

CHALLENGEvault M™  
Owner's Guide

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# Introduction

This guide is designed to help you install, manage, and troubleshoot your CHALLENGEvault M deskside/desktop SCSI expansion box. This document is organized as follows:

- Chapter 1 “Introducing the CHALLENGEvault M” describes how to properly set up and use the drive expansion box and its capabilities.
- Chapter 2 “Getting Started” describes all of the system components and reviews all of the controls, indicators, and connectors. Installation steps for hard disks are listed. Powering on and off and locking the box are also covered.
- Chapter 3 “Installing a Removable Media SCSI Device” takes the user/administrator through the process of installing a removable media drive.
- Chapter 4 “Troubleshooting and Maintenance Tips” offers tips on simple diagnosis of minor problems and maintenance of removable media.

## Audience

The primary audience for this manual is presumed to be end users or administrators who have some basic computer hardware and software knowledge. The document may also be helpful (from an informational standpoint) to field support personnel and OEM partners.

Additional software-specific information is found in the software guides that come with your system:

- *Personal System Administration Guide*
- *IRIS<sup>®</sup> Essentials*
- *IRIX<sup>™</sup> Advanced Site and Server Administration Guide*

Useful information regarding the host systems that connect to your CHALLENGEvault M can be found in the following manuals.

- *CHALLENGE<sup>™</sup> Deskside Owner's Guide*
- *Onyx<sup>™</sup> Deskside Owner's Guide*
- *Indigo<sup>2™</sup> Workstation Owner's Guide*
- *CHALLENGE M<sup>™</sup> Server Owner's Guide*

Note that these manuals are shipped with the host system and not with the CHALLENGEvault M.

## Introducing the CHALLENGEvault M

Welcome to the *CHALLENGEvault M™ Owner's Guide*. This manual is your complete guide to setting up, installing, and maintaining your CHALLENGEvault M drive box. Specifically, it tells you how to:

- select a site for your CHALLENGEvault M and connect external cables
- unpack and install hard disk drives in the chassis
- install internal SCSI channel and power cables on the rear of each drive
- install a removable media peripheral
- diagnose hardware problems
- correctly maintain your CHALLENGEvault M

Refer to this guide to set up the system, to install hardware options, or whenever you suspect there is a hardware problem. Connection of the differential vault M to a desktide system may require some setup by a qualified service provider. Otherwise, the vault M and all the procedures in this guide are designed so that customers may install, use, and maintain the drive box without the help of a trained technician. However, do not feel that you *must* work with the hardware yourself. You can always contact your maintenance provider to have an authorized service person work with the hardware instead.

### Conventions

This *CHALLENGEvault M Owner's Guide* uses these conventions:

- The term “vault M” will be used in the text as an abbreviated name for the CHALLENGEvault M.
- References to other documents are in *italics*.

- References to sections within this guide are in quotation marks.
- IRIX file names are in *italics*.
- Entries that you are to type exactly as shown are in **boldface typewriter font**.
- Numbered sentences are steps that you follow to complete a task. Sentences preceded by a square bullet follow a step and describe in detail how to do the step. For example:
  1. Remove the front access panel.
    - Face the front of the vault M chassis.
    - Snap the cover away from the top edge of the chassis and tip it down.

## Where to Go from Here

To set up the vault M drive box, go to Chapter 2, "Getting Started." This chapter tells you how to choose a site, put all the pieces together, and turn the box on so it can communicate with your host system.

To configure the vault M to work with your host system, refer to the *IRIX Advanced Site and Server Administration Guide*.

To install removable media peripherals, go to Chapter 3. That chapter tells you how to install an internal tape or a CD-ROM drive. You'll also learn what other devices you can cable to your vault M.

If you have a problem while powering on or using your vault M drive box, go to Chapter 4 for service and troubleshooting information.

## How to Use the CHALLENGEvault M

The vault M product has been specifically designed and tested to work with the following Silicon Graphics® host systems:

- CHALLENGE L desktide server systems
- Onyx desktide graphics systems

- CHALLENGE M desktop server systems
- Indigo<sup>2</sup> desktop graphics systems

**Note:** Please consult with your Silicon Graphics sales or service representative before using the vault M with any host system that is not in the above list. ♦

There are two functional variations of the vault M:

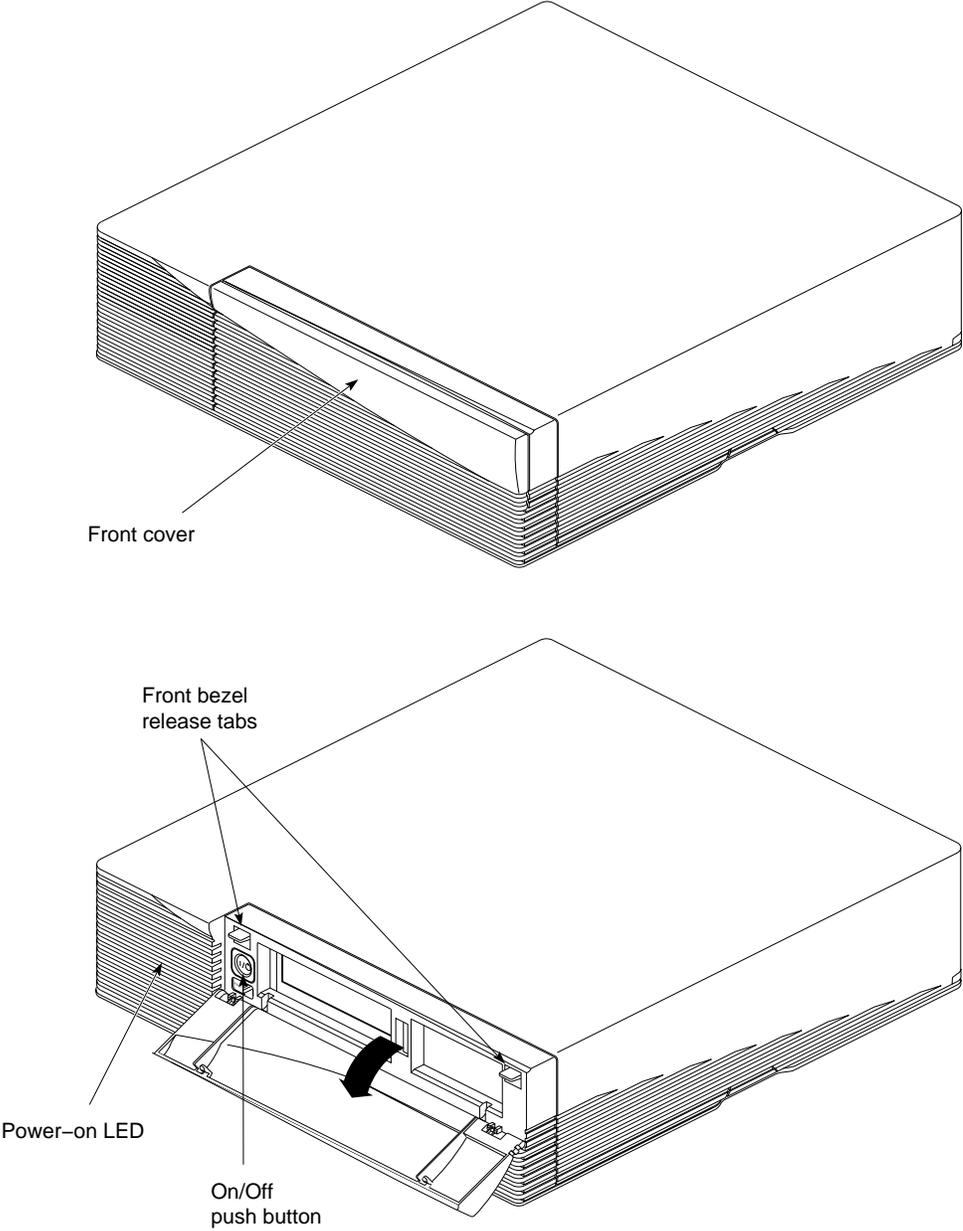
- The differential SCSI vault M for use with CHALLENGE L/Onyx deskside systems
- The single-ended SCSI vault M for use with CHALLENGE M/Indigo<sup>2</sup> desktop systems

The differential and single-ended chassis are externally identical except for the sticker used to indicate what SCSI protocol the vault M uses. The sticker should be installed on the back of the unit above the SCSI connectors. Note that the differential version of the vault M cannot use a removable media drive and cannot be connected to a CHALLENGE M or Indigo<sup>2</sup>.

As shown in Figure 1-1, the vault M uses a swing-down front cover that allows access to the On/Off push button, the removable media drive (if installed), and the front bezel tabs. The vault M's power-on LED is located to the left of the front cover.

**Caution:** Never turn an active vault M chassis off until after you have taken the disks in the vault M off-line and gracefully halted the host system. Turning the vault M off while it is in active use by the host will most likely result in data loss.

The back of the vault M has two SCSI connectors. The top SCSI connector attaches to the host system and the bottom connector is used for termination or (with differential vault M only) continuation of the SCSI bus. The power cord connection for the unit is located at the left rear of the chassis (as seen in Figure 1-2).



**Figure 1-1** Front Cover in Closed and Open Positions

## CHALLENGEvault M Hardware Specifications

Physical, electrical, environmental, and power specifications for the vault M desktop/deskside mass storage system are listed in Table 1-1.

**Table 1-1** CHALLENGEvault M Hardware Specifications

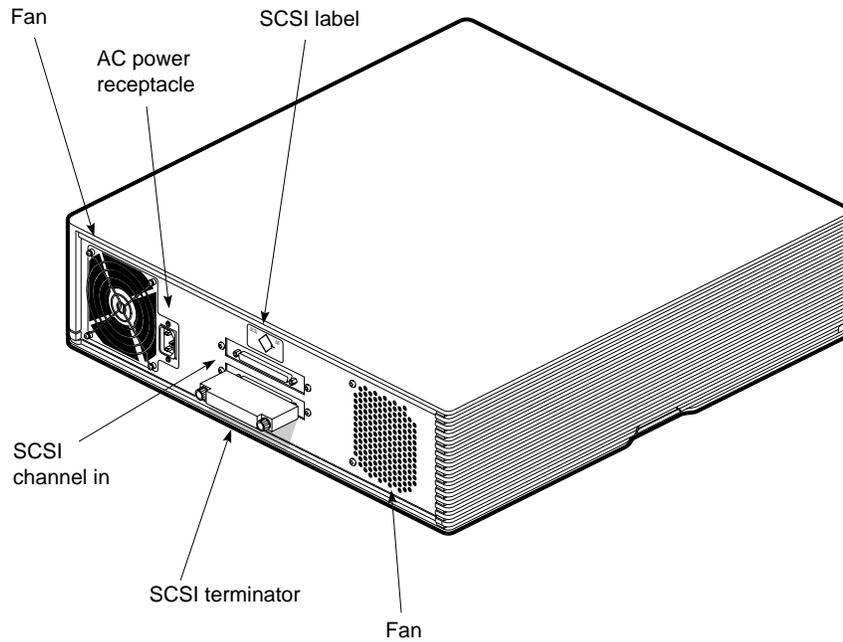
Parameter	Characteristics
<b>Physical Characteristics (without a stand)</b>	
Height	4.5 inches (11.4 cm)
Width	18.5 inches (47 cm)
Depth	18.5 inches (47 cm)
Weight	42 lbs (19 kg) maximum
Airflow clearance	3 inches (7.6 cm) minimum at rear of unit
<b>Physical Characteristics (using a stand)</b>	
Height	21.2 inches (53.9 cm)
Width	10.8 inches (27.4 cm) at the base
Depth	18.5 inches (47 cm)
<b>Electrical</b>	
Rating	100-120VAC or 200-240VAC
Frequency	47-63Hz at 100-120VAC or 200-240VAC
Power consumption	231 Watts nominal
Heat dissipation	788 Btu/hr. approximate
Plug type (100-120VAC)	Nema 5-15P
Plug type (200-240VAC)	International IEC-309
<b>Environmental</b>	
Operating temperature range	+13 to +35° C at 10% to 80% humidity
Nonoperating temperature range	+2 to +65° C at 10% to 95% humidity
Noise level	44 dB approximate

## Cabling and Termination Guidelines

Each vault M unit comes with a SCSI interface cable used to connect it to the host system.

If the vault M is a single-ended SCSI unit, a 1.5-foot (0.46 m) cable will be included. This cable will have a 68-pin high-density connector on one end for connection to the back of the vault M. The other end will have a 50-pin high-density connector for connection to the back of the Challenge M or Indigo<sup>2</sup>.

The locations of the external connectors and access panel are shown in Figure 1-2.



**Figure 1-2** External Connectors on the CHALLENGEvault M

**Caution:** Always allow at least 3 inches (7.6 cm) of clearance at the back of the vault M to provide proper ventilation space and cable clearance.

**Caution:** The single-ended vault M product is limited to a total SCSI cable length of 9.8 feet (3 m). The vault M's internal SCSI connection cable measures approximately 6 feet (1.8 m). Never connect the single-ended vault M to the host system with a cable that exceeds 3 feet (0.9 m). Doing so may result in SCSI bus errors or data loss.

**Note:** No additional SCSI devices may be daisy-chained to the back of the single-ended vault M. Always place the terminator on the lower SCSI connector of the single-ended vault M or SCSI errors may result. ♦

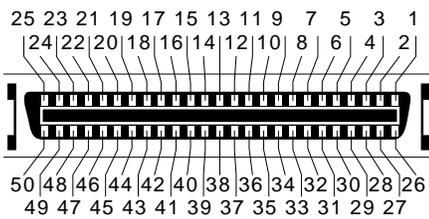
If the vault M is a differential SCSI unit, it will come with a 12-foot (3.7 m) cable for connection to the host system. A 1.5-foot (0.46 m) cable may also be ordered for extending the differential SCSI bus to connect with an additional vault M. Both these cables will have a 68-pin high-density connector on each end.

If the vault M is the last differential device on the SCSI bus, you must terminate it with a differential SCSI terminator.

Cables available with your vault M include:

- 1.5-foot (0.46 m), 68-pin to 50-pin, high density (P/N 018-0416-001)
- 12-foot (3.7 m), 68-pin to 68-pin (P/N 9290103)
- 1.5-foot (0.46 m), 68-pin to 68-pin (P/N 9290051)

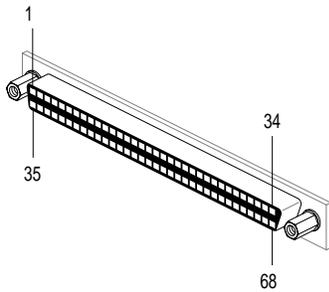
Pinouts for a host system's 50-pin single-ended or 68-pin differential SCSI connector are shown in Table 1-2 and Table 1-3, respectively. Figure 1-3 and Figure 1-4 accompany the tables to show the connector type and pin number locations.



**Figure 1-3** 50-pin Connector

**Table 1-2** 50-pin Single-ended, High-density SCSI Pinouts

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



**Figure 1-4** 68-pin Connector

**Note:** Read the following information regarding signal names.

The hyphen preceding a signal name indicates that the signal is active-low.

8-bit devices that connect to the P-cable leave these signals open: -DB(12), -DB(13), -DB(14), -DB(15), -DB(P1), -DB(8), -DB(9), -DB(10), -DB(11), +DB(12), +DB(13), +DB(14), +DB(15), +DB(P1), +DB(8), +DB(9), +DB(10), +DB(11). All other signals are connected as shown in Table 1-2.

**Table 1-3** 68-pin Differential, High-density SCSI Pinouts

Pin Number	Signal Name	Pin Number	Signal Name
1	+DB(12)	35	-DB(12)
2	+DB(13)	36	-DB(13)
3	+DB(14)	37	-DB(14)
4	+DB(15)	38	-DB(15)
5	+DB(P1)	39	-DB(P1)
6	Ground	40	Ground
7	+DB(0)	41	-DB(0)
8	+DB(1)	42	-DB(1)
9	+DB(2)	43	-DB(2)
10	+DB(3)	44	-DB(3)
11	+DB(4)	45	-DB(4)
12	+DB(5)	46	-DB(5)
13	+DB(6)	47	-DB(6)
14	+DB(7)	48	-DB(7)
15	+DB(P)	49	-DB(P)
16	DIFFSENS	50	Ground
17	TERMPWR	51	TERMPWR
18	TERMPWR	52	TERMPWR
19	Reserved	53	Reserved
20	+ATN	54	-ATN
21	Ground	55	Ground
22	+BSY	56	-BSY
23	+ACK	57	-ACK
24	+RST	58	-RST
25	+MSG	59	-MSG
26	+SEL	60	-SEL
27	+C/D	61	-C/D
28	+REQ	62	-REQ
29	+I/O	63	-I/O
30	Ground	64	Ground
31	+DB(8)	65	-DB(8)
32	+DB(9)	66	-DB(9)
33	+DB(10)	67	-DB(10)
34	+DB(11)	68	-DB(11)

## Disk-Handling Precautions

SCSI disk drives are most vulnerable to damage when they are unpackaged and not yet mounted in a system. Even while still packaged, a drive can be damaged by rough handling.

