

# **HP NetServer Fibre Channel Host Bus Adapter Installation Guide**



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## Audience Assumptions

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This Installation and Configuration Guide is for the person who installs, administers, and troubleshoots LAN servers. Hewlett-Packard Company assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

# Contents

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<b>1 Introduction .....</b>	<b>1</b>
Audience for this Manual .....	1
What is the Hewlett-Packard Fibre Channel Adapter? .....	1
Contents of the Fibre Channel Adapter Kits .....	1
What Is Needed Besides the Adapter .....	2
Adapter Overview .....	2
System Requirements .....	4
Windows NT Systems.....	4
Windows 2000 Systems .....	4
NetWare Systems.....	4
<b>2 Installation.....</b>	<b>5</b>
Overview.....	5
Installing Adapter in PCI Slot.....	5
General Steps.....	5
GBIC Overview.....	6
Installing the GBIC.....	7
Connecting Cables .....	8
Removing the GBIC.....	9
Verifying the Adapter .....	10
<b>3 Windows NT Driver Installation.....</b>	<b>13</b>
Overview .....	13
Installing the Driver .....	13
Removing the Driver .....	14
<b>4 Windows 2000 Driver Installation .....</b>	<b>15</b>
Overview .....	15
Installing the Driver .....	15
Removing the Driver .....	16
Additional Notes .....	16

<b>5 NetWare Driver Loading .....</b>	<b>17</b>
Overview .....	17
Driver Loading on an Existing NetWare Server .....	17
Unloading the Driver .....	19
Updating the Driver .....	19
<b>6 PCI Hot Plug Support .....</b>	<b>21</b>
<b>7 Troubleshooting .....</b>	<b>23</b>
<b>A Electrostatic Discharge (ESD) .....</b>	<b>25</b>
Preventing Electrostatic Damage .....	25
Grounding Methods .....	25
<b>B Regulatory Information .....</b>	<b>27</b>
Regulatory Notices .....	27
Electromagnetic Compliance .....	27
Notice for United States .....	28
(Federal Communications Commission) .....	28
Class A Accessories .....	29
Notice for Canada .....	29
Notice for Japan .....	29
Notice for Taiwan .....	30
Notice for European Union .....	30
Declaration of Conformity (US, EU, China) .....	31
<b>C Specifications .....</b>	<b>33</b>
Fibre Channel Operation .....	33
<b>D Software License Terms .....</b>	<b>35</b>
<b>E Fibre Channel Cables .....</b>	<b>37</b>
<b>F Warranty and Support .....</b>	<b>39</b>
Hardware Accessories Limited Warranty .....	39
Hewlett-Packard Hardware Accessories .....	39

Third-Party Hardware Products .....	40
HP Repair and Telephone Support .....	40
U.S. and Canada .....	40
Other Countries .....	40
World Wide Web .....	40



# 1 Introduction

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## Audience for this Manual

This guide is intended for network administrators, maintenance engineers or qualified personnel who maintain and/or update servers. Since installing this Adapter involves both hardware and software installation functions, it is important that the person installing the adapter is familiar with performing such tasks as installing PCI cards, connecting cables, and installing software drivers.

## What is the Hewlett-Packard Fibre Channel Adapter?

The Hewlett-Packard Fibre Channel Adapter is a reliable, high performance serial I/O storage interface for servers. The serial nature of Fibre Channel brings the flexibility and ease of use of LAN connectivity to storage attachment, introducing the idea of Storage Area Networks (SAN). Fibre Channel simplifies the physical configuration issues related to the I/O channel. Peripherals may be positioned at considerable distances from the server (depending on cabling media) for convenience or for data security. More reliable in data transfer than conventional LAN, Fibre Channel offers Gigabit performance and greater device connectivity than parallel SCSI. The 32/64 bit, 33 MHz, 1 Gigabit HP Fibre Channel Adapter provides the I/O channel scalability required for continuous growth in storage capacity and availability needs.

The Hewlett-Packard Fibre Channel Adapter is configured to run on an Arbitrated Loop, or a Fabric environment, Class 3 operation with the SCSI FCP protocol. The SCSI FCP protocol allows the use of the standard Windows NT SCSI miniport interface, thus blending the Hewlett-Packard Fibre Channel Adapter's revolutionary I/O technology with evolutionary requirements of standards-based servers.

## Contents of the Fibre Channel Adapter Kits

This section describes what is in the HP Fibre Channel Adapter kit. The kit contents are as follows:

- Fibre Channel Host Bus Adapter (HBA)
- A Hewlett-Packard Navigator CD containing the available adapter driver(s)
- A documentation CD containing the Fibre Channel Host Bus Adapter Installation Guide
- This installation guide

