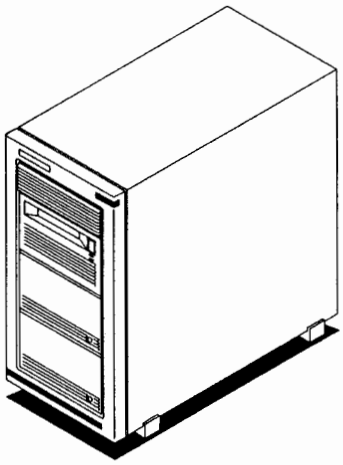
HP Series 6000
Mass Storage System
Hardware Installation Manual



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Hewlett-Packard Company
3000 Hanover Street
Palo Alto, CA 94304 U.S.A.

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Printing History

New editions incorporate all update material since the previous edition. Updating Supplements, which are issued between editions, contain additional and revised information to be incorporated into the manual by the user. The date on the title page changes only when a new edition is published.

Edition 1 July 1991

Safety Symbols and Conventions

The following conventions are used throughout this manual:

- **Bold** words in the text indicate a term defined in the Glossary included in this binder.
- *Italic* is used for emphasis or manual titles.

Note Notes contain important information set off from the text.

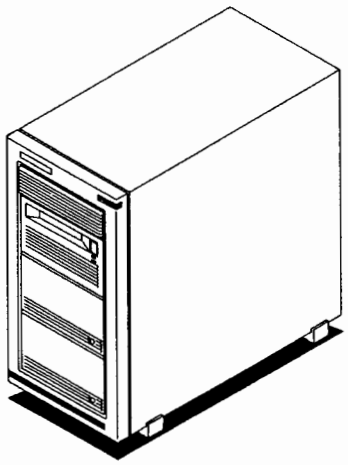
Caution Caution messages indicate procedures which, if not observed, could result in damage to equipment. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

Warning **Warning messages indicate procedures or practices which, if not observed, could result in personal injury. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.**

Contents

1

Installing Your HP Storage System



This manual contains complete instructions for installing the hardware components of your HP Series 6000 Mass Storage System. The installation is broken down into sections, each containing simple, step-by-step instructions. Carefully follow each step, and you should be able to install the hardware quickly and easily.

Your storage system is shipped completely assembled — all you need to do is install the storage system on your host system. Complete instructions for installing the storage system are included in this chapter.

Using the Quick Setup Guide

If you have experience installing computer hardware, you may want to use the Quick Setup Guide included with this manual. The condensed Quick Setup Guide format is quick and easy to use, but it does require some experience. If you use the Quick Setup Guide and run into trouble, do not worry — each installation step is explained in greater detail in this manual.

Adding a Mass Storage Device

This manual also describes adding a new mass storage device to your storage system. Read Chapter 2 for complete instructions on installing a device in the storage system cabinet.

SECTION A. The Preliminaries

You are probably anxious to begin installing and using your storage system, but take a few minutes to read this section first. These preliminary steps lay the foundation for a successful installation.

Assembling The Things You Need

You will need the following items to install the storage system:

- Power Cord - included with your storage system.
- SCSI Interface Cable - included with the host system.
- SCSI Terminator - included with the host system.

Your System Requirements

System requirements vary among operating systems. Refer to the Supported Hosts and Operating Systems section in the *Configuration Quick Reference Card* for a list of which system manual(s) to consult for system requirements.

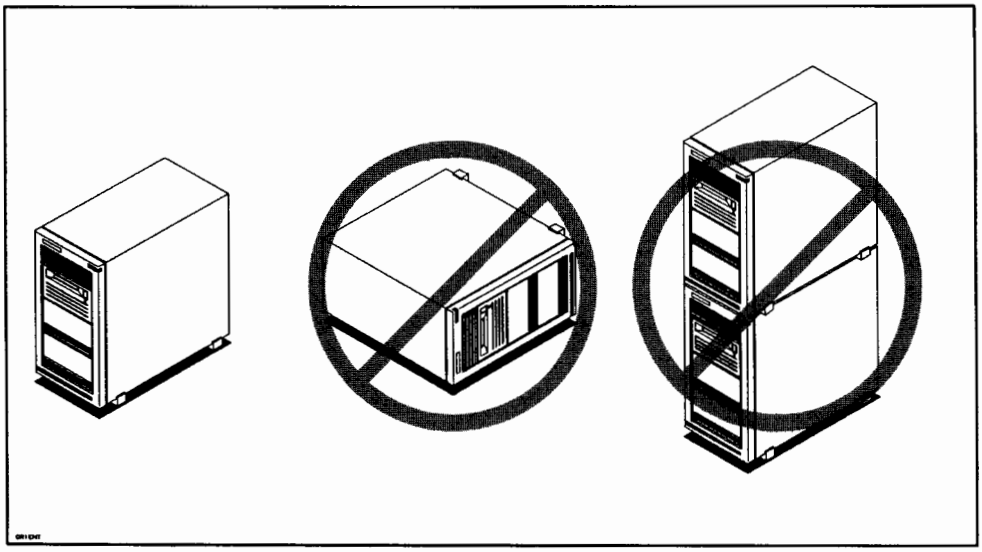
Selecting the Right Location

Detailed information regarding site requirements for your storage system is included in the *HP Series 6000 Mass Storage System User's Manual.* Usually, if the location meets the requirements for the rest of the system components, it should be suitable for your storage system.

The location you select should provide:

- A temperature between 10° C and 40° C (50° F and 104° F).
- Relative humidity between 20% and 80%.
- A stable environment, free from any sudden changes in temperature and humidity.
- Low levels of shock and vibration. This is particularly important for mass storage devices, which are more susceptible to shock and vibration than other types of electronic equipment.
- A constant line voltage.
- Adequate clearance around the storage system cabinet for cooling. Make sure there is at least 2 inches (50 mm) of space in front of and behind the cabinet.

- Make sure the storage system cabinet is upright. Do not lay it on its side, and do not stack one on top of another.



Handling Tips

- Handle the storage system carefully. Although designed to withstand the normal handling of everyday use, the mass storage devices can be damaged if not handled properly. Avoid dropping or bumping the cabinet.
- When fully loaded the storage system cabinet can weigh up to 27 kilograms (60 pounds). Use care when moving or lifting the cabinet, or get help if necessary.

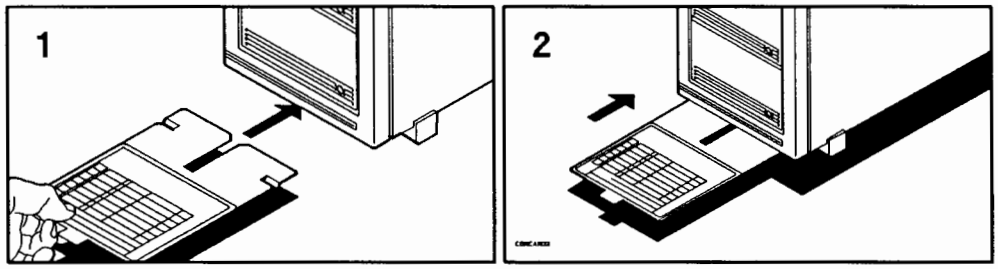
Recording Configuration Information

The hardware components of your storage system have various configuration parameters associated with them, such as SCSI addresses. You may need to know this information when you configure your storage system into the host operating system. We have simplified the task of recording the configuration information by providing a pull-out configuration card.

Locate the card and install it on the underside of the cabinet as shown in the figure below. A local language configuration label is included with all non-English product documentation. If necessary, attach the label to the card over the English text.

The card provides space for information about each mass storage device, and the system SCSI interface board, or host bus adapter (HBA). Fill in as much information as you can. Use a pencil so you can erase the information if it changes.