When handling a drive after unpackaging, there are two major types of damage to beware of:

- impact damage (rough handling)
- electrostatic discharge (ESD) damage

Dropping an unpackaged disk drive onto a hard surface from as little as one inch (2.5 cm) can cause damaging internal forces.

Avoid touching the drive's printed circuit board (PCB) and leave the unit in ESD protective wrap as long as possible. Use an antistatic mat and/or a grounding strap when inspecting or handling the drive.

Other handling considerations prior to installation include:

- Install drives in a clean, dust-free work area.
- Leave the drive in the packing box and antistatic bag until time for the installation.
- Handle drives by their frames; avoid touching the edge connectors or PCB.
- Do *not* stack drives on top of one another.
- Do not store or rest drives on their sides. Unpackaged drives should rest with the hard drive assembly side down (PCB side up) until installed or repackaged.

## Using Third-party SCSI Drives

As the performance and sophistication of SCSI drives and interfaces have increased rapidly in the last several years, the concept of a standard “plug-and-play” SCSI drive has become nearly obsolete.

Silicon Graphics (and most other companies) have found that the SCSI specification is not nearly “tight” enough to cover all drives on all platforms. This means there is no guarantee that a disk drive, an interface card, and an operating system software driver can all be built independently to the SCSI specification and still be relied upon to work well without modification.

Virtually all SCSI drives that have gone through Silicon Graphics’ test labs have required some modifications to work at their full potential with our systems. This does not mean there was anything wrong with any of the drives. What it does mean is that a drive design has been tested and its firmware specifically “tuned” to perform with a particular line of Silicon Graphics systems. If you plug that same tested Silicon Graphics drive design into another company’s UNIX<sup>®</sup> workstation, it might perform poorly or not at all.

Approximately 125 function/configuration tests are run on each Silicon Graphics-qualified SCSI device. Many users’ applications use only a subset of these test areas. This means that use of a third-party drive might never show a difference unless the drive has a problem in one of the very commonly used areas.

Sometimes a problem that a particular user encounters is not immediately obvious as a disk problem. Symptoms may appear to be an operating system glitch or intermittent loss of performance. Worse yet, the nonconforming third-party disk may artificially limit the maximum performance of the Silicon Graphics system. It would be highly advisable to ask a third-party drive vendor the following questions before purchasing its products:

- How much and what kind of testing has been done on the drive?
- With what Silicon Graphics system configurations has the device been tested? (Obviously, the model you care most about is the one you use.)
- What systems does the vendor have in-house for testing SCSI drives?

Silicon Graphics-trained support personnel are equipped to handle issues involving systems and their approved SCSI devices sold by Silicon Graphics.

Problems caused by using nonconforming third-party disks with a Silicon Graphics system may be difficult to solve. Issues regarding such problems should be referred to the third-party drive supplier.

## Getting Started

This chapter tells you how to set up your CHALLENGEvault M. It includes instructions on:

- selecting a site for the unit
- checking your shipment
- removing the covers
- configuring and installing disk drives
- putting all the pieces together
- turning on your vault M
- shutting down and turning off your vault M
- locking the unit using the lockbar

To set your system up as a network resource, refer to the *IRIX Advanced Site and Server Administration Guide*. If you need help with basic troubleshooting or maintenance procedures, go to Chapter 4 in this manual. Note that the power supply in your vault M should be repaired only by a qualified service person.

If you want to secure your vault M server, follow the instructions in the section “Locking Your CHALLENGEvault M” at the end of this chapter.

### Selecting a Site

The vault M is designed to sit on or beside your desk. If you prefer to keep the vault M chassis on its side on the floor, you can attach the unit’s “feet” that shipped with the system and set it beside your desk.

For guidelines on how to physically place the vault M, see the section “Placement of the CHALLENGEvault M” later in this chapter.

Install any internal drives first before placing the system in your work area.

Select a site using these guidelines:

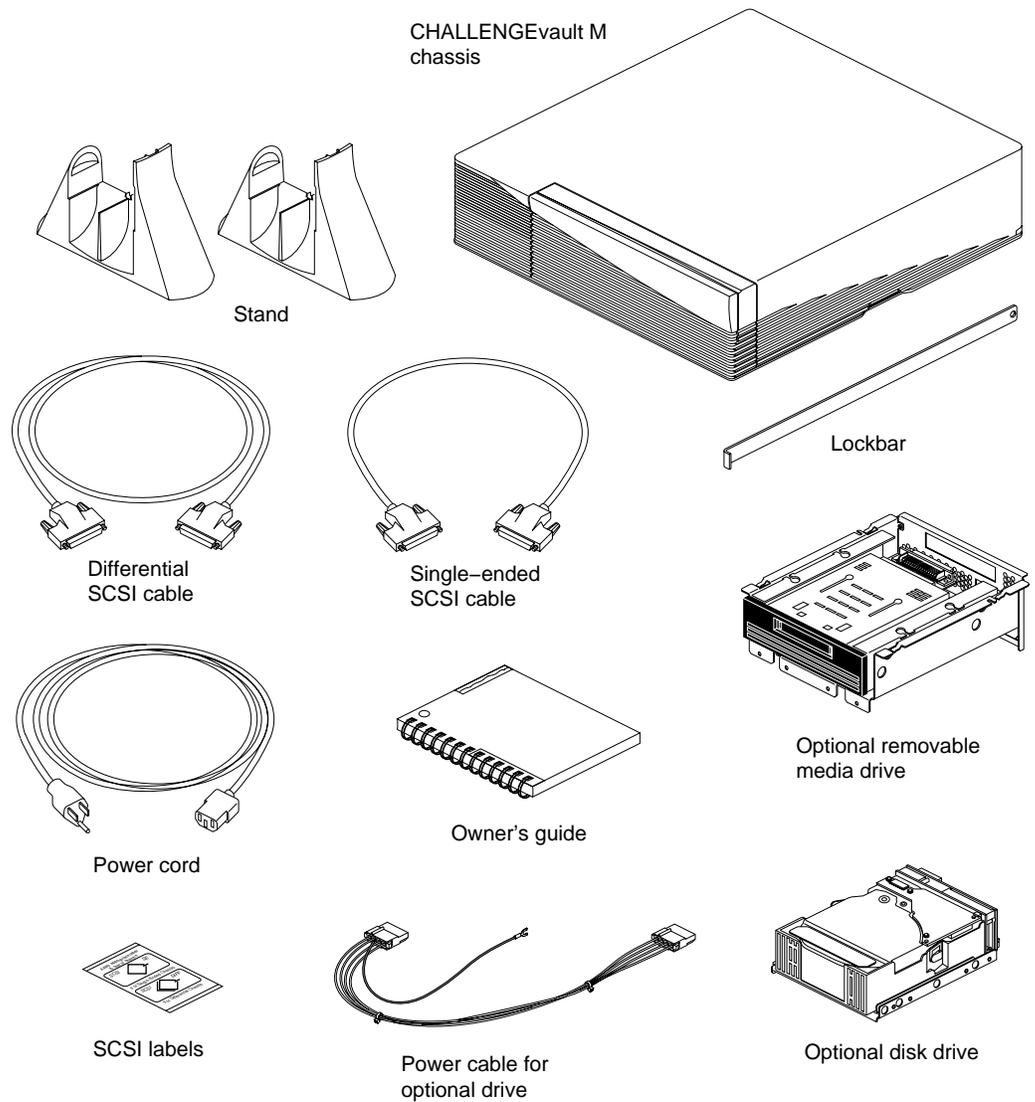
- For North American applications, place the vault M so that its 10-foot (3 m) power cord can reach a standard three-pronged (grounded) electrical outlet.
- For international applications, place the vault M so that its 8.2-foot (2.5 m) power cord can reach an approved electrical outlet.
- Place the single-ended vault M so that it is directly below, on top of, or next to the host system. The SCSI cable measures 1.5 feet (0.46 m).
- Place the differential vault M so that it is within 8 feet (2.4 m) of the host system.
- If a second differential vault M will be daisy-chained to the first, place it within 1.5 feet (0.46 m) of the first vault M.
- Do not place the vault M within a small, enclosed area, such as a closet, or it may overheat. It is important not to block the vents.
- Do not drape anything, such as a jacket or blanket, over the vault M.

## Checking Your Shipment

The vault M is shipped in a single box. In it, you should find the vault M chassis, lockbar, vertical stand, and this guide.

SCSI cables, the power cord, and optional disk or removable media drives that you ordered are shipped in separate additional boxes.

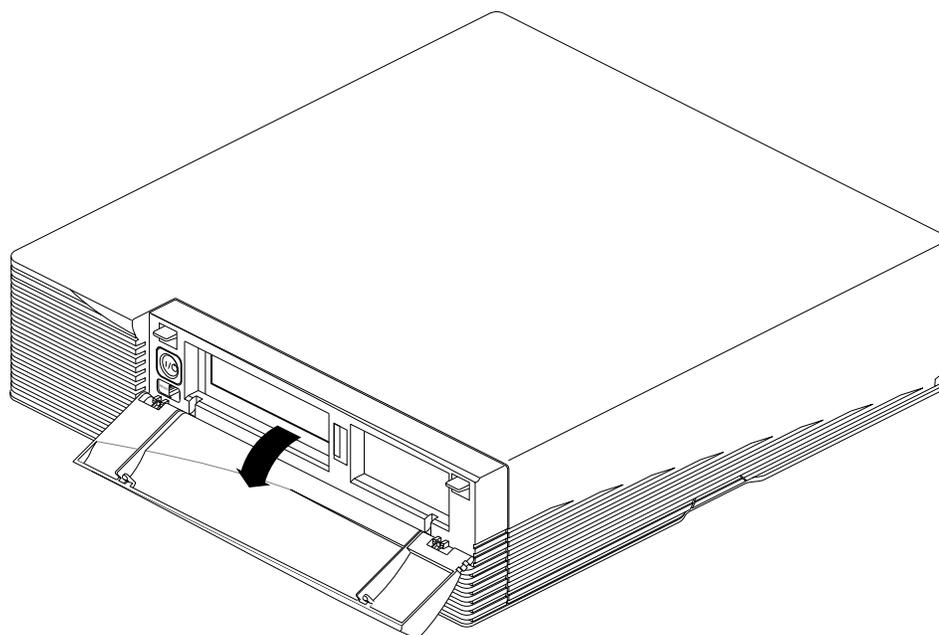
After you unpack your vault M and its parts, make sure you have all the non-optional pieces shown in Figure 2-1.



**Figure 2-1** CHALLENGEvault M Standard and Optional Parts

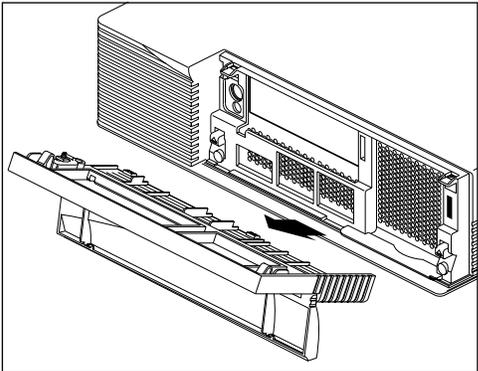
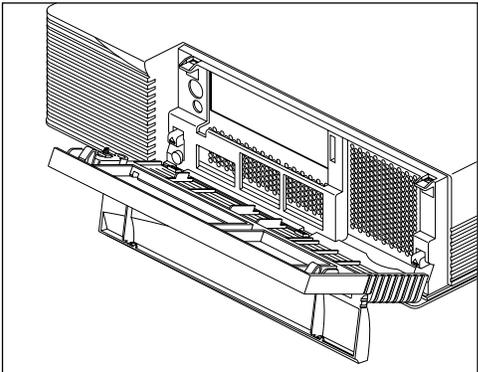
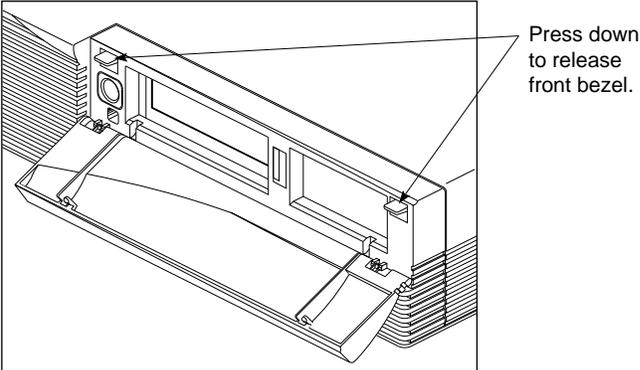
## Removing the Covers

1. Open the front cover.
  - Face the front of the vault M chassis.
  - Snap the front cover away from the top edge of the chassis and tip it down, as shown in Figure 2-2.



**Figure 2-2** Opening the Front Cover of the CHALLENGEvault M Chassis

2. Remove the front bezel.
  - Press down on the tabs on each side of the bezel; see Figure 2-3.
  - Pull the bezel at the top and then lift it away from the chassis.

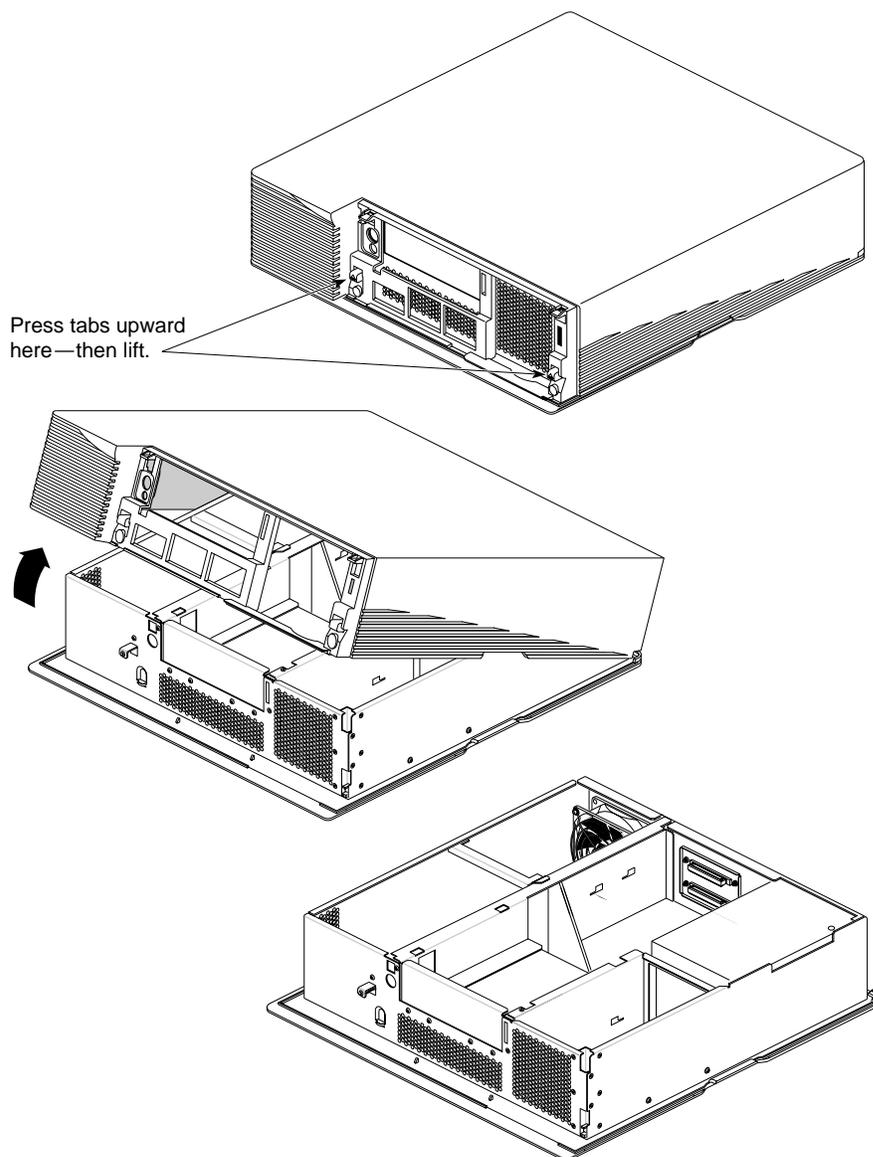


**Figure 2-3** Removing the Front Bezel from the CHALLENGEvault M Chassis

3. Remove the top cover as shown in Figure 2-4.
  - Press the lower tabs on either side of the drive openings upward.
  - Pull up on the cover and move it back and away from the chassis, lifting it clear.

