete	0x11= MB cmd, 12-13 = mbxStatus
0xE7	SRB already queued to ring	
0xE8	Restart failed	
0xE9	Port bypass (LPB) received	
0xEB	Unknown IOCB cmd rsp	0x11= 15:8=cmd field
0xEC	Uncached extension alloc. error	
0xED	Link down @boot time (30 sec.)	
0xEF	Too many interrupts at initial boot	
0xF0*	Rcv ELS Request (possible logout)	0x11= ELS type, 12-13 = X_ID
0xF1	LinkUp error; LP6/7 down, driver up	0x11= parameter field, 12=IOCB cmd
0xF2	LinkUp with illegal or corrupt RPI	0x11= parameter field, 12=IOCB cmd
0xF3*	DeQueue ring->iotCmd.head	0x11= caller ID
0xF4	Adapter reset	0x11 = coded reason for reset:
		bit 0 = IOCB Requeue; bit 1=ReadLa retry
		bit 2 = InitLink retry; bit 3=RstBus retry
		bit 4 = mailbox time out
0xF5*	FCP_IXXX_CR IOCB rsp err	0x11= cmdStat, 12= Parm err, 13= AL_PA
0xF6*	FCP_IXXX_CX IOCB rsp err	0x11= cmdStat, 12= Parm err, 13= AL_PA
0xF8	Invalid FCP_RSP	0x11 = FcpCntrl, 12 = ScsiStat, 13 = Len
0xF9*	Two consec. timeouts, issue LIP	
0xFA	START_IO error	0x11 = ErrType, 12 = SrbStat, 13 = LinkUp

0xFB*	ELS_REQ_CR IOCB rsp err	0x11= cmdStat, 12= Parm err, 1 3= AL_PA
0xFC*	ELS_REQ_CX IOCB rsp err	0x11= cmdStat, 12= Parm err, 1 3= AL_PA
0xFE*	FLOGI failed	0x11= cmdStat, 12= Parm err

CmdStat Values

IOSTAT_FCP_RSP_ERR	0x1	
IOSTAT_REMOTE_STOP	0x2	Remote sent an ABTS
IOSTAT_LOCAL_REJECT	0x3	Parameter field contains additional info
IOSTAT_NPORT_RJT	0x4	
IOSTAT_FABRIC_RJT	0x5	
IOSTAT_NPORT_BSY	0x6	
IOSTAT_FABRIC_BSY	0x7	
IOSTAT_INTERMED_RSP	0x8	
IOSTAT_LS_RJT	0x9	Remote sent LS_RJT
IOSTAT_BA_RJT	0xA	Remote sent BA_RJT

Parameter Error Values (valid only when CmdStat=0x3)

IOERR_SUCCESS	0x00	
IOERR_MISSING_CONTINUE	0x01	
IOERR_SEQUENCE_TIMEOUT	0x02	Possible bad cable/link noise
IOERR_INTERNAL_ERROR	0x03	
IOERR_INVALID_RPI	0x04	Remote port login data invalid
IOERR_NO_XRI	0x05	
IOERR_ILLEGAL_COMMAND	0x06	
IOERR_XCHG_DROPPED	0x07	
IOERR_ILLEGAL_FIELD	0x08	
IOERR_BAD_CONTINUE	0x09	
IOERR_TOO_MANY_BUFFERS	0x0A	
IOERR_RCV_BUFFER_WAITING	0x0B	
IOERR_NO_CONNECTION	0x0C	
IOERR_TX_DMA_FAILED	0x0D	
IOERR_RX_DMA_FAILED	0x0E	
IOERR_ILLEGAL_FRAME	0x0F	Possible bad cable/link noise
IOERR_EXTRA_DATA	0x10	
IOERR_NO_RESOURCES	0x11	
IOERR_RESERVED	0x12	
IOERR_ILLEGAL_LENGTH	0x13	
IOERR_UNSUPPORTED_FEATURE	0x14	
IOERR_ABORT_IN_PROGRESS	0x15	
IOERR_ABORT_REQUESTED	0x16	
IOERR_RECEIVE_BUFFER_TIMEOUT	0x17	