## **What Is Needed Besides the Adapter**

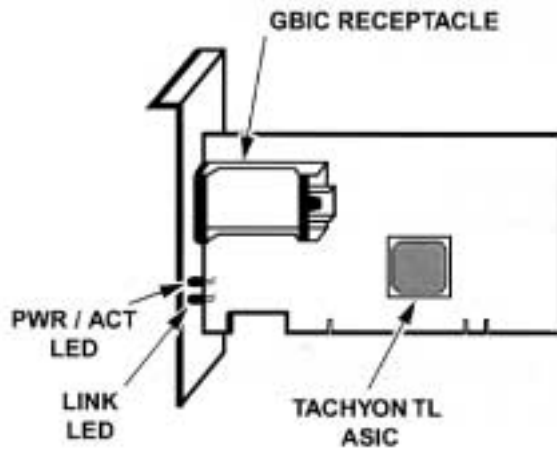
Besides the Fibre Channel HBA, you will need the following:

- A GBIC module supported by the Fibre Channel HBA
- A fibre channel cable, either optical or copper
- A fibre channel device (such as the Fibre Channel Hub) to connect to the GBIC module

## **Adapter Overview**

The HP Fibre Channel Adapter is a PCI to Fibre Channel controller card that provides a one Gigabit serial interface between a server and a Fibre Channel storage system. The cabling between the storage system and the interface card can be either fiber optic or copper.





**Figure 1-1. 32/64 bit PCI, 33 MHz PCI, 1 Gbit**

The HP Fibre Channel Adapter installs into a standard PCI (Peripheral Component Interconnect) slot. This adapter supports a high performance 64-bit PCI bus (backward compatible to 32-bit) with multiplexed address and data lines, and parity information. The PCI bus provides a high speed (up to 264/132 Megabytes/sec) path between the system board and the Fibre Channel Adapter. The HP Fibre Channel Adapter is a PCI Bus Master device and conforms to the PCI Local Bus Specifications version 2.1.

The D8602B Fibre Channel Adapter requires the installation of a Gigabit Interface Converter (GBIC) module before connecting the Fibre Channel cables. See the GBIC Overview section in Chapter 2.

# System Requirements

## Windows NT Systems

The following items are required when you install the HP Fibre Channel Adapter into a Windows NT system:

- A Pentium or higher system with PCI local bus
- Windows NT 4.0 installed with at least service pack 4
- Minimum recommended system memory is 32 MBytes

## Windows 2000 Systems

The following items are required when you install the HP Fibre Channel Adapter into a Windows 2000 system:

- A Pentium or higher system with PCI local bus
- Windows 2000 RTM installed
- Minimum recommended system memory is 64 MBytes

## NetWare Systems

The following items are required when you install the HP Fibre Channel Adapter into a Novell NetWare system:

- A Pentium or higher system with PCI local bus
- Novell NetWare 5 installed
- Minimum system memory of 32 MBytes

## 2 Installation

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### Overview

Before installing the Adapter in your server, make sure that the system is powered down and that you follow ESD procedures to reduce the risk of damage to the Adapter or the server electronics. See Appendix A regarding ESD information.

### Installing Adapter in PCI Slot

Install the Adapter in any standard PCI slot. The following generalized installation steps pertain to most PCI installations. Most system chassis are either vertical or horizontal orientated, therefore, you should install your card depending on the orientation of your system. Consult your server or workstation manual for PCI card installation.

### General Steps

1. Back up your work and turn off power to your system.
2. Remove the chassis cover.
3. Locate an empty PCI expansion slot in your system.
4. Remove the expansion slot cover. (Save the slot cover screw.)
5. Insert the HP Fibre Channel Adapter into the slot until it is firmly seated. Refer to Figure 2-1. on page 6.
6. Replace the slot cover screw.

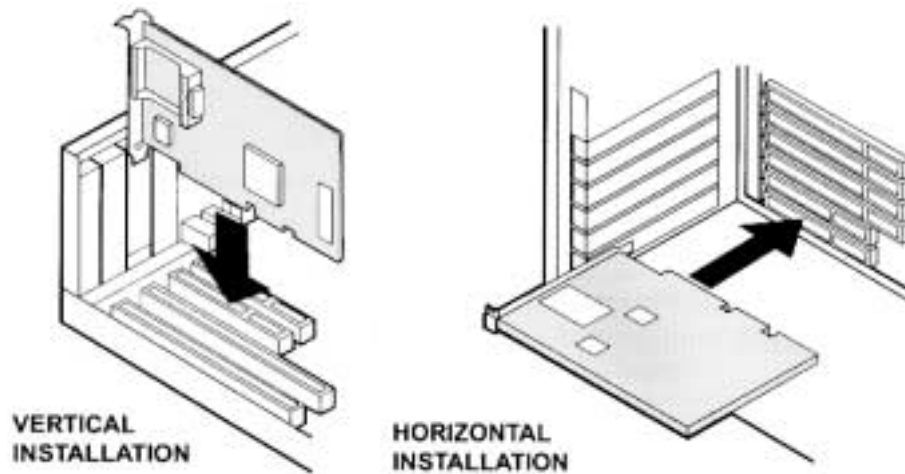


Figure 2-1. Installing Adapter

## GBIC Overview

A GBIC converts internal electrical signals to external electrical or optical signals for transmission across the Fibre Channel media. The Fibre Channel cable inserts into the connector of the GBIC module.

There are several types of GBIC modules currently available that can be used in the D8602B Fibre Channel Adapter. GBICs are “hot pluggable,” which means they can be plugged into, or pulled out of the Adapter while the power is applied.