Knowing how your storage system is configured is important not only during installation, but also when you add other devices, or when trying to solve problems. We encourage you to take the time to make sure the information on the card is as complete and accurate as possible.

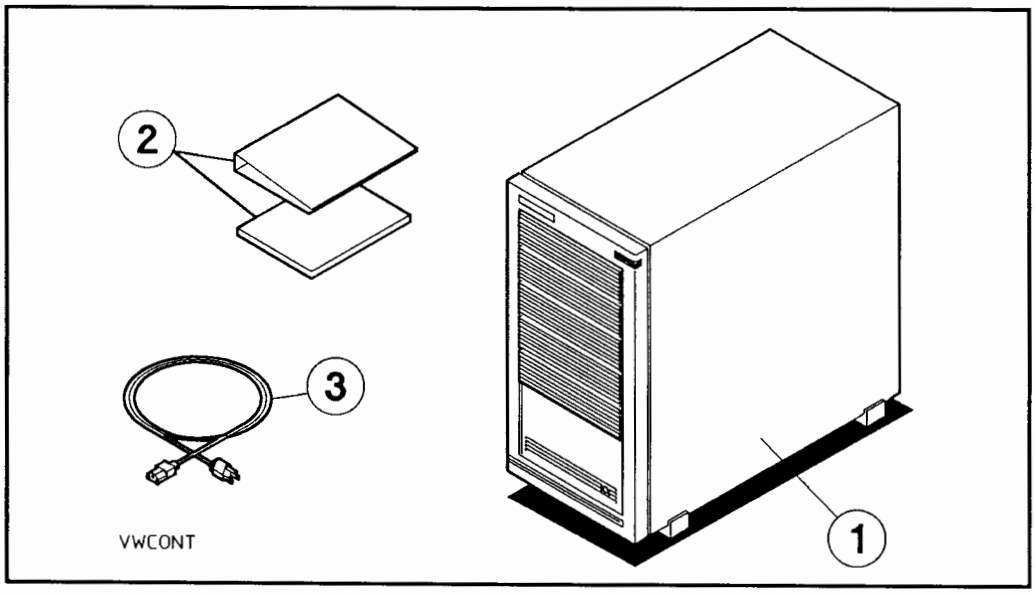


Unpacking and Checking All the Pieces

The instructions for unpacking the storage system are printed on the shipping carton. Follow the illustrated steps to unpack the storage system. When everything is unpacked, make sure you have all the items shown. Check each item for any damage. If anything is missing or damaged, contact your dealer immediately.

Keep all of the packing material in case you need to repackage the storage system.

In addition to the items shown, some storage systems also include a SCSI interface cable that can be used to connect storage system cabinets together.



___1. Storage system.

___2. Documentation and binder

___3. Power cord

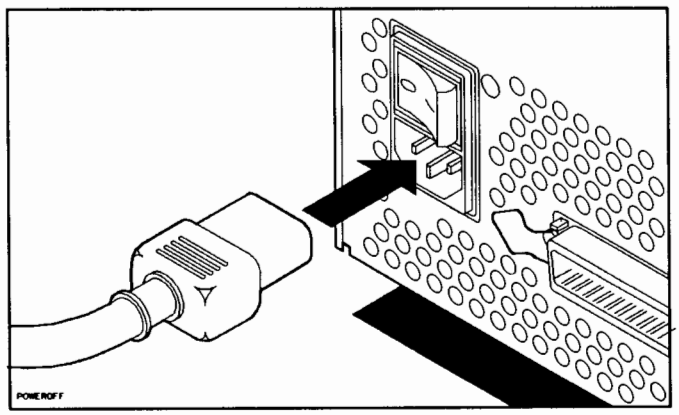
SECTION B. Connecting Power and Performing a Power-On Checkout

Before connecting the storage system to the host system, you should perform a power-on checkout to make sure all the devices are working properly.

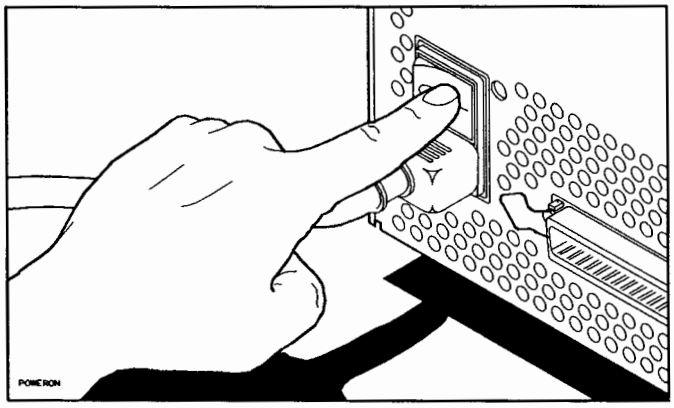
Warning

- **To avoid a fire hazard, the ac branch supply circuit used to power the storage system must be properly protected by either a fuse or a circuit breaker.**
- **If you do not use the power cord included with the storage system, use only a UL/CSA approved power cord, SVT type, rated for suitable voltage and current. This type of power cord has two conductors plus a ground. Failure to use the proper power cord could result in a shock or fire hazard.**

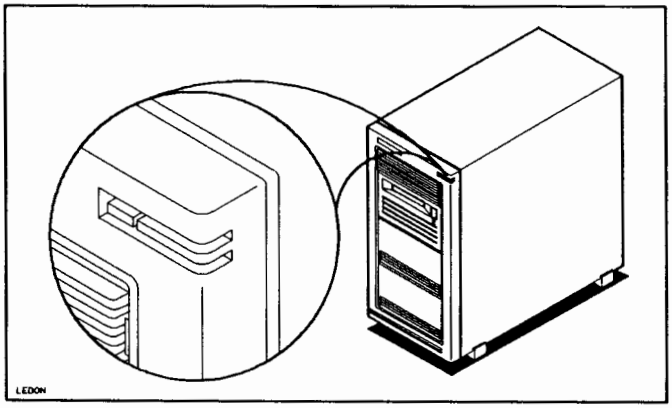
1. Make sure the power switch on the rear of the storage system cabinet is in the O (OFF) position, and connect the power cord. Plug the other end of the cord into an ac power outlet.



2. Set the power switch to the 1 (ON) position.



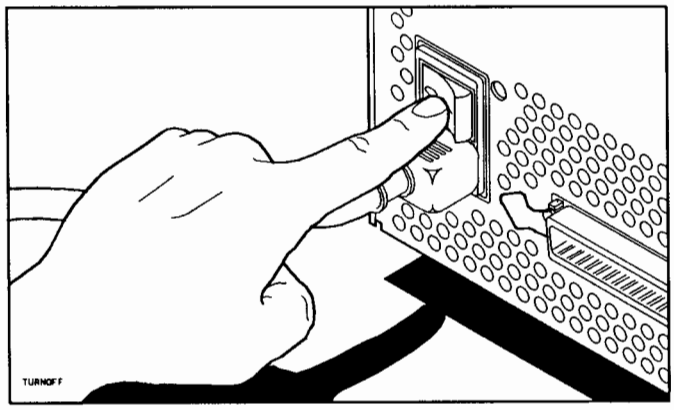
3. The power-on light will go on indicating that power is applied to the storage system cabinet.



4. Let all of the mass storage devices complete self-test. This takes less than 40 seconds. During that time the front panel status light (or lights) on each device will flash on and off in various patterns.

   When the self-tests have completed successfully, the status light on each device should be off. If you suspect a device has failed self-test, or have other questions about the status lights, refer to the device *User's Manual* for more information.

