

# **HP A4800A PCI FWD SCSI Host Bus Adapter**

## **Service and User Guide**

**Edition 6**

Customer Order Number: A3725-90007



**Manufacturing Part Number: A3725-96031  
E0201**

U.S.A.

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# **1 HP A4800A Adapter Overview**

This chapter contains the following sections that describe the HP A4800A PCI FWD SCSI host bus adapter (HBA):

- “About the A4800A Adapter” on page 7.

- “Features” on page 9.
- “Supported HP 9000 Servers” on page 10.
- “Cable Specifications” on page 11.

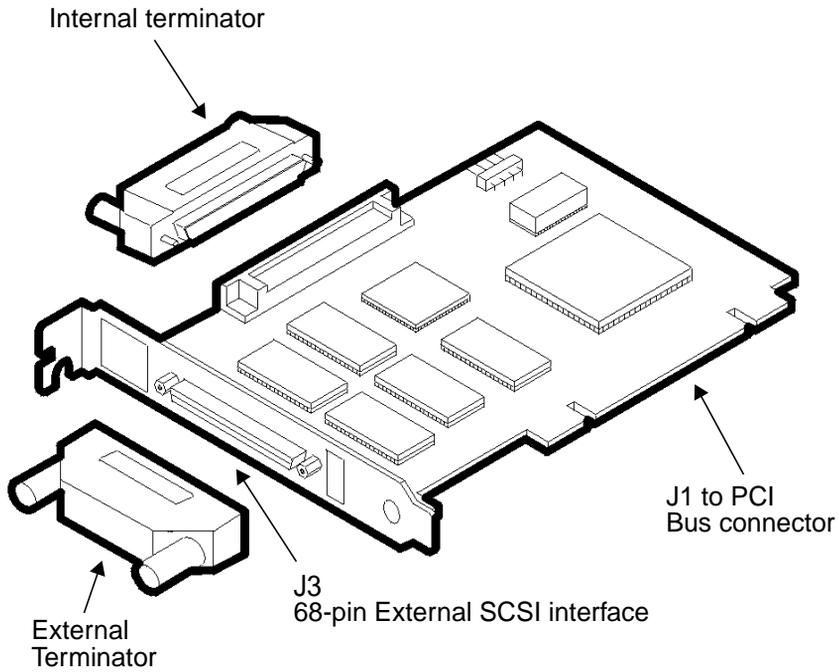
## About the A4800A Adapter

The HP A4800A PCI Fast/Wide/Differential (FWD) SCSI Host Bus Adapter is an intelligent, high-performance, direct memory access (DMA) bus master SCSI host bus adapter for HP 9000 and HP e3000 servers. The adapter combines a SCSI executive processor and a PCI Local Bus interface in a single chip. This adapter supports bootable devices and can be used with hard drives, tape drives, and other differential SCSI devices. The adapter is High Voltage Differential (HVD) SCSI only.

Consult with your Hewlett-Packard representative for more information on specific system configurations.

Figure 1-1 below is a drawing of the A4800A adapter.

**Figure 1-1      The A4800A PCI Ultra HVD SCSI Host Bus Adapter**



## Features

The A4800A adapter has the following features:

- Compliance with Intel PCI Local Bus Rev. 2.1 specification.
- Compliance with ANSI X3.131-1994 SCSI-2 standard.
- Support for asynchronous and synchronous transfer modes.
- Synchronous SCSI data transfer rates:
  - Wide and Ultra SCSI (40 Mbytes/sec).
  - Ultra SCSI (20 Mbytes/sec).
  - Wide and Fast SCSI (20 Mbytes/sec) differential.
  - Fast SCSI (10 Mbytes/sec) differential.
  - Narrow (5 Mbytes/sec) differential.
- Support for differential mode.
- Support for up to 15 SCSI, SCSI-2, or Ultra devices.
- Support for logical unit numbers (LUNs) 0-7.
- Support for bus master DMA.
- 68-pin, High-Density (HD) SCSI external connector.
- Supports HVD SCSI, SCSI-2, or Ultra devices only.

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## Supported HP 9000 Servers

Table 1-1 below shows which HP 9000 servers support the A4800A adapter.

**Table 1-1**      **A4800A Supported HP 9000 Servers**

<b>HP 9000 Server</b>	<b>HP-UX Operating System</b>	<b>HP e3000 Operating System</b>
A-Class	10.20 (for the A180 and A180C servers <i>only</i> ) & 11.0 or 11i	MPE/iX 7.0 or later
L-Class	11.0 or 11i	
N-Class	11.0 or 11i	MPE/iX 7.0 or later
V-Class	11.0 or 11i	

Note that the maximum number of SCSI HBAs you can install in any HP 9000 or HP e3000 server is equal to the maximum number of corresponding card slots in the server. For example, if you are installing SCSI PCI HBAs and the server has four PCI card slots, you can install four SCSI PCI HBAs in that server.

## Cable Specifications

The A4800A adapter supports High Voltage Differential (HVD) SCSI connections only. Internal cables for interconnection with the embedded CD-ROM drive and DAT tape drive are provided in the system.

The A5068A SCSI cable kit is required when connecting the A4800A adapter to internal, non-embedded SCSI devices. Table 1-2 below shows the parts that make up the A5068A kit.

**Table 1-2**      **A5068A SCSI Cable Kit**

Description	Part Number
10-inch SCSI shielded cable with back shell	A4700-67086
68-pin HD SCSI terminator	A4700-67098

For more information on connecting the adapter to internal disk and tape devices, refer to the appropriate disk drive or tape drive product manual.

### For V-Class Systems

If you are connecting external SCSI devices to an A4800A adapter installed in a V-Class system, you must use one of the cables shown in Table 1-3 below. Note that cables are normally supplied with the peripheral device.

**Table 1-3**      **Cables for Connecting External SCSI Devices to the A4800A Adapter in V-Class Systems**

Description	Product Number	Option
5-meter 68-pin HD/68-pin HD Male inline terminator SCSI cable for V-Class	A3401A	875

**Table 1-3 Cables for Connecting External SCSI Devices to the A4800A Adapter in V-Class Systems (Continued) (Continued)**

<b>Description</b>	<b>Product Number</b>	<b>Option</b>
10-meter 68-pin HD/68-pin HD Male inline terminator SCSI cable for V-Class	A3401A	851
2/5-meter 68-pin HD Male inline terminator SCSI cable for V-Class	A3401A	871
2/3-meter 68-pin HD Male inline terminator SCSI cable for V-Class	A3401A	873

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## **2**

# **Installing the A4800A Adapter**

This chapter contains the following sections that describe how to install the A4800A adapter:

- “Preparing for Installation” on page 15.