IOERR_LOOP_OPEN_FAILURE	0x18	FC_AL target not responding. Received our own transmitted frame back. Port may be bypassed by a hub.
IOERR_RING_RESET	0x19	
IOERR_LINK_DOWN	0x1A	
IOERR_CORRUPTED_DATA	0x1B	
IOERR_CORRUPTED_RPI	0x1C	
IOERR_OUR_OF_ORDER	0x1D	Possible bad cable/link noise
IOERR_CORRUPTED_ACK	0x1E	
IOERR_DUPLICATE_FRAME	0x1F	
IOERR_INVALID_ACK	0x20	
IOERR_BAD_40BIT_ADDRESS	0x21	
IOERR_RESERVED	0x22	
IOERR_RESERVED	0x23	
IOERR_RESERVED	0x24	
IOERR_ABORT_MULTI_REQUESTED	0x25	
IOERR_RESERVED	0x26	
IOERR_RESERVED	0x27	
IOERR_LINK_BUFFER_SHORTAGE	0x28	
IOERR_RCV_XRIBUF_WAITING	0x29	

SCSIport Miniport Driver Does Not See Drives

Situation: Windows does not see the drives. If there is no LUN 0, Windows will not see the drives.

Resolution: Map LUN 0 to enable Windows to see the drives.

- Make sure that automapping is enabled at the global level and at the target level.

or

- Manually map LUN 0 to the target.

Iputilnt Installs, but HBAnyware Does Not

Situation: When you run setupapps.exe, Iputilnt installs but HBAnyware does not.

You have attempted to install the utilities for the SCSIport Miniport driver before installing the SCSIport Miniport driver.

Resolution: Perform the installation tasks in the following order:

1. Install the SCSIport Miniport driver (see the online Installation manual)
2. Install the utilities (see the online Installation manual).

Operating Error Occurs When Attempting to Run HBAnyware

Situation: You have run setupapps.exe. When you attempt to run HBAnyware, an operating system error may occur (often referred to as a "blue screen"). The computer may freeze and require restarting to make the computer operational.

You have installed the utilities for the SCSIport Miniport driver before installing the SCSIport Miniport driver. You are currently running an older version of the SCSIport Miniport driver with the adjunct filter driver.

Resolution: Perform the installation tasks in the following order:

1. Install the SCSIport Miniport driver (see the online Installation manual).
2. Install the utilities (see the online Installation manual).

Cannot See Other HBAs or Hosts

Situation:

Although HBAnyware is installed, only local host bus adapters (HBAs) are visible. The other HBAs and hosts in the SAN cannot be seen.

Resolution:

HBAnyware uses in-band data communication, meaning that the management server running HBAnyware must have a physical Fibre Channel connection to the SAN. All the HBAs in the SAN will be visible if:

1. The other servers have a Fibre Channel connection to your zone of the SAN.
2. All other HBAs are running HBAnyware and the appropriate driver.
3. The other HBAs are Emulex HBAs.

Note HBAnyware 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.

Cannot See Multiple Zones from the Management Server

Situation:

Cannot see multiple zones on the same screen of my management server running HBAnyware.

Resolution:

Provide a physical Fibre Channel connection into each of the zones. For each zone you want to see, connect an Emulex HBAnyware enabled port into that zone.

SAN Management Workstation Does Not Have a Fibre Channel Connection

Situation:

The SAN management workstation does not have a physical Fibre Channel connection into the SAN because the other management tools are all out-of-band. Can HBAnyware be run on this SAN management workstation?

Resolution:

From the SAN management workstation, run a terminal emulation session into one of the servers that has HBAnyware loaded on it. For Windows servers, use the operating system's terminal services option. On Solaris or Linux servers, open an X-Windows session to run the server's HBAnyware GUI remotely.

Cannot See New LUNS

Situation:

Although new LUNS were created on the storage array, they do not appear in HBAnyware.

Resolution:

Refresh the screen.

HBAnyware Appears on Remote Servers in the SAN

Situation:

HBAnyware appears on remote servers in the SAN.

Resolution:

To prevent HBAnyware from appearing on remote servers in the SAN, do one of the following:

- In Windows, disable the HBAnyware service.
- In Solaris, disable the rmserver process.
- In Linux, disable the rmserver process.

Disabling this service or process prevents the local servers from being seen remotely.