HP NetServer Storage System/6 User Guide

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Audience Assumptions

The user 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.

ii

Contents

iii

Contents

---

iv

English

v

1   Introduction

The NetServer Storage System/6 provides external mass storage for use with the current line of HP NetServers. The NetServer Storage System/6 is compatible with the Small Computer System Interface (SCSI-2) industry standard. Both Fast and Fast-Wide SCSI-2 are supported. The embedded SCSI controllers in NetServers, SCSI host bus adapters (HBA) or Disk Array Controllers (DAC) provide the SCSI interface between the host system and the storage system. DACs and HBAs are available from Hewlett-Packard (check with your dealer). The NetServers, HBAs and DACs include software that supports a variety of operating systems.

The chassis contains horizontal mass storage shelves called *SCSI device shelves* in the upper area of the chassis and a hot-swap subsystem with six hot-swap shelves in two cages in the lower area. The SCSI device shelves support SCSI devices, such as tape drives. The hot-swap shelves support SCA-2 hot-swap disk modules provided by HP.

The SCSI connectors on the rear panel connect the storage system to the host system. The SCSI bus terminates inside the storage system cabinet. A power supply and the internal cabling necessary for most configurations are included in the storage system.

The NetServer Storage System/6 can be configured to solve a variety of storage problems. The disk modules are available in a variety of capacities to meet your mass storage needs. Mass storage devices and external SCSI cables are not included with the storage system. They must be ordered separately from your HP dealer.

1

Basic Installation

This section provides the basic information for installing the NetServer System/6. For detailed information, refer to the applicable chapter or section. Please also read the section "General Operating Instructions" in this chapter before installing the storage system.

The basic steps for installing the storage system are as follows:

1. Unpack the device and inventory the accessories as described in the next section "Unpacking the NetServer Storage System/6."

2. Plug in the power cord.

> **WARNING** NetServer Storage System/6 does NOT have an auto ranging power supply. During initial unpacking and setup, verify the 230/115 voltage switch on the back of the power supply is set properly.

3. Turn the storage system on.

4. Verify that the LED readout displays HP and the system powers up. If the system powers up, continue with this section. If the system fails to power up, go to the chapter on troubleshooting in this manual.

5. Turn the power off and unplug the power cords.

6. Accept the default cabling configuration and SCSI address settings or configure the cabling for the devices and set the SCSI addresses as described in the chapter "Cabling Storage Devices and Setting SCSI Addresses."

> **CAUTION** It is important to follow the principles outlined in the chapter "Cabling Storage Devices and Setting SCSI Addresses."

7. Install the hot-swap disk modules as described in the chapter "Installing Hardware Accessories."

8. Install the SCSI device(s) in the SCSI device shelves as described in the chapter "Installing Hardware Accessories."

9. Secure the storage system in its permanent location.

10. Connect the external power cords and cables.

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11. Configure the system with the appropriate drivers and/or operating system, as described in the user's manual of the HP NetServer or disk array controller.

Unpacking the NetServer Storage System/6

The instructions for unpacking your storage system are printed on the shipping carton. Keep all of the packing material, including the plastic bags, in case you need to repackage the storage system. When everything is unpacked, make sure you have all the items. If any parts are missing or damaged, contact your dealer immediately.

CAUTION	Components of the NetServer Storage System/6 are sensitive to static electricity and can easily be damaged by improper handling. The use of a grounding strap is recommended.

Contents of the NetServer Storage System/6 Package

The NetServer Storage System/6 package contains the following:

- The NetServer Storage System/6 chassis.

- This *NetServer Storage System/6 User Guide*.

- Cables for the internal SCSI configuration. (These are already attached to the storage system in the default configuration.)

- A power cord.

NOTE	SCSI devices for the SCSI device shelves, disk modules and external SCSI cables are ordered separately.

1 Introduction

Identifying Parts of the NetServer Storage System/6

Figure 1-1 shows the various parts of the storage system. Please take a few moments to acquaint yourself with the parts of the storage system.

Power Indicator
Power Switch
Reset Switch

LED Readout
Chassis Keylock
SCSI Device Shelves
Drive Activity Light
Drive Power Light

Hot-Swap Subsystem Keylock

Hot-Swap Subsystem
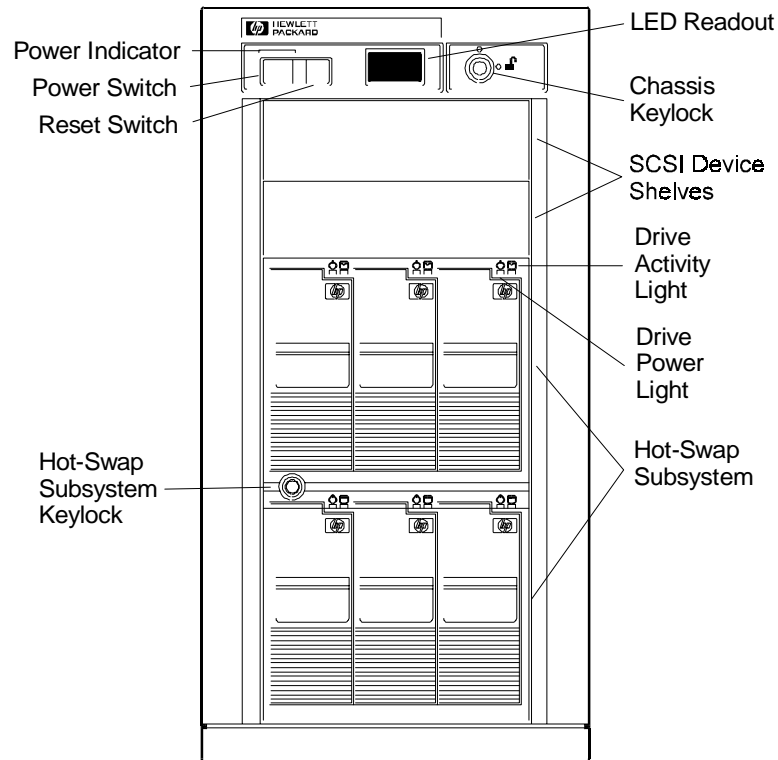
Figure 1-1. Front View of the Storage System

The parts of the system shown in Figure 1-1 are described below:

Power Indicator	Lights green when the power is on.
Power Switch	Switches the power to the cabinet on or off. This single switch controls the power to all of the storage devices.
Reset Switch	Provides several functions: performs a self-test, performs a power supply reset or changes the unit identification number.

4

LED Readout	Displays "HP" (the default) or the unit identification number during normal operation, displays status information during a self-test or warns of an error condition.
Chassis Keylock	The front bezel is locked to the chassis with the key lock near the top of the bezel. When the bezel is in place, it effectively locks the chassis door.
SCSI Device Shelves	Standard SCSI devices, such as a DAT tape drive or an independent hard disk drive, can be installed in the SCSI device shelves.
Drive Activity (LED) Light	The LED lights while the drive spins up. It goes off when the drive has spun up and is idle and flashes when the drive in the module is reading or writing data. If, after the drive has spun up, the light remains on, the drive may be hung. If you suspect the drive is hung, refer to the "Troubleshooting" chapter in this manual.
Drive Power (LED) Light	Indicates the status of drive power and warns of an over temperature condition. The LED lights green when the disk module has been fully inserted into the shelf and power is good.
	If a single drive is **flashing yellow**, it indicates a faulty power condition. If all the drives in a cage are **flashing yellow**, it indicates a possible over temperature condition. If all the drives in a cage are **flashing red**, it indicates the temperature has exceeded the operational range. Immediately begin shut-down procedures and refer to the "Troubleshooting" chapter in this manual.
Hot-Swap Disk Module Keylock	When locked, the key is required to remove a hot-swap disk. Only one key is needed to remove or install any disk module. The key also matches the chassis keylock.

1   Introduction
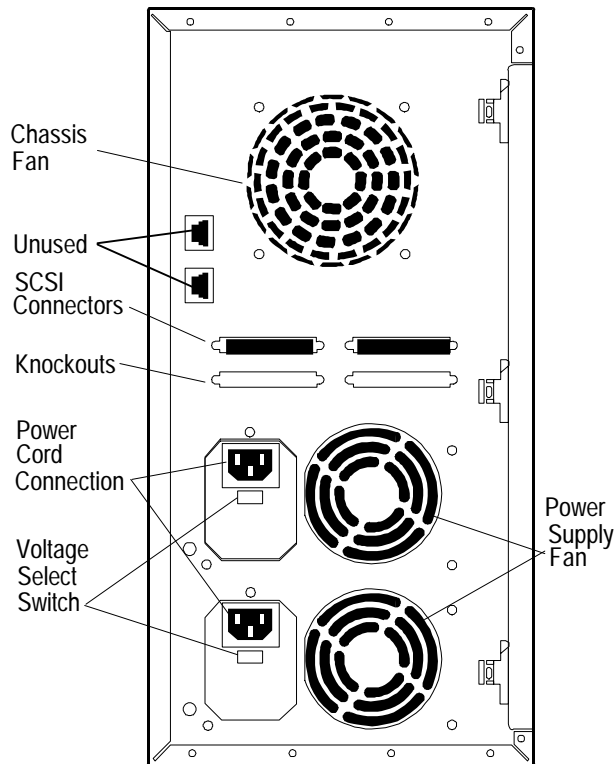
Figure 1-2. Rear View of the Storage System

The parts of the system shown in Figure 1-2 are described below:

Chassis Fan	Provides cooling for the storage system.
SCSI Connectors	Provides 68-pin, high-density SCSI interface connections to the storage system cabinet.
Knockouts	SCSI interface connections can be added by removing the knock-outs and installing the appropriate SCSI connector.
Power Supply Fan	Provides cooling for the storage system's power supply and storage system.
Power Cord Connection	Provides a connection for the AC power cord.
Voltage Select Switch	Controls the voltage accepted by the power supply.

6

General Operating Instructions

Please read the following instructions carefully. They contain information on how to avoid data loss and damage to the system due to improper handling.

Reset Switch

The front panel's reset switch resets the power supply, performs a self test, and can be used to set the unit identification number.

Power Supply Reset

If the power supply shuts down, momentarily pressing the reset switch initiates a power supply reset. The reset sequence takes about 15 seconds. The display and power-on LED are off during the reset sequence.

Self-Test

When a self-test is performed, the results are displayed on the LED. To perform a self-test, complete the following procedure:

1. With the power switch off, hold the reset switch and turn the power on.

2. Release the reset switch. The seven-segment LED blinks "8.8." five times, then displays the firmware revision number. The unit then performs a power supply reset, as described above.

Unit Identification Number

A unit identification number can be set for identification purposes. It has no impact on the operation of the storage system. To change the unit identification number, complete the following procedure:

1. Press and hold the reset switch for approximately five seconds, until the LED starts its count (at one-second intervals). The numbers 1 through 16 and the letters "HP" display in sequence ("HP" is the default unit identification number).

