Install the LP850 Host Adapter

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Prerequisites:

- One open 32-bit or 64-bit PCI bus slot with a 3.3 VDC or 5.0 VDC signaling interface
- Maximum PCI bus clock rate of 33 MHz
- Media and connectors (user supplied; view supported media types.)

Follow these procedures to assemble and install the host adapter. Click procedures for details. When finished, click "Return to top of page" to return to this summary.

1. Record reference numbers. Write down the host adapter's IEEE address and serial number.
2. Install the host adapter board. Insert the host adapter board into a PCI slot on the computer's motherboard.
3. Attach media. Connect fiber optic or copper duplex cabling to the host adapter.
4. Apply power. Apply power to the computer and observe the LED display.

After the host adapter is installed, install device drivers or run a DOS diagnostic program to check host adapter functions or update firmware.

Record reference numbers

Each host adapter is shipped with a unique address identifier called the IEEE address. The Fibre Channel industry uses a World Wide Name (WWN) derived from the IEEE address, and this number is need for arbitrated loop connectivity. The serial number is used when communicating with Emulex. Both numbers are clearly marked on the board. We recommend that you record these numbers before installation.

Return to top of page.

Install the host adapter board

1. Turn off and unplug the computer.
2. Remove the computer case.
3. Remove the blank panel from an empty 32 or 64-bit PCI bus slot.
4. Insert host adapter board into the empty 32 or 64-bit PCI bus slot. Press firmly until seated.
5. Secure the host adapter's mounting bracket to the case with the panel screw.

6. Replace the computer case and tighten case screws.

The host adapter is now installed in the PC. Continue with the attach media section.

Attach media

Select one of these types of media supported by the Emulex host adapter:

- Multimode fiber optic cable (50/125 μm or 62.5/125 μm)
- Copper duplex cable

If necessary, use an MIA to connect fiber optic cabling to a host adapter's copper DB9 connector.


Fiber optic cable (multimode)

More Information: View fiber optic specifications.

These cables support a data rate of 1.0625 Gb/s for short wave and long wave lasers.

Fiber Optic Cable	Maximum Length	Minimum Length	Connector
62.5/125 μ m (multimode)	175 meters	2 meters	Dual SC
50/125 μ m (multimode)	500 meters	2 meters	Dual SC
9/125 μm (single mode)	10,000 meters	2 meters	Dual SC

1. Connect the fiber optic cable to the dual SC connector on the host adapter board as shown below.

    To attach fiber optic cable to a host adapter's copper DB9 connector, use an MIA.
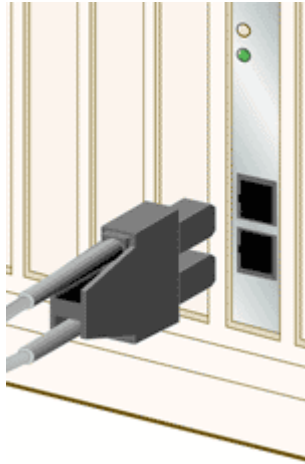
2. Connect other end of cable to Fibre Channel device.

After the media is connected to the host adapter, you are ready to apply power to the computer.
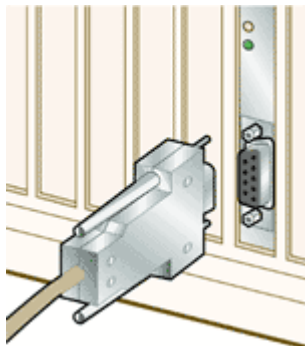
Return to top of page.

Copper duplex cable

TechNote: View copper specifications.

Cable Type	Maximum Length	Data Rate	Connector
Dual Twinax or Quad Axial	30 meters	1.0625 Gb/s	DB9

1. Connect the copper duplex cable to the DB9 connector on the host adapter board as shown below.

2. Connect other end of cable to Fibre Channel device.

After the media is connected to the host adapter, you are ready to apply power to the computer.

Apply Power

1. Verify the host adapter is securely installed in the computer.
2. Verify correct media is attached.
3. Plug in and turn on computer.
4. Observe LEDs for Power On Self Test (POST) results.

Power On Self Test and LEDs

Green and yellow display lights (LEDs) can be seen through openings in the host adapter's mounting bracket. Green indicates power and yellow signifies port activity.

This chart shows normal LED indications. For other LED patterns, refer to the detailed LED chart.

Green LED	Yellow LED	State
OFF	flashing (irregular)	POST processing in progress
ON	blink	normal - active - link up
blink	OFF	normal - link down or not yet started

Host adapter installation is complete. At this point, you should install a driver or run the DOS diagnostic utility. Return to index to choose.

LP850 Additional Information

LP850 Host Adapter Specifications

| Parameter	Range
Hardware Interface	20 pin connector for GBIC models
Physical Dimensions	Short PCI form factor 6.88" x 4.20"
Power Requirements	11 watts @ + 5.0 VDC (typical)
Airflow	100 lfm minimum
Temperature	Operating: 32° to 113°F (0° to 45°C) Storage: 14° to 131°F (-10° to 55°C)
Humidity	5% to 95% non-condensing
Agency Approvals for LP850-D1	UL recognized to UL1950 CUR recognized to CSA22.2, No. 950 TUV certified to EN60950 FCC Rules, Part 15, Class A Industry Canada, ICES-003, Class A EMC Directive 89/336/EEC (CE Mark) EN55022, Class A EN50082-1 Australian EMC Framework (C-Tick Mark) AS/NZS 3548:1994, Class A VCCI, Class A.
Agency Approvals for LP850-N1/T1 and LP850-F1	Class 1 Laser Product per DHHS 21CFR (J) & EN60825 UL recognized to UL1950 CUR recognized to CSA22.2, No.950 TUV certified to EN60950 FCC Rules, Part 15, Class B Industry Canada, ICES-003, Class B EMC Directive 89/336/EEC (CE Mark) EN55022, Class B EN50082-1 Australian EMC Framework (C-Tick Mark) AS/NZS 3548:1994, Class B VCCI, Class B

MIA

A Media Interface Adapter (MIA) is an adapter that allows you to convert from fibre optic cable to copper. The adapter has two signal interfaces: an optical interface (SC connector) and a serial interface (DB9 connector). By connecting an MIA to a copper DB9 connector on a host adapter, a non-Open Fiber Control (non-OFC) optical link is provided. The Emulex host adapter with a copper interface is designed to support an MIA that conforms with the Fibre Channel - Media Interface Adapter specification.

Note	An MIA is user supplied.

To attach an MIA,

1. Connect the MIA DB9 connector to the host adapter copper DB9 connector.
2. Tighten screws carefully - do not over tighten.
3. Connect the SC connector of the fiber optic cabling to the optical SC port of the MIA.
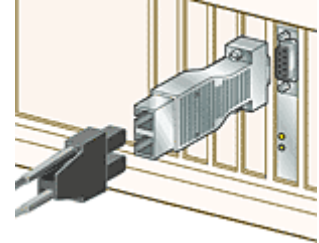
For more information on MIA specifications and operating instructions, consult the MIA manufacturer's documentation.

Supported media types

- Multimode fiber optic cable (50/125 μ m or 62.5/125 μ m) with dual SC connectors, used with short wave lasers
- Copper duplex cabling with DB9 connectors (also called DE9)
- Media Interface Adapter (MIA) used to convert from fiber optic to copper, if required (user supplied)

Host Adapter LEDs

POST conditions and results are summarized in this table.

Green LED	Yellow LED	State
OFF	OFF	wake-up failure (dead board)
OFF	ON	POST failure (dead board)
OFF	slow blink (1 Hz)	wake-up failure
OFF	fast blink (4 Hz)	failure in POST
OFF	flashing (irregular)	POST processing in progress

ON	OFF	failure while functioning
ON	ON	failure while functioning
ON	slow blink (1 Hz)	normal - inactive
ON	flashing (irregular)	normal - active
ON	fast blink (4 Hz)	normal - busy
slow blink	OFF	normal - link down or not yet started
slow blink	slow blink (1 Hz)	off-line for download
slow blink	fast blink (4 Hz)	restricted off-line mode (waiting for restart)

FCC and Regulatory Notices

Class 1 Information Label

CLASS 1 LASER PRODUCT
LASER KLASSE 1
LUOKAN 1 LASERLAITE
APPAREIL A` LASER DE CLASSE 1

TO IEC 825-1 (1993) + CENELEC HD 482 S1

The above statement applies to products marketed in the European Union.

FCC and VCCI

Model LP850-D1 (Copper Model)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
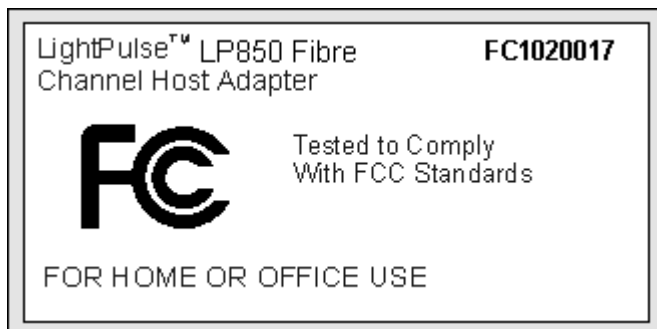
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Shielded cables must be used between this equipment and attached peripheral devices. The reader is cautioned that changes or modifications made to the equipment not expressly approved by Emulex could void the user's authority to operate this equipment.

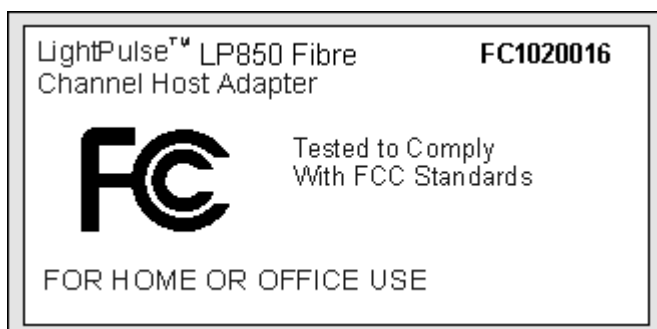The above statement applies to products marketed in the USA

This class A digital apparatus meets all requirements of the Canadian Interference - Causing Equipment Regulations. Cet Appareil numerique de la classe A respecte toutes les exigences du reglement sur le material brouilleur du Canada.

The above statement applies to products marketed in Canada.

FCC Compliance Information Statement; Models LP850-T1/N1 (GBIC Models)

LightPulse™ LP850 Fibre
Channel Host Adapter   FC1020017

FC Tested to Comply
With FCC Standards

FOR HOME OR OFFICE USE

FCC Compliance Information Statement; Model LP850-F1 (1 X 9)

LightPulse™ LP850 Fibre
Channel Host Adapter   FC1020016

FC Tested to Comply
With FCC Standards

FOR HOME OR OFFICE USE

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Responsible Party: Paul Folino, President & CEO, Emulex Corporation, 3535 Harbor Blvd., Costa Mesa, CA 92626, USA, (714) 662-5600

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The reader is cautioned that any changes or modifications to the equipment not expressly approved by Emulex could void the user's authority to operate this equipment.

This class B digital apparatus meets all requirements of the Canadian Interference - Causing Equipment Regulations. Cet Appareil numerique de la classe B respecte toutes les exigences du reglement sur le material brouilleur du Canada.

The above statement applies to products marketed in Canada.

VCCI Notices and Translations (Japan Only)

Note   VCCI regulations provide that changes or modifications not expressly approved by Emulex Corporation could void your authority to operate this equipment.