With the cover removed, you are ready to install your hard disk(s). Go on to the next section to perform the necessary procedures.

**Caution:** The vault M is designed and tested to operate with disk drives specifically tested and configured for Silicon Graphics system requirements. Use of non-approved drives in this unit may result in lower system performance, SCSI errors, data loss, or other problems. Refer to the section “Using Third-party SCSI Drives” at the end of Chapter 1 for additional information.

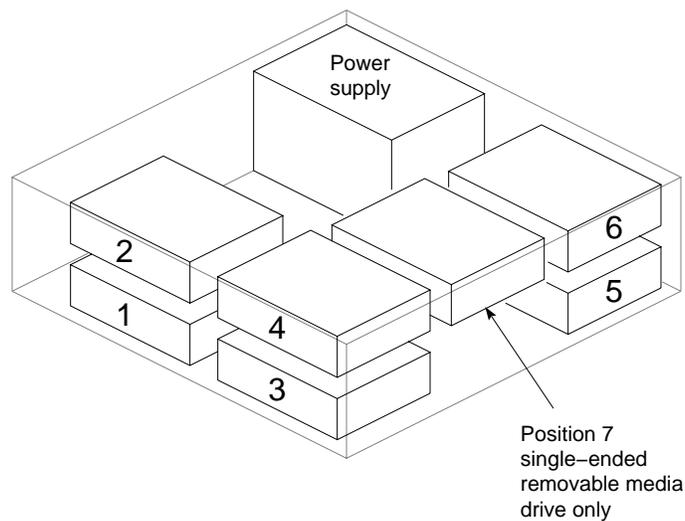


**Figure 2-4** Removing the Plastic Top Cover

## Configuring a New 3.5-inch Hard Disk Drive

After you have removed the cover from the vault M, you must select the location(s) for your new disk(s) and properly configure and install it (them).

There are six locations for hard disks within the vault M. Figure 2-5 shows the proper sequence for installing hard disks within the unit. The priority of each drive position is determined by safety and cooling constraints and should always be followed.



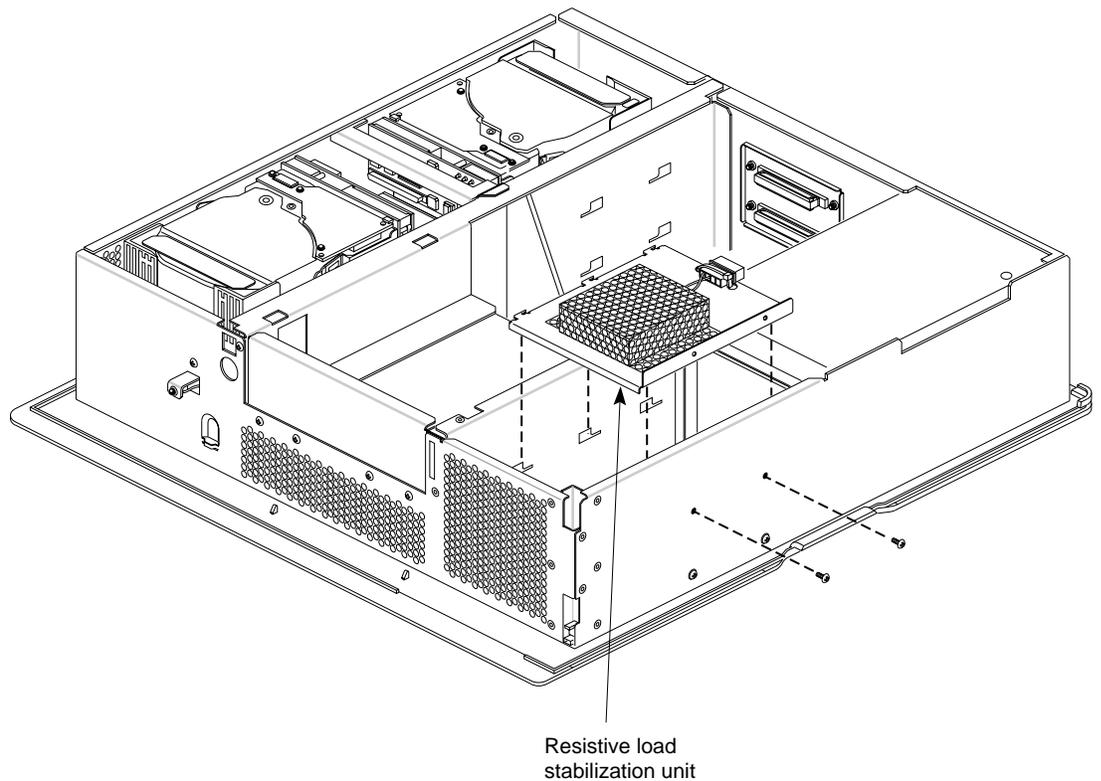
**Figure 2-5** Proper Drive Placement Sequence

**Note:** Each drive comes with a grounding strap. Be sure to use the grounding strap when installing or removing disk drives. Clip the grounding strap to a bare-metal part of the grounded chassis. ♦

Be sure to use the configuration information in the next sections to properly configure each disk drive before installing it in the vault M.

**Caution:** Improper SCSI implementation will cause degraded system performance, a system crash, and/or possible data loss.

You will note that there is a resistive load stabilization unit installed in drive position 6. This stabilization unit is installed to balance power distribution in vault Ms that use fewer than six hard disk drives. Do not permanently remove it unless you are ready to install the sixth disk drive in your vault M (see Figure 2-6).



**Figure 2-6** Resistive Load Unit Removed from Chassis

### Checking and Setting the 2GB Drive's SCSI ID

Each drive comes individually packed in its own shipping carton. The drive comes already attached to its vault M mounting bracket. Before unpacking a drive, you should put on the grounding wrist strap and use the instructions

in the following subsections to properly configure the jumpers on the back of each drive.

**Note:** Each disk drive shipped for installation in the vault M is assigned a default SCSI ID setting at the factory. Single-ended drives are set to ID 7 and differential drives to ID 15. If you are going to install only one hard disk drive in the vault M, you can leave the drive configured as it was shipped. However, any subsequent drives you install will have to be configured with a different SCSI ID. ♦

It is advantageous (but not required) to give each SCSI device a consecutive ID number related to its position in the vault M and the order in which it is installed. This will make the job of identifying a malfunctioning disk much easier if troubleshooting steps are required. To do this:

- Configure the disk in position 1 as SCSI ID 1.
- Configure the disk in position 2 as SCSI ID 2.
- Configure the disk in position 3 as SCSI ID 3.
- Configure the disk in position 4 as SCSI ID 4.
- Configure the disk in position 5 as SCSI ID 5.
- Configure the disk in position 6 as SCSI ID 6.
- Configure the removable media device as SCSI ID 7 (single-ended vault M only). No removable media devices are supported in the differential vault M units.

When using a second vault M daisy-chained to the first (differential vault M only):

- Configure the differential disk in position 1 as SCSI ID 7.
- Configure the differential disk in position 2 as SCSI ID 8.
- Configure the differential disk in position 3 as SCSI ID 9.
- Configure the differential disk in position 4 as SCSI ID 10.
- Configure the differential disk in position 5 as SCSI ID 11.
- Configure the differential disk in position 6 as SCSI ID 12.

If each drive in the vault M is not properly configured, SCSI bus errors and possible data loss may result when you bring the vault M on-line.

### Single-ended Drive Configuration

On the back of each hard disk is a jumper plug with nine possible positions for jumpers. For configuration purposes in the vault M, we are concerned only with the five pairs of pins on the left side of the block (address jumpers 0-4). See Figure 2-7 for the location of the jumper blocks.

Figure 2-8 shows how to properly place the jumpers on the disk's jumper block to set the SCSI ID for a number between 1 and 15. In single-ended devices, only the SCSI IDs 1 through 7 can be used.

**Caution:** Never set the drive to SCSI ID zero (with all jumpers removed), this ID is reserved specifically for the host SCSI controller.

If a removable media drive is installed, the factory default SCSI ID will be set to 6 for tape drives and CD-ROM drives. Setting the removable media SCSI ID to 7 is the recommended procedure. This leaves SCSI IDs 1 through 6 available for the hard disk drives installed in positions 1 through 6 in the vault M.

As a general rule, hard disk drives are usually numbered up from one and removable media drives numbered down from seven. See Chapter 3, "Installing a Removable Media SCSI Device," for additional information.

The motor-start jumper (fifth from the left) on the jumper block must always be installed to ensure proper drive power-on sequencing. The time sequencing for the drives to power on and operate is a 10 second delay times the drive's SCSI ID number. This ensures that the drives come on line in a manner that does not strain the power supply. See Figure 2-7 for the jumper location.

**Note:** Jumper settings shown are only for Silicon Graphics 2.0GB disk drives. †

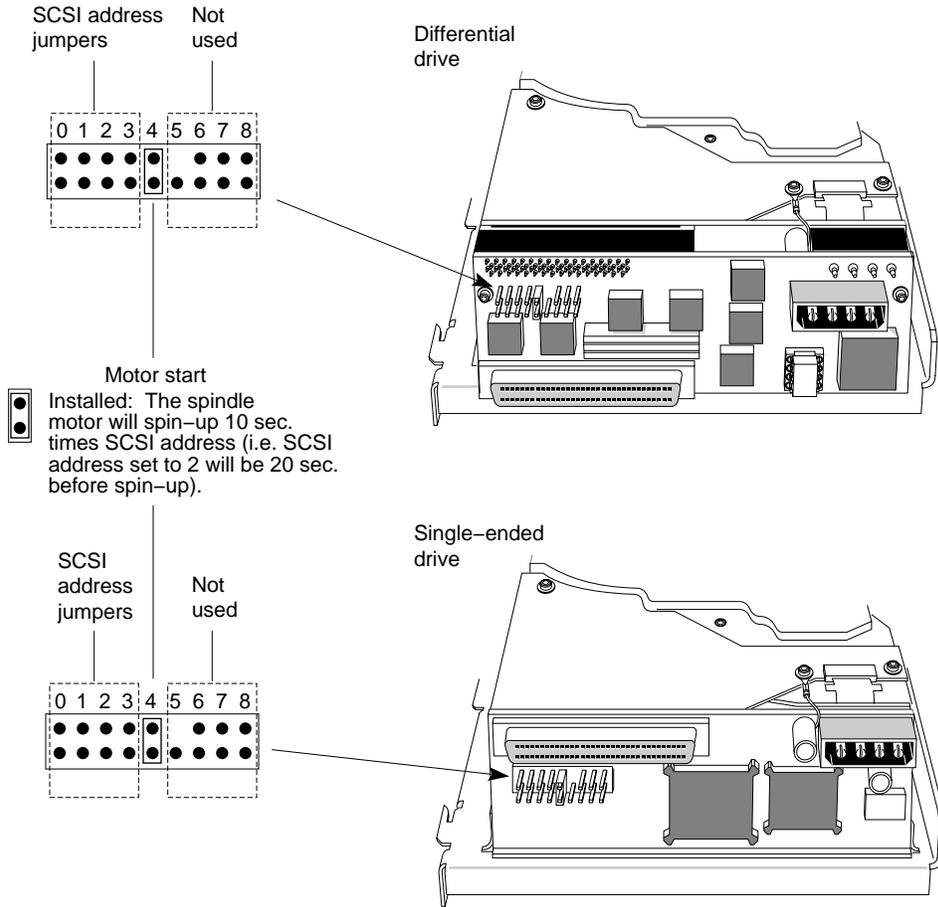
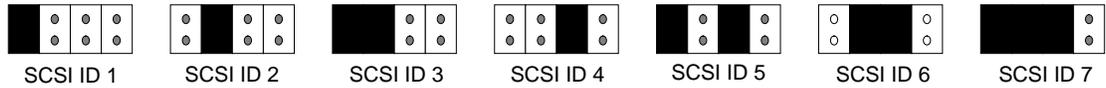
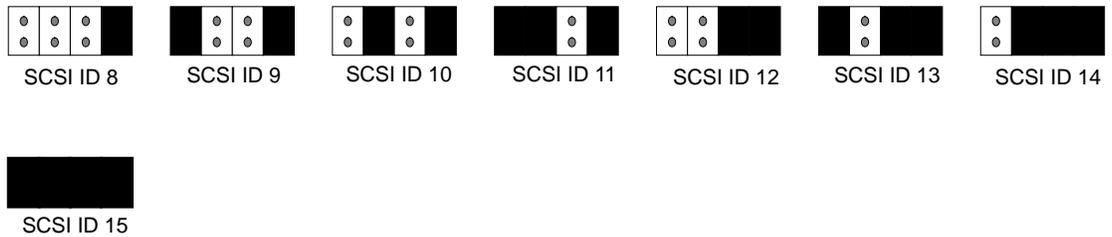


Figure 2-7 Jumper Block Location on Rear of Drive

SCSI IDs 1-7 are for single-ended or differential disk drives.



SCSI IDs 8-15 are for differential disk drives only.



**Figure 2-8** SCSI ID Jumper Assignments for Disk Drives

Table 2-1 shows the SCSI ID assignments in a tabular format.

**Table 2-1** SCSI ID Jumper Assignments

Jumper 0	Jumper 1	Jumper 2	Jumper 3	Address
In	Out	Out	Out	1
Out	In	Out	Out	2
In	In	Out	Out	3
Out	Out	In	Out	4
In	Out	In	Out	5
Out	In	In	Out	6
In	In	In	Out	7 <sup>a</sup>
Out	Out	Out	In	8
In	Out	Out	In	9
Out	In	Out	In	10

**Table 2-1** (continued) SCSI ID Jumper Assignments

Jumper 0	Jumper 1	Jumper 2	Jumper 3	Address
In	In	Out	In	11
Out	Out	In	In	12
In	Out	In	In	13
Out	In	In	In	14
In	In	In	In	15

a. Single-ended drives use only IDs 1-7.

**Differential Drive Configuration**

In the differential version of the vault M, you can configure and install up to six hard disk drives. Up to two vault Ms can be daisy-chained together, connected to a single differential SCSI bus. See Figure 2-7 for the location of the disk drive jumper block. See Figure 2-8 and Table 2-1 for information on configuring the SCSI ID jumpers.

Since no removable media drives are supported in the differential version of the vault M, configuration of a seventh device in the differential vault M is not an issue. The seventh disk on the SCSI bus would be in a daisy-chained vault M. See the section “Checking and Setting the 2GB Drive’s SCSI ID.”

**Note:** All disk drives installed in the vault M must have the motor-start jumper installed in position 4 on the disk drive jumper block (see Figure 2-7). ♦

**Installing a Hard Disk**

After you have completed all the configuration procedures for each disk drive assembly, you are ready to install the drives in the vault M.

**Note:** You will need a #2 Phillips-head screwdriver to install the disk drives or remove and reposition the mounting bracket as detailed in the section “Changing the Drive Bracket for Positions 3 and 4” later in this chapter. ♦

Use the following guidelines when mounting disk drives in the vault M:

- Always mount a disk drive with the connector end closest to the center of the vault M.
- Mount drives 1 and 2 in the bay adjacent to the system fan (see Figure 2-5).
- Mount drives 3 and 4 in the bay adjacent to the first and second drives.

**Note:** Use the additional instructions in the section “Changing the Drive Bracket for Positions 3 and 4.” ♦

- Drives mounted in positions 3 and 4 must be removed from their brackets, turned around, and remounted, before they can be installed in the vault M. The capacitive ground wire should be connected to the drive bracket during the remounting process.
- Don’t permanently remove the resistive load stabilization unit from drive position 6 unless you have at least five drives already installed.
- Install disk drives in positions 5 and 6 in the bay adjacent to the power supply *only* after filling all disk positions in the first two bays.

Use the following steps and illustrations to install up to six disk drives in the vault M:

1. Select the highest-priority disk drive position that is available and find two Phillips-head screws that are used to secure the disk assembly bracket to the outer sheet metal of the chassis. See Figure 2-10.