7

2. Release the reset switch when the desired number displays. The unit identification number displayed is stored in the EEPROM. The unit identification number does not change even if the storage system is power-cycled (unless this procedure is repeated).

NOTE	The power supply does not reset when the unit identification number is changed.

Power Cycling

On an active network, switching the storage system power on or off while the host system is operating may affect server operation. Always make sure it is safe to cycle the power before doing so. Alert network users that the mass storage will be unavailable while the power is off.

For example, if you are using the HP DAC Write Cache, power cycling could result in data loss. When using the Write Cache, use the JetSet utility (provided with HP NetServers) to flush the cache before you cycle power. Wait until the disk drives are idle and the Write Cache (if used) has been flushed before switching off power. This avoids corrupting any data transfer that may be in progress between the host system and a disk.

The status lights on the front of each disk indicate activity. The lights flash when the host system is transferring data. If no lights are flashing, the bus is idle and it is safe to switch off the power.

Continuous Operation

The storage system power should remain on whenever the host system is operating. The disk drives are not harmed by continuous operation; avoid cycling power unnecessarily.

8

Temperature Control

Keeping the unit within the range of normal operating temperatures (see Appendix A, "Specifications") is important to the long life and proper function of the storage system. If the storage system cabinet has been exposed to temperature extremes, allow two hours for it to stabilize to room temperature and humidity before switching on the power.

Blank filler panels that cover the SCSI device shelves and the disk module shelves are installed by the factory. These panels must remain installed for the product to comply with safety and regulatory requirements, and to provide proper cooling for the disk modules. If a SCSI device shelf filler panel is lost, you can order replacements (part number C3310-60017). If a hot-swap storage device shelf filler panel is lost, you can order replacements (part number 5063-5676).

CAUTION	To avoid the hazard of electrical shock and to ensure the cooling system functions properly, the storage system should not be operated with the door open.

If "FF" (fan fault) is displayed on the LED panel, the cooling fan has failed. Shut down the system as quickly as possible. Continued operation of the storage system with a failed fan could result in loss of data or damage to the storage system and installed devices.

The LEDs on the disk drive modules indicate the status of the cage. If all the disk drive module LEDs in a cage are flashing yellow, it indicates a possible over temperature condition in that cage. If all the drives in a cage are flashing red, it indicates the temperature in that cage has exceeded the operational temperature range. Immediately begin shut-down procedures and refer to the "Troubleshooting" chapter in this manual.

Placement

Do not block the cooling vents. Do not place the storage system closer than 6 inches to a wall to ensure sufficient air flow and cooling.

Hot-Swap Disk Module Care and Relocation

Handle disk modules carefully. Disk modules are more susceptible to shock, vibration and electro-static discharge when they are not in the cabinet. Also, do not touch the SCSI edge connector pins when a disk module is out of the cabinet. The oils on your skin could weaken the contact.

Once the storage system has been configured and installed, a disk module should not be moved from one hot-swap shelf to another shelf. Relocating a disk module changes the SCSI address of that disk. If the SCSI address is changed, the storage system is not able to read the information on that disk and data will be lost.

Each disk module shelf is numbered. It is recommended that you mark each module with its shelf number prior to installation. If a disk module fails, remove the failed module and place a new module in the same shelf. Placing a replacement module in a different shelf or relocating a disk module will result in the loss of data.

Spin Up

The storage system must be powered up and the drives on the storage system allowed to "spin up" to speed before the HP NetServer is powered on. The drive activity light is on while the drive spins up. The light is off when the drive has spun up and there is no read/write activity. If the HP NetServer is powered on before the storage system is powered on and the drives have spun up, the host will not recognize the storage system devices.

NOTE	If the SCSI addresses of the hot-swap shelves are set to 1-3 or 9-11, they are programmed to delay startup. Wait at least two minutes after the storage systems are powered up before powering up the host system if any SCSI address is set to 1-3 or 9-11.

Using an Uninterruptible Power Supply

It is recommended that you operate your storage system on an uninterruptible power supply (UPS). If you do, refer to the documentation included with the UPS for complete instructions on connecting your storage system. The recommended UPS budget for a fully loaded storage system is 600VA.

2 Cabling Storage Devices and Setting SCSI Addresses

This chapter describes the NetServer Storage System/6, switch settings and common cabling configurations. Once the addresses are set and cabling is configured, the hardware can be installed as described in the next chapter.

CAUTION	Be careful when handling electronic components. Electronic components can be easily damaged by static electricity. Leave these sensitive components in their anti-static bags until you are ready to install them. Handle accessories as little as possible. When you must handle an accessory, handle it only by the edges or the mounting bracket. Avoid touching any contacts on the accessory connector. Before touching any components inside your storage system, touch a metal part of the chassis. The use of a grounding strap is recommended.

How you configure the storage system depends on your system's requirements and the type of SCSI channel available from the host system. For example, the HP NetServer LH array model has two embedded Fast SCSI-2 channels and includes a PCI DAC card, which provides two Fast-Wide SCSI-2 channels.

Each channel supports a range of SCSI addresses. The addresses in each Fast SCSI-2 channel range from 0-7. The addresses in each Fast-Wide SCSI-2 channel range from 0-15. In both Fast SCSI-2 and Fast-Wide SCSI-2 configurations, address 7 is used by the controller. Therefore, each Fast SCSI-2 channel supports up to seven SCSI devices on addresses 0-6. Each Fast-Wide SCSI-2 channel supports up to 15 SCSI devices on addresses 0-6 and 8-15.

Each SCSI device on the same channel must have a unique address. An address of 1 on Channel 0 is different from an address of 1 on Channel 1.

The SCSI device shelves support only Fast SCSI-2 devices (addresses 0-6). For devices installed in the SCSI device shelves, the address is set *on the device* per the manufacturer's instructions. SCSI addresses for the hot-swap subsystem are set using the *switches in the storage system*.

2 Cabling Storage Devices and Setting SCSI Addresses

The basic procedure for configuring the storage system is as follows:

1. Determine the desired configuration.

2. Power down the storage system and detach all power cords and external cables.

3. Open the storage system door. The procedure is described in the "Opening the Door" section of this chapter.

4. Set the switches that determine the SCSI addresses for the hot-swap cages as described in the "Setting SCSI Addresses" section of this chapter.

5. Set the SCSI addresses for the devices on the SCSI device shelves as described by the manufacturer of the devices.

6. Install the SCSI devices in the SCSI device shelves as described in the "Installing Hardware Accessories" chapter.

7. Attach the cables to the devices as described in the "Cabling Configurations" section of this chapter.

8. Close the door.

9. Attach all power cords and external cables.

10. Power-up the storage system.

Opening the Door

If you are installing any hardware accessories, such as SCSI mass storage devices, you must open the door on the side of the storage system.

> **WARNING** Always unplug all power cords and cables from the system before opening the door.

The following procedures explain how to open the door.

1. Turn off the system.

2. Unplug the power cords and cables.

3. Unlock the bezel from the chassis.

12

4. Remove the front bezel. Pull the top of the bezel forward, swinging it down to clear the retaining clips at the bottom of the chassis. Lift the bezel away from the chassis, as shown in Figure 2-1.
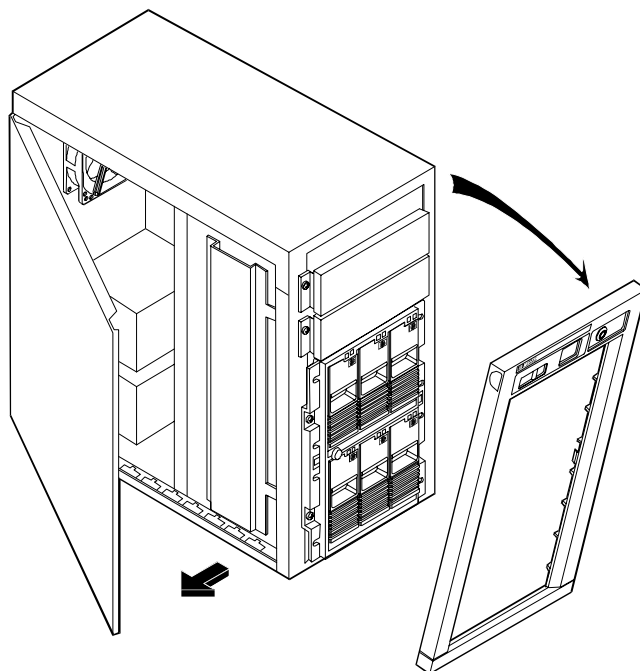
Figure 2-1. Removing the Bezel and Opening the Door

5. Loosen the door mounting screws using a straight-blade screwdriver. (The screws remain attached to the door.)

6. Swing the door open, as shown in Figure 2-1.

CAUTION	The door is an integral part of the unit. The storage system must be operated with the door closed to ensure proper airflow for continued reliability and to maintain compliance with radio frequency interference (RFI) and safety standards.

7. Lift the door off the chassis (if desired).

Reinstalling the door is accomplished by reversing the procedure.

13

Setting SCSI Addresses

The following is a description of the switch settings on the rear of the hot-swap subsystem cage (see Figure 2-1). The default switch setting is described in the "Cabling Configurations" section of this chapter.

NOTE	The numbers on the front bezel simply denote the position of the disk module in relation to the hot-swap subsystem. These numbers are not related to the SCSI addresses.

Switches 3, 4 and 6 determine the SCSI address of the hot-swap shelf, as shown in Figure 2-2.

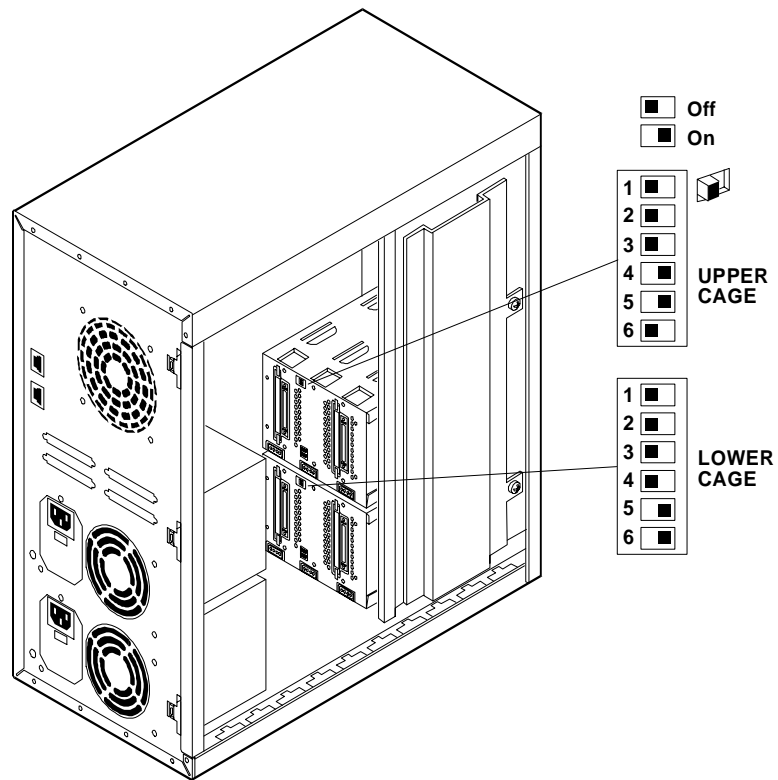**Figure 2-2. Storage System Switch Location**

2   Cabling Storage Devices and Setting SCSI Addresses

The switch setting location and functions are the same on both cages. The switch 6 setting differentiates the upper and lower cages.