Models LP850-T1/N1 (GBIC Models)

この装置は，情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＢ情報技術装置です。この装置は，家庭環境で使用することを目的としていますが，この装置がラジオやテレビジョン受信機に近接して使用されると，受信障害を引き起こすことがあります。
取扱説明書に従って正しい取扱をして下さい。

This is a Class B product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

Model LP850-D1 (Embedded Copper Model)

Product Label

　この装置は，クラスＡ情報技術装置です。この装置を家庭環境で使用する
と電波妨害を引き起こすことがあります。この場合には使用者が適切な対策
を講ずるよう要求されることがあります。　　　　　　**VCCI－A**

Translation:

This is a Class A product. In a domestic environment this product may cause radio interference in which case
the user may be required to take adequate measures. VCCI—A

Manual Notice

　この装置は，情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準
に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波
妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ず
るよう要求されることがあります。

Translation:

This is a Class A product based on the standard of the Voluntary Control Council for Interference by
Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio
disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

Laser Safety Notice

This laser safety information contains certification and product information covering laser products known as optical Gigabaud Link Modules (GLMs), Gigabit Interface Converters (GBICs) and 1x9 transceivers sold as accessories to or incorporated in Emulex LightPulse host adapters. The GLM, GBIC and 1x9 transceiver are the primary cable connection mechanisms for any optical port on the host adapter and hub. This data is not intended to be a replacement for any safety regulations and standards; relevant safety documents should always be consulted if necessary. Contact Emulex Corporation with any questions or concerns about laser safety.

Certification and Classification
Labeling Requirements
Product Information
Usage Restrictions
System Level Certification

Certification and Classification

LP6000 and LP7000/E PCI host adapters may contain a laser product known as an optical Gigabaud Link Module (GLM). The optical GLM is attached to the host adapter using an 80-pin connector and extends through the mounting bracket. In turn, the host adapter can be inserted into any host system's PCI slot.

The LH5000 hub may contain a laser product known as a Gigabit Interface Connector (GBIC). The GBIC provides the physical connector to the optical cable. The GBIC can be inserted into any pluggable hub port.

The LP8000 and LP850 PCI host adapter may contain a laser product known as a Gigabit Interface Converter (GBIC) or an embedded 1x9 transceiver. The GBIC and or 1x9 transceiver provide the physical connection to the optical cable, and its SC-style connector extends through the mounting bracket. In turn, the host adapter can be inserted into any host system's PCI slot.

In the United States, all optical GLMs, GBICs and 1x9 transceivers sold by Emulex are certified as Class 1 laser products that conform to the requirements contained in the Department of Health and Human Services (DHHS) regulation 21 CFR subchapter J. The certification is indicated by a label located on the optical GLM, GBIC or 1x9.

In Europe, all optical GLMs, GBICs and 1x9 transceivers sold by Emulex are certified as Class 1 laser component assemblies that conform to the requirements contained in the International Electrotechnical Commission (IEC) standard 825-1 (1993) and CENELEC (European Committee for Electrotechnical Standardization) standard EN60825-1 (1994). GLMs, GBICs and 1x9 transceivers are certified by a recognized European testing agency and have appropriate markings on the assembly. The DHHS conformity label and European conformity mark will not be visible externally once the optical GLM, GBIC or 1x9 is connected to or inserted in the host adapter and the adapter is installed into a system.
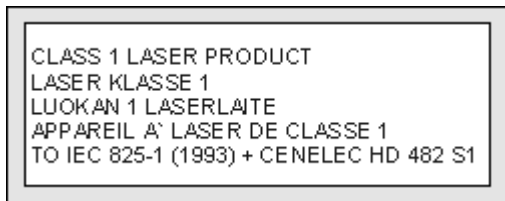
Return to top of page.

Labeling Requirements

No caution or danger labels are required for use of the GLM, GBIC or 1x9 transceiver since they are Class 1 laser component assembly. In the U.S., the only laser safety label required is the DHHS certification label that already appears on the GLM, GBIC and 1x9 transceiver. In Europe, the IEC825-1/EN60825-1 standards require that the system-level product has a Class 1 information label permanently attached and clearly visible whenever

access to the GLM, GBIC or 1x9 transceiver optical port is possible. Each Class 1 product shall have affixed an explanatory label bearing the words:

```
CLASS 1 LASER PRODUCT
```

Alternatively, at the discretion of the manufacturer, the same statement may be included in user information. If a label is used, an example of the IEC Class 1 information label that is suitable for most European countries is shown below. The label consists of black printing on a white background. Languages represented on this label are English, German, Finnish and French, and they represent the minimum set for acceptance of a Class 1 product in most European countries. Refer to IEC 825-1 (1993) for recommended label and border dimensions.

```
CLASS 1 LASER PRODUCT
LASER KLASSE 1
LUOKAN 1 LASERLAITE
APPAREIL A` LASER DE CLASSE 1
TO IEC 825-1 (1993) + CENELEC HD 482 S1
```

Product Information

[GLM](#)
[GBIC](#)
[1 x 9 Transceiver](#)

GLM

The optical GLM is a single port communications card. Each communication port consists of a transmitter and receiver optical subassembly. The transmitter subassembly contains a semiconductor laser diode of gallium aluminum arsenide (GaAlAs). This material emits in the wavelength range of 770 to 860 nanometers for shortwave and 1270 to 1355 nanometers for long wave, and are commonly referred to as short wavelength (SW) or long wavelength (LW) lasers. The discrete laser diodes are classified as Class 3B laser products. Once they are incorporated into the GLM, the product's automatic power control maintains the average power launched into a fiber at a value below the Class 1 limit.

> **Note** OFC GLMs are found only on the LP6000. Any reference to OFC or non-OFC products apples only to the LP6000, and not to the LP7000/E, LP8000 or LP850.

For OFC GLMs (Open Fiber Control) the optical fiber link between two GLM ports is continuously monitored by the open fiber link detection and laser safety control system (OFC). In the event of a break anywhere in the path, this control system prevents laser emissions from exceeding Class 1 levels. For

non-OFC links, the optical power from the laser transmitter is controlled and maintained at a lower power level. The power emitted from either an open fiber or open laser transmitter is guaranteed to be below the Class 1 limit. Class 1 laser products are not considered hazardous. No user maintenance, service operations or adjustments can be performed on any GLM accessory.

GBIC

The optical GBIC is an integrated duplex data link for bi-directional communications over multimode or single mode optical fiber. Each GBIC consists of a transmitter and receiver optical subassembly. The transmitter subassembly contains a semiconductor laser emitting in the wavelength range of 770 to 860 nanometers for shortwave length GBICs and 1270 to 1355 nanometers for long wavelength GBICs. For non-OFC links, the optical power from the laser transmitter is controlled and maintained at a lower power level. The power emitted from either an open fiber or open laser transmitter is guaranteed to be below the Class 1 limit. Class 1 laser products are not considered hazardous. No user maintenance, service operations or adjustments can be performed the GBIC.

1x9 Transceiver

The 1x9 transceivers is an integrated duplex data link for bi-directional communications over multimode fiber. Each 1x9 consists of a transmitter and receiver optical subassembly. The transmitter subassembly contains a semiconductor laser emitting in the wavelength range of 770 to 860 nanometers for shortwave 1x9s. For non-OFC links, the optical power from the laser transmitter is controlled and maintained at a lower power level. The power emitted from either an open fiber or open laser transmitter is guaranteed to be below the Class 1 limit. Class 1 laser products are not considered hazardous. No user maintenance, service operations or adjustments can be performed the 1x9 transceiver.

Return to top of page.

Usage Restrictions

Failure to comply with these usage restrictions may result in incorrect operation of the system and could possible lead to points of access that may emit laser radiation levels above the Class 1 limits established in the U. S. by the DHHS and within Europe by IEC 825-1/EN60825-1.

GLM
GBIC
1 x 9 Transceiver

GLM

The GLM is designed and certified for applications using point-to-point optical fiber links only. Use of the product with multiple input or multiple output optical links (for example, star couplers) is prohibited since it is incompatible with the GLM's certification.

The GLM will not allow normal data transmission on the optical link unless it is connected to another similar GLM or compatible laser product. For OFC GLMs, another manufacturer's laser product is not considered compatible unless it contains the open fiber link detection and laser safety control system (OFC) and is properly certified as a Class 1 laser product. Similarly, for non-OFC GLMs, a compatible laser device must be non-OFC.

Any system level product that incorporates the GLM must provide power supply protection that guarantees a voltage of 6.0 volts or less at the GLM. The functional power supply range of the GLM

product is specified as 4.75 to 5.25 volts typically. Operation outside of this range may degrade the performance and lifetime of the GLM. The GLM will remain operational with laser emissions below Class 1 limits provided the power supply level at the adapter remains at or below 6.0 volts. If the power supply level rises above 6.0 volts, the GLM cannot be guaranteed to operate correctly and could result in laser emissions that may exceed Class 1 limits.

GBIC

Short wavelength and long wavelength GBICs allow normal data transmission on the optical link when they are connected to another compatible laser product. Short wavelength and long wavelength GBICs sold by Emulex as accessories are non-OFC devices. For non-OFC links, a compatible laser device must be non-OFC and certified as a Class 1 laser product.

1 x 9 Transceiver

Short wavelength 1x9 transceivers allow normal data transmission on the optical link when they are connected to another compatible laser product. Short wavelength 1x9s embedded in Emulex host adapters are non-OFC. For non-OFC links, a compatible laser device must be non-OFC and certified as a Class 1 laser product.

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System Level Certification

All GLMs and GBICs sold as accessories by Emulex or host adapters containing embedded 1x9 transceivers are certified as Class 1 laser products within the U.S. and Class 1 laser component assemblies outside of the U.S. Manufacturers of products properly incorporating the GLM, GBIC or 1x9 transceiver do not need to recertify their product for laser safety. The procedure for full system certification is therefore identical to that used for any other electronic system. When applying for system level certification to electronic standards such as IEC950, the regulatory engineers may want to see the DHHS and European conformity labeling on the GLM, GBIC or 1x9 transceiver, and the system level documentation and labeling. Copies of the certificate of conformity for any GLM, GBIC or 1x9 transceiver sold by Emulex can be obtained upon request from Emulex Corporation, Costa Mesa.

Install Host Adapter Driver

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Windows NT 4.0 SCSI Mini Port Driver

Prerequisites:

Verify these minimum operating environment and software requirements:

- Windows NT 4.0 server, with Service Pack 3
- Emulex SCSI mini-port driver for Windows NT
- Installed LP3000, LP6000, LP7000/E, LP8000, or LP850 host adapter
- Fibre Channel drives connected to the host adapter using fiber optic or copper duplex media (user supplied)

Follow this procedure to install the Emulex SCSI mini port driver for Windows NT 4.0. Click procedure for details. When finished, click "Return to top of page" to return to this summary.

1. Install Windows NT SCSI Mini Port Driver. The driver files are located on the diskette included with your product.

Once the driver is installed, you can use the host adapter in the Windows NT environment, or manage the host adapter using the Mini Port Utility (see the Management Guide.

TechNote: See the How to... Guide to enable simultaneous networking and storage. To perform additional configuration changes see the how to guide or consult your Windows NT documentation.

Install Windows NT SCSI Mini Port Driver

From the Windows NT desktop,

1. **Select Start, Settings, and Control Panel.**
2. **Double click the SCSI Adapters icon.**
3. **Select Drivers tab.**
4. **Click Add.**
5. **Click Have Disk.**
6. **Enter the path to the driver files and click OK.**
7. **Select the Driver and click OK to install necessary files.**
8. **Click Yes to restart the computer.**
9. **Select Start, Settings, and Control Panel.**
10. **Double click the SCSI Adapters icon.**

11. **Select Drivers tab.**

    Verify the Emulex SCSI mini-port driver is present and started.

12. **Select Devices tab.**

    Verify that the host adapter is present.

13. **Click the "+" sign to expand the adapter listing.**

    Verify the connected disk drive is listed.

Once the driver is installed, you can use the host adapter in the Windows NT environment, or manage the host adapter using the Mini Port Utility (see the Management Guide.

To perform additional configuration changes see the How to... Guide or consult your Windows NT documentation.

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Using Management Utilities

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DOS Management

Run diagnostics to verify the host adapter's installation and view host adapter properties or upgrade the host adapter's firmware.

Windows NT 4.0 SCSI Port Driver Utility

Use the Emulex Configuration Utility to configure LP6000, LP7000/E and LP8000 host adapters. Perform LUN mapping, SCSI device mapping, upgrade host adapter firmware, and modify driver parameters in the Windows NT registry.

Windows NT 4.0 SCSI Mini Port Driver Utility

View LP6000, LP7000/E and LP8000 host adapter parameters, download PCI configuration files (CFL), modify driver parameters in the Windows NT registry, and upgrade host adapter firmware.