5. Switch off the storage system.



SECTION C. Connecting the Cabinet To The Host

The storage system cabinet connects to a SCSI interface board installed in the host system. Before you connect the cabinet to the system SCSI interface, here are a few things to remember:

Caution

There are two different types of SCSI interfaces used on the storage system products: **single-ended** and **differential**. If you are not sure which type your storage system uses, check the included *Configuration Quick Reference Card*. Make sure the interface board and the storage system use the same type of SCSI interface. Connecting a single-ended storage system to a differential interface board (or vice versa) may damage both the board and the mass storage devices.

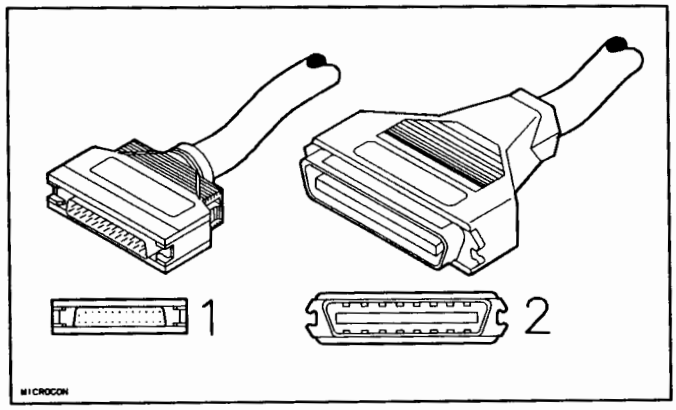
SCSI Addresses

- Each operating system has specific requirements regarding the number of devices that can be connected to the SCSI interface, and the SCSI address assigned to each device. The factory default SCSI addresses assigned to the devices should be satisfactory for most systems. To check system requirements, refer to manual(s) listed in the Supported Hosts and Operating Systems section of the *Configuration Quick Reference Card*.
- Make sure the SCSI addresses assigned to the devices do not conflict with addresses used by any other devices connected to the interface. Check the *Configuration Quick Reference Card* for the factory default addresses assigned to the devices. The device addresses should also be recorded on the pull-out configuration card. If you need to change any of the addresses, refer to Chapter 2.

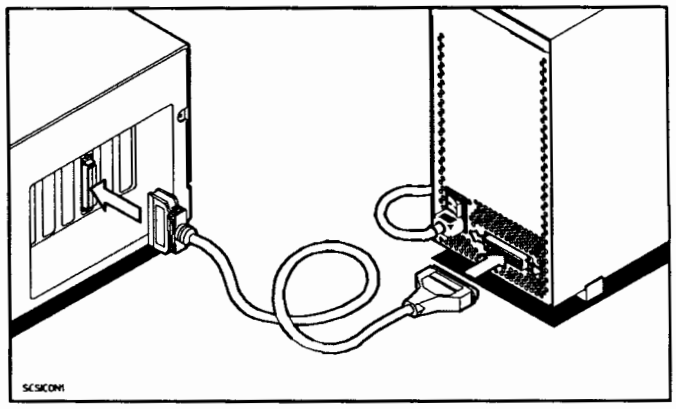
SCSI Cabling

- Storage system cabinets can be connected together, allowing you to increase the number of mass storage devices connected to the SCSI interface. However, the *total* number of mass storage devices in the cabinets must not exceed seven.
- A SCSI terminator must be installed on a storage system cabinet connected to the SCSI interface. Use the terminator included with your host system.

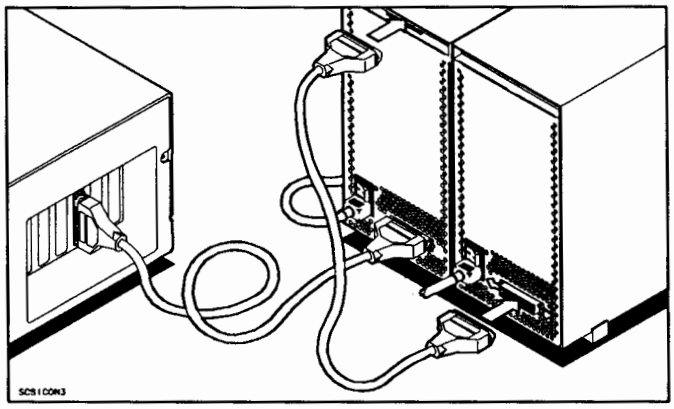
- Make sure the total length of SCSI cabling does not exceed 6 meters (19.7 feet) for single-ended systems, or 25 meters (82 feet) for differential systems. When selecting external SCSI cables, you must take into account the internal cabling in the storage system cabinet. Each cabinet includes 1.3 meters (4.3 feet) of internal cabling. To ensure optimum performance, keep the external SCSI cabling as short as possible.
- A SCSI interface cable is included with your host system. The SCSI interface cable used to connect the storage system cabinet to the host system has a different connector at each end. The smaller, high-density connector (1) connects to the host, and the larger, low-density connector (2) connects to the storage system cabinet.



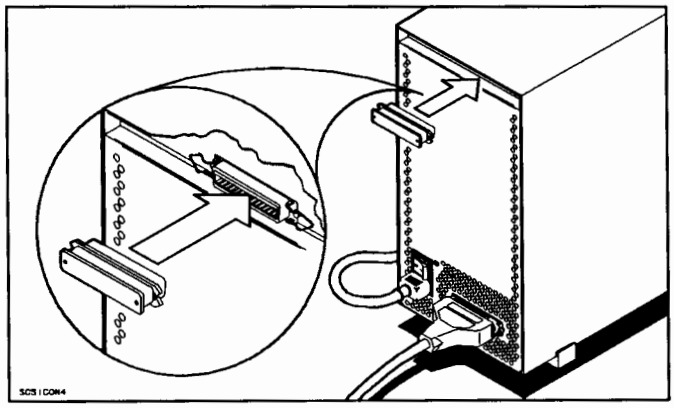
1. Make sure the host computer and the storage system are switched off.
2. Connect the small cable connector to the host. Connect the large cable connector to the lower SCSI connector on the rear of the cabinet. Snap the retaining clips on the cabinet over the connector to hold it in place.



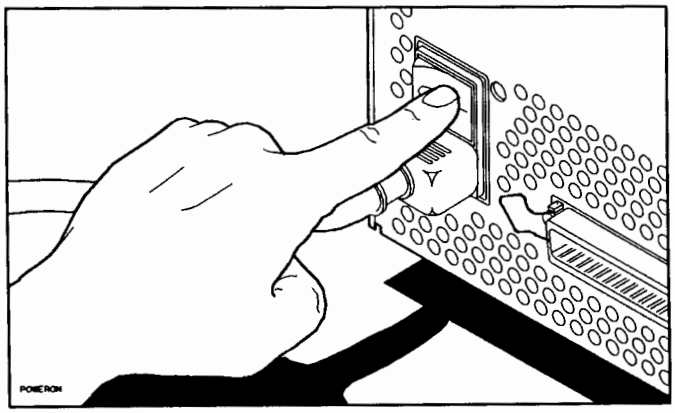
3. If you are installing additional cabinets, connect them together with a SCSI interface cable having large, low-density connectors at each end.



4. Install a SCSI terminator in the unused SCSI connector on the cabinet. Snap the retaining clips on the terminator to hold it in place. The terminator must be installed whether one or more cabinets are connected to the SCSI interface.