**CAUTION** Do not remove or insert the Adapter while power is applied. If you do switch GBICs while the system is powered up, make sure the Adapter is secured in the PCI slot. If the Adapter is not secured in the PCI slot, damage may occur to the Adapter and possibly the system’s logic board.

**CAUTION** Inserting a passive GBIC without Fibre Channel device/hub attached will cause an open loop condition. This open loop condition will prevent devices attached to the internal HSSDC connector from functioning. To avoid this situation, avoid inserting the passive GBIC until external Fibre Channel devices are attached to the passive GBIC.

## Installing the GBIC

Select the type of GBIC module that is compatible with your system.

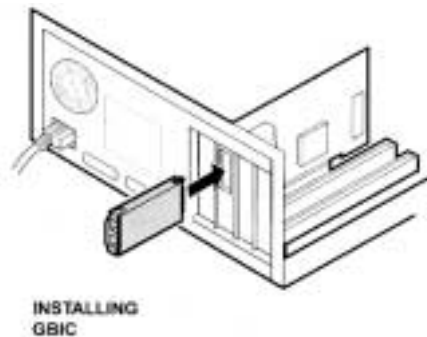
- Install the GBIC into the receptacle on the Adapter.

Refer to Figure 2-2 below.

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**NOTE** You can only install the GBIC one way, as the GBIC and guide rails inside the Adapter receptacle are keyed.

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**Figure 2-2. Installing GBIC Module**

## Connecting Cables

1. If you are using an optical GBIC module, remove the dust plug covers protecting the optical connectors before inserting the fibre-channel cable. Save the dust plug covers for future use.
2. Select the correct cable that matches the GBIC you installed and install the end connectors into the GBIC. The GBIC and Fibre Channel cable are keyed, so they can only fit one way. Refer to Figure 2-3. on page 8 for optical cable connection and Figure 2-4. on page 9 for copper cable connection.
3. Support the Fibre Channel cable so that you do not have a bend radius of less than 3 inches.
4. Support and route the Fibre Channel cable to prevent damage from sharp edges or from being crushed by nearby equipment.

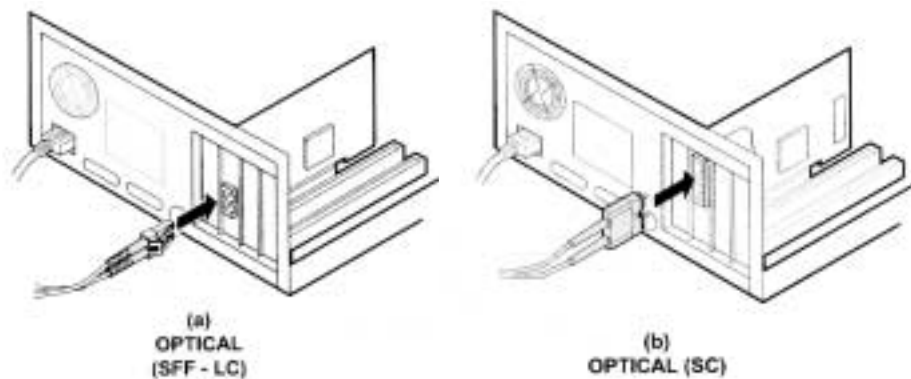
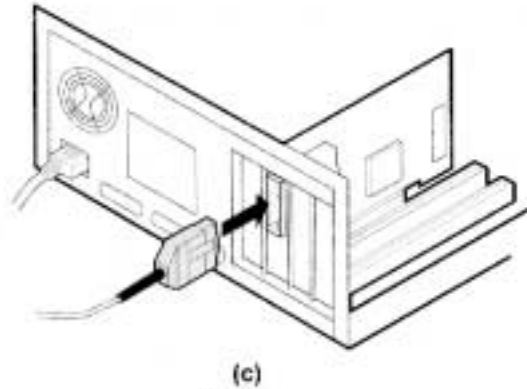


Figure 2-3. Optical (SFF - LC) and Optical (SC) Cable Connector



**Figure 2-4. Copper Cable Connector**

## Removing the GBIC

To remove the GBIC, follow these steps:

1. Remove the Fibre Channel cable.
  - (a) If you are using the HSSDC Copper Cable, squeeze the tab to remove. (See Figure 2-6. on page 10.)
  - (b) If you are using the HSSDC Copper GBIC, squeeze the tabs on both sides of the GBIC. (See Figure 2-6. on page 10.)
2. (a) If you are using an optical GBIC, flip the bar of the GBIC to the “OPEN” position and pull to remove. (See Figure 2-5. on page 10.)
3. Pull the module out of the receptacle.
4. For optical GBICs, reinsert the dust plug.