Boot BIOS

Boot BIOS works with the existing system BIOS on Intel Pentium PCI motherboards. Boot BIOS allows you to designate a fibre channel drive as the boot drive, change the arbitrated loop physical address (ALPA), change the link timers, select topologies (arbitrated loop or fabric), enable or disable individual devices.

Using Management Utilities

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DOS Diagnostic Utility

The lp6dutil is a DOS-based program that enables a user to test the host adapter board and to upload firmware. This program is intended for use in a stand-alone environment. You can designate a single computer as a test station and test up to four host adapter boards at the same time. The lp6dutil program tests a variety of host adapter boards (for example, LP6000, LP7000/E, and LP8000). Running this program while the host adapter is connected to an arbitrated loop is not recommended.

Prerequisites:

- Installed Emulex host adapter
- DOS 6.x or higher (program may not run in the DOS shell under Windows on all systems.
- Loopback connector for expanded testing (user supplied)

Follow these procedures to perform hardware diagnostic testing of an Emulex host adapter. Click procedure for details. When finished, click "Return to top of page" to return to this summary.

1. Verify operating conditions. Do not run the lp6dutil program with a memory manager or under a DOS shell in Windows on all systems.
2. Install lp6dutil. Copy the software to your hard drive.
3. Start lp6dutil. Type the command to run the program or customize the command with command options.
4. Examine the diagnostic main menu to display available tests and options.

Verify operating conditions

Ensure that you run lp6dutil under these conditions::

- Stop all memory manager programs like Expanded Memory Manager (EMM386).
- Run in DOS, not in a DOS shell under Windows.

Install lp6dutil software to hard drive

1. Make a directory on your hard drive.
2. Insert diagnostic diskette in disk drive or download from

2. Insert diagnostic diskette in disk drive or download from
   ftp.emulex.com/pub/fibre/lp6xxx/lp6dutil.
3. Copy files to your hard drive.

Start lp6dutil

At the DOS prompt, enter lp6dutil with or without command options.

```
c:\>lp6dutil {o=outfilename} {i=infilename} {/d} {/nr} {d=xxxx}
```

Option	Description
infilename	Script input file that is read and executed by the program.
outfilename	Creates a file of keystrokes that is stored for later use (for example, as an input file).
d	Enables prompt for remapping the host adapter's memory requirements.
nr	When the utility starts, the host adapter is not restarted.
xxxx	Alternate device ID. When the utility starts, it searches for the host adapter at the device ID entered here.

Preliminary testing

The diagnostic program performs the following preliminary analysis of the host adapter boards before displaying the Main menu:

- Looks for installed PCI host adapters and display up to four.
- Performs preliminary testing on all installed host adapters, including:
        SLIM memory test
        BIU register test
        BIU configuration registers test.
- Reports pass or fail status messages.
- Resets the host adapters.
- Checks POST (Power On Self Test) status of host adapters.
- Reports revision levels of diagnostic and functional firmware.
- Displays the resources of each host adapter.

If no host adapter is found, the program will exit. Error messages are displayed when failures occur.

failures occur.

Diagnostic main menu

After the lp6dutil goes through its start-up procedure, the Main menu displays and handles user requests. To display a previous menu, you must type 0. Displayed values are hexadecimal.

If lp6dutil finds two or more host adapters in the system, you will be prompted to select which host adapter(s) is to be tested.

These choices are available from the Main menu.

Test Host Adapters - This option runs host-based internal and external loopback tests.

Modify Test Options - You can enable or disable up to 7 different tests, depending upon the cards installed (BIU-1 or BIU-2). Specify number of retries, and actions to take if error occurs.

Restart Host Adapters - Resets the host adapter under test.

Input/Output - This option opens or closes input and output files.

Maintenance - This option is used to update firmware or non-volatile parameters in FLASH ROM, and can display program images stored in memory.

Show Host Adapters Info - This displays various configuration and status data that can be used by Tech Support to help troubleshoot problems.

Quit - Finish all testing and exit the lp6dutil program.

Test Host Adapters

1. Select this option to run these host-based internal and external loopback tests on the host adapter.

    Internal BIU PCI loopback and other loopback tests are run automatically.

2. Choose 0 (No) if you do not have an external loopback connector.

    External loopback tests are disabled by default (0 = No (default); 1 = Yes).

Modify Test Options

1. Select the desired test: PCI loopback, Internal loopback, External Loopback through the GLM, or all three.

    These test options are available for BIU-2 cards: BIU2 Tx and Rx DMA, BIU2 GP DMA, and BIU2 concurrent DMA.

    To perform the external loop back test, you must connect a loopback connector.

2. Configure the SRAM test by entering the number of sequences (or concurrent sequences) and the sequence byte length.
3. Select number of passes (default is 0x50; 0 = infinity).
4. Select action to take upon encountering errors (0 = stop (default), 1 = repeat, 2 = ignore).

Restart Host Adapters

Select this option to reset the host adapter. When restart occurs, lp6dutil performs POST testing on the adapter and its reloads functional firmware.

Input/Output

Select this option to open or close input and output files. An input file is interpreted and executed by the lp6dutil program. The output file contains a log of all messages.

Maintenance

Use this option to update the firmware or non-volatile parameters in the Flash ROM. This option also displays program images (load list) stored in the host adapter's memory. You must reboot the host adapter for the new firmware to take effect.

Show Host Adapter Info

Select this option to display this host adapter data:

> BIU PCI Configuration Parameters
> Host Adapter Info and Status
> Adapter Revisions
> Display Configuration data
> Service Parameters
> Status/Counters Info
> Link Status
> Link Attention

Quit

Select this option to exit the lp6dutil program. A warning message occurs if errors were encountered during the session.

Upgrade firmware

Prerequisites:

- DOS 6.x or higher (program may not run in the DOS shell under Windows on all systems.
- DOS diagnostic utility program installed
- Firmware image file upgrade (available from Emulex ftp server at ftp.emulex.com/pub/fibre.
- No memory manager programs like Expanded Memory Manager (EMM386) currently running.

Upgrade procedure

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

```
c:\>lp6dutil
```

3. Type 5 Maintenance on the Main menu.
4. Type 1 to Upgrade Firmware.
5. Enter new image file name and path to upgrade file.
6. Type 1 to upgrade now.
7. Type CR to reset the host adapter.
8. Type 0 until the Main menu reappears.
9. Type 7 to Quit.

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# Windows NT 4.0 SCSI Port Driver Utility

The Emulex Configuration Utility (elxcfg.exe) is installed automatically as an executable during the SCSI port driver installation. A shortcut to the utility is located on the Start Menu under Programs. When launched, the configuration utility will probe the registry. Adapters defined in the registry are listed in the Available Adapters list box. This list displays the adapter type, bus number, slot location and firmware revision.

Prerequisites

- Installed host adapter with connected device
- Installed SCSI port driver

The utility is explained under the following sections.

- Host Adapter Function Buttons
- Adapter Controls
- Adapter Timer Settings
- SCSI Target list box
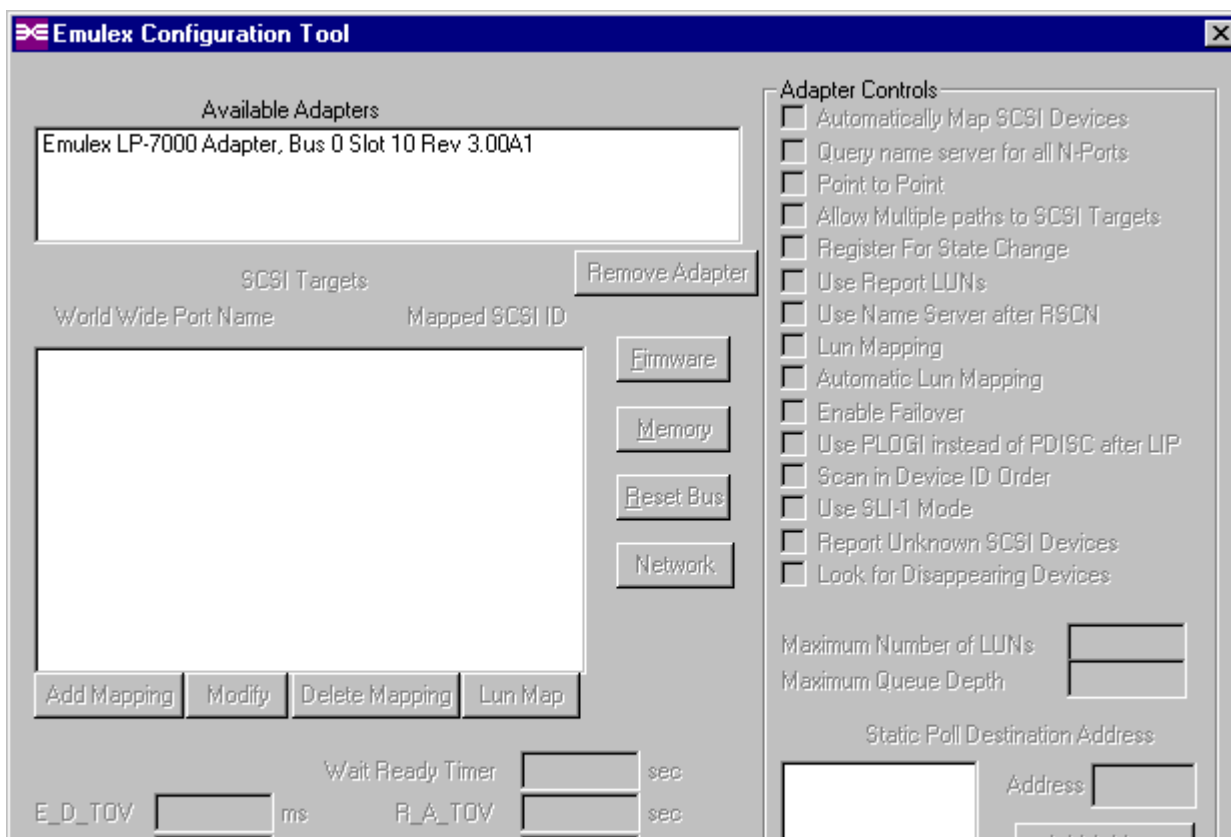
Host Adapter Function Buttons

These functions can be viewed and or executed as long as the adapter is installed. Execution of these functions take effect immediately.

- **Remove Adapter** - Removes previously installed adapter information.
- **Firmware** - Download new firmware to the host adapter.
- **Memory** - View the host adapter memory.
- **Reset Bus** - Emulate a SCSI bus reset using the host adapter.
- **Network** - Select and view the host adapter networking parameters.
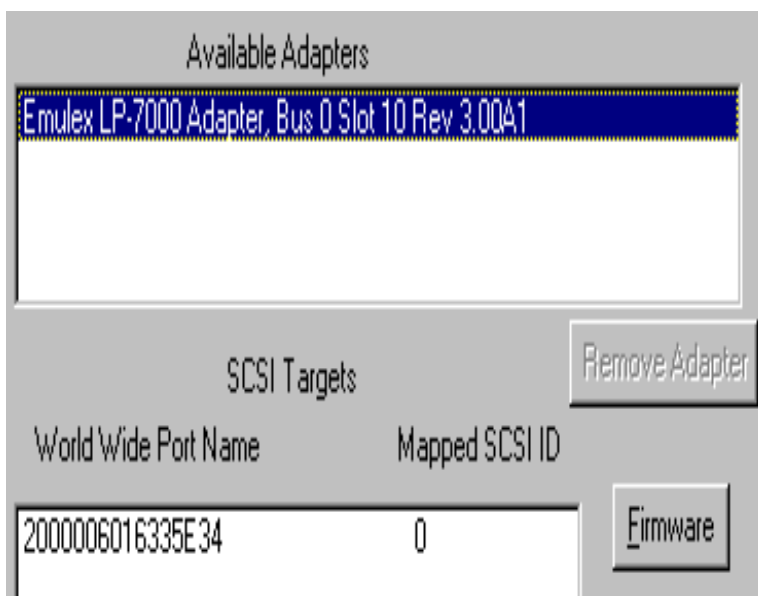
Remove Adapter

> The Remove Adapter button is used to delete a host adapter's entry from the registry. This can only occur after the physical removal of the host adapter. When the adapter is physically present in the bus, the Remove Adapter button is grayed out (disabled).