5. Switch on power to the host computer.
6. Switch on power to the storage system.



Note

Individual devices in the mass storage system do not supply termination power to the SCSI bus. This may cause misleading self-test results for hard disk drives when your host computer is connected but not powered on. If self-test appears to fail, an accurate self-test can be verified by one of two methods:

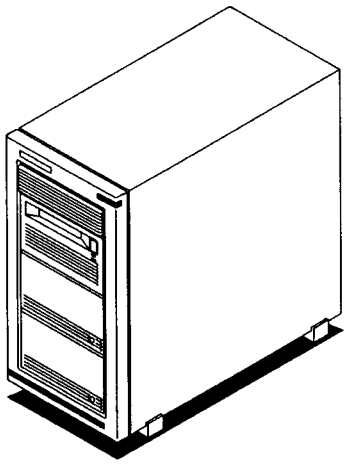
1. Disconnect all external SCSI cables and terminators from the storage system, then switch on power, or
2. With cables and terminators connected, switch on the host system power before switching on power to the storage system.

SECTION D. Configuring the Storage System into Your Operating System

Once the storage system hardware is installed, it must be configured into your operating system. Refer to the Supported Hosts and Operating Systems section in the *Configuration Quick Reference Card* for a list of which system manual(s) to consult for configuration information.

2

Installing Mass Storage Devices



This chapter contains step-by-step instruction on how to install mass storage devices in the storage system cabinet. Although each storage system comes fully assembled, you may want to add a new device to your cabinet at some later time.

The modular design of your storage system makes it easy to install mass storage devices.

The steps in this chapter are general enough to cover the installation of any type of mass storage device. Any supplemental information is contained in the *Installation Details* included with each device.

Other Tasks

In addition to installing mass storage devices, you should also refer to this chapter when changing a device's SCSI address, or when removing a device from the cabinet.

The table on the following page lists the sections you must read to perform each task covered in this chapter.

Read these sections	To perform this task		
	Installing a mass storage device in the cabinet	Changing a device SCSI address	Removing a mass storage device
A. The Preliminaries	⇐		
B. Disassembling the Cabinet	⇐	⇐	
C. Installing a Mass Storage Device	⇐		
D. Setting the SCSI Address	⇐	⇐	
E. Reassembling the Cabinet	⇐	⇐	
F. Finishing Up	⇐		
G. Removing a Mass Storage Device			⇐

SECTION A. The Preliminaries

Before you begin installing a mass storage device, take a few minutes to read these preliminary steps.

Assembling The Things You Need

- A flat-blade screwdriver or T15 TORX to disassemble the storage system cabinet and install the mass storage device.
- An anti-static work station, if available.
- A pencil to record configuration information about the device.
- The *Installation Details* included with each mass storage device you are installing. This information contains important device-specific installation tips and information.

Installation Tips

- Install hard disk drives on the lower cabinet shelves. This avoids making the cabinet top-heavy. A top-heavy cabinet is unstable and more likely to tip over if it is bumped or moved.
- For convenient access, install devices that use removable media on the upper shelves.
- A serial number label is included with each device. Attach the label to the rear of the cabinet. Do not put the label over the airflow vent holes on the cabinet rear panel.

Handling Tips

- Handle mass storage devices carefully. Although designed to withstand the normal handling of everyday use, they can be damaged if not handled properly. Avoid dropping or bumping a device — a sudden mechanical shock can damage it.
- When handling mass storage devices, keep them upright. Hard disk drives particularly are more susceptible to mechanical shock when they are upside down.
- Make sure you take the necessary precautions against static electricity. To help you avoid problems with static electricity, we have included a brochure

on the subject. Read it and follow the instructions before beginning the installation.

Using Other SCSI Devices

The storage system is designed for Hewlett-Packard accessory mass storage devices. To ensure the storage system meets its published performance, regulatory, and safety specifications, we recommend that you use only the mass storage devices listed in the *Configuration Quick Reference Card* included with your storage system.

However, it is possible to install other SCSI devices in the storage system cabinet. Any other SCSI device, whether from Hewlett-Packard or another manufacturer, is considered a foreign device. Before installing a foreign device in the storage system cabinet, consider the following:

Caution

- When using a foreign device, it becomes the responsibility of the individual assembling the system to ensure the altered cabinet configuration meets relevant safety and electromagnetic emission requirements. If you purchased an integrated system, this responsibility is with the dealer from whom you purchased it.
- Hewlett-Packard cannot be liable for damages resulting from the inclusion of foreign devices in the storage system cabinet. If damage occurs, it may not be covered by your warranty.
- A foreign device may raise the internal operating temperature of the cabinet, thus affecting the performance and reliability of other devices in the cabinet. We recommend you monitor the internal cabinet temperature to make sure the maximum operating limits are not exceeded.
- Foreign devices may exceed the power handling capability of the cabinet. The capacity of the cabinet power supply and the internal cabling must be considered when using foreign devices.
- Any foreign device must use the same type SCSI interface (single-ended or differential) used by the other devices in the cabinet. Mixing interface types may damage the other devices on the SCSI bus.

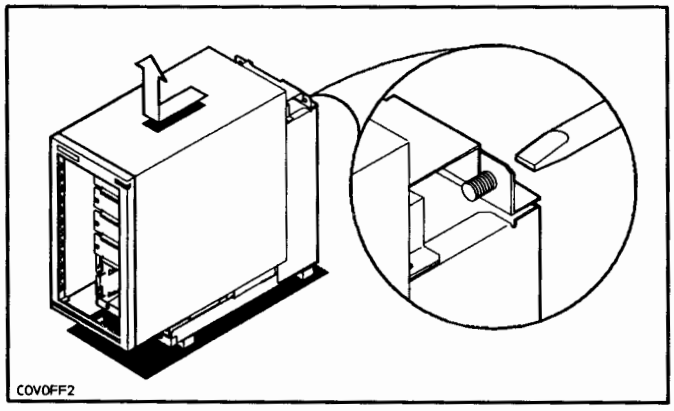
SECTION B. Disassembling the Storage System Cabinet

Warning

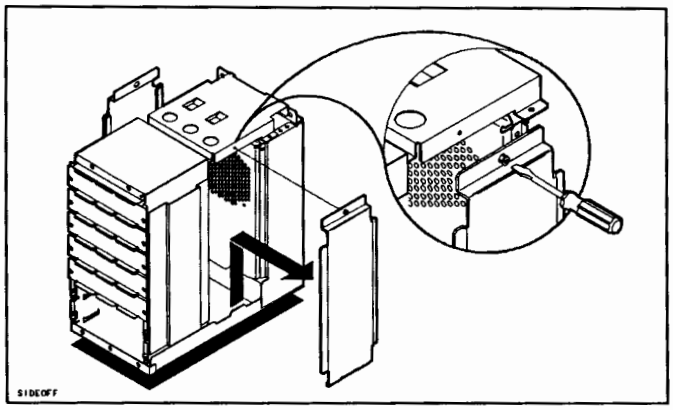
- **Make sure the LINE~ switch on the storage system cabinet is in the 0 (OFF) position and the power cord is disconnected before disassembling the cabinet.**
- **To avoid electrical shock, only disassemble as much of the cabinet as described in the following steps. Do not remove any additional parts or panels from the cabinet.**

1. If you are adding a new mass storage device to your storage system:
   a. Switch off the power to the storage system cabinet.
   b. Disconnect the SCSI interface cable from the rear of the cabinet.
   c. Disconnect the power cord from the rear of the cabinet.