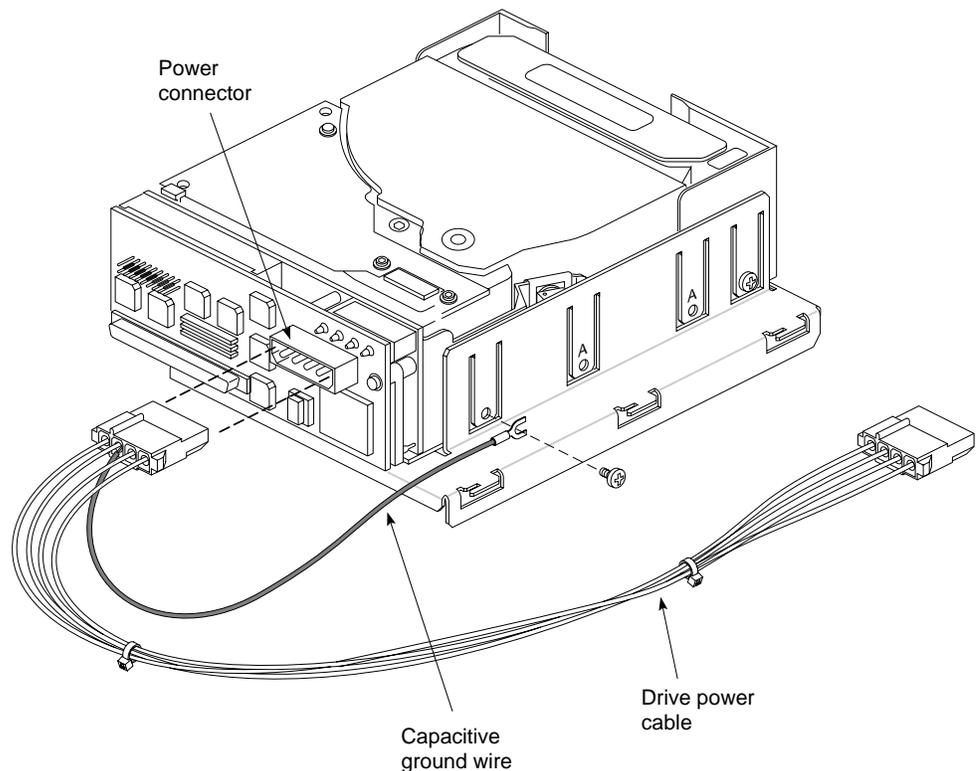
**Note:** Installing disk drives in positions 3 and 4 in the vault M requires additional steps that are specified in the next section. ♦

2. Plug the end of the drive’s power cable into the four-pin power connector on the back of the disk. Be sure to plug in the end that has a single small capacitive ground wire protruding from the back of the connector.

**Note:** All disks installed in a vault M require use of the Silicon Graphics’ disk power cable (with capacitive ground wire). Failure to use this cable may cause SCSI errors.

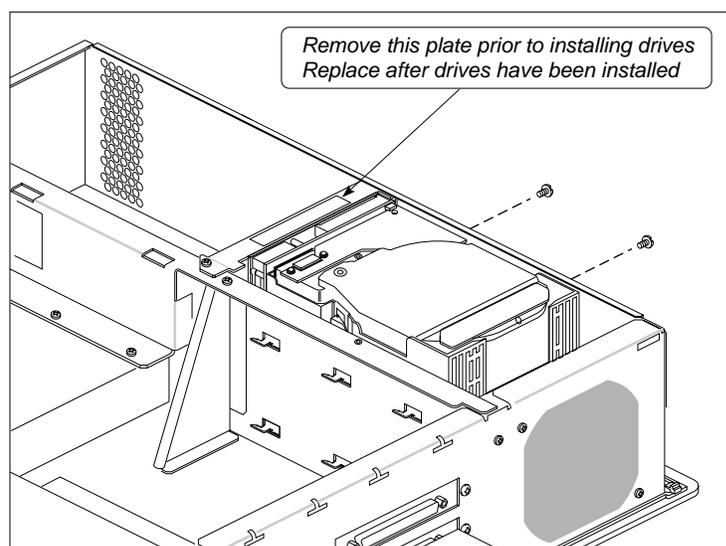
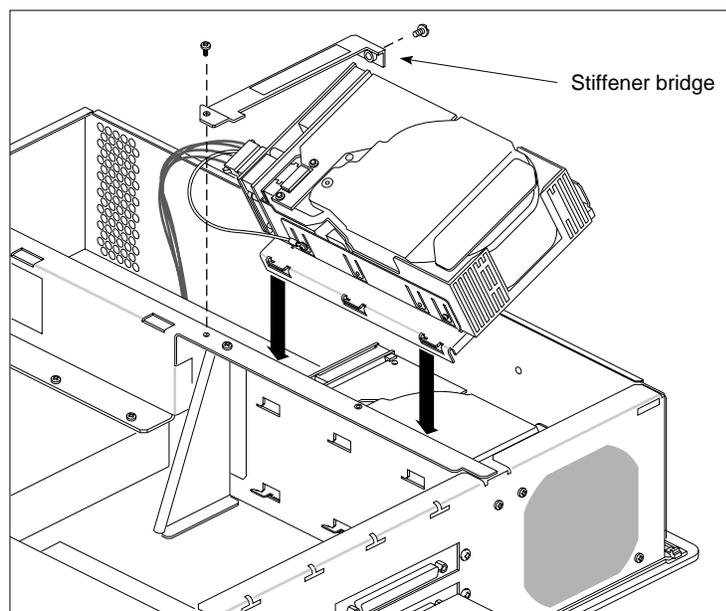
3. Use a Phillips-head screwdriver to loosen the bracket-to-drive mounting screw that is nearest the power connector on the rear of the disk drive.

4. Place the forks at the end of the small ground wire around the body of the screw, (between the screw head and the bracket) and tighten the screw head down. The forks should be firmly clamped between the screw head and the sheet metal of the bracket (see Figure 2-9).



**Figure 2-9** Attaching the Grounding Wire to the Drive Bracket (Positions 1, 2, 5, 6)

5. If you are installing a drive in positions 1 through 4, you should remove the sheet metal (stiffener) bridge that separates the two bays. Use the Phillips-head screwdriver to remove the outer and inner screws.
6. Tilt the drive toward the center of the vault M chassis and lower the disk assembly into the chosen position (see Figure 2-10). You should route the disk power cable through the cable access hole (where the SCSI cable comes through) before seating the drive hooks in the sheet metal.

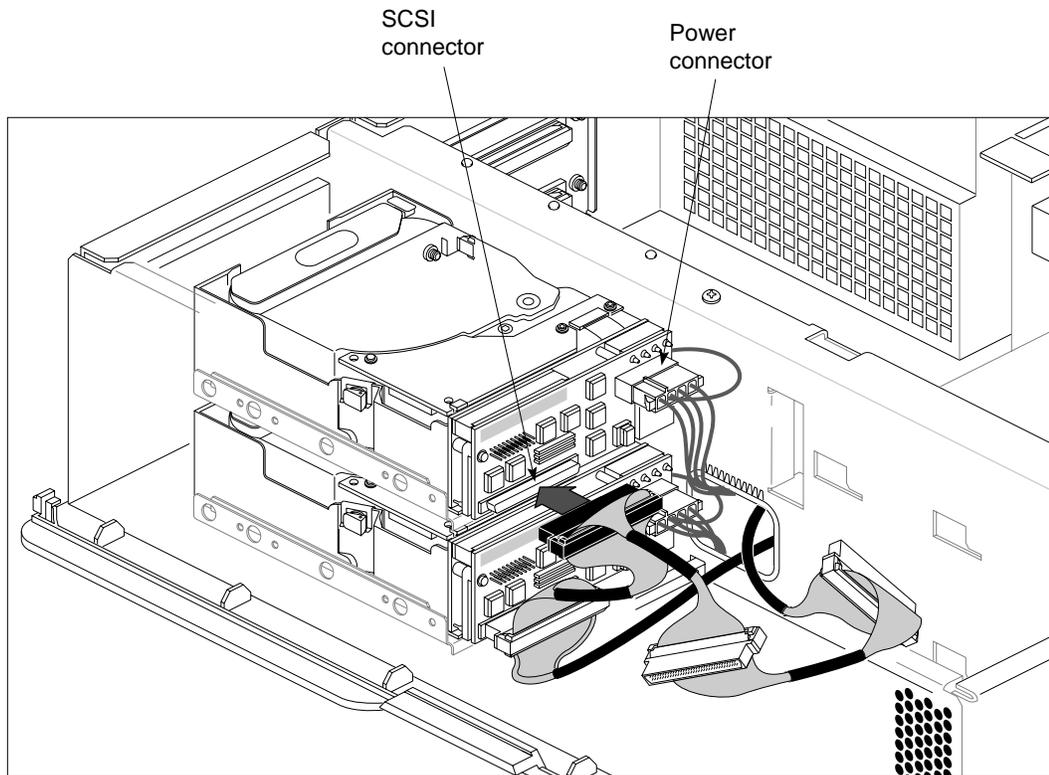


**Figure 2-10** Positioning the Disk

7. The three “hooks” on the SCSI drive bracket must match up with the openings in the inner sheet metal wall.

**Hint:** If you are installing disk drives that will fill positions 1 through 4, install the drives in the lower positions first. This method will make it easier to attach the SCSI connectors to the rear of each disk drive assembly and route the power cables to the vault M’s power board. ♦

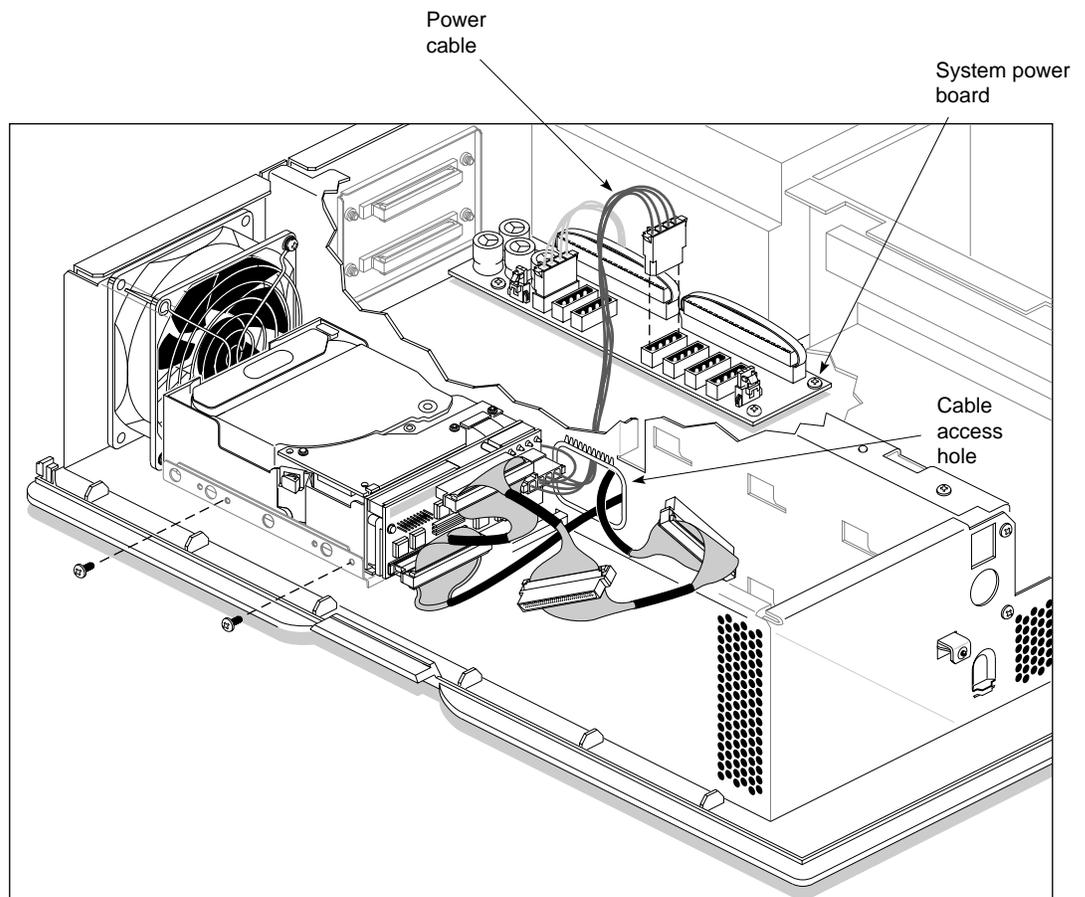
8. Attach the SCSI connector to the back of the drive. See Figure 2-11. Note that each connector is keyed to fit on the back of the drive in a specific orientation
9. Push the rear of the drive assembly toward the center of the vault M chassis until the drive bracket hooks are firmly locked in their inner sheet metal slots.



**Figure 2-11** SCSI and Power Connectors in the CHALLENGEvault M

10. Secure the bracket to the outer wall of the chassis with the two Phillips-head screws.
11. Route the four-wire power cable to the closest available power connector on the system power board and plug it in (see Figure 2-12).

This process should be repeated for drives in positions 1, 2, 5, or 6. See Figure 2-5 for proper drive positions.



**Figure 2-12** Routing the Drive's Power Cable to the Power Board

## Changing the Drive Bracket for Positions 3 and 4

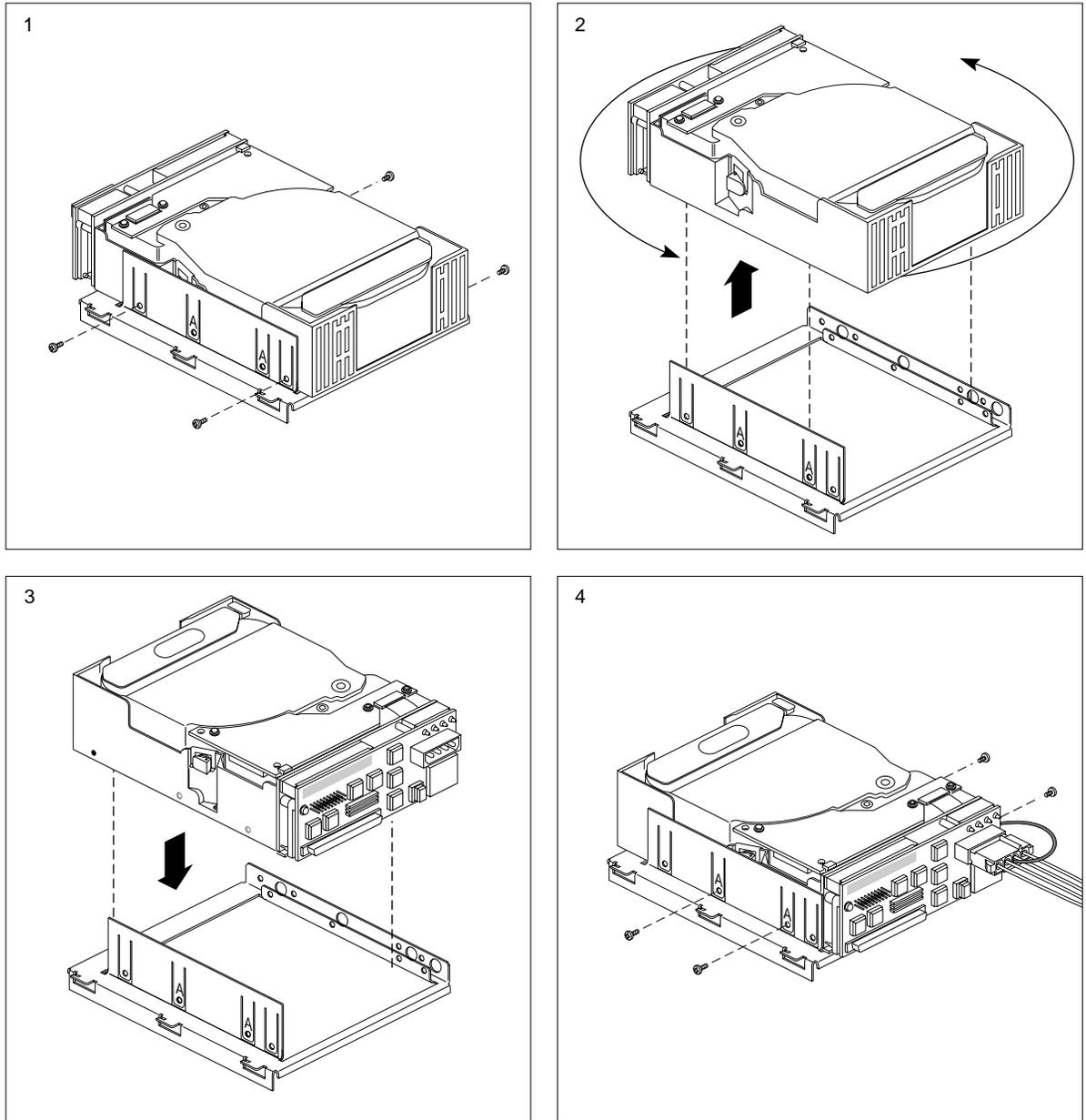
You must remove and reposition the disk drive bracket in order to properly install a drive in position 3 or 4 within the vault M. See Figure 2-5 for proper drive positions. After changing the position of the drive bracket, use the steps in the previous section, "Installing a Hard Disk," to install a drive in position 3 or 4.