- “Connecting to External SCSI Devices” on page 16.
- “Handling the A4800A Adapter” on page 17.
- “Looking at Adapter Installation” on page 18.
- “Connecting SCSI Peripheral Devices” on page 25.
- “Terminating the A4800A Adapter” on page 28
- “Setting SCSI IDs” on page 29
- “Verifying Installation” on page 31.

## Preparing for Installation

Installing the host bus adapter requires disassembly of some server components. Before beginning installation, see the HP 9000 system manual for detailed instructions about how to install host bus adapters in the PCI slots.

You will need the following things:

- ✓ One HP A4800A SCSI adapter.
- ✓ One grounding (ESD) wrist strap.
- ✓ Any other tools needed for installing components in the HP 9000 or HP e3000 system (for example, screwdrivers); see the system's documentation.

## **Connecting to External SCSI Devices**

If you intend to connect the PCI Ultra SCSI adapter to an external SCSI device, you need to supply a differential SCSI cable that is long enough to reach the device. Part numbers for several different cable lengths are listed in the section titled “Cable Specifications” on page 11.

## Handling the A4800A Adapter

The host bus adapter is packaged with an ESD kit, which contains materials to prevent damage from static electricity during installation.

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### CAUTION

The adapter is highly susceptible to damage by electrostatic discharge during installation and routine maintenance procedures. Do not handle circuit boards without wearing a wrist strap fastened to a good earth ground or to the system chassis.

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While you are installing the A4800A adapter, please follow these precautions:

- ✓ Keep the adapter in its shielded antistatic bag until you are ready to install it.
- ✓ Use a wrist strap or other ESD protection. Wrap the strap around your wrist and attach the copper end to a metal portion of the computer frame.
- ✓ Avoid working in carpeted areas.
- ✓ Gently place the adapter, printed circuit board (PCB) side down, on an antistatic work surface pad.
- ✓ Hold the adapter only by its sides or cover plate. Do not touch any components on the printed circuit board assembly (PCBA).
- ✓ Do not use any test equipment to check the components on the PCB.
- ✓ Do not bump, jar, or drop the adapter. Do not place other objects on top of the adapter.
- ✓ Transport the adapter in its shielded bag in an appropriate shipping container. Do not put other materials in the bag with the adapter.

## Looking at Adapter Installation

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### NOTE

The host bus adapter card is supported on the HP N4000 N-class system. Refer to the Hewlett-Packard eproducts web site (<http://www.eproducts.hp.com>) to disassemble the system, install the adapter in an available PCI slot, and reassemble the system.

---

Installation can be performed in one of two ways:

- Use the OLAR (On Line Add/Replace) capability (HP-UX 11i)
- Power down the system and then add or replace the HBA

The method you choose will depend on your situation and requirements.

### Install Using OLAR (HP-UX 11i)

The letters O, L, A and R stand for On Line Addition [and] Replacement. This refers to the ability of a PCI I/O card to be installed (replaced or added) in an HP-UX computer system designed to support this feature without the need for completely shutting down, then re-booting the system or adversely affecting other system components. The system hardware uses the per-slot power control combined with operating system support in HP-UX 11i to enable this feature.

---

### IMPORTANT

Certain “Classes” of hardware are not intended for access by users. At this time this includes V-Class and SuperDome systems. HP recommends that these systems only be opened by a qualified HP Engineer. Failure to observe this requirement can invalidate any support agreement or warranty to which the owner might otherwise be entitled.

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### Important Terms and Concepts

The addition or replacement of an OLAR-compatible card may be done in either one of two ways:

1. Using the SAM utility.

2. Issuing command-line commands using `rad`.

For detailed information about the use of either of these two procedures, please refer to the following document:

*Configuring HP-UX For Peripherals*, HP Part Number B2355-90698

This document may be ordered from HP, or you may view, download and print it from the following website: [www.docs.hp.com](http://www.docs.hp.com)

**Table 2-1**

**Important Terms**

<b>Term</b>	<b>Meaning</b>
OLAR	All aspects of the OLAR feature including On-line Addition (OLA) and On-line Replacement (OLR).
Power Domain	A grouping of 1 or more interface card slots that can be powered on or off as a unit. (NOTE: Multi-slot power domains are not currently supported)
target card / target card slot	The interface card which will be added or replaced using OLAR, and the card slot in which it resides.
affected card / affected card slot	Interface cards and the card slots in which they reside, and which are in the same power domain as the target slot.

---

**IMPORTANT**

In many cases, other interface cards and slots within the system are dependent upon the target card. For example:

If the target card is a multiple-port card, suspending or deleting drivers for the target card slot also suspends individual drivers for the multiple hardware paths on that card).

---

During a card replacement operation, SAM performs a *Critical Resource Analysis*, which checks all ports on the target card for critical resources that would be temporarily unavailable while the card is shut down.

### **Planning and Preparation**

SAM will, generally, prevent you from performing OLAR procedures that would adversely affect other areas of the server. Refer to *Configuring HP-UX For Peripherals*, HP Part Number B2355-90698 for detailed information.

**Critical Resources** Because power to the slot must be off when the old card is removed and the new card is inserted, the effects of shutting down the card's functions must be carefully considered.

This is particularly important if there is no on-line failover or backup card to pick up those functions. For example:

- Which mass storage devices will be temporarily disconnected when the card is shut down?
- Will a critical networking connection be lost?

A critical resource is one that would cause a system crash or prevent the operation from successfully completing if the resource were temporarily suspended or disconnected. For example, if the SCSI adapter to be replaced connects to the unmirrored root disk or swap space, the system will crash when the card is shut down.

During an OLAR procedure, it is essential to check the targeted card for critical resources, as well as the effects of existing disk mirrors and other situations where a card's functions can be taken over by another card that will not be affected.

Fortunately SAM performs a thorough critical resource analysis automatically, and presents options to you based on its findings. If you determine that critical resources *will* be affected by the procedure, you should replace the card when the server is off-line.

If you must take action immediately, you can use `rad` to attempt an on-line addition of a backup card and deletion of the target card.

## Card Compatibility

**On-Line Addition (OLA).** When on-line adding an interface card, the first issue that must be resolved is whether the new card is compatible with the system. Each PCI slot provides a set amount of power. The replacement card cannot require more power than is available.

The card must also operate at the slot's bus frequency. A PCI card must run at any frequency lower than its maximum capability; however, a card that operated at a maximum of 33 MHz would not work on a bus running at 66 MHz. `rad` provides information about the bus frequency and power available at a slot, as well as other slot-related data.

