HP DDS-2 Tape Drive
User's Guide

HEWLETT®
PACKARD

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Preface

The *HP DDS-2 Tape Drive User's Guide* describes how to install, configure, and use the HP DDS-2 tape drive.

We've organized this guide as follows:

Chapter 1 Provides a general description of the drive and the procedures for installing it into a system.

Chapter 2 Describes the drive configurations, the controls and features of the drive, and provides directions for using it.

Chapter 3 Provides information on caring for DDS tapes, troubleshooting information, and removal/replacement procedures for the drives.

Appendix A Provides safety and regulatory information.

Appendix B Lists the pinnouts for the SCSI connector on the drive.

Audience

This guide is intended for use by anyone familiar with the the HP workstations who wants to install and configure the DDS drive.

Safety and Regulatory Statements

See Appendix A for the safety and regulatory statements that apply to the HP DDS-2 drive.

Installation Notice

Products designated in the applicable Hewlett-Packard price list as customer-installable can be installed by computer-knowledgeable customers who carefully read and follow the instructions provided. Customers who elect to have the product installed by our field personnel are charged the applicable field installation charge, as covered under the standard terms and conditions. For more information, please contact your local sales representative.

Related Manuals

For more information, refer to the following documents:

- The Owner's Guide that came with your system

- *HP-UX Installing Peripherals: HP 9000 Series 700* (B2355–90006)

- *Using Your HP Workstation* (A2615–90003)

- *HP Visual User Environment User's Guide* (B1171–90061)

- *System Administration Tasks HP 9000 Series 700 Computers* (B2355–90040)

- *Using HP-UX* (B2910–90001)

Documents specific to HP DDS drives:

- *Integration Guide*, Vol 2 of HP DDS Technical Manual (C1533–90906)

- *The SCSI Interface*, Vol 3 of HP DDS Technical Manual (C1533–90907)

- *Background to DDS Products*, Vol 4 of HP DDS Technical Manual (C1533–90908)

- *HP DDS Configuration Guide*, Vol 5 of HP DDS Technical Manual (C1533–90915)

Contact your HP supplier for copies.

Revision History

The revision history for each edition of the manual is listed below:

Edition	Revision History
E0296	First Printing.

Questions and Problems

If you have any questions or problems with our hardware, software, or documentation, please contact either your HP Response Center or your local HP representative.

Documentation Conventions

Unless otherwise noted in the text, this guide uses the following symbolic conventions:

literal values   Bold words or characters in formats and command descriptions represent commands that you must use literally. Pathnames are also in bold.

user-supplied values   Italic words or characters in formats and command descriptions represent values that you must supply. Italics are also used in text for emphasis.

`screen display`   Information that the system displays appears in `this typeface`.

(Return)   A rectangle with rounded corners and a key label denotes a key on your keyboard. (In this manual we refer to the **Return** key. On your keyboard the key may be labeled either **Return** or **Enter**.)

———— 🔲 ————   This symbol indicates the end of a chapter or part of this guide.

———— 🔲 ————
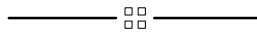
Chapter 1
Introduction

This document describes the HP DDS-2 (HP model number C1533A) drive, its installation, operation, troubleshooting, and removal/replacement procedures.

This chapter introduces the DDS-2drive and contains the following information:

- General description of the drive

- Major features of the drive

- Preparing to install the drive

- Preparing the system

- Powering off the workstation and any peripherals.

- Adding or removing the DDS-2 drive bezels or expansion brackets

General Description

The HP DDS-format drives have been developed by Hewlett Packard for data storage drives that build on DAT technology. The DDS-2 drive has 4-GB native capacity, yielding up to 8 GB of stored data and has data compression functionality. Figure 1–1 shows the DDS-2 drive.
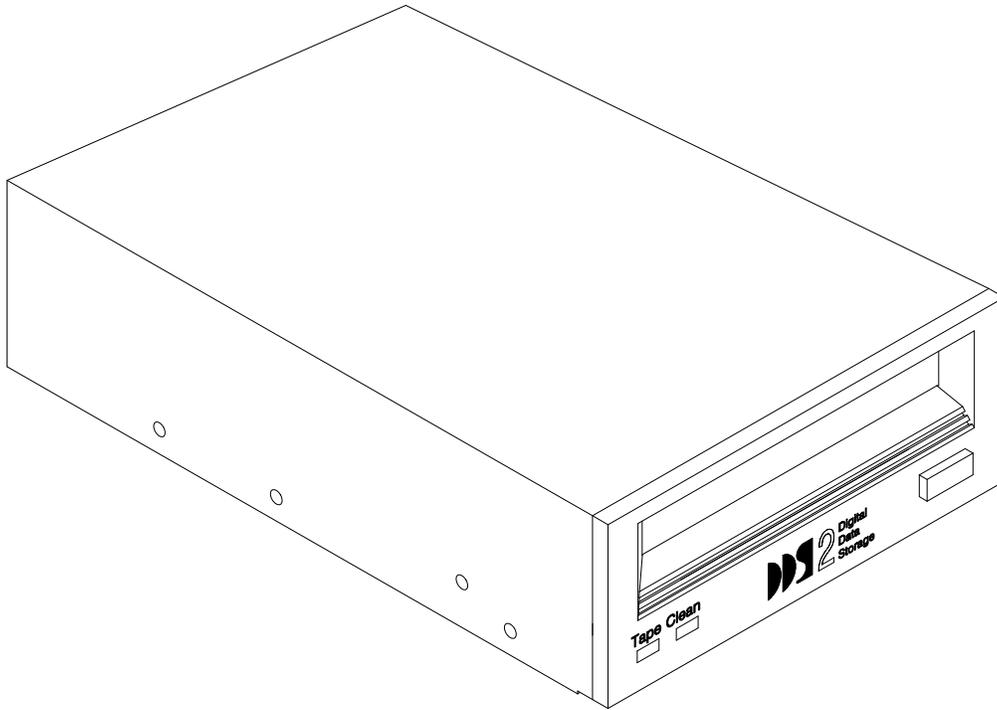
Figure 1–1. HP DDS-2 Drive

Major Features of DDS Drives

The DDS-1 format incorporates error correction techniques used in audio DAT drives with additional techniques specifically designed to provide the integrity of data necessary for computer use. These extra methods of error detection and correction are as follows:

- C3 ECC, a third level of Error Correction Code providing correction across frames within groups.

- Read-After-Write, where data is verified immediately after it is written and re-written if there is any error.

- Data Randomizer, for recording the data in order to provide a consistent signal level. This enables read-after-write to be effective.

- Track Checksums, for detecting and locating helical errors, and so improving the performance of C3 ECC.

- N-Group Writing, where every group is repeated a set number of times. The default setting for N is 1.

Each tape can be formatted as a single data space, or as two partitions that can be written to independently.