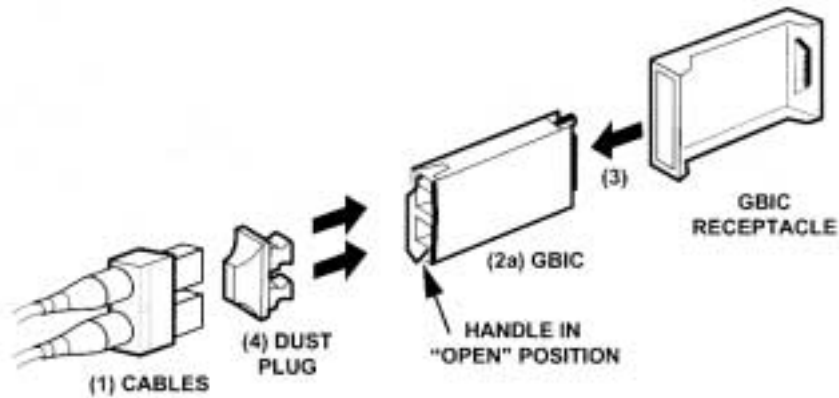


Figure 2-5. Removing the Optical GBIC Module

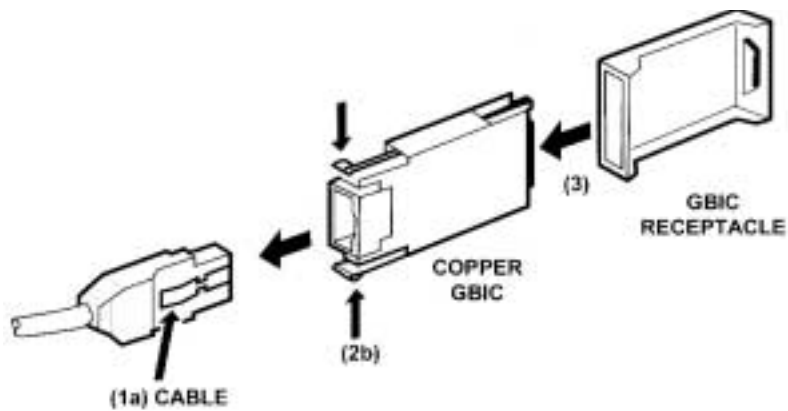


Figure 2-6. Removing the HSSDC Copper GBIC Module

## Verifying the Adapter

You can verify the Adapter and cable installation by powering up the system and looking at the two LEDs on the bulkhead of the adapter. See Figure 2-7. on page 11. Under normal operation, the LEDs operate as follows:



**Upon Power-up:**

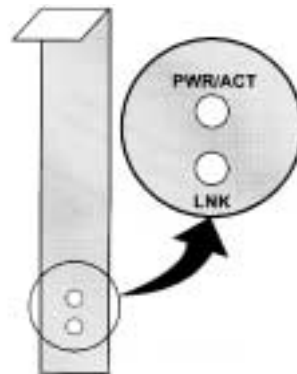
- PWR / ACT LED is ON
- LINK LED is OFF

**During Card initialization by the Host OS:**

- PWR / ACT LED will flash as Fibre Channel devices are identified
- LINK LED is OFF

**Once the card has been initialized by the Host OS:**

- PWR / ACT LED will flash at approximately 1 second intervals
- LINK LED is on if the link is up



**Figure 2-7. Adapter LEDs**



## 3 Windows NT Driver Installation

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**NOTE** Check this worldwide web address to ensure that you have the latest version of the Windows NT driver:  
<http://netserver.hp.com/netserver/>  
If it is a newer version than the one on the supplied HP Navigator CD, download it and use it instead of the earlier driver.

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### Overview

Before installing the Fibre Channel Adapter driver, the Windows NT system should be up and running.

The HP Navigator CD contains the fibre channel HBA drivers. You need to create a driver diskette before driver installation. Follow these procedures to create driver diskette:

- Insert the HP Navigator CD into the HP Netserver CD-ROM, and boot the Netserver with the CD.
- On the main menu, select **Netserver utilities**, then select **diskette library**.
- Select the “**HP D8602B Fibre Channel HBA Winnt 4.0 support disk**”.
- Insert a diskette into the floppy disk drive.
- Follow instructions on the screen to create driver diskette.

### Installing the Driver

To install the Windows NT driver, perform the following steps:

1. Start Windows NT and log into an account with administrative privileges.
2. Insert the “HP D8602B Fibre Channel HBA Winnt 4.0 Support Disk” into the flexible diskette drive.
3. From the *Start* bar, select *Settings*.

4. From the *Settings* menu, select *Control Panel*.
5. From the *Control Panel* window, select *SCSI Adapters*.
6. From the *SCSI Adapter* window, select *Drivers*.
7. From the *Drivers* window, select *Add*.
8. Select *Have Disk*.
9. From the floppy disk drive (path, A:\WINNT), select **Agilent PCI Fibre Channel Controller (NT 4.0)**.
10. Press **OK**.
11. When the installation is complete, remove the diskette, shut down Windows NT, and reboot the system to load the driver.

## Removing the Driver

In certain situations you may need to remove the controller driver. Follow these steps to remove the driver:

1. Start Windows NT and log into an account with administrative privileges.
2. From the *Start* bar, select *Settings*.
3. From the *Settings* menu, select *Control Panel*.
4. From the *Control Panel* screen, select *SCSI Adapters*.
5. From the *SCSI Adapter* window, select *Drivers*.
6. Select **Agilent PCI Fibre Channel Controller (NT 4.0)**
7. From the *Drivers* window, select *Remove*.
8. Click on *Yes*.
9. When you are finished, shut down Windows NT, and reboot the system to remove the driver.