**On-Line Replacement (OLR)** When on-line replacing an interface card, the replacement card must be identical to the card being replaced or at least be able to operate using the same driver as the replaced card. This is referred to as *like-for-like* replacement and should be adhered to because using a similar but not identical card may cause unpredictable results. For example, a newer version of the target card which is identical in terms of hardware may contain an updated firmware version that could potentially conflict with the current driver.

The PCI specification allows a single physical card to contain more than one port. A single-port SCSI bus adapter can not be replaced by a dual-port adapter, even if the additional port(s) on the card are identical to the original SCSI bus adapter.

When the replacement card is added to the system, the appropriate driver for that card must be configured in the kernel before beginning the operation. SAM ensures the correct driver is present. (In most cases, the replacement card will be the same type as a card already in the system, and this requirement will be automatically met.) If you have any question about the driver's presence, or if you are not certain that the replacement card is identical to the existing card, you can use `ioscan` together with `rad` to investigate.

- If the necessary driver is not present and the driver is a dynamically loadable kernel module (DLKM), you can load it manually. Refer to the section "Dynamically Loadable Kernel Modules" in Chapter 2 of the document: *Configuring HP-UX For Peripherals*, HP Part Number B2355-90698 for more information.
- If the driver is static and not configured in the kernel, then the card cannot be On-line Added. The card could be physically inserted on-line, but no driver would claim it.

### OLA/R Restrictions for the A4800A

The HBA has some restrictions in the OLA/R procedure. These restrictions are explained below.

The restrictions are necessary because the SCSI attributes of *initiator ID*, and *speed* cannot be changed online for this HBA.

**OLA of A4800-60001** The HBA can be online added *only* if the SCSI attribute values of *initiator ID* and *speed* are usable in your configuration. These values will be set to the current PDC (Processor Dependent Code) values (if any) or default to the new HBA's values (see Table 2-2).

**Table 2-2**                      **A4800-60001 - Default SCSI Attribute Values**

Attribute	Default Value
Initiator ID	7
Speed	Fast

If these attributes are not acceptable, you must reboot the system to access the Boot Console Handler (BCH) prompt and then change the values in the PDC.

**OLR of A4800-60001** the A4800-60001 can be Online Replaced without special considerations. See the *Configuring HP-UX Peripherals* manual for the steps that are necessary to OLR this HBA.

### Install/Replace With System Powered Down

Check the manual supplied with the server to perform the following installation:

- Step 1.** Shut down the operating system.
- Step 2.** Power off the system and disconnect the power cord and cables.
- Step 3.** Access the back of the server cabinet following the instructions in the server documentation. Refer to the server documentation for instructions on disassembling the server and installing host bus adapters.

- Step 4.** Locate the card separator/extractor slot where you intend to install the adapter.
- Step 5.** Remove the blank panel aligned with the PCI slot you intend to use. If the blank panel has a bracket screw, save it for reuse during the installation.
- Step 6.** Following the instructions in the server manual, insert the adapter into an available PCI slot.

The adapter is keyed to be inserted in only one way. The components on the adapter may face the opposite way from other boards on the system.

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**NOTE**

If the internal bus is not connected to any peripherals it **MUST** be terminated using the supplied low profile, internal terminator.

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- Step 7.** Verify that the connectors on the adapter and the bus converter are aligned properly and firmly seated. The card's bracket should fit where the blank panel was removed. Secure the bracket with the bracket screw from the blank panel, if there is one. Note that, for N-Class systems, a screw is *not* used to secure the card.

---

**NOTE**

If the adapter will only be used with internal SCSI devices, install the A4700-67098 (1252-6520) differential terminator into the external port.

---

- Step 8.** Connect peripheral devices and terminate the SCSI bus.

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**NOTE**

A cable for connecting the PCI Ultra SCSI Host Bus Adapter to a disk tray A or B port connector is supplied with the A5068A product. Cables for connecting external devices are not supplied with the controller and must be purchased separately.

---

- Step 9.** Set the SCSI ID, if needed.

The default SCSI ID is 7. To change this to a different value for High-Availability (HA) applications, you must use the Boot Console Handler (BCH). There are no SCSI address switches or jumpers. You

must invoke the appropriate commands in the SCSI section of the BCH and change the address electronically to whatever is required for the HA configuration being used. Refer to "Checking SCSI Bus Compatibility" on page 36.

---

**NOTE** Do not change for MPE/iX. You may need to change "rate" setting.

---

**Step 10.** Reassemble the server.

**Step 11.** Power on the system and reboot the operating system.

**Step 12.** The A4800A adapter runs an automatic self test. Error messages, if any are generated, appear on the system console.

## Connecting SCSI Peripheral Devices

Connect multiple SCSI devices by chaining them together with shielded, 68-pin, High-Density (HD) cables. The connectors on these cables are keyed to ensure proper pin-1 to pin-1 registration. Refer to the peripheral manual for instructions on attaching SCSI cables. Peripheral storage devices are normally shipped with the required SCSI cables.

Table 2-3 below shows the SCSI bus widths and speeds that have been established by the SCSI Trade Association (STA).

**Table 2-3**      **SCSI Bus Widths and Speeds**

Type <sup>(1)</sup>	SCSI Bus Width (in Bits)	SCSI Bus Speed Maximum Data Rate (in MBytes/Second)
SCSI-1	8	5
Fast SCSI	8	10
Fast Wide SCSI	16	20
Ultra SCSI	8	20
Wide Ultra SCSI	16	40
Ultra2 SCSI	8	40
Wide Ultra2 SCSI	16	80
<sup>(1)</sup> Absence of the word "Wide" means an 8-bit bus width; using the term "Narrow" to avoid ambiguity is acceptable, too.		

You can connect up to eight SCSI, Fast SCSI, and Ultra SCSI devices on a single-ended Ultra SCSI bus if they are evenly spaced on a 1.5 m Ultra 2 SCSI cable (0.19 m between devices).

You can connect up to four devices if they are evenly spaced on a 3 m Ultra SCSI cable (0.75 m between devices). The single-ended SCSI bus must not exceed 3 m (total internal and external cable lengths) even with fewer than four devices.

Table 2-4 below shows the maximum bus length for each of the SCSI types.