DDS-DC Drive

The HP Model C1536A implements the DDS-DC format. This includes all of the features of the DDS-1 format, plus an extension to include data compression as follows:

- Compressed data can be stored in a way that maintains the full functionality of the DDS format and ensures backwards compatibility with existing DDS drives.

- Any DDS-1 and DDS-DC cartridge can be read, whether data compression is switched on or off.

- Data is automatically decompressed on reading even if data compression is switched off.

- Mixing compressed and uncompressed data is supported. This means that a cartridge can be written with uncompressed data and read in any DDS drive.

DDS-2 Drive

The HP C1533A implements the DDS-2 format. This includes all of the features of the DDS-1 and DDS-DC formats, plus the ability to read and write with much higher capacity as follows:

- Reads and writes using DDS-1 and DDS-DC formats when using DDS-1 media (60 m and 90 m). Has all of the features of the DDS-1 and DDS-DC formats.

- Reads and writes with much higher capacity when using DDS-2 media (120 m).

DDS-2 Drive Environmental Requirements

The DDS-2 drive has the following environmental requirements:

- **Ambient Temperature**

Operating	5° C to 40° C
	(41° F to 104° F)
Non-Operating	–40° C to 70° C
	(–40° F to 158° F)

- **Altitude**

Operating	0 km to 4.6 km (0 to 15,000 ft)
Non-Operating	0 km to 15.2 km (0 to 50,000 ft)

- **Humidity**

Operating	20% to 80%RH (non-condensing)
Non-Operating	5% to 95%RH (non-condensing)
	Maximum wet bulb temperature = 26° C

DDS-2 Drive Physical Specifications

The following illustration describes the physical specifications of the DDS-2 drive.
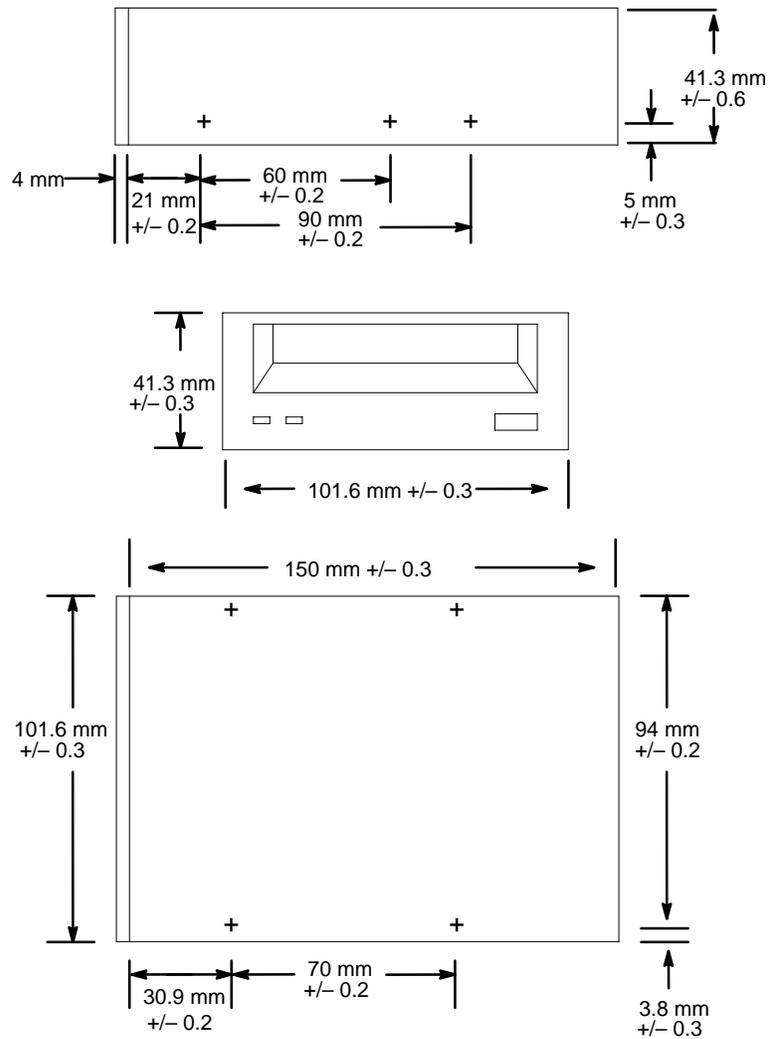
Figure 1–2. HP DDS-2 Drive Physical Specifications

Preparing to Install the DDS-2 Drive

The following information describes how to prepare the DDS-2 drive for installation.

Tools Required

The following tools are needed to install the DDS-2 drive:

- #2 Phillips screwdriver

- Small needle-nose pliers

Verifying Kit Contents

Verify that the kit contains one of each of the following:

- DDS-2 drive (part numbers 0950–3002 for 5 1/4-in drive, or 0950–3028 for 3 1/2-in drive)

- Set of 4 screws (M4x6)

- Power adapter cable

- SCSI I/O cable

- Static strap

- *HP DDS-2 Tape Drive User's Guide* (A1658–90689)

NOTICE: If any contents of your kit are missing, contact your sales representative.

Operating System Support

The HP DDS-2 drive supports HP-UX 9.05 and later. This drive requires the following HP-UX patches (or their replacements): PHKL_6050 and PHSS_6142. Both patches are for OS versions 9.x only and cannot be used on any 10.x OS versions.

Setting the SCSI-2 Address

The DDS-2 drive must have a unique SCSI-2 target address. The DDS-2 drive's jumpers are set at the factory to the SCSI-2 default address of 3 as shown in Figure 1–3. You must also ensure that the Operation Mode jumpers are set for correct drive operation, as shown in Figure 1–4. We ship the drive with the Operation Mode jumpers set to operate correctly with your system. We recommend that you keep the default address, if possible.

CAUTION: SCSI tape drives are susceptible to mechanical and electrostatic shock. When handling a DDS-2 drive, always wear the static-grounding wrist strap that comes in the DDS-2 drive kit, and always handle the drive carefully.

Electrostatic charges can damage drives. To prevent such damage from occurring, observe the following precautions during unpacking and installation:

- Stand on a static-free mat.
- Wear a static strap to ensure that any accumulated electrostatic charge discharges from your body to ground.
- Connect all equipment together, including the static-free mat, static strap, routing nodes, and peripheral units.
- Keep uninstalled DDS-2 drives in their protective antistatic bags.

If you need to change the DDS-2 drive's address or operation mode, follow these instructions, referring to Figures 1–3 and 1–4.

1. Locate the jumpers at the back of the DDS-2 drive.

2. To change the jumper settings, use needlenose pliers to set the drive's SCSI ID to an address that is not used by another SCSI device. Check that the other jumpers are set correctly.

3. If you need to change the Operation Mode switches, locate the switches on the underside of the DDS-2 tape drive. Switches 1 and 2 are used to configure the data compression operation mode. Switches 3 through 8 are used to specify drive connectivity and functionality according to host or customer requirements. The default setting is all switches ON.