Use the following steps and Figure 2-13 to change the disk bracket so that the drive assembly fits properly into position 3 or 4:

1. Locate and remove the four black-oxide Phillips-head screws that hold the disk drive to its mounting bracket.
2. Carefully separate the disk drive and its bracket.
3. Rotate the drive or bracket 180 degrees so that the sheet metal "hooks" that mount the bracket to the inner wall of the drive bay are on the opposite side of the drive. The mounting hooks should be on the side of the drive closer to the 68-pin SCSI connector.
4. Center the bracket underneath the drive and align the bracket mounting holes coded "A" with those on the disk drive.
5. Connect the bracket to the drive with the same four black-oxide screws you removed in step 1. Leave the bracket screw closest to the drive's power connector slightly loose in preparation for installing the ground wire that is part of the drive's power cable.

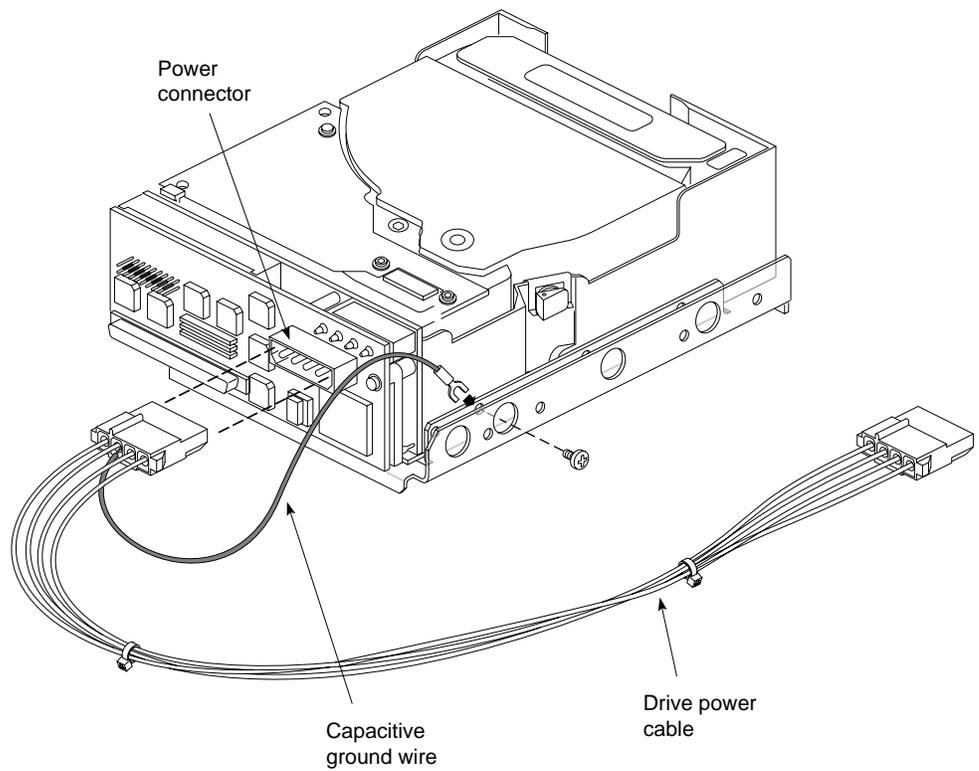
**Caution:** When you reconnect the bracket to the disk drive, it is important that you use the same 3/16-inch black-oxide screws that were removed from the drive assembly in step 1. Use of longer screws may short internal components within the drive and cause malfunction.

6. Plug the end of the drive's power cable into the four-pin power connector on the back of the disk. Be sure to plug in the end that has a single small capacitive ground wire protruding from the back of the connector. The ground wire will connect to the loose screw in step 5.



**Figure 2-13** Repositioning the Drive Bracket

7. Place the forks at the end of the small ground wire around the body of the screw (between the screw head and the bracket) and tighten the screw head down. The forks should be firmly clamped between the screw head and the sheet metal of the bracket (see Figure 2-14).
8. Install the disk drive and bracket assembly as described in the previous section, "Installing a Hard Disk."



**Figure 2-14** Attaching the Grounding Wire to the Drive Bracket (Positions 3 and 4)

## Putting the Pieces Together

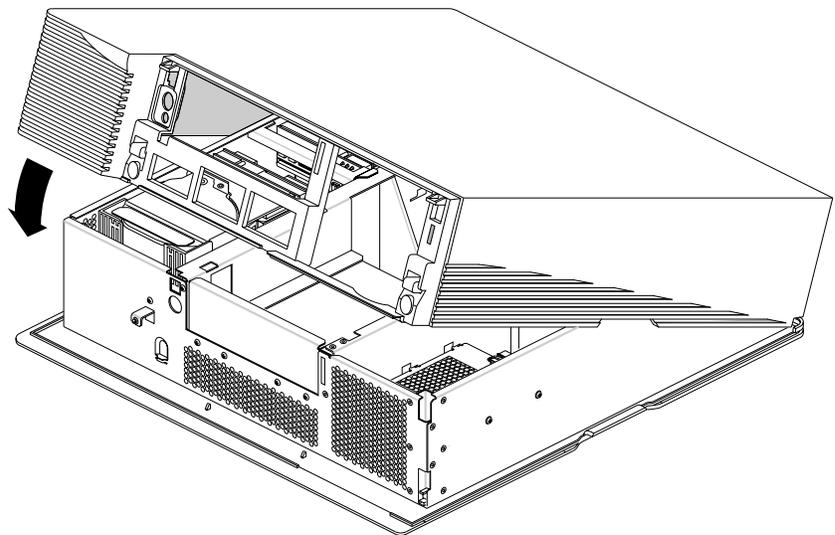
If you need to install a removable media device in the vault M, turn to Chapter 3 and read the section on “Drive Installation.”

If you are finished installing drives, place the vault M in its intended operational location using the information in the section “Placement of the CHALLENGEvault M.” Go on to the following sections for information on proper SCSI cable and power cord connections.

### Replacing the Cover

To replace the plastic top cover, follow these steps:

1. Place the hooks at the back of the cover into the slots in the back of the chassis, as shown in Figure 2-15.
2. Lower the cover down onto the chassis until it snaps into place, and then replace the front bezel and front cover.



**Figure 2-15** Replacing the Top Cover on the CHALLENGEvault M Chassis

## Placement of the CHALLENGEvault M

There are several ways to position the system, including:

- Placing the vault M on top of (or below) the Challenge M or Indigo<sup>2</sup> chassis.
- Stacking the vault M on top of the Challenge L or Onyx deskside chassis.
- Standing the vault M on its side near the host system using the workstation stand.

**Caution:** Do not stand the vault M on its side without using the unit's stand. Install the stand as described in the section, "Using the CHALLENGEvault M Stand," below. The vault M's stand has been designed to allow proper airflow through the vault M chassis. Standing the vault M on its side without using the stand can impede airflow through the system and lead to overheating.

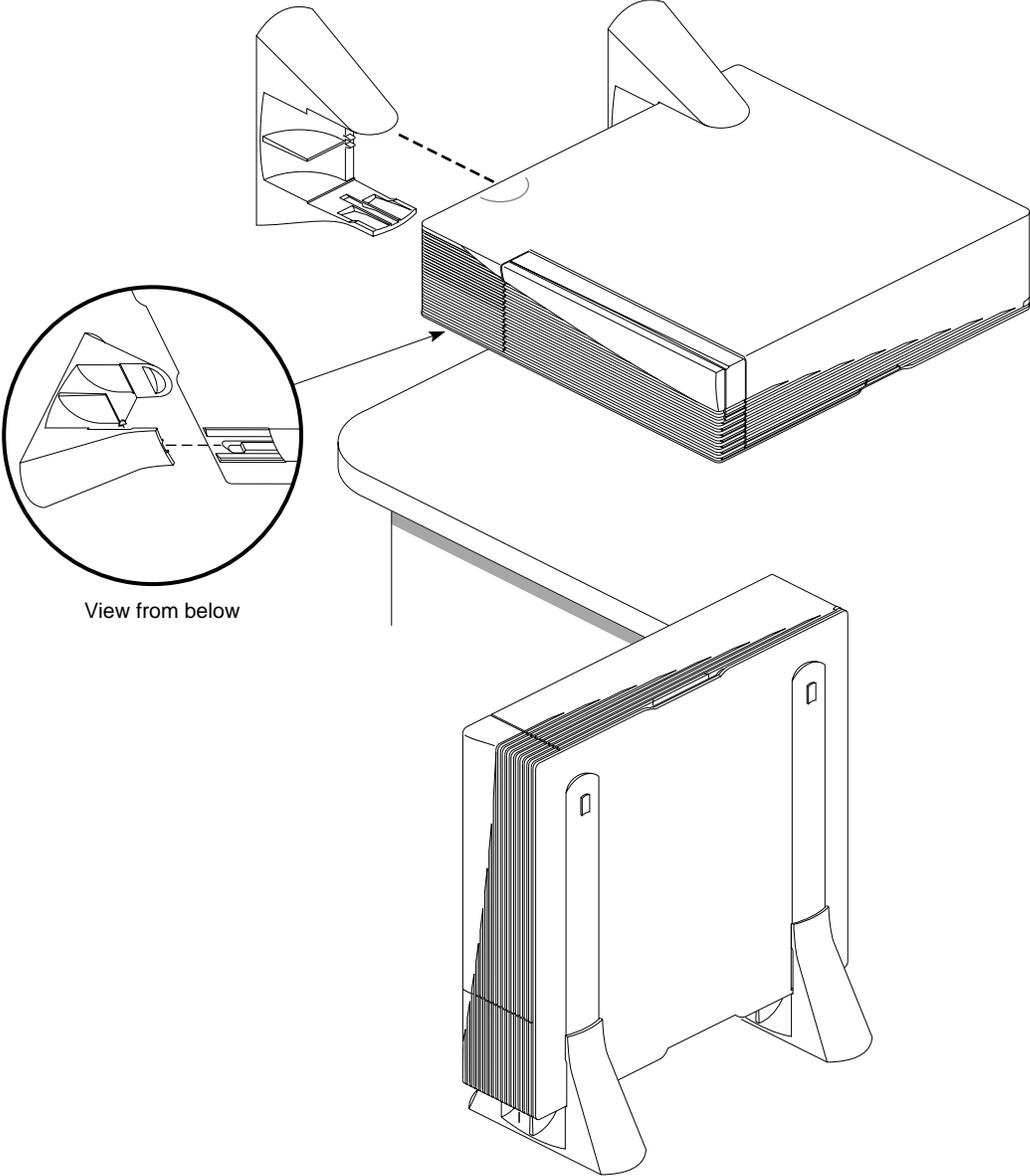
## Using the CHALLENGEvault M Stand

To set the vault M in a vertical position on the stand, follow these steps:

1. Face the front of the system.
2. Place the system so the left side is hanging off the edge of your work surface.
3. Look beneath the left side of the vault M. You will see guides for the vault M stand, as shown in Figure 2-16.
4. Press each piece of the stand onto the vault M, aligning the pieces with the guides, as shown in Figure 2-16.

**Note:** The vault M can weigh up to 42 pounds (19 kg); use extra care or get help when lifting it up off the desk and into position. ♦

5. Tip the vault M down onto the floor so that it rests on the stand.



**Figure 2-16** Attaching the CHALLENGEvault M Stand to the System

## Connecting the CHALLENGEvault M to the Host

Use the following procedures to properly connect your vault M to the host system:

1. Power off the host system and plug one end of the SCSI cable into the host's external SCSI connector.

**Note:** On desktide systems, the connector will be located behind the front door. See Figure 2-17. The following section, "Special SCSI Requirements for Desktide Systems" has additional information regarding this topic. ♦

2. Plug the other end of the SCSI cable into the top SCSI connector on the back of the vault M.

**Note:** Always plug the incoming SCSI cable into the top SCSI connector on the back of the vault M. The bottom 68-pin SCSI connector should be used for termination or (with differential vault M only) continuation of the bus to another vault M. ♦

## Special SCSI Requirements for Desktide Systems

The external SCSI connector on the CHALLENGE L/Onyx desktide products does not come as a standard, pre-connected feature from the factory. The external SCSI connector must be connected and configured by a trained field installer during or after the installation of the desktide host system.

Connection and configuration of the external SCSI port is not considered an end-user task. Opening of the I/O panel by other than a qualified service person may violate safety agency requirements and regulations.

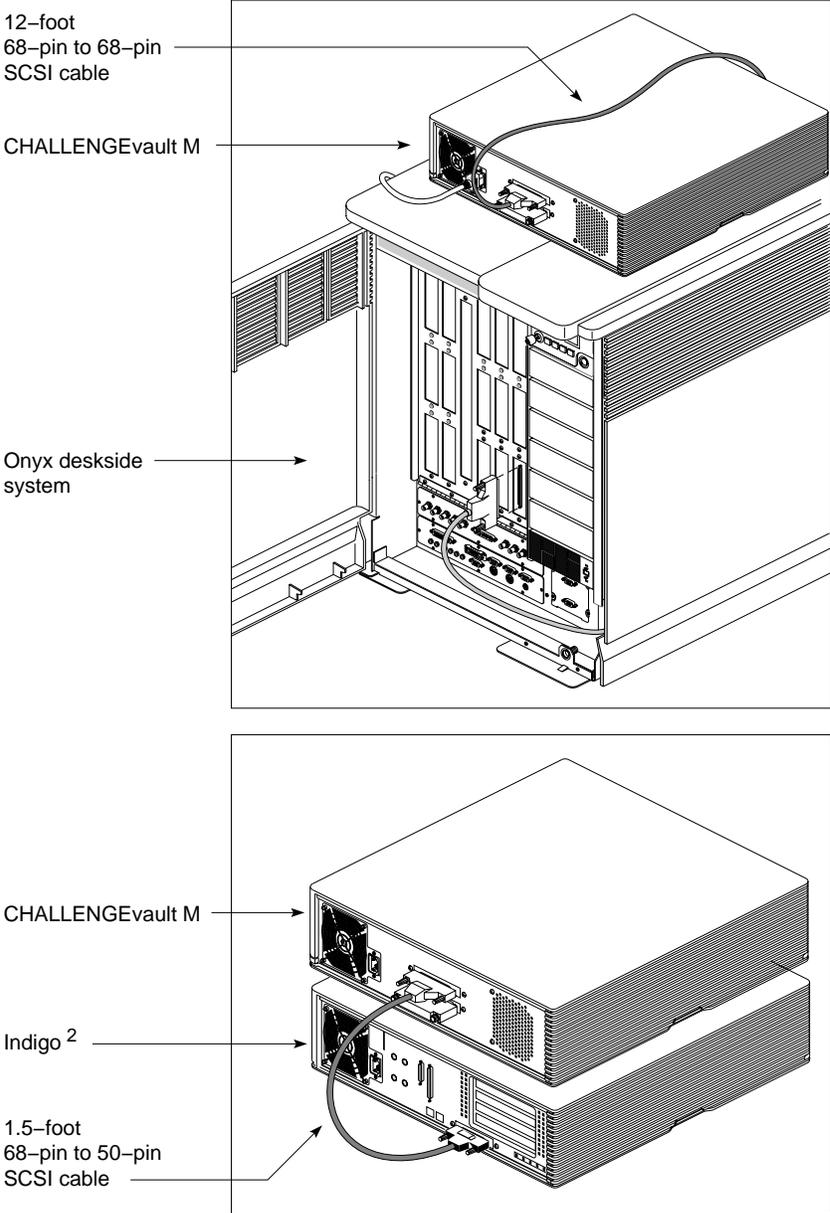
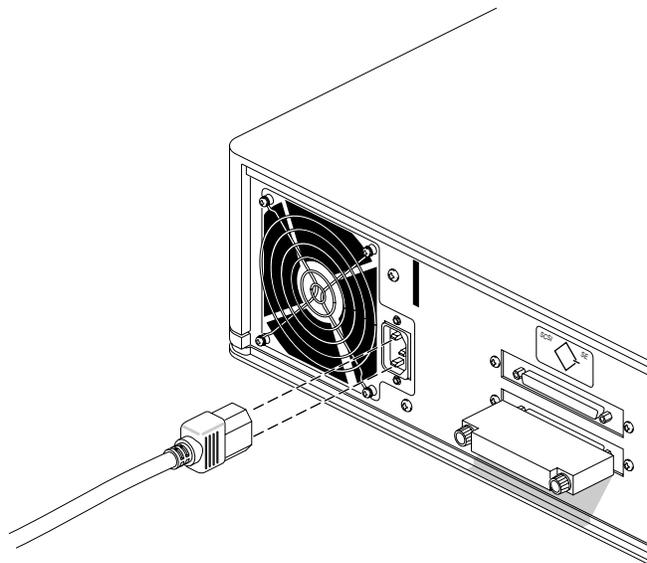


Figure 2-17 SCSI Connection to a Host System

### Attaching the Power Cord

To attach the power cord, follow these steps:

1. Connect the socket end of the cord to the power connector on the back of the vault M chassis, see Figure 2-18.
2. Plug the other end into a three-pronged (or other approved) grounded electrical outlet.