**Table 2-4 Maximum SCSI Bus Lengths**

Type	Maximum Bus Length (in Meters) <sup>(1)</sup>			Maximum Devices
	Single-ended (SE)	Low Voltage Differential (LVD)	High Voltage Differential (HVD)	
SCSI-1	6	12.5	25	8
Fast SCSI	3	12.5	25	8
Fast Wide SCSI	3	12.5	25	16
Ultra SCSI	1.5	12.5	25	8
Ultra SCSI	3	-	-	4
Wide Ultra SCSI	-	12.5	25	16
Wide Ultra SCSI	1.5	-	-	8
Wide Ultra SCSI	3	-	-	4
Ultra2 SCSI	(2)	12.5	(2)	8
Wide Ultra2 SCSI	(2)	12.5	(2)	16

**Table 2-4 Maximum SCSI Bus Lengths (Continued) (Continued)**

Type	Maximum Bus Length (in Meters) <sup>(1)</sup>			Maximum Devices
	Single-ended (SE)	Low Voltage Differential (LVD)	High Voltage Differential (HVD)	
<p><sup>(1)</sup>This parameter can be exceeded in point-to-point and engineered applications.</p> <p><sup>(2)</sup>Single-ended and High Voltage Differential are not defined at Ultra2 speeds.</p>				

## Terminating the A4800A Adapter

The A4800A has no auto-termination setting. Termination must be provided by a physical terminator. When the HBA is at the end of the SCSI bus, the terminator should be installed and secured at either the internal or external connector (whichever does not have a cable attached) as shown in Figure 1-1 on page 8.

When the adapter is used in High-Availability (HA) applications (such as MC/ServiceGuard) *and* it is required to be in the middle of the bus, the adapter's terminator *must* be removed.

The SCSI bus *must* be properly terminated. Terminators may be ordered separately if needed (When ordered with the HBA, the part number is A4800A option 2. When ordered separately, the part number is C2905A). The first and last physical SCSI devices connected on the ends of the SCSI bus must have terminators attached. All other SCSI devices on the SCSI bus must have their terminators removed or disabled. Note that the host bus adapter is *also* on the bus.

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### IMPORTANT

The A4800A does *not* provide automatic termination.

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### NOTE

When the adapter is used in HA applications that use two SCSI host bus adapters (such as MC/ServiceGuard) *and* it is required to be in the middle of the bus, the adapter's SCSI ID will need to be changed (for example, from 7 to 6). Each device on the bus must have a unique ID. Refer to "The SCSI Command" on page 37.

---

To disable the adapter's termination, you need to physically remove the terminator from the HBA connector. Termination for this bus must now be provided by some other SCSI device (e.g. disk, disk array, or other HBA, as required).

## Setting SCSI IDs

You must assign a separate SCSI ID (0 through 15 for a 16-bit SCSI bus) to the SCSI host bus adapter and each SCSI device. The priority of the device on the SCSI bus is determined by the SCSI ID of the device. The order of SCSI ID priorities (from highest to lowest) is 7, 6, 5, 4, 3, 2, 1, 0, 15, 14, 13, 12, 11, 10, 9, and 8. A device with SCSI ID 7 has the highest priority, and one with SCSI ID 8 has the lowest.

When you are assigning SCSI IDs, we recommend you to give the SCSI host bus adapter higher priority than the other SCSI devices on the bus. SCSI ID 7 is the preset SCSI ID for the A4800A SCSI host bus adapter (giving it the highest priority on the SCSI bus). Set each of the other SCSI devices on the bus to one of the remaining SCSI IDs.

For a multi-initiator (High Availability [HA]) configuration, where multiple SCSI host bus adapters are connected to the same SCSI bus, the SCSI host bus adapter that carries most of the traffic must be assigned a SCSI ID of 7 (giving it the highest priority). Later, you must change the SCSI ID of each of the remaining SCSI host bus adapters on the bus from the preset setting (7) to the next highest priority remaining SCSI IDs (for example, 6, 5, 4, and so on).

If you plan to boot your system from a hard disk drive on the SCSI bus, you must assign that drive the next highest priority unassigned SCSI ID. If there is only one SCSI host bus adapter (SCSI ID = 7), the hard disk drive would be assigned a SCSI ID of 6. If there are multiple SCSI host bus adapters, the hard disk drive would be assigned the next highest priority SCSI ID available after all of the SCSI host bus adapters have been assigned higher priority SCSI IDs.

To change the SCSI ID of the A4800A host bus adapter, refer to “Checking SCSI Bus Compatibility” on page 36.

The peripheral device SCSI IDs are usually set with jumpers or a switch on the peripheral. Refer to the peripheral manufacturer’s instructions to determine the ID of each device and how to change it.

---

### IMPORTANT

You must not have duplicate SCSI IDs on a SCSI bus; the system will hang or crash if you have duplicate SCSI IDs on the bus.

---

Make necessary changes, if any, to the SCSI IDs and record the IDs for future reference. To keep a record of the IDs, you can use Table 2-5.

**Table 2-5**      **Record of SCSI IDs**

<b>SCSI ID</b>	<b>SCSI Device</b>
15	
14	
13	
12	
11	
10	
9	
8	
7	Adapter (default)
6	
5	
4	
3	
2	
1	
0	

## Verifying Installation

After installing the adapter and attaching peripheral devices, verify that all components are working. Refer to your system documentation for information on verifying operation.

### HP 9000

- Step 1.** To verify that the adapter is correctly installed, execute the following command:

```
ioscan -f
```

The `ioscan` output could look like this:

```
ext_bus 0 0/0/0 c720 CLAIMED INTERFACE Ultra wide SCSI
```

The third column represents the hardware path of the slot the adapter is installed in. For information about the `ioscan` command, refer to your operating system reference manual or the `ioscan` man page.

- Step 2.** Verify that the adapter and driver display.
- Step 3.** Verify that the devices you attached to the adapter display.

Installing the A4800A Adapter  
Verifying Installation

**HP e3000** Assuming an N-Class system with an I/O card being added to slot #12, we will expect path 1/0/0/0 to be returned for our card.

**Step 1.** From BCH menus:

```
-----
-Command          Description
-----
ALL              Display all system information
...
  IO             Display I/O interface information
...

-----
Information Menu: Enter command > io

I/O MODULE INFORMATION

          Path  Slot          IODC
Type      (dec)  Number  HVERSION  SVERSION  Vers
-----
System bus adapter  0          0x8030  0xc10     0x0
Local bus adapter  0/0      Built_In 0x7820  0xa00     0x0
Local bus adapter
...
Local bus adapter  1/0      12       0x7820  0xa00     0x0
...

PCI DEVICE INFORMATION

          Path          Vendor  Device  Bus  Slot
Description (dec)      Id      Id      #    #
-----
Ethernet cntlr  0/0/0/0  0x1011  0x19    0    Built_In
SCSI bus cntlr  0/0/1/0  0x1000  0xc     0    Built_In
SCSI bus cntlr  0/0/2/0  0x1000  0xf     0    Built_In
SCSI bus cntlr  0/0/2/1  0x1000  0xf     0    Built_In
Comp. ser cntlr 0/0/4/0  0x103c  0x1048  0    Built_In
Comp. ser cntlr 0/0/5/0  0x103c  0x1048  0    Built_In
SCSI bus cntlr  1/0/0/0  0x1000  0xf     128  12

Information Menu: Enter command >main
Main Menu: Enter command or menu > sea 1/0/0/0
Searching for potential boot device(s) - on Path 1/0/0/0

This may take several minutes.
To discontinue search, press any key (termination may not be immediate).
  Path#  Device Path (dec)  Device Path (mnem)  Device Type
-----
  P0    1/0/0/0.6          intscsia.6          Random access media
Main Menu: Enter command or menu >
```

---

# **3 Troubleshooting**

This chapter contains the following sections that describe how to troubleshooting the A4800A adapter:

- “General Procedure” on page 35.