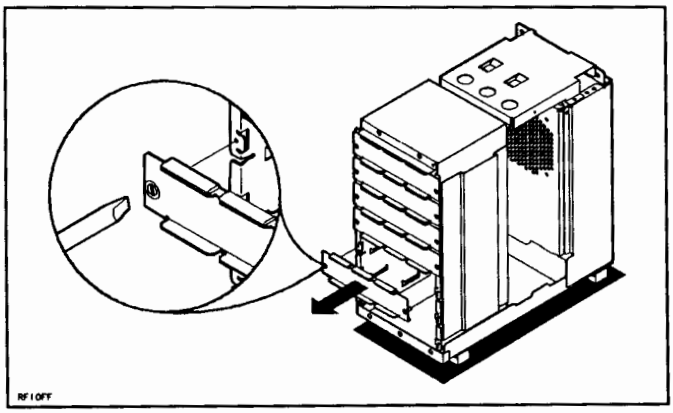
2. Remove the cabinet cover by loosening the two rear captive mounting screws, sliding the cover forward slightly, then lifting it off the cabinet.



3. Remove both side panels by loosening the captive screw holding each panel in place.

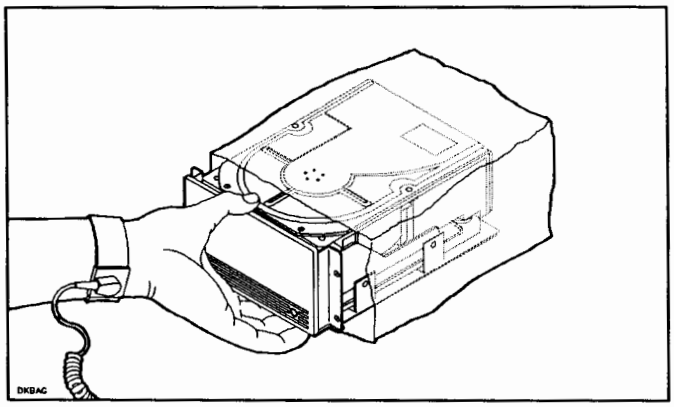


4. Remove the necessary shield panels by loosening the two captive screws holding each panel. Check the appropriate *Installation Details* to determine how many panels must be removed for the device being installed.

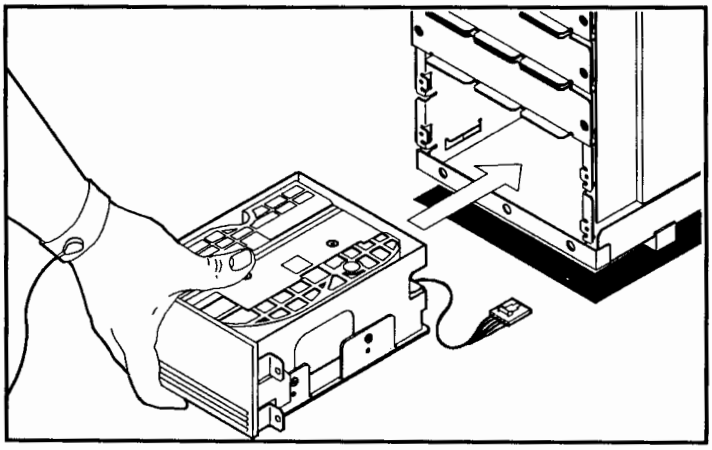


SECTION C. Installing A Mass Storage Device

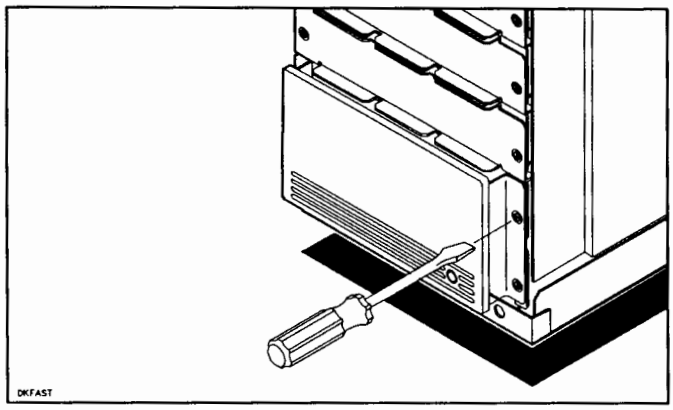
1. Remove the device from its anti-static bag.



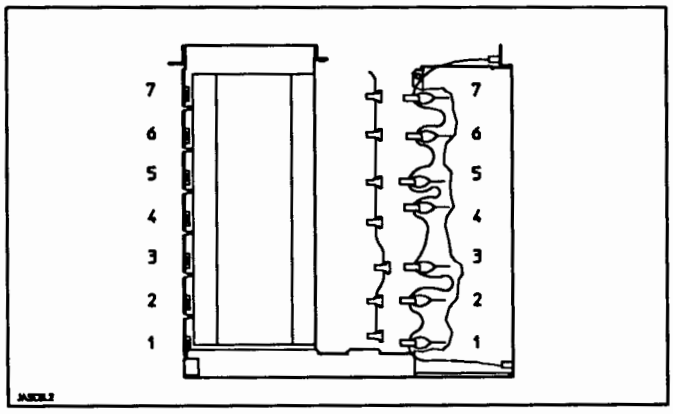
2. Slide the device into the cabinet on one of the mounting shelves. Be careful not to catch the device address cable on the cabinet.



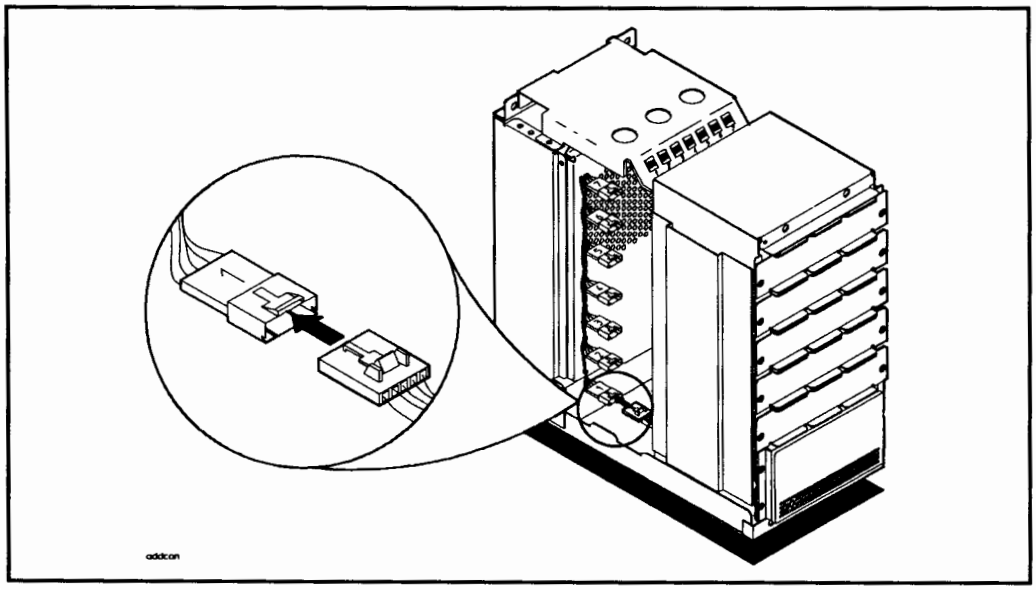
3. Align the mounting screws with the holes in the cabinet, and tighten the screws securely. Some devices have two mounting screws; some have four.



4. The internal power cable and the internal SCSI cable each have seven connectors — one for each of the cabinet shelf positions. Check the appropriate *Installation Details* to determine which cable connectors to use.