## 4 Windows 2000 Driver Installation

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**NOTE** Check this worldwide web address to ensure that you have the latest version of the Windows 2000 driver:  
<http://netserver.hp.com/netserver/>  
If it is a newer version than the one on the supplied HP Navigator CD, download it and use it instead of the earlier driver.

---

### Overview

Before installing the Fibre Channel Adapter driver, the Windows 2000 system should be up and running.

The HP Navigator CD contains the fibre channel HBA drivers. You need to create a driver diskette before driver installation. Follow these procedures to create driver diskette:

- Insert the HP Navigator CD into the HP Netserver CD ROM drive, and boot the Netserver with the CD.
- On the main menu, select **Netserver utilities**, then select **diskette library**.
- Select the **“HP D8602B Fibre Channel HBA Win2K support disk”**.
- Insert a diskette into the floppy disk drive.
- Follow instructions on the screen to create driver diskette.

### Installing the Driver

The AFCW2K.SYS miniport driver installation is done through the standard Windows 2000 PnP driver installation. Miniport driver installation can be done multiple ways: using the Windows 2000 PnP hardware detection, Hardware Wizard, Device Manager, etc.

Follow the instruction indicated by Windows 2000 “Found New Hardware” Wizard and specify “Floppy disk drive” when selecting the search location for the driver.

During installation select the “**HHBA-510X PCI Fibre Channel Controller**”.  
Please review the Readme file for details.

## Removing the Driver

To uninstall the HP Fibre Channel board:

1. Turn off your system and remove the HP Fibre Channel board from your computer.
2. Once you reboot the system, Windows 2000 will recognize that the HP Fibre Channel board has been removed.

## Additional Notes

1. RAID Storage Arrays:

If you are using RAID Storage arrays that are continually timing out on complex operations you should set the TimeoutValue to 60 (decimal) seconds to avoid Event ID 9s from being logged in the EventLog Viewer.

The registry subkey to configure request timeout is:

`\HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\Disk\TimeoutValue`

This subkey is a REG\_DWORD specifying the number of seconds. You can perform this change using Regedt32.exe. For detailed information on using the Registry Editor, please refer to your Windows 2000 documents.

2. Large I/O request performance enhancement:

Performance enhancement for a large size I/O request could be done by increasing the maximum number of scatter-gather lists or NumberOfPhysicalBreaks used by the SCSIIPORT driver.

The Registry to specify the maximum number of scatter/gather list elements for the HBA:

`HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\AFCW2K\Parameters\MaximumSGList`

The default when not specified in Registry is 17. The maximum value for MaximumSGList is 255, but use this adjustment sparingly because scatter/gather lists consume nonpaged memory. MaximumSGList is a REG\_DWORD. The MaximumSGList is used by Windows 2000 SCSIIPORT driver.

## 5 NetWare Driver Loading

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**NOTE** Check this worldwide web address to ensure that you have the latest version of the NetWare driver:  
<http://netserver.hp.com/netserver/>  
If it is a newer version than the one on the supplied HP Navigator CD, download it and use it instead of the earlier version.

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### Overview

Before loading the HP NetWare Fibre Channel Adapter driver, verify that the programs “NWPA.NLM” and “SCSIHD.CDM” are loaded on your system. In most cases, these programs exist on your system if it is running NetWare 5.

The HP Navigator CD contains the fibre channel HBA drivers.

- You need to create a driver diskette before driver installation. Follow these procedures to create driver diskette:
- Insert the HP Navigator CD into the HP Netserver CD-ROM and boot the Netserver with the CD.
- On the main menu, select **Netserver utilities**, then select **diskette library**.
- Select the “**HP D8602B Fibre Channel HBA NetWare 5.x support disk**”.
- Insert a diskette into the floppy disk drive.
- Follow instructions on the screen to create driver diskette.

### Driver Loading on an Existing NetWare Server

To install the driver, perform the following steps:

1. Insert the HP Fibre Channel Driver Diskette for Novell NetWare 5.x into the floppy drive.

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**NOTE** The driver can either be installed from the hard drive or floppy diskette. For driver installation from the hard drive, copy the driver file to the server boot up directory under DOS, and specify the complete device path when typing the instruction below. For installation from the floppy diskette, continue with instructions as specified below.

---

2. Switch to the *Command Console* and type:

**LOAD A: \AFCNW.HAM <RETURN>**

The driver starts loading, and the display shows the slot number that the Adapter is in.

If there are multiple HP Adapters installed in the system, the driver will prompt you with a list of slot numbers to select the appropriate controller. The driver must be loaded for each controller card added to the system configuration.

3. Remove the floppy diskette after the driver loads. The drives are now ready to be configured using the normal network administrator access to create volumes and/or partition the drives. The startup.ncf file can be modified to load the driver automatically whenever the server is rebooted.



## Unloading the Driver

For removing or updating the driver, perform the following steps:

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**NOTE** The old driver must be removed before installing the new one.