- “Checking SCSI Bus Compatibility” on page 36.
- “Using Support Tools Manager (STM)” on page 41
- “Contacting Your Hewlett-Packard Representative” on page 42.

## General Procedure

The A4800A adapter is a single field-replaceable unit (FRU) and does not contain any field-serviceable parts. Troubleshooting procedures described in this section are limited to verifying that the adapter is operational and a valid connection is established.

In general, follow these steps to troubleshoot the A4800A adapter:

**Step 1.** Check the connection.

Make sure that the correct cable is used, connected, and operating properly and that there are no bent pins in any of the connectors.

**Step 2.** Check SCSI bus compatibility.

Ensure transfer rate compatibility with the attached devices using the SCSI boot menu command.

**Step 3.** Check the adapter.

Inspect the adapter to make sure it is seated properly in the PCI bus slot. If necessary, power down the system, reseal the adapter, and restart the system.

**Step 4.** Run diagnostics.

If a visual inspection of the adapter and cable(s) does not reveal any problems, or if an action taken as a result of the inspection does not produce a working adapter, you may want to run diagnostics to determine whether the adapter can communicate and respond to PCI bus instructions. Diagnostics are described in the next section.

If diagnostics determine that the controller is defective, you must replace it. Contact your local Hewlett-Packard customer representative or call the HP Response Center.

## Checking SCSI Bus Compatibility

You can ensure SCSI controller and SCSI device compatibility by using the `SCSI` command to display and select SCSI bus parameters.

The `SCSI` command is available from the boot menu displayed after the test station has booted (if autoboot is disabled). The boot menu looks like this (for highlighting reasons, the `SCSI` command is in bold here):

Command	Description
-----	-----
<code>Auto [BOot SEARch ON OFF]</code>	Display or set the specified flag
<code>BOot [PRI ALT &lt;path&gt; &lt;args&gt;]</code>	Boot from a specified path
<code>BootTimer [time]</code>	Display or set boot delay time
<code>CLEARPIM</code>	Clear PIM storage
<code>CPUconfig [&lt;proc&gt;] [ON OFF]</code>	Configure/Deconfigure Processor
<code>Default</code>	Set the sytem to defined values
<code>DIisplay</code>	Display this menu
<code>ForthMode</code>	Switch to the Forth OBP interface
<code>IO</code>	List the I/O devices in the system
<code>LS [&lt;path&gt; flash]</code>	List the boot or flash volume
<code>OS [hpux spupx]</code>	Display/Select Operating System
<code>PASSword</code>	Set the Forth password
<code>Path [PRI ALT CON] [&lt;path&gt;]</code>	Display or modify a path
<code>PDT [CLEAR DEBUG]</code>	Display/clear Non-Volatile PDT state
<code>PIM_info [cpu#] [HPMC TOC LPMC]</code>	Display PIM of current or any CPU
<code>RESET [hard debug]</code>	Force a reset of the system
<code>RESTRict [ON OFF]</code>	Display/Select restricted access to Forth
<b><code>SCSI [INIT RATE] [bus slot val]</code></b>	<b>List/Set SCSI controller parms</b>
<code>SEARch [&lt;path&gt;]</code>	Search for boot devices
<code>SECure [ON OFF]</code>	Display or set secure boot mode
<code>TIme [cn:yr:mo:dy:hr:mn[:ss]]</code>	Display or set the real-time clock
<code>VERsion</code>	Display the firmware versions

## The SCSI Command

As explained above, you can use the `SCSI` command to check the compatibility of the SCSI adapter and the SCSI device(s), by displaying and setting SCSI bus parameters.

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### NOTE

See “HP e3000 Communicator for MPE/iX release 7.0” for MPE/iX guidelines on rate. <http://docs.hp.com/mpeix/pdf/30216-90312.pdf>

---

## Displaying Transfer Rates

To use the `SCSI` command to display the SCSI transfer rate for an adapter, follow this syntax:

```
SCSI rate bus_number slot_number
```

where

*bus\_number* Specifies the number of the bus the adapter is installed on.

*slot\_number* Specifies the number of the slot the adapter is in.

For example:

- To display the SCSI transfer rate for the adapter installed on bus 5 slot 2, issue this command:

```
SCSI rate 5 2
```

The output could look something like this:

```
PCI device /5.2 = no limit
```

- To list transfer rates for all bus and slot numbers, issue this command:

```
SCSI rate
```

### Setting Transfer Rates

To use the SCSI command to set the SCSI transfer rate for an adapter, follow this syntax:

```
SCSI rate bus_number slot_number rate
```

where

<i>bus_number</i>	Specifies the number of the bus the adapter is installed on.
<i>slot_number</i>	Specifies the number of the slot the adapter is in.
<i>rate</i>	Specifies the adapter's transfer rate: <ul style="list-style-type: none"><li>• 0 (no limit)</li><li>• 10 (Fast SCSI)</li><li>• 20 (Ultra SCSI)</li></ul>

For example, to set the SCSI transfer rate for the adapter installed on bus 5 slot 2 to Fast SCSI and then display the results, issue these commands:

```
SCSI rate 5 2 10
```

```
SCSI rate 5 2
```

The output (of the second command) could look something like this:

```
PCI device /5.2 = fast SCSI
```

## Displaying SCSI IDs

To use the SCSI command to display the initiator (SCSI) IDs for an adapter, follow this syntax:

```
SCSI init bus_number slot_number
```

where

*bus\_number* Specifies the number of the bus the adapter is installed on.

*slot\_number* Specifies the number of the slot the adapter is in.

For example:

- To display the SCSI ID for the adapter on bus 5 slot 2, issue this command:

```
SCSI init 5 2
```

The output could look something like this:

```
PCI device /5.2 = 7
```

- To list the SCSI IDs for all bus and slot numbers, issue this command:

```
SCSI init
```

### Setting SCSI IDs

To use the SCSI command to set the initiator (SCSI) ID for an adapter, follow this syntax:

```
SCSI init bus_number slot_number ID_number
```

where

*bus\_number*        Specifies the number of the bus the adapter is installed on.