Address Jumpers

To set the drive's address, use the SCSI-2 address jumpers, and perform the following steps:

1. Attach the static-grounding wrist strap by following the instructions on the package that contains the strap. Attach one end of the strap to the system chassis.

2. Locate the address jumpers on the rear of the DDS-2 drive. Figure 1–3 shows the rear of the DDS-2 drive with the significant bits identified.

3. Set the drive's SCSI-2 target address to an address that's not used by another SCSI-2 device. Using Figure 1–3 as a guide, use needlenose pliers to set the jumpers. When finished, refer to "Preparing the System," later in this chapter for information on verifying the jumpers have been set correctly and your system sees the drive.

NOTICE: **Do not** use SCSI-2 address 7 because the system's SCSI-2 controller uses address 7 by default. We advise that you **do not** use SCSI-2 address 6 because the root disk drive uses it.

Bit 0
Bit1
Bit 2
Term
PWR

SCSI Connector

Power Connector
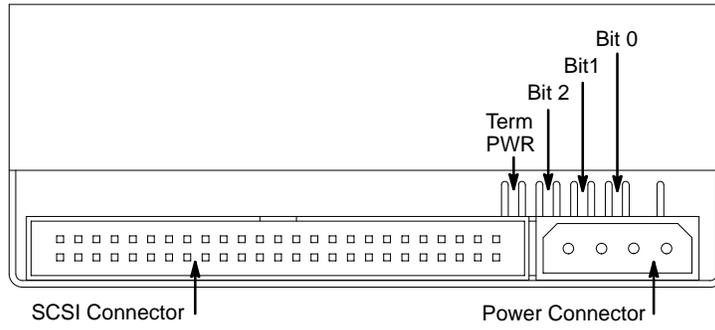
SCSI ID	Term PWR*	Bit 2	Bit 1	Bit 0	SCSI ID	Term PWR*	Bit 2	Bit 1	Bit 0
0	○ ○	○ ○	○ ○	○ ○	4	○ ○	[○ ○]	○ ○	○ ○
1	○ ○	○ ○	○ ○	[○ ○]	5	○ ○	[○ ○]	○ ○	[○ ○]
2	○ ○	○ ○	[○ ○]	○ ○	6	○ ○	[○ ○]	[○ ○]	○ ○
3 (Default)	○ ○	○ ○	[○ ○]	[○ ○]					

*Term PWR is not used in HP workstation configurations.

Figure 1–3. Rear View of DDS-2 Drive and SCSI Address/Jumper Settings
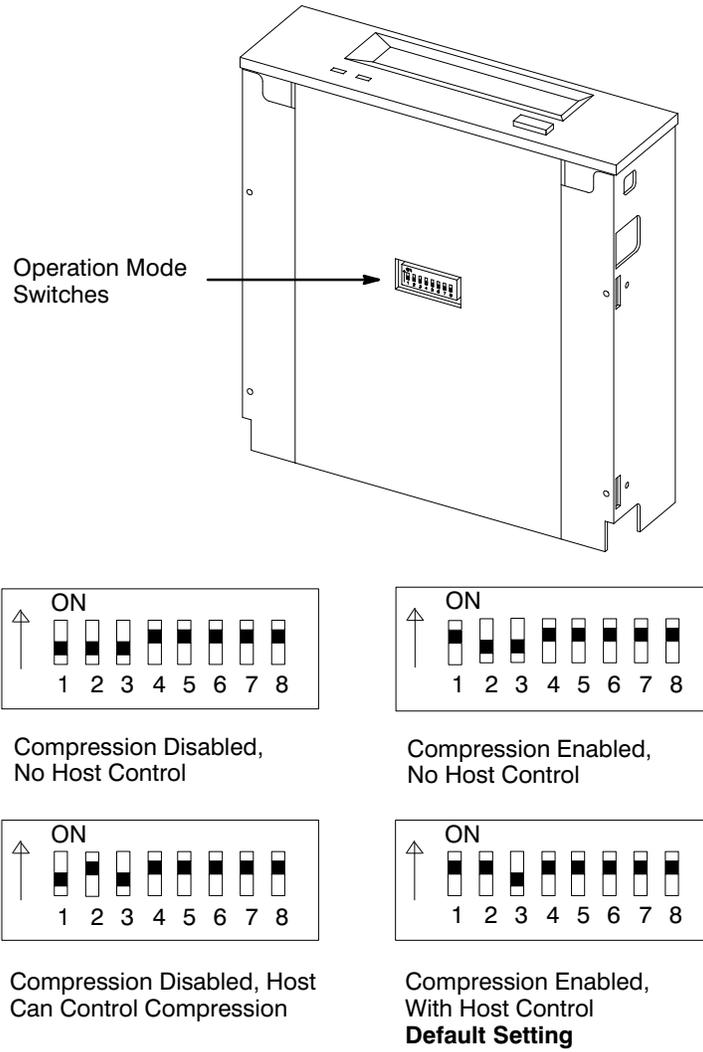
Figure 1–4. Switch Settings for Data Compression Operation Mode

Preparing the System

Perform the following steps to prepare the system for the DDS-2 drive installation:

1. Determine the existing SCSI-2 address settings currently in use on your system by completing the following steps:.

2. If you are using HP-UX 9.X, enter the following at the prompt:

> **/etc/ioscan -d scsitape** `RETURN`

After a few moments the **ioscan** utility lists all of the SCSI I/O devices it can find. If there is a SCSI DDS drive in the list, its listing appears similar to the following:

```
H/W Path          Description      Status
===============================================
2.0.1.3.0         scsi             ok(nnnnnnnn)
```

If you are using HP-UX 10.X, enter the following at the prompt:

> **/usr/sbin/ioscan -d stape** `RETURN`

After a few moments the **ioscan** utility lists all of the SCSI I/O devices it could find. The list appears similar to the following:

```
H/W Path          Description      Status
===============================================
2/0/1.3.0         tape             HP C1533A
```

If you are using HP-UX 10.X and wish to list all I/O devices, enter the following at the prompt:

/usr/sbin/ioscan `RETURN`

The list appears similar to the following:

```
H/W Path    Class               Description
==========================================
           bc
8          bc                  I/O Adapter
8/0             ext_bus         GSC built-in Fast/Wide SCSI Interface
8/0.0               target
8/0.0.0                 disk    QUANTUM LPS1080WD
8/0.5               target
8/0.5.0                 disk    DEC     DSP3210SW
8/0.6               target
8/0.6.0                 disk    DEC     DSP3210SW
8/12            ba              Core I/O Adapter
8/12/5          ext_bus         Built-in SCSI
8/12/5.3            target
8/12/5.3.0             tape.    HP C1533A
8/12/5.4            target
8/12/5.4.0             disk.    SEAGATE ST3600N
8/12/5.6            target
8/12/5.6.0             disk     MICROP  2112
10         bc                  I/O Adapter
10/12           ext_bus         GSC add-on Fast/Wide SCSI Interface
10/12.4             target
10/12.4.0              disk     SEAGATE ST31200W
```

If your DDS-2 drive is not listed, go to Chapter 3, "Troubleshooting and Removal/ Replacement Procedures."