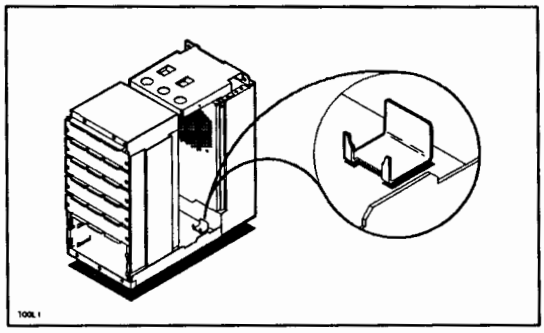
5. Connect the internal power cable and SCSI cable to the device. Again, refer to the appropriate *Installation Details* for specific information.
6. Connect the device address cable to the cabinet address cable. Use the connector on the cabinet address cable that corresponds to the shelf the device is installed on. There are seven address connectors — one for each cabinet shelf.



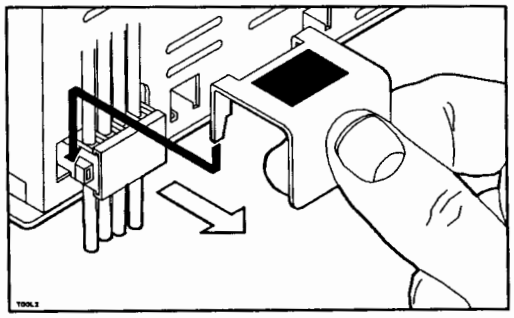
Disconnecting the Power Cable

The dc power supply connector fits snugly and can be difficult to remove without pulling on the wiring, which can damage the cable. If you need to disconnect the power supply cable, we have included a tool which makes it easy to do.

The tool is attached to the cabinet chassis with a piece of hook-and-loop fastener.



To remove a power cable connector, slide the tool over the connector so it grips the connector firmly. Then pull on the tool to remove the connector.



SECTION D. Setting the SCSI Address

After installing the device, you must set its SCSI address. Each device connected to the SCSI interface must have a unique address.

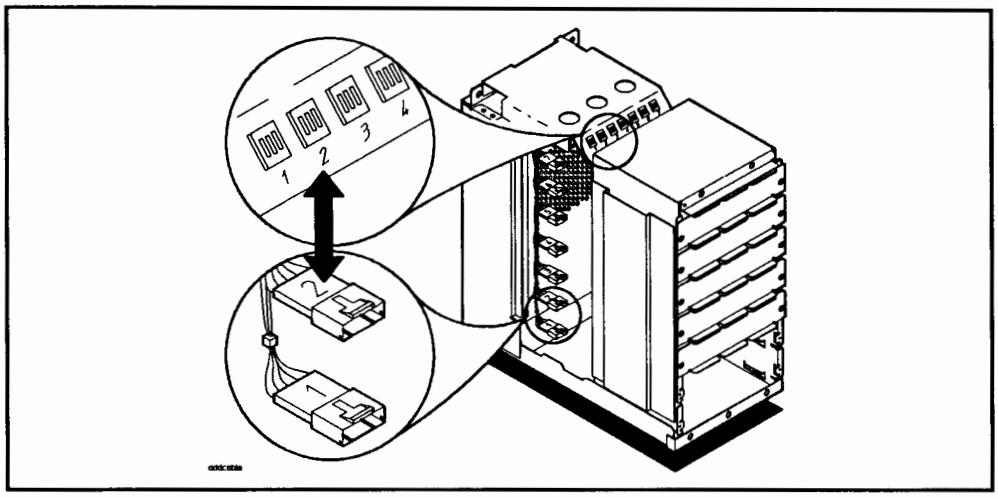
Before setting the device address, you should take into account any operating system requirements regarding SCSI addresses. Refer to the Supported Hosts and Operating Systems section in the *Configuration Quick Reference Card* for a list of which system manual(s) to consult for this information.

Note

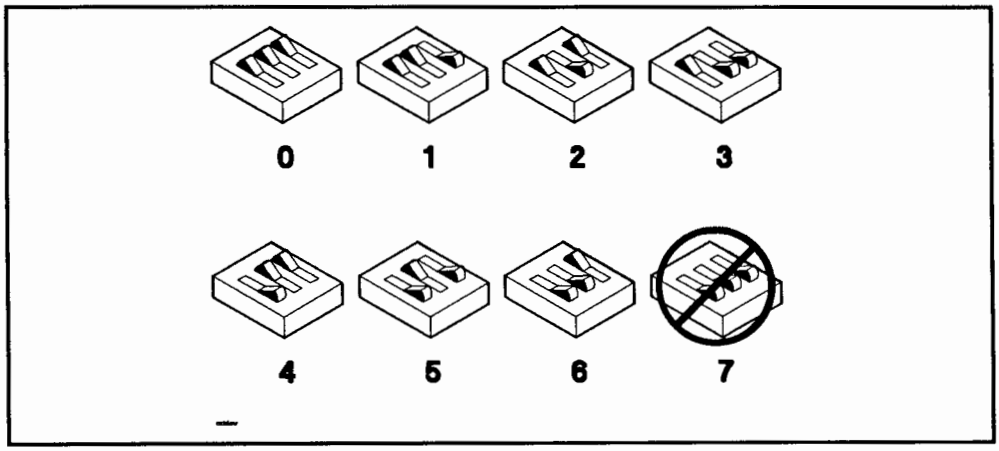
Once you have set the device SCSI address, write it on the storage system pull-out configuration card. Use a space on the card that corresponds to one of the shelves occupied by the device.

To set the SCSI address:

1. Determine what addresses are being used by the other devices connected to the system SCSI interface. The pull-out configuration card on your storage system cabinet should contain this information for each device installed in the cabinet. Also remember that address 7 is used by the system SCSI interface board.
2. Select an available address for the device.
3. On top of the cabinet are seven SCSI address switches, and on the side of the cabinet is an address cable with seven connectors. Each connector is numbered and corresponds to the address switch with the matching number. For example, as shown in the following figure connector 2 corresponds to address switch 2.



4. Identify the cabinet address cable connector the device is connected to, then set the corresponding address switch to the address you have selected. The address is set by positioning the switch segments as shown below.



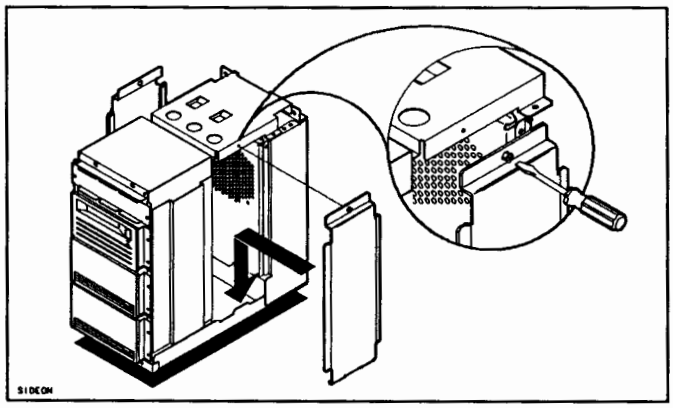
SCSI Address Switch Settings

SECTION E. Reassembling the Cabinet

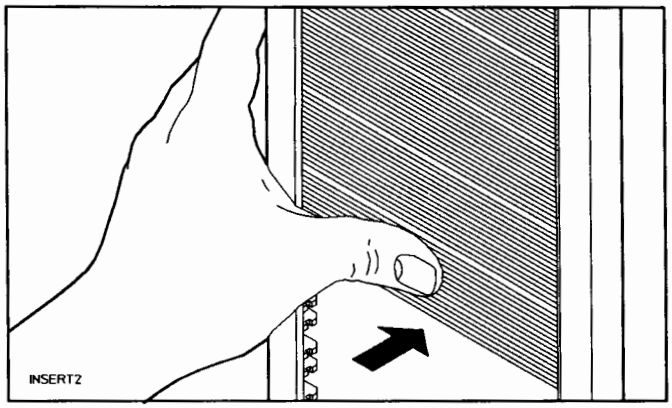
Before reassembling the cabinet, make sure:

- You have installed all the mass storage devices.
- Each device is mounted securely in the cabinet.
- All cables are properly connected to each device.
- Each device is set to a different SCSI address.
- You have recorded the SCSI address for each device on the pull-out configuration card.