Table 2-1. Switch Functions and Settings

Switch	Functions	Settings
1	**Not Used**	Always set to **Off.**
2	**Not Used**	Always set to **Off.**
3	**High/Low Addresses** Fast-Wide (68 pin) SCSI Only. Sets SCSI addresses for upper or lower eight addresses.	**On** Sets the drives to the upper eight SCSI addresses. **Off** Sets the drives to the lower eight SCSI addresses. See SCSI Address Settings table below for description of the settings.
4	**SCSI Address Zero** Sets middle shelf in the hot-swap cage to SCSI ID 0 or ID 8. The ID number depends on the setting of switch 3.	**On** Sets the middle shelf in the cage (shelf 2 or shelf 5) to SCSI ID 0 or SCSI ID 8. **Off** Sets the middle shelf to the normal SCSI address sequence. See SCSI Address Settings table below for a description of the settings.
5	**Remote Start** Determines control of the hot-swap disk module power-on sequence.	**On** Internal control: Upper cage is set to delayed start and lower cage is set to power-on at startup. **Off** Power-on sequence is determined by the host.
6	**Upper/Lower Cage** Identifies cage location.	**On** Lower cage. **Off** Upper cage. See SCSI Address Settings table below for description of settings.

It is important that the disk drives have a staggered power-up sequence. The storage system may shut down if all of the devices attempt to spin-up at the same time. If the staggered power-up sequence is not supported by the host system, be sure switch 5 is in the "ON" (default) position.

15

2   Cabling Storage Devices and Setting SCSI Addresses

Switches 3, 4 and 6 determine the SCSI address setting for each shelf in the hot-swap subsystem. Table 2-2 describes the settings and the shelf's SCSI address.

Table 2-2. Hot-Swap SCSI Address Settings

Upper Cage		Lower Cage	
Switch Settings	**SCSI Address**	**Switch Settings**	**SCSI Address**
3 - Off	Shelf 1 = ID 1	3 - Off	Shelf 4 = ID 4
4 - Off	Shelf 2 = ID 2	4 - Off	Shelf 5 = ID 5
6 - Off	Shelf 3 = ID 3	6 - On	Shelf 6 = ID 6
3 - Off	Shelf 1 = ID 1	3 - Off	Shelf 4 = ID 4
4 - On	Shelf 2 = ID 0	4 - On	Shelf 5 = ID 0
6 - Off	Shelf 3 = ID 3	6 - On	Shelf 6 = ID 6
3 - On	Shelf 1 = ID 9	3 - On	Shelf 4 = ID 12
4 - Off	Shelf 2 = ID 10	4 - Off	Shelf 5 = ID 13
6 - Off	Shelf 3 = ID 11	6 - On	Shelf 6 = ID 14
3 - On	Shelf 1 = ID 9	3 - On	Shelf 4 = ID 12
4 - On	Shelf 2 = ID 8	4 - On	Shelf 5 = ID 8
6 - Off	Shelf 3 = ID 11	6 - On	Shelf 6 = ID 14

Cabling Configurations

The storage system can be reconfigured by changing the internal cabling configuration or changing the switch settings on the cages. This section describes the external, the internal default, and some (but not all possible) internal cabling configurations and switch settings for both the hot-swap cages and the SCSI device shelves.

External Cabling

The storage system uses external, SCSI cables (not included) to communicate with the host system. Cables used with this product must be properly shielded to comply with regulatory requirements. The connection(s) at the back of the storage system are 68-pin, high-density connectors. Using the appropriate external SCSI cable, the storage system can be connected to the host system by using a variety of connectors (see Table 2-3 for the appropriate cable). The

16

external cables connect from the host system to the rear panel of the storage system cabinet.

For instructions on connecting the external cables to the storage system, consult the host system user's guide or in the case of a DAC card, the user's guide for the DAC card.

At least one external SCSI cable is required to attach each storage system to the host system. All connections from the storage system to the host must be direct. Do not connect storage systems in series, or connect to other external SCSI devices.

Many of the cabling configurations need more than one external SCSI cable. If you need additional cables, they can be ordered from HP. The storage system is not shipped with external SCSI cables. Table 2-3 lists some of the external SCSI cables available from HP.

Table 2-3. Optional External SCSI Cables

System or Accessory	SCSI Port	1.0-Meter Cable Number	2.5-Meter Cable Number
NetServer LC Embedded Controller	Fast SCSI-2 50-pin high density.	5181-7705	D3635A
NetServer LF Embedded Controller	Fast SCSI-2 50-pin high density.	5181-7705	D3635A
NetServer LF Array Model	Fast SCSI-2 50-pin high density.	5181-7705 C2960A*	D3635A
NetServer LH Embedded Controller	Fast SCSI-2 50-pin high density.	5181-7705	D3635A
NetServer LH Array Model	Fast-Wide SCSI-2 68-pin ultra-high density.	C3726A	D3637A
NetServer LM Embedded Controller	Fast SCSI-2 50-pin high density.	5181-7705	D3635A
NetServer LM	Fast SCSI-2 50-pin	5181-7705	D3635A

2   Cabling Storage Devices and Setting SCSI Addresses

System or Accessory	SCSI Port	1.0-Meter Cable Number	2.5-Meter Cable Number
Array Model	high density.	C2960A*	
NetServer LS Embedded Controller	Fast-Wide SCSI-2 68-pin high density.	C2911A (.9mts)	D3636A
NetServer LS Array Model	Fast-Wide SCSI-2 68-pin ultra-high density.	C3726A	D3637A
EISA DAC	Fast SCSI-2 50-pin high density.	5181-7705 C2960A*	D3635A
PCI DAC	Fast-Wide SCSI-2 68-pin ultra-high density.	C3726A	D3637A
EISA SCSI Adapter D2078B	Fast SCSI-2 50-pin high density.	5181-7705	D3535A
*C2960A connects the second EISA DAC SCSI channel (Channel 1) to the host.			

18

Storage System Layout

In the configuration drawings in this section, the SCSI device shelves and the hot-swap cages are mapped as shown in Figure 2-3.
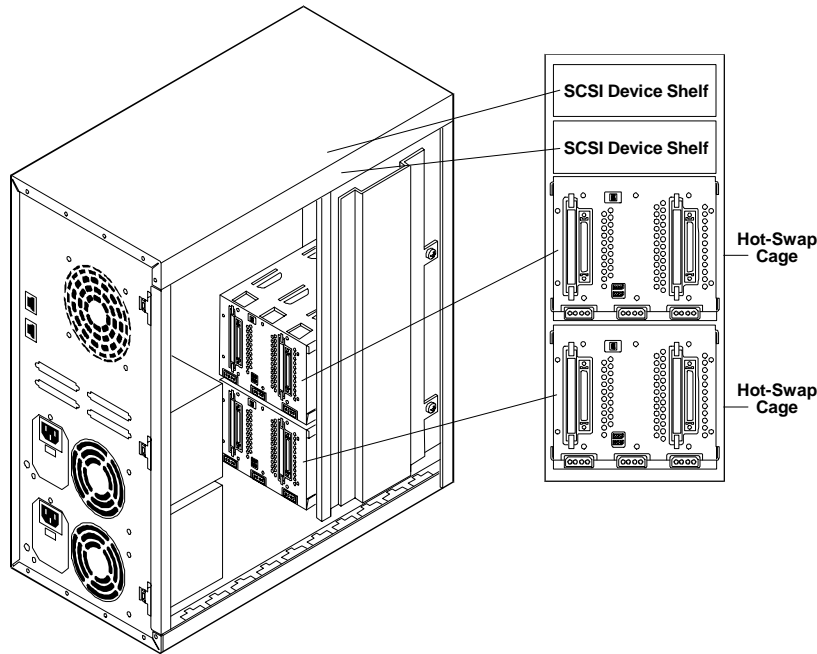

Figure 2-3. Storage System Map

Only the internal HP cables shown in Table 2-4 are supported.

Table 2-4. Cabling Diagram Legend

Cabling Diagram Label	Description	Part Number	Number Included
C11	Narrow SCSI (50 pin) cable with built-in terminator.	5182-6748	1
C14	Fast-Wide SCSI (68 pin) cable.	5182-6747	1
C20	Fast-Wide SCSI (68 pin) cable with external connector.	5182-9326	2

Default Cabling Configuration (Non-Duplex)

External terminator built into cable

T

SCSI Device Shelf

C11

SCSI Device Shelf

68 to 50 pin adapter

A

Internal terminator

T

C14

C20

SCSI A   **SCSI B**

SCSI C   **SCSI D**

C20

Hot Swap Subsystem
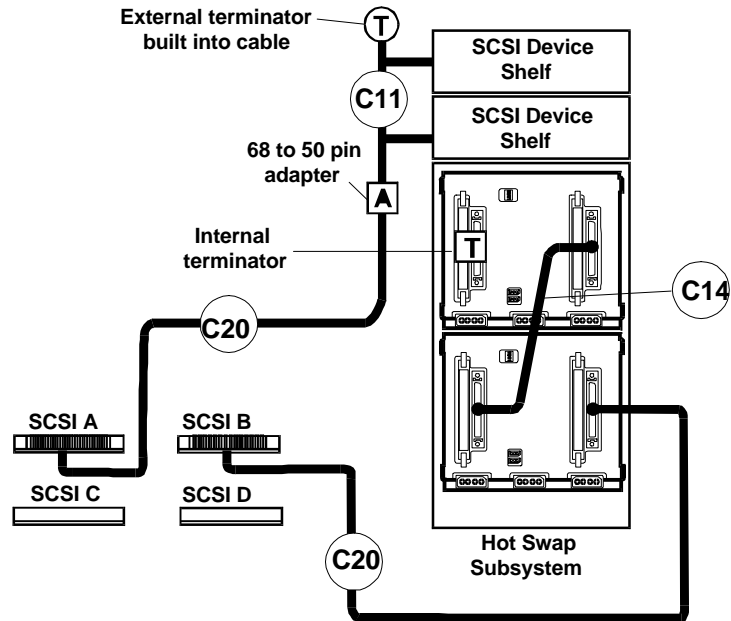
Figure 2-4. Default Cabling Configuration (Non-Duplex)

■ Off
□■ On

UPPER CAGE
1 ■
2 ■
3 ■
4 ■
5 □ ■
6 □ ■

SCSI ID

ID 1   ID 2   ID 3

UPPER CAGE

LOWER CAGE
1 ■
2 ■
3 □ ■
4 □ ■
5 □ ■
6 □ ■

ID 4   ID 5   ID 6

LOWER CAGE
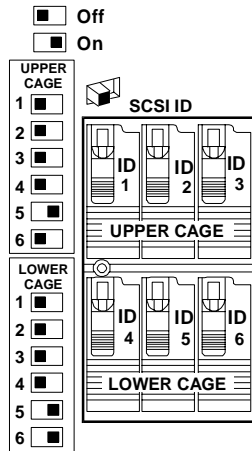
The SCSI device shelves are on one SCSI channel; the hot-swap cages are on another channel. SCSI A may not be connected to a DAC card. SCSI B can be connected to a DAC card.