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1. Confirm that there is no Fibre Channel activity occurring by dismounting the drive.
2. Switch to the *Command Console*
3. To dismount the drive,

Type:

**Dismount volume\_name** <return>

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**NOTE** The volume\_name is the volume that the user has created. If more than one volume needs to be dismounted, perform the dismount command for each individual volume.

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4. To remove the driver,

Type:

**Unload AFCNW.HAM** <return>

When the driver is successfully removed, an acknowledgement from the system displays the message:

*driver unloaded*

The controller card is now deactivated.

## Updating the Driver

To update the driver, first perform the unload procedure, then the load procedure detailed above.



## 6 PCI Hot Plug Support

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PCI Hot Plug involves the insertion and removal of PCI adapters from a system without interrupting the normal operation or powering down the whole system. PCI Hot Plug functions by disabling power to PCI slots where PCI Hot Plug capable adapters will be inserted or removed. To provide PCI Hot Plug functionality, the system hardware and software, the installed operating system, and the device driver for the PCI adapter must all support the PCI Hot Plug capability.

The D8602B device driver for Windows NT 4.0 and Netware 5.x supports the PCI hot swap/replacement capability on system platforms that support PCI Hot Plug. Please check the readme file on the Fibre Channel installation diskette for details on the PCI Hot Plug.

**CAUTION** Do not insert or remove HP Fibre Channel Adapters into or out of PCI slots with power enabled.

Please consult your system documentation on PCI Hot Plug support. If PCI Hot Plug support is provided by your system hardware and software then follow the procedures for insertion and removal of Hot Plug capable PCI Adapters as defined by your system documentation.



## 7 Troubleshooting

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The following tips are general troubleshooting procedures.

- Check that the card is seated all the way into the PCI slot.
- Check motherboard system documentation to ensure that bus mastering support is provided and enabled for the PCI slot containing the HP Fibre Channel Adapter.
- Check that the GBIC is seated correctly into the Adapter.
- Check that the cable is inserted all the way into the GBIC.
- Check that all peripherals are connected correctly throughout the loop. Peripherals with intermittent connections can cause long Operating System initialization during Power-On. Remove suspect peripheral from loop.
- Check the LED lights; The PWR/ACT LED turns on at power up, and flashes after the card is initialized. The LINK LED indicates that the link is up. See Chapter 2 for details on verifying the adapter card.
- If not using a HUB or switch, make sure that the cables are connected correctly throughout the loop. The loop must be in series, from one device to another.
- If a problem occurs while loading the Windows NT driver or when you try to access a storage device, check the Windows NT Event Log. The Event Log lists events that have been logged by various software components. As an example, if the driver failed to initialize, the log should have an event listed as “Driver failed to initialize.” For other Operating Systems, consult troubleshooting section in the accompanying operating system user manual.

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**NOTE** A possible cause of driver or device failure could be that the loop is not complete or, in other words, devices are not connected in series to form a loop. This does not apply if you are using a HUB or switch.

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- Verify that at least one device in the loop is powered up if you are not using a HUB or switch. Hubs or switches detect devices that are not powered up and automatically do a port bypass.



# A Electrostatic Discharge (ESD)

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A discharge of static electricity from a finger or other conductor may damage static-sensitive devices. This type of damage may reduce the life expectancy of the adapter.

## Preventing Electrostatic Damage

To prevent electrostatic damage, observe the following precautions:

- Avoid hand contact by transporting and storing parts in static-safe containers, such as anti-static bags.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their container.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

## Grounding Methods

There are several methods for grounding. Use one or more of the following measures when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to the chassis.
- Wrist straps are flexible straps with a minimum of 1 megaohm  $\pm$  10 percent resistance.
- Use heel straps, toe straps, or bootstraps at standing workstations.
- Wear the straps on both feet when standing on conductive floors or dissipation floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.
- Touch part of the bare metal chassis in the system prior to installing the adapter card.





## B Regulatory Information

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### Regulatory Notices

#### Electromagnetic Compliance

Electromagnetic Compatibility (EMC) requirements have been established in many countries to regulate the radio frequency energy generated by Information Technology Equipment (ITE). This energy is generated during the normal and intended use of this equipment and so it is limited by country regulations to levels intended to minimize potential interference to other electrical equipment, including public safety services.

Two levels of radio frequency energy are allowed according to the type or use of equipment. Class A levels have been established for use in commercial or business environments. Class B levels are lower than the Class A requirement and have been established for use in residential environments. Class B levels are also suitable when the environment includes electrically sensitive equipment.

The fiber channel host bus adapter that you have purchased has been provided with compliance labels to indicate where it may be used with reasonable protection to the environment in which it is used. Additional statements are provided below as required by the requirements of international and domestic regulations.

EMC testing and compliance of the D8602B Fibre Channel Adapter is valid only with the GBIC interface models listed on the Declaration of Conformity. Other GBIC modules must be tested for EMC compliance.

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**NOTE** Check the label on your product to determine the level of operation.

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## **Notice for United States**

### **(Federal Communications Commission)**

#### **Class B Equipment**

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 and 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 correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the 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/television technician for help.