Firmware

> The Firmware button is used to download a new firmware image into the host adapter's flash ROM. Firmware images can be downloaded from the Emulex FTP site. The firmware will be verified, downloaded, and the adapter restarted.

firmware will be verified, downloaded, and the adapter restarted.

Memory

> The Memory button brings up the Memory Dump window. Enter the desired starting address in the Memory Offset edit box, and the length in bytes of the memory to dump in the Count edit box.
>
> Click Reload to display contents in the memory dump window.

Reset Bus

> The Reset Bus button will emulate a SCSI bus reset.

Network

> **Note**   Network parameters are only valid if an IP driver or Combo driver is installed.

> The Network button brings up the Network Configuration window which allows you to set the following parameters.

- Networking - enable or disable networking.
- Class - Select the class of service.
  Class 2 permits frame transfers with an acknowledgment and Class 3 permits frame transfers with out an acknowledgment.
- MTU - enter the appropriate Maximum Transfer Unit in decimal format.

<div align="right">

[Return to top of page.](#)

</div>

Adapter Controls

General host adapter configurations are located under Adapter Controls. Check or clear the check box to enable or disable contols. All changes take effect after a server reboot.

Automatically Map SCSI Devices

> Enable – Tells the driver to automatically map new SCSI devices as they are discovered. If the devices have already been mapped, either by discovery or manually, this checkbox has no effect.
>
> Disable – Tells the driver to disable auto mapping. You must use the utility to manually map devices. New devices will not be usable until the device is mapped.
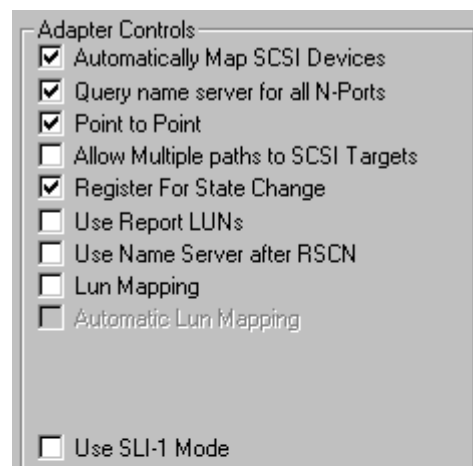
mapped.

Query name server for all N-Ports

Enable – Tells the driver to poll the name server for all connected N-Ports.

Disable – The driver will ask for all registered SCSI FCP devices.

Note	Emulex adapters register as a SCSI FCP device. If the only devices on the fibre channel are Emulex Adapters and storage devices, the same list of devices will be returned for each of the two choices.

Point to Point

Enable – Causes the adapter to initialize in a point to point configuration. This control should also be checked if connected to a fabric via an F-Port.

Disable – The adapter will use Loop Initialization to initialize the link.

Allow Multiple paths to SCSI Targets

Enable – Mapped SCSI devices are reported on each connected port.

Disable – Mapped SCSI devices are reported only on the first connected port.

Register for State Change

Enable – When a fabric is present, the driver will register with the fabric to receive Registered State Change Notification (RSCN) ELS requests from the fabric.

Disable – The driver will not register with the fabric, even if the fabric is present.

Note	Disabling State Change Notification will disable the automatic discovery of new devices. It will also prevent the recovery when moving cables on a switch connected to a storage device.

Use Report LUNs

Enable - For all SCSI devices, the driver will issue a Report LUNs SCSI command to determine the LUNs present on the storage device. The target device is responsible for reporting all present LUNs. If this option is enabled and the target device supports Report

reporting all present LUNs. If this option is enabled and the target device supports Report LUNs, then the Maximum number of LUNs is ignored for the target device.

Disable - If the target does not support the Report LUNs SCSI command or the option is disabled, then the driver will poll each device for the present LUNs. The driver will start with LUN 0 and proceed for each LUN up to the Maximum LUN value.

Use Name Server after RSCN

Enable - The driver will ignore the payload of the RSCN and query the name server for the latest list of devices.

Disable - The driver relies on the data in the RSCN payload to update the list of devices.

| Note | This option should be selected if using a switch with FL ports or soft zoning (check your switch manufacturers user guide). If neither FL ports or soft zoning is being used, disable this option for faster recovery after faults. |

LUN Mapping

Enable - All LUNs behind all targets are mapped. Since Fibre Channel targets support a LUN number 64 bits long and the port driver under NT only supports 8 bits, some sort of mapping is required. Unmapped LUNs are not accessable by NT.

Disable - There is a one to one correspondence of Fibre Channel LUNs to NT LUNs. In the case where LUN Mapping is not used, the Fibre Channel LUN is created as follows:

```
00xx00000000
```

where the xx is the NT LUN number.

Automatic LUN Mapping

Enable - LUNs are automatically mapped by the driver as they are discovered.

| Note | Automatic mapping may cause LUN numbers to "change". For example, the LUN indicated by the SCSI Applet on the control panel may be different from the actual LUN number on the device. The mapping can be viewed by clicking on the LUN Mapping button. |

Disable - LUNs must be manually mapped.

Use SLI-1 mode

Enable –SLI-1 is used even if the adapter is capable of SLI-2.

Disable – The driver will use SLI-2.

Maximum Number of LUNs

This is the number of LUNs the driver will poll during device discovery. The minimum value is 1, the maximum value is 255.

Maximum Queue Depth

The number of outstanding commands to a single LUN.

Adapter Timer Settings

E_D_TOV

This parameter changes the Error Detect Timeout Value,

AL_TOV

This parameter changes the Arbitrated Loop Timeout Value,

R_A_TOV

This parameter changes the Resource Allocation Timeout Value

ARB_TOV

This parameter changes the Arbitration Timeout Value.

Static Poll Destination Address

The Static Poll Destination Address lists a 24 bit Fibre Channel address that will be polled for devices when the adapter boots. To add an address, enter the 6 hex digits of the Fibre Channel address in the Address box and click the Add Address button. To delete an address, select the address and click the Delete Address button.

SCSI Targets list box

The SCSI Targets list box shows the current SCSI ID to Fibre Channel World Wide Port name mapping.

Add Mapping

> Add mapping allows you to map available and unmapped Fibre Channel devices to a SCSI ID.
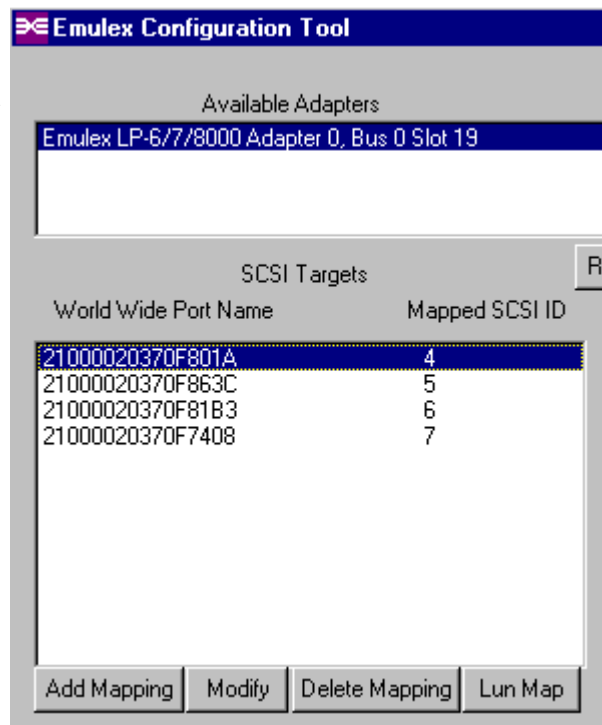
Modify

> Allows you to modify a currently mapped device.

Delete Mapping

> Deletes the current mapping.

LUN Map

> LUN map shows the LUN mapping for a selected target.

> **Note**   The LUN Map button will only be enabled if the LUN Mapping check box is checked for the adapter.

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Windows NT SCSI Mini Port Driver Utility

The host adapter utility (Lputilnt.exe) is an executable file on the diskette containing the host adapter driver. Run the utility from the floppy or copy and run it from your local hard drive. Requires:

- Windows NT version 4.0 or greater
- Installed LP6000, LP7000/E, LP8000, or LP850 host adapter
- Installed Windows NT SCSI Mini Port Driver

> **Note** The LightPulse Utility/NT Requires that the SCSI Mini-port driver be installed and connected to at least one drive before it can operate properly.

1. Double click Lputilnt.exe to start utility.
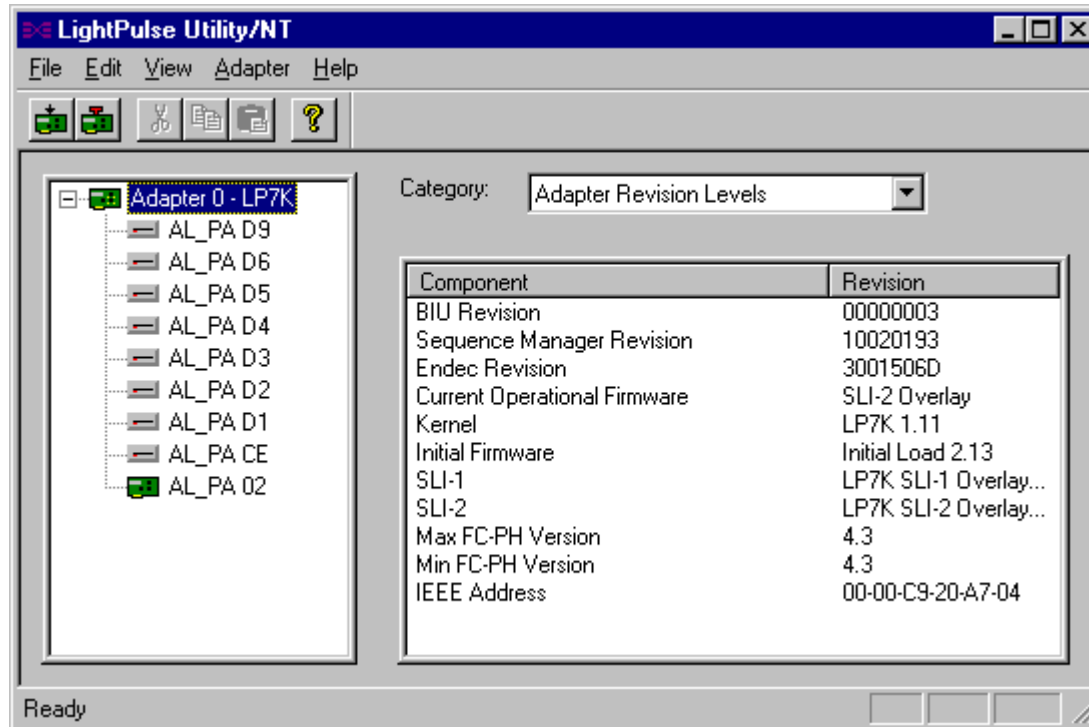
2. Select an adapter from the list on the left.
3. On the menu bar, click Adapter or pull down the Category list.
4. Select an option to view parameters.

There are eight options available, each displaying a different group of host adapter

There are eight options available, each displaying a different group of host adapter parameters:

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. The user can also:

- o Upgrade host adapter firmware
- o Manage existing firmware
- o Enable or Disable the adapter's Boot BIOS

Loop Map - View a list of the members of the selected host adapter's loop map.

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. The user can also:

- o Download PCI configuration files (CFL)

Driver Parameters - View information about device driver parameters that are maintained in the Windows/NT registry. The user can also:

- o Modify driver parameters in the Windows NT registry

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, etc.

Return to top of page.

Firmware Maintenance

From the LightPulse Utility/NT main window,

1. Select the desired host adapter.
2. Expand the Category list and select Firmware Maintenance.

This display provides detailed information about the firmware in the Flash ROM of the selected host adapter. The radio buttons determine how data is displayed.

- ⊙ Flash ROM List
- ○ Flash ROM Map
- ○ RAM Map
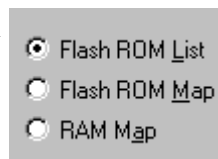
- **Flash ROM List** shows all firmware images in the selected adapter's flash ROM.

adapter's flash ROM.

- **Flash ROM Map** displays these same images, along with unused flash ROM space.
- **RAM Map** displays the firmware images currently loaded in the selected adapters SRAM.