3. Shut down the system.

If you are running HP-UX under HP VUE, shut down your system according to the shutdown procedure described in the Owner's Guide that came with your workstation.

If you are running HP-UX without HP VUE, shut down your system by typing the following command:

/etc/shutdown -h `RETURN`

You must have superuser privileges to use the **/etc/shutdown** command. If you do not have superuser privileges, contact your system administrator.

If your workstation is part of a cluster, refer to *Managing Clusters of HP 9000 Computers* for instructions on shutting down.

SCSI-2 Connection and Termination

Only single-ended SCSI-2 configuration is supported, with a maximum sustained transfer rate of 5.0 MB/second. Only unshielded connectors can be used.

The DDS-2 drive does not support termination on the device itself. Normally, drives such as this are not required to be at the end of a bus, but if this is unavoidable, HP recommends using a feed-through SCSI terminator that plugs directly into the rear of the drive. Use active termination, as the drive is capable of a transfer rate greater than 5 MB/second.

If you do not already have a SCSI terminator, you must order either terminator K2291 (bale-lock style) or terminator C2094A (thumbscrew style).

NOTICE: Use care when inserting and removing feed-through terminators to avoid damaging the end walls of the terminator and the drive.

Powering Off the Workstation and any Peripherals

To power off the workstation and any peripherals, perform the following steps:

1. Power off the workstation, using the power switch on the front of the workstation.

CAUTION: Do not power off your workstation without first shutting down HP-UX. Powering off with HP-UX still running could damage the data on the disks associated with your workstation.

If you are already at the boot-administration level (the level used to check the SCSI-2 IDs), you do not need to shut down before powering off.

If you accidentally rebooted HP-UX while determining the address settings, see "Preparing the System," earlier in this chapter, for instructions on shutting down HP-UX.

2. Disconnect the power cord from the rear of the workstation and the wall outlet.

3. Power off any external peripherals attached to your workstation, and unplug their power cables from the wall outlet.

Adding or Removing the DDS-2 Drive Bezels or Expansion Brackets

Depending on the size of the drive opening in your system, you may need to add or remove a bezel or expansion brackets to ensure that your DDS-2 drive fits in your system.

NOTICE: Before performing any of these changes, make sure there is not a cassette in the drive.

- To add a bezel (it can be a 3.5-in bezel, or a 5.25-in bezel) to your drive, push onto the drive, making sure the tabs click into place. Refer to Figure 1–5.

- To remove a bezel from a drive, use a straight blade screwdriver to lift the bezel tabs from the sides of the drive. Refer to Figure 1–6.

- To add or remove expansion brackets to the drive, use a T10 torx wrench to either tighten or remove the four torx screws that hold each expansion bracket to the drive. Refer to Figure 1–7.
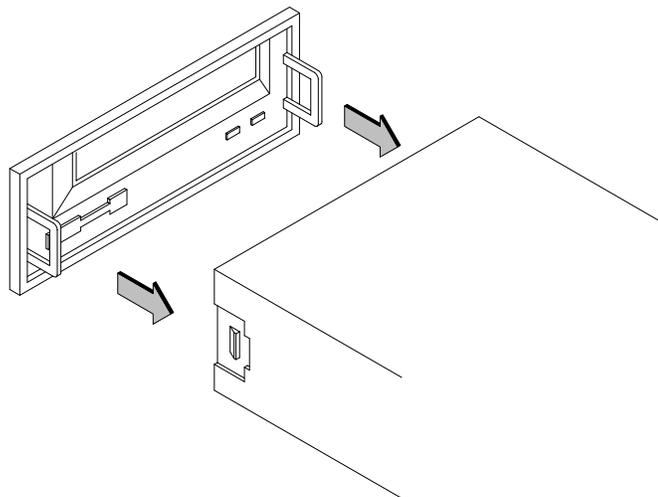
Figure 1–5. Adding a Bezel to the DDS-2 Drive
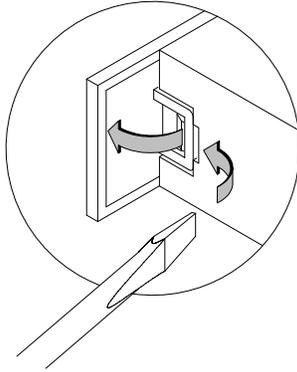
Figure 1–6. Removing a Bezel from the DDS-2 Drive
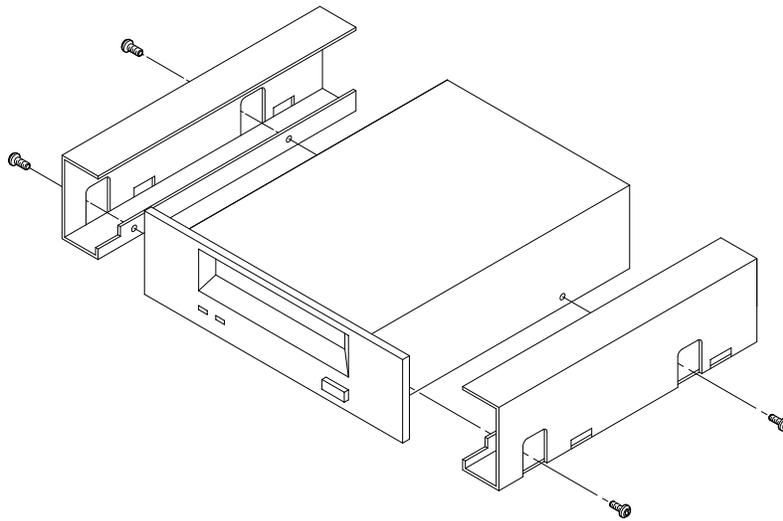
Figure 1–7. Adding or Removing Expansion Brackets

You are now ready to begin the hardware installation of your DDS-2 drive. The step-by-step instructions for installing the drive are found in the Owner's Guide that came with your workstation.

Chapter 2
Using the DDS-2 Drive

This chapter provides the following information on using your DDS-2 drive:

- DDS-2 drive configuration

- Controls and features of the DDS-2 drive

- Using the DDS-2 drive

To verify HP-UX system operation, see the Owner's Guide that came with your workstation.

For more information on checking or reconfiguring the kernel for a device driver or file, see *System Administration Tasks Manual: HP 9000 Series 700 Computers*.

Your DDS-2 Drive Configuration

Your HP-UX operating system comes with preconfigured device files and drivers. If you use these preconfigured device files and drivers, you won't need to configure your DDS-2 drive with the operating system.

To find out more about creating and using device files, the the Owner's Guide that came with your system.