Hewlett-Packard's system certification tests were conducted with HP supported peripheral devices and HP shielded cables, such as those you receive with your computer. Changes or modifications not expressly approved by Hewlett-Packard could void the user's authority to operate the equipment. Cables used with this device must be properly shielded to comply with the requirements of the FCC.

#### **Class A Equipment**

This equipment has been tested and found to comply with the limits for Class A digital devices, 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 instructions 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 is required to correct the interference at their own expense.

## Class A Accessories

Installation and use of a Class A accessory creates a system that meets the requirements for industrial and commercial environments. If you are installing a Class A accessory in a system that has been labeled as a Class B product, the requirements and notice for Class A equipment shall be applied.

## Notice for Canada

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

## Notice for Japan

The configuration of the host bus adapter you have purchased may be in either the Class A or Class B category.

## For products labeled as Class B:

This equipment is in the Class B category information technology equipment based on the rules of Voluntary Control Council For Interference by Information Technology Equipment (VCCI). Although aimed for residential area operation, radio interference may be caused when used near a radio or TV receiver.

この装置は、情報処理装置等電磁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。  
取り扱い説明書に従って正しい取り扱いをして下さい。

### For products labeled as Class A:

This equipment is in the Class A category information technology equipment based on the rules of Voluntary Control Council For Interference by Information Technology Equipment (VCCI). When used in a residential area, radio interference may be caused. In this case, user may be required to take appropriate corrective actions.

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。

### Notice for Taiwan

#### Class A Warning

警告使用者：這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

### Notice for European Union

#### Radio Frequency Emissions Warning for Accessories

This product has been found to comply with CISPR 22 Class B EMC emission limits. Installation and use of a Class A accessory creates a system that meets the requirements for industrial and commercial environments. However, in a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

## Declaration of Conformity (US, EU, China)

### DECLARATION OF CONFORMITY

according to ISO/IEC Guide 22 and EN 45014

**Manufacturer's/Supplier Name:** Hewlett-Packard Company  
**Manufacturer's/Supplier Address:** 10955 Tantau Avenue  
Cupertino, Ca 95014 USA

**declares, that the product**

**Product Name:** Fibre Channel Host Bus Adapter  
**Model Number(s):** D8602A, D8602B, D6977A  
**Product Options:** ALL

**conforms to the following Product Specifications:**

**Safety:** IEC 950: 1991+A1 + A2 + A3 +A4/ EN 60950: 1992 + A1+ A2 + A3 +A4  
EN 60825 - 1 (+A11); 1996  
GB4943-1995

**EMC:** CISPR 22:1993 / EN 55022:1994 Class A  
GB9254-1988  
EN 50081-1:1992 - Generic Emission  
EN 50082-1:1992 - Generic Immunity  
IEC 801-2:1991, 4 kV CD, 8 kV AD  
IEC 801-3:1984, 3 V/m  
IEC 801-4:1988, 0.5 kV Signal Lines, 1 kV Power Lines  
FCC Title 47 CFR, Part 15

**Supplementary Information:**

1) The product was tested in a typical configuration with a Hewlett-Packard NetServer and Hewlett Packard Mass Storage Unit via copper Fibre Channel cables.

2) The product complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

The product herewith complies with the requirements of the following directives and carries the CE-marking accordingly:

- EMC Directive 89/336/EEC
- Low Voltage Directive 73/23/EEC

Cupertino, October, 2000

North American Contact: Hewlett-Packard Company Product Regulations Manager  
3000 Hanover Street  
Palo Alto, CA 94304  
650-857-1501

European Contact: Your local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH  
Department ZQ/Standards Europe, Herrenberger Straße 130, D-7030 Böblingen, (FAX: +49-7031-14-3143)  
Quality Management Services & Systems Phone ++613 9272 8355



## C Specifications

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### Fibre Channel Operation

#### Fibre Channel Operation

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Burst Transfer	1 Gbit/sec 100 MBytes/sec
Topology	Fabric, Arbitrated Loop
Class of Operation	Class 3
Protocol	SCSI FCP
Frame Latency Buffer	8 KBytes Reads 2 KBytes Writes
Frame Payload Size	1 K

#### Fibre Channel Media

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Media Interface	GBIC (Gigabit Interface Converter)
ShortWave GBIC	to 500 m Device-to-Device
LongWave GBIC	to 10 km Device-to-Device
Active Copper GBIC	to 30 m Device-to-Device
ShortWave LC-SFF	to 500 m Device-to-Device

#### PCI

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Compliance	PCI Local Bus Spec. 2.1
Burst Transfer	Busmaster DMA at 132 or 264 MBytes/sec
Host Interrupts per I/O	1 or less
PCI Data Caching Buffers	Yes
Bridged Implementation	Compatible

## Architectural Features

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On-Card Processing	<ul style="list-style-type: none"><li>• High performance, low latency state machine architecture</li><li>• Parallel processing of inbound and outbound data</li><li>• Complete SCSI exchange handled entirely in hardware</li><li>• Hardware sequence segmentation and reassembly</li><li>• Automatic inbound CRC checking and outbound generation</li><li>• Automatic ACK frame generation and processing</li></ul>
SCSI Command Execution	<ul style="list-style-type: none"><li>• No Host Intervention Required for Command Execution</li><li>• 16 Concurrent Threads (exchanges) in Processor Cache</li><li>• Multi-initiator Environment Capable</li></ul>