*slot\_number*       Specifies the number of the slot the adapter is in.

*ID\_num*            Specifies the adapter's SCSI ID number.

For example, to set the SCSI ID for the adapter installed on bus 5 slot 2 to 6 and then display the results, issue these commands:

```
SCSI init 5 2 6
```

```
SCSI init 5 2
```

The output (of the second command) could look something like this:

```
PCI device /5.2 = 6
```

## Using Support Tools Manager (STM)

STM is a software application that can be run from the console to obtain status and descriptive information about the A4800A adapter, diagnose problems, and update firmware. See the *Support Tools Manager User's Guide* for more details about STM.

---

## Contacting Your Hewlett-Packard Representative

If the equipment is covered by an HP service contract, document the problem as a service request and forward it to your HP representative. Include the following information where applicable:

- Describe the problem, including the events and symptoms leading up to the problem. Attempt to describe the source of the problem.

Include HP-UX or MPE/iX commands, communication subsystem commands, functionality of user programs, result codes and messages, and data that can reproduce the problem.

- Obtain the version, update, and fix information for all software.
  1. To check the version of the kernel, enter this command:

```
uname -r
```

To check patches, enter:

```
what /stand/vmunix | grep scsi
```

2. To check the version of MPE/iX enter: SHOWME

To check patches, enter: PRINT HPSWINFO.PUB.SYS

This allows HP to determine if the problem is already known and the correct software is installed at your site.

- Illustrate as clearly as possible the context of any messages. Record all error messages and numbers that appear at the user terminal and the system console.
- Prepare the formatted output and a copy of the log file for the HP representative to analyze.
- Prepare a listing of the HP-UX or MPE/iX I/O configuration being used for the HP representative to analyze.
- Try to determine the general area within the software where the problem may exist. Refer to the appropriate reference manual and follow the guidelines on gathering information for that product.

- Document your interim (workaround) solution. The cause of the problem can sometimes be found by comparing the circumstances in which the problem occurs with the circumstances in which the problem does not occur.
- In the event of a system failure, obtain a full memory dump.
- For HP-UX: If the directory `/var/adm/crash` exists, the HP-UX utility `/sbin/savecore` automatically executes during reboot to save the memory dump. HP recommends that you create the `/tmp/syscore` directory after successfully installing this product. Send the output of the system failure memory dump to the HP representative.
- For MPE/iX: If you use AUTORESTART and DUMPTODISK products follow your normal system recovery steps. Otherwise take a memory dump and save the resulting tape. Contact HP Support for analysis of your failure.

If the equipment is not covered by an HP service contract, there may be a charge for time and materials.

Troubleshooting

**Contacting Your Hewlett-Packard Representative**

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# **A** **SCSI Sense Codes**

This appendix shows the possible codes that appear in SCSI error messages.

### HP 9000

The following example shows a typical SCSI error message:

```
[+6708 72410001 002a9858 0:7] scsi disk: CHECK CONDITION on disk 0:6:5:0
Read of logical block 509856, count 128
disk sd45a, block 254920, 65536 bytes
Valid = 1, Error code = 0x70
Segment number = 0x00, Filemark = 0, EOM = 0, ILI = 0
Sense key = 0x1, "RECOVERED ERROR"
Information = 0x00 0x07 0xc7 0xe4
[+6709 72410001 002a9a10 0:7] scsi disk: Additional sense length = 0x0a
Command-specific information = 0x00 0x00 0x00 0x00
Additional sense = 0x18, Qualifier = 0x01
Field replaceable unit code = 0xea
SKSV = 1, C/D = 0, BPV = 0, Bit pointer = 0
Field pointer = 0x0003
```

The status (**CHECK CONDITION**) and sense key (**RECOVERED ERROR**)—shown in bold in the example above—are interpreted for you in the error message text. Each Additional sense and its corresponding Qualifier code—shown in bold in the example above—require interpretation on your part. Use the two codes together to determine the meaning. In the example above, the Additional sense (0x18) and Qualifier (0x01) codes together mean “recovered data with error correction and retries applied.” You can look up the various codes and keys in the tables on the next pages.

### MPE/iX

Use the CSTM tool to look at hardware error information. Information about CSTM can be found in the article “TERMDSM: User Interface Change undre System Diagnostics” in the “Communicator 3000 MPE/iX Release 6.5”. <http://docs.hp.com/mpeix/pdf/30216-90291.pdf>

Table A-1 below lists all possible SCSI status codes and their meanings.

**Table A-1**                      **SCSI Status Codes**

<b>SCSI Status Code</b>	<b>Meaning</b>
0x00	Good
0x02	Check condition
0x04	Condition met
0x08	Busy
0x10	Intermediate
0x14	Intermediate—condition met
0x18	Reservation conflict
0x22	Command terminated
0x28	Queue full

Table A-2 below lists all possible SCSI sense keys and their meanings.

**Table A-2**                    **SCSI Sense Keys**

<b>SCSI Sense Key</b>	<b>Meaning</b>
0	No sense
0x1	Recovered error
0x2	Not ready
0x3	Medium error
0x4	Hardware error
0x5	Illegal request
0x6	Unit attention
0x7	Data protect
0x8	Blank check
0x9	Vendor-specific
0xa	Copy aborted
0xb	Aborted command
0xc	Equal
0xd	Volume overflow
0xe	Miscompare
0xf	Reserved

Table A-3 below lists the Additional sense codes and Qualifier codes and their meanings. Remember that you must use the combined codes—an Additional sense code/Qualifier code pair—to find the correct meaning.