Controls and Features of the DDS-2 Drive

Your DDS-2 tape drive is either a 3 1/2-inch form factor, or a 5 1/4-inch form factor DDS-2 tape drive with data compression and a SCSI interface. It conforms to the DDS-1 format standard for storing computer data. It's a high-capacity, high transfer-rate device for data storage on tape.

Figure 2–1 shows the LEDs and eject button of the DDS-2 drive.

Tape Light   Clean/Attention Light   Eject Button
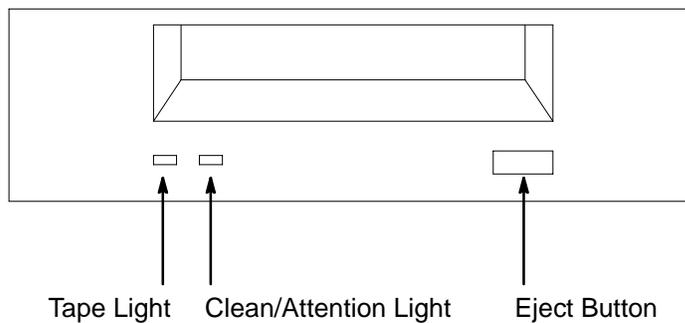
Figure 2–1. DDS-2 Drive Controls and Indicators

LEDs

The front panel has two colored LEDs: the Tape Light and the Clean/Attention Light. The Tape Light flashes **green** to show activity (loading, unloading, reading, and writing). Steady green means a cartridge is loaded.

The Clean/Attention Light flashes **amber** to indicate head cleaning is needed or a cartridge is near the end of its life. Steady amber means a hard fault.

Table 2–1. LED Display Codes

Tape Light	Clean/ Attention	Meaning
▰	▭	Activity – load or unload
▮▯▮	▭	Activity – read or write
▬	▭	Cartridge loaded
Any	▰	Cleaning needed
Any	▰	Fault

Key	
▭	OFF
▬	Steady Green
▰	Steady Amber
▰	Flashing Green 1/2 sec on, 1/2 sec off
▰	Flashing Amber 1/2 sec on, 1/2 sec off
▮▯▮	Fast Flash Green 1/4 sec on, 1/4 sec off

Data Cassettes

Media Life
HP DDS data cassettes are currently specified to 2000 passes over any part of the tape under optimal environmental conditions (50% relative humidity, 22 degrees C). During a tape operation, any one area of the tape may have multiple passes over the heads, this translates into approximately 200 to 300 backups or restores.

Under certain conditions, the life of your data cassette is less than 200 to 300 backups or restores. Replace your data cassettes after 100 backups or restores if your operating conditions meet any of the following criteria:

- The relative humidity in your operating environment is consistently less than 50%.

- You know that the backup software you are using makes multiple passes over sections of the tape during backups or restores.

- You notice that when you do backups and restores the tape stops and starts frequently.

Cleaning the Tape Heads

Clean the heads of your tape drive after every 25 hours of tape drive use or if the Media Wear (Caution) signal is displayed on the LED.

NOTICE: Only use HP Cleaning Cassettes (HP92283K) to clean the tape heads. Do not use swabs or other means of cleaning the tape heads.

Follow this procedure to clean the tape heads:

1. Insert the cleaning cassette into the drive. The tape automatically loads the cassette and cleans the heads. At the end of the cleaning cycle, the drive ejects the cassette.

2. Write the current date on the label on the cleaning cassette so that you know how many times you have used it. Discard the cleaning cassette after you have used it 25 times.

Media Restrictions

If you interchange media between other HP workstation DDS tape drives, note that data cassettes with compressed data can only be read by tape drives that have data compression capabilities. This includes data cassettes that contain both compressed and noncompressed data.

Setting the Write-Protect Tab on a Data Cassette

You can only store or change information on a data cassette when the write-protect tab is in the *write* position. So, before trying to write to the data cassette, make sure that the write-protect tab is in the *write* position, as shown in Figure 2–2.
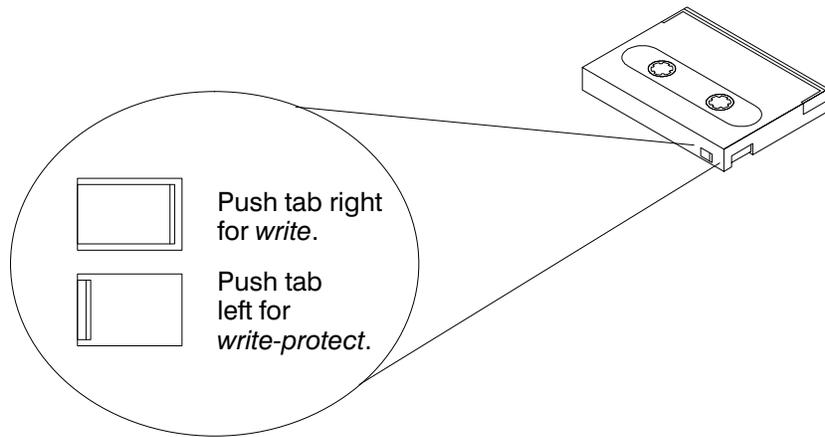
Figure 2–2. Setting the Write-Protect Tab on a DDS Tape

To protect information on a data cassette from being overwritten, set the write-protect tab to the *write-protect* position, as shown in Figure 2–2.

NOTICE: The write-protect tab should always be in the *write* position for transferring data to a cassette.

Using the DDS-2 Drive

This section describes how to perform tasks with your DDS-2 tape drive.

Loading and Unloading a Data Cassette

Follow these steps to load and unload a data cassette from the DDS-2 tape drive:

1. Turn on power to the tape drive.

2. Insert the data cassette into the drive, as shown in Figure 2–3.
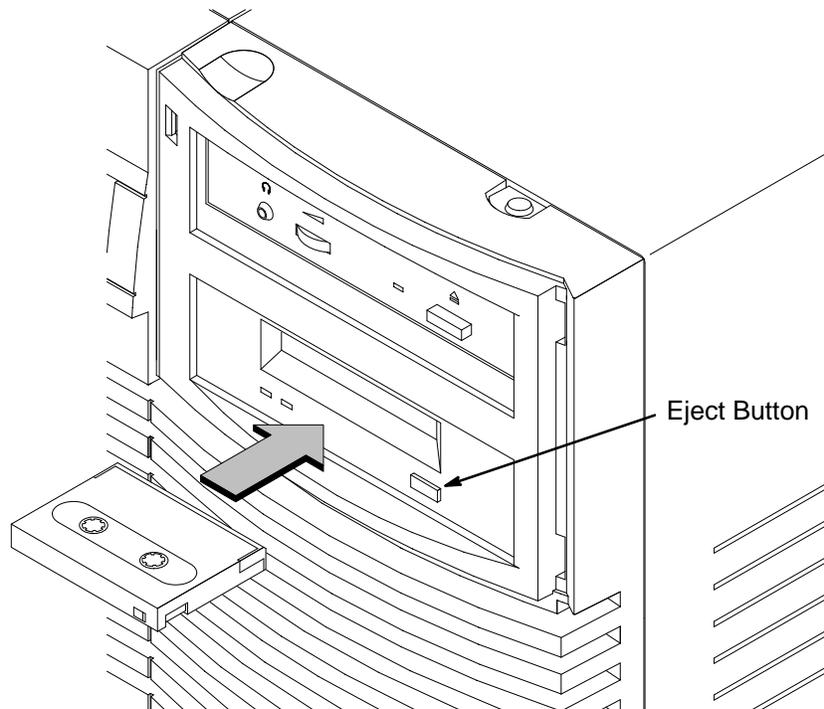
Figure 2–3. Loading a Data Cassette

3. Push the data cassette about three quarters of the way into the drive. The drive automatically pulls the data cassette the rest of the way in. When the LEDs on the front of the drive stop flashing, the drive has loaded the data cassette.