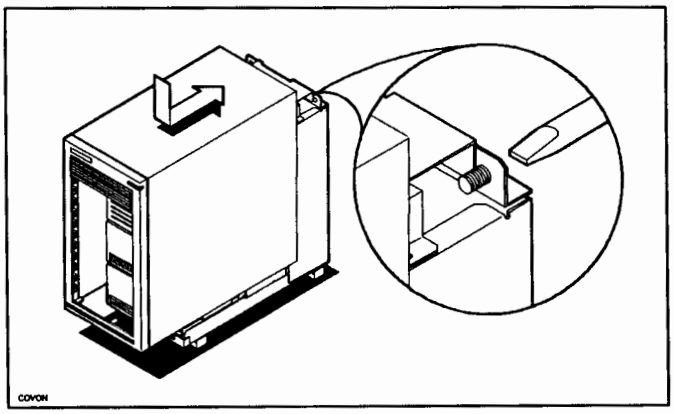
1. Install the two side panels and tighten each captive mounting screw securely.



2. Remove a filler panel for each new shelf position being used. Press on the center of the panel to remove it.



3. Place the cover on the cabinet, slide it backward into position, and tighten the two rear mounting screws securely.



SECTION F. Finishing Up

When you have finished installing the mass storage device(s), perform the following steps to return your storage system to use:

1. Connect the power cord to the storage system cabinet.
2. Switch on power to the cabinet and make sure the new device is working properly.
3. Switch off the storage system power.
4. Connect the SCSI interface cable to the storage system cabinet.
5. Switch on the storage system.
6. Configure the new device into your operating system.

SECTION G. Removing a Mass Storage Device

At some time you may find it necessary to remove a device from the storage system cabinet. You may have to move it to another location in the cabinet, or remove it for servicing.

Removing the device is as easy as installing it — you simply reverse the process. The steps involved in removing the device are summarized below.

Warning

- **Make sure the LINE˜ switch on the storage system cabinet is in the 0 (OFF) position and the power cord is disconnected before disassembling the cabinet.**
- **To avoid electrical shock, only disassemble as much of the cabinet as described in the following steps. Do not remove any additional parts or panels from the cabinet.**

Caution

If the device has removable media, make sure you remove the media before switching off power. If you leave the media installed, you may damage the device.

1. Perform the preliminaries, including taking the necessary precautions against static electricity.
2. Disassemble the storage system cabinet.
3. Disconnect the SCSI cable from the device.
4. Disconnect the power cable from the device. Use the removal tool if necessary.
5. Disconnect the device address cable from the cabinet address connector.
6. Loosen the captive mounting screws and slide the device out the front of the cabinet. To avoid damaging the front panel on the device, slowly push the device out of the cabinet from the rear rather than pulling it out from the front. Also be careful not to catch the device address cable on the cabinet when removing the device.

When you are ready to reinstall the device and reassemble the cabinet, follow the installation instructions in this chapter.

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Hard Disk Drive
User's Manual

HEWLETT
PACKARD

HP Part No. 5960-0844
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Hewlett-Packard Company
3000 Hanover Street
Palo Alto, CA 94304 U.S.A.

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Edition 1 June 1991

Typographical Conventions

The following safety symbols and typographical conventions are used in this manual:

- (LINE~) indicates the power button on a storage system.
- *Italic* is used for emphasis or titles of manuals.

Note 

Notes contain important information.

Caution 

Caution messages appear before procedures which, if not observed, could result in damage to equipment or loss of your data.

About This Manual

This manual provides information on operating and maintaining hard disk drives included in Hewlett-Packard storage systems.

How It's Organized

- Chapter 1, Operating Your Hard Disk Drive, provides information on the basic tasks of operating the drive.
- Chapter 2, More About Your Hard Disk Drive, provides additional useful information about the drive. Once the drive is operating, you should read this chapter to gain a better understanding of the product.
- Appendix A, Hard Disk Drive Technical Information, includes the technical specifications of and environmental requirements for the drive.

How To Use It

1. Using the information in Chapter 1, begin operating the drive.
2. Once the drive is operating, read through Chapter 2 to learn more about the drive.

Contents

Figures

Tables

1

Operating Your Hard Disk Drive

This chapter describes how to operate your hard disk drive within your HP storage system. Normal operation of the hard disk drive includes switching on drive power and ensuring the drive passes self-test.

Identifying Front Panel Parts

There are two hard disk drive models: the 5.25-inch model and the 3.5-inch model. Your disk drive front panel may look like Figure 1-1 or Figure 1-2. The drive status light is the only indicator on the front panel, and is described on page 1-3.

Note 

Some storage systems have a front panel that covers the drive front panel. On these storage systems, the hard disk drive status lights are located on the lower right-hand corner of the front panel. Refer to the storage system user's manual for the location of the drive status light on these storage systems.

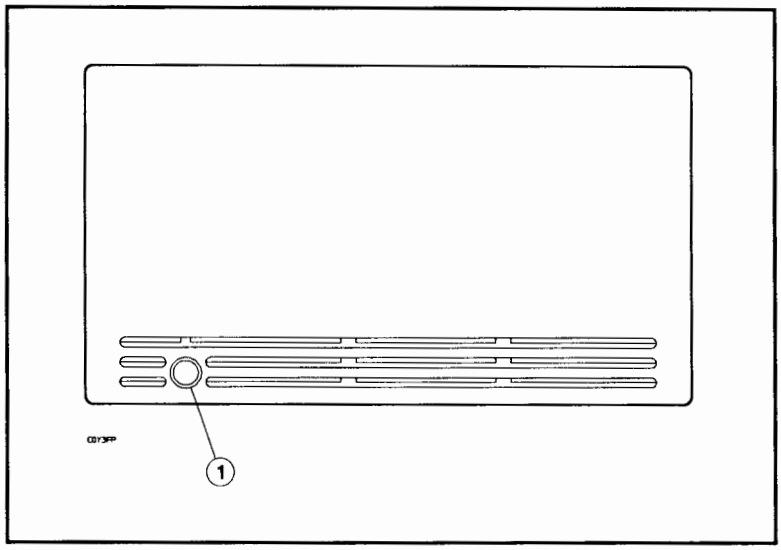

Figure 1-1. Hard Disk Drive (5.25-inch Model)

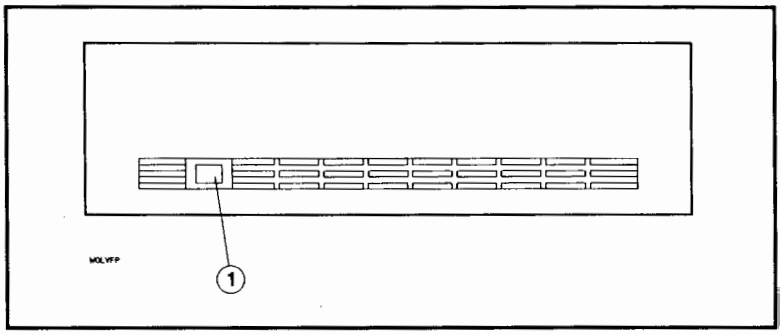

Figure 1-2. Hard Disk Drive (3.5-inch Model)

1—Drive Status Light — This light indicates the results of the drive power-on self-test, and host activity. See Table 1-1 for information about drive status light indications during normal operation and fault conditions.