**Table A-3**      **SCSI Additional Sense Code/Qualifier Code Pairs**

<b>SCSI Additional Sense Code</b>	<b>SCSI Qualifier Code</b>	<b>Meaning</b>
0x00	0x00	No additional sense information
	0x01	Filemark detected
	0x02	End-of-partitions/medium detected
	0x03	Setmark detected
	0x04	Beginning of partition/medium detected
	0x05	End-of-data detected
	0x06	I/O process terminated
	0x11	Audio play operation in progress
	0x12	Audio play operation paused
	0x13	Audio play operation successfully completed
	0x14	Audio play operation stopped due to error
	0x15	No current audio status to return
0x01	0x00	No index/sector signal
0x02	0x00	No seek complete
0x03	0x00	Peripheral device write fault
	0x01	No write current
	0x02	Excessive write errors

**Table A-3 SCSI Additional Sense Code/Qualifier Code Pairs (Continued)**

<b>SCSI Additional Sense Code</b>	<b>SCSI Qualifier Code</b>	<b>Meaning</b>
0x04	0x00	Logical unit not ready, cause not reportable
	0x01	Logical unit in process of becoming ready
	0x02	Logical unit not ready, initializing command required
	0x03	Logical unit not ready, manual intervention required
	0x04	Logical unit not ready, format in progress
0x05	0x00	Logical unit does not respond to selection
0x06	0x00	Reference position found
0x07	0x00	Multiple peripheral devices selected
0x08	0x00	Logical unit communication failure
	0x01	Logical unit communication time-out
	0x02	Logical unit communication parity error
0x09	0x00	Track following error
	0x01	Tracking servo failure
	0x02	Focus servo failure
	0x03	Spindle servo failure
0x0a	0x00	Error log overflow
0x0c	0x00	Write error
	0x01	Write error recovered with auto reallocation
	0x02	Write error—auto reallocation failed

**Table A-3 SCSI Additional Sense Code/Qualifier Code Pairs (Continued)**

<b>SCSI Additional Sense Code</b>	<b>SCSI Qualifier Code</b>	<b>Meaning</b>
0x10	0x00	ID crc or ecc error
0x11	0x00	Unrecovered read error
	0x01	Read retries exhausted
	0x02	Error too long to correct
	0x03	Multiple read errors
	0x04	Unrecovered read error—auto reallocate failed
	0x05	l-ec uncorrectable error
	0x06	circ unrecovered error
	0x07	Data resynchronization error
	0x08	Incomplete block read
	0x09	No gap found
	0x0a	Miscorrected error
	0x0b	Unrecovered read error—recommend reassignment
	0x0c	Unrecovered read error—recommend rewrite the data
0x12	0x00	Address mark not found for ID field
0x13	0x00	Address mark not found for data field

**Table A-3 SCSI Additional Sense Code/Qualifier Code Pairs (Continued)**

<b>SCSI Additional Sense Code</b>	<b>SCSI Qualifier Code</b>	<b>Meaning</b>
0x14	0x00	Recorded entity not found
	0x01	Record not found
	0x02	Filemark or setmark not found
	0x03	End-of-data not found
	0x04	Block sequence error
0x15	0x00	Random positioning error
	0x01	Mechanical positioning error
	0x02	Positioning error detected by read of medium
0x16	0x00	Data synchronization mark error
0x17	0x00	Recovered data with no error correction applied
	0x01	Recovered data with retries
	0x02	Recovered data with positive head offset
	0x03	Recovered data with negative head offset
	0x04	Recovered data with retries and/or circ applied
	0x05	Recovered data using previous sector ID
	0x06	Recovered data without ecc—data auto-reallocated
	0x07	Recovered data without ecc—recommend reassignment
	0x08	Recovered data without ecc—recommend rewrite

**Table A-3 SCSI Additional Sense Code/Qualifier Code Pairs (Continued)**

<b>SCSI Additional Sense Code</b>	<b>SCSI Qualifier Code</b>	<b>Meaning</b>
0x18	0x00	Recovered data with error correction applied
	0x01	Recovered data with error correction and retries applied
	0x02	Recovered data—data auto-reallocated
	0x03	Recovered data with circ
	0x04	Recovered data with lec
	0x05	Recovered data—recommend reassignment
	0x06	Recovered data—recommend rewrite
0x19	0x00	Defect list error
	0x01	Defect list not available
	0x02	Defect list error in primary list
	0x03	Defect list error in grown list
0x1a	0x00	Parameter list length error
0x1b	0x00	Synchronous data transfer error
0x1c	0x00	Defect list not found
	0x01	Primary defect list not found
	0x02	Grown defect list not found
0x1d	0x00	Miscompare during verify operation
0x1e	0x00	Recovered ID with ecc
0x20	0x00	Invalid command operation code

**Table A-3 SCSI Additional Sense Code/Qualifier Code Pairs (Continued)**

<b>SCSI Additional Sense Code</b>	<b>SCSI Qualifier Code</b>	<b>Meaning</b>
0x21	0x00	Logical block address out of range
	0x01	Invalid element address
0x22	0x00	Illegal function
0x24	0x00	Invalid field in cdb
0x25	0x00	Logical unit not supported
0x26	0x00	Invalid field in parameter list
	0x01	Parameter not supported
	0x02	Parameter value invalid
	0x03	Threshold parameters not supported
0x27	0x00	Write protected
0x28	0x00	Not ready to ready transition (medium may have changed)
	0x01	Import or export element assessed
0x29	0x00	Power on, reset, or bus device reset occurred
0x2a	0x00	Parameters changed
	0x01	Mode parameters changed
	0x02	Log parameters changed
0x2b	0x00	Copy cannot execute since host cannot disconnect
0x2c	0x00	Command sequence error
	0x01	Too many windows specified

**Table A-3 SCSI Additional Sense Code/Qualifier Code Pairs (Continued)**

<b>SCSI Additional Sense Code</b>	<b>SCSI Qualifier Code</b>	<b>Meaning</b>
0x2f	0x00	Commands cleared by another initiator
0x30	0x00	Incompatible medium installed
	0x01	Cannot read medium—unknown format
	0x02	Cannot read medium—incompatible format
	0x03	Cleaning cartridge installed
0x31	0x00	Medium format corrupted
0x32	0x00	No defect spare location available
	0x01	Defect list update failure
0x33	0x00	Tape length error
0x36	0x00	Ribbon, ink, or tower failure
0x37	0x00	Rounded parameter
0x39	<b>0x00</b>	Saving parameters not supported
0x3a	0x00	Medium not present

**Table A-3 SCSI Additional Sense Code/Qualifier Code Pairs (Continued)**

<b>SCSI Additional Sense Code</b>	<b>SCSI Qualifier Code</b>	<b>Meaning</b>
0x3b	0x00	Sequential positioning error
	0x01	Tape position error at beginning-of-medium
	0x02	Tape position error at end-of-medium
	0x03	Tape or electronic vertical forms unit not ready
	0x04	Slew failure
	0x05	Paper jam
	0x06	Failed to sense top-of-form
	0x07	Failed to sense bottom-of-form
	0x08	Reposition error
	0x09	Read past end of medium
	0x0a	Read past beginning of medium
	0x0b	Position past end of medium
	0x0c	Position past beginning of medium
	0x0d	Medium destination element full
0x0e	Medium source element empty	
0x3d	0x00	Invalid bits in identify message
0x3e	0x00	Logical unit has not self-configured yet