4. To remove the data cassette, press and release the eject button on the front of the drive, as shown in Figure 2–3. The LEDs on the drive flash on and off. Ten to twenty seconds later, the data cassette slides partway out of the drive. Remove the cassette from the drive.

Verifying the DDS-2 Tape Drive Operation

To verify that your workstation can communicate with the DDS-2 tape drive, if you are using HP-UX 9.05, type the following:

> **/etc/ioscan -d scsitape** ⌜Return⌝

After a few moments the **ioscan** utility returns a message similar to the following:

```
H/W Path             Description       Status
==========================================
2.0.1.3.0            tape_drive        ok(nnnnnnnnn)
```

If you are using HP-UX 10.0, type the following:

> **/usr/sbin/ioscan -d stape** ⌜Return⌝

After a few moments the **ioscan** utility returns a message similar to the following:

```
H/W Path    Class                Description
==========================================
            bc
8           bc                   I/O Adapter
8/12            ba               Core I/O Adapter
8/12/5             ext_bus       Built-in SCSI
8/12/5.3              target
8/12/5.3.0              tape      HP       HP35480A
```

If your DDS-2 drive is not listed, go to Chapter 3, "Troubleshooting and Removal/ Replacement Procedures."

For information on using device files or archiving data to or from the DDS-2 drive, see the Owner's Guide that came with your workstation.

Media Interchangeability Restrictions

If you interchange media between DDS-format tape drives, the following two restrictions apply to the media:

- Data cassettes with compressed data can only be read by tape drives that have data compression capabilities, such as the tape drive (part number C1504–67201) found in Kit A2275A #AHS.

- Full height (5 1/4-in) DDS-format tape drives (models HP 35470A and HP35480A) can get 1.3 GB and can read or write to 60-meter data cassettes only, if they are not using data compression. With data compression, these drives can get 2 GB and can read or write to 90-meter cassettes.

Ordering Information

To order Hewlett-Packard data cassettes and cleaning cassettes for use in your DDS-2 tape drive, use the following order numbers:

- HP92283A   Box of five 60-meter DDS data cassettes

- HP92283B   Box of five 90-meter DDS data cassettes

- HP92300A   Box of five 120-meter DDS data cassettes

- HP92283K   Package of two head-cleaning cassettes

- HP92283L   Lockable storage box for 12 cassettes

CAUTION: Use only data cassettes labeled as DDS (Digital Data Storage) cassettes. Never use audio cassettes labeled DAT (Digital Audio Tape) in your DDS-format drive.
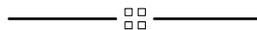
Chapter 3
Troubleshooting and Removal/Replacement Procedures

This chapter provides the following information on troubleshooting and removal/replacement procedures for your DDS-2 drive:

- Checking the address settings

- Checking the hardware installation

- Verifying system operation

- Field Replaceable Units

- Powering off the system

- Removing and replacing the DDS-2 drive

- Adding or removing DDS-2 drive bezels and expansion brackets

Troubleshooting

If you have trouble with any of these procedures, see the Owner's Guide that came with your system.

This chapter explains what to do if you experience problems during the configuration process. It also explains how to run the Support Tool Manager or the Extended Self Test to verify your system.

If you are experiencing difficulty booting the system, reconfiguring HP-UX, or using the DDS-2 drive, complete each of the following tasks, in the order they are presented, until you discover and correct the problem:

- Check the address settings of any single-ended SCSI-2 devices.

- Check that you have installed the hardware correctly.

- Recheck the device list.

- Run verification tests.

Checking the Address Settings for Single-Ended Drives

Check the address settings of each single-ended SCSI-2 device on the bus. Make sure that no device has the same address setting as another. If you find two devices with the same address, change one of the devices to a different, unused address setting. To check the address settings for each single-ended SCSI-2 device, type the following in a terminal window or HP-UX command line:

If you are using HP-UX 9.X, enter the following at the prompt:

/etc/ioscan `RETURN`

A screen similar to the following appears:

```
H/W Path     Description     Status
====================================
1.0.0        graphics        ok(0x577)
2.0.1        scsi            ok(0x7071)
2.0.1.3.0    tape_drive      ok(0x1800202)
2.0.2        lan             ok(0x7072)
2.0.3        hil             ok(0x7073)
2.0.4        serial          ok(0x7075)
2.0.5        serial          ok(0x7075)
2.0.6        parallel        ok(0x7074)
2.0.7        scsi            ok(0x707c)
2.0.7.6.0    disk            ok(0x101)
```

Look under the **H/W Path** heading for device paths beginning with the sequence **2.0.1**. The sequence **2.0.1** denotes a single-ended SCSI controller. The number following **2.0.1** is the address setting for a single-ended device on that controller. For example, the listing **2.0.1.3.0** in the sample device list tells us that there is a single-ended device currently using address 3.

If you are using HP-UX 10.X, enter the following at the prompt:

/usr/sbin/ioscan -d scsitape `RETURN`

After a few moments the **ioscan** utility lists all of the SCSI I/O devices it could find. The list appears similar to the following:

```
H/W Path    Class              Description
============================================
            bc
8           bc                 I/O Adapter
8/0              ext_bus       GSC built-in Fast/Wide SCSI Interface
8/0.0                target
8/0.0.0              disk      QUANTUM LPS1080WD
8/0.5                target
8/0.5.0              disk      DEC     DSP3210SW
8/0.6                target
8/0.6.0              disk      DEC     DSP3210SW
```

```
8/12            ba              Core I/O Adapter
8/12/5          ext_bus         Built-in SCSI
8/12/5.3         target
8/12/5.3.0        tape          HP C1533A
8/12/5.4         target
8/12/5.4.0        disk          SEAGATE ST3600N
8/12/5.6         target
8/12/5.6.0        disk          MICROP  2112
10                bc            I/O Adapter
10/12           ext_bus         GSC add-on Fast/Wide SCSI Interface
10/12.4          target
10/12.4.0         disk          SEAGATE ST31200W
```

Checking the Hardware Installation

Perform the following steps to check the hardware installation:

CAUTION: The DDS-2 drive is susceptible to mechanical and electrostatic shock. When handling the drive, always wear the static strap that came in the DDS-2 drive kit. Always handle the drive carefully.