To change the SCSI addresses, see the "Setting SCSI Addresses" section. For internal cable part numbers, see the "Cabling Diagram Legend."

The switch settings shown in the example are *not* the only acceptable settings.

20

Duplex Configuration

External terminator built into cable

T

C11

SCSI Device Shelf

SCSI Device Shelf

Internal terminator

T

SCSI A

SCSI B

SCSI C

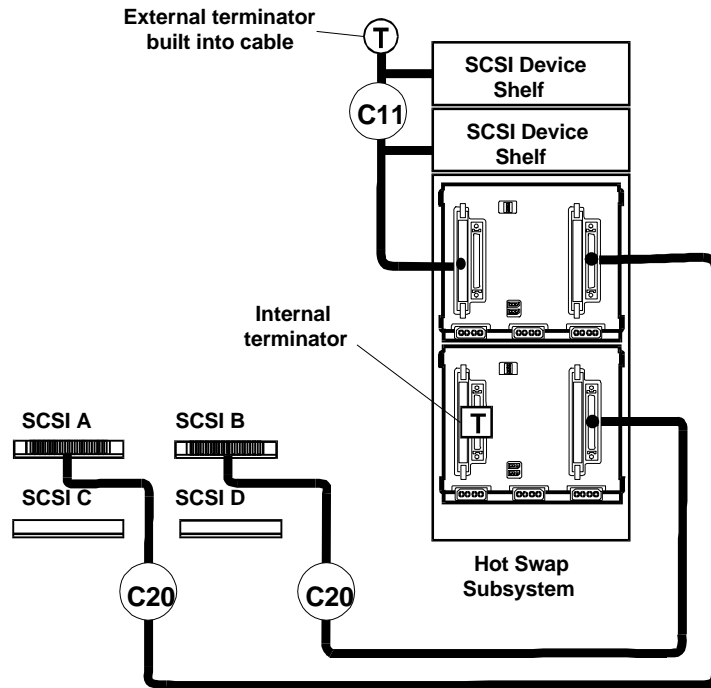**SCSI D**

C20

C20

Hot Swap Subsystem

Figure 2-5. Duplex Configuration

In this example, the SCSI device shelves are connected to the upper hot-swap cage. Make sure the addresses in the SCSI device shelves are unique to each device, including the hot-swap disk modules. SCSI A cannot be connected to a DAC card. SCSI B can be connected to a DAC card.

For internal cable part numbers, see the "Cabling Diagram Legend." To change the SCSI addresses, see the "Setting SCSI Addresses" section.
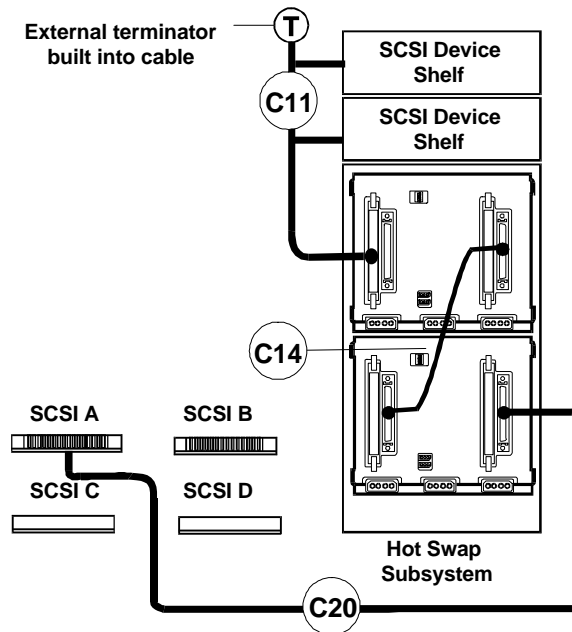
21

Alternate Non-Duplex Configuration

Figure 2-6. Alternate Non-Duplex Configuration

In this example, eight devices are connected to one SCSI channel. If the SCSI controller, NOS or OS are limited to narrow (Fast) SCSI-2 addresses, a **maximum of seven SCSI devices** are allowed on a narrow SCSI-2 channel and this configuration is not supported. This configuration is not supported by the DAC card.

To change the SCSI addresses, see the "Setting SCSI Addresses" section. For internal cable part numbers, see the "Cabling Diagram Legend."

22

Alternate Duplex Configuration

External terminator
built into cable

SCSI Device
Shelf

C11

SCSI Device
Shelf

68 to 50 pin
Adapter

A

Internal
Terminator

T

C20

SCSI A

SCSI B

T

SCSI C

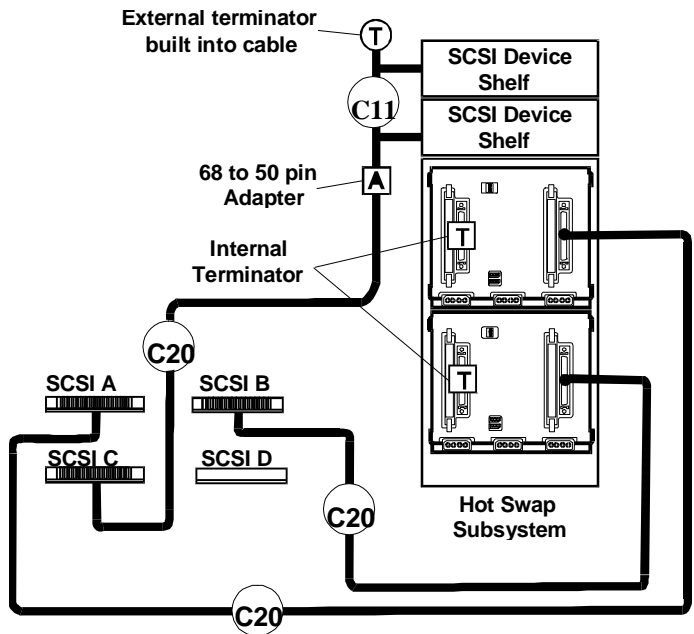SCSI D

C20

Hot Swap
Subsystem

C20

Figure 2-7. Alternate Duplex Configuration

The SCSI device shelves and each of the hot-swap cages are on separate SCSI channels. This configuration requires that you obtain another C20 cable and remove one of the knock-outs in the rear of the storage system to accommodate the connector. The DAC card can be used with SCSI A and/or SCSI B. The DAC card cannot be used with SCSI C.

To change the SCSI addresses, see the "Setting SCSI Addresses" section. This configuration requires an additional internal cable. For internal cable part numbers, see the "Cabling Diagram Legend."

23

3 Installing Hardware Accessories

This section describes how to physically install the SCSI mass storage devices in the storage system. There are two categories of mass storage devices—the hot-swap modules and the SCSI devices that can be installed in the SCSI device shelves.

Installing Hot-Swap Storage Devices

Only SCA-2 compliant, single-ended, Fast SCSI-2, hot-swap disk modules can be installed in the hot-swap subsystem.

CAUTION	Mass storage devices are susceptible to mechanical shock and can be damaged by a drop as small as a quarter of an inch.

Unpacking a Hot-Swap Disk Module

The drives have shipping plugs to ensure the hot-swap disk modules are not damaged while the drives are transported. Remove and *save* this plug before using the device. If you plan to reship your system, reinstall the shipping plug as shown in Figure 3-1.
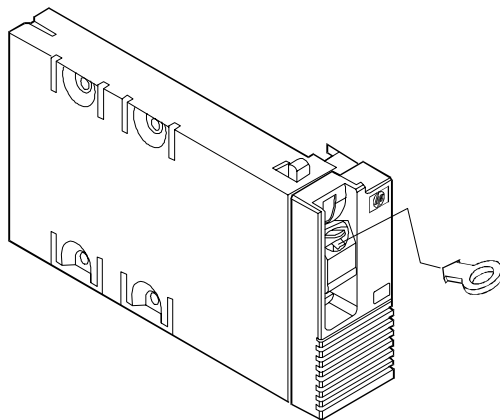

Figure 3-1. The Shipping Plug

25

Installing a New Hot-Swap Disk Module

This section describes the installation of a new hot-swap disk module.

CAUTION	Use one of the six (6) vertical shelves in the system. *Do not* attempt to install the hot-swap disk module in the SCSI device shelves.

Complete the following procedure to install a new disk module:

1. Unlock the hot-swap disk module keylock and remove the filler panel in the disk shelf by pulling the filler panel straight out.

NOTE	Do not dispose of the filler panel. If you decide to operate the storage system with the empty bay, it must be covered with a filler panel to ensure proper cooling and RFI compliance.

2. Press the locking tab on the hot-swap disk module down and lift the lever up. Lifting the lever retracts the locking pin at the top of the disk drive.

3. Holding the hot-swap disk module as shown in Figure 3-2, slide the hot-swap disk module slowly into the shelf until it stops.

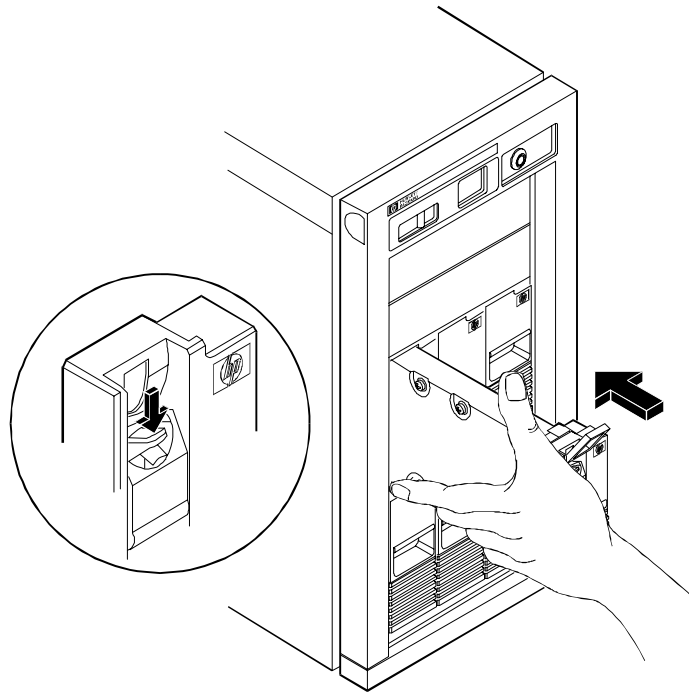|	
CAUTION	When the module stops, it is not flush with the bezel; the module extends about one-quarter inch from the bezel. When you lock the module in place, the module moves to the final position, flush with the bezel. Forcing the module past the first stop may damage the module.