Firmware images that are referenced in the host adapter's wake-up parameters are denoted with a **W** in the leftmost column of the display.
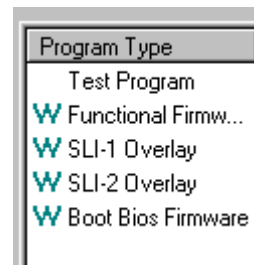
From the Firmware Maintenance window, you can:

- Upgrade host adapter firmware
- Delete or activate existing firmware
- Enable or disable the adapter's Boot BIOS

Program Type
Test Program
W Functional Firmw...
W SLI-1 Overlay
W SLI-2 Overlay
W Boot Bios Firmware

Upgrade Host Adapter Firmware

1. Obtain a copy of the desired upgrade file.

   Upgrade files are available on the Emulex ftp server at ftp.emulex.com/pub/fibre/.

2. Start the utility.
3. Select the desired host adapter
4. Expand the Category list and select Firmware Maintenance.
5. Click Download.
6. Locate the new upgrade file.
7. Click Open.

   The new software is transferred to the host adapter.

8. Expand the Category list and select Adapter Revision Levels.
9. Verify the new firmware revision is shown.

Delete or Activate Firmware Image

Deleting a firmware image may be necessary in order to provide storage for a subsequent download. When two images of the same type, but different revision exist in the host adapter's Flash ROM, you may select which image is active. Only one image of a particular type can be active at a time. The active image is preceded by a **W** in the list.

From the LightPulse Utility/NT main window,

1. Select the desired host adapter.
2. Expand the Category list and select Firmware Maintenance.
3. Select a firmware image.
4. Click Delete to remove the image file or Activate to activate the image file.

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Enable or Disable Boot BIOS

Boot BIOS is used to designate a Fibre Channel drive as the boot drive. To enable a Fibre Channel drive as the boot drive, first enable Boot BIOS using this procedure and then refer to the Boot BIOS section.

From the LightPulse Utility/NT main window,

1. Select the desired host adapter.
2. Expand the Category list and select Firmware Maintenance.
3. Select the Boot BIOS Firmware image.

   If Boot BIOS Firmware is not listed, you will need to download a Boot BIOS image.
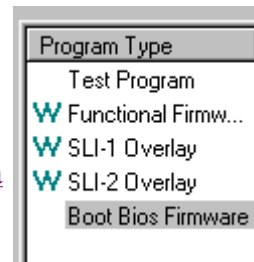
4. Click Enable.

The Enable button toggles to Disable when Boot BIOS is enabled.

Download PCI configuration files (CFL)

This display provides information about the data in each of the configuration regions in the Flash ROM of the selected host adapter. The user selects a region in the drop-down Region list and the data contained in that region is displayed. Regions 5, 6 and 7 allow the user to download PCI configuration data files to the selected region.
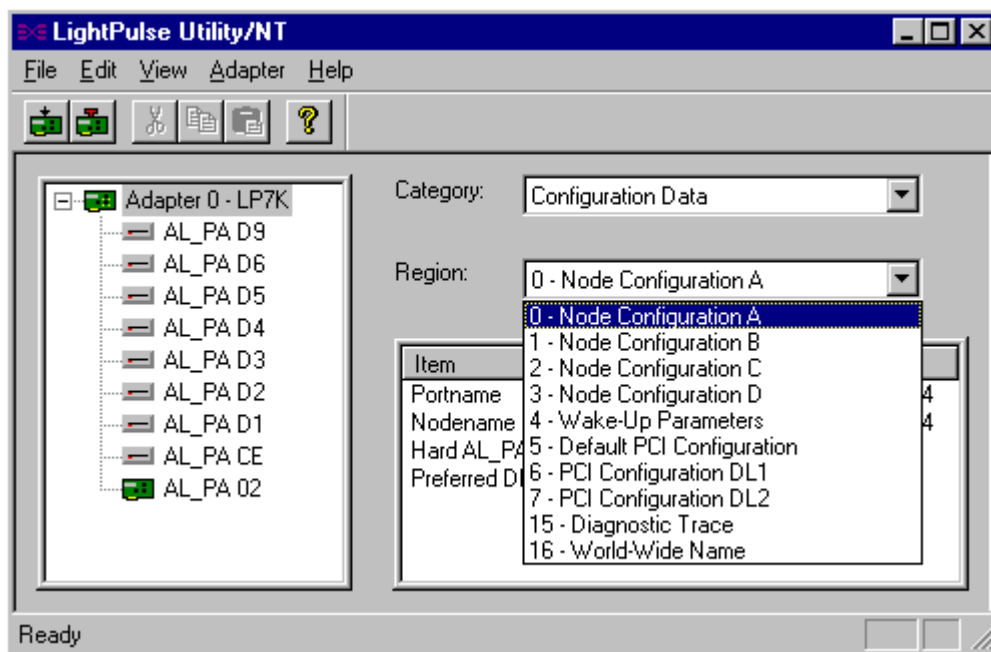
From the LightPulse Utility/NT main window,

1. Select the desired host adapter.
2. Expand the Category list and select Configuration Data.
3. Expand the Region list and select region 5, 6, or 7.
4. Click Download button.
5. Enter the path to the PCI configuration data file (*.cfl).
6. Click Open.

File is downloaded into the selected region.

Modify driver parameters in the Windows NT registry

This display provides information about device driver parameters that are maintained in the Windows/NT registry, and allows those values to be modified. All available device driver parameters are listed in the data display, along with the current, minimum, maximum, and default values. Parameters that have their value specified in the system registry are denoted with either a **G** or an **L** in the leftmost column of the display. The **G** indicates that the value is set in the global registry entry, which applies to all adapters that do not have a local registry entry. The **L** indicates that the value is set in a registry entry specific to the selected adapter, which overrides the value settings in the global entry. A column labeled Dynamic indicates if a parameter change takes effect immediatly. Values for this parameter are **yes**, **restart**, and **reboot**.

Modifying Driver Parameters

From the LightPulse Utility/NT main window,

1. Select the desired host adapter.
2. Expand the Category list and select Driver Parameters.
3. Double click on a parameter name.
4. Enter desired value in the New Value field.
5. Select Permanent or Global checkbox.

Select Permanent to cause the new value to be written to the system registry. If Permanent is not selected, the parameter will revert to its default value when the driver is reset.

Select Global to change the global registry entry. Otherwise, the change is made to the adapter-specific registry entry.

Update Device Driver

Device drivers are updated periodically and can be obtained from the Emulex website at ftp.emulex.com/pub/fibre/. In the Windows NT environment, you should remove the existing driver before installing a new driver. Follow the steps below to remove an existing driver and then refer to the installation section to install a new driver.

From the Windows NT desktop,

1. Click Start, select Settings, and Control Panel.
2. Double click the SCSI Adapters icon.
3. Select Drivers tab.
4. Click Remove, and Yes to confirm.
5. Click OK.
6. Reboot the computer to restart Windows NT.
7. Install new driver.

Boot BIOS Utility

Requirements:

- Intel Pentium computer system, with system BIOS copyrighted 1995 or later
- MS-DOS 6.0 or higher
- Installed LP3000, LP6000, LP7000/E or LP8000 host adapter
- Connected Fibre Channel drive or disk array

Boot BIOS does the following:

- Supports up to 8 LightPulse Fibre Channel host adapters per computer.
- Supports multi-initiators on different systems, connected by hubs.
- Supports multiple disk arrays and LUNs (up to 8 LUNs per ALPA).
- Detects up to 99 devices per adapter
- Displays a maximum of 16 devices during the boot process.

This page provides a detailed description of each menu choice on the Boot BIOS Utility menu. Default options are acceptable for most installation. If a menu is marked as an "Advanced Option", novice users should accept the defaults.

The Main Menu choices are described below. Select a link for additional descriptions, or click "Return to top of page" to return to this summary.

Change BIOS boot device/display all devices
Change default ALPA on this adapter
Enable or disable BIOS on this adapter
Change FC Link Timer
Change Extended Link Service Timer
Enable or disable individual devices
Change PLOGI retry timer
Topology selections
Fabric D_ID and WWPN selection

Change BIOS Boot Device/Display All Devices

This option applies to an arbitrated loop (FC-AL) topology only. It shows all drives attached to the selected host adapter. The adapter is not the boot device, but a drive attached to the host adapter can be designated as the boot device. The first device in the list is the boot device. By default, the lowest arbitrated loop physical address (ALPA or AL_PA) of the device on the first adapter will be the boot disk.

device on the first adapter will be the boot disk.

To specify a Fibre Channel drive as the boot device, enter a two digit number (01, 02, etc.) to specify which drive will be the boot device. (After specifying a device as the boot device, go to menu option 6 to verify that device is enabled). The Boot device at the top of the menu changes to reflect this entry.

Each device is displayed by ALPA, Select ID, LUN number and drive information. Use <PageDn> to scroll through a long list of drives to find the desired boot device. Only 16 are shown on the screen each time, but a maximum of 99 devices per adapter can be displayed.

Change default ALPA of this adapter

This option applies only to arbitrated loop (FC-AL). Use this option to change the ALPA (Arbitrated Loop Physical Address) of the selected adapter. The default ALPA for the adapter BIOS is 01 (hex).

The ALPA could be changed if these conditions are present:

- The computer with the installed host adapter is moved to another location.
- The System Administrator designates a change for administrative purposes.

Enable or Disable BIOS on This Adapter

Use this option to enable or disable boot BIOS on the selected host adapter. If enabled, a device connected to the host adapter can be designated as the boot device. Default is disabled.

Boot BIOS can be enabled on more than one host adapter at a time.

Change FC Link Timer (+ Advanced Option +)

Use this option to configure the Link up wait timer. Choices are 5, 10, 15 (default), 20, and 30 seconds. Link up wait time is the time that the host adapter will wait for a link up to be established.

Changed Extended Link Service Timer (+ Advanced Option +)

Link services are used for log in, sequence and exchange management, and connection maintenance. Use this option to configure the wait timer for the Extended Link Service (ELS) command. Examples are PLOGI (port log in) or Prli (process log in). Choices are 4 (default), 10, 20 and 90 seconds.

Enable or Disable Individual Devices (+ Advanced Option +)

This option applies only to arbitrated loop (FC-AL). Default is enabled for each device. Each device can be enabled or disabled by the user. The maximum number of devices (including LUNs) that can be displayed in the device menu is 99 per adapter.

If a change is made to the boot device in the Change BIOS Boot Device/Display All Adapters menu, the user must check this menu to verify that the new boot device is enabled.

This menu option must be updated to reflect any hardware configuration changes.

Change PLOGI Retry Timer (+ Advanced Option +)

This menu is used to set the interval for the PLOGI (port log in) Retry Timer. This option is especially useful for Tachyon-based RAID arrays. Under very rare occasion, a Tachyon-based RAID array will reset itself and the port will go off line temporarily in the loop. When the port comes to life, the PLOGI retry interval scans the loop to discover this device.

The time it takes for one PLOGI to scan the whole loop (if 126 ALPA are on the loop) is shown below:

- 50 msec will take 5 to 6 seconds.
- 100 msec will take 12 seconds.
- 200 msec will take 22 seconds.

The default is 0 (no retry); other options are 50, 100 and 200 milliseconds.

Topology Selections (+ Advanced Option +)

Use this option to select the topology for the host adapter. Choose 1 for arbitrated loop (FC-AL) and 2 for fabric point to point. The default is FC-AL

Fabric D_ID and WWPN section (+ Advanced Option +)

This applies to fabric point to point topology only.

Fabric destination identifier (D_ID) indicates the address identifier of the N_Port.

A list of devices will be displayed by a Name Server Inquiry, which contains a list of all port identifiers. By default, the first successful D_ID returned from a Name Server Inquiry will be the boot device.

A dialog box appears with these choices.

D_ID and WWPN. D_ID and WWPN are checked to see if they are also in the BIOS region 8 area. If they are the same, boot occurs.

region 8 area. If they are the same, boot occurs.

WWPN only. Name Server Inquiry is issued to locate the D_ID of this WWPN. If found, a boot can occur.

D_ID only. PLOGI is issued to this D_ID regardless WWPN.