## Operating System

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Windows NT Compliance	4.0 SP4 SCSI Miniport
Windows 2000	
NetWare Compliance	5.X



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## E Fibre Channel Cables

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<b>Cable Type</b>	<b>Cable Kit Contents</b>	<b>HP Part Number</b>
3 meter (FC), short-wave copper	2 copper GBICs and one Copper cable	D6978A
5 meter (FC), short-wave copper	2 copper GBICs and one Copper cable	D6979A
10 meter (FC), short-wave copper	2 copper GBICs and one Copper cable	D7080A
50 meter (FC), short-wave optical	2 optical GBICs and one Optical cable	D6980A
100 meter (FC), short-wave optical	2 optical GBICs and one Optical cable	D6981A

The above Fibre Channel Connectivity products are available through Hewlett-Packard Company.



## F Warranty and Support

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The hardware warranty below applies to components purchased as accessories. If your component was factory installed as part of an HP NetServer model, refer to the *HP NetServer Warranty and Service/Support Booklet* for the warranty limitations, customer responsibilities, and other terms and conditions.

### Hardware Accessories Limited Warranty

#### Hewlett-Packard Hardware Accessories

An HP NetServer Hardware Accessory is an internal HP hardware product that is specifically designated for use with HP NetServers; is added on or integrated into an HP NetServer in order to provide higher performance, capacity, or increased capability; and is listed as a product in HP's Corporate Price List. Upon installation inside an HP NetServer, the HP NetServer Hardware Accessory carries a System-Matching Warranty. This warranty includes a one-year Return-to-HP warranty or the remainder of the warranty period for the original HP NetServer in which it is installed, whichever is longer.

This accessory may be serviced through expedited part shipment. In this event, HP will prepay shipping charges, duty, and taxes; provide telephone assistance on replacement of the component; and pay shipping charges, duty, and taxes for any part that HP asks to be returned.

HP warrants this HP NetServer Hardware Accessory against defects in material and workmanship, under normal use, for the period specified in the section titled HP NetServer Limited Warranty Coverage. The warranty commences on receipt of this product by Customer from HP or Reseller. If HP or Reseller receives notice of such defects during the warranty period, HP or Reseller will either, at its option, repair or replace products that prove to be defective.

Should HP or Reseller be unable to repair or replace the hardware accessory within a reasonable amount of time, Customer's alternate remedy shall be a refund of the purchase price upon return of the hardware accessory product.

HP products external to the system processor unit, such as external storage subsystems, printers, or other peripherals, are covered by the applicable

warranty for those products. HP SureStore drives are considered external accessories and carry their own warranty.

The customer may be required to run HP-supplied configuration and diagnostic programs before a replacement will be dispatched or an on-site visit is authorized.

### **Third-Party Hardware Products**

HP does not warrant third-party hardware products. Third-party hardware products may be warranted in accordance with the third-party warranty statement accompanying the product. On-site visits caused by third-party hardware products—whether internal to the HP NetServer system processor unit (such as non-HP DIMMs) or external to the system processor unit (such as LAN cabling)—are subject to standard per-incident travel and labor charges.

## **HP Repair and Telephone Support**

### **U.S. and Canada**

For hardware repair or telephone support in the U.S. and Canada contact HP Customer Support Center (Colorado) (970) 635-1000 (24-hours a day, 7-days a week).

### **Other Countries**

Refer to the *HP NetServer Warranty and Service/Support Booklet* supplied with your HP NetServer system documentation for instructions on how to obtain HP repair and telephone support.

## **World Wide Web**

On the World Wide Web go to:  
<http://netserver.hp.com/netserver/>

# Index

---

## A

audience 1, 2

## C

cables 1, 3, 8, 23, 28, 37  
connecting cables 1  
control panel 14

## D

Declaration of Conformity 27, 31  
diskette 13, 14, 15, 17, 21  
drivers 1, 13, 14, 17

## E

electromagnetic compliance 27  
electrostatic discharge 25

## F

Fibre Channel cables 31, 37  
Fibre Channel HBA 2, 13, 15, 17

## G

GBIC 8  
GBIC interface 27  
GBIC Module 2, 6, 8, 10  
grounding 25

## H

hot plug 6, 21

## I

interference 27, 28, 29, 30, 31

## N

NetWare Driver 17

## O

operating system 21, 23, 34

## P

PCI 1, 2, 3, 4, 6, 14, 21, 23, 33

## R

regulatory 27  
removing the driver 14, 16  
removing the GBIC 9

## S

safety 27, 31  
server 1, 2, 5, 18  
software license 35  
specifications 3, 31, 33  
support 40  
system requirements 4

## T

troubleshooting 23

## **W**

warranty

Windows 2000 4, 15, 34

Windows 2000 Driver 15

Windows NT 1, 2, 4, 34

Windows NT Driver 13, 23



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