4. Press the lever down until it latches.

26

Figure 3-2. Installing the Hot-Swap Disk Module

Removing a Hot-Swap Disk Module

This section describes the process for removing a hot-swap disk module.

CAUTION	The module may be spinning and may be warm to touch.

Complete the following procedure to remove a disk module:

1. Verify the hot-swap disk module keylock is unlocked, and unlock the hot-swap disk module by pushing the locking tab down and lifting the front lever.

2. Support the bottom of the module as shown in Figure 3-3. Slowly pull the module straight out. *Do not allow the hot-swap disk module to fall*.
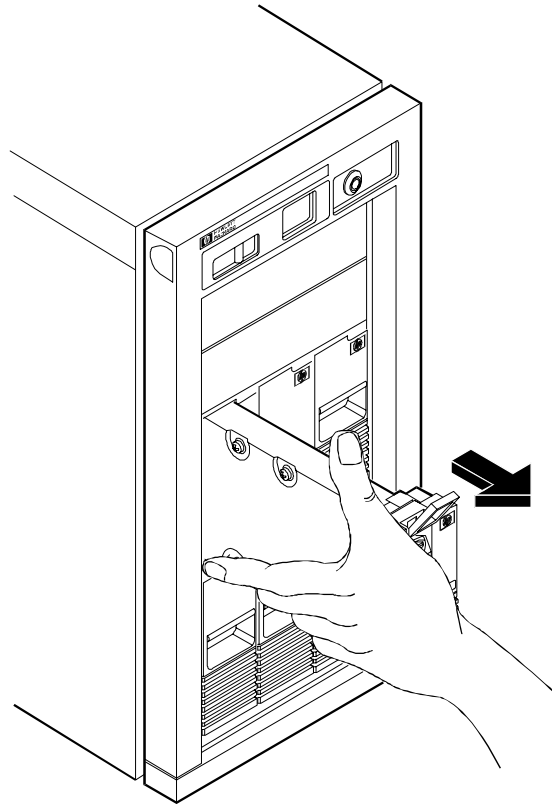
27

Figure 3-3. Removing the Hot-Swap Disk Module

3. Wait for the drive to stop spinning, then turn the hot-swap disk module slowly to its horizontal storage orientation.

4. Place the hot-swap disk module in an electrostatic protected container. *Do not stack hot-swap disk modules.*

5. Replace the blank filler panel or install a replacement disk module.

CAUTION	The storage system must be operated with all of the empty bays covered by blank filler panels to ensure proper air flow for continued reliability, and to maintain compliance with RFI and safety standards.

28

Installing a SCSI Device in a SCSI Device Shelf

Almost any Fast SCSI-2 single-ended 3.5-inch or 5.25-inch device, such as a digital audio tape (DAT), CD-ROM or SCSI hard disk drive, can be installed in a SCSI device shelf. The details for configuring the device, such as jumper settings, are supplied by the manufacturer of the device. Internal cabling configurations are described in the "Cabling Configurations" section of this manual. This section describes the basic process of installing a SCSI device in a SCSI device shelf. A SCSI hard disk drive is used as an example.

Use only the cables supplied by HP. The storage system includes an actively terminated SCSI cable for your SCSI tray devices. Fast SCSI-2 (up to 10 MB/second synchronous transfer) devices require an actively terminated SCSI cable.

NOTE	To use SCSI mass storage devices, you need to obtain trays to install them in the storage system. Contact your HP dealer for obtaining these trays: 5.25-inch tray (HP D2199A), 3.5-inch tray (D2198A).

For installation of a third-party, non-HP device in a SCSI device shelf, consult the HP BBS (408-553-3500) for recommended supplies and instructions.

The following example demonstrates the procedure for installing a SCSI hard disk drive:

1. Verify that the device is not terminated because the internal SCSI cable includes a built-in terminator. If you are installing a SCSI device that uses a built-in terminator, remove the terminator from the device before proceeding with the installation. The HP accessory devices available for your storage system are shipped with the terminators disabled.

2. Power down the unit. (Since all the data stored on all the drives in the storage system is inaccessible while the system is powered down, consider informing all users before powering down the storage system.)

3. Open the door of the storage system as described in the section "Opening the Door."

4. Position the first device closest to the SCSI cable terminator located at the end of the SCSI cable.

5. Remove the screws that secure the filler panel to the disk shelf. (Do not attempt to pry the plastic cover off the storage system.)

3 Installing Hardware Accessories

NOTE	Do not dispose of the blank filler panel. If you decide to operate the storage system with an empty bay, it must be covered with a blank filler panel to ensure proper cooling, and compliance with RFI and safety standards.

6. Mount the device in an HP tray if necessary.

7. Configure the device per manufacturer's instructions.

8. Secure the drive and tray in the SCSI device shelf using the same screws used to attach the filler panel.

9. Attach the SCSI cable for the appropriate configuration. Refer to the "Cabling Configuration" section of this manual for additional information.

10. Attach the power connector to the device.

11. Replace the door and the bezel of the storage system.

12. Reconnect the power cords and cables.

13. Power up the storage system, allowing the drives to spin up to speed.

14. Configure the drive as described in your host system's user guide.

4 Troubleshooting

If you are having problems installing or configuring the storage system, there are a number of tools and procedures available to help you resolve the problem. If you need assistance from HP, the "Service and Support" chapter of this manual contains information on service and support.

> **WARNING** Whenever opening the door, disconnect the power cords to avoid exposure to high energy levels, which may cause burns when parts are short-circuited by metal objects such as tools or jewelry.

Troubleshooting Procedures

The following are recommended troubleshooting procedures to help you find the problem when your storage system does not work properly. If you need assistance, contact your reseller first.

When the host system starts, the SCSI BIOS displays a banner and copyright notice. The BIOS checks for valid devices on the SCSI bus and reports which devices are found. If you have installed and configured the SCSI devices correctly, a list displays confirming all the SCSI devices installed in the system.

Begin troubleshooting by isolating the problem. Simplify the configuration to the minimum required to function and reinstall the items (drives, modules, etc.) one at a time, each time checking the system for errors. The suggestions in this section will assist you in diagnosing the problem.

If The System Will Not Power On

If, after pressing the power switch, you see: the power indicator LED fails to light, the LED readout fails to light, the chassis fan is not working, and the power supply fan is not working, the storage system has not powered up. Check the items listed below:

- Verify the voltage switch on the power supply is in the correct position.

- Ensure all cables and power cords are firmly plugged into the proper receptacles.

- Verify the power source is switched on. Plug a different electrical device (such as a printer) into the power outlet, and turn it on.

- Press and release the reset button in case the power supply shut down. (The reset process takes about 15 seconds.)

- If the storage system is plugged into a switched, multiple-outlet box, make sure the switch on the outlet box is turned on.

- If the storage system appears to power up, but the LED readout shows "PF" (power fault), immediately power down the storage system. Verify the voltage select switch is set to the proper voltage for the area.

- Verify the cable coming out of the power supply is plugged into connector PS1 on the management board. (Refer to the cable management label on the inside of the door of the storage system.)

- Verify the control panel cable is inserted properly in connector CP1 on the management board.

If the LED Readout Shows a Fan Fault (FF)

If the system powers on, but the main chassis fan is not operating and/or "FF" is displayed, open the door and verify the fan cable is connected to the fan connector on the management board. (Refer to the cable management label on the inside of the door.)

> **CAUTION**   Do not operate the storage system when the fan is not operating.

If the LED Readout Shows a Line Fault (LF)

If the line power is not connected properly to one of the power supplies and "LF" blinks alternately with HP, verify the line power is connected properly to each power supply device and to a power source. If the error message persists, power down the storage supply and replace the line power.

If the LED Readout Shows a Power Supply Fault (PF)

If the voltage switch is not set properly or power supply is not working properly and "PF" blinks alternately with HP, power down the storage supply and verify the line power voltage matches the voltage switch setting (for example, 115 volts in the U.S. and 230 volts in Europe). If the error message persists, power down the storage supply and replace the power supply.

If the SCSI Devices Fail to Spin Up

If the storage system powers up, but the SCSI devices fail to spin up (usually indicated by the failure of the LEDs on the devices to light), do the following:

- Remove and reinstall all hot-swap drive modules.

- Verify the power distribution cable is plugged into:

  ◊ Connector PD1 on the management board.

  ◊ Any devices in the SCSI device shelves.

  ◊ The upper and lower hot-swap cages.

- Verify the switches on the back of the hot-swap cages are set correctly. (Refer to manufactured configuration label to see default settings.)

33

If the Host Cannot Communicate With the Storage System

If the SCSI devices spin up, but the host cannot access the SCSI devices, do the following on the storage system:

- Verify all of the drive modules are inserted correctly and latched. (It may be necessary to remove and reinstall all hot-swap disk modules.)

- Make sure the system is configured properly, including the devices installed in the SCSI device shelves. (Refer to the cable management label in the storage system and this manual.)

- Verify the switches on the back of the hot-swap cages are set correctly. (Refer to Table 2-2 or the manufactured configuration label to see default settings.)

- Verify the switches and jumpers on the SCSI device trays are properly set. (Refer to the manuals that came with the devices.)

- Make sure that the active terminator is attached to the end of the SCSI device cable C1, and that terminators are not installed on any other devices. (The hot-swap cages are self-terminating.)

- Verify the SCSI device address for each device is unique.

- Make sure the SCSI devices are single-ended devices and that a differential SCSI device has not been added to the bus. (If a differential drive is used, the power indicator will not light.)

- Make sure that no SCSI device is set to SCSI address 7; address 7 is the SCSI ID used by the SCSI controller.

If the SCSI devices spin up, but the host cannot access the SCSI devices, do the following on the host system:

- Verify the host system operates correctly without the storage system attached.

- Verify the external SCSI cables are firmly connected to the storage system.

- Verify the external SCSI cable(s) used are those recommended by HP for the storage system.

- Make sure all SCSI adapter cards are properly installed.

34

- Verify the network operating system supports the configuration.

- Verify the same SCSI channel is not used for both internal and external SCSI devices.

- Verify with the ECU utility that your SCSI controllers are properly configured.

- Make sure the NOS and the appropriate drivers are properly installed for your SCSI and DAC controllers. (Refer to the related NOS, NetServer, HBA or DAC documentation for additional information.)

- Verify the server recognizes the SCSI devices. When the server is started, the SCSI BIOS displays a banner and copyright notice. The BIOS then checks for valid devices on the SCSI bus and reports which devices are found. If the SCSI devices are installed and configured correctly, the SCSI devices installed in the system are shown in the list.