All Operating Systems

Boot from a fibre channel drive

Boot BIOS works with the existing system BIOS on Intel Pentium PCI motherboards and allows a system to boot from a fibre channel drive.

Connect a fiber optic cable to a copper port

Use an MIA to convert media.

Upgrade the host adapter's driver

You must first remove the existing driver before installing a new driver.

Upgrade the host adapter's firmware

Using the DOS utility, save a new copy of the host adapter's firmware in its flash ROM

Windows NT

Assign Windows NT ALPA

Permanently assign an ALPA (Arbitrated Loop Physical Address) to the host adapter.

Use the Windows NT event viewer

The Windows NT SCSI driver verifies the success of the PCI Host adapter's Power On Self Test (POST). In case of a failure or suspected failure, an error log entry is issued to the Windows NT System Event Logger (Viewer).

Enable simultaneous networking and storage over Windows NT

Install two host adapters in the same Windows NT computer and use one for storage and one for networking.

Enhance Windows NT SCSI driver performance

> Advanced users only. Configure registry to enhance performance when using a Windows NT SCSI driver.

Enhance Window NT IP driver performance

> Modify class, topology or MTU values or the way Windows NT TCP/IP services transmits Ethernet packets (802.3 SNAP) by changing registry values.

Perform LUN mapping

> This procedure requires the use of the Emulex Configuration Utility. This Utility is installed along with the Windows NT 4.0 SCSI Port driver.

Perform manual SCSI mapping

> This procedure requires the use of the Emulex Configuration Utility. This Utility is installed along with the Windows NT 4.0 SCSI Port driver.

Upgrade host adapter firmware using the Emulex Configuration Utility

> This procedure requires the use of the Emulex Configuration Utility. This Utility is installed along with the Windows NT 4.0 SCSI Port driver.

Designate a fibre channel drive as the boot drive

Boot BIOS is a set of x86 instructions in the host adapter Flash ROM that allows a user to designate a Fibre Channel hard drive as the boot drive. Boot BIOS works with the existing system BIOS on Intel Pentium PCI motherboards.

> **Note**   The examples in this chapter use the Windows NT 4.x operating system.

Supported Host Adapters

LP6000, LP7000/E, LP8000, and LP850.

Requirements

- Intel Pentium computer system, with system BIOS copyrighted 1995 or later
- MS-DOS 6.0 or higher
- Windows NT 4.x installation media

- Installed host adapter
- Connected Fibre Channel drive or disk array
- The Emulex SCSI mini-port driver
- LP6dutil DOS Diagnostic, version 8.3 or higher

Defining a Fibre Channel Drive as the Boot Drive

The following is a summary of the procedures necessary to define a Fibre Channel disk drive as the boot drive in Windows NT 4.x.

- Enable Boot BIOS
- Create a DOS boot disk
- Designate a Fibre Channel boot drive
- Format the Fibre Channel drive
- Install Windows NT 4.x operating system

Return to top of page.

Enable Boot BIOS

Note   You can enable Boot BIOS using the Windows NT LightPulseUtility/NT to enable Boot BIOS. See page 5-7 or use the DOS utility as shown below.

1. Boot the system in DOS.
2. Insert lp6dutil diskette in drive A.
3. Type this command:

```
a:\>lp6dutil
```

The Main menu is displayed.

lp6dutil Main Menu
1 - Test Host Adapters
2 - Modify Test Options
3 - Restart Host Adapters
4 - Input/Output
5 - Maintenance
6 - Show Host Adapters Info
7 - Quit

From the lp6dutil Main menu,

1. Type <5> and press <Enter> to open the Maintenance menu.
2. Type <3> and press <Enter> to enable Boot BIOS.
3. Type <0> and press <Enter> to return to the previous menu.
4. Type <7> and press <Enter> to exit the lp6dutil program.

Create a DOS Boot Diskette

From MS-DOS prompt,

1. Place empty floppy disk in drive.
2. Format floppy with system files.

```
format a:/s
```

3. Copy these four files onto the floppy disk.
   ```
   format.com
   fdisk.exe
   mscdex.exe
   The CD-ROM device driver (see manufacturer's manual)
   ```

   Note   SCSI CD-ROMs can use the ASPI DOS driver or the DOSCAM driver.

4. Create a simplified autoexec.bat file on the floppy disk and enter this line:

```
a:\mscdex.exe/d:any_name
```

For example,

```
a:\mscdex.exe/d:OEMCD001
```

5. Create a simplified config.sys file on the floppy disk and enter this line:

```
a:\DEVICE=device_driver/d:any_name
```

device_driver	CD-ROM device driver provided by manufacturer.
any_name	This name serves as a link between autoexec.bat and config.sys files. The same name must be used

in both the config.sys and autoexec.bat files.

For example,

```
a:\DEVICE=MTMCDAI.SYS/d:OEMCD001
```

6. Reboot system with floppy and verify your system boots properly.
7. Power down the computer.
8. Disable or disconnect the IDE hard drive from its controller.

Note   Do not disconnect the IDE CD-ROM. The system
BIOS will always scan for IDE before scanning for
other interfaces.

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Designate a Fibre Channel Boot Drive

This procedure allows a user to select a Fibre Channel boot drive.

1. Insert the newly created boot disk in drive A.
2. Turn on the computer.
3. Press <F5> immediately when the message displays to go to the Emulex BIOS Utility.

Note   Press <F5> within 5 seconds of the displayed
message to invoke the Boot BIOS utility.

The Main window displays a list of adapters

Emulex LPxxx BIOS Utility			
LightPulse Adapters in the System:			
1.	ALPA: 18	PCI BUS #: 00	PCI DEVICE #: 10
2.	ALPA: 01	PCI BUS #: 00	PCI DEVICE #: 0E
Enter a Selection:			
Enter <F7> to Exit:			

4. Select the adapter by entering the appropriate number.

Any Fibre Channel drive attached to the host adapter can be designated as the boot device.

Adapter 1:	ALPA: 18	PCI BUS #: 00	PCI DEVICE #: 10
1.	Change BIOS Boot Device/Display All Devices.		
2.	Change default ALPA of this Adapter.		
3.	Enable or Disable BIOS on this Adapter.		
4.	Change FC Link Timer (+ Advanced Option +)		
5.	Changed Extended Link Service Timer (+ Advanced Option +)		
6.	Enable or Disable Individual Devices (+ Advanced Option +)		
7.	Change PLOGI Retry Timer (+ Advanced Option +)		
8.	Topology Selections (+ Advanced Option +)		
9.	Fabric Boot (+ Advanced Option +)		
Enter a Selection:			
Enter <F7> to Exit	<F6> to Default Values	<PageUp> to Previous Menu	

5. Type <1> and press <Enter> to display all devices.
6. Enter the two digit number (01, 02, etc.) to specify the boot device.

   The Boot Device ALPA information at the top of the menu changes to reflect your entry.

7. Press <PageUp> to return to the previous menu.
8. Type <3> and press <Enter> to enable Boot BIOS on the adapter.
9. Type <1> and press <Enter> to enable BIOS on the selected drive (if not already enabled).
10. Press <F7> to exit Boot BIOS.
11. Select <Y> to reboot.

Format the Fibre Channel Drive

Caution   Ensure that the system IDE or SCSI hard drive is

> disabled before continuing. This will allow the
> Fibre Channel drive to boot, and will prevent
> accidental erasure of the system disk during the
> format procedure below.

From the MS-DOS prompt,

1. Use the fdisk command to create a primary DOS partition (maximum size) on the Fibre Channel disk.
2. Format the Fibre Channel hard drive with copy system files option.

```
a:\format c: /s
```

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Install Windows NT

These steps summarize the installation script provided by Windows NT. Consult the Windows NT documentation for detailed descriptions.

1. Boot computer with Windows NT installation disk #1 in drive A.
2. When prompted the first time, press <Enter> to allow Windows NT installation to detect the CD-ROM drive.
3. When prompted a second time, press <S> to skip mass storage device detection.

   Bypassing this step permits manual detection of additional SCSI adapters.

4. Select Other and press <Enter>.
5. Insert the Emulex Windows NT SCSI driver diskette.
6. Select the Emulex Fibre Channel SCSI driver and press <Enter>.
7. Insert the Windows NT CD-ROM when prompted.
8. Insert the Emulex driver diskette again when prompted.
9. Complete setup process by following the Windows NT prompts.

The system should boot up Windows NT from the Fibre Channel disk. You may now use it as installed or install another operating system.

Connect a fiber optic cable to a copper port

If you want to connect fiber optic cable to a copper connector, you can convert from one media to another by using an MIA. The adapter has two signal interfaces: an optical interface SC connector and a serial interface DB9 connector. By connecting an MIA to a copper connector, a non-OFC optical link is provided. Any fixed
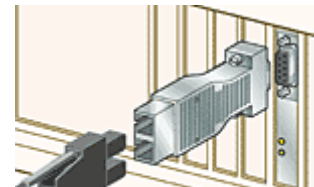
copper duplex interface supports the Fibre Channel - Media
Interface Adapter specification.

Upgrade device driver

Note   It is important to remove the existing host
                  adapter driver before upgrading or reinstalling
                  a new driver.

Follow these procedures to upgrade or reinstall the device driver. Click procedure for
details. When finished, click "Return to top of page" to return to this summary.

1. Obtain driver - Obtain new driver from the Emulex ftp site at
   ftp.emulex.com/pub/fibre.
2. Remove driver - Procedure differs for Windows NT 4.0, AIX, Solaris, or UnixWare.
3. Install new device driver

Obtain driver

Driver files are on the Emulex ftp server at ftp.emulex.com/pub/fibre.

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Remove existing Windows NT 4.0 driver

The procedure is slightly different for the SCSI driver and IP driver. Refer to the proper
procedure.

Windows NT 4.0 SCSI driver

From the Windows NT desktop,

1. Click Start, select Settings, Control Panel.
2. Double click Network icon.
3. Select Adapters tab.
4. Select Emulex PCI-Fibre Channel host adapter.
5. Click Remove and Yes to confirm.
6. Click Close.
7. Reboot the computer to restart Windows NT.

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Windows NT 4.0 IP driver

From the Windows NT desktop,

1. Click Start button, select Settings, and click Control Panel.
2. Double click the SCSI Adapters icon.
3. Select Drivers tab.
4. Click Remove, and Yes to confirm.
5. Click OK.
6. Reboot the computer to restart Windows NT.

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Remove existing AIX driver

Select one of the previously released versions of the AIX SCSI/IP driver.

Prior Version	Driver Name
1.0.0.0	df10e51a
2.0.0.0	lp6000

Versions Below 2.0.0.0

1. Login as root.
2. Open terminal window and type this command to uninstall old driver:

```
# installp -u devices.pci.df10e51a
```

3. Type this command to remove the network interface (fcnet):

```
# rmdev -dl fcnetn
```

where **n** is the network device driver (interface) number. A message should appear showing device not found.

4. If the debugging program bosboot has been run previously, enter,

```
# bosboot -a -d /dev/ipldevice -D
```

5. Reboot the system.

Versions 2.0.0.0 or Above

1. Login as root.
2. Open terminal window and type this command to uninstall old network drivers (fchan).

```
#installp -u devices.pci.lp6000
```

3. If the debugging program bosboot has been run previously, enter,

```
# bosboot -a -d /dev/ipldevice -D
```

4. Reboot the system.

Remove existing Solaris device driver

1. Type this command to remove the driver package lpfc:

```
pkgrm lpfc
```

This command removes both the storage and networking drivers.

2. Type <y> when prompted to uninstall.
3. Reboot the system.

Remove existing UnixWare device driver

Perform these steps to remove a previously installed lp6fc device driver package:

1. Login as root user.
2. Enter this command to determine if a device driver is present.

```
pkginfo -l lp6fc
```

3. Enter this command to remove the previously installed lp6fc device driver.

```
pkgrm lp6fc
```

4. Reboot the system.

Upgrade firmware

Prerequisites:

* DOS 6.x or higher (program may not run in the DOS shell under Windows on all systems.
* DOS diagnostic utility - Download version 8.4
* Firmware image file - Download latest versions from the Emulex ftp server at ftp.emulex.com/pub/fibre
* No memory manager programs like Expanded Memory Manager (EMM386) currently running.