1. Check that the SCSI-2 terminator is connected to the single-ended SCSI-2 port on the rear I/O panel of the system unit (if there are no external SCSI-2 devices), or that the last external single-ended SCSI-2 device is terminated.

2. Attach the static-grounding wrist strap by following the instructions on the package that contains the strap.

3. Shut down HP-UX.

NOTICE: If you are already at the boot administration level, you do not need to shut down; skip this step and go on to Step 4.

If you are running HP-UX under HP VUE, shut down your system by performing the shutdown procedure described in the Owner's Guide that came with your work-station.

If you are running HP-UX without HP VUE, shut down your system by typing the following command:

/etc/shutdown -h `RETURN`

You must have superuser privileges to use the **/etc/shutdown** command. If you do not have superuser privileges, contact your system administrator.

If your workstation is part of a cluster, refer to *Managing Clusters of HP 9000 Computers* for instructions on shutting down.

4. Power off the workstation, using the power switch on the front of the workstation.

CAUTION: Do not power off your workstation without first shutting down HP-UX. Powering off with HP-UX still running could damage the data on the disks associated with your workstation.

5. Remove the drive and check the jumpers, as described in "Removal/Replacement Procedures" at the end of this chapter.

6. Replace the drive.

7. Check the cable connections of your DDS-2 drive. Make sure that the connectors are aligned and seated correctly.

8. Recheck the device list (see "Recheck the Address Settings" below).

Rechecking the Address Settings

Check the address settings again to see if the drive is now listed (see "Checking the Address Settings for Single-Ended Drives," earlier in this chapter).

If the DDS-2 drive and all other SCSI-2 devices available to you before you installed the DDS-2 drive are now listed, run the system verification test for your software version, as explained in the next sections.

If the DDS-2 drive is still not listed, or one of the SCSI-2 devices available to you before you installed the DDS-2 drive is still not listed, contact your service representative.

Verifying the System Operation using SupportWave

HP-UX uses a diagnostics product called SupportWave. SupportWave contains the Support Tools Manager so that you can verify your system operation.

You can access the Support Tools Manager while in a terminal window. If you are using HP VUE as your interface, you can also access the Support Tools Manager through the **sys_admin** directory.

NOTICE: You must use software patch PHSS_6142 on HP-UX 9.03, 9.05 and 9.07 to run SupportWave successfully.

Three interfaces are available with the Support Tools Manager: a command line interface (accessed through the **cstm** command), a menu-driven interface (accessed through the **mstm** command), and the graphical user interface (accessed through the **xstm** command).

For more information on SupportWave user interfaces, see the online man pages by entering the following at a command line prompt:

<p style="text-align: center;"># man cstm <code>RETURN</code></p>

<p style="text-align: center;"># man mstm <code>RETURN</code></p>

<p style="text-align: center;"># man xstm <code>RETURN</code></p>

To run SupportWave from either HP VUE or the HP-UX command line shell, perform the following steps:

1. To invoke the command line interface, in a terminal window or command line shell, type the following at the # prompt:

<p style="text-align: center;"># cstm <code>RETURN</code></p>

The following screen appears:

```
**********************************************************************
******                                                        ******
******                SUPPORT TOOLS MANAGER                    ******
******                                                        ******
******                Command Line Interface                  ******
******                                                        ******
******                  Version  A.00.12                      ******
******                                                        ******
******             Part Number  B2478-10002                   ******
******                                                        ******
******     (C) Copyright Hewlett Packard Co. 1991, 1992       ******
******                 All Rights Reserved                    ******
******                                                        ******
**********************************************************************
Please wait. System mapping in progress . . .
Please type HELP or ? to list available commands.
CSTM>
```

2. To verify the system operation, type the following at the CSTM> prompt:

    CSTM> **verify all** `RETURN`

Messages that are similar to the following appear:

```
Verification has started on device (CPU).
Verification has started on device (FPU).
Verification has started on device (0/0/0).
Verification has started on device (2/0/1.3.0).
Verification has started on device (2/0/1.6.0).
Verification has started on device (2/0/2).

CSTM>Message from (0/0/0):
This graphics test displays a number of graphics images on the screen of
the graphics device being tested.  If an X server is not currently run-
ning on that display, X Windows will be started and run for the duration
of the test. The Starbase shared library (/usr/lib/libsb.sl) should be
present to run this test.

CAUTION: This test will fail if any portion of the test window is modi-
fied or overlaid in any way.
```

3–7

```
NOTE: If a VUE login screen is currently displayed on the monitor, the
test will wait until someone logs in the HP VUE on the graphics monitor
to release the lock.  The test stops if the Screen Saver times out, it
runs again once the Screen is activated.

WARNING: Do not run this exerciser with any other operation.

(Type 'R' for Ready, Type 'S' for Skip) [R] >>
```

3. When you see the `>>` prompt shown above, type the following:

    R `RETURN`

4. The following appears from `2/0/1.3.0`:

```
Load blank medium on drive 2/0/1.3.0
(Type 'R' for Ready, Type 'S' for Skip) [R] >>
```

The following messages and a graphics test window appear:

```
Verification of (2/0/1.6.0) has completed.  Result status – (Success).
Verification of (CPU) has completed.  Result status – (Success).
Verification of (FPU) has completed.  Result status – (Success).
Verification of (2/0/2) has completed.  Result status – (Success).
Verification of (0/0/0) has completed.  Result status – (Success).
```

5. To return the `CSTM>` prompt, press `RETURN` .

6. To exit the Support Tools Manager, enter the following:

    CSTM> **exit** `RETURN`

If any tests failed, further diagnosis is necessary by qualified service personnel.

Removal/Replacement Procedures

The removal/replacement procedures for the DDS-2 drive follow.

CAUTION: Electrostatic charges can damage the integrated circuits on printed circuit boards. To prevent such damage from occurring, follow proper ESD precautions.

Field Replaceable Units

The following components are authorized for field replacement.

Description	Part Number
DDS-2	C1533A–69203

Powering Off the System

Before performing the removal/replacement procedures, observe the following precautions:

1. Refer to the Owner's Guide that came with your system for the procedures to power off the system.

2. Unplug the system unit power cord and the power cords of any peripheral devices from the power source.

3. Unplug the system unit power cord from the back of the system unit.

WARNING: Failure to properly shut down and remove power from the system can create a personal hazard, or may result in hardware damage or data corruption.

Removing and Replacing the DDS-2 Drive

To open your system, remove and reinstall the DDS-2 drive, refer to the Owner's Guide that came with your system. Read "Preparing to Install the DDS-2 Drive" in Chapter 1 of this guide before beginning an installation.