If the Hot-Swap Disk Power LEDs are Flashing

If one hot-swap drive is flashing yellow, it is likely that the power to the drive is faulty. Verify the drive was inserted properly. Also verify the power distribution cable is correctly installed for that drive.

If all hot-swap drives in a cage are flashing a **red light**, turn off the storage system immediately! The drives have exceeded the operational temperature range and, if allowed to continue, can cause permanent damage. If all hot swap drives in a cage have **yellow flashing lights**, it is a warning that the temperature is approaching the maximum temperature allowed.

If all the disk modules in a hot-swap cage are flashing red or yellow, check the following items:

- Verify the chassis fan and power supply fan are operating.

- Verify all of the blank filler panels cover any empty shelves.

- Make sure the chassis door is closed. (The door must be closed for the cooling system to function properly.)

- Verify the air vents are not blocked. (The storage system cooling outlets should be at least six inches from any obstructions.)

- Verify the ambient temperature does not exceed the levels noted in the "Specifications" appendix.

- Run the hot-swap temperature self test by powering up the storage system. The hot-swap assembly should briefly flash red. If it fails to flash, the storage system may require service.

Error Messages

The front panel of the storage system includes two-digit, seven-segment LEDs. When operations are normal, the display will show "HP" or the unit identification number. The LEDs are powered by the internal power supply, and when the power supply is not working there will be no display.

If the chassis fan in the unit becomes stalled, the display will show "FF" (fan fault). (Do not continue to operate the storage system without the fan operating.)

If the storage system appears to power up, but the LED readout shows a "PF" (power fault), the voltage select switch may be in the wrong position. Immediately power down the storage system. Verify the voltage select switch is set to the proper voltage for the area (for example, 115 volts in the U.S. and 230 volts in Europe).

Troubleshooting Tools

Use the troubleshooting tools to help verify and test the configuration of the storage system. The following tools are available on your HP NetServer Navigator:

- HP NetServer Information Assistant: At the HP NetServer Navigator Main Menu, select "Access Information Assistant." Follow the menus to use the tools listed below:

    ◊ Troubleshooting Information.

    ◊ Part Information.

    ◊ List of Error Messages and Beep Error Messages.

- NetServer Utilities: At the HP NetServer Navigator Main Menu, select "Access NetServer Utilities" to use the following utilities:

    ◊ HP Diagnostic Assistant Utility: This utility is available if the host system is an HP LS, LH, LF or LC NetServer (some LF and LC NetServers do not support the HP NetServer Navigator). It is an easy-to-use hardware diagnostic for system verification and rapid troubleshooting. The Diagnostic Assistant is also located on a flexible

36

disk mounted inside your HP NetServer cabinet in a plastic pouch. If you do not have a copy of this utility or would like to obtain the latest copy, see the "Service and Support" chapter of this manual.

◊   Print or View Configuration: Allows you to print or view the current system configuration, including details of which cards are detected in the system and what resources are allocated to the cards.

◊   Create ECU Diskette: Creates a copy of the EISA Configuration Utility (ECU), CFG and OVL files on a diskette.

◊   Create BIOS Update Diskette: Creates a diskette you can use to update your system BIOS when the flash BIOS ROM has been corrupted and you are unable to boot the HP NetServer Navigator CD-ROM.

◊   Error Message Utility: Lets you view descriptions of errors that occur during the host Power-on Self Test (POST) and tells how to handle the errors.

◊   Event Log Report Utility: Describes server management events and lets you review a list of errors and other system events.

•   BIOS Update Utility: Allows you to update system BIOS so that you can flash to any BIOS version available on the HP NetServer Navigator CD-ROM.

•   HP JetSet Utility: If you are using an HP DAC card, the JetSet utility is used to both configure and troubleshoot SCSI systems connected through this interface.

•   HP NetServer Saver: If your system comes with a NetServer Save Test Disk, it is mounted in a pouch on the inside of your HP NetServer. Follow the instructions on the disk to run NetServer Saver.

5 Service and Support

Service

Like all Hewlett-Packard products, the storage system is designed for superior reliability. However, with enough use, any electronic equipment will require service.

If you are having problems with the storage system, begin by referring to the "Troubleshooting" chapter of this manual.

If your storage system requires service, there are a few things you can do to help your service representative identify and solve the problem quickly.

Record any information about the problem. This includes error messages displayed by the host system, the state of the disk status lights, information accessed using any applications, utilities or diagnostics, and details regarding the operation being performed when the problem occurred.

If a disk array controller is used to communicate with the host device, the "Tools" section of the JetSet utility can be used to run a self-test and read the error tables.

Contact the dealer service representative and explain the problem. Your dealer service representative should be able to provide the assistance you need to solve the problem.

System Design, Integration and Support

The hardware, utility software, and any operating system or environment software supplied by Hewlett-Packard provide an enhanced industry-standard base. A network operating system, utilities, and application software have been added to create your complete system.

5 Service and Support

The most effective source of system and software support is the organization that designed and configured your complete system. This can be a reseller, a consultant, or your company's information systems department.

The organization that worked with you to define your application and configuration—including hardware or software not supplied by HP—knows your unique operating procedures and can provide local, personal, and uniquely responsive support.

Your Authorized Reseller is backed by special HP resources; your company's information systems department is normally backed by a Response Center telephone support contract from HP.

If you have designed and configured the system yourself, you are filling the role of reseller, consultant, or information systems department yourself—and you must work with the different hardware and software manufacturers to obtain assistance. Refer to each manufacturer's documentation for information on obtaining telephone support, repair service, World Wide Web, Internet FTP, BBS, and/or automated fax support. If you are performing system integration, we recommend that you subscribe to CompuServe, as described later in this chapter.

For topics that require on-site visits or continuing contact, such as network design, performance tuning, and mainframe communication, paid consulting is available from value-added resellers, independent consultants, and HP's Professional Services Organization.

Information and Support When You Need It

Hewlett-Packard offers a complete set of support and information sources—each discussed in this chapter:

- HP NetServer Information Assistant

- HP Support Assistant CD-ROM

- CompuServe discussion forum and library

- World Wide Web and Internet FTP

- Bulletin Board System

- Automated Fax

- HP Repair and Telephone Support

40

HP provides a complete communication program to help you keep up to date
with your HP NetServer:

- HP NetServer Support News

- HP NetServer Navigator CD-ROM Subscription

- HP Support Assistant CD-ROM Subscription

In addition, this chapter also covers:

- Ordering HP cables, drive trays, and manuals

- Contacting HP's Regional Headquarters

- Joining CompuServe

HP NetServer Information Assistant

The HP NetServer Information Assistant is an information retrieval system for
quick access to information on HP NetServers and accessories, NOS installation
and tuning, and product service and support. It is included on the HP NetServer
Navigator CD-ROM shipped with your HP NetServer system.

The HP NetServer Information Assistant gives you access to technical and
product information while you are installing and configuring your HP NetServer
using the HP Configuration Assistant. It is also installable from the HP
NetServer Navigator CD-ROM for information retrieval from any PC running
Microsoft Windows 3.1, Windows for Workgroups 3.11, or Windows NT.

The HP NetServer Information Assistant uses advanced hypertext techniques to
make the information highly retrievable.

For subscription information on the HP NetServer Navigator CD-ROM, which
contains the HP NetServer Information Assistant, obtain ordering instructions
from the library of the HPSYS forum on CompuServe, via HP's World Wide Web
home page, or from HP's automated fax system. Each of these services is
described elsewhere in this chapter.

HP Support Assistant CD-ROM

The HP Support Assistant is a traditional CD-ROM that includes technical and product information documents on HP Vectra Personal Computers, HP networking Products, HP LaserJet printers, and accessory products—in addition to the HP NetServer information that underlies the HP NetServer Information Assistant.

For subscription information on the HP Support Assistant, obtain ordering instructions from the library of the HPSYS forum on CompuServe, via HP's World Wide Web home page, or from HP's automated fax system. Each of these services is described elsewhere in this chapter.

CompuServe Discussion Forum and Library

CompuServe, the worldwide electronic information utility, provides support, technical data, and updated software drivers for the products of some 900 hardware and software manufacturers, including Hewlett-Packard.

With a CompuServe account you post your question publicly in a managed, focused forum dedicated to one manufacturer or topic. People who regularly visit that forum read your question and reply within a day or two. If the topic is complex or controversial, an electronic discussion starts among several people—providing you with a group consensus.

HP products are covered on CompuServe in forums operated by independent consultants. The NetServer section of the HPSYS forum is visited regularly by HP employees and a group of knowledgeable and friendly NetServer users. Libraries are maintained of newsletters, technical articles, drivers, and other software modules. Enter "GO HPSYS" to reach the HP Systems Forum.

There are CompuServe forums covering most hardware and software manufacturers. In addition to the HPSYS forum, some other forums of interest to HP NetServer owners include those for: Banyan®, IBM® OS/2, Intel, HP Peripherals, Lotus®, Microsoft Windows NT®, Novell®, Oracle®, SCO, and Sybase®.

See "Joining CompuServe" at the end of this chapter to open a CompuServe account (with a free introductory membership and free usage credit).

World Wide Web and Internet FTP

HP has a home page on the Internet World Wide Web—http://www.hp.com. From there, you can jump to the NetServer home page.

You can also download NetServer files from HP via Internet FTP:

1. address: ftp://ftp.netserver.hp.com

2. logon: anonymous

3. password: <your e-mail address>

Bulletin Board System

The HP NetServer Support BBS is for downloading—messages asking support questions should be left in the HPSYS forum on CompuServe.

The HP PC Support BBS has eight lines. Datacomm specifications:

- 300/1200/2400/9600/14400 baud

- 103/212/V22bis/HST/V32/V32bis/V42 bis/MNP standards

- No parity, 8 data bits, 1 stop bit (N,8,1)

- ASCII, XMODEM, 1K-XMODEM, YMODEM, YMODEM-G, YMODEM-batch, ZMODEM, KERMIT, and Super Kermit file transfer protocols

Call (1 408) 553-3500 to connect to the HP NetServer Support BBS.

Automated Fax

HP's automated fax system contains full product data sheets, configuration and price guides, and a subset of the HP NetServer support information.

In the U.S. call (1 800) 333-1917 from a push button tone phone to request that an index of available documents be sent to your fax machine. Call again to select the documents that you want transmitted.

Outside the U.S. and Canada, call (1 208) 344-4809 from your fax machine. Use the handset and touch-tone keyboard on your fax machine to request an index of available documents. After you have made your choice, you are instructed to press START on your fax machine and hang up the handset. The telephone connection is maintained and used to send the fax to your machine. Call again from your fax machine to select the documents that you want transmitted to you. If you are using a fax modem instead of a fax machine, this process works only if your fax software provides a START command.

HP NetServer Support News

HP NetServer Support News is an electronic newsletter dedicated to bringing you late-breaking product and support information on HP NetServer products.