**Figure 2-18** Attaching the Power Cord to the CHALLENGEvault M Chassis

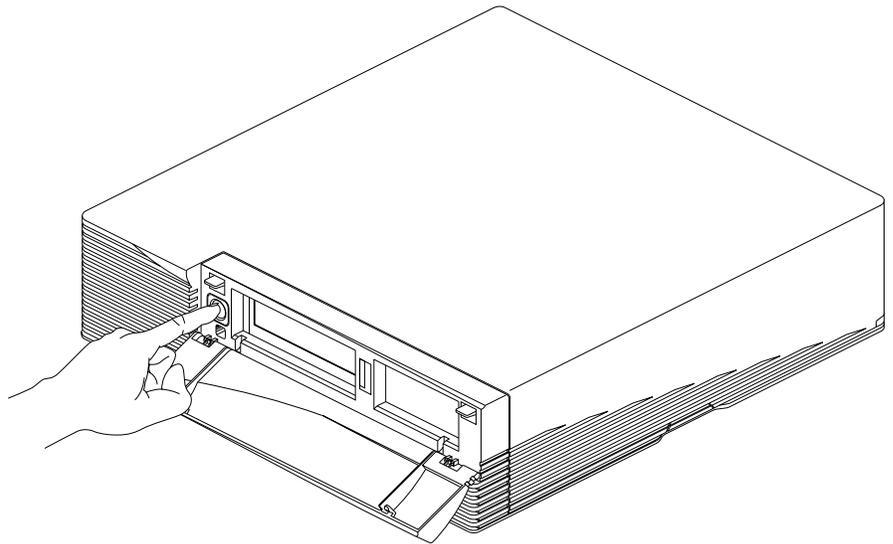
You are finished setting up your vault M and are ready to power on the system.

## Turning On the CHALLENGEvault M

Once you've connected all of the pieces, as described in the previous sections, power-on your vault M and then the host system by following these steps:

1. Power on the vault M.
  - Open the front cover on the vault M by snapping it away from the top edge of the chassis and tipping it down.
  - Press the power switch to turn on the vault M, as shown in Figure 2-19.

**Caution:** You must wait approximately two minutes after pressing the power switch on the vault M before powering on the host system. Failure to follow this procedure will result in SCSI errors.
2. Power on the host system and its console or monitor.



**Figure 2-19** Powering on the CHALLENGEvault M

When you power on the vault M, you should see the LED on the front of the machine turn on.

## Configuring the Host System to Recognize the CHALLENGEvault M Devices

Depending on what type and how many SCSI devices you installed in the vault M, some configuration steps may be necessary. The *hinov* command can confirm if your system recognizes the new SCSI drives installed in the vault M. Chapter 4 provides sample *hinov* listings from desktop and deskside units.

The next three sections describe various configuration needs and approaches.

### Configuration Options for New Hard Disks

After rebooting the host system, you will want to configure your new disks for use with IRIX. The configuration process can vary, depending on how many disks you have added and how you want to use them.

Some likely configuration processes would include:

- Partitioning the disks, if you want multiple partitions, using the *fx(1m)* command.
- Creating device nodes to access the disks using the *MAKEDEV(1m)* command (depending on how the disks are partitioned).
- Creating file systems on the disks, creating mount points for those file systems, and configuring the host system to automatically check and mount the file systems (as needed) using the *Add\_disk(1)* command.
- Using the *fx(1m)* command to format drives not purchased from Silicon Graphics. Drives purchased from Silicon Graphics are tested and pre-formatted. See the section “Using Third-party SCSI Drives” at the end of Chapter 1 for more information on this topic.

You may also want to grow an existing file system onto a new disk, increase swap space, create logical volumes, or stripe disks for increased performance. For information on performing all of these tasks, see the *fx(1m)*, *MAKEDEV(1m)*, *dks(7m)*, and *Add\_disk(1)* manual pages.

Additional information is available in the *IRIX Advanced Site and Server Administration Guide*.

### **If You Installed a Tape Drive**

If all you installed was a tape drive, it should be ready to use with your desktop system. For information on backing up and restoring data using the new tape drive, see the *Personal System Administration Guide* that was shipped with your desktop system.

### **If You Installed a CD-ROM Drive**

If you installed a CD-ROM, you need to mount the new drive as a local file system. Refer to the *Personal System Administration Guide* that came with your desktop system for instructions on how to do this.

## **Shutting Down and Powering Off Your CHALLENGEvault M**

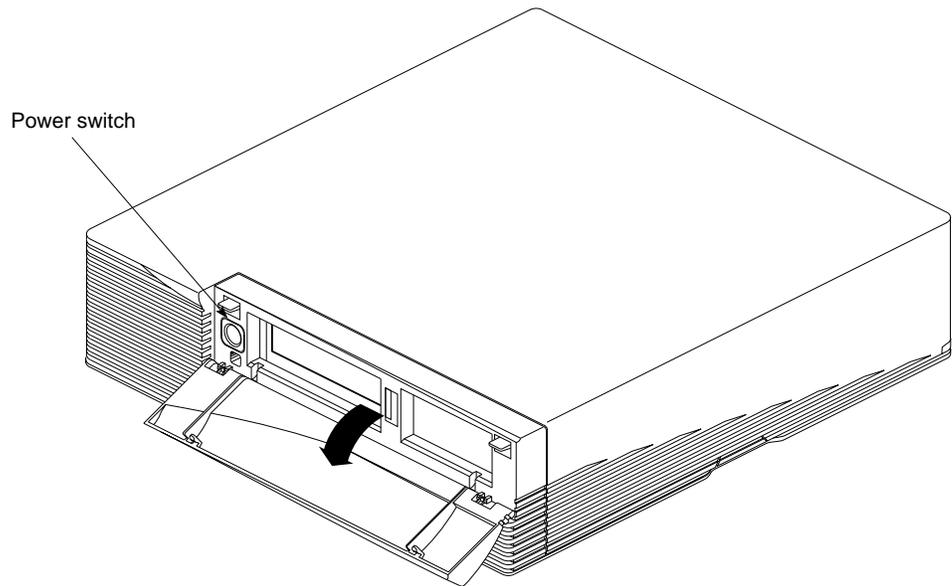
The host system must always be shut down before powering off the vault M.

**Caution:** Do not shut the vault M down until you are certain that nobody is logged in and using files on the host system, or unless there is an emergency and you must turn off the system immediately.

Use only the power switch located at the front of the vault M to shut down the system. Follow the procedures outlined in the *IRIX Advanced Site and Server Administration Guide* for bringing drives down properly.

To use the power switch to shut off your vault M mass storage system, follow these steps:

1. Open the front cover of the chassis, as shown in Figure 2-20.
  - Face the front of the vault M chassis.
  - Snap the cover away from the top edge of the chassis and tip it down, as shown in Figure 2-20.



**Figure 2-20** Opening the Front Cover

2. Press and release the power switch; the power will turn off and the vault M's front LED will go dark.

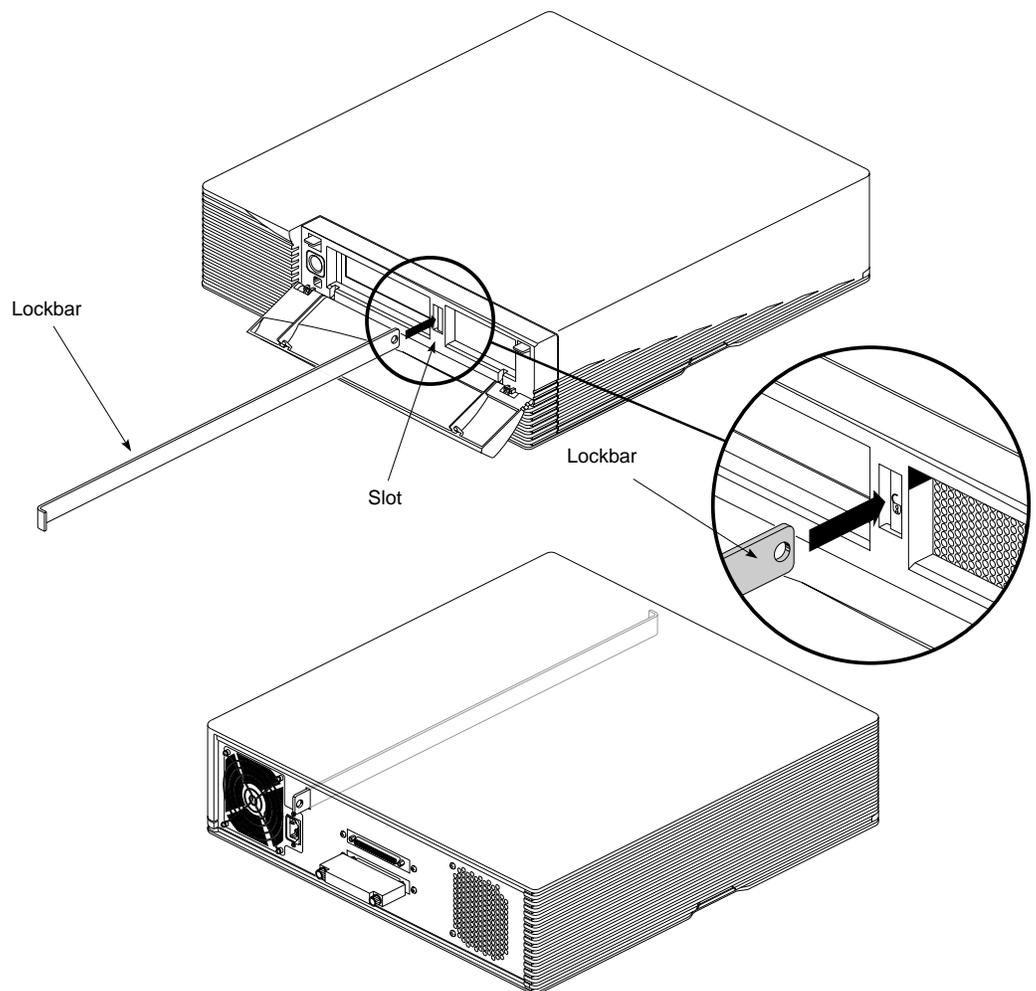
## Locking Your CHALLENGEvault M

The vault M is shipped with a metal bar that you can use to secure the removable bezel and system cover, and lock the system in place. You must obtain a padlock to use the lockbar.

With the lockbar in place, the disk drives cannot be removed without tampering with the lock, or without destroying the lockbar or the vault M chassis. You can also attach a cable or other device to the lockbar to secure the chassis to the premises.

To lock your vault M, follow these steps:

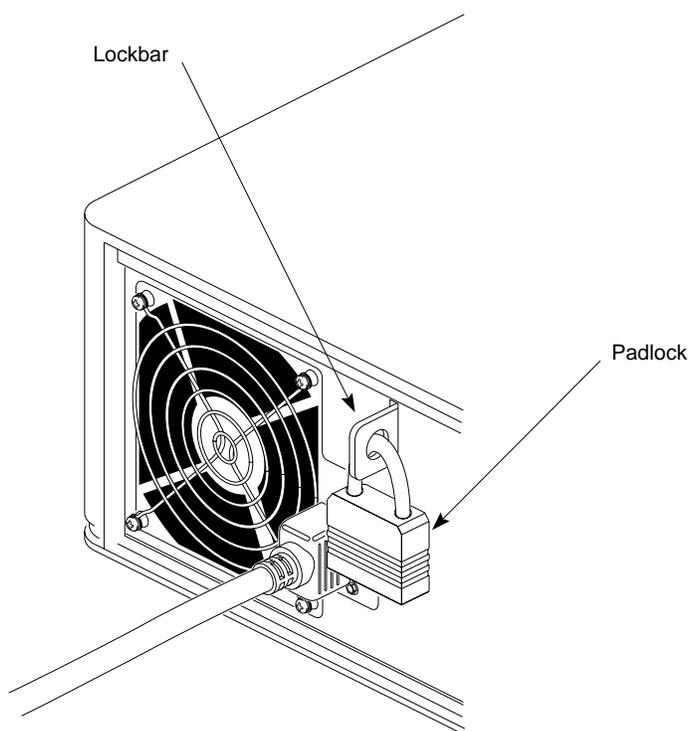
1. Open the front cover by snapping it away from the chassis at the top; then tip it down.
2. Place the straight end of the lockbar into the opening in between the disk drive slots in the front of the chassis, and push the lockbar all the way through the system, as shown in Figure 2-21.



**Figure 2-21** Installing the Lockbar

**Note:** Be sure the curved flange on the front end of the lockbar fits all the way into the recess in the plastic front bezel. ♦

3. Attach a lock through the hole in the lockbar in the back of the system to lock the system, as shown in Figure 2-22.



**Figure 2-22** Locking the CHALLENGEvault M

4. To prevent the machine from being moved, you can also attach an anchored cable or chain to the lock.
5. Close the front cover.

## Installing a Removable Media SCSI Device

This chapter tells you how to install the half-height removable media SCSI drive in the vault M. The drive may be a 4-mm DAT drive, a CD-ROM drive, or another Silicon Graphics-approved removable media SCSI device. This drive would always be a single-ended device used with a CHALLENGE M or Indigo<sup>2</sup>.

If your host system is a desktide CHALLENGE L/Onyx product, the interface is differential and the vault M will *not* use a removable media SCSI device.

When you are ready to shut down and power off the system, follow the steps at the end of Chapter 2 under the section "Shutting Down and Powering Off Your CHALLENGEvault M." If the power is already off, continue to the next section in this chapter.

### Drive Installation

Your drive should come with an antistatic grounding strap for use when configuring and installing an electronic device. Be sure to attach the grounding strap to your wrist and a grounded metal surface of the chassis before installation.

Remove the back of the drive tray to access the jumpers if necessary (see Figure 3-1).

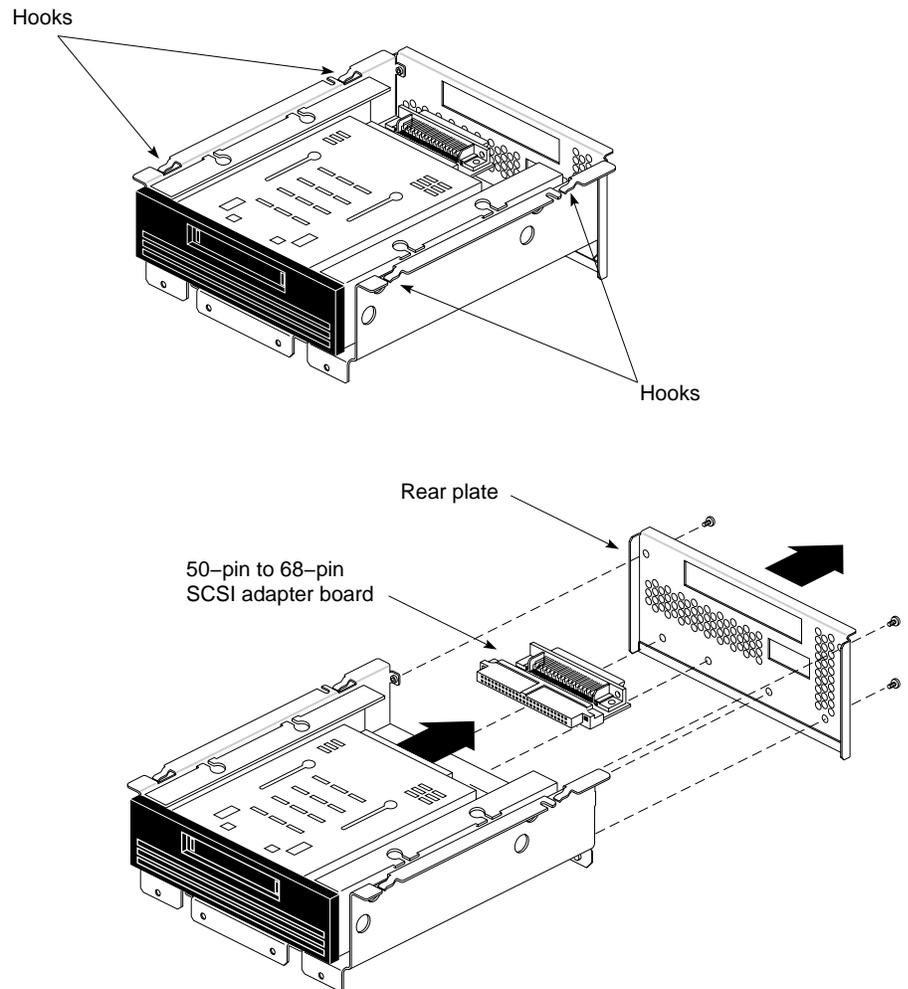
## Drive Configuration

Before installing the removable media drive, you should verify that it is properly configured for placement in the vault M. There are some configuration areas that should be verified:

- The SCSI mode selector should be set for SCSI-2 (DAT drive).
- The parity select jumper should be installed.
- The SCSI ID should be set to 7 to maintain consistency with the drive position in the chassis.