Adding or Removing the DDS-2 Drive Bezels and Expansion Brackets

Depending on the size of the drive opening in your system, you may need to add or remove a bezel or expansion brackets to ensure that your DDS-2 drive fits in your system.

NOTICE: Before performing any of these changes, make sure there is not a cassette in the drive.

- To add a bezel (it can be a 3.5-in bezel, or a 5.25-in bezel) to your drive, push onto the drive, making sure the tabs click into place. Refer to Figure 3–1.

- To remove a bezel from a drive, use a straight blade screwdriver to lift the bezel tabs from the sides of the drive. Refer to Figure 3–2.

- To add or remove expansion brackets to the drive, use a T10 torx wrench to either tighten or remove the four torx screws that hold each expansion bracket to the drive. Refer to Figure 3–3.
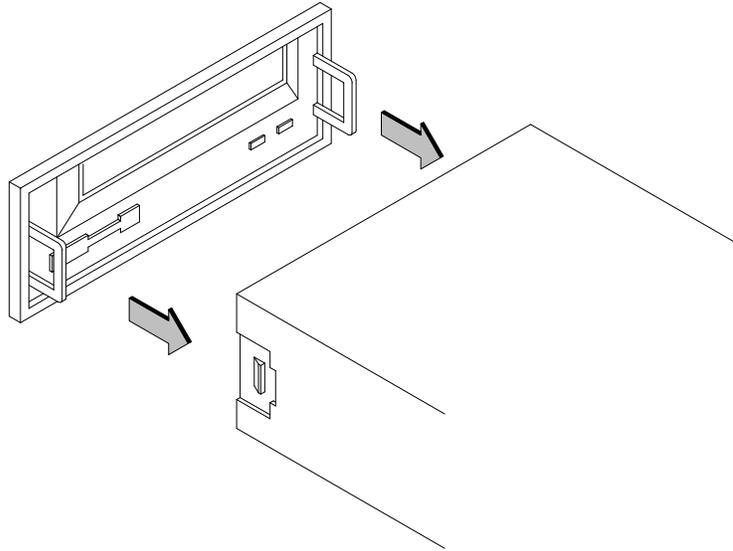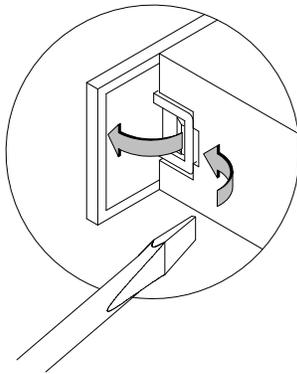
Figure 3–1. Adding a Bezel to the DDS-2 Drive

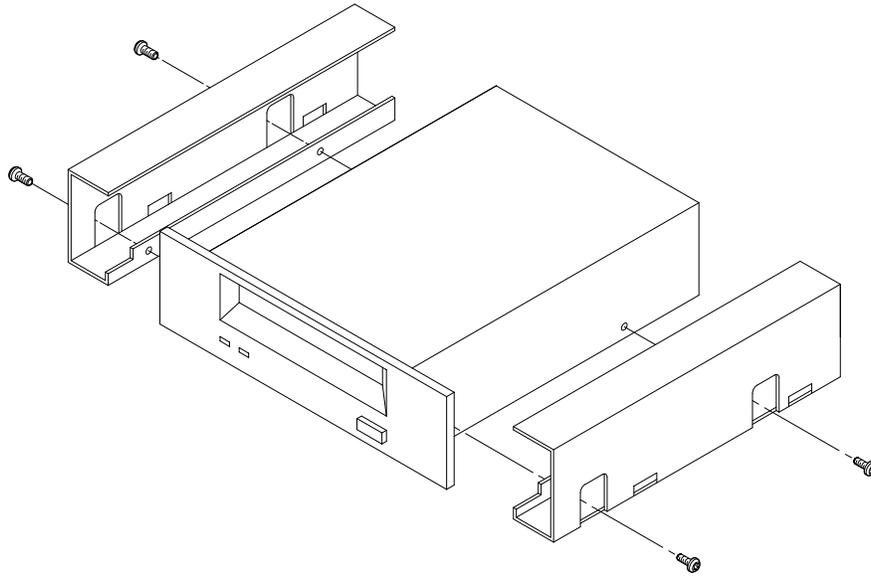*Figure 3–2. Removing a Bezel from the DDS-2 Drive*

Figure 3–3. Adding or Removing Expansion Brackets

Appendix A
Safety and Regulatory Statements

This appendix contains the following safety and regulatory statements:

- Emissions regulations

- Emissions regulations compliance

- Electrostatic discharge precautions

Emissions Regulations

Federal Communications Commission (FCC)

The Federal Communications Commission of the U.S. government regulates the radio frequency energy emanated by computing devices through published regulations. These regulations specify the limits of radio frequency emission to protect radio and television reception. All HP Apollo nodes and peripherals have been tested and comply with these limits. The FCC regulations also require that computing devices used in the U.S. display the agency's label and that the related documentation include the following statement:

NOTICE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canadian Department of Communications (CDC)

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the Radio Interference Requirements of the Canadian Department of Communications.

Emissions Regulations Compliance

Any third-party I/O device installed in HP system(s) must be in accordance with the requirements set forth in the preceding Emissions Regulations statements. In the event that a third-party noncompliant I/O device is installed, the customer assumes all responsibility and liability arising therefrom.

Electrostatic Discharge (ESD) Precautions

Electrostatic charges can damage the integrated circuits on printed circuit boards. To prevent such damage from occurring, observe the following precautions during board unpacking and installation:

- Stand on a static-free mat.

- Wear a static strap to ensure that any accumulated electrostatic charge is discharged from your body to ground.

- Connect all equipment together, including the static-free mat, static strap, routing nodes, and peripheral units.

- Keep uninstalled printed circuit boards in their protective antistatic bags.

- Handle printed circuit boards by their edges, once you have removed them from their protective antistatic bags.

Appendix B
SCSI Connector Pinouts

Table B–1. SCSI Connector Pinouts

PIN	SIGNAL	PIN	SIGNAL
1	GND	26	TERMPWR
2	DB(0)	27	GND
3	GND	28	GND
4	DB(1)	29	GND
5	GND	30	GND
6	DB(2)	31	GND
7	GND	32	–ATN
8	DB(3)	33	GND
9	GND	34	GND
10	DB(4)	35	GND
11	GND	36	–BSY
12	DB(5)	37	GND
13	GND	38	–ACK
14	DB(6)	39	GND
15	GND	40	–RST
16	DB(7)	41	GND
17	GND	42	–MSG
18	DB(P)	43	GND
19	GND	44	–SEL
20	GND	45	GND
21	GND	46	–C/D
22	GND	47	GND
23	GND	48	–REQ
24	GND	49	GND
25	OPEN	50	–I/O