This newsletter is published once a month and it contains the latest news since the last edition of the HP Support Assistant CD-ROM (described earlier in this chapter). The information in the newsletters is added to the next edition of the HP Support Assistant CD-ROM.

HP NetServer Support News can be obtained in several ways:

- From the library of the HPSYS forum on CompuServe

- Via HP's World Wide Web home pages

- Via Internet FTP

- From HP's Bulletin Board System

Each of these electronic sources is described in this chapter.

The most convenient way to keep up to date is to visit the HPSYS forum on CompuServe regularly. Issues of *HP NetServer Support News* are posted in the forum as they come out—part of the ongoing seminar on HP NetServer systems.

Telephone Support

The HP-supplied hardware and software in HP servers are covered by no-charge telephone assistance during the warranty period. As described below, in some geographic areas this telephone support is provided by Hewlett-Packard; in other areas telephone support is provided by your reseller.

Telephone support is generally available from the manufacturers and resellers of the various non-HP hardware and software components.

44

Hewlett-Packard provides telephone assistance in installing, configuring, and diagnosing the server such that one local client PC is able to log into an HP-supported network operating system.

Assistance with additional functions, such as system design, operating system upgrades, or performance optimization—and assistance with other technical areas, such as cabling, non-HP hardware, or multiple operating system environments—is available from Hewlett-Packard, resellers, or consultants at additional charge.

For example, HP offers Network Phone-In Support Service, with a 7-day/24-hour option for network operating systems and multi-vendor hardware. Contact your local HP office for details.

For non-HP products, support numbers are included in the product documentation or are available from your reseller.

Obtaining HP Repair and Telephone Support

The "Warranty and Software License" chapter of this Guide gives details of the hardware warranty—including which HP products are covered, travel limitations, charges for non-HP-caused service calls, etc.

Please refer to the chapter "Troubleshooting" for the steps to follow before calling for service.

U.S. and Canada. For hardware service and telephone support, contact either:

* A participating Service Authorized HP Personal Computer Reseller.

* HP Customer Support Center (Colorado) (1 970) 635-1000

Europe. For hardware service and telephone support, contact either:

* A participating Service Authorized HP Personal Computer Reseller.

5 Service and Support

- HP Customer Support Center (Amsterdam)

English language	(+31 20) 581-3330
German language	(+31 20) 581-3333
French language	(+31 20) 581-3332
Italian language	(+31 20) 581-3338
Spanish language	(+31 20) 581-3339
Dutch language	(+31 20) 581-3331

Other countries. For hardware service, contact your local HP office. For telephone support, contact your authorized HP reseller.

Ordering HP Cables, Drive Trays and Manuals

Ordering System Documentation

The following manuals are available by special order:

- *HP NetServer System Guide*

- *HP NetServer NOS Guide: NetWare*

- *HP NetServer NOS Guide: Windows NT*

- *HP NetServer NOS Guide: SCO UNIX*

- *HP NetServer NOS Guide: MS-DOS/Windows*

- *HP NetServer NOS Guide: UnixWare*

- *HP NetServer NOS Guide: Banyan VINES*

- *HP NetServer NOS Guide: IBM OS/2*

Europe

- To order by phone, call (+31) 55 38 4279

- To order by fax, call (+31) 55 43 4455

- To order by mail:

  Fulfill:Plus
  P. O. Box 501
  7300 AM Apeldoorn
  The Netherlands

46

North America and Asia

- To order by phone, call (1 800) 438-5591

- To order by fax, call (1 317) 364-8888

- To order by mail:

    Fulfill:Plus
    P. O. Box 4100
    Crawfordsville, IN 47933
    USA

Ordering HP Cables, Drive Trays and Technical Publications

If you need more technical information, Hewlett-Packard publishes other references that you can order from HP:

- *HP NetServer Service Manual*
  HP Part Number D3330-90001

- *Dealer Configuration (CFG) File Creation Guide*
  HP Part Number D2230-90001

U.S.

- To identify a part or manual: BBS (1 800) 635-7278; automated fax (1 800) 333-1917; voice (1 916) 783-0804.

- To order with a credit card: (1 800) 227-8164.

- Emergency order with a credit card: (1 916) 785-8468 (7-day/24-hour; additional expedite charge).

Canada

- Call (1 800) 387-3154.

- Also available for part or manual identification: automated fax (1 800) 333-1917; voice (1 916) 783-0804.

Latin America

- Call your local HP office or (1 305) 267-4220 (Miami).

- Also available for part or manual identification: call (1 208) 344-4809 from your fax machine; voice (1 916) 783-0804.

Other countries

- Call your local HP office.

- Also available for part or manual identification: call (1 208) 344-4809 from your fax machine; voice (1 916) 783-0804.

Contacting HP Regional Headquarters

Should you need to contact Hewlett-Packard, check your local telephone directory for the HP Sales and Service Office near you. If you cannot locate an HP office, contact one of the Worldwide HP Marketing Headquarters listed here:

Asia/Pacific Headquarters
Hewlett-Packard Asia Pacific Ltd.
17-21/F Shell Tower, Times Sq.
1 Matheson Street, Causeway Bay
Hong Kong
Phone: (+852) 599-7777
Fax: (+852) 506-9261

Europe/Middle East/Africa
Hewlett-Packard S.A.
150, route du Nant-d'Avril
1217 Meyrin 2/Geneva
Switzerland
Phone: (+41 22) 780-8111
Fax: (+41 22) 780-8542

Latin America Headquarters
Hewlett-Packard Company
Waterford Building, 9th Floor
5200 Blue Lagoon
Miami, FL 33126, USA
Phone: (+1 305) 267-4220
Fax: (+1 305) 267-4247

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Mention "Representative 133" to receive a free introductory membership with a free usage credit.

CompuServe
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Columbus, Ohio 43220
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Direct: (1 614) 529-1349
Fax: (1 614)529-1610

CompuServe Europe
Postfach 11 69
82001 Unterbaching/Muenchen
Germany
Freephone: 0130-37-32
Direct: (+49 89) 66-535-111
Fax: (+49 89) 66-535-242

CompuServe also has offices and agents in the following countries:

- Argentina—CompuServe S.A., Buenos Aires

- Australia/NZ—CompuServe Pacific, Fujitsu Australia, Chatswood NSW

- Chile—ChilePac, Santiago

- France—CompuServe SARL, Rueil

- Hong Kong—CompuServe Hong Kong, Motorola Air Communications

- Hungary—CompuServe Hungary, Middle Europe Network, Budapest

- Israel—CompuServe Israel, Trendline Info. Comm., Tel Aviv

- Japan—NIFTY Corporation, Tokyo

- Mexico—CompuServe Mexico, Infoacces S.A. de C.V., Mexico City

- South Africa—CompuServe Africa, Lynnwood Ridge

- South Korea—ATEL Co., Seoul

- Taiwan—TTN-Serve, Taiwan Telecomm, Taipei

- United Kingdom—CompuServe Ltd., Bristol

- Venezuela—CompuServe C.A. Venezuela, Caracas

From elsewhere, call CompuServe in the U.S. at (1 614) 529-1349.
Fax: (1 614) 529-1610.

6 Warranty and Software License

This chapter contains the following warranties:

- NetServer Storage System/6 On-Site Limited Warranty

- HP Software Product License Agreement and Limited Warranty

NetServer Storage System/6 On-Site Limited Warranty

Three Year On-Site Limited Hardware Warranty

Hewlett-Packard (HP) warrants this hardware product against defects in materials and workmanship for a period of three years from receipt by the original end-user purchaser.

If HP receives notice of such defects during the warranty period, HP will either, at its option, repair or replace products that prove to be defective. Some newly manufactured products may contain remanufactured parts equivalent to new in performance. Service parts are new or equivalent to new.

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

Limitation of Warranty

The above warranty shall not apply to defects resulting from misuse (including incorrect input voltage); unauthorized modification; operation or storage outside the environmental specifications for the product; in-transit damage; improper maintenance; or defects resulting from use of non-HP software, accessories, media, supplies, consumables or such items not designed for use with the product.

6 Warranty and Software License

HP makes no other express warranty, whether written or oral, with respect to this product. Any implied warranty of merchantability or fitness is limited to the one year duration of this written warranty. Some states or provinces do not allow limitations on how long an implied warranty lasts, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights that vary from state to state, or province to province.

Limitation of Liability and Remedies

The remedies provided above are the customer's sole and exclusive remedies. In no event shall HP be liable for any direct, indirect, special, incidental, or consequential damages, whether based on warranty, contract, tort, or any other legal theory.

The foregoing limitation of liability shall not apply in the event that any HP product sold hereunder is determined by a court of competent jurisdiction to be defective and to have directly caused bodily injury, death, or property damage; provided, that in no event shall HP's liability for property damage exceed the greater of $50,000 or the purchase price of the specific product that caused such damage.

Some states or provinces do not allow the exclusion or limitation of incidental or consequential damages—including lost profit—so the above limitation or exclusion may not apply to you.

Obtaining Warranty Service

U.S. and Canada. For hardware service and telephone support, contact either:

- A participating Service Authorized HP Personal Computer Reseller.

- HP Customer Support Center (Colorado) (1 970) 635-1000

Europe. For hardware service and telephone support, contact either:

- A participating Service Authorized HP Personal Computer Reseller.

52

- HP Customer Support Center (Amsterdam):

English language	(+31 20) 581-3330
German language	(+31 20) 581-3333
French language	(+31 20) 581-3332
Italian language	(+31 20) 581-3338
Spanish language	(+31 20) 581-3339
Dutch language	(+33 20) 581-3331

Other countries. For hardware service, contact your local HP office. For telephone support, contact your authorized HP reseller.

Warranty start date. The customer must be prepared to supply proof of the purchase date.

Equipment location. The on-site warranty is limited to products that remain in the country of original end-user purchase from HP or an Authorized HP Personal Computer Reseller.

Outside the country of original purchase, on-site warranty service is available only by prior arrangement—either through purchase of the product at HP's International Price, with the destination specified at time of order, or through purchase of a service contract from the HP Subsidiary or Distributor in the destination country. Otherwise, the product must be returned by the customer to the country of original purchase for service.

Parts covered. The system processor unit and Hewlett-Packard accessories inside the system—such as mass storage devices sold as complete HP system accessory kits—are covered by this warranty.

Customer-replaceable parts—such as HP SCSI disk drives— 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 mass storage devices—such as hard drives and DAT drives—**sold as component mechanisms** are not covered by this on-site warranty. They are covered under a component replacement warranty provided by the distributor.

HP/Colorado Memory Systems internal tape drives are not covered by this on-site warranty—they are covered under a replacement warranty included with the product.

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

warranties for those products; HP software is covered by the HP Software Product Limited Warranty.

Non-HP products. On-site visits caused by non-Hewlett-Packard products—whether internal to the system processor unit (such as non-HP SIMMs) or external to the system processor unit (such as LAN cabling)—are subject to standard per-incident travel and labor charges.