Table 1-1. Drive Status Light Indications

Status	Explanation
OFF	Drive power is off, self-test passed, or no activity with the host.
ON	Drive is spinning up or performing a self-test. If the light stays on more than 20 seconds after the drive begins spinning up for a 5.25-inch model (15 seconds for a 3.5-inch model), a drive fault occurred. Call your service center.
FLASHING (1 Hz)	If the light continues flashing at a rate of 1 Hz more than 20 seconds after the drive begins spinning up for a 5.25-inch model (15 seconds for a 3.5-inch model), the self-test failed. Call your service center.
FLASHING (intermittent)	Activity with the host.

Switching On Power

Caution

If the drive has been exposed to temperature extremes, allow two hours for it to stabilize at room temperature and humidity before operating it. Operating a drive that is very cold or very hot may damage it (refer to "Environmental Requirements" in Appendix A).

Note

The drive does not supply termination power to the SCSI bus. This may cause erroneous self-test results when the storage system is connected to the host system. To prevent an erroneous self-test failure, you should perform one of the following procedures:

- Disconnect the SCSI cable and SCSI terminator from the storage system, then switch on storage system power,

  or

- With the SCSI cable and SCSI terminator connected to the storage system, switch on host system power, then switch on storage system power.

1. Switch on drive power by setting the LINE~ switch on the storage system cabinet to the 1 (ON) position.

2. Wait 20 seconds for the drive to complete the self-test.

Note

If the drive is in a storage system that contains other hard disk drives, the self-test may be delayed 20 seconds due to a sequential spin-up routine for hard disk drives.

3. Check the drive status light to ensure the self-test passed. The drive status light should be off.

Note

If the drive status light stays on more than 20 seconds after the drive begins spinning up, a drive fault occurred (see Table 1-1). If the drive status light continues flashing more than 20 seconds after the drive begins spinning up, the self-test failed (see Table 1-1). Call your service center.

Learning More About Your Drive

Now that you have learned how to operate your hard disk drive, read Chapter 2 for additional information about your drive.

2

More About Your Hard Disk Drive

This chapter includes the following information about your hard disk drive:

- A description of the drive.
- Information about troubleshooting.
- Information about service.

Drive Description

The hard disk drive is a random access mass storage device that contains 3.5-inch or 5.25-inch nonremovable, magnetic disk media. Data is stored on and retrieved from the media using a series of movable data heads. A servo head is used to read position information from a dedicated servo surface. This position information allows the drive to locate data on the data surfaces. (Refer to Appendix A for information about the formatted capacity of the hard disk drive.)

The drive includes a Small Computer System Interface (SCSI) controller with built-in self-test diagnostic routines. Each time the drive is switched on, the self-test diagnostics ensure the drive is working properly.

Maintenance

Due to the design of your drive, regular maintenance is not required. However, the performance and reliability of your drive depend on the operating environment. Ensure your drive operates within the environmental limits in Appendix A.

Troubleshooting

Your drive does not supply termination power to the SCSI bus. This may cause misleading self-test results on some systems. If the hard disk drive self-test appears to fail, the self-test can be verified by one of the following methods:

- Disconnect all external data cables and terminators from the storage system, then switch on power, or
- With cables and terminators connected, switch on host system power *before* switching on power to the storage system.

If the hard disk drive still fails self-test, call your service center.

If a problem occurs, check the drive status light (see Table 1-1). Your operating system may include an on-line troubleshooting utility to aid in the diagnosis and repair of the drive. There may also be an off-line utility available for troubleshooting the drive. Refer to the documentation included with your storage system for more information about troubleshooting utilities.

If the drive has a problem you cannot solve, call your service center. Refer to the next section to prepare for a service call.

Service

Caution

There are no user-serviceable parts inside the drive. Service should only be performed by someone with the proper training. If you attempt to fix the problem, you may void the warranty and damage the drive.

If the drive requires service, there are a few things you can do to help your service center identify the problem and solve it quickly:

1. Record any information about the problem. This includes any error messages displayed by your computer, information accessed using troubleshooting utilities, details about the operation that was being performed, and the software application being used when the problem occurred.
2. Locate the serial number of the drive on either the storage system cabinet pull-out configuration card, or on the rear of the drive.
3. Call your service center for assistance in solving the problem.

Warranty

If you have any questions about the warranty for your drive, contact your dealer or Hewlett-Packard sales representative.

Repacking the Drive

Before the drive is moved to a new site or sent to a repair facility, it must be repacked in the original type of shipping container and packing material. If the original container and packing material are not available, order a replacement container and packing material from your dealer or your service center.

Note

Hewlett-Packard reserves the right to reject a warranty claim for a product that was improperly repacked before shipment.

A

Hard Disk Drive Technical Information

This appendix contains the technical specifications of and environmental requirements for hard disk drives. The data capacity (in megabytes) and model (5.25-inch or 3.5-inch) of your drive are listed with each specification to help you find information for your drive.

Note

The environmental requirements for your storage system are a composite of the environmental requirements for the mass storage devices within your storage system. The environmental requirements for this drive may be more stringent than those for your storage system. Consequently, the environmental requirements for this drive may determine the environmental requirements for your storage system. Refer to your storage system user's manual for the environmental requirements for your storage system.

Technical Specifications

WEIGHT

Net:	
677/1355 MB, 5.25-inch:	4.1 kg (9.0 lbs)
422 MB, 3.5-inch:	2.1 kg (4.6 lbs)
Shipping:	
677/1355 MB, 5.25-inch:	5.2 kg (11.5 lbs)
422 MB, 3.5-inch:	2.6 kg (5.7 lbs)

FORMATTED CAPACITY

Data Surfaces:	
677 MB, 5.25-inch:	11
1355 MB, 5.25-inch:	19
422 MB, 3.5-inch:	9
Bytes/Sector:	
677/1355 MB, 5.25-inch:	512
422 MB, 3.5-inch:	512
Drive Capacity (Bytes):	
677 MB, 5.25-inch:	677,191,680
1355 MB, 5.25-inch:	1,367,212,032
422 MB, 3.5-inch:	422,295,552

Environmental Requirements

TEMPERATURE

Operating:	
677/1355 MB, 5.25-inch:	0°C to 50°C (32°F to 122°F)
422 MB, 3.5-inch:	5°C to 50°C (41°F to 122°F)
Nonoperating:	
677/1355 MB, 5.25-inch:	-40°C to 65°C (-40°F to 149°F)
422 MB, 3.5-inch:	-40°C to 65°C (-40°F to 149°F)
Maximum Rate of Change:	
677/1355 MB, 5.25-inch:	10°C/hr (50°F/hr)
422 MB, 3.5-inch:	10°C/hr (50°F/hr)

HUMIDITY

Operating:	
677/1355 MB, 5.25-inch:	8% to 80% RH (noncondensing)
422 MB, 3.5-inch:	8% to 80% RH (noncondensing)
Nonoperating:	
677/1355 MB, 5.25-inch:	5% to 80% RH (noncondensing)
422 MB, 3.5-inch:	5% to 90% RH (noncondensing)
Maximum Wetbulb Temperature:	
677/1355 MB, 5.25-inch:	28°C (82°F)
422 MB, 3.5-inch:	28°C (82°F)

ALTITUDE

Operating:	
677/1355 MB, 5.25-inch:	-61 m to 3,048 m (-200 ft to 10,000 ft)
422 MB, 3.5-inch:	-305 m to 3,048 m (-1,000 ft to 10,000 ft)
Nonoperating:	
677/1355 MB, 5.25-inch:	-305 m to 15,240 m (-1,000 ft to 50,000 ft)
422 MB, 3.5-inch:	-305 m to 15,240 m (-1,000 ft to 50,000 ft)

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