If it is not already in place, plug the 50-to-68 pin adapter board into the 50-pin connector on the rear of the drive. Remove the rear plate if necessary; see Figure 3-1 for an example.

See Figure 3-2 to properly configure the DAT drive and Figure 3-3 to properly configure the CD-ROM drive.



**Figure 3-1** Rear Plate Detached from Removable Media Bracket

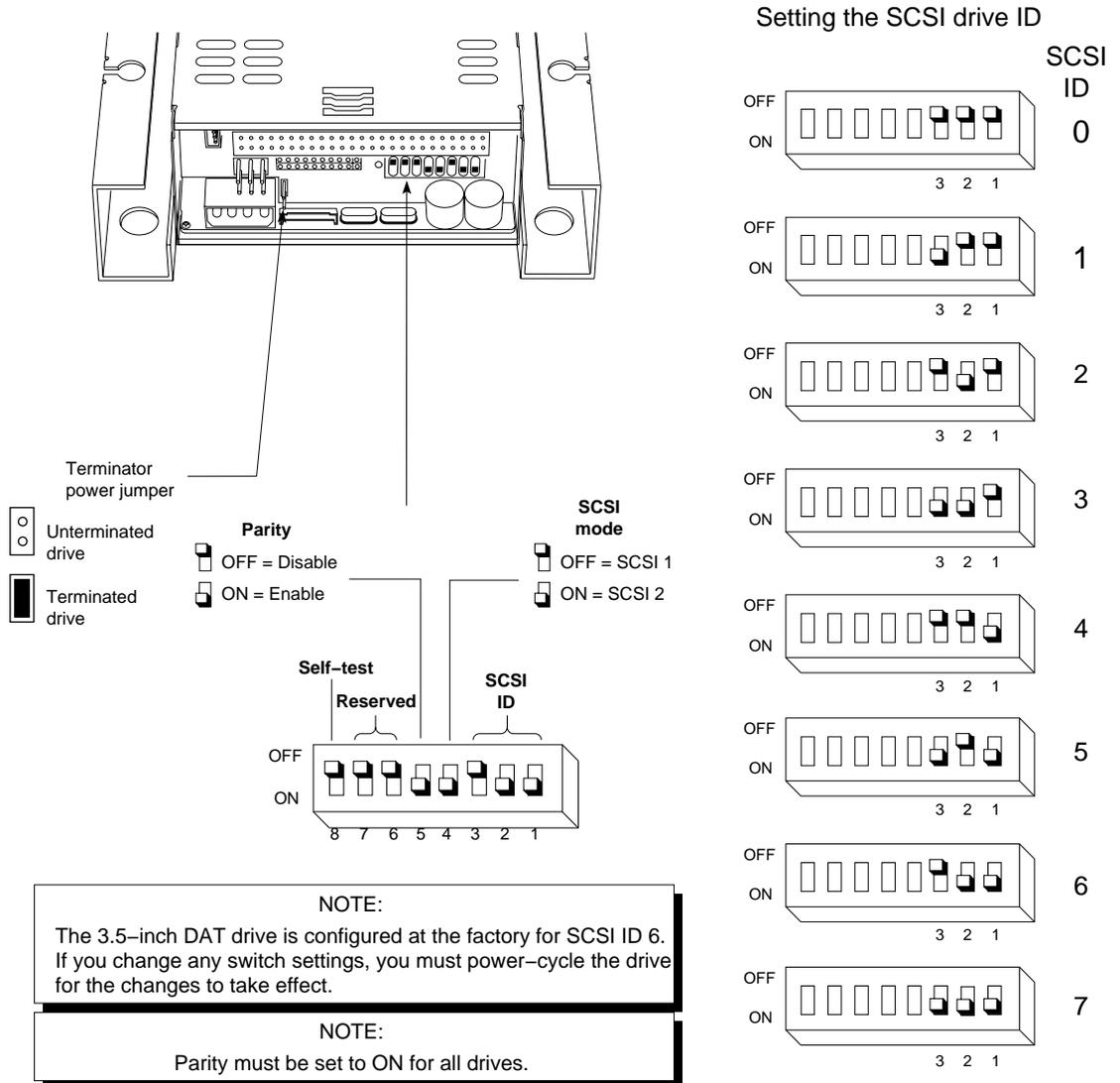


Figure 3-2 Configuring the DAT Drive

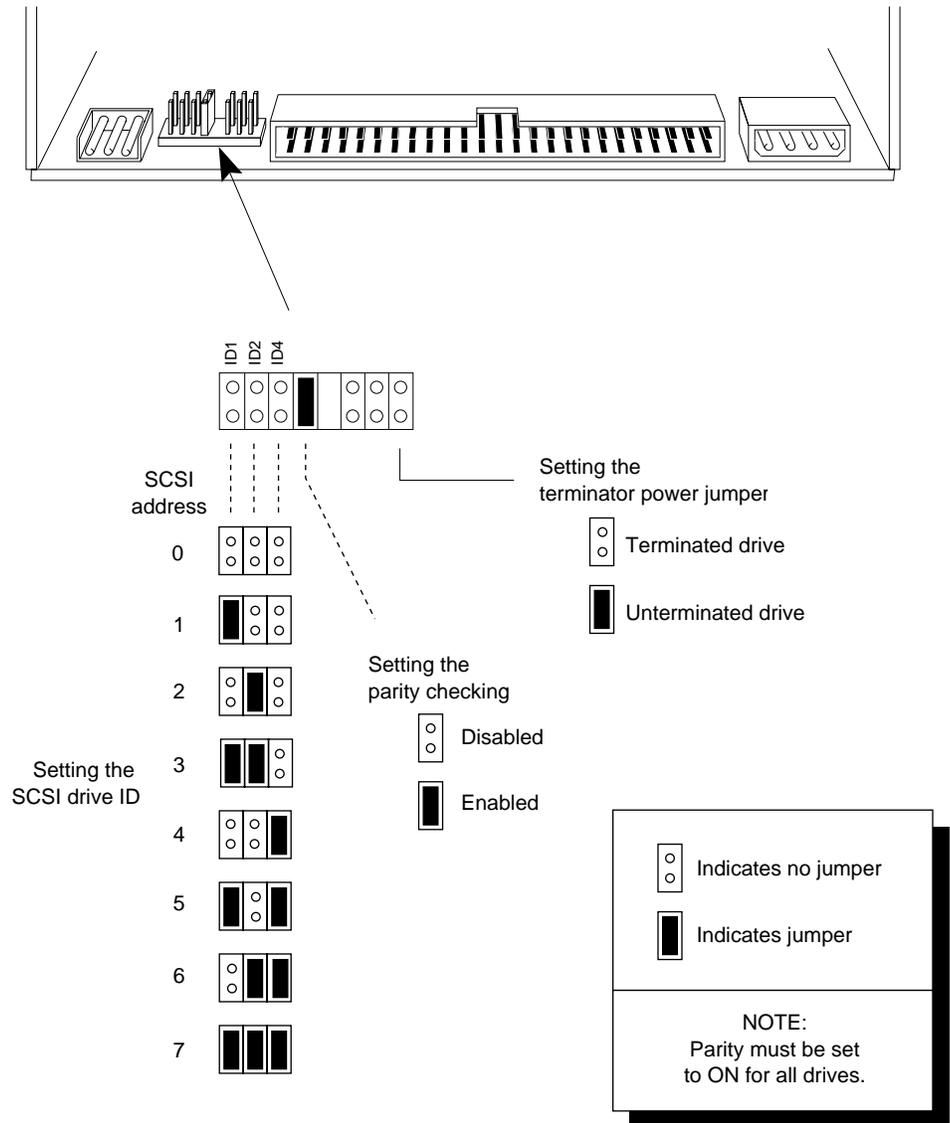


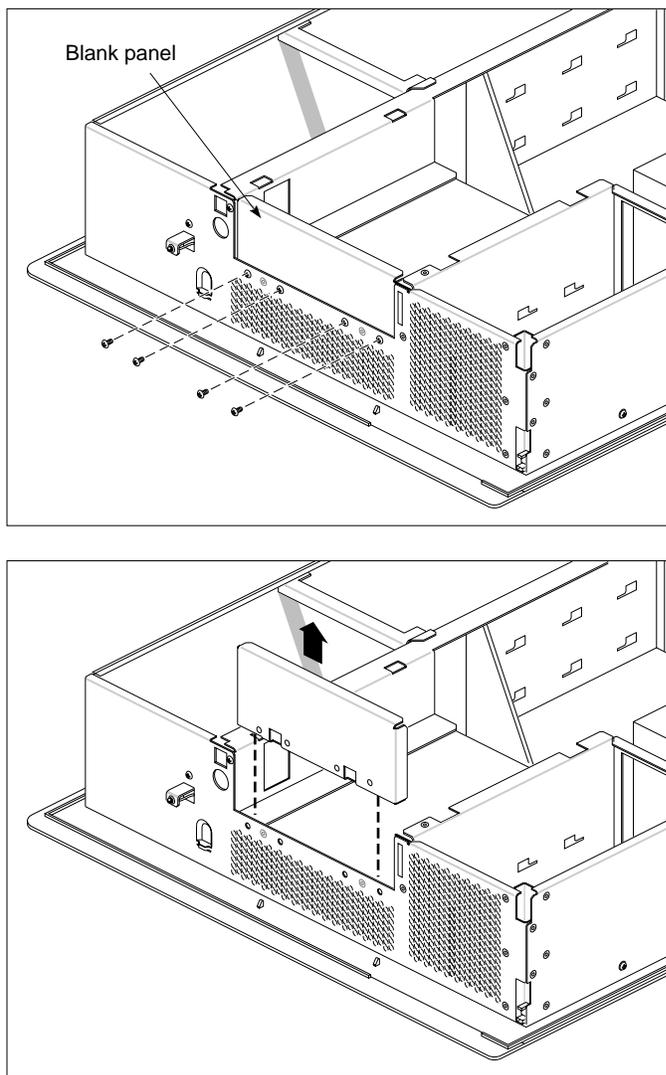
Figure 3-3 Configuring the CD-ROM Drive

## Installing the DAT or CD-ROM Drive

After you have properly configured your removable media SCSI device, you are ready to install it in position 7 within the vault M. Position 7 was specially designed for installation of half-height removable media SCSI devices.

Use the following steps to install a removable media drive in the vault M:

1. Remove the front and top covers as detailed in the section "Removing the Covers" in Chapter 2.
2. Use a #2 Phillips-head screwdriver to remove the four screws that hold the blank sheet metal panel at the front of position 7. See Figure 3-4.
3. Lower the drive assembly into the bay and slide it forward to engage the hooks in the four chassis slots.
4. Secure the front of the drive bracket using the four screws you extracted in step 2; see Figure 3-5.
5. Secure the top of the drive bracket using two screws.
6. Connect the 68-pin SCSI cable to the connector on the adapter at the rear of the assembly.
7. Plug the drive's power cable into the four-pin connector on the back of the drive.
8. Route the power cable to an available plug on the vault M power board (adjacent to the power supply).
9. Replace the plastic top cover, front bezel, and front cover (use the information in the next section).
10. Power on the host system and configure the new drive.



**Figure 3-4** Removing the Blank Panel

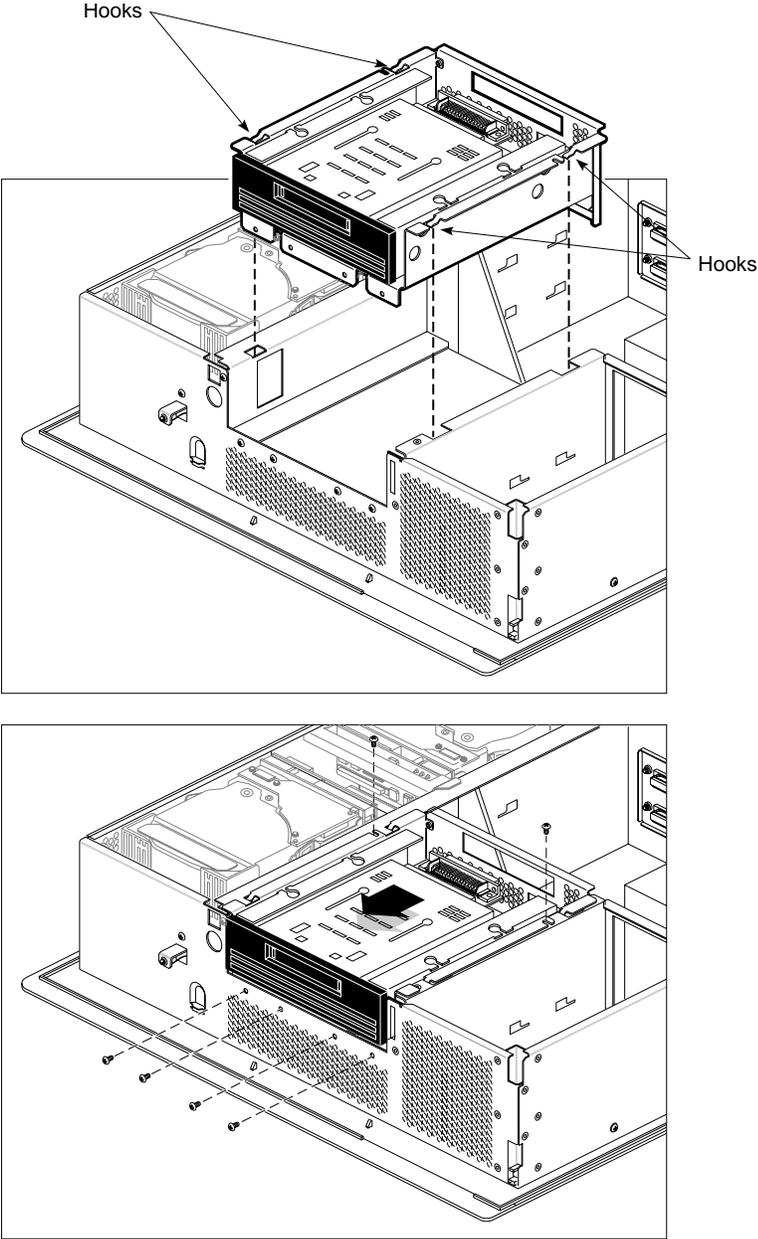
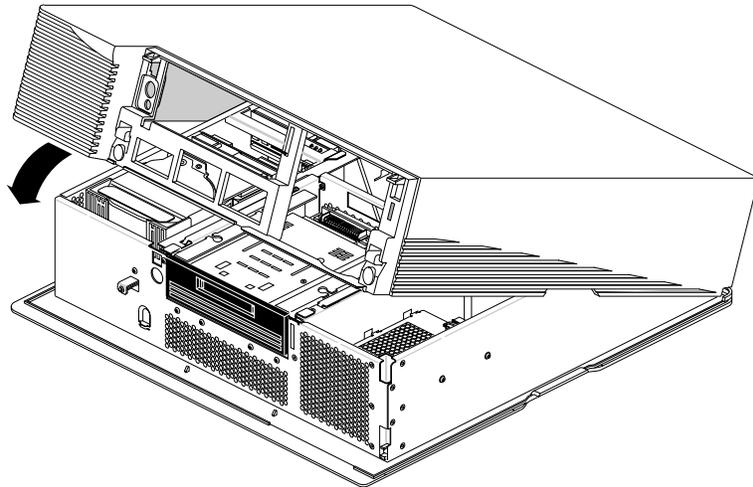


Figure 3-5 Installing the Removable Media Drive

## Replacing the Covers

To replace the plastic covers:

1. Place the hooks at the back of the top cover into the slots in the back of the chassis, as shown in Figure 3-6.
2. Lower the top cover down onto the chassis until it snaps into place.
3. Replace the front bezel and front cover.