Travel restrictions and response time. On-site service for this product is restricted or unavailable in certain locations. In HP Excluded Travel Areas—areas where geographical obstacles, undeveloped roads, or unsuitable public transportation prohibit routine travel—service is provided on a negotiated basis at extra charge.

Response time for HP on-site service in an HP Service Travel Area is normally next business day (excluding HP holidays) for HP Travel Zones 1, 2, and 3 (generally 100 miles or 160 km from the HP office). Response time is second business day for Zones 4 and 5 (200 miles, 320 km); third business day for Zone 6 (300 miles, 480 km); and negotiated beyond Zone 6. The HP Worldwide Customer Support Travel Guide is available from any HP Sales Office.

Travel restrictions and response time for reseller service are defined by the participating reseller.

Service contracts that provide after-hours or weekend coverage, faster response time, or service in an HP Excluded Travel Area are generally available from HP or an authorized reseller at additional charge.

Customer Responsibilities

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

The customer is responsible for the security of its proprietary and confidential information and for maintaining a procedure external to the products for reconstruction of lost or altered files, data, or programs.

For on-site service, the customer must provide the following: access to the product; adequate working space and facilities within a reasonable distance of the product; access to and use of all information and facilities determined necessary by HP to service the product; and operating supplies and consumables such as the customer would use during normal operation.

54

When service is being performed on-site, an adult representative of the customer must be present at all times. The customer must state if the product is being used in an environment that poses a potential health hazard to repair personnel. HP or the servicing reseller may require that the product be maintained by customer personnel under direct HP or reseller supervision.

Obtaining Return Warranty Service

If on-site warranty service is not applicable, the product must be returned to a service facility designated by HP. The customer must enclose a copy of a document proving date of purchase.

The customer shall prepay shipping charges (and shall pay all duty and taxes) for products returned to HP for warranty service. HP shall pay for return of products to the customer except for products returned to the customer from another country.

Software Product Limited Warranty

Ninety-Day Limited Software Warranty

HP warrants for a period of ninety (90) days from the date of the purchase that the software product will execute its programming instructions when all files are properly installed. HP does not warrant that the operation of the software will be uninterrupted or error free. In the event that this software product fails to execute its programming instructions during the warranty period, Customer's remedy shall be a refund or repair. Should HP be unable to replace the media within a reasonable amount of time, Customer's alternate remedy shall be a refund of the purchase price upon return of the product and all copies.

Removable Media (if supplied)

HP warrants the removable media, if supplied, upon which this product is recorded to be free from defects in materials and workmanship under normal use for a period of ninety (90) days from the date of purchase. In the event the media prove to be defective during the warranty period, Customer's remedy shall be to return the media to HP for replacement. Should HP be unable to replace the media within a reasonable amount of time, Customer's alternate remedy shall be a refund of the purchase price upon return of the product and destruction of all other non-removable media copies of the software product.

6 Warranty and Software License

Notice of Warranty Claims

Customer must notify HP in writing of any warranty claim not later than thirty (30) days after the expiration of the warranty period.

Limitation of Warranty

HP makes no other express warranty, whether written or oral, with respect to this product. Any implied warranty of merchantability or fitness for a particular purpose is limited to the 90-day duration of this written warranty. Some states or provinces do not allow limitations on how long an implied warranty lasts, so the above limitation or exclusion may not apply to you.

This warranty gives specific legal rights, and you may also have other rights that vary from state to state, or province to province.

Limitation of Liability and Remedies

The remedies provided above are the Customer's sole and exclusive remedies. In no event shall HP be liable for any direct, indirect, special, incidental, or consequential damages (including lost profit) whether based on warranty, contract, tort, or any other legal theory. Some states or provinces do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

Obtaining Warranty Service

You may obtain Warranty service from your Authorized HP Reseller or HP Sales and Service Office.

Consumer transactions in Australia and the United Kingdom: The disclaimers and limitations above shall not apply and shall not affect the statutory rights of a Consumer.

56

A Specifications

The specifications listed below can vary if you install a mass storage device in your storage system that has more stringent environmental limits. Make sure that the operating environment for your storage system is suitable for all the mass storage devices that you are using.

Environment

Temperature
Operating	5° to 35° C (41° to 95° F)
Non-operating	–40° to +70° C (–40° to +158° F)

Humidity (noncondensing)
Operating	20% to 80% relative humidity
Non-operating	90% relative humidity

Altitude
Operating	3,046 m (10,000 ft)
Non-operating	12,200 m (40,000 ft)

Weight and Dimensions

Height	425 mm (16.7 in)
Width	217 mm (8.5 in)
Depth	444 mm (17.5 in)
Weight	16.4 kg (36 lb)

Power Supply Specifications

Power supply input voltage	Switch-selectable input range: 100 to 127 VAC ~ 6.0 A at 50/60 Hz 220 to 240 VAC ~ 3.15 A at 50/60 Hz
Power supply output	194 W continuous 230 W peak

57

B   Regulatory Information

Notice for USA: FCC Statements

Class B Product Statement

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 system. 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.

Country Notices

Notice for Canada: DOC Requirements

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

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

Notice for Germany: Noise Declaration and Ergonomics

LpA < 60 dB (A)
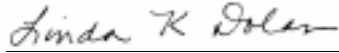
am Arbeitsplatz (operator position)
normaler Betrieb (normal position)
nach DIN 45635 T. 19 (per ISO 7779)

This product has not been evaluated for compliance with the ZH1/618 ergonomic requirements.

Notice for U.K.: General Approval

The NetServer/6 Storage System is approved under approval number NS/G/1234/J/100003 for indirect connection to Public Telecommunication Systems in the U.K.

Notice for EU: Declaration of Conformity

DECLARATION OF CONFORMITY
according to ISO/IEC Guide 22 and EN 45014

Manufacturer's Name: Hewlett-Packard Company   Hewlett-Packard Pte Ltd

Manufacturer's Address: 5301 Stevens Creek Blvd.   72 Bendemeer Road
Santa Clara, CA 95052   #01/01 to #07/01
USA   Singapore 1233

declares, that the product

Product Name: NetServer Storage System/6
Model Number(s):   HP NetServer Storage System/6
Product Options: All

conforms to the following Product Specifications:

Safety: IEC 950:1991 + A1, A2 / EN 60950:1992 + A1, A2
EMC: CISPR 22:1985 / EN 55022 (1988) - Class B [1]
EN 50082-1:1992 - Generic Immunity
   IEC 801-2:1991, 4 kV CD, 8 kV AD
   IEC 801-3:1984, 3V/m
   IEC 801-4:1988, 0.5 kV Signal Lines, 1 kV Power Lines

Supplementary Information:

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC.

1) The Product was tested in a typical configuration with Hewlett-Packard NetServers.

Santa Clara, August 30, 1995

Linda K. Dolan / Quality Manager

Singapore, August 30, 1995

Seah Beng Geok / Quality Manager

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: + 49-7031-143143)

B   Regulatory Information

Notice for Japan: VCCI Statement

この装置は、第二種情報処理装置（住宅地域又はその隣接した地域において使用されるべき情報処理装置）で住宅地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会（VCCI）基準に適合しております。

しかし、本装置をラジオ、テレビジョン受信機等に近接してご使用になると、受信障害の原因となることがあります。

取扱説明書に従って正しい取り扱いをして下さい。

(Translation)

This equipment is in the 2nd Class category (information technology equipment to be used in a residential area or an adjacent area thereto) and conforms to the standards set by the Voluntary Control Council For Interference by Information Technology Equipment aimed at preventing radio interference in such residential area.

When used near a radio or TV receiver, it may become the cause of radio interference.

Read the instructions for correct handling.

Notice for Korea: RFI Statement

사용자 안내문(A 급)

이 기기는 업무용으로 전자파장해검정을 받은 기기이오니, 판매자 또는 사용자는 이점을 주의하시기 바라며, 만약 잘못구입하였을 때에는 구입한 곳에서 비업무용으로 교환 하시기바랍니다.

(Translation)

User Guide (Class A)

Please note that this equipment has been approved for business purposes with regard to electromagnetic interference. If purchased in error for use in a residential area, you may wish to exchange the equipment where you purchased it.

62

Mexico: Hardware Warranty Statement

This warranty statement applies only to sales in Mexico.

Póliza de Garantía

Hewlett-Packard de México, S. A. de C. V. con domicilios en:

Guadalajara, Jalisco
Montemorelos No. 299
Fracc. Loma Bonita, 45060
Tel. 669 95 00

Monterrey, Nvo. León
Calz. Del Valle O. No. 409
4º Piso, Col. Del Valle
Garza García, 76030
Tel. 378 42 40

México, D.F.
Prolongación Reforma No. 470
Col. Lomas de Sta. Fe, 01210
Delegación Alvaro Obregón
Tel. 326 46 00

Garantiza este producto por el término de treinta y seis meses en todas sus partes y mano de obra contra cualquier defecto de fabricación y funcionamiento a partir de la fecha de entrega al consumidor final. En el caso de productos que requieran de enseñanza o adiestramiento en su manejo o en su instalación, a partir de la fecha en que hubiese quedado operando normalmente el producto después de su instalación en el domicilio que señale el consumidor.

CONDICIONES

1. Centros de Servicio, Refacciones y Partes:

Para hacer efectiva esta garantía, no podrán exigirse mayores requisitos que la presentación de esta póliza junta con el producto en el lugar donde fue adquirido o en cualquiera de los centros de servicio ubicados en los domicilios de la parte superior de esta hoja, mismos en los que se pueden adquirir refacciones y partes.

2. Cobertura:

La Empresa se compromete a reparar o cambiar el producto, así como las piezas y componentes defectuosos del mismo, sin ningún cargo para el consumidor. Los gastos de transportación que se deriven de su cumplimiento serán cubiertos por Hewlett-Packard de México, S. A. de C. V.

3. Tiempo de Reparación:

El tiempo de reparación en ningún caso será mayor a treinta días contados a partir de la recepción del producto en cualquiera de los sitios en donde pueda hacerse efectiva la garantía.

4. Limitaciones:

Esta garantía no es válida en los siguientes casos:

A. Cuando el producto ha sido utilizado en condiciones distintas a las normales.

B. Cuando el producto no ha sido operado de acuerdo con el instructivo de uso en idioma Español proporcionado.

C. Cuando el producto ha sido alterado o reparado por personas no autorizadas por Hewlett-Packard de México, S.A. de C. V.

Producto	Marca	Modelo
No. de Serie	Nombre del Distribuidor	
Dirección : (Calle, Número, Colonia o Poblado, Delegación o Municipio)		
C.P.	Ciudad.	Estado	Teléfono
Fecha de entrega o instalación			

Notas

El consumidor podrá solicitar que se haga efectiva la garantía ante la propia casa comercial donde adquirió el producto.

En caso de que la presente garantía se extraviara, el consumidor puede recurrir a su proveedor para que se le expida otra póliza de garantía, previa presentación de la nota de compra o factura respectiva.

64

Index

65

Index

66

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