Upgrade procedure

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

```
c:\>lp6dutil
```

The main menu appears.
3. Type 5 to select Maintenance.
4. Type 1 to select Upgrade Firmware.
5. Enter Firmware Image file name including path.
6. Type 1 to proceed with the upgrade.
7. Type 1 when prompted to reboot the host adapter.
8. Type 0 until the Main menu reappears.
9. Type 7 to Quit.

AL_PA Table

When a device is connected to a Fibre Channel arbitrated loop, the loop initialization process (LIP) automatically assigns an ALPA (Arbitrated Loop Physical Address) to the device. This number is assigned to the device as long as it is connected to the loop and powered up. When the device is removed from the loop or turned off, as it is reconnected or when another LIP occurs, the device is assigned a different ALPA.

The HardALPA=0x**n** command in the registry allows the user to permanently assign an ALPA to the host adapter. However, **only valid ALPAs** may be used. The chart below shows valid ALPAs.

0x01	0x02	0x04	0x08	0x0F	0x10	0x17	0x18	0x1B
0x1D	0x1E	0x1F	0x23	0x25	0x26	0x27	0x29	0x2A
0x2B	0x2C	0x2D	0x2E	0x31	0x32	0x33	0x34	0x35
0x36	0x39	0x3A	0x3C	0x43	0x45	0x46	0x47	0x49
0x4A	0x4B	0x4C	0x4D	0x4E	0x51	0x52	0x53	0x54
0x55	0x56	0x59	0x5A	0x5C	0x63	0x65	0x66	0x67
0x69	0x6A	0x6B	0x6C	0x6D	0x6E	0x71	0x72	0x73
0x74	0x75	0x76	0x79	0x7A	0x7C	0x80	0x81	0x82
0x84	0x88	0x8F	0x90	0x97	0x98	0x9B	0x9D	0x9E
0x9F	0xA3	0xA5	0xA6	0xA7	0xA9	0xAA	0xAB	0xAC
0xAD	0xAE	0xB1	0xB2	0xB3	0xB4	0xB5	0xB6	0xB9
0xBA	0xBC	0xC3	0xC5	0xC6	0xC7	0xC9	0xCA	0xCB
0xCC	0xCD	0xCE	0xD1	0xD2	0xD3	0xD4	0xD5	0xD6
0xD9	0xDA	0xDC	0xE0	0xE1	0xE2	0xE4	0xE8	0xEF

Windows NT Event Viewer

The Windows NT SCSI driver verifies the success of the PCI Host adapter's Power On Self Test (POST). In case of a failure or suspected failure, an error log entry is issued to the Windows NT System Event Logger (Viewer).

From Main menu,

1. Click Start, select Administrative Tools , Event Viewer.
2. Double-click any event with source name lp6nds35.
3. Change the data view from Bytes (default) to Words.
4. Examine entry at offset 0x10.
5. If low byte = E**n**, match low byte with error found in SCSI Port Log Error table

---

Windows NT SCSI driver event log codes

- Event Log
- CmdStat values
- Parm error values (valid only when cmdStat=0x3)

The Windows NT SCSI driver logs events and errors in the Windows NT event log. Serious errors are always be logged, while informational events are only logged if the registry parameter "LogErrors=1" is used. All Windows NT SCSI driver logged events are issued with an Event ID of 11, Internal Adapter Error, but do not necessarily indicate an adapter error occurred. Byte offset 0x10 of the event is the driver event code, while byte offset 0x11-0x13 contain event specific information.

0x10 Offset	Explanation	0x11-0x13 further information
0xD0	SNS_REQ (XMIT_SEQ) failed	0x11= cmdStat, 12= Parm err
0xD1	SNS_RSP (RCV_SEQ) failed	0x11= cmdStat, 12= Parm err
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 time-out	0x11 - 13 no additional information

0xD7	Mailbox Interrupt Time-out	0x11= Mailbox word 0
0xD8	TPRLO requested when busy	0x11= local req. state, 12= discState, 13= Mailbox word 0
0xD9	Link down time-out occurred	0x11= local req. state, 12= discState, 13= Mailbox word 0
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 Init	Status register bytes 1-3 in event 11-13
0xE5	Requested Loop but link=PT-PT	
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	
0xF1	LinkUp err; LP6/7 Down, driver Up	0x11= parameter field, 12=IOCB cmd

0xF2	LinkUp w/ 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= ALPA
0xF6	FCP_IXXX_CX IOCB rsp err	0x11= cmdStat, 12= Parm err, 13= ALPA
0xF7	Ring hd !=0 && pendingSrb!=NULL	
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, 13= ALPA
0xFC	ELS_REQ_CX IOCB rsp err	0x11= cmdStat, 12= Parm err, 13= ALPA
0xFE	FLOGI Failed	0x11= cmdStat, 12= Parm err
0xFF	SNS_PLOGI Failed	0x11= cmdStat, 12= Parm err

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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	
IOSTAT_BA_RJT	d0xA	

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Parm error values (valid only when cmdStat=0x3)

IOERR_SUCCESS	0x00
IOERR_MISSING_CONTINUE	0x01
IOERR_SEQUENCE_TIMEOUT	0x02
IOERR_INTERNAL_ERROR	0x03
IOERR_INVALID_RPI	0x04
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
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
IOERR_RING_RESET	0x19
IOERR_LINK_DOWN	0x1A
IOERR_CORRUPTED_DATA	0x1B
IOERR_CORRUPTED_RPI	0x1C

Enable simultaneous networking and storage over Windows NT

By Windows NT default, if a Windows NT SCSI driver is installed, it will load first when the computer boots, and use the host adapter's default or alternate device ID (View jumper settings). The Windows NT IP driver loads later, and requires a separate device ID. This ID is set through jumpers on the host adapter board. Jumper blocks JX1 and JX2 must be set to enable the correct device ID.

This method requires two host adapters installed in the same computer. One adapter must be an LP6000, LP7000/E or LP8000.
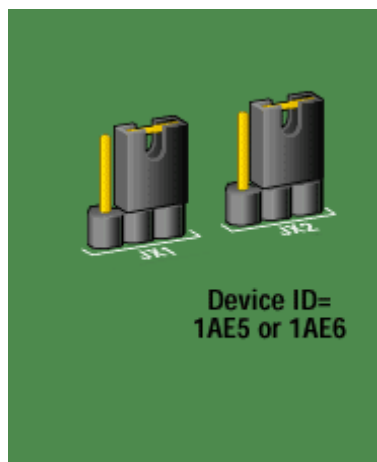
To run both drivers at the same time,

1. Install the first host adapter.
2. Leave one host adapter's jumpers in the default position: JX1:1-2 and JX2:2-3.
3. On the second host adapter, move jumper JX1:1-2 to JX1:2-3 to enable jumper block JX2.
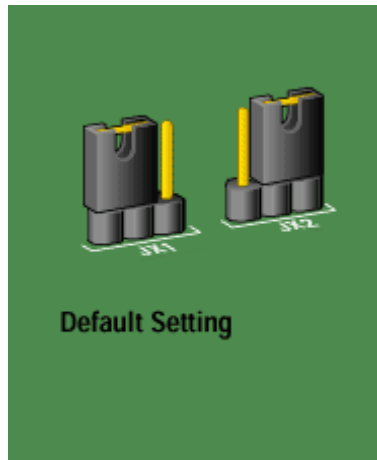
4. Move jumper JX2:2-3 to JX2:1-2.

5. Install the second host adapter.
6. Install the Windows NT SCSI driver on the host adapter with the default or alternate device ID.
7. Install the Windows NT IP driver on the second host adapter.
8. Reboot the computer.

Windows NT 4.0 IP driver

Change the Class (class 3), Topology (loop) or MTU size (5DC) or enhance network performance by forcing Windows NT TCP/IP to transmit Ethernet packets using 802.3 SNAP

encoding.

Note	These configuration changes are made to the Windows NT registry. Before changing any values, we recommend making a backup copy of the registry. Changes made incorrectly to the Windows NT Registry will have disastrous effects.

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Fibre Channel Class

The Windows NT IP driver can operate in class 2, or 3, but is set to 3 (default) during installation. To view or change this entry without directly modifying the registry, access the LAN registry parameter window and make changes there.

A second method is to run the registry configurator program (lp6conf.exe) which came with the Emulex Windows NT driver. After running configurator program, the system must be rebooted.

You can also add or modify the class entry in the Windows NT registry as shown below.

HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\lp6ndlan**x**\Parameters (where **x** is the adapter suffix)		
class	REG_DWORD	default is 3; set to 2 or 3

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Fibre Channel Topology

The Windows NT IP driver can operate in loop topology for Fibre Channel Arbitrated Loop operation, Pt2Pt for Point to Point/Fabric operation (for use with a fabric switch or hub), or Both for Point to Point initialization with failover to FC-AL initialization. Topology is set to loop (default) during installation.

To view or change this entry without directly modifying the registry, access the LAN registry parameter window and make changes there.

A second method is to run the registry configurator program (lp6conf.exe) which came with the Emulex Windows NT driver. After running configurator program, the system must be rebooted.

You can also add or modify the topology entry in the Windows NT registry as shown below.

HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\lp6ndlan**x**\Parameters (where **x** is the adapter suffix)		
topology	REG_SZ	default is loop; set to loop, pt2pt, or both.

Maximum Transfer Unit

This parameter establishes the maximum transmission unit (MTU) for a network interface. The MTU is the maximum packet size, in bytes, that the transport will transmit over the network. The packet size includes the transport header.

The MTU is set to 5DC (default) during installation. To view or change this entry without directly modifying the registry, access the LAN registry parameter window and make changes there.

A second method is to run the registry configurator program (lp6conf.exe) which came with the Emulex Windows NT driver. After running configurator program, the system must be rebooted.

You can also add or modify the MTU entry in the Windows NT registry as shown below.

HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\lp6ndlan**x**\Parameters\tc (where **x** is adapter suffix)		
MTU	REG_DWORD	default is 5DC; from 0X44--0XC350.

802.3 SNAP

The Emulex Windows NT IP driver uses the 802.3 SNAP frame encoding format. By default, Microsoft Windows NT TCP/IP stack transmits DIX Ethernet format only, but is able to receive both DIX and 802.3 SNAP formats. Changing this registry value to 1 forces Windows NT TCP/IP to transmit Ethernet packets using 802.3 SNAP encoding.

Because this registry change affects all adapter cards using TCP/IP (for example, Ethernet and Fibre channel host adapters) in the computer, every card must support 802.3 SNAP encoding.

Add or modify the ArpUseEtherSnap entry in the Windows NT registry as shown below.

HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Tcpip\Parameters		
ArpUseEtherSnap	REG_DWORD	default is 0; set to 1 to enable 802.3 SNAP

Modify the Windows NT Registry

Note   Before changing any values, we recommend making a backup copy of the registry. Changes made incorrectly to the Windows NT Registry will have disastrous effects.

You can modify Windows NT parameters through the registry using the format shown below.

HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\lp6nds35 \Parameters\Device**n** (where **n** is adapter number 0-99; without **n**, applies to all adapters)		
DriverParameter	REG_SZ	separate multiple entries in string by a semi-colon (;)

Windows NT 4.0 Registry Parameters

The table below lists parameters that can be changed, allowable range of values, and factory defaults.