**Table A-3 SCSI Additional Sense Code/Qualifier Code Pairs (Continued)**

<b>SCSI Additional Sense Code</b>	<b>SCSI Qualifier Code</b>	<b>Meaning</b>
0x3f	0x00	Target operation conditions have changed
	0x01	Microcode has been changed
	0x02	Changed operating definition
	0x03	Inquiry data has changed
0x40	0x00	RAM failure
	<i>nn</i>	Diagnostic failure on component <i>nn</i>
0x41	0x00	Data path failure
0x42	0x00	Power-on or self-test failure
0x43	0x00	Message error
0x44	0x00	Internal target failure
0x45	0x00	Select or reselect failure
0x46	0x00	Unsuccessful soft reset
0x47	0x00	SCSI parity error
0x48	0x00	Initiator detected error message received
0x49	0x00	Invalid message error
0x4a	0x00	Command phase error
0x4b	0x00	Data phase error
0x4c	0x00	Logical unit failed self-configuration
0x4e	0x00	Overlapped commands attempted

**Table A-3 SCSI Additional Sense Code/Qualifier Code Pairs (Continued)**

<b>SCSI Additional Sense Code</b>	<b>SCSI Qualifier Code</b>	<b>Meaning</b>
0x50	0x00	Write append error
	0x01	Write append position error
	0x02	Position error related to timing
0x51	0x00	Erase failure
0x52	0x00	Cartridge fault
0x53	0x00	Media load or eject failed
	0x01	Unload tape failure
	0x02	Medium removal prevented
0x54	0x00	SCSI to host system interface failure
0x55	0x00	System resource failure
0x56	0x00	Reserved
0x57	0x00	Unable to recover table of contents
0x58	0x00	Generation does not exist
0x59	0x00	Updated block read
0x5A	0x00	Operator request or state change input (unspecified)
	0x01	Operator medium removal request
	0x02	Operator selected write protect
	0x02	Operator selected write permit

**Table A-3 SCSI Additional Sense Code/Qualifier Code Pairs (Continued)**

<b>SCSI Additional Sense Code</b>	<b>SCSI Qualifier Code</b>	<b>Meaning</b>
0x5B	0x00	Log exception
	0x01	Threshold condition met
	0x02	Log counter at maximum
	0x03	Log list codes exhausted
0x5C	0x00	RPL status change
	0x01	Spindles synchronized
	0x02	Spindles not synchronized
0x5D	0x00	Reserved
0x5E	0x00	Reserved
0x5F	0x00	Reserved
0x60	0x00	Lamp failure
0x61	0x00	Video acquisition error
	0x01	Unable to acquire video
	0x02	Out of focus
0x62	0x00	Scan head positioning error
0x63	0x00	End of user area encountered on this track
0x64	0x00	Illegal mode for this track
0x65	0x00	Reserved
0x66	0x00	Reserved
0x67	0x00	Reserved
0x68	0x00	Reserved

**Table A-3 SCSI Additional Sense Code/Qualifier Code Pairs (Continued)**

<b>SCSI Additional Sense Code</b>	<b>SCSI Qualifier Code</b>	<b>Meaning</b>
0x69	0x00	Reserved
0x6A	0x00	Reserved
0x6B	0x00	Reserved
0x6C	0x00	Reserved
0x6D	0x00	Reserved
0x6E	0x00	Reserved
0x6F	0x00	Reserved

---

# **B** **Regulatory Information**

This appendix contains all of the regulatory-related information for the A4800A adapter.

## **Regulatory Statements**

This section contains all of the regulatory statements for the A4800A adapter.

### **FCC Statement (For U.S.A. Only)**

The Federal Communications Commission (in 47 CFR 15.105) has specified that the following notice be brought to the attention of the users of this product.

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. The end user of this product should be aware that any changes or modifications made to this equipment without the approval of Hewlett-Packard could result in the product not meeting the Class A limits, in which case the FCC could void the user's authority to operate the equipment.

### **IEC Statement (Worldwide)**

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.

### **DOC Statement (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.

## Spécification ATI Classe A (France)

DECLARATION D'INSTALLATION ET DE MISE EN EXPLOITATION d'un matériel de traitement de l'information (ATI), classé A en fonction des niveaux de perturbations radioélectriques émis, définis dans la norme européenne EN 55022 concernant la Compatibilité Electromagnétique.

Cher Client,

Conformément à la Réglementation Française en vigueur l'installation ou le transfert d'installation, et l'exploitation de cet appareil de classe A, doivent faire l'objet d'une déclaration (en deux exemplaires) simultanément auprès des services suivants:

- Comité de Coordination des Télécommunications 20, avenue de Ségur - 75700 PARIS
- Préfecture du département du lieu d'exploitation

Le formulaire à utiliser est disponible auprès des préfetures.

La déclaration doit être faite dans les 30 jours suivant la mise en exploitation.

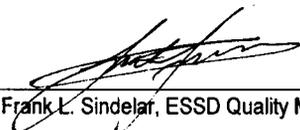
Le non respect de cette obligation peut être sanctionné par les peines prévues au code des Postes et Télécommunications et celles indiquées dans la loi du 31 mai 1993 susvisée.

Arrêté du 27 Mars 1993, publié au J.O. du 28 Mars - ATI

## VCCI Statement (Japan)

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。

## Declaration of Conformity

<b>DECLARATION OF CONFORMITY</b> according to ISO/IEC Guide 22 and EN 45014	
<b>Manufacturer's Name:</b>	Hewlett-Packard Company Enterprise Storage Solutions Division
<b>Manufacturer's Address:</b>	8000 Foothills Blvd. Roseville, CA 95747 USA
<b>declares, that the product</b>	
<b>Product Name:</b>	Single Port FWD SCSI HBA
<b>Model Number(s):</b>	A4800A
<b>Product Options:</b>	N/A
<b>conforms to the following Product Specifications:</b>	
<b>Safety:</b>	IEC 950:1991 + A1, A2, A3, A4 / EN 60950:1992 + A1, A2, A3, A4 GB 4943-1995
<b>EMC:</b>	CISPR 22:1993 / EN 55022:1994 - Class A <sup>1</sup> GB 9254-1988 EN 50082-1:1992 IEC 801-2:1991 / prEN 55024-2:1992, 4 kV CD, 8 kV AD IEC 801-3:1984 / prEN 55024-3:1991, 3 V/m IEC 801-4:1988 / prEN 55024-4:1993, 0.5 kV Signal Lines 1 kV Power Lines
<b>Supplementary Information:</b>	
The product here with complies with the requirements of the EMC Directive 89/336/EEC and carries the CE marking accordingly.	
1) The Product was tested in a typical configuration with HP 9000 computer system.	
Roseville, 10/6/98	 Frank L. Sindelar, ESSD Quality Mgr.
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