**Figure 3-6** Replacing the Top Cover on the CHALLENGEvault M Chassis



## Troubleshooting and Maintenance Tips

This chapter tells you how to identify and troubleshoot simple problems with the vault M after it has been installed.

Sections on basic maintenance of removable media drives are included in the second half of this chapter.

### Solving Basic Problems on the CHALLENGEvault M

This section will list some common malfunctions that might occur with the vault M and list some simple things you can do to resolve them. When a problem is beyond the general scope of an end user/administrator, referral to a trained service person is advisable.

**Note:** Malfunctions caused by use of nonconforming third-party SCSI devices are not addressed in this chapter. See the section “Using Third-party SCSI Drives” at the end of Chapter 1. ♦

There are a number of basic problems you might encounter that could cause the vault M to be partly or completely nonfunctional:

- The hardware may not be connected properly.
- The operating system may not be configured to recognize the vault M.
- SCSI cabling or termination may be incorrect.
- SCSI device IDs may be improperly configured.
- The SCSI cable could be pinched or damaged.
- The power supply may be malfunctioning or dead.

**Caution:** The power supply should be repaired only by qualified service personnel.

The most basic way to tell if the host system sees all the drives you installed in your vault M is to use the *hinv* (hardware inventory) command.

The *hinv* command lists all the information that is contained in the host system's hardware inventory table. The hardware inventory table is generated and updated each time the host system is rebooted. If the host system has not been fully rebooted after installation of the new vault M and/or new drives, the inventory table will not have information regarding the new drives.

### Using *hinv* on CHALLENGE or Onyx Deskside Systems

An example list from an *hinv* inquiry to a deskside system may include more information than is listed for the CHALLENGE M/Indigo<sup>2</sup> desktop products because the deskside units have more optional hardware features.

In the following example, SCSI controller 0 and 1 are used to control the seven drives that reside internally. SCSI controller 2 is the first port on an optional SCSI mezzanine card that is used to communicate with the vault M disks. The example shows that integral SCSI controller 2 is communicating with a total of five disks in the vault M.

**Tip:** If you had installed a total of six disks in the vault M, this list is showing that the host system does not see the sixth disk attached to SCSI controller 2. Refer to Table 4-1 for a list of possible solutions.

```
% hinv <Enter>
4 100 MHZ IP19 Processors
CPU: MIPS R4400 Processor Chip Revision: 4.0
FPU: MIPS R4010 Floating Point Chip Revision: 0.0
Data cache size: 16 Kbytes
Instruction cache size: 16 Kbytes
Secondary unified instruction/data cache size: 1 Mbyte
Main memory size: 256 Mbytes, 2-way interleaved
I/O board, Ebus slot 3: IO4 revision 1
Integral IO4 serial ports: 4
```

```
Integral Ethernet controller: et0, Ebus slot 3
Integral SCSI controller 2: Version WD33C95A
Disk drive: unit 5 on SCSI controller 2
Disk drive: unit 4 on SCSI controller 2
Disk drive: unit 3 on SCSI controller 2
Disk drive: unit 2 on SCSI controller 2
Disk drive: unit 1 on SCSI controller 2
Integral SCSI controller 1: Version WD33C95A
Disk drive: unit 1 on SCSI controller 1
Integral SCSI controller 0: Version WD33C95A
Disk drive: unit 6 on SCSI controller 0
Disk drive: unit 5 on SCSI controller 0
Disk drive: unit 4 on SCSI controller 0
Disk drive: unit 3 on SCSI controller 0
Disk drive: unit 2 on SCSI controller 0
Disk drive: unit 1 on SCSI controller 0
VME bus: adapter 0 mapped to adapter 13
VME bus: adapter 13
Integral IO4 parallel port: Ebus slot 3
```

## Using *hinv* on CHALLENGE M or Indigo<sup>2</sup> Systems

Once you have connected the vault M to your CHALLENGE M/Indigo<sup>2</sup> and rebooted your desktop system, you can use the *hinv* command to confirm that it recognizes the drives you installed in the vault M.

The drives that the system sees in the vault M are listed above the integral SCSI controller 1.

```
% hinv <Enter>
1 100 MHZ IP22 Processor
CPU: MIPS R4000 Processor Chip Revision: 3.0
FPU: MIPS R4010 VLSI Floating Point Chip Revision: 0.0
On-board serial ports: 2
Data cache size: 8 Kbytes
Instruction cache size: 8 Kbytes
Secondary unified instruction/data cache size: 1 Mb
Main memory size: 32 Mbytes
Integral Ethernet: ec0, version 1
CDROM: unit 7 on SCSI controller 1
Disk drive: unit 5 on SCSI controller 1
Disk drive: unit 4 on SCSI controller 1
Disk drive: unit 3 on SCSI controller 1
Disk drive: unit 2 on SCSI controller 1
Disk drive: unit 1 on SCSI controller 1
Integral SCSI controller 1 : Version WD33C93B, revision D
Tape drive: unit 6 on SCSI controller 0: DAT
Disk drive: unit 2 on SCSI controller 0
Disk drive: unit 1 on SCSI controller 0
Integral SCSI controller 0 : Version WD33C93B, revision D
IRIS Audio Processor: version A2 revision 0.1.0
Graphics Board: GU1-Extreme
```

## Symptoms and Possible Solutions

Table 4-1 provides a list of potential problems and possible solutions. If none of the offered solutions helps, you may wish to consult your system administrator or service provider.

**Table 4-1** CHALLENGEvault M Problem Symptoms and Possible Solutions

Symptom	Possible Solutions for the Problem				
The host does not see any vault M disks.	Are all the SCSI cable connections secure?	Are the internal or external SCSI cables pinched or damaged?	Is the vault M power switched on?	Is the vault M plugged into a power source?	Is the power supply fan operating?
The host does not see a particular disk in the vault M.	Is the disk's power cable plugged in?	Is the disk's SCSI connector plugged in?	Are there any bent pins on the SCSI connector?	Is the disk drive SCSI ID set properly?	Is the motor-start jumper correctly installed?
The host is registering numerous SCSI errors.	Are the SCSI cables firmly connected? Are there any bent SCSI pins?	Is the proper vault M SCSI terminator in place?	Is the length of the SCSI bus within acceptable limits?	Are there any duplicate SCSI IDs on the drives?	Are there any SE devices connected to the rear of the vault M?
External SCSI device/cable diagnostic fails at power on.	Was the vault M powered on 2 minutes before the host system?	Are the SCSI cables firmly connected? Are there any bent SCSI pins?			
Error message—"...resetting SCSI bus" after power interruption or power on.	Was the vault M powered on 2 minutes before the host system?	Was there an unplanned power interruption to a vault M?			

## Maintenance of Removable Media

This section is intended to familiarize you with the capabilities and limitations of your vault M removable media devices. To maintain your removable media in top operating condition, follow the recommended cleaning procedures.

### The Archive Python 4320 NT (4-mm DAT Drive)

The manufacturer recommends cleaning the 4-mm DAT drive after every 25 hours of use.

When a drive head is dirty and needs cleaning, the unit may exhibit either read or write errors.

To clean a drive, use only an approved cleaning kit. You can use a cleaning kit a limited number of times before you must replace it. You can use the 4-mm drive kit approximately 60 times. Do not use cleaning kits that are intended for use in audio DAT units, since these cassettes are not recognized by the drives covered in this guide.

The Archive Python 4320 NT provides 1.3GB of storage on a 60-meter DDS DAT cassette and 2.0GB of storage on a 90-meter DDS DAT cassette. The 4320 NT drive complies with the American National Standards Institute (ANSI) Digital Data Storage (DDS) format and uses a small DAT with 4-mm tape. The data transfer rate is 183KB per second. Note that these capacity and transfer rate figures are approximate.

### Loading and Unloading Cassettes

To load a cassette, insert it into the drive and push gently on the middle of the cassette until the tape is fully recessed in the drive unit. Insert the cassette so that the arrow on the top of the cassette enters the drive first.

When you load a tape into the drive, the unit checks to see if the tape is initialized. This checking process takes between 10 and 20 seconds. If the tape has never been initialized, the drive will initialize it when you first start

to write data to the tape. Initializing the tape takes an extra 30 seconds beyond what is required to write the data.

**Note:** Do not remove the tape from the drive while it is being initialized. ♦

To remove a cassette, press the unload button on the face of the drive. The unit automatically rewinds the tape and ejects it partway. Grasp the cassette and remove it from the drive. Note that the unload button is disabled when the drive is writing or reading a tape.

To clean a 4-mm DAT drive:

1. Insert the cleaning kit into the drive. The drive automatically detects that the cassette is a cleaning cassette, then loads and runs the cassette. After about 10 to 15 seconds, the cleaning is complete and the drive ejects the cassette.
2. Remove the cleaning cassette from the drive and make a note, either in a log book or on the cassette itself, that you used the cleaning kit.

**Note:** Every time you use the cleaning cassette, the drive uses a new, unused portion of the tape. Eventually, the entire tape is used and you must obtain a new cleaning cassette. It is, therefore, a good idea to keep track of the number of times you use each cleaning cassette. ♦

### Front Panel Lights

The 4-mm drive has two LEDs, one green and one amber, that indicate the status of the unit (see Table 4-2).

**Table 4-2** 4-mm DAT Front Panel LED Status Indicators

LED	Action	Meaning
Amber	On (lit)	The drive is reading or writing the tape (normal operation).
Amber	Flashing rapidly	A hardware fault occurred, or condensation was detected in the unit (error).
Green	On (lit)	A cassette is loaded in the drive, and it does not generate excess errors (normal operation).
Green	Flashing slowly	A cassette is inserted, but is generating excess soft errors beyond a predefined error threshold (caution: heads may need cleaning).
Green	Flashing slowly with amber LED	A prerecorded audio cassette is inserted and is being played automatically.
Green	Flashing rapidly	The drive cannot write the tape correctly (error).

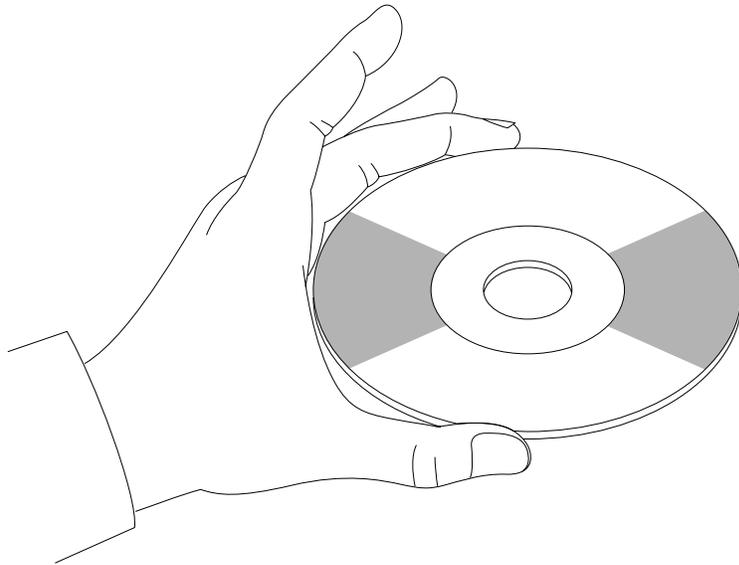
### CD-ROM Use and Maintenance

To remove dust or other particles from a CD, use a blast of clean compressed air. You can also clean the CD in running water and then blot it dry with a soft lintless cloth, (*do not* use a paper towel). Wipe the cloth directly outward from the center of the disc. Do not rub in a circular motion as you would with a standard phonograph record.

**Note:** *Do not* use solvents or other common cleaners, and *do not* use your mouth to blow dust or other particles off the disc. ♦

Individual discs should be handled by the edges only (see Figure 4-1). Touching or scratching the bottom of the disc can mar the finish and degrade the optical readability of the media. Do not write, label, or mark on any surface of the compact disc.

An auto-eject occurs when a very dirty or badly scratched disc (or a disc placed in the operating case (“caddy”) label-side down) is inserted.



**Figure 4-1** Handling a Compact Disc

### **CD-ROM Environmental Considerations**

Bringing a disc from a cold to a warm environment may cause moisture to form on its surface. Wipe any condensed moisture off with a soft lint-free cloth (not a paper towel) before use. Allow approximately one hour for the disc to acclimate to room temperature.

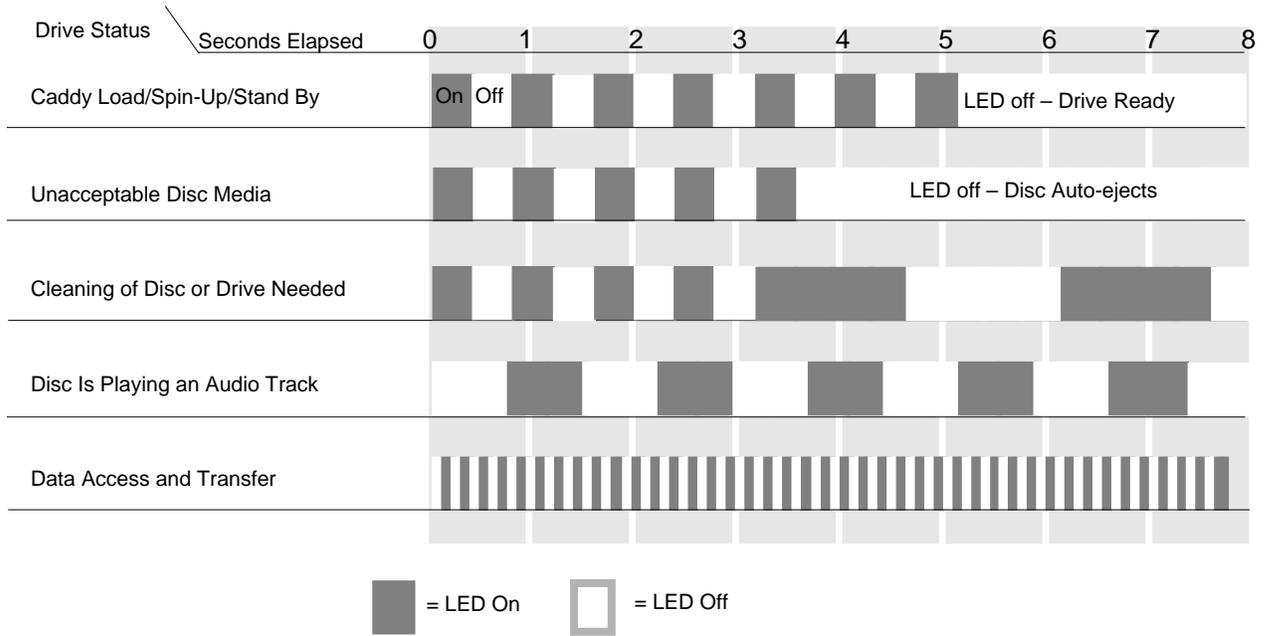
Protect the discs from dust, scratches, and warping by storing them in a caddy or nonfunctional plastic storage container (known as a jewel case). Never leave or store discs in the following areas:

- locations exposed to direct sunlight
- dusty and/or humid environments
- areas directly exposed to heating appliances or heat outlets
- a vehicle parked in the sun

## CD-ROM Front Panel Operational Features

A number of operation controls are located on the front panel of the CD-ROM drive:

- The *headphone jack* receptacle accepts a 3.5-mm diameter stereo plug. Monitoring of audio signals is available.
- Use the *volume control dial* (located to the right of the headphone jack) to adjust the sound level of the headphones.
- An *emergency eject hole* is located just above the volume control. It is used to eject the caddy when the normal procedure does not work. Power off the CD-ROM drive and remove the Phillips-head screw in the hole. Insert the end of a large, straightened paper clip into the hole until the caddy cartridge ejects.
- A *drive-active indicator LED* is located to the left of the eject button. When this LED is blinking, it indicates drive activity. The LED will stay dark when no disc caddy is loaded in the drive. See Figure 4-2 for details on blink patterns and the status they indicate for the drive.
- The *eject button* works *only* when the CD-ROM drive is powered on. The caddy will not eject if the CD-ROM is in an active (busy) state. After you push the eject button, two to three seconds will elapse before release occurs.



**Figure 4-2** CD-ROM Drive LED Status Indicators



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