AbortStatus = 0x**n**	Values from 0x00 - 0xFF. Controls NT SRB error status for general Abort conditions. Default = SRB_STATUS_BUS_RESET (0x0E) which will not cause the current NT Class driver to throttle down I/O performance after 4 of these errors have been received (on a per-LUN basis).
ALTOV = **n**	Values are in milliseconds from 1 to 15. Default = 15.
ARBTOV = **n**	Values are in milliseconds from 500 to 10000. Default = 1000. Represents FC_AL arbitration time-out prior to LIP.
Class = **n**	Values from 0 - 2. Default = 2. Controls which Fibre Channel Class will be used: 0 = Class 1, 1 = Class 2, 2 = Class 3.
EDTOV = **n**	Values are in milliseconds from 500 to 10000. Default = 1000. Represents error detect time-out value prior to LIP.
EnableDPC = **n**	Values 0 or 1. Default = 0. 0 = process I/O completion at interrupt

EnableDPC = n	level, 1 = process at DPC level.
FrameSizeMSB = **n**	Values from 1 - 8. Default = 8. Controls the upper byte of receive FrameSize if issued in PLOGI. This allows the FrameSize to be constrained on 256 byte increments from 256 (1) - 2048 (8).
HardALPA = 0x**n**	Values from 0x01 - 0xEF. Default = 0x01. Allows the adapter to use a hard assigned loop address. **Note**: ONLY VALID ALPAs may be used (see ALPA table).
LinkTimeOut = **n**	Values are in seconds from 1 - 500. Default = 60. Controls the time-out at which link no longer BUSY's requests but issues SELECTION_TIMEOUT error status.
LogErrors = **n**	Values 0 or 1. Default = 0. 0 = do not log general adapter/disk errors. 1 = use Event Log to log general errors.
NodeTimeOut = **n**	Values are in seconds from 1 - 255. Default = 10. Controls the time-out at which a formerly logged in node will issue SELECTION_TIMEOUT error status to an I/O request.
QueueDepth = **n**	Values from 1-64 (decimal). Default = 32. Requests per LUN/Target (see Queue Target parameter).
QueueTarget = **n**	Values 0 or 1 (decimal). Default = 0. 0 = QueueDepth applies on a per LUN basis 1 = QueueDepth applies on a per Target basis.
RATOV = **n**	Values are in seconds from 2 to 120. Default = 2. This value is the ELS request time-out.
ReadCheck = **n**	Values 0 or 1. Default = 1. 0 = do not enable byte counting for read operations. 1 = enable byte counting. If bytes counted are less than requested transfer count, issue underrun.
ResetFF = **n**	Values 0 or 1. Default = 1. 0 = ResetBus translates to LIP(F7). 1 = ResetBus translates to LIP (FF). Used for WolfPack to force reservations to be freed when ResetBus issued. Only meaningful for FC_AL topology and Seagate native FC disk drives.
ResetTPRLO = **n**	Values 0 or 1. Default = 1. 0 = ResetBus translates to LIP( ). 1 = ResetBus translates to ThirdPartyProcessLogout + LIP ( ). Used for WolfPack to force reservations to be freed when ResetBus is issued.
RetryInterval = **n**	Values are in seconds from 2-255. Default = 45. Used for time-out interval if RetryIoTimeOut = 1. Must be shorter than Class driver TimeOutInterval.
RetryIoTimeOut = **n**	Values 0 or 1. Default = 1. 1 = allow adapter to time-out I/O prior to port driver's time-out which will cause a LIP/Link Reset.

| RTTOV = **n**	Values are in milliseconds from 100 to 511. Default = 256. Represents time-out between phases of Offline to Online protocol.
ScanDown = **n**	Values 0 or 1. Default = 0. 0 = Lowest AL_PA = Lowest physical disk (ascending AL_PA order). 1 = Highest AL_PA = Lowest Physical Disk (ascending SEL_ID order).
SliFlags = **n**	Values from 0 - 2. Default = 0. Controls which driver interface to use. 0 = automode; attempt SLI-2 first. If that fails uses SLI-1. 1 = always use SLI-1. 2 = always use SLI-2.
SimulateDevice = **n**	Values 0 or 1. Default = 0. 0 = do not create a "dummy" disk device. 1 = create a dummy disk to force the driver to load even if no disk devices are present at boot time.
SnsALL = **n**	Values 0 or 1. Default = 1. Controls which N_Ports are queried from the NameServer. 0 = SCSI FCP only. 1 = All N_Ports.
Topology = **n**	Values 0 or 1. Default = 0. 0 = FC_AL (loop), 1 = PT-PT Fabric. When set to 1, FLOGI, SCR/RSCN and NameServer queries are employed.
TrafficCop = **n**	Values 0 or 1. Default = 0. 1 = enable FC-AL loop master to run unfair and break potential arbitration problems by sending frames to itself. 0 = run fair all the time.

Perform LUN Mapping

LUN mapping performs these tasks:

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

From the Windows NT desktop;

1. Click Start menu, select Programs group, and select Configuration Utility.
2. In the Adapter Controls section, check the LUN Mapping box.
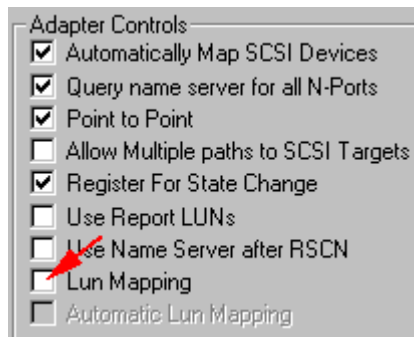
3. Reboot the system if any changes were made to LUN Mapping.
4. Select a SCSI Target under the World Wide Port Name list.
5. Click LUN Map under the list of SCSI targets.
6. Click Add in the LUN Map pop-up window.
7. Select a 64-bit Fibre Channel LUN then click OK.
   The format of this number is found under the FCP standard or PLDA (Private Loop Drive Attachment) standard. The first number is this series will be all one's.
8. Enter the NT LUN number. This number is self-incrementing.
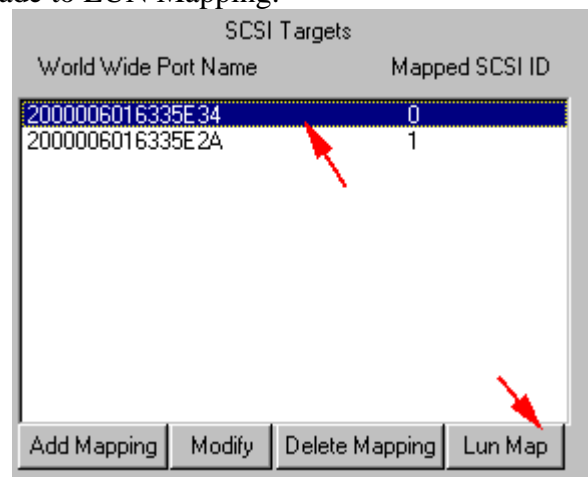
Manual SCSI Mapping

From the Windows NT desktop,

1. Click Start menu, select Programs group, and select Emulex Configuration Utility. The Configuration Utility main window opens:

   Note   In the Adapter Controls section, uncheck (if checked) the Automatically Map SCSI devices box. Reboot the system if any changes were made to Adapter Controls.

2. Select an adapter from the Available Adapters list
3. Click Add Mapping under SCSI Targets list.
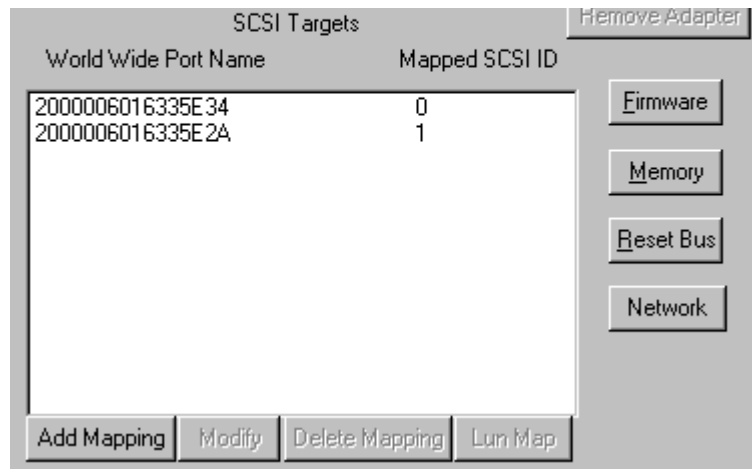4. In the displayed window,
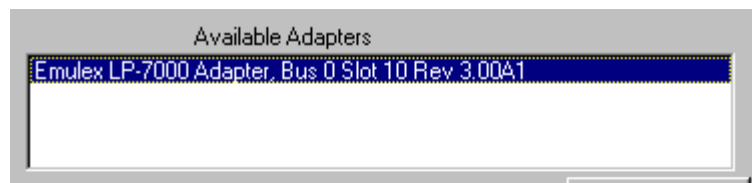
select a World Wide Name and SCSI ID then click on OK.

This binds the designated SCSI device to the Windows NT system.

To verify the computer sees the device as one of its own disks.

1. Click Start, select Programs Administrative tool;and click Disk Administrator.

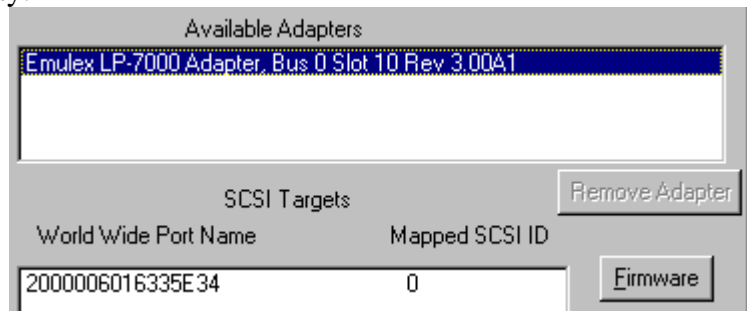2. Verify that the new SCSI device is shown as one of the drives.

Upgrade Firmware

From the Windows NT desktop,

1. Obtain a copy of the desired upgrade file.
2. Upgrade files are available on the Emulex ftp server at ftp.emulex.com/pub/fibre/.
3. Click Start menu.
4. Click Programs group.
5. Click the Configuration Utility. The main window opens:
6. Select an adapter from the Available Adapters list.
7. Click the Firmware button.
8. Locate the new upgrade file.
9. Click Open.

The firmware will be verified, downloaded, and the adapter restarted.

Declaration of Conformity

This Declaration identifies the product, manufacturer's name and address, and applicable specifications recognized in the European Union.

DECLARATION OF CONFORMITY

Manufacturer: Emulex Corporation
3535 Harbor Blvd.
Costa Mesa, CA 92626
USA

declares under sole responsibility that the product:

Product Name: LightPulse™ LP850 Fibre Channel PCI Host Adapter

Assembly Number: FC1020017-XX (GBIC model)
FC1020016-XX (Embedded Optical, 1x9 model)

Accessories: Emulex PN 2300029 (Active Copper DB9 GBIC Module)

Emulex PN 2300028 (Shortwave Optical GBIC Module)

to which this Declaration relates is in conformity with the following standards or other documents:

Safety: IEC950:1991+A1,A2/EN60950 (1992)+ A1,A2
including EN60825-1 (1994)
TUV Rheinland, Certificate No. R9677151.1

EMC: EN55022 (1994)/CISPR-22 (1993), Class B
EN50082-1 (1997)

following the provisions of the Low Voltage Directive 73/23/EEC and EMC Directive 89/336/EEC (as amended by 92/31/EEC) and is Marked in accordance with the CE Marking Directive 93/68/EEC

February 18, 1999
Costa Mesa, CA

Paul Folino

Paul Folino, President

European Contact: Emulex Corporation   Telephone: 44-118-977-2929
7 & 8 Forest Court   Fax: 44-118-977-3237
Oaklands Park
Fishponds Road
Wokingham, Berkshire
RG41 2FD, England

European Union

This equipment complies with CISPR22/EN55022 Class A.

WARNING *This is a class A product. In a domestic environment, this product may cause radio interference requiring the user to take adequate measures.*

Declaration of Conformity

This Declaration identifies the product, manufacturer's name and address, and applicable specifications recognized in the European Union.

DECLARATION OF CONFORMITY

Manufacturer: Emulex Corporation
3535 Harbor Blvd.
Costa Mesa, CA 92626
USA

declares under sole responsibility that the product:

Product Name: LightPulse™ LP850 Fibre Channel PCI Host Adapter

Assembly Number: FC1020019-XX (Embedded DB9 model)

to which this Declaration relates is in conformity with the following standards or other documents:

Safety: IEC950:1991+A1,A2/EN60950 (1992)+ A1,A2
TUV Rheinland, Certificate No. R9677151.1

EMC: EN55022 (1994)/CISPR-22 (1993), Class A
EN50082-1 (1997)

following the provisions of the Low Voltage Directive 73/23/EEC and EMC Directive 89/336/EEC (as amended by 92/31/EEC) and is Marked in accordance with the CE Marking Directive 93/68/EEC

November 25, 1998
Costa Mesa, CA

Paul Folino

Paul Folino, President